BEFORE THE

MANITOBA PUBLIC UTILITY BOARD

Manitoba Hydro 2010/11 and 2011/12 General Rate Application	: : : :	Docket No. _____

DIRECT TESTIMONY AND EXHIBITS OF

ROGER D. COLTON

ON BEHALF OF
RESOURCE CONSERVATION MANITOBA (RCM)
and
TIME TO RESPECT EARTH'S ECOSYSTEMS (TREE)

November 12, 2010

Q. PLEASE STATE YOUR NAME AND ADDRESS FOR THE RECORD.

A. My name is Roger Colton. My business address is Fisher, Sheehan & Colton, Public Finance and General Economics, 34 Warwick Road, Belmont, MA 02478.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am a principal in the firm of Fisher Sheehan & Colton, Public Finance and General Economics of Belmont, Massachusetts. In that capacity, I provide technical assistance to a variety of federal and state agencies, consumer organizations and public utilities on rate and customer service issues involving telephone, water/sewer, natural gas and electric utilities.

Q. FOR WHOM ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of Resource Conservation Manitoba and Time to Respect Earth's Ecosystems (RCM/TREE) of Winnipeg, Manitoba.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL BACKGROUND.

A. I work primarily on low-income utility issues. This involves regulatory work on rate and customer service issues, as well as research into low-income usage, payment patterns, and affordability programs. At present, I am working on various projects in the states of New Hampshire, Connecticut, New York, New Jersey, Pennsylvania, Illinois, Iowa, Colorado, Texas and Washington. I have worked on low-income utility issues for nearly 30 years.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND.

A. After receiving my undergraduate degree in 1975 (Iowa State University), I obtained further training in both law and economics. I received my law degree in 1981 (University of Florida). I received my Masters Degree (economics) from the McGregor School in 1993.

Q. HAVE YOU EVER PUBLISHED ON PUBLIC UTILITY REGULATORY ISSUES?

A. Yes. I have published more than 80 articles in scholarly and trade journals, primarily on low-income utility and housing issues. I have published an equal number of technical reports for various clients on energy, water, telecommunications and other associated low-income utility issues. A list of my professional publications is presented in Exhibit RDC-1

Q. HAVE YOU EVER TESTIFIED BEFORE THIS OR OTHER UTILITY COMMISSIONS?

A. While I have not previously testified before the Manitoba Public Utilities Board, I have served as an expert witness before regulatory and judicial bodies on numerous occasions regarding energy, water and telecommunications issues affecting low-income customers. I have testified in regulatory proceedings in more than 30 states and various Canadian provinces on a wide range of low-income utility issues. Proceedings in which I have previously appeared as an expert witness are listed in Exhibit RDC-1.

Q. PLEASE DESCRIBE YOUR PREVIOUS WORK IN CANADA.

A. My recent work in Canada involves primarily work in Ontario, Quebec and Nova Scotia. In Ontario, I work with a coalition of groups called the Low-income Energy Network (LIEN),

as well as with a group called the Advocacy Centre for Tenants Ontario (ACTO). In the last several years, I have worked for LIEN/ACTO on the Ontario Energy Board's low-income consultation as well as on the OEB's rewrite of its customer service regulations. I have further worked with LIEN/ACTO on the OEB's Fuel Assistance Working Group (FAWG) and Conservation Working Group (CWG). I have finally worked with ACTO regarding the issue of suite metering, both before the Ministry of Municipal Affairs and Housing and before the OEB. In Quebec, I have worked for Hydro Quebec doing research and preparing materials regarding possible structures through which to provide low-income affordability assistance. In Nova Scotia, I have worked with Dalhousie Legal Aide for a number of years regarding a low-income assistance program for Nova Scotia Power, Inc (NSPI).

Q. DO YOU WORK FOR THE UTILITY INDUSTRY AS WELL AS FOR NONPROFIT ORGANIZATIONS AND GOVERNMENT AGENCIES?

A. Yes. My current workload includes projects for Xcel Energy (doing business as Public Service Company of Colorado). I also routinely do work for Entergy Services Company, a major electric utility serving the Mid-South (Arkansas, Louisiana, Mississippi, Texas). In 2009, I was engaged in major projects for Tacoma Public Utilities (TPU), as well as for a consortium of Indiana utilities (Citizens Gas and Coke Utility, Northern Indiana Public Service Company, Vectren Energy Delivery). This work for the utility industry extends to the national industry associations. This year, I completed (as part of a team) a study of customer assistance programs for the Water Research Foundation (previously known as the American Water Works Association Research Foundation). In 2009, I authored a white paper for the Edison Electric Institute (EEI) on the use of winter shutoff moratoria as a

consumer protection device. I am currently preparing presentations for EEI for its April 2011 "customer service" conference in Kansas City; those presentations will address customer service and low-income issues.

Q. CAN YOU DESCRIBE THE WORK YOU PERFORM FOR NONPROFIT ORGANIZATIONS?

A. It is really impossible, of course, to fully describe 30 years of work on low-income affordability issues in a brief answer. However, I have worked for large nonprofits such as Energy Outreach Colorado, the National Fuel Funds Network (NFFN), and the National Low-Income Energy Consortium (NLIEC) on the structure and funding of low-income programs. I have worked with small nonprofits such as the Coalition to Keep Indiana Warm, the Pennsylvania Utility Project (PULP), the North Carolina Equal Justice Center, and The Way Home (a New Hampshire-based homeless shelter). I have worked for various state associations of Community Action Agencies (CAAs) (Indiana, Kentucky, Iowa, Illinois, Mississippi, Washington, Oregon), those nonprofit organizations primarily involved with the delivery of street-level affordability services, on issues ranging from low-income energy efficiency to prepayment meters to rate affordability assistance.

Q. OUTSIDE SPECIFIC "PROGRAMS," HAVE YOU ENGAGED IN RESEARCH REGARDING LOW-INCOME ENERGY ISSUES?

A. Yes. Not all of my work involves specific programs or program proposals. I have been hired by both state legislatures (e.g., the Colorado legislature regarding electric restructuring) and by regulatory commissions to provide assistance in the design and

implementation of low-income programs. In addition, I was hired by the U.S. Department of Health and Human Services to develop the Home Energy Insecurity Scale, a mechanism which is now frequently used to measure the outcomes of low-income programs. My work on "energy poverty" in Missouri and Georgia was some of the initial work to apply the Home Energy Insecurity Scale.

I authored a study of the health impacts of unaffordable home energy for the Iowa Department of Human Rights based on data from the Iowa Department of Public Health's Behavioral Risk Factor Surveillance System (BRFSS) survey. I undertook a study of the public safety impacts of unaffordable home energy for the National Fuel Funds Network. I undertook a study of the educational impacts of unaffordable home energy for the Missouri association of Head Start providers. I undertook studies of the impact that unaffordable home energy has on the affordability of housing in Pennsylvania and in Colorado. I undertook studies of the economic development impacts of promoting affordable home energy for Energy Outreach Colorado and for Entergy Services Company (throughout its multi-state service territory).

Q. ARE YOU EVER INVITED TO MAKE PRESENTATIONS ON HOME ENERGY AFFORDABILITY ISSUES?

A. Yes. Indeed, recently I was invited to speak to the Canadian Electric Association in Ottawa regarding low-income energy efficiency issues. I routinely appear before regulatory (NASUCA, NARUC, National Regulatory Conference), nonprofit (National Community Action Foundation, state Community Action Associations), government (U.S. Department

of Housing and Urban Development), and industry (E-SOURCE Forum, Indiana Electric Association, Florida Association of Municipal Utilities) conferences and seminars to make presentations. Copies of roughly 70 of my various presentations on home energy affordability issues have been posted on the "publications" page of my firm's web site (www.fsconline.com).

Q. WHAT IS YOUR PURPOSE IN PROVIDING THIS EXTENDED DISCUSSION OF YOUR EXPERIENCE AND EXPERTISE?

A. My purpose is to emphasize three things.

- First, when I speak about low-income home energy affordability issues, I know what I'm talking about. I am a generally-recognized authority on low-income energy affordability.

- Second, when I speak about low-income home energy affordability issues, my analysis and conclusions are not based on some ideology or philosophy that is divorced from reality. I have designed programs; I have helped implement programs on the ground; I have helped evaluate programs. My client base covers the spectrum of stakeholders, from nonprofit "consumer advocacy" organizations, to state and federal government agencies, to both energy and water utilities. My clients are interested in assuring that programs work in the real world. My clients are not interested in ideology; they are instead interested in delivering workable programs that generate desired outcomes at a reasonable cost.

- Third, when I speak about low-income energy affordability, my opinions and conclusions are based on real-world knowledge. My 30 years of experience in this arena help me to distinguish between what is theoretical and what is practical. I do not make recommendations based on theory that cannot be implemented in the real world.

Q. PLEASE EXPLAIN THE PURPOSE OF YOUR TESTIMONY.

A. I have been asked by Resource Conservation Manitoba (RCM) and Time To Respect Earth's Ecosystem (TREE) to consider and comment on the following issues for Manitoba Hydro:

- Is there a need for low-income affordability assistance on the Manitoba Hydro system;
- If so, has Manitoba Hydro offered an adequate or appropriate programmatic response to that need;
- If Manitoba Hydro's programmatic response is *not* adequate or appropriate, how might an appropriate response be structured and funded; and
- To what extent does the low-income programmatic response you recommend fit within traditional regulatory principles.

Q. WHAT DO YOU CONCLUDE?

A. Based on the information and analysis that I have included with this testimony, along with my experience and expertise as I have described above, I reach the following conclusions:

- There is a substantial unmet need for low-income home energy affordability assistance in Manitoba. Rate affordability assistance would address both a social and a utility problem on the Manitoba Hydro system. The Manitoba Hydro conclusion that low-income home energy burdens do not reach "crisis" levels is unsupportable.
- The Affordable Energy Program (AEP) advanced by Manitoba Hydro is an inadequate and inappropriate programmatic response to the unmet need for home energy affordability assistance on the Manitoba Hydro system. The proposed AEP fails to address the home energy affordability needs; cannot be expected to generate positive outcomes regarding either the utility or the social problems arising because

of the unmet affordability needs; and has structural, operational and financial problems.

- A reasonable low-income affordability program for Manitoba Hydro consists of the following components: (1) a rate affordability component; (2) an arrearage management component; and (3) a crisis intervention component. In addition, the Company should complement its affordability program by adopting specified low-income energy efficiency goals. This program can be delivered at a reasonable cost.
- The affordability program I recommend in this proceeding can be justified on traditional regulatory principles. No special legislative authority is necessary for the Manitoba Public Utilities Board to approve any given component of the low-income program I recommend.

Q. DO YOU AGREE WITH MANITOBA HYDRO'S ASSERTION THAT DELIVERING A LOW-INCOME PROGRAM IS ADMINISTRATIVELY COMPLEX?

A. No. The rate affordability program I propose for Manitoba Hydro involves an income-based fixed credit rate. Such an affordable rate can be delivered through the promulgation of specific tariff sheets. Moreover, affordable rate programs have now existed for nearly 25 years. Fixed credit programs do not present unreasonable administrative challenges.

Q. ARE YOU SPONSORING ANY EXHIBITS THROUGH YOUR TESTIMONY?

A. Yes. In addition to my curriculum vitae, which is attached as Exhibit RDC-1, I am sponsoring the following Exhibits:

- Exhibit RDC-2, a report I authored for RCM/TREE titled: Home Energy Affordability in Manitoba: A Low-Income Affordability Program for Manitoba Hydro.
- Exhibit RDC-3, a report I authored for Hydro-Quebec titled: Best Practices: Low-Income Affordability Programs: Articulating and Applying Rating Criteria (2007). This Exhibit responds to Manitoba Hydro's concerns regarding the administrative feasibility of a low-income program.
- Exhibit RDC-4, a report which I routinely use in my work on Pennsylvania rate affordability programs. This report was prepared by the Pennsylvania State University and is titled: Long-Term Study of Pennsylvania's Low-Income Usage Reduction Program: Results of Analyses and Discussion (2008).

Note as well that all of the Manitoba Hydro responses to RCM/TREE data requests that I have cited and/or quoted in My Manitoba Hydro report attached as Exhibit RDC 2 are to be found in first round responses numbered between RCM/TREE/MH I-40 and RCM/TREE/MH I-171.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

ROGER D. COLTON

BUSINESS ADDRESS: Fisher Sheehan & Colton
Public Finance and General Economics
34 Warwick Road, Belmont, MA 02478
617-484-0597 (voice) *** 617-484-0594 (fax)
roger@fsconline.com (e-mail)
http://www.fsconline.com (www address)

EDUCATION:

J.D. (Order of the Coif), University of Florida (1981)

M.A. (Economics), McGregor School, Antioch University (1993)

B.A. Iowa State University (1975) (journalism, political science, speech)

PROFESSIONAL EXPERIENCE:

Fisher, Sheehan and Colton, Public Finance and General Economics: 1985 - present.

As a co-founder of this economics consulting partnership, Colton provides services in a variety of areas, including: regulatory economics, poverty law and economics, public benefits, fair housing, community development, energy efficiency, utility law and economics (energy, telecommunications, water/sewer), government budgeting, and planning and zoning.

Colton has testified in state and federal courts in the United States and Canada, as well as before regulatory and legislative bodies in more than three dozen states. He is particularly noted for creative program design and implementation within tight budget constraints.

National Consumer Law Center (NCLC): 1986 - 1994

As a staff attorney with NCLC, Colton worked on low-income energy and utility issues. He pioneered cost-justifications for low-income affordable energy rates, as well as developing models to quantify the non-energy benefits (*e.g.*, reduced credit and collection costs, reduced working capital) of low-income energy efficiency. He designed and implemented low-income affordable rate and fuel assistance programs across the country. Colton was charged with developing new practical and theoretical underpinnings for solutions to low-income energy problems.

Community Action Research Group (CARG): 1981 - 1985

As staff attorney for this non-profit research and consulting organization, Colton worked primarily on energy and utility issues. He provided legal representation to low-income persons on public utility issues; provided legal and technical assistance to consumer and labor organizations; and provided legal and technical assistance to a variety of state and local governments nationwide on natural gas, electric, and telecommunications issues. He routinely appeared as an expert witness before regulatory agencies and legislative committees regarding energy and telecommunications issues.

PROFESSIONAL AFFILIATIONS:

Coordinator:	BelmontBudget.org (Belmont's Community Budget Forum)
Coordinator:	Belmont Affordable Shelter Fund (BASF)
Member:	Board of Directors, Belmont Housing Trust, Inc.
Chair:	Housing Work Group, Belmont (MA) Comprehensive Planning Process
Past Chair:	Waverley Square Fire Station Re-use Study Committee (Belmont MA)
Past Member:	Belmont (MA) Energy and Facilities Work Group
Past Member:	Belmont (MA) Uplands Advisory Committee
Past Member:	Advisory Board: Fair Housing Center of Greater Boston.
Past Member:	Fair Housing Committee, Town of Belmont (MA)
Past Member:	Aggregation Advisory Committee, New York State Energy Research and Development Authority.
Past Member:	Board of Directors, Vermont Energy Investment Corporation.
Past Member:	Board of Directors, National Fuel Funds Network
Past Member:	National Advisory Committee, U.S. Department of Health and Human Services, Administration for Children and Families, Performance Goals for Low-Income Home Energy Assistance.
Past Member:	Editorial Advisory Board, International Library, *Public Utility Law Anthology*.
Past Member:	ASHRAE Guidelines Committee, GPC-8, *Energy Cost Allocation of Comfort HVAC Systems for Multiple Occupancy Buildings*
Past Member:	National Advisory Committee, U.S. Department of Housing and Urban Development, Calculation of Utility Allowances for Public Housing.
Past Member:	National Advisory Board: Energy Financing Alternatives for Subsidized Housing, New York State Energy Research and Development Authority.

PROFESSIONAL ASSOCIATIONS:

National Association of Housing and Redevelopment Officials (NAHRO)
Association for Enterprise Opportunity (AEO)
Iowa State Bar Association
Energy Bar Association
Association for Institutional Thought (AFIT)
Association for Evolutionary Economics (AEE)

Society for the Study of Social Problems (SSSO)
International Society for Policy Studies
Association for Social Economics

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COLTON EXPERIENCE AS EXPERT WITNESS

1988 - PRESENT

CASE NAME	ROLE	CLIENT NAME	TOPIC	JURIS.	DATE
I/M/O Avista Natural Gas Corporation	Witness	The Opportunity Council	Low-income assistance/rate design	Washington	10
I/M/O Manitoba Hydro	Witness	Resource Conservation Manitoba (RCM)	Low-income program design	Manitoba	10
I/M/O TW Phillips	Witness	Office of Consumer Advocate	Low-income program cost recovery	Pennsylvania	10
I/M/O PECO Energy—Gas Division	Witness	Office of Consumer Advocate	Low-income program cost recovery	Pennsylvania	10
I/M/O PECO Energy—Electric Division	Witness	Office of Consumer Advocate	Low-income program cost recovery	Pennsylvania	10
I/M/O PPL Energy	Witness	Office of Consumer Advocate	Low-income program cost recovery	Pennsylvania	10
I/M/O Columbia Gas Company	Witness	Office of Consumer Advocate	Low-income program design/cost recovery	Pennsylvania	10
I/M/O Atlantic City Electric Company	Witness	Office of Rate Council	Customer service	New Jersey	10
I/M/O Philadelphia Gas Works	Witness	Office of Consumer Advocate	Low-income program cost recovery	Pennsylvania	10
I/M/O Philadelphia Gas Works	Witness	Office of Consumer Advocates	Low-income program design	Pennsylvania	10
I/M/O Xcel Energy Company	Witness	Xcel Energy Company (PSCo)	Low-income program design	Colorado	09
I/M/O Atmos Energy Company	Witness	Atmos Energy Company	Low-income program funding	Colorado	09
I/M/O New Hampshire CORE Energy Efficiency Programs	Witness	New Hampshire Legal Assistance	Low-income efficiency funding	New Hampshire	09
I/M/O Public Service Company of New Mexico (electric)	Witness	Community Action of New Mexico	Rate Design	New Mexico	09
I/M/O UGI Pennsylvania Natural Gas Company (PNG)	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	09
I/M/O UGI Central Penn Gas Company (CPG)	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	09
I/M/O PECO Electric (provider of last resort)	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	08
I/M/O Equitable Gas Company	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	08
I/M/O Columbia Gas Company	Witness	Office of Ohio Consumers' Counsel	Rate design	Ohio	08
I/M/O Dominion East Ohio Gas Company	Witness	Office of Ohio Consumers' Counsel	Rate design	Ohio	08
I/M/O Vectren Energy Delivery Company	Witness	Office of Ohio Consumers' Counsel	Rate design	Ohio	08
I/M/O Public Service Company of North Carolina	Witness	NC Department of Justice	Rate design	North Carolina	08
I/M/O Piedmont Natural Gas Company	Witness	NC Department of Justice	Rate design	North Carolina	08

CASE NAME	ROLE	CLIENT NAME	TOPIC	JURIS.	DATE
I/M/O National Grid	Witness	New Hampshire Legal Assistance	Low-income rate assistance	New Hampshire	08
I/M/O EmPower Maryland	Witness	Office of Peoples Counsel	Low-income energy efficiency	Maryland	08
I/M/O Duke Energy Carolinas Save-a-Watt Program	Witness	NC Equal Justice Foundation	Low-income energy efficiency	North Carolina	08
I/M/O Zia Natural Gas Company	Witness	Community Action New Mexico	Low-income/low-use rate design	New Mexico	08
I/M/O Universal Service Fund Support for the Affordability of Local Rural Telecomm Service	Witness	Office of Consumer Advocate	Telecomm service affordability	Pennsylvania	08
I/M/O Philadelphia Water Department	Witness	Public Advocate	Credit and Collections	Philadelphia	08
I/M/O Portland General Electric Company	Witness	Community Action--Oregon	General rate case	Oregon	08
I/M/O Philadelphia Electric Company (electric)	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	08
I/M/O Philadelphia Electric Company (gas)	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	08
I/M/O Columbia Gas Company	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	08
I/M/O Public Service Company of New Mexico	Witness	Community Action New Mexico	Fuel adjustment clause	New Mexico	08
I/M/O Petition of Direct Energy for Low-Income Aggregation	Witness	Office of Peoples Counsel	Low-income electricity aggregation	Maryland	07
I/M/O Office of Consumer Advocate et al. v. Verizon and Verizon North	Witness	Office of Consumer Advocate	Lifeline telecommunications rates	Pennsylvania	07
I/M/O Pennsylvania Power Company	Consultant	Office of Consumer Advocate	Low-income program	Pennsylvania	07
I/M/O National Fuel Gas Distribution Corporation	Consultant	Office of Consumer Advocate	Low-income program	Pennsylvania	07
I/M/O Public Service of New Mexico--Electric	Witness	Community Action New Mexico	Low-income programs	New Mexico	07
I/M/O Citizens Gas/NIPSCO/Vectren for Universal Service Program	Witness	Citizens Gas & Coke Utility/Northern Indiana Public Service/Vectren Energy	Low-income program design	Indiana	07
I/M/O PPL Electric	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	07
I/M/O Section 15 Challenge to NSPI Rates	Witness	Energy Affordability Coalition	Discrimination in utility regulation	Nova Scotia	07
I/M/O Philadelphia Gas Works	Witness	Office of Consumer Advocate	Low-income and residential collections	Pennsylvania	07
I/M/O Equitable Gas Company	Witness	Office of Consumer Advocate	Low-income program	Pennsylvania	07
I/M/O Section 11 Proceeding, Energy Restructuring	Witness	Office of Peoples Counsel	Low-income needs and responses	Maryland	06
I/M/O Citizens Gas/NIPSCO/Vectren for Universal Service Program	Witness	Citizens Gas & Coke Utility/Northern Indiana Public Service/Vectren Energy	Low-income program design	Indiana	06

CASE NAME	ROLE	CLIENT NAME	TOPIC	JURIS.	DATE
I/M/O Public Service Co. of North Carolina	Witness	North Carolina Attorney General/Dept. of Justice	Low-income energy usage	North Carolina	06
I/M/O Electric Assistance Program	Witness	New Hampshire Legal Assistance	Electric low-income program design	New Hampshire	06
I/M/O Verizon Petition for Alternative Regulation	Witness	New Hampshire Legal Assistance	Basic local telephone service	New Hampshire	06
I/M/O Pennsylvania Electric Co/Metropolitan Edison Co.	Witness	Office of Consumer Advocate	Universal service cost recovery	Pennsylvania	06
I/M/O Duquesne Light Company	Witness	Office of Consumer Advocates	Universal service cost recovery	Pennsylvania	06
I/M/O Natural Gas DSM Planning	Witness	Low-Income Energy Network	Low-income DSM program.	Ontario	06
I/M/O Union Gas Co.	Witness	Action Centre for Tenants Ontario (ACTO)	Low-income program design	Ontario	06
I/M/O Public Service of New Mexico merchant plant	Witness	Community Action New Mexico	Low-income energy usage	New Mexico	06
I/M/O Customer Assistance Program design and cost recovery	Witness	Office of Consumer Advocate	Low-income program design	Pennsylvania	06
I/M/O NIPSCO Proposal to Extend Winter Warmth Program	Witness	Northern Indiana Public Service Company	Low-income energy program evaluation	Indiana	05
I/M/O Piedmont Natural Gas	Witness	North Carolina Attorney General/Dept. of Justice	Low-income energy usage	North Carolina	05
I/M/O PSEG merger with Exelon Corp.	Witness	Division of Ratepayer Advocate	Low-income issues	New Jersey	05
Re. Philadelphia Water Department	Witness	Public Advocate	Water collection factors	Philadelphia	05
I/M/O statewide natural gas universal service program	Witness	New Hampshire Legal Assistance	Universal service	New Hampshire	05
I/M/O Sub-metering requirements for residential rental properties	Witness	Tenants Advocacy Centre of Ontario	Sub-metering consumer protections	Ontario	05
I/M/O National Fuel Gas Distribution Corp.	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	05
I/M/O Nova Scotia Power, Inc.	Witness	Dalhousie Legal Aid Service	Universal service	Nova Scotia	04
I/M/O Lifeline Telephone Service	Witness	National Ass'n State Consumer Advocates (NASUCA)	Lifeline rate eligibility	FCC	04
Mackay v. Verizon North	Witness	Office of Consumer Advocate	Lifeline rates—vertical services	Pennsylvania	04
I/M/O PECO Energy	Witness	Office of Consumer Advocate	Low-income rates	Pennsylvania	04
I/M/O Philadelphia Gas Works	Witness	Office of Consumer Advocate	Credit and collections	Pennsylvania	04
I/M/O Citizens Gas & Coke/Vectren	Witness	Citizens Action Coalition of Indiana	Universal service	Indiana	04
I/M/O PPL Electric Corporation	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	04

CASE NAME	ROLE	CLIENT NAME	TOPIC	JURIS.	DATE
I/M/O Consumers New Jersey Water Company	Witness	Division of Ratepayer Advocate	Low-income water rate	New Jersey	04
I/M/O Washington Gas Light Company	Witness	Office of Peoples Counsel	Low-income gas rate	Maryland	04
I/M/O Washington Gas Light Company	Witness	Office of Peoples Counsel	Low-income gas rate	Maryland	03
Golden v. City of Columbus	Witness	Helen Golden	ECOA disparate impacts	Ohio	02
Huegel v. City of Easton	Witness	Phyllis Huegel	Credit and collection	Pennsylvania	02
I/M/O Universal Service Fund	Witness	Public Utility Commission staff	Universal service funding	New Hampshire	02
I/M/O Philadelphia Gas Works	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	02
I/M/O Washington Gas Light Company	Witness	Office of Peoples Counsel	Rate design	Maryland	02
I/M/O Consumers Illinois Water Company	Witness	Illinois Citizens Utility Board	Credit and collection	Illinois	02
I/M/O Public Service Electric & Gas Rates	Witness	Division of Ratepayer Advocate	Universal service	New Jersey	01
I/M/O Pennsylvania-American Water Company	Witness	Office of Consumer Advocate	Low-income rates and water conservation	Pennsylvania	01
I/M/O Louisville Gas & Electric Prepayment Meters	Witness	Kentucky Community Action Association	Low-income energy	Kentucky	01
I/M/O NICOR Budget Billing Plan Interest Charge	Witness	Cook County State's Attorney	Rate Design	Illinois	01
I/M/O Rules Re. Payment Plans for High Natural Gas Prices	Witness	Cook County State's Attorney	Budget Billing Plans	Illinois	01
I/M/O Philadelphia Water Department	Witness	Office of Public Advocate	Credit and collections	Philadelphia	01
I/M/O Missouri Gas Energy	Witness	Office of Peoples Counsel	Low-income rate relief	Missouri	01
I/M/O Bell Atlantic--New Jersey Alternative Regulation	Witness	Division of Ratepayer Advocate	Telecommunications universal service	New Jersey	01
I/M/O T.W. Phillips Gas and Oil Co.	Witness	Office of Consumer Advocate	Ratemaking of universal service costs.	Pennsylvania	00
I/M/O Peoples Natural Gas Company	Witness	Office of Consumer Advocate	Ratemaking of universal service costs.	Pennsylvania	00
I/M/O UGI Gas Company	Witness	Office of Consumer Advocate	Ratemaking of universal service costs.	Pennsylvania	00
I/M/O PFG Gas Company	Witness	Office of Consumer Advocate	Ratemaking of universal service costs.	Pennsylvania	00
Armstrong v. Gallia Metropolitan Housing Authority	Witness	Equal Justice Foundation	Public housing utility allowances	Ohio	00
I/M/O Bell Atlantic--New Jersey Alternative Regulation	Witness	Division of Ratepayer Advocate	Telecommunications universal service	New Jersey	00
I/M/O Universal Service Fund for Gas and Electric Utilities	Witness	Division of Ratepayer Advocate	Design and funding of low-income programs	New Jersey	00
I/M/O Consolidated Edison Merger with Northeast Utilities	Witness	Save Our Homes Organization	Merger impacts on low-income	New Hampshire	00

CASE NAME	ROLE	CLIENT NAME	TOPIC	JURIS.	DATE
I/M/O UtiliCorp Merger with St. Joseph Light & Power	Witness	Missouri Dept. of Natural Resources	Merger impacts on low-income	Missouri	00
I/M/O UtiliCorp Merger with Empire District Electric	Witness	Missouri Dept. of Natural Resources	Merger impacts on low-income	Missouri	00
I/M/O PacifiCorp	Witness	The Opportunity Council	Low-income energy affordability	Washington	00
I/M/O Public Service Co. of Colorado	Witness	Colorado Energy Assistance Foundation	Natural gas rate design	Colorado	00
I/M/O Avista Energy Corp.	Witness	Spokane Neighborhood Action Program	Low-income energy affordability	Washington	00
I/M/O TW Phillips Energy Co.	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	00
I/M/O PECO Energy Company	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	00
I/M/O National Fuel Gas Distribution Corp.	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	00
I/M/O PFG Gas Company	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	00
I/M/O UGI Energy Company	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	00
Re. PSCO/NSP Merger	Witness	Colorado Energy Assistance Foundation	Merger impacts on low-income	Colorado	99 - 00
I/M/O Peoples Gas Company	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	99
I/M/O Columbia Gas Company	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	99
I/M/O PG Energy Company	Witness	Office of Consumer Advocate	Universal service	Pennsylvania	99
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HOME ENERGY AFFORDABILITY IN MANITOBA:

A Low-Income Affordability Program for Manitoba Hydro

Prepared for:

Resource Conservation Manitoba/Time to Respect Earth's Ecosystem
Winnipeg, Manitoba

Prepared by:

Roger D. Colton
Fisher, Sheehan & Colton
Public Finance and General Economics
Belmont, Massachusetts

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"We, in conjunction with utilities, and social service agencies, have all worked hard to devise ways to [e]nsure that low-income Pennsylvanians have utility services which really are necessities of life as the tragic fire deaths associated with the loss of utility service underlined. . .

"However, for the poorest households with income considerably below the poverty line, existing initiatives do not enable these customers to pay their bills in full and to keep their service. . .Consequently, to address realistically these customers' problems and to stop repeating a wasteful cycle of consecutive, unrealistic payment agreements that cannot be kept, despite the best of intentions, followed by service termination, then restoration, and then more unrealistic agreements, we believe that new approaches like PECO's CAP program and the OCA's proposed EAP program should be tried."

Pennsylvania Public Utility Commission

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PART 1:
HOME ENERGY AFFORDABILITY IN MANITOBA

Manitoba Hydro has a large and growing home energy affordability problem facing its low-income households. Available resources are insufficient to address this affordability problem. The discussion below documents the unaffordability of energy on the Manitoba Hydro system. The data and analysis below shows how the unaffordability of home energy presents itself as not only a social problem for the residents of Manitoba, but also as a significant business problem for Manitoba Hydro.

This paper proposes a modest but meaningful program through which Manitoba Hydro, as a utility, can address affordability issues based on sound regulatory principles and consistent with its obligations as a public utility.

THE UNAFFORDABILITY OF HOME ENERGY IN MANITOBA

Energy bills impose a substantial burden on low-income households in the service territory of Manitoba Hydro[1] today. Current home heating, cooling and electric bills in Manitoba have driven the home energy burdens for households living with incomes at or below 125% of the Low-Income Cutoff (LICO) to crushing levels. Home energy burdens represent energy bills as a percentage of household income.

[1] Hereafter, the service territory of Manitoba Hydro will be referenced as "Manitoba" unless the context clearly indicates otherwise.

The Extent of Energy Unaffordability in Manitoba

The level of home energy burdens in Manitoba today, as well as the number of households facing these energy burdens, is staggering. Table 1 shows typical home energy burdens at differing income levels along with the number of Manitoba Hydro customers on whom these burdens are placed:

- More than 8,500 Manitoba Hydro customers live with income at or below $10,000 and thus face a potential home energy burden of more than 60%.

- 37,000 additional Manitoba households live with incomes between $10,000 and $20,000 and thus face a potential home energy burden of 10% or more.

- 23,000 *more* Manitoba households live with incomes between $20,000 and $30,000 and thus face a potential home energy burden of 6% or more.

Home energy burdens should be of concern to a public utility when they exceed 6% of household income. An affordable home energy burden is 6% of income.[2] This affordable home energy burden is to be distinguished from a "severe" energy burden of 15%.

Table 1: Manitoba Hydro Electric Heating Burdens at Average Electric Heating Bill for Households with Income Less than 125% LICO /a/

Income	Income Mid-Point	Manitoba Hydro Customers		Electric Bill	Electric Burden
		Number /b/	Percentage		
Under $5,000	$2,500	8,508	9%	$1,517	61%
$5,000 - $9,999	$7,500			$1,517	20%
$10,000 - $19,999	$15,000	36,960	40%	$1,517	10%
$20,000 - $29,999	$25,000	23,210	25%	$1,517	6%
$30,000 - $39,999	$35,000	12,242	13%	$1,517	4%
$40,000 - $49,999	$45,000	8,856	10%	$1,517	3%
$50,000 or more	$50,000	3,421	4%	$1,517	3%
Total	---	93,197	100%	---	---

NOTES:

/a/ Manitoba Hydro refused to release the calculations, the data, or the source documents leading to its conclusion that home energy burdens were not at a "crisis" level for any Manitoba Hydro customers. See, RCM/TREE/MH-I-104(a) (calculations); RCM/TREE/MH-I-104(b) (data); RCM/TREE/MH-I-104(c) (source documents).
/b/ RCM/TREE/MH-I-147.

[2] See generally, Carroll, Colton and Berger (2007). *Ratepayer Funded Low-Income Energy Programs: Performance and Possibilities*, at 16, Apprise Inc.: Princeton (NJ). The 6% threshold is for heating, cooling and baseload electric. To the extent that particular components of home energy are viewed apart, the affordable burden would be lower. An affordable baseload electric burden, for example, is considered to be 3% if the household heats with natural gas.

As Table 1 shows, nearly half (49%) of Manitoba's low-income (below 125% LICO) customers are highly cost-burdened by their energy bills.[3] A full three-quarters of Manitoba Hydro's customers with income at or below 125% of LICO experience energy burdens at or above the maximum affordable level.[4]

Even the energy burdens provided above, however, under-state the magnitude of the home energy affordability problem on the Manitoba Hydro system. Setting aside the fact that the Manitoba Hydro analysis was based on 2003 prices, home energy bills fall at or below the 6% affordability level in Table 1 when income reaches $25,000. This break-point, however, is misleading since it is based on an average electric bill. As Manitoba Hydro reports, "generally, for a fixed income, the energy burden will rise as the family size increases." (PUB/MH-I-213(d)). Electric heating customers with three people in their home have electric bills 40% higher than customers with only one person in the home (and 15% higher than two-person households). This is significant because households at the higher income levels are also disproportionately larger-size households which should have higher-than-average electric bills.

- While 4-person households are only 15% of the total population, they are 41% of the population with income of $30,000 or more.

- While 5-person households are only 7% of the total population, they are 21% of the population with income of $30,000 or more.

- While 6-person households are only 4% of the total population, they are 11% of the population with income of $30,000 or more.

- While 7-person households are only 1% of the total population, they are 3% of the population with income of $30,000 or more.

As can be seen, since higher income households are associated with larger households, and since larger households are associated with larger home energy bills, the energy burdens of the higher income households will be greater than those that are presented in Table 1.[5]

The inadequacy of income for low-income households in Manitoba can further be seen by the comparison that the National Council on Welfare makes annually between welfare income and various poverty measures.[6] The National Council compares welfare income to three different measures of poverty: before-tax LICO; after-tax LICO, and a market-basket measure (MBM). Table 2 sets forth the most recent data.

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[3] A "high cost burden" falls in the middle of a three-step range of home energy burdens: (1) affordable; (2) highly burdened; and (3) severely burdened. Households are considered to be highly cost-burdened if their home energy burdens fall into the 10% to 11% range. Carroll, et al., at 15.

[4] If Manitoba Hydro customers combined gas heating with electric bills, their home energy bills are even greater, and, therefore, their burdens would be higher. See, RCM/TREE/MH-I-150.

[5] The converse will be true as well, of course: households with fewer people will have lower energy burdens. However, even if the energy burden for households with income below $10,000 is lowered by 20%, those burdens will remain at between 15% and 40% of income.

[6] Information for this analysis was taken from the most recent annual report. National Council on Welfare (Winter 2008). *Welfare Incomes: 2006 and 2007*, National Council on Welfare: Ottawa (ONT).

Table 2. Comparison of Welfare Income to Three Measures of Poverty (Manitoba) (2007)

Household type	Welfare Income	LICO, After-Tax		LICO, Before-Tax		Market Basket Measure	
		Welfare Pct of	Deficit /a/	Welfare Pct of	Deficit /a/	Welfare Pct of	Deficit /a/
Single, employable	$5,827	27%	($15,840)	32%	($12,128)	42%	($8,096)
Person with disability	$7,026	42%	($12,640)	50%	($8,928)	65%	($4,897)
Lone parent, one child	$14,664	54%	($12,308)	67%	($7,187)	81%	($3,436)
Couple, two children	$21,177	53%	($19,083)	62%	($12,770)	76%	($6,669)

NOTES:
/a/ Deficit is the dollars required to reach each respective poverty measure from the welfare income.

SOURCE: National Council on Welfare Reports, Welfare Incomes, 2006 and 2007, at 44 (LICO-AT), 45 (LICO-BT), and 49 (MBM) (Winter 2008).

Table 2 shows the financial crisis facing welfare households in Manitoba. While the dollar amounts may differ, the pattern is the same for the After-Tax LICO, Before-Tax LICO, and Market Basket Measure delineations of "poverty." Welfare incomes are a fraction of income compared to each of the three poverty measures. In each case, the lone parent household with one child comes closest to having welfare income equal to the respective poverty measures. The income deficit is still substantial under each measure.

- On an after-tax LICO basis, a lone-parent with a child is in the best position, still falling more than $12,300 short of the funds to reach 100% of after-tax LICO.

- On a pre-tax LICO basis, the welfare income of a lone-parent, single child family comes closer to the poverty measure. Nonetheless, the income deficit is still nearly $7,200.

- When compared to Canada's Market Basket Measure,[7] welfare incomes come closest to fully funding (81%) a minimally adequate income. Nonetheless, the lone-parent with a single child falls more than $3,400 short of the Market Basket Measure of poverty.

In contrast to the lone parent with a single child, a couple with two children have welfare incomes that range from roughly half of the After-Tax LICO (53% with an income deficit of $19,083) to nearly 80% of the Market Basket Measure (76% with an income deficit of $6,669) of the respective poverty measures.

[7] The Market Basket Measure was developed by Human Resources Canada to supplement LICO. The MBM takes into account differences in the cost of living between the provinces. Moreover, the MBM takes into account the differences in cost-of-living for different household and family types.

The Failure of the Manitoba Hydro Income Analysis

The Manitoba Hydro calculations supporting its conclusion that none of its low-income customers live in a "crisis" situation are seriously flawed. In setting forth its Affordable Energy Program (AEP), Manitoba Hydro asserts that "in reviewing the energy burden of Manitoba Hydro's lower income customers, it has been determined that the energy burden is not at a crisis level" (AEP 4). The flaws in the methodology lead to errors in the conclusion.[8]

The Company described the "methodology" upon which it based its "determination" as follows:

> In preparing the Manitoba Hydro Affordable Energy Program, a high level assessment was undertaken on the energy burden within Manitoba. This assessment simply looked at two levels of income and assessed the energy burden based on the average energy cost of customers falling within the LICO x 125% category.

(PUB/MH-213(a)). The Company acknowledged, however, that "the assessment was based on two levels of incomes and average energy costs. Individual customers will have a broad range of energy costs." (PUB/MH-213(a)).[9] Despite its recognition of the existence of this "broad range" of incomes and "broad range" of energy costs, the Company made no effort to incorporate those ranges into assessing whether it conclusion was accurate. The Company made no effort to assess:

- The distribution of customers by a ratio of household income to LICO (RCM/TREE/MH-I-147);
- The average (or median) income of customers with differing ratios of income to LICO (RCM/TREE/MH-I-148);
- A distribution of the LICO x 125% population disaggregated into quintiles of income (RCM/TREE/MH-I-152).

The Company's failure to consider different ranges of income is fatal to its conclusion. While the Company asserts that its AEP is directed toward its "most vulnerable" customers, the Company could not determine whether the two income levels it used in reaching its conclusion that no "crisis level burden" exists on its system placed the customers at those income levels within that "most vulnerable" population. (RCM/TREE/MH-I-157; RCM/TREE/MH-I-158).

[8] The Company refused to release either the data or the calculations used in reaching this conclusion. (RCM/TREE/MH-104). In addition, the Company either could not or would not provide the name of the specific individual who was the lead researcher undertaking the review, the scope of work provided to (or by) that individual, or the level of effort (measured in either time or dollars) devoted to the work. (RCM/TREE/MH-I-107(b)).

[9] Moreover, the Company's analysis was based on 2003 energy prices. (RCM/TREE/MH-I-149; RCM/TREE/MH-I-150).

The failure of Manitoba Hydro to consider anything but average incomes in its assessment of energy needs in the province is in conflict with the generally-accepted approach used in assessing low-income energy needs. Consider, for example, a recent report examining energy poverty prepared by the Environmental Law Centre of the University of Victoria.[10] While the Centre found that British Columbia energy bills represented only 4.49% of income for all BC residents, they represented 13.53% of income for residents in the lowest income quintile. According to the Centre, a "conservative" estimate leads to the conclusion that 60% of BC households (n=195,000) in the lowest income quintile live in energy poverty, while an *additional* 30% of households (n=97,000) in the second lowest income quintile would. Unlike an analysis based on the "average," which would indicate that home energy was "on average" affordable, examining households disaggregated by income quintiles "would make potentially as many as 349,000 households in British Columbia that were unable to meet their energy needs without compromising their access to other essentials in 2007."[11]

The point here is not to determine how many households live in energy poverty in British Columbia. The conclusion to be drawn is that the Manitoba Hydro analysis leading to the conclusion that no low-income household in Manitoba is living in a "crisis" situation, which relies only on an "average" analysis, is so seriously flawed as measured by generally-accepted standards of analysis that it cannot reasonably be used as the basis for decisionmaking.

The Manitoba-specific data presented above presents a far more accurate discussion of home energy affordability needs than does the Manitoba Hydro discussion.

ACTUAL VERSUS AFFORDABLE UTILITY BILLS

A second way to look at the problem of high energy burdens leads to the same results, but focuses on why these low incomes present a business problem to Manitoba Hydro as the local electric utility. Actual average 2009 baseload electric bills reached $88.25 per month.[12] In contrast, in order for monthly electric bills to be affordable for the specific sub-populations at the average incomes identified in Table 2 above, electric base load (i.e., non-heating) bills would need to reach the following levels (defining an affordable electric baseload bill to be 3% of household income):

- Single employable: $14.56
- Person with a disability: $22.04
- Lone parent, one child: $35.66
- Couple, two children: $52.74

[10] Maine McEachern and Jill Vivian (April 2010). *Conserving the Planet without Hurting Low-Income Families: Options for Fair Energy Efficiency Programs for Low-Income Households, A Report for the Energy Poverty Initiative of the Climate Justice Project,* University of Victoria Environmental Law Centre.
[11] Conserving the Planet, at 20 – 21.
[12] The average annual residential bill was $1,059. (RCM/TREE/MH-I-48). The average monthly bills would thus be $88.25 ($1,059 / 12 = $88.25).

The Manitoba Hydro average residential electric bill, in other words, ranges from nearly 1.7 times ($88.25 / $52.74 = 1.7x) to more than six times ($88.25 / $14.56 = 6.1x) higher than that which is affordable to the Company's low-income customers.

In contrast, the Company reports that actual 2009 average space heating bills reached $122.41 per month.[13] In contrast, in order for bills to be affordable at the average incomes identified above for the populations identified in Table 2, space heating bills would need to reach the following levels (defining affordable as being 6% of household income):

- Single employable: $29.11
- Person with a disability: $44.07
- Lone parent, one child: $71.31
- Couple, two children: $105.48

As with the residential baseload electric bill in 2009, the Company's electric heating bill ranged from nearly 1.2 times ($122.41 / $105.48 = 1.2x) to more than four times ($122.41 / $29.11 = 4.2x) higher than that which is affordable to the Company's low-income customers.

As can be seen, delivering electricity at an affordable home energy burden cannot happen without additional assistance from Manitoba Hydro. For Manitoba Hydro, as the vendor of the unaffordable services, to argue that "the problem" is exclusively a social problem of inadequate income refuses to acknowledge the impacts which this unaffordability generates for the utility as a utility.

Moreover, the use of LICO as a definition of "low-income" status tends to over-state the income of low-income households in Manitoba. As recently as 2007, income for female lone-parent families on average fell $7,700 short of LICO; the income of two-parent families in 2007 fell $10,500 short of LICO.[14] The unaffordability of electricity, therefore, is not a household budgeting issue. Increased money management by low-income households will not eliminate the shortfall between available resources and necessary resources. The gap between actual income and reaching the Low-Income Cutoff is substantial.

THE SOCIAL PROBLEMS OF HOME ENERGY UNAFFORDABILITY

As a result of the mismatch between energy bills and the resources needed to pay them in Manitoba, many low-income households incur unpaid bills and experience the termination of service associated with those arrears. In addition, the paid-but-unaffordable bill is a real phenomenon in Manitoba. Even when low-income households pay their bills in a full and timely manner, they will often suffer significant adverse hunger, education, employment, health and

[13] The average annual electric space heating bill was $1,469. (RCM/TREE/MH-I-153). The average monthly electric space heating bill would thus be $122.41 ($1,469 / 12 = $122.41).
[14] Statistics Canada, *Income trends in Canada 1976 – 2007*, Table 802 and 804.

housing consequences in order to make such payments.[15] These consequences generate adverse impacts not only for low-income customers and the utilities that serve them, but they also generate adverse impacts on the competitiveness of business and industry that are members of the broader Manitoba community. The discussion below considers an array of consequences arising from unaffordable home energy.

The findings of the unaffordability of home energy in Manitoba are sobering from a social perspective. The unaffordability of energy manifests itself in more than simply unpaid bills. While researchers have not studied the issue specifically in Manitoba, U.S. research is informative. According to a series of survey studies published by the National Energy Assistance Directors Association (NEADA),[16] "despite. . .significant residential energy expenses, most low-income households pay their energy bills regularly. But at what cost?". The NEA survey found that "LIHEAP recipients faced life-threatening challenges."[17]

- 17% of the national respondents had their heating disconnected or discontinued because of an inability to pay.
- 8% had their electricity (as opposed to heating) disconnected due to an inability to pay.
- 38% went without medical or dental care in order to have money to pay their home energy bill;
- 30% went without filling a prescription or taking the full dose of a prescribed medicine.
- 22% went without food for at least one day.

Low-income customers frequently have little incentive, and even fewer choices, to pursue constructive responses to their energy poverty. All too frequently, the customer is faced with an immediate need (*e.g.*, bill payment by a date certain) with the available constructive responses to an inability-to-pay unable to deliver assistance either in the form, the time period, or the magnitude necessary to meet that need. Given the immediate consequences of failing to address the short-term nonpayment crisis, the customer is presented with a choice between untenable alternatives.

Public Health Implications

The disconnection of electricity and/or natural gas service represents a distinct public health threat, particularly to aging households and to low-income households with children. The impact of service disconnections on the public's health and safety can hardly be debated in light of

[15] See generally, Ford and Harris (2003). *Acceptable Living Levels: Manitoba*, Winnipeg Harvest and the Social Planning Council of Winnipeg, Winnipeg (MAN); Hajer (November 2009). *The View from Here: How a Living Wage can Reduce Poverty in Manitoba*, Canada Centre for Policy Alternatives: Ottawa (ONT).
[16] Apprise, Inc. (April 2005). *National Energy Assistance Survey Report*, National Energy Assistance Directors Association: Washington D.C. Similar survey studies, with similar results, have been published in 2003, 2008 and 2009.
[17] LIHEAP is the Low-Income Home Energy Assistance Program, the federally-funded fuel assistance program in the United States.

recent research. According to the 2005 NEADA survey, the loss (and threatened loss) of home heating service has significant health consequences to low-income households with children. NEADA found that survey respondents reported becoming ill because their home was too cold in the winter heating months. Nearly 1-in-6 of all energy assistance recipients reported that someone in the home became sick because the home was too cold in the past five years.

These illnesses were frequently severe enough to require medical treatment. In both 2003 and 2005, 11% of the surveyed energy assistance recipients reported that someone in the home had become ill enough to require going to a doctor or hospital because the home was too cold in the past five years.

A variety of reasons contribute to the overall rate of illness, as well as to the rate at which illnesses required medical treatment within the low-income energy assistance recipient population.[18] The primary contributing factor to the adverse health outcomes involves the tendency of low-income households to keep their homes at unsafe or unhealthy temperatures, given the unaffordability of home energy to the household. Of the households with children under age 18, between 20% and 25% kept their homes at "unsafe or unhealthy temperatures" because they did not have enough money to pay their home heating bills. Aside from households with children, the adverse health impacts of cold temperatures within a home are particularly acute for elderly households.[19]

Nutrition Implications

Unaffordable home energy has a substantial impact on the nutrition of low-income households. According to the Congressionally-funded NEADA study, one-in-five low-income energy assistance recipients went without food for at least one day due to energy bills in the past five years. Renters experience food deprivation more frequently than do homeowners. While 10% of elderly homeowners went without food because of the need to pay home energy bills, 17% of elderly renters did. While 24% of non-elderly owners went without food due to energy bills, 28% of non-elderly renters did.

The impact of unaffordable home energy bills on nutrition was a phenomenon in all parts of the United States and across all climate regions. While the highest penetration of households going without food was in the West (31%), the existence of food deprivation attributable to the need to pay home energy bills was consistent throughout the remaining regions, including the Northeast (20%), Midwest (17%), and South (19%). There is no reason to believe, therefore, that the data presented in the NEADA survey is not transferable to Manitoba.

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[18] See generally, Wilkins et al (2001). *Cold Comfort: The Social and Environmental Determinants of Excess Winter Death in England 1986 – 1996*. The Policy Press: Bristol; Maheswaran et al. (2004). Socio-economic deprivation and excess winter mortality and emergency hospital admissions in South Yorkshire Coalfields Health Action Zone, UK. *Public Health* 118. 167 – 176.

[19] Brennan et al. (1982). Seasonal variation in arterial blood pressure, *British Medical Journal*. 285. 919 – 923; Wilkinson et al. (2004). Vulnerability to winter mortality in elderly people in Britain: population based study. *British Medical Journal* 329. 647 – 652; Collins (1986). Low indoor temperatures and morbidity in the elderly. *Age and Aging* 15(4):212-20.

The conclusions of the NEADA survey are bolstered by significant academic research documenting a relationship between unaffordable home energy bills and nutritional deficiencies. One November 2006 article published in *Pediatrics*, the journal of the American Academy of Pediatrics, reports that "convergent evidence suggests that the periodic stress of home heating and cooling costs may adversely impact the health and nutritional status of children and other vulnerable populations."[20] According to this *Pediatrics* article, a study of children 6 to 24 months of age in Boston (MA) found higher proportions of children with weight-for-age below the 5th percentile in the three months after the coldest months, compared with all of the other months of the year.

The article reported further that:

> there is also evidence that hunger and food insecurity are associated with high utility costs and cold weather. In the United States, data show that families reporting unheated days or threats of utility turnoff are more likely to report that their children were hungry or at risk for hunger than families without either experience. In addition, national data collected from 1995 to 2001 as part of the Current Population Survey Food Security Supplement suggest that rates of food insecurity with hunger increased during the winter and early spring among low-income families in areas with high winter heating costs and during summer in regions with high summer cooling costs.[21]

Other research on food insecurity has shown that food budgets are those most often sacrificed to meet other survival needs in low-income families.[22]

The nutrition threats are not limited simply to children. A November 2006 article in *The Journal of Nutrition* examined the association between household food insecurity and seasonally high heating and cooling costs for low-income elderly.[23] The study "examined the extent to which greater proportions of poor households, especially poor elderly households, experienced very low food security (the more severe range of food insecurity) during times of the year when home heating and cooling costs were high, controlling for important covariates." "Very low food security" is a severe range of food insecurity, which the U.S. Department of Agriculture referred to as "food insecurity with hunger" in its pre-2006 reports. The study found that "the odds of

[20] Frank, D., Neault, N., Skalicky, A., Cook, J., Wilson, J., Levenson, S., Meyers, A., Heeren, T., Cutts, D., Casey, P., Black, M., and Berkowitz, C. (2006). Heat or Eat: Low Income Home Energy Assistance Program and Nutritional Risk Among Children Under 3 Years Old. *Pediatrics*.

[21] Heat or Eat, supra.

[22] See generally, Frank DA, Roos N, Meyers AF, et al., Seasonal variation in weight-for-age in a pediatric emergency room. *Public Health Reports*, 1996; 111:366-371; Bhattacharya J, DeLeire T, and Currie J. Heat or eat? Cold-weather shocks and nutrition in poor American families. *Am. J. Public Health*. 2003; 93:1149-1154; Frank et al. (2006). *Unhealthy Consequences: Energy Costs and Child Health: A Child Health Impact Assessment of Energy Costs and the Low-Income Home Energy Assistance Program*, Child Health Impact Working Group: Boston Medical Center: Boston (MA); Colton (2008). *Public Health Outcomes Associated with Energy Poverty: An Analysis of 2007 Behavioral Risk Factor Surveillance System (BRFSS) Data from Iowa*, Iowa Department of Human Rights: Des Moines (IA).

[23] Mark Nord and Linda Kantor. Seasonal Variation in Food Insecurity is Associated with Heating and Cooling Costs Among Low-Income Elderly Americans. *Journal of Nutrition*. 2006; 136:2939-2944.

very low food security were 27% higher in the summer than in the winter in a high-cooling state. In a high-heating state, the odds of very low food security were 43% lower in the summer than in the winter. . ."

The study found that there was a direct relationship between unaffordable home energy bills and the nutrition deficiencies that were documented. It concluded that "the association of interest appears, therefore, to represent a causal effect of home heating and cooling costs and not to be a spurious artifact caused by other seasonally variable economic factors. If anything, the effects of seasonally high home heating and cooling costs on food insecurity may be somewhat ameliorated by seasonal differences in economic factors." The authors concluded that "our analysis shows that in high-heating states, households with incomes below the poverty line were substantially more vulnerable to very low food security during the winter than during the summer, whereas the opposite was true in high-cooling states."

Public Safety Implications

In addition to these public health and nutrition issues, the unaffordability of home heating service represents a distinct public ***safety*** threat as well. According to the Canadian Housing and Rental Association, energy poverty can cause households to turn to unsafe heating practices, including heating their home with an open oven door or faulty electric heater. Supplemental heaters cause 120,000 residential fires and 600 deaths annually in the United States.[24]

The loss of ***electric*** service (not merely heating service) poses a particular threat to the health and safety of low-income Manitoba households with children. The home electric service that is being disconnected to low-income households is frequently essential to the operation of some medically-necessary equipment in the home. A full 25% of all energy assistance recipients surveyed for the NEADA study, that had children under the age of 18, reported that a member of the household used medical equipment that requires electricity. A full 6% of all energy assistance recipients surveyed by NEADA reported that the equipment using electricity was used to treat asthma. Nearly as many (4%) said that someone in the household was taking medication that required refrigeration.

The move to auxiliary heating sources when primary heating fuels are disconnected opens up the possibility of an associated fire risk for low-income households. While home heating equipment is no longer the ***single*** most substantial cause of home fires,[25] it remains ***one*** of the leading factors contributing to fires, as well as to fire-related injuries and deaths. In particular, portable and fixed space heaters present a risk of harm. While portable space heaters are not the major cause of home heating fires, they play a much more substantial role in deaths and injuries. Portable and fixed space heaters (and their related equipment such as fireplaces, chimneys and chimney collectors) accounted for roughly two of every three (65%) home heating fires in 1998

[24] Canadian Housing and Rental Association (February 2005). *Affordable & Efficient: Towards a National Energy Efficiency Strategy for Low-Income Canadians.*

[25] The term "`homes' refers to one- and two-family dwellings (which includes manufactured homes) and apartments. . ." The share of fires involving heating equipment, the National Fire Prevention Association (NFPA) says, "is quite different for the two types of homes." While heating equipment is the second leading cause of fires in one- and two-family dwellings, it was only the seventh highest cause of fires in apartments.

and three of every four (76%) associated deaths.[26] Each of these devices has a higher death rate per million households using them than do the various types of central heating units or water heaters.

The National Fire Protection Association (NFPA) reports data confirming these data and conclusions. According to the NFPA, "not being able to afford utilities" is one of the "major factors of increased fire risks" for low-income households. "In poor homes, small portable heaters or space heaters may be used to heat areas much too large for their capacity, and some households supplement heating equipment by turning on their ovens and leaving the door open."[27]

The Competitiveness of Business and Industry

Not all impacts arising from unaffordable home energy affect only the individual (or household) experiencing the unaffordable bill. An increasing body of research has documented how the problems associated with inability-to-pay affect the competitiveness of local business and industry as well.

This conclusion is neither profound nor much disputed by researchers that consider the impacts of programs such as home energy affordability subsidies on private employers. One comprehensive study published in 2004 concluded:

> [E]mployers have good reason to be concerned that large numbers of working people with low family incomes do not take advantage of the public benefits intended to help them and their families achieve economic sufficiency -- benefits that also help employers by contributing to the economic stability of their workforces. These public benefits bolster the ability of low-income workers to meet their basic needs, in effect providing a wage supplement to employers.[28]

This joint study, performed in collaboration with the Center for Workforce Preparation of the U.S. Chamber of Commerce and the Center for Workforce Success of the National Association of Manufacturers, reports that many low wage workers fail to access public benefits.

> This not only hurts the workers who miss out on income and benefits; it also hurts their employers through higher turnover and increased absenteeism. Unreliable transportation, inadequate child care, and poor health are leading contributors to absenteeism, tardiness, and turnover among low-income workers. An evaluation of [households leaving the TANF program][29] in New Jersey by Mathematica

[26] Marty Ahrens (June 2001). *The U.S. Fire Problem Overview Report: Leading Causes and Other Patterns and Trends*, at 55, National Fire Protection Association: Quincy (MA).
[27] "Burning Issues," *NFPA Journal*, at 104 (January/February 1996).
[28] Geri Scott (2004). *Private Employers and Public Benefits*, Workforce Innovation Networks (WINS): Boston (MA) and Washington D.C. WINS is a collaboration of Jobs for the Future, the Center for Workforce Preparation of the U.S. Chamber of Commerce, and the Center for Workforce Success, The Manufacturing Institute of the National Association of Manufacturers.
[29] TANF is the Temporary Aid for Needy Families program, that program generally considered to be "welfare" in the United States.

> Policy Research reported that 52 percent had been fired as a result of frequent tardiness or absenteeism related to child care or health problems. In the words of a call center manager who has hired many entry-level workers through the Annie E. Casey Foundation's Jobs Initiative, "these peoples' lives are in chaos. They have so many problems they cannot pay attention to work."
>
> An unpublished survey conducted by ASE in Detroit, Michigan, highlights workplace problems that employers can experience when employees' non-work needs are not addressed. ASE asked entry-level workers and their supervisors in five companies about barriers to employee advancement. After "caring for a dependent," "money problems" were reported more frequently than 19 other potential problems ranging from "understanding work assignments" to "getting along with colleagues." "Financial worry about making ends meet" appears to contribute to absenteeism, distraction on the job, strained relations with supervisors and co-workers, and a number of other factors that reduce productivity.[30]

Affordable home energy can be analogized to other public goods that have been found to provide direct benefits to businesses. The Committee on Economic Development[31] has quantified the beneficial impacts to business from reducing the causes of employee absenteeism and employee turnover associated with unaffordable child care. According to the Committee:

> Studies have found that employee turnover produces disruption and inefficiency in the work environment and that the cost of replacing employees is high. For example, Merck & Co., Inc. found that it costs. . . about 75 percent of salary to replace a clerical or technical employee. It also found that it may take considerable time to fill a vacant position and an average of 12.5 months for a new employee to become adjusted to the job.[32]

Other research confirms these findings. One professor at Johns Hopkins University considered the extent to which increased low-income status results in increased overall costs to business. She found a variety of costs to business, reporting:

> Poverty. . .produces ill-prepared workers whose lives are easily disrupted by small catastrophes. If the car breaks down, if the kid gets sick, it suddenly becomes impossible to be a reliable worker. Poverty also generates poor

[30] "Private Employers and Public Benefits," at 5.

[31] CED is a national business-academic partnership. One objective of CED is "to unite business judgment and experience with scholarship in analyzing the issues and develop recommendations to resolve the economic problems that constantly arise in a dynamic and democratic society." *Objectives of the Committee for Economic Development.* The Research and Policy Committee of the CED is directed under the organization's bylaws to "initiate studies into the principles of business policy and of public policy which will foster the full contribution by industry and commerce to the attainment and maintenance" of the objectives of the organization.

[32] Research and Policy Committee (1993). *Why Child Care Matters: Preparing Young Children for a More Productive America, A Statement by the Research and Policy Committee of the Committee for Economic Development*, at 1, Committee for Economic Development: New York.

> health among workers, making them less reliable still and raising the cost of employing them.[33]

Understanding the impact of poverty generally, and unaffordable home energy more specifically, on the competitiveness of business is important for Manitoba Hydro. Almost 70% of poor children in Manitoba live in families where members together worked the equivalent of one full time full-year position.[34] In fact, 10.2% of all children in Manitoba who lived in families where family members worked the equivalent of one full time, full-year position were poor. Manitoba was the second worst province in this regard.[35] In 2009, a parent with two children working at the minimum wage would have had to work more than 70 hours per week just to meet the LICO (before tax) for a three-person household in Winnipeg.[36]

The conclusion from this multitude of research is that the unaffordability of home energy impedes the competitiveness, productivity and profitability of business. With low-wage employees, in particular, unaffordable home energy directly contributes to lowered productivity related to the unaffordability of home energy. Increased personal illness, increased employee turnover, and increased family care responsibilities are but three of the factors contributing to lower employee productivity.

Summary

The unaffordability of home energy facing low-income Manitoba residents has severe social, economic, and business consequences that ramify throughout all sectors of the province. From a social perspective, unaffordable home energy not only threatens the ability of low-income customers to maintain access to their utility service, but also imposes a range of adverse consequences threatening the health, housing, and general welfare of those households. The paid-but-unaffordable home energy bill is a real phenomenon in Manitoba. Paying an unaffordable home energy bill means that low-income Manitoba residents will go without food, medical care, and other life necessities.

In addition, research has found that the prevalence of money problems (such as unaffordable home energy bills) has a direct and substantial impact on the ability of business and industry to remain competitive.

In short, unaffordable home energy has an adverse impact not only on low-income households, but also on Manitoba Hydro as the local utility serving those households and on the Manitoba economy generally.

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[33] Erica Schoenberger (1999). *The Living Wage in Baltimore: Impacts and Reflections*, John Hopkins University Department of Geography and Environmental Engineering: Baltimore (MD).
[34] Social Planning Council of Winnipeg (November 2009). *2009 Manitoba Child and Family Poverty Report Card*, at 7.
[35] Winnipeg Harvest (January 2009). *Winnipeg Facts 2009*, at 2, citing Social Planning Council of Winnipeg, *Child and Family Poverty Report Card* (2008).
[36] 2009 Report Card, at 8.

WHY THE "SOCIAL PROBLEM" OF ENERGY UNAFFORDABILITY IS ALSO A UTILITY PROBLEM.

Quite aside from the impacts that unaffordable home energy has on individual low-income households and local businesses, the unaffordability of home energy has substantial adverse financial and economic impacts on the utility itself. As the public utility charged with serving these low-income customers who cannot afford to pay their bills, Manitoba Hydro incurs the expenses associated with non-payment, including collection expenses, working capital, and uncollectibles.

Unaffordability as an Energy, Not an Income, Problem

An extensive body of research finds that the unaffordability of energy, and the problems resulting from that unaffordability, are issues specifically associated with energy bills as they relate to low-income status, and are not simply associated with the poverty status of low-income households. One tool that is used in the United States to comprehensively measure the impact of energy unaffordability on household well-being is the Home Energy Insecurity Scale. The Home Energy Insecurity Scale was developed for the U.S. Department of Health and Human Services (HHS) to take into account the multiple aspects of energy unaffordability.[37] When households face unaffordable home energy bills, they can engage in different types of behavior. They might pay their energy bills while experiencing deprivation in other household necessities. They might not pay their energy bills, while maintaining their other necessities. Or they might engage in a reduction in energy use, beyond mere conservation, and face household deprivation in those respects.

A study of "energy poverty" in Missouri, performed for the National Low-Income Energy Consortium (NLIEC)[38] in 2004, found that home energy insecurity was not simply a function of poverty and/or income but rather a function of energy burdens.[39] "Energy burden" is a household's home energy bill as a percentage of income. Households with lower energy burdens tended to have higher home energy security in Missouri.[40] Twice as many households with energy burdens of 6% or less had Home Energy Insecurity thresholds of Stable or higher as compared to households with energy burdens in excess of 12%. In addition, households with higher energy burdens (i.e., their home energy bills took increasingly larger portions of their income) had progressively lower Home Energy Insecurity ratings.

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[37] Colton (2003). *Measuring the Outcomes of Low-Income Energy Assistance Programs through a Home Energy Insecurity Scale*, LIHEAP Committee on Managing for Results, U.S. Department of Health and Human Services.

[38] NLIEC is a public-private partnership, governed by a board of organizations representing the full spectrum of perspectives in the low income energy community.

[39] Colton (2004). *Paid but Unaffordable: The Consequences of Energy Poverty in Missouri*, National Low-Income Home Energy Consortium: Washington D.C..

[40] "Energy insecurity" is a comprehensive measurement of the impacts of home energy affordability developed for the U.S. Department of Health and Human Services (HHS), the federal agency that administers the federal fuel assistance program in the United States. The Home Energy Insecurity Scale, modeled after the U.S. Department of Agriculture's "food security" scale, places households in one of five levels of "energy security," depending upon their ability to pay their home energy bills. The lowest level of energy security is "in-crisis" while the highest level is "thriving." The middle levels in order from top to bottom are "capable," "stable" and "vulnerable."

Other research confirms these findings. The 2006 evaluation of the New Jersey Universal Service Fund (USF) left little question but that energy unaffordability problems were a function of energy burdens rather than simply being a function of income and/or poverty. The USF Evaluation expressly found that increasing the percentage of income burdens charged to USF participants had an adverse impact on the ability of USF participants to maintain payment compliance under the program. The New Jersey evaluation reported:

- "More than 80% of households with an effective [energy burden] below 3 percent covered 100 percent or more of their annual bill. Less than 60 percent of households with a [net energy burden] at or above 8 percent covered 100 percent of their annual bill."

- While 26% of the participants with net energy burdens exceeding 8% of income paid between 50% and 90% of their bill, only 6% of households with energy burdens of between 2% and 3% had coverage rates that low.

The USF evaluation reported the same types of results for gas/electric combination USF participants.

- While nearly 80% of participants with burdens of less than 4% paid 100% or more of their bills, only 43% of participants with burdens exceeding 12% did.

- While 31% of USF participants with burdens exceeding 12% paid between 50% and 90% of their bills, only 9.0% of participants with burdens less than 4% had bill coverage rates that low.

The New Jersey USF evaluation documents quite clearly that as percentage of income payment responsibilities increase, payment compliance decreases. Recognizing that high energy burdens are directly related to nonpayment, the payment and collection data for Manitoba Hydro is examined below.

Utility Arrears

Manitoba Hydro has a significant problem with residential arrears on its system. Table 3 presents the arrears data that Manitoba Hydro maintains by aging bucket.[41] The arrearage problem faced by Manitoba Hydro manifests itself in several ways in Table 3. First, the proportion of residential accounts with long-term arrears is substantial. In any given month, the Company has five percent (5%) or more of its residential accounts 90 or more days in arrears. The 90+ day arrears held by Manitoba Hydro represent very long-term arrears. As Table 3 shows, those customers falling in the 90+ day arrears bucket are, in fact, more than 12 months behind on their Manitoba Hydro bill. The Table incorporates a "bills behind" analysis.[42]

[41] Manitoba Hydro reports that it does not retain arrearage data prior to February 2009.

[42] "Bills behind" is a weighted arrearage statistic that allows comparisons to be made between billing periods and between companies. It divides the outstanding arrears by an average bill to determine how many months behind a customer is in payments. The use of "weighted arrears" as a mechanism to assess payment outcomes is based on a foundation first provided by the Bureau of Consumer Services (BCS) of the Pennsylvania Public Utilities Commission. According to a 1983 BCS analysis, contrary to the argument by that state's utility companies, the

In addition to the size of the long-term arrears, the long-term arrears experienced by Manitoba Hydro do not demonstrate the variability that the Company's short-term arrears do. Two particular observations stand out in an examination of Table 3.

- Most Manitoba Hydro customers who fall into short-term arrears do not allow their arrears to ripen into long-term payment troubles. The highest level of 30-day arrears ($13.7 million in February 2009) had been reduced to $5.1 million by September 2009, a reduction of 63%. The highest level of 60-day arrears ($6.8 million in March 2009) had been reduced to $2.0 million by October 2009, a reduction of 70%.

- The level of the reduction in short-term dollars of arrears is far greater than the level of reduction in the number of accounts in arrears. While the dollar reduction in 30-day arrears from February to September was 63%, the reduction in the number of accounts 30-days in arrears in that same time frame was only 20%. While the dollar reduction in 60-day arrears from March to October was 70%, the reduction of accounts 60-days in arrears during that same time frame was only 26%.

Both of these observations support the conclusion that some base proportion of the Company's accounts are chronically in arrears. While the Company faces a sub-population of residential customers that fall into short-term arrears that are retired in short order, the Company faces a separate population that cannot retire their arrears in the same fashion.

This conclusion, that Manitoba Hydro has a population of customers that cannot retire their arrears, is reinforced by the data regarding the 90+ day arrears. This aging bucket does not exhibit the same variability that the short-term arrears do. The dollars of 90+ day arrears vary only between a low of $20.0 million (December 2009) and a high of $25.3 million (July 2009);

Pennsylvania winter shutoff moratorium did not result in an increase in the number of unpaid bills, or the amount of unpaid bills, that would have existed in the absence of a moratorium. The BCS study reported that:

> Average overdue bills are at a low in November and rise to a high point in March or April. The apparent relationship of this pattern to Public Utility Commission regulations is obvious. That is, arrears are greatest at the end of the Commission's winter termination restrictions (December 1 to March 31 of the following year) and have been reduced to their lowest point immediately prior to the introduction of those restrictions for the following year. This pattern is consistent with the assertion put forward by utilities that they would be able to control arrearages if there were no winter termination restraints. However, the seasonal fluctuations are substantial only for heating accounts. Arrearages for non-heating accounts show only minor seasonal fluctuations. A comparison of [the data] suggests a simple explanation for this difference, that is, that the size of arrearages is related to the size of monthly bills. Heating customers' bills grow radically in the winter and so do their arrearages. Non-heating customers' bills change very little seasonally and their arrearages follow suit. In other words, if the assertion that winter termination restraints invite nonpayment were correct, then non-heating arrearages should show the same seasonal pattern of variations as do heating arrearages. That they do not casts substantial doubt on the assertion that PUC winter termination restraints are responsible for willful non-payment and consequent collection problems.

Joseph Farrell (1983). *Utility Payment Problems: The Measurement and Evaluation of Responses to Customer Nonpayment*, at 19, Pennsylvania Public Utility Commission: Harrisburg, PA.

the number of accounts with 90+ day arrears varies only between a low of 21,821 accounts (December 2009) and a high of 24,964 accounts (June 2009). Unlike the 60% to 70% reductions in short-term arrears over the course of a year, the long-term arrears remain relatively constant (both in terms of dollars of arrears and in terms of accounts in arrears).

Table 3. Manitoba Hydro Arrears by Aging Buckets (Feb – December 2009)

	Residential Customers	Dollars /a/			Accounts /b/			90-Day "Bills Behind"
		30 Days	60 Days	> 90 Days	30 Days	60 Days	> 90 Days	
Feb-09	460,615	$13,673,000	$5,354,000	$23,326,000	38,374	19,886	22,677	
Mar-09	460,804	$12,053,000	$6,759,000	$24,070,000	35,348	20,426	22,546	
Apr-09	461,075	$11,661,000	$6,080,000	$24,603,000	34,035	18,341	23,833	
May-09	461,315	$11,809,000	$6,060,000	$25,061,000	37,532	18,919	24,572	
Jun-09	461,599	$9,241,000	$6,299,000	$25,067,000	34,677	20,605	24,964	
Jul-09	461,969	$7,469,000	$4,263,000	$25,342,000	32,861	16,735	24,123	
Aug-09	462,310	$7,063,000	$3,995,000	$24,151,000	34,573	17,108	24,717	
Sep-09	462,776	$5,107,000	$3,280,000	$23,387,000	30,622	15,980	24,609	
Oct-09	463,392	$6,579,000	$2,046,000	$22,112,000	31,457	15,237	23,664	
Nov-09	463,860	$7,637,000	$2,735,000	$20,372,000	36,028	15,073	22,890	
Dec-09	464,305	$7,906,000	$4,018,000	$20,005,000	33,302	16,956	21,821	
Average	462,184	$9,108,909	$4,626,273	$23,408,727	34,437	17,751	23,674	12.2 bills behind

SOURCES:

/a/ RCM/TREE/MH-I-40(a).
/b/ RCM/TREE/MH-I-40(b).

One problem faced by Manitoba Hydro customers who carry arrears is the higher bills for current usage that those customers face each month. Table 4 compares the bills for current consumption incurred by all Manitoba Hydro residential customers against the bills for current consumption incurred by the Company's residential accounts in arrears. On average, Manitoba Hydro residential customers in arrears experienced bills for current consumption 70% higher than the average residential customer. While the average bill for current consumption for the Company's residential accounts in arrears was $135 in the 11 month period for which Manitoba Hydro could provide data, the average monthly bill for current consumption was only $81. Throughout the year, bills for residential accounts in arrears were significantly greater than bills for the average residential customer.

Table 4. Bills for Current Usage (Residential Accounts in Arrears vs. All Residential)

	Bills for Current Consumption		Amount by which Bills for Accts in Arrears Exceed All Residential Accounts	
	All Residential Accounts	Residential Accounts in Arrears	Dollar Difference	Percentage Difference
Feb-09	$116	$161	$45	39%
Mar-09	$108	$181	$73	68%
Apr-09	$103	$161	$58	57%
May-09	$71	$130	$59	84%
Jun-09	$65	$115	$50	76%
Jul-09	$60	$81	$21	35%
Aug-09	$57	$114	$57	100%
Sep-09	$59	$111	$52	89%
Oct-09	$76	$127	$51	67%
Nov-09	$78	$158	$80	102%
Dec-09	$101	$142	$41	40%
Average	$81	$135	$53	69%

Utility Collection Activity

Manitoba Hydro's substantial collection problems result in the need for the Company to devote a significant portion of its work activities to the collection process. The data is presented in Table 5.

- The Company engages in between 21,000 and more than 33,000 collection calls each month, more than 300,000 for the year (recognizing that only eleven months of data are presented).

- The Company disconnected more than 9,650 accounts in the eleven month period, more than 2% of its total residential customer base.

- The Company delivered 1.6 field notices of disconnection for every disconnection that it performed (15,185 notices leading to 9,653 disconnections).

This collection activity has both a direct cost to the Company and an opportunity cost. Not only does the collection activity have a direct cost allocated to it,[43] but if Company staff were ***not*** engaged in these collection activities, they would be able to engage in other work that the Company needs to have done. (RCM/TREE/MH-I-72(d)).

[43] These direct costs exist even though Manitoba Hydro does not separately track its collection costs. RCM/TREE/MH-I-50, RCM/TREE/MH-I-51, RCM-TREE/MH-I-52; RCM/TREE/MH-I-53 ("residential collection activities. . .are not budgeted for separately").

Table 5. Manitoba Hydro Collection Activities (2009)

	Customers in Arrears /a/	Outbound Collection Calls	Inbound Collection Calls	Payment Arrangements	Collection Notices Delivered	Disconnects	Reconnects
Feb-09 /b/	22,677	9,639	11,398	5,992	915	277	163
Mar-09	22,546	12,606	14,236	9,029	1,335	340	235
Apr-09	23,833	15,022	17,115	11,421	1,320	523	368
May-09	24,572	19,396	13,662	11,976	1,467	1,202	719
Jun-09	24,964	15,173	17,319	9,609	1,763	1,947	1,367
Jul-09	24,123	16,471	16,738	9,808	1,970	1,874	1,534
Aug-09	24,717	13,007	14,171	7,947	1,561	1,361	1,060
Sep-09	24,609	13,455	12,700	7,077	1,541	1,215	1,142
Oct-09	23,664	13,251	11,928	6,810	1,200	456	642
Nov-09	22,890	13,464	11,449	6,946	1,381	332	427
Dec-09	21,821	12,042	9,479	5,561	732	126	194

SOURCE: RCM/TREE/MH-I-70

NOTES:

/a/ While Manitoba Hydro reports this data for "accounts in arrears," other data reported by the Company indicates that these figures are the figures for accounts falling in the 90+ day aging bucket. See, RCM/TREE/MH-I-40(b).
/b/ Since the Company did not archive data on the number of accounts in arrears prior to February 2009, January 2009 is excluded.

The Company is not particularly successful in generating payments through its collection processes. As Table 6 shows, in the average month in 2009, fewer than 80% of residential bills were paid on or before the due date. (RCM/TREE/MH-I-42). More than six percent (6%) of its accounts were 60 or more days in arrears. (RCM/TREE/MH-I-42). Despite handling, on average, more than one call for every account 90 or more days in arrears, the Company averages only 35 payments arrangements for every 100 accounts 90 or more days in arrears. The Company fails to collect past-due amounts through its normal collection process, being forced to disconnect nearly four accounts for every 100 accounts that fall into arrears. And, customers whose service is disconnected for nonpayment frequently never return as customers. Only 80% of Company accounts disconnected for nonpayment are reconnected (7,851 reconnections compared to 9,653 disconnections in the 11-month study period).

Table 6. Credit and Collection Metrics (Manitoba Hydro 2009)

	Collection Calls per Account in Arrears	Payment Arrangements per Account in Arrears	Collection Notices per 100 Accounts in Arrears	Disconnections per 100 Accounts in Arrears	Reconnections per Disconnection	Collection Calls per $1,000 Arrears Reduction /b/	Collection Calls per 1.0 Paid Account /b/
Feb-09 /a/	0.9	0.3	4.0	1.2	0.6	---	---
Mar-09	1.2	0.4	5.9	1.5	0.7	1.4	1.2
Apr-09	1.3	0.5	5.5	2.2	0.7	4.5	1.6
May-09	1.3	0.5	6.0	4.9	0.6	5.7	2.1
Jun-09	1.3	0.4	7.1	7.8	0.7	6.0	2.0
Jul-09	1.4	0.4	8.2	7.8	0.8	6.5	1.8
Aug-09	1.1	0.3	6.3	5.5	0.8	9.6	2.1
Sep-09	1.1	0.3	6.3	4.9	0.9	7.2	1.5
Oct-09	1.1	0.3	5.1	1.9	1.4	8.5	1.7
Nov-09	1.1	0.3	6.0	1.5	1.3	6.6	1.5
Dec-09	1.0	0.3	3.4	0.6	1.5	6.9	1.3

NOTES:

/a/ Since the Company did not archive data on the number of accounts in arrears prior to February 2009, January 2009 is excluded.
/b/ Measured in terms of reduction of arrears, and reduction of accounts in arrears, from 30-days to 60-days.

The impact of inability to pay on collection processes is evident from the Company data as well. The Company reports that "Manitoba Hydro attempts to work with customers continuously throughout the year, providing information regarding the customer's bill, payments, and encouraging mutually acceptable arrangements to address any outstanding arrears, not just during the months of peak service disconnection." (RCM/TREE/MH-I-72(d)). Despite this work "continuously throughout the year," the number of payment arrangements in the high-cost months of December and February (January data was not reported) were at a level half of the level achieved in the peak disconnection months of April through July. The Company does not maintain data on the success of its payment arrangements. (RCM/TREE/MH-I-69, RCM/TREE/MH-I-70). Despite Manitoba Hydro's work "continuously throughout the year," the rate at which disconnected accounts are reconnected during the months of February through June is half of the rate at which disconnected accounts are reconnected in October through December.

The relative inefficiency of the Company's collection processes is further shown by the level of activity that it undertakes to achieve a reduction both in dollars of arrears and in the number of accounts in arrears. Looking at the payment patterns between 30-day arrears to 60-day arrears, Table 6 shows that Manitoba Hydro must generally handle between five and ten collection calls for every $1,000 reduction in arrears. The Company must handle between 1.3 and 2.1 collection calls for every single account that has a 30-day arrears which is paid to prevent it from becoming a 60-day arrears.

SUMMARY

Indisputably, the unaffordability of home energy creates a range of social problems as discussed above. Equally indisputable, however, is the observation that the unaffordability of home energy manifests itself in a series of business problems presented to the utility. Just as it would be inappropriate to focus on the social problems to the exclusion of the utility problems, it would be equally inappropriate to focus on the positive impacts generated by addressing the social problems to the exclusion of also considering the positive utility impacts by addressing the inability to pay.

Addressing the unaffordability of low-income home energy will generate positive social benefits. It will improve public health and safety and bolster the competitiveness of local business and industry. Addressing the unaffordability of low-income home energy, however, will also generate positive utility benefits. It will reduce the costs of nonpayment and improve the efficiency and effectiveness of utility collection efforts. It would be inappropriate to view low-income unaffordability simply as a non-utility "social" problem.

PART 2:
THE INADEQUACY OF THE PROPOSED MANITOBA HYDRO RESPONSE

Manitoba Hydro proposes a three-part "low-income" program to address the inability-to-pay problems on its system. The proposed low-income program involves:

- A crisis intervention component;
- Providing "payment alternatives"; and
- Providing energy efficiency improvements.

Both the basis for the Company's response and the extent of the Company's response show the inadequacy of Company effort in this regard. The discussion below explains why and how the Company's proposed low-income initiative should not be accepted as the basis for a low-income affordability program in Manitoba.

THE CONCEPTUAL FAILINGS OF THE MANITOBA HYDRO RESPONSE

Manitoba Hydro's Affordable Energy Program (AEP) lacks a sound conceptual basis. The Company states that its program incorporates three "disciplines": (1) demand side management; (2) bill management; and (3) emergency financial services. The program's "key focus," however, is on demand side management through energy efficiency measures and customer education. (AEP 6). The Company also proposes to provide "emergency assistance funding" to customers who are in a "state of energy financial hardship and who display genuine difficulty in paying their utility bills." (AEP 5).

The Conceptual Basis for the Manitoba Hydro Affordable Energy Program

Manitoba Hydro sets forth three conceptual bases for its low-income program proposal. First, the Company urges that its program will be targeted to those most in need. Second, the Company urges that its program will maximize its "return on investment." Finally, the Company rejects the option of providing rate relief because discounted rates do not cover the full cost of energy and provide inappropriate price signals.

The three conceptual bases advanced by Manitoba Hydro offer little upon which to base a response to low-income home energy unaffordability. The discussion below identifies each of the three conceptual bases advanced by Manitoba Hydro and then considers the shortcomings of each.

The "Targeting" Proposed by Manitoba Hydro

The argument advanced by Manitoba Hydro: Manitoba Hydro urges in its AEP that "assistance should be targeted to those most in need and who genuinely cannot pay their bill." (AEP 5). Manitoba Hydro urges that an adequate low-income assistance program should be based on the principle that "eligibility for the program must be clearly defined with emphasis on providing funding assistance to vulnerable customers that genuinely cannot pay their energy bill." (AEP 26). This "clear definition" of eligibility, according to Manitoba Hydro, is to be applied on a case-by-case approach, since the circumstances facing each individual are "unique." (RCM/TREE/MH-I-130(a); RCM/TREE/MH-I-121(b)). The Company argues that "by more clearly defining eligibility, Manitoba Hydro can begin more aggressively targeting those customers through their data bases or by partnering with other organizations to identify the customers. . ." (AEP 28).

In proposing this case-by-case approach, Manitoba Hydro proposes several limitations on who can access assistance through its program. None of these limitations, however, meet the Company's own criterion of establishing a "clear definition" of eligibility. The Company states that the assistance provided through its proposed low-income program would be directed to:

- Customers who are not simply "unable to pay their energy bill" (AEP 4), but whose inability-to-pay is "due to personal hardship or crisis." (AEP 4).
- Customers who are "most in need." (AEP 4, 28).
- Customers who "genuinely cannot pay their bill." (AEP 4, 5, 27).
- Customers who "***genuinely*** (emphasis in original) find it difficult to pay their utility bills." (AEP 26).
- Customers who are "in a state of financial hardship." (AEP 5).
- Customers who are "lower income *and* who find themselves in an emergency financial situation." (AEP 12) (emphasis added).

The failings of that argument: Despite its statements regarding the need to "clearly define" eligibility, Manitoba Hydro has no indication of how to define its various eligibility criteria, let alone how to implement a program that might incorporate these limitations. Manitoba Hydro concedes the following:

- "Manitoba Hydro does not have a specific definition of customers 'most in need', or [of] those who 'genuinely cannot pay their bill.'" (RCM/TREE/MH-I-111(c)). The Company has no metrics to use to distinguish customers "most in need" (RCM/TREE/MH-I-111(b)). Nor does it have any specific data elements that it proposes to use to distinguish those "most in need" from those not "most in need." (RCM/TREE/MH-I-111(c)).

- Manitoba Hydro cannot define the term "genuinely cannot pay their bill." (RCM/TREE/MH-I-111(d)). The Company has no metrics it proposes to use to determine who "genuinely cannot pay their bill." (RCM/TREE/MH-I-111(e)). Nor does it have any data elements it proposes to use to determine who "genuinely cannot pay their bill." (RCM/TREE/MH-I-111(f)).

- Manitoba Hydro cannot define "energy financial hardship." (RCM-TREE/MH-I-121). However, the Company does concede that "if an individual is experiencing financial hardship, the individual will be experiencing financial hardship with the various components of the individual's financial obligations which would include energy bills, provided the customer is using and obligated to pay for the energy use." (RCM/TREE/MH-I-122(a)).

- Manitoba Hydro has no way to determine how a person who is displaying a "difficulty in paying their utility bills" is also displaying a "***genuine*** difficulty."[44] Manitoba Hydro has no way to determine whether a customer in a "state of energy financial hardship" is displaying a "genuine difficulty in paying their utility bills." (RCM/TREE/MH-I-123).

- The Company has neither identified nor defined either metrics (RCM/TREE/MH-I-123(d)) or data elements (RCM/TREE/MH-123(e)) by which to determine whether someone is in a "state of energy financial hardship."

- Manitoba Hydro has no definition for deciding, nor does it have either metrics or data elements to use in identifying, whether a customer's inability to pay is due to "personal hardship." (RCM/TREE/MH-133). Nor does Manitoba Hydro have a definition for, or metrics or data elements to use to determine, whether a customer is facing an "emergency situation." (RCM/TREE/MH-134).

[44] Note that the Company's AEP program proposal, itself, added the emphasis to the word "genuine" (AEP 26), thereby distinguishing "difficulty in payment" from "genuine difficulty in payment." In the minds of the author of the AEP, the concept of "***genuine*** difficulty" in paying bills had some import, even though the Company cannot define what it means by the term and does not know what information could be used to distinguish persons with a "genuine difficulty" from persons without a "genuine difficulty."

Despite the Company's statements that an appropriate low-income program depends for its legitimacy on "clear definitions" of eligibility requirements, the Company's own program proposal is singularly lacking in such definitions of the oft-repeated limitations it proposes to place on program participation.

The "Return on Investment" Proposed by Manitoba Hydro

The argument advanced by Manitoba Hydro: The Company argues as one basic premise for its program proposal that the "key learnings from other programs include [that] bill assistance programs should focus on demand side management as it offers the best return on investment for the customers of the utility." (AEP 4). The Company urges further that placing the "most emphasis on demand side management initiatives" provides "the most sustainable return on investment." (AEP 24). The Company thus makes two claims about the use of energy efficiency investments regarding low-income affordability:

(1) that it offers the highest ("best") return on investment; and

(2) that it offers the "most sustainable" return on investment.

Each of these claims should be dismissed.

The failings of that argument: The Manitoba Hydro low-income affordability program lacks any basis grounded in an argument that its program proposal offers a superior "return on investment." While urging that it seeks to receive the "best" and the "most sustainable" return on investment makes for great political rhetoric, to impose such a requirement for its low-income program:

- Has been done in no other jurisdiction identified by the Company; and
- Is based on no recognized methodology or empirical results available to the Company.

Moreover, Manitoba Hydro imposes a return on investment requirement on none of its other major credit and collection activities directed toward low-income customers. For example, Manitoba Hydro does not calculate a "return on investment" for:

- The dollars spent on the disconnection of service for nonpayment; (RCM/TREE/MH-I-118(a));
- The dollars spent on deferred payment plans as a method to retire arrears (RCM/TREE/MH-I-118(c));
- The dollars spent on load limiters (RCM/TREE/MH-I-118(e));
- The dollars spent on offering budget billing (RCM/TREE/MH-118(g)).

The Company has never assessed the extent to which its existing collection mechanisms reduce either residential bad debt (RCM/TREE/MH-I-66) or residential arrears (RCM/TREE/MH-I-67), let alone calculated a return on investment for these activities. The Company cannot provide even a methodology for calculating a return on investment for its existing collection activities. (RCM/TREE/MH-I-118(b), (d), (f), (h)), let alone having used such a methodology in practice.[45]

It is not clear upon what Manitoba Hydro relied when it asserts that "key learnings from other programs include [that] bill assistance programs should focus on demand side management as it offers the best return on investment for the customers and the utility." (AEP 4). Manitoba Hydro could identify no program evaluation ever making such a finding, let alone provide a copy of such an evaluation making such a finding or provide a page citation to such a finding. (RCM/TREE/MH-I-112).[46]

Moreover, it is not clear upon what Manitoba Hydro relied when it asserts that "key learnings from other programs" include that demand side management offers a ***better*** return on investment to both customers and the utility than do programs such as low-income arrearage forgiveness, rate discounts, crisis intervention, or percentage of income programs. The Company could provide no document that set forth even a ***methodology*** for calculating a return on investment (from the perspective of either the customer or the utility) for an arrearage forgiveness program (RCM/TREE/MH-I-113); a crisis intervention program (RCM/TREE/MH-I-114); a rate discount program (RCM/TREE-I-115); or a percentage of income program (RCM/TREE/MH-I-116), let alone any results, analysis or conclusions based on the use of such a methodology.

Indeed, the Company could not identify a single rate assistance program for which a "return on investment" was calculated (RCM/TREE/MH-I-117), let alone identify what the return on investment was (RCM/TREE/MH-I-117), or provide a copy of any document in which a return on investment was reported (RCM/TREE/MH-I-117).

Finally, the Company had reviewed ***none*** of the empirical ex post program evaluations which considered the costs and benefits of programs involving arrearage forgiveness, rate discounts, or percentage of income programs (RCM/TREE/MH-I-171). Nor, in choosing utilities to "study" for its low-income research with the exception of Public Service Electric and Gas (PSEG) (New Jersey), did Manitoba Hydro choose to examine a utility in one of the various jurisdictions that have arrearage forgiveness and percentage of income programs. (RCM/TREE/MH-170). Even with PSEG, the Company chose not to read the program evaluation of the New Jersey low-income Universal Service Fund (USF), a percentage of income program setting low-income rates equal to an affordable burden of 6% of income. (RCM/TREE/MH-I-171(h)). The Company

[45] The Company does not track when or whether it is cost-effective to disconnect service for nonpayment. (RCM/TREE/MH-I-73; RCM/TREE/MH-I-74). Nor has the Company established any criteria by which to measure the effectiveness of its existing credit and collection activities (RCM/TREE/MH-I-59), and has never evaluated the effectiveness of those activities. (RCM/TREE/MH-I-60).

[46] The incomplete nature of the Company's review was conceded in discovery. When asked to identify a copy of evaluations of actual low-income programs it had reviewed in preparation of its AEP, the Company acknowledged that its conclusions were based on "reviewing ***some*** reports" and "included discussions with ***several*** utilities." (RCM/TREE/MH-I-119) (emphasis added).

failed to report that of the ten utilities that it seeks to emulate for its AEP due to their "holistic" approach to low-income services, seven offer substantial rate discounts to their low-income customers. (RCM/TREE/MH-I-126). Indeed, of the seven utilities offering discounts, three participate in percentage of income programs.

In sum, Manitoba Hydro presents no information to support its assertion that a low-income affordability program should focus on demand side management because the "lessons learned" from programs in other jurisdictions counsel that demand side management generates a greater return on investment to both customers and the utility. No empirical study comparing the return on investment has been identified, let alone cited or reviewed by the Company. No methodology for calculating a return on investment has been presented (or even identified). Moreover, to impose a return on investment test on low-income programs would impose on those programs a test that Manitoba Hydro does not impose on any other major credit and collection activity directed toward low-income customers.

The Need to Provide "Price Signals" Proposed by Manitoba Hydro

The argument advanced by Manitoba Hydro: Manitoba Hydro finally expresses concern about whether the offer of discounted rates to low-income customers would "distort" price signals to those customers. (RCM/TREE/MH-I-159). The Company selectively cites the comments of various stakeholders opposed to low-income rates. The thrust of the comments, however, is the assertion that "assistance should not distort price signals to consumers. The commodity price should continue to reflect the true cost of energy used by low-income energy consumers. . ." (RCM/TREE/MH-I-159).

The failings of that argument: Energy bills represent an ineffective means to send price signals to low-income customers. The notion of sending a "price signal" assumes that the customer has the ability to *receive and act upon* the signal. When a customer has an inability-to-pay, however, that inability-to-pay distorts the price signal far more than a rate discount would. Low-income customers, particularly customers with energy burdens exceeding a prescribed level, pay less than their entire bill. Under such circumstances, it is the unaffordability of the bill that distorts the price signal.

A low-income discount program that reduces bills to an affordable level actually *improves* the price signaling of utility rates rather than distorting that price signaling function. This is particularly true if the low-income program is appropriately designed.

For example, analysis presented in this paper recommends a percentage of income "fixed credit" mechanism for delivering low-income discounts in Manitoba. Under a fixed credit program, low-income customers receive a fixed dollar credit applied to their bills at standard residential rates. To the extent that a customer's bill changes, whether due to changes in price or due to changes in consumption, the customer's payment obligation either increases or decreases accordingly. Reduced bills attributable to energy conservation, just like increased bills due to higher consumption, are immediately reflected in the low-income customer's payment obligation.

This immediate change in the customer's affordable bill presents a far more cogent "price signal" than the customer would receive without the fixed credit program. Without the program, the impact to the customer might well be only whether the customer has an arrears of $800 or an arrears of $900,[47] hardly a compelling price signal mechanism in that both mean that the bill for current usage will not likely be paid in a full and timely fashion.

Despite the theoretical concern expressed by Manitoba Hydro about a low-income rate affordability program distorting price signals, the reality is that a low-income rate affordability program improves rather than distorts the price signaling function of utility bills.[48] From an empirical basis, despite the operation of low-income discount programs in the United States for more than 20 years, and repeated impact evaluations of those programs by numerous different evaluators,[49] *not one impact evaluation has found that the rate discount resulted in a systematic increase in consumption*.

Quite aside from the fact that neither economic theory nor empirical evaluations support the concern that Manitoba Hydro has expressed about how low-income discounts would "distort" price signals, the Company has not expressed similar concerns with respect to other billing programs that primarily benefit customers other than low-income customers. For example, the Company does not express concern about whether, or how, its Levelized Budget Billing program distorts price signals.

Table 7 provides basic information about the Equal Payment Plan program offered by Manitoba Hydro.[50] Roughly 20% of the Company's total residential customer base was in the levelized budget billing program in 2009. Participation ranged from 90,000 to 100,000 residential customers.[51] By its nature, levelized budget billing is intended to cost-shift utility bills so customers do not see the full impact of their consumption decisions in their monthly bills. As a result, by design, levelized budget billing distorts the "price signals" to residential customers, especially in the high costs months when consumption decisions would have the biggest impact on usage and bills. Indeed, as Table 7 shows, in the high cost months of January through March, between 65% and 90% of residential customers on the levelized budget billing plan are not billed the full cost of their monthly consumption. Given an average residential bill of more than $80, the budget billing customers are being billed somewhere between 30% and 75% less than their

[47] The average residential arrears of an account with an arrears 60-days old or older is $900. RCM/TREE/MH-I-155.
[48] From an economic theory perspective, it is easy to understand this result. From a price theory perspective, price signals "work" only if there is adequate information about price and quality. The inability-to-pay, and the resulting arrears, impedes this information process. By improving this information process, while maintaining the task of reflecting increases and decreases in a bill, the rate affordability program improves rather than distorts the price signal. See generally, R.Colton (1990). "Customer Consumption Patterns within an Income-Based Energy Assistance Program." 24 *Journal of Economic Issues* 1079.
[49] See the various reports presented to, but not reviewed by Manitoba Hydro. (RCM/TREE/MH-I-171).
[50] An Equal Payment Plan program does not provide substantive affordability benefits to low-income customers with high energy burdens. High energy burdens are calculated on an annual basis. No matter how a home energy burden is spread over a year, a burden of more than 6% will still be unaffordable. Equal Payment Plans are designed to help customers whose bills may be affordable on an annual basis, but whose monthly variability in the billing pushes any particular month into an unaffordable range for that month.
[51] For administrative reasons, customers are removed from budget billing in the settlement month (August) and re-enrolled the following month. Participation rates in August and September thus do not reflect the annual rate.

actual usage in those high cost months. Nonetheless, Manitoba Hydro does not express concern about any resulting distortion of price signals for these budget billing customers.

Table 7. Manitoba Hydro Levelized Budget Billing Plan (2009)

	Residential Customers	Average Monthly Bill	Levelized Budget Billing Plan Participants				
			No. of LPP Participants	Percent of Total Residential	No. with Credit Balance	No. with Debit Balance	Pct with Debit Balance
January	460,269	$140	89,057	19%	14,533	78,297	88%
February	460,615	$116	90,043	20%	27,538	57,587	64%
March	460,804	$108	90,422	20%	35,633	58,159	64%
April	461,075	$103	90,557	20%	40,419	44,197	49%
May	461,315	$71	90,505	20%	80,610	13,013	14%
June	461,599	$65	90,421	20%	72,769	11,858	13%
July	461,969	$60	90,189	20%	69,759	23,435	26%
August /a/	462,310	$57	4,619	1%	43,934	45,891	994%
September	462,776	$59	83,625	18%	66,747	23,685	28%
October	463,392	$76	97,904	21%	75,682	22,481	23%
November	463,860	$78	99,729	21%	86,994	17,836	18%
December	464,305	$101	101,064	22%	49,929	46,166	46%

SOURCE: RCM/TREE/MH-I-57

NOTES:

/a/ For program administration purposes, customers are removed from the Equal Payment Plan in the balancing month (August) and re-enrolled the following billing month.

When coupled with the failure of Manitoba Hydro to perform any "return on investment" for its budget billing program, or to assess the extent to which, if at all, budget billing helps to reduce either bad debt or residential arrears, the added failure of Manitoba Hydro to evidence concern about the price distortion of levelized budget billing makes the concern that Manitoba Hydro now expresses about the impact that a low-income discount might have on "price signals" ring hollow.

THE PROGRAMMATIC FAILINGS OF THE MANITOBA HYDRO RESPONSE

Manitoba Hydro fails to support its proposed low-income program proposal on a programmatic basis. The Company's program fails when considered from a needs basis and from an administrative basis. The problems with the energy efficiency, crisis intervention and payment management components will be separately reviewed below.

The Lack of a Grounding in a Needs-Determination

The Manitoba Hydro low-income program proposal fails to meet the affordability needs of its low-income population in any reasonable fashion. The AEP proposal advanced by Manitoba Hydro does not, in any objective way, even begin to address the low-income needs identified by the Company's own data.

The Energy Efficiency Program

The Company's Low-Income Energy Efficiency Program (LIEEP) does not begin to address the efficiency needs of Manitoba Hydro's low-income population. Manitoba Hydro touts its low-income efficiency program as being "recognized as one of the leading DSM programs in Canada." (AEP 15). The program includes "basic energy efficiency items such as compact fluorescent lights and low flow showerheads, air sealing materials, insulation measures, and the replacement of standard efficiency furnaces with high efficiency furnaces." (AEP 15).

Table 8 presents the number of lower income customers from all fuel sources that have received LIEEP assistance by year.[52] Over the four years of program data, 513 low-income customers have been served by LIEEP. Over the most recent three years, the Company has treated an average of 161 lower income homes per year.

Table 8. LIEEP Program Participation by Year (Manitoba Hydro)

	2006 - 2007	2007 - 2008	2008 - 2009	2009 – 2010 (YTD)	Total
LIEEP	31	108	143	231	513

SOURCE: RCM/TREE/MH-I-166.

Despite Manitoba Hydro's comments about the advantages of having a multi-pronged approach to serving low-income customers, only one (1) customer received both LIEEP and crisis assistance in 2008/2009; only three (3) customers received both LIEEP and crisis assistance in the first three quarters of 2009/2010. (RCM/TREE/MH-I-166(c)). No other customers (other than these four) have participated in both LIEEP and the Company's crisis intervention program. (RCM/TREE/MH-I-166(e)).

Despite the Company's emphasis on an individualized case-by-case determination of what interventions are appropriately to be directed toward low-income customers that have a "genuine difficulty" in paying their bills, of the 1,285 combined participants in the NHN and LIEEP programs (RCM/TREE/MH-I-166(d)), only four (4) (0.3%) have been found to merit receiving both crisis assistance to pay arrears and efficiency assistance to reduce future bills. After making an individualized case-by-case determination of need, only four (4) low-income customers have

[52] According to the Company: "please note that this is based on participation which is defined as homes that have completed all the LIEEP program recommendations and completed an ecoENRGY E evaluation, or comparable verification. In addition to those participants below, many additional LIEEP customers had some measures implemented, however, not all work has been completed (e.g., furnaces may have been installed but insulation was not completed." (RCM/TREE/MH-I-166).

received both crisis assistance and energy efficiency assistance despite the fact that low-income customers in arrears have bills that are, on average, nearly 70% higher than average residential customers bills.

The problem, of course, is that despite Manitoba Hydro's representations to the contrary, the Company does not really seek to deliver holistic assistance to address nonpayment and its underlying causes.[53] The purpose of the Manitoba Hydro program is to resolve the immediate payment crisis, not to holistically address the inability to pay problem. The offer of energy efficiency assistance cannot help a customer make a payment by a date certain in response to a notice of an impending disconnection of service for nonpayment and is thus not offered.

Moreover, in contrast to the LIEEP participation above, Table 9 presents Manitoba Hydro's low-income population disaggregated by billing bands. As Table 9 shows, nearly 37,500 low-income customers experience home energy bills at or above the Company's residential average (13,447 above electric heating average of $1,517; 24,000 above natural gas heating average of $1,753). More than 26,000 low-income customers experience bills that are 125% or more of the Company's residential average. Given the three-year average production level for LIEEP (161 homes per year), Manitoba Hydro would be able to treat all low-income customers with bills at the average or above within the next 233 years (assuming no growth in the number of low-income customers and assuming that no home would need to be re-treated in that time frame). Given the three year average production level for LIEEP, Manitoba Hydro would be able to treat all low-income customers at or above 125% of the average bill within the next 163 years.

Table 9 further shows the fallacy of relying on demand side management as the "focus" of a rate affordability initiative. If the Company were to treat all low-income customers with bills in excess of $3,000, it would undertake to treat 2,249 homes (5.4% of the total). At the three-year average production rate, this would be a 14-year effort. Even after this 14-year effort, if the Company were to achieve an average bill reduction of 25%:[54]

- the resulting bills (electric heating) would still range between 160% and 240% higher than the Company's residential average.

- the resulting bills (gas heating) would range between 160% and 190% of the Company residential average.

For these bills to be affordable at 6% of income:

- electric heating customers would need to have income between $38,883 ($2,333 / 0.06 = $38,883) and $58,350 ($3,501 / .06 = $58,350), well above the incomes of the Company's low-income customers.

- natural gas heating customers would need to have income between $38,983 and $47,333.

[53] A further discussion of this conclusion is presented in the "administrative" section below.
[54] In order to achieve a bill reduction of 25%, the usage reduction would need to be more than 25% given that a portion of the bill involves a fixed monthly charge.

Even after a 14-year effort, and a successful bill reduction of 25%, the Company still would not have achieved the goal of affordable home energy for these customers. The program may well have been a very successful usage reduction effort. It simply would not be a successful energy affordability initiative.

Table 9. Low-Income Customers By Bill Range (Electric Heating and Gas Heating)
(Manitoba Hydro)

	Electric Heating			Gas Heating		
	Number /a/	Avg. Bill /b/	25% Reduction	Number /c/	Avg. Bill /d/	25% Reduction
<$250	219	$222	$167	4,515	$230	$173
$251 - $500	2,137	$414	$311	8,084	$328	$246
$501-$750	2,960	$606	$455	2,707	$599	$449
$751 - $1,000	2,623	$868	$651	1,814	$903	$677
$1,001 - $1,250	3,955	$1,127	$845	3,117	$1,156	$867
$1,251 - $1,500	4,770	$1,375	$1,031	7,152	$1,374	$1,031
$1,501 - $1,750	4,446	$1,625	$1,219	11,696	$1,627	$1,220
$1,751 - $2,000	3,315	$1,849	$1,387	10,370	$1,872	$1,404
$2,001 - $2,250	2,244	$2,129	$1,597	5,937	$2,105	$1,579
$2,251 - $2,500	1,121	$2,399	$1,799	3,794	$2,351	$1,763
$2,501 - $2,750	622	$2,624	$1,968	2,061	$2,613	$1,960
$2,751 - $3,000	583	$2,819	$2,114	705	$2,840	$2,130
$3,001 - $3,250	554	$3,111	$2,333	460	$3,118	$2,339
$3,251 - $3,500	187	$3,415	$2,561	362	$3,381	$2,536
$3,501 or more	375	$4,668	$3,501	311	$3,786	$2,840

SOURCES:

/a/ RCM/TREE/MH-I-153(a).
/b/ RCM/TREE/MH-I-153(b).
/c/ RCM/TREE/MH-I-154(a).
/d/ RCM/TREE/MH-I-154(b).

Table 10 presents the problem from the converse perspective. Table 10 assumes a low-income household with an income of $17,000.[55] For a bill to be affordable at a 6% energy burden given this income, a home energy bill would need to be no greater than $1,020 ($17,000 x 0.06 = $1,020). Table 10 shows the bill reductions that the Company's LIEEP initiative would need to generate in order to achieve an affordable bill.

[55] While this income is not accepted as appropriately or reasonably representing the income of a Manitoba Hydro low-income customer, it is the income used by the Company in its low-income program proposal.

Table 10. Bill Reduction Needed to Achieve Affordable Bill at Different Bill Levels (Manitoba Hydro)

6% burden	Electric heating				Gas Heating			
	Number	Affordable Bill	Average Bill	Reduction Needed	Number	Affordable Bill	Average Bill	Reduction Needed
<$250	219	$1,020	$222	0%	4,515	$1,020	$230	0%
$251 - $500	2,137	$1,020	$414	0%	8,084	$1,020	$328	0%
$501-$750	2,960	$1,020	$606	0%	2,707	$1,020	$599	0%
$751 - $1,000	2,623	$1,020	$868	0%	1,814	$1,020	$903	0%
$1,001 - $1,250	3,955	$1,020	$1,127	9%	3,117	$1,020	$1,156	12%
$1,251 - $1,500	4,770	$1,020	$1,375	26%	7,152	$1,020	$1,374	26%
$1,501 - $1,750	4,446	$1,020	$1,625	37%	11,696	$1,020	$1,627	37%
$1,751 - $2,000	3,315	$1,020	$1,849	45%	10,370	$1,020	$1,872	46%
$2,001 - $2,250	2,244	$1,020	$2,129	52%	5,937	$1,020	$2,105	52%
$2,251 - $2,500	1,121	$1,020	$2,399	57%	3,794	$1,020	$2,351	57%
$2,501 - $2,750	622	$1,020	$2,624	61%	2,061	$1,020	$2,613	61%
$2,751 - $3,000	583	$1,020	$2,819	64%	705	$1,020	$2,840	64%
$3,001 - $3,250	554	$1,020	$3,111	67%	460	$1,020	$3,118	67%
$3,251 - $3,500	187	$1,020	$3,415	70%	362	$1,020	$3,381	70%
$3,501 or more	375	$1,020	$4,668	78%	311	$1,020	$3,786	73%

Table 10 shows that the bill reductions that the Company's LIEEP initiative would need to generate in order to achieve affordability at a 6% home energy burden are beyond those that are reasonably to be expected from LIEEP. The inability of LIEEP to achieve the bill reductions required to achieve an affordable burden is not limited to the highest bill levels. For electric heating, more than 9,000 customers would require bill reductions of 45% or more to achieve affordability at 6%; for gas heating customers, 24,000 customers would require bill reductions of 45% or more. A program such as LIEEP could not be expected to generate such usage reduction results.

The Crisis Intervention Program

The Company's crisis intervention program (Neighbors Helping Neighbors: NHN) does not begin to address the crisis needs of Manitoba Hydro's low-income population. NHN can neither serve the number of low-income customers needing assistance, nor provide the depth of assistance that is necessary to resolve payment crises.

Manitoba Hydro's crisis intervention relies on the Salvation Army to deliver assistance to customers "who are unable to pay their energy bills due to personal hardship or crisis." (AEP 12). While the Company defines neither term ("personal hardship" or "crisis"), broadly, the Company refers "customers who are struggling to pay their energy bill and facing disconnection" to NHN. (RCM/TREE/MH-I-135). In 2008/2009, NHN delivered assistance to 472 customers. (AEP 12).

The Company does not know either the level of arrears carried by customers receiving NHN assistance (RCM/TREE/MH-I-135(a)) or the age of arrears (RCM/TREE/MH-135(b)). The Company speculates that the average arrears of NHN recipients is $900, which is the average arrears of all customers having arrears greater than 60-days old. (RCM/TREE/MH-I-155). The Company "has not made an effort to estimate the targeted market for NHN." (RCM/TREE/MH-I-156).

Table 11 sets forth a table of accounts in arrears by the level of arrears. Table 11 shows the inadequacy of the Company's proposed crisis intervention program. If one engages in the conservative assumption that low-income customers are in arrears at the same rate as their incidence in the residential population as a whole (20.2% for Manitoba Hydro),[56] the Company experiences between 14,000 (October) and 16,500 (May) low-income accounts in arrears each month on average.[57] Of the low-income accounts in arrears greater than $100:

- Nearly 30% (2,194) have arrears of greater than $500;[58]
- Nearly 15% (1,073) have arrears greater than $1,000; and
- More than 5% (434) have arrears greater than $2,000.

The Company's treatment of fewer than 500 low-income customers per year falls well short of the need for arrearage assistance at these higher levels of arrears. Moreover, expanding the participation level to 708 customers (RCM/TREE/MH-I-156) does not remedy this shortcoming.

[56] In fact, the incidence of low-income arrears in the population of customers having arrears is higher than the incidence of low-income customers in the residential population.
[57] The variability in 30-day arrears documents that these are different accounts.
[58] The maximum NHN grant is $450. (RCM/TREE/MH-I-167).

Table 11. Accounts in Arrears by Month and Level of Arrears – 2009
(Total Residential and Low-Income) /a/

Residential	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
$0 - $100	36,273	34,659	34,661	38,190	40,832	39,730	42,880	40,307	40,846	40,920	38,805
$101 – 200	14,451	13,524	12,929	14,235	14,291	13,129	13,688	12,832	13,074	14,866	13,882
$201 - $300	7,525	7,673	6,947	7,447	6,537	5,661	5,630	5,205	5,028	6,116	6,190
$301 - $500	8,094	7,720	7,337	7,170	6,354	5,218	4,879	4,534	4,195	4,782	5,471
$501 - $750	5,233	5,043	4,624	4,504	3,786	3,142	2,815	2,581	2,222	2,337	2,756
$751 - $1,000	2,994	2,988	2,787	2,553	2,141	1,750	1,639	1,370	1,219	1,235	1,324
$1,001 - $2,000	4,200	4,390	4,454	4,333	3,606	2,883	2,694	2,380	1,997	1,969	1,915
$2,001 or more	2,162	2,322	2,470	2,587	2,425	2,207	2,166	1,997	1,777	1,764	1,734
Totals	80,932	78,319	76,209	81,019	79,972	73,719	76,391	71,206	70,358	73,989	72,077
Low-Income	Feb.	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
$0 - $100	7,327	7,001	7,002	7,714	8,248	8,025	8,662	8,142	8,251	8,266	7,839
$101 – 200	2,919	2,732	2,612	2,875	2,887	2,652	2,765	2,592	2,641	3,003	2,804
$201 - $300	1,520	1,550	1,403	1,504	1,320	1,144	1,137	1,051	1,016	1,235	1,250
$301 - $500	1,635	1,559	1,482	1,448	1,284	1,054	986	916	847	966	1,105
$501 - $750	1,057	1,019	934	910	765	635	569	521	449	472	557
$751 - $1,000	605	604	563	516	432	354	331	277	246	249	267
$1,001 - $2,000	848	887	900	875	728	582	544	481	403	398	387
$2,001 or more	437	469	499	523	490	446	438	403	359	356	350
Totals	16,348	15,820	15,394	16,366	16,154	14,891	15,431	14,384	14,212	14,946	14,560

SOURCE: RCM/TREE/MH-I-49

NOTES:

/a/ Assumes incidence of low-income in same proportion as incidence of low-income in total Manitoba Hydro residential population (20.2%).

One further problem with the NHN program is that while it may address, in some limited fashion, a portion of the arrearage problem faced by low-income customers –the Company provides a grant of not more than $450 applied against an ***average*** arrears of $900, with the distribution of arrears shown above indicating frequent arrears much greater than $900—it does not address the underlying ***cause*** of the arrearage problem. NHN grants do not exceed the value of a customer's arrears. (RCM/TREE/MH-I-167). If the cause of the arrears is the underlying unaffordability as documented above, while NHN may temporarily retire the arrears, it is reasonable to expect that customer to fall into arrears once again. The presence of arrears, in other words, is the indicator of the problem; it is not the problem itself.

As a result of this failure to address the underlying cause of the arrears facing a low-income customer, the Company cannot provide information on the outcomes generated by the grants

provided through NHN. While the Company receives a formal annual report from the Salvation Army each year, that report does not provide information on the outcomes generated by NHN grants. (RCM/TREE/MH-I-136, 137(a)). Indeed, the Company has never proposed or assessed, let alone decided upon, a set of outcome measures for its NHN program. (RCM/TREE/MH-I-137(b)).

Manitoba Hydro has no basis upon which to assess the effectiveness of its NHN in addressing either the prevention of utility arrears and collections, or the underlying unaffordability that leads to such arrears and collections. The Company can report how much money it spends on NHN and the number of customers receiving grants. (RCM/TREE/MH-I-136(b)). However, the Company can ***not*** provide information on basic outcome measures such as:

- Either the level of arrears (RCM/TREE/MH-I-135(d)) or the age of arrears (RCM/TREE/MH-I-135(e)) that NHN recipients have six months ***after*** receiving their NHN grant; or

- The number of disconnections experienced by NHN recipients in the 12 months ***after*** receiving their NHN grant (RCM/TREE/MH-I-135(f)); or

- The number of disconnect notices received by NHN recipients in the 12 months ***after*** receiving their NHN grant (RCM/TREE/MH-I-135(g)).

The Company cannot even report whether, six months after providing the crisis intervention assistance, the level of arrears on the account of an NHN recipient is lower than, greater than, or about the same as the level of arrears at the time the customer received the NHN grant. (RCM/TREE/MH-I-135(h)). Despite the money spent on its NHN program, the Company has no basis to assess whether those expenditures are having any impact on addressing the affordability of home energy bills or the payment problems that arise because of that unaffordability.

The "Payment Management" Program Option

The "payment management" program option that Manitoba Hydro advances for its low-income customers is an inadequate response to low-income inability to pay. Manitoba Hydro lists the following as the components of its "payment management" program: (1) "alternative payment methods"; (2) "payment locations"; and (3) "bill messaging." (AEP 8).

Manitoba Hydro could offer no support for its assertion that the offer of these "payment management" options would assist low-income customers facing an inability to pay. Despite asserting that its proposal was "based on the [referenced] research," Manitoba Hydro could not:

- Identify one single "bill assistance report and consultation paper" that identified "bill messaging" as a key component to a comprehensive bill affordability program. (RCM/TREE/MH-I-129(b));

- Identify one single program evaluation of a rate affordability program using “bill messaging” as a key component (RCM/TREE/MH-I-129(c));

- Identify one single “bill assistance report and consultation paper” that identified “alternative payment methods” as a key component to a comprehensive rate affordability program (RCM/TREE/MH-I-129(e));

- Identify one single program evaluation of a rate affordability program using “alternative payment methods” as a key component of the rate affordability program. (RCM/TREE/MH-I-129(f)).

- Identify one single “bill assistance report and consultation paper” that identified “payment locations” as a key component to a comprehensive rate affordability program (RCM/TREE/MH-I-129(h));

- Identify one single program evaluation of a rate affordability program using “payment locations” as a key component of the rate affordability program. (RCM/TREE/MH-I-129(i)).

One problem with these “payment management” options is that Manitoba Hydro views low-income inability to pay as a budget problem (i.e., “payment management”) rather than as an affordability problem. As Manitoba Hydro quite openly states: the “concept of energy burdens is not used in the design or assessment of Manitoba Hydro’s affordable energy programs.” (PUB/MH-I-213).

While Manitoba Hydro concedes that there will be customers who “require more assistance than Manitoba Hydro can offer,” (AEP 11), the Company has not:

- Identified any metrics to employ to make that determination (RCM/TREE/MH-I-132(a));

- Identified any data elements that would be used to identify such customers (RCM/TREE/MH-I-132(b));

- Established any policies or procedures for staff to use in making such a determination (RCM/TREE/MH-I-132(e)); or

- Created any training materials, or provided training to any call center or field office staff, on how to make such a determination. (RCM/TREE/MH-I-132(f)).

The ineffectiveness of the “payment management” options that Manitoba Hydro references can be seen in the case studies of an ""“acceptable living level” for Manitoba. No matter how well a low-income household “manages” its budget, it is simply not possible to stretch an income of

$7,011.96 to cover expenses of $36,912.[59] No matter how well a low-income household "manages" its payments, it is not possible to stretch an income of $8,888.16 to cover expenses of $15,382.31.[60]

Ultimately, the "payment management" options that Manitoba Hydro offers will be ineffective because they do not address the underlying unaffordability. Manitoba Hydro, however, does not offer these program options because they will be effective. Rather, the Company offers these program options because of its stated philosophy that "the issue of whether energy is affordable is outside the scope of Manitoba Hydro's mandate. . ." (RCM/TREE/MH-I-94).

The Administrative Program Shortcomings

The low-income program proposed by Manitoba Hydro has substantial administrative shortcomings. Many of those shortcomings have been addressed above. There is no definition of key elements of the eligibility requirements imposed by the Company, let alone an articulation of specific metrics or data elements to be used in the application of those eligibility requirements. There is no ability to determine even short-term outcomes from the application of NHN grants, including the prevention of arrears, the prevention of disconnect notices, and the prevention of service disconnections for nonpayment.

One other administrative shortcoming, however, is the considerable administrative expense that underlies the NHN program. In 2008/2009, the last year for which there is data, the Manitoba Hydro NHN initiative budgeted to spend 37% of its total program costs on program administration (RCM/TREE/MH-I-138), with an additional 2.7% budgeted to support the "marketing" of the NHN program (RCM/TREE/MH-I-139). Of the $217,172 budget, in other words, $87,308 was budgeted to support administration and marketing.

In the 2008/2009 fiscal year, for each average grant of $254 provided by NHN, Manitoba Hydro spent $166 on administration and marketing. (RCM/TREE/MH-I-141, RCM/TREE/MH-I-142). More efficient ways exist through which the Company can appropriately address low-income inability-to-pay.

In addition to the costs of the Manitoba Hydro crisis intervention program, however, is the inability of Manitoba Hydro to coordinate the services that it provides with the crisis intervention program. The failure of the Company to coordinate the NHN crisis intervention with the Company's energy efficiency program has been previously discussed. This failure is not coincidental. It is inherent within the program structure. The Company has no information upon which to offer the integrated services that it discusses. Instead, it refers customers to the Salvation Army and relies upon the Salvation Army to "assess client needs and situations." (RCM/TREE/MH-I-133). The Company does not receive, nor could it provide, any information on the client "needs and situations" as determined by the Salvation Army. (RCM/TREE/MH-I-134). With such a lack of information, it is not possible to determine the integrated services (e.g., efficiency, crisis intervention) that would benefit each client.

[59] Ford and Harris (2003). *Acceptable Living Level: Manitoba*, at 49, Winnipeg Harvest and the Social Planning Council of Winnipeg, Winnipeg (MAN).
[60] Id., at 50.

SUMMARY

The Affordable Energy Program proposed by Manitoba Hydro has within it inherent and irresolvable difficulties. The Company proposes to provide individualized assistance to customers who have a "genuine difficulty" in paying their home energy bills. Despite this individualized assistance, the Company proposes to have a "clear definition" of eligibility. Manitoba Hydro cannot, however, even define who is and who is not eligible for assistance, let alone identify what information will be used to distinguish who will receive assistance and who will not.

The Company further proposes to focus its Affordable Energy Program on delivering energy efficiency investments. The energy efficiency needs of the Company's low-income customers, however, far outstrip the ability of the Company to deliver. On the one hand, the number of low-income customers with bills sufficiently high to indicate the probable need for efficiency investments is so large as to be beyond the reach of the Company in a reasonable time frame. On the other hand, a substantial number of low-income customers have bills that, even with reasonably expected bill reductions accruing from efficiency investments, could not be reduced to an affordable level.

Finally, while the Company proposes a program that it asserts will deliver a higher "return on investment" than any alternative, it further proposes to rely on a program that for every average grant of $254, it has historically spent $166 on administrative and marketing costs.

An alternative programmatic approach and delivery system for addressing the social and utility problems presented by the unaffordability of home energy to Manitoba Hydro's low-income customers is presented in the next section.

PART 3:
A LOW-INCOME AFFORDABILITY PROGRAM FOR MANITOBA HYDRO

In response to the affordability problems documented above, and the broad range of utility, social, and business competitiveness impacts arising because of these problems, this report outlines the essential components comprising an effective and efficient low-income affordability program for Manitoba Hydro. These components include:

- A rate affordability component;
- An arrearage management component;
- A crisis intervention component; and
- An energy efficiency component.

THE RATE AFFORDABILITY COMPONENT

The first critical component of a low-income affordability program is a rate affordability program. Through the rate affordability program component, the price of home energy is set at 6% of income, a level that will generate an enhanced ability of low-income customers to make actual payments. Within the context of Manitoba Hydro's electric rates, this paper considers an electric program.

An Overview and Summary.

Building a rate affordability program consists of the following basic steps:[61]

1. **Eligibility:** Defining the eligibility for the rate affordability program should allow the program to be *open to enrollment* by any low-income consumer. For purposes of this program, a "low-income consumer" is any consumer with gross household income at or below 125% of the Low-Income Cutoff (LICO).

2. **Outreach:** Informing low-income customers of the availability of the rate affordability program involves both education about the *existence* of the program and education about *how to enroll* in the program. The most effective forms of outreach for ratepayer-funded programs have been found to involve the use of community-based organizations as well as organizations that deliver social assistance benefits to the same households that are eligible to receive rate affordability benefits. Outreach should also occur through the local utility channeling customers to the program when, based on utility records, those customers are found to be payment-troubled.

3. **Intake:** Enrolling customers in the rate affordability program involves making customers into program participants. The primary intake should occur by contracting with relevant federal and provincial agencies to "match" electronic lists of residential customers with lists of social assistance program participants. This income verification is effective and inexpensive. In addition, consumers should be given the opportunity to complete an in-person application through a community-based site whether or not they participate in a social assistance program.

4. **Collections:** Enforcing customer payment obligations after a customer receives a rate affordability benefit should occur through the same credit and collection activities directed toward any residential customer. If a customer receiving service through an affordable rate does not make appropriate payments, that customer enters the collection cycle with the same rights and responsibilities as any other customer. In this fashion, no new or special administrative process is created for the rate affordability participants.

5. **Recertification:** Recertifying income for customers whose income cannot reasonably be determined to be non-variable over the long-term should occur on an annual basis. Most participants will have their income recertified automatically through a contract with the appropriate social assistance agency. For those customers whose income cannot be recertified in this fashion, the customer will be notified at an appropriate time before his or her anniversary date of the need for recertification.

Having provided this summary, the remainder of this section will address the structural and operational issues of rate affordability assistance in more detail.

[61] *See generally*, Roger Colton (2007). *Best Practices: Low-Income Affordability Programs, Articulating and Applying Rating Criteria*, prepared for Hydro-Quebec, Fisher, Sheehan & Colton: Belmont (MA).

Proposed Structure for a Manitoba Rate Affordability Program.

Rate affordability assistance for Manitoba Hydro customers should be tied to the most recently available LICO. The proposal here is to set eligibility equal to 125% of LICO. For a household with three persons, the maximum eligibility[62] under this guideline would be $42,416 for a community with a population of 500,000 or more.[63]

Table 12. Low-Income Cutoffs for 2008 (before tax) (1.25x)

Family Size	Rural	Urban Areas			
		Less than 30,000	30,000 – 99,999	100,000 – 499,999	500,000 or more
1	$19,078	$21,705	$23,720	$23,868	$27,714
2	$23,750	$27,019	$29,529	$29,711	$34,501
3	$29,198	$33,216	$36,301	$36,528	$42,416
4	$35,451	$40,330	$44,076	$44,350	$51,498
5	$40,206	$45,743	$49,990	$50,299	$58,409
6	$45,348	$51,590	$56,381	$56,731	$65,874
7 or more	$50,488	$57,438	$62,773	$63,161	$73,341

SOURCE: Based on: Low-income Cut-offs and Low-Income Measures for 2007 and 2008 (June 2009).

It should be recognized that under a rate affordability program that is based on affordable home energy burdens, if, because of relatively higher income or relatively lower home energy bills, the pre-determined percent of a household's income will exceed their annual electric bill, the household will receive no benefit. In those instances, the home energy bill is deemed "affordable" and the local utility will collect the entire bill calculated at standard residential rates. Only in those instances where the household, due to low incomes or high bills, faces a utility bill that exceeds the designated percentage of its income, is the bill deemed to be “unaffordable” and the rate is offered to reduce the burden to an affordable level.[64]

[62] The fact that the maximum eligibility is set at $42,416 does not mean that the average income for eligible customers will be at this income level. The average income will be much lower.

[63] With a population in Winnipeg of roughly 675,000, the figure for 500,000 or more seems to present the best comparison.

[64] To illustrate, assume a household has an annual income of $25,000, an annual energy bill of $1,200, and is asked to pay six percent (6%) of her income toward her energy bill in an income-based program. This customer's income-based energy bill payment would be $1,500 ($25,000 x .06 = $1,500). Hence, this customer would decide *not* to participate in the income-based rate, since her bill at standard residential rates is *less* than the bill rendered under the rate affordability program.

Rate affordability assistance in Manitoba should be distributed on a percentage of income basis. Using a percentage of income approach to targeting provides a more efficient use of scarce rate affordability resources. This can be demonstrated by comparing an across-the-board discount to a percentage of income approach. While a percentage of income approach delivers those benefits, but only those benefits, needed to bring low-income bills into an affordable range, an across-the-board discount does not. Using an across-the-board discount, the universal service program would pay some customers *more* than is necessary to bring bills into an affordable range while paying other customers *less* than is necessary to bring bills into an affordable range. Accordingly, it is most appropriate to base the rate affordability component of the Universal Service Program on a percentage of income targeting mechanism.[65]

Although a variety of percentage-of-income based approaches exist, delivery of rate affordability assistance using a fixed credit approach is most appropriate. The fixed credit approach begins as an income-based approach. In order to be eligible for the rate, a household must meet *both* eligibility criteria: (1) that the household income is at or below 125% of the Low-Income Cutoff (LICO) for Manitoba; and (2) that the household energy burden exceeds the burden deemed to be affordable.[66]

The fixed credit approach next calculates what bill credit would need to be provided to the household in order to reduce the household's energy bill to a designated percent of income. To calculate the fixed credit involves three steps: (1) calculating a burden-based payment; (2) calculating an annual bill; and (3) calculating the fixed credit necessary to reduce the annual bill to the burden-based payment. Each step is explained below.

1. **Burden-based payment:** The first step in the fixed credit model is to calculate a burden-based payment. Assume -- simply for the sake of illustration here -- that the household has an annual income of $8,000 and is required to pay six percent (6%) for its home energy bill. The required household payment is thus $480. This is determined as follows: $8,000 x 6% = $480.

   Distinctions in the percentage of income payment are made based upon whether the customer is a heating or non-heating customer. The payment is split evenly between the heating and non-heating component of the utility bill. Under a 6% scenario, a natural gas heating customer would be asked to pay three percent (3%) of the household's income toward her home heating bill, and another three percent (3%) toward her electric bill. An all electric customer would pay six percent (6%) toward her electric bill. Other percentage burdens would be similarly split half-and-half (8% converts to 4% toward each fuel; 10% converts to 5% for each fuel).

   The energy burden represented by a combined heating and non-heating energy bill should not generally exceed six percent (6%) of income. It is generally accepted that a household's "shelter burden" (rent/mortgage plus taxes plus utilities) should not exceed

[65] Two states in the United States have adopted a "tiered discount" program to serve as an alternative to an across-the-board discount (New Hampshire and Indiana).

[66] A customer may still participate in the arrearage management program component even if he or she does not participate in the rate affordability component.

30% of income. In addition, a household's home utility bill should not exceed 20% of the household's shelter costs. Combining those two yields an affordable home energy burden of six percent (6%).[67] Clearly, however, the reasonableness of an energy burden is a range and not a point. Ultimately, whether an affordable burden should be set as 6% or as 8% (or some other figure) is a policy decision. The percentage of income burden that triggers significant payment-troubles (*e.g.*, service disconnections) appears to be in the range of 10% to 12% of annual income.[68]

2. **Projected annual bill:** The second step is to calculate a projected annual household energy bill. This calculation is to be made using whatever method the local utility *currently* uses to estimate annual bills for other purposes. A utility, for example, will likely have an established procedure for estimating an annual bill for purposes of placing residential customers (low-income or not) on a levelized Budget Billing Plan (where bills are paid in equal installments over 12 months). That same process can be used to estimate an annual bill for purposes of calculating the needed fixed credit.

3. **Fixed credit determination:** The final step is to calculate the necessary fixed credit to bring the annual bill down to the burden-based payment. Given an annual bill projection of $1,200 and a burden-based payment of $480, the annual fixed credit would need to be $720 ($1,200 - $480 = $720). The household's *monthly* fixed credit would be $60 ($720 / 12 = $60).

In addition to various administrative benefits from the use of a fixed credit, the fixed credit also offers the advantage of providing a strong conservation incentive to the low-income customer. Under the fixed credit model, the local utility provides a $60 fixed credit to the low-income household irrespective of the household's actual bill. If the household increases its consumption, and thus has a higher bill, the household pays the amount of the increase. If, in contrast, the household conserves energy and thus lowers its bill, the household pockets the savings.

The administrative advantages of the fixed credit program are two-fold. First, use of fixed credits as a benefit distribution mechanism allows the program to work within a fixed operating budget. Once a low-income customer is enrolled in the universal service program, the maximum possible financial exposure for the time of the enrollment is established. At no time, can the maximum financial exposure exceed the budgeted program revenues. Systems can be easily designed to track funds that are obligated and expended to ensure that the budget is not exceeded. In contrast, benefit expenditures through either a straight percentage of income program or a percentage of bill program may vary based upon changes in consumption.

In addition to this budgeting advantage, the fixed credit approach makes the billing less complicated as well. Using the same process that currently exists to establish a levelized budget-billing plan, fixed credits can be subtracted from a customer's levelized annual bill.[69] The

[67] This report sets aside for the moment the inclusion of water and sewer utility bills in this six percent.
[68] "Affordability" concerns are triggered at much lower percentage of income burdens. Affordability concerns, involving household budget trade-offs and payment troubles less intense than the loss of service appear to be triggered at the 6% to 8% percentage of income burden levels.
[69] The fixed credit is, in essence, booked as a "payment" on the account.

monthly bill is then rendered based upon this one-time annual adjustment. The utility does not need to make monthly billing adjustments as is the case with either the straight percentage of income, or with the percentage of bill, approach.

In sum, the following critical components of the proposed rate affordability component of a rate affordability program are proposed above:

- Eligibility is set at 1.25 x the Low-Income Cutoff (LICO);
- Enrollment should be, to the maximum extent feasible, implemented through an automated data exchange with social assistance agencies;
- Rate affordability benefits are to be delivered through a fixed credit approach;
- The level of "affordability" should be set at 6% of household income. This affordability factor should be split evenly between baseload electric usage (3%) and space heating (3%). An all electric household should pay the full 6%.[70]

An Alternative Structure for a Manitoba Rate Affordability Program.

Not all electric and/or natural gas utilities have the financial wherewithal to adopt the fixed credit rate affordability described above. For small utilities in particular – Manitoba Hydro would not qualify as a "small" utility --[71] a rate affordability alternative is available. The substantive benefits of a rate affordability program can be generated without incurring the administrative costs of implementing a fixed credit program.

The alternative to a fixed credit program involves the adoption of a tiered discount program. As with the fixed credit program, a tiered discount program is tied to an affordable energy burden. The tools this alternative uses to reach the affordability objectives, however, are somewhat blunter and less-well tailored to assure that all customers achieve affordability. Instead of the targeted affordability benefits, a tiered discount program is aimed at ensuring affordability on average.

The purpose of a rate affordability program is to promote the supply of affordable home energy service to low-income customers. As described above, energy burdens are the generally-accepted mechanism by which to measure "affordability." The fixed credit approach to distributing home energy affordability benefits, as described above, explicitly reduces low-income electric bills to a point where those bills present an affordable burden. The fixed credit is based on a household's actual annual income and actual home energy bills (with some exceptions). The fixed credit defrays the cost of bills that exceed the affordable burden.

[70] As discussed in more detail above, however, the affordable burden is a range and not a point. Total energy burdens of up to as high as 10% could be determined, by policy, to be within a range of reasonableness.
[71] The Belmont Electric Light Department, a municipal utility serving 10,000 residential customers, adopted a "small utility" rate affordability alternative effective January 2006. One alternative to defining "small utility" by policy is to establish the "small utility" alternative and require a utility to petition regulators for the option of adopting the small utility alternative.

In contrast to the fixed credit approach, a tiered discount approach can only approximate an affordable burden. A tiered discount approach to distributing benefits is designed to reduce a bill to an affordable percentage of income (with the percentage differing depending on whether the customer is a base load customer or a space heating customer) *assuming that the household consumes at the average level of consumption*. To the extent that a household consumes more or less than average, the household will bear a burden either higher or lower (respectively) than the affordable burden.

To calculate a tiered discount, all low-income customers are placed into buckets demarcated by annual income levels. Buckets used to develop a tiered discount can be disaggregated into as large (or small) of a range as desired. Using the mid-point of each income bucket, an affordable bill can be calculated by applying the electric burden determined to be "affordable." A program having seven "buckets" has been examined for Manitoba Hydro; the buckets largely correspond to the income buckets for which the Company collects information. An affordable home energy burden is set at 6% of income for electric heating and 3% of income for electric base load consumption associated with natural gas heating customers.[72]

Table 13. Affordable Bills by Electric Heating and Electric Baseload (gas heating)

	Electric Heating			Electric Baseload		
Annual Income	Mid-point	Affordable Burden	Affordable Bill	Mid-point	Affordable Burden	Affordable Bill
< $10,000	$5,000	6%	$300	$5,000	3%	$150
$10 - $19,999	$15,000	6%	$900	$15,000	3%	$450
$20 - $29,999	$25,000	6%	$1,500	$25,000	3%	$750
$30 - $39,999	$35,000	6%	$2,100	$35,000	3%	$1,050
$40 - $49,999	$45,000	6%	$2,700	$45,000	3%	$1,350
$50 - $59,999	$55,000	6%	$3,300	$55,000	3%	$1,650
$60,000 or more	$70,000	6%	$3,900	$70,000	3%	$1,950

By taking the mid-point of each bucket, the affordable burden is exactly accurate only for those persons exactly at that mid-point. Customers with incomes in the half of each bucket below the mid-point will pay somewhat more than an affordable burden, while customers with incomes in the half of the bucket above each mid-point will pay somewhat less than an affordable burden.

Households in each income bucket are next assigned the average annual expenditure for electricity irrespective of income. According to Manitoba Hydro, "there is no direct correlation between energy consumption and income."[73]

[72] A further refinement of the tiered discount approach is to base the discounts on a tiered energy burden. This approach quite reasonably is based on the observation that 3% of income is "more important" to households in the lowest income tiers than it is to households in the higher income tiers. This refinement, however, is set aside for now.

[73] Manitoba Hydro Affordable Energy Program, at 4 (November 10, 2009).

Table 14. Affordable Bills by Electric Heating and Electric Baseload (gas heating)

Annual Income	Electric Heating			Electric Baseload		
	Affordable Bill	Average Bill /a/	Avg Deficit	Affordable Bill	Average Bill /b/	Avg Deficit
< $10,000	$300	$1,800	$1,500	$150	$710	$560
$10 - $19,999	$900	$1,800	$900	$450	$710	$260
$20 - $29,999	$1,500	$1,800	$300	$750	$710	$0
$30 - $39,999	$2,100	$1,800	$0	$1,050	$710	$0
$40 - $49,999	$2,700	$1,800	$0	$1,350	$710	$0
$50 - $59,999	$3,300	$1,800	$0	$1,650	$710	$0
$60,000 or more	$3,900	$1,800	$0	$1,950	$710	$0

NOTES:

/a/ Based on information provided in response to RCM/TREE/MH-I-149.
/b/ Based on information provided in response to RCM/TREE/MH-I-150.

The *difference* between the average bill and the affordable bill is determined. For example, the amount by which the actual average bill exceeds the affordable bill for a household in the bucket with less than $10,000 of income (mid-point of $5,000) is $1,500 for electric heating customers ($1,800 - $300 = $1,500) and $560 for electric baseload customers ($710 - $150 = $560).

This difference is the benefit that a tiered discount is designed to deliver. So long as a customer has annual expenditures that are equal to the company's residential average, application of a tiered discount will reduce that customer's annual electric bill to the burden determined to be affordable. Converting the data above into discounts would result in the discounts proposed in Table 15.

Table 15. Affordable Bills by Electric Heating and Electric Baseload (gas heating)

	Electric Heating			Electric Baseload		
Annual Income	Average Bill	Average Deficit	Discount	Average Bill	Average Deficit	Discount
< $10,000	$1,800	$1,500	80%	$710	$560	80%
$10 - $19,999	$1,800	$900	50%	$710	$260	37%
$20 - $29,999	$1,800	$300	15%	$710	$0	15%
$30 - $39,999	$1,800	$0	CCW	$710	$0	CCW
$40 - $49,999	$1,800	$0	CCW	$710	$0	CCW
$50 - $59,999	$1,800	$0	CCW	$710	$0	CCW
$60,000 or more	$1,800	$0	CCW	$710	$0	CCW

NOTES:

CCW = 100% Customer charge waiver. The percentage discounts are otherwise applied to the customer charge.

Table 15 demonstrates that a six percent (6%) energy burden is achieved for a household with an annual income at the mid-point between $10,000 and $19,999 ($15,000) by providing a 50% discount to an $1,800 home energy bill. An affordable burden (6%) is achieved for a household with an annual income at the mid-point between $20,000 and $29,999 ($25,000) by providing a discount of 15%.

The discount is "tiered" because, as incomes decrease, it takes a deeper discount to deliver a benefit equal to the difference between an affordable bill and the average bill. The more levels of discount that exist (i.e., the more "tiers"), the more highly targeted the discount will be. Manitoba regulators need to determine, by policy, how many tiers they wish should they choose to adopt a tiered discount program.

In all matters other than benefit level, a tiered discount affordable rate should deliver the same program components (e.g., arrearage management, crisis assistance, availability to energy efficiency) to all tiers.

The Policy Choices between the Two Alternative Rate Affordability Programs.

A decision on whether to implement a fixed credit program or implement a tiered discount alternative for Manitoba Hydro presents two primary issues. The issues are of two kinds:

- A policy issue, and
- A program issue

The policy issue: The first issue is one of policy. On the one hand, the fixed credit program clearly better targets benefits to low-income customers. A customer would consume at a utility's average residential consumption only by happen chance. Because discounts are based on average consumption, in nearly every case, low-income customers will receive either more benefits than are needed to reduce their expenditure to an affordable burden or fewer benefits than are needed.

And this result does not even consider the fact that average consumption is combined with the use of the mid-point of the income range. Even if a customer consumes exactly at a company's average, unless that customer *also* has annual income exactly at the mid-point of the income bracket for which the discount is established, a tiered discount will give the customer either "too much" or "too little."

The response to this is that, setting aside whether the tiered discount is *exactly* correct in its reduction of energy burdens to an affordable level, in *every* case, the customer is *better off* than had the customer received no discount at all. The adage that it is better to be approximately correct than precisely wrong informs this observation. Even if the lowest income customers do not have their electric burdens reduced to exactly six percent (6%), paying eight percent (8%) with the discount leaves the customer better off than paying 40% without the discount.

The fixed credit, on the other hand, precisely targets benefits. The issue of whether some customers receive "too much" and others receive "too little" does not arise. This precision in targeting, however, comes with a cost. Some utilities argue that the cost of setting-up and administering a fixed credit program is much higher than the cost of setting-up and administering a tiered discount program. The significance of the higher set-up and administrative costs is that every dollar that goes for set-up and administration is a dollar that is *not* going to pay energy assistance benefits. No utility with a fixed credit program approaches the administrative cost level of nearly 40% incurred by Manitoba Hydro's existing NHN program.

The program issue: The program issue is raised by the fact that a fixed credit is "fixed." Once determined at the beginning of the program year, the risk that bills will change (based either on weather or on price) lies with the customer. If the customer has a lower bill, he or she pockets the difference. If the customer has a higher bill, he or she bears the burden of the increase.

In addition to creating a conservation incentive, this approach provides operational benefits. The maximum program expenditure is established at the time a customer enters the program. Changes in weather or price will not drive program costs up. In contrast, with a tiered discount, program costs will fluctuate based on both weather and price. If there is a very cold winter (or a very hot summer), with correspondingly higher bills, the program must bear the cost of the higher discounts that will be provided.

Summary

Outside of these two major issues, the fixed credit and tiered discount programs should operate in much the same fashion. No inherent differences exist. The tiered discount and the fixed

credit are simply alternative ways of delivering benefits. The programs remain basically constant. The fixed credit program assures that all rate affordability assistance is precisely targeted; this assurance comes with a somewhat more involved administrative structure. The tiered discount program has a somewhat less involved administrative structure; this simplicity comes with an inherent level of mis-targeting, with some customers receiving "too little" and other customers receiving "too much."

For a utility the size of Manitoba Hydro, the advantages of the fixed credit program outweigh the disadvantages. Manitoba Hydro should adopt a percentage of income fixed credit program.

THE ARREARAGE MANAGEMENT COMPONENT.

The second critical component to a low-income affordability program involves arrearage management. An arrearage management program component is designed to reduce pre-program arrears to a manageable level over an extended period of time. Through an arrearage management program, a customer earns credits toward his or her preprogram arrears over a period of time, so long as the customer remains on the affordable rate. By the end of the time period, the household's preprogram arrears will be reduced to $0.

The Need for an Arrearage Management Program Component

An arrearage management program component is necessary to help get low-income customers "even" so they have a chance at future success in making payments. It makes no difference to have *current* bills be affordable if the total bill is unaffordable due to payment obligations required to retire *past due* bills incurred before the program began (known as preprogram arrears).

The 2006 evaluation of the New Jersey Universal Service Fund (USF) left little question but that that program's arrearage management provisions (called the "Fresh Start program") were necessary to help USF program participants successfully comply with the payment terms of USF bills.[74] In the absence of Fresh Start, USF program participants would be responsible for complete payment of their pre-program arrears. These arrearage payments would be above and beyond the percentage of income burdens found to be affordable.

The New Jersey evaluation expressly found that increasing the percentage of income burdens charged to USF participants had an adverse impact on the ability of USF participants to maintain payment compliance under the program. As the evaluation noted, "more than 80% of households with a [net energy burden] below 3 percent covered 100 percent or more of their annual bill. Less than 60 percent of households with a [net energy burden] at or above 8 percent covered 100 percent of their annual bill." Indeed, while 25.6% of the participants with net energy burdens exceeding 8% of income paid between 50% and 90% of their bill, only 6.0% of households with energy burdens of between 2% and 3% had coverage rates that low.

[74] Apprise, Inc. (2006). *Impact Evaluation and Concurrent Process Evaluation of the New Jersey Universal Service Fund*, prepared for the New Jersey Board of Public Utilities, Apprise, Inc.: Princeton (NJ).

Table 16. Distribution of Effective Coverage Rate by Net Energy Burden
New Jersey Universal Service Fund (USF)

Net Energy Burden	Coverage Rate			
	<50%	50% - <90%	90% - <100%	100% or more
Less than 2%	0.0%	2.7%	5.3%	92.0%
2% - 3%	0.0%	6.0%	11.5%	82.5%
3% - 4%	0.0%	10.0%	13.2%	76.9%
4% - 6%	0.0%	11.6%	16.6%	71.6%
6% - 8%	0.4%	16.6%	17.4%	65.5%
Over 8%	1.0%	25.6%	16.1%	57.4%

The New Jersey evaluation reported the same types of results for gas/electric combination USF participants. While nearly 80% of participants with burdens of less than 4% paid 100% or more of their bills, only 43% of participants with burdens exceeding 12% did. While 31.1% of USF participants with burdens exceeding 12% paid between 50% and 90% of their bills, only 9.0% of participants with burdens less than 4% had bill coverage rates that low. The New Jersey USF evaluation documents quite clearly the need for an arrearage management program component in a low-income affordability program. As percentage of income payment responsibilities increase, payment compliance decreases.

The Operation of an Arrearage Management Program Component

While some utilities simply forgive all arrears brought into a low-income program at the time the program begins, most utilities provide arrearage management over an extended period of time. In the latter situations, the time period over which to provide preprogram arrears credits needs to stay within the reasonable planning horizon of the customer.[75] The program design recommended for Manitoba Hydro involves an arrearage management period of three years. Arrearage credits are earned on a monthly basis.[76]

No prerequisite is proposed for the offer of arrearage management credits. While at first blush, it may seem desirable to make the grant of credits toward preprogram arrears contingent upon full and timely payment of current bills, there are both policy and operational reasons not to do this.

First, there are the operational issues. To implement such a contingent credit, the local utility would need to develop an information system process that determines, on a monthly basis, not only whether the full bill has been paid, but whether it has been paid on a timely basis. Depending on the answer to those inquiries, different bills will be generated by the utility (either

[75] To suggest, for example, that arrears will be reduced to $0 over a period of four or more years is outside the horizon within which low-income households do their planning.

[76] While arrearage credits are to be ***earned*** on a monthly basis, they can be ***credited*** to the account (or "posted" to the account) on a quarterly or semi-annual basis. The point at which earned preprogram arrears credits are actually credited is often a matter of billing system programming rather than a program policy question.

one reflecting an arrears credit or one not reflecting such a credit). Layering a process for "curing" missed payments adds further administrative complexity.

Second, from a policy perspective, program administrators have learned that creating layer upon layer of "incentives" for payments clouds the fundamental underlying proposition. That proposition posits that, in recognition of the underlying unaffordable burden posed by utility bills at fully-embedded rates, the low-income customer is allowed to take service under the low-income program. Given that response to unaffordability, customers then have the responsibility to make full and timely payment of their bills irrespective of any further "incentive."

Accordingly, nonpayment for service provided under the affordable low-income rate will be met by placing the customer into the same collection process as that which would be faced by any other customer. Nonpayment does not result in suspension from the program. Instead, while the customer would continue to take service under the low-income rate, nonpayment under the low-income rate will place the program participant in the collection process.

The program proposal recommended for Manitoba Hydro involves low-income customers making a monthly co-payment toward preprogram arrears. In this fashion, customers with minimum levels of payment troubles will not receive credits toward their arrears. In addition, in this fashion, low-income customers will bear some responsibility for their preprogram debt.[77]

The requirement of a customer copayment toward a preprogram arrears, however, should not interfere with the underlying affordability goals of the affordable rate. Accordingly, this proposal recommends setting the customer copayment level equal to $5 per month. Over the three-year arrearage management period, low-income customers will pay $180 toward their pre-existing arrearages ($5/month x 12 months/year x 3 years = $180). Only if customers have a pre-existing arrearage greater than $180 will the arrearage management component of the program create a program cost.

In sum, the following critical elements of the proposed arrearage management component of a low-income affordability program are proposed above:

- Arrears are to be retired over a three-year period;
- Customers are to make copayments toward their arrears;
- Copayments are to be set equal to $5 per month ($60 per year);
- No pre-condition is established for the grant of arrearage management credits; and
- The appropriate response to nonpayment is to place the program participant in the same collection process as any other residential customer.

[77] However, some utilities have decided that the cost of developing a billing capacity for the customer copayment is not merited by the amount of revenue produced by the copayment process. These utilities provide credits toward 100% of the preprogram arrears.

THE CRISIS INTERVENTION COMPONENT.

The third critical component of a low-income affordability program involves crisis intervention. The need for a crisis intervention program arises from three different attributes of low-income households.

- First, one attribute of low-income households is their lack of cash assets to allow them to weather the storm of unexpected expenses or unexpected loss of income. Low-income households do not have the ability to withstand a significant expense associated with a family emergency, or the loss of income associated with such an emergency. Given such exigencies, there is a likelihood that some proportion of customers taking service under the low-income program will have occasional exigencies that can be met through a crisis intervention program.

- Second, one attribute of a low-income household is that low wage workers tend to be hourly wage workers. The overwhelming majority of these workers lack paid leave. The need for either medical leave, or family care leave, in other words, leads directly to lost income when paid leave is not provided. The lack of paid leave time may directly affect the ability of a working poor customer to maintain payments on their monthly utility bill. A person working 35 hours a week on hourly wages may lose three days of work simply due to a sick child missing school and requiring care. If no paid leave time exists for that employee, the sick child translates into permanently lost wages.

- Third, low wage workers tend to have lower quality jobs, often marked by considerable income fluctuations due to the number of hours they are called upon to work. The number of lost hours, and thus the amount of lost wages, is referred to as involuntary part-time employment. This fact of unstable income presents no commentary on the working poor individuals themselves. Rather it reflects the nature of work in which the working poor find themselves.

Given these attributes of the target population, the crisis component of the low-income program represents a budget from which to provide crisis intervention assistance on an as-needed basis.

Crisis intervention assistance should not be based on income eligibility such as that established for the rate affordability assistance. Crisis intervention is frequently triggered by unusual expenses rather than by persistently low-income. A senior citizen facing medical expenses, as well as a working poor household facing substantial automobile repair expenses, may be marginally capable of paying their monthly bills but for their unusual expenses. The agency or community-based organization administering crisis interventions should be provided the flexibility to distribute crisis intervention funding on an as-needed basis rather than be bound by income limitations.

Given this, assistance provided through the crisis intervention component should be on a limited-time basis. The crisis intervention is intended to help meet financial exigencies rather than to provide monthly rate affordability assistance to customers.

In sum, the following critical elements of the crisis intervention component of a low-income program are proposed above:

- The crisis intervention component should not be based on income-eligibility;
- The crisis intervention component should provide administering agencies with the flexibility to distribute assistance on an as-needed emergency basis;
- The crisis intervention component should be on a limited-time basis; and
- The crisis funding should be distributed through existing crisis intervention programs.

COST RECOVERY FOR NON-EFFICIENCY PROGRAM COMPONENTS

This proposal recommends the recovery of costs primarily (but not exclusively) through a fixed meters charge. The use of a meters charge minimizes differences in intra-class burdens that might arise if cost recovery is undertaken on a volumetric basis. A meters charge cost recovery structure imposes a fixed charge on customers varying by customer class. The fee within any given class, however, does not vary between customers. A residential customer using 600 kWh each month pays the same fee that a residential customer using 1,500 kWh pays.

The Estimated Cost of the Proposed Manitoba Hydro Program

The estimated annual cost of the proposed Manitoba Hydro program is $15.50 million. The program cost is divided into four sections: (1) rate discount; (2) arrearage management; (3) crisis intervention; and (4) administration.

The Cost of the Rate Discount

The total cost of the rate discount program is estimated to be $10.8 million. This cost is based on a 40% participation rate and average 2009 residential bills. (RCM/TREE/MH-I-48(a)). The program cost is based on a 6% affordable energy burden for electric heating customers and a 3% affordable energy burden (electricity) for natural gas heating customers.

The Cost of the Arrearage Management

The cost of the arrearage management program is estimated to be $2.7 million. This cost is based on the following observations about low-income participation in affordability programs:

- 40% of eligible customers will participate in the program;
- 30% of program participants will enter the program with pre-existing arrears;[78]

[78] Manitoba Hydro does not have information on the penetration of arrears within its low-income population. RCM/TREE/MH-I-48(f).

- The Company estimates that the level of low-income pre-existing arrears is equal to $900,[79] which will be reduced by the customer copayment of $180. The resulting balance is amortized over three years.

The impact of these program characteristics yields an annual arrearage management cost of $2.7 million (93,000 low-income customers x 40% participation rate x 30% arrearage penetration x annual cost of $240).

The Cost of the Crisis Intervention

The cost of the crisis intervention program should be set equal to a reasonable percentage of the sum of the rate discount and arrearage management. A crisis intervention program funded at 5% of the costs of these two program components is not unreasonable. The annual cost of the crisis intervention would thus be $671,000.

The Cost of Program Administration

The cost of program administration is set equal to 10% of total program costs. A 10% administrative cost is a generally accepted costing methodology. At a 10% cost, the annual cost of the administration of the program recommended above would be $1,400,000.

Total Program Costs

The total cost of the proposed low-income affordability program is $15.50 million. The derivation of this total cost is set forth in Table 17.

Table 17. Total Costs of Proposed Manitoba Hydro Low-Income Affordability Program (mm$)

Rate discount	$10.8
Arrearage management	$2.7
Crisis intervention	$0.67
Administration	$1.4
Total	$15.50

[79] Manitoba Hydro does not have information about the average level of arrears within its low-income population. RCM/TREE/MH-I-48(e), (g).

The Structure of Cost Recovery

The costs of the proposed low-income affordability program are proposed to be recovered through a two-part structure. First, a portion of residential late fee revenue should be devoted to the program. The remainder of the program should be recovered as an addition to the meters charge of each customer class.

The Meters Charge Revenue

A meters charge is structured to obtain a customer class payment from each customer class, while at the same time protecting high use customers within any given class from bearing a disproportionate burden of the program costs. Within the residential class, in particular, significantly more than half of the monthly residential bills rendered in 2009 would have experienced an increase of 2% or less. (RCM/TREE/MH-I-83; RCM/TREE/MH-84).[80]

Table 18. Distribution of Low-Income Affordability Program Costs through Meters Charge (Manitoba)

	Number of Customers	Months In Year	Monthly Meters Charge	Annual Meters Charge	Total Revenue
Residential /a/	466,951	12	$1.00	$12.00	$5,603,412
General Service (small) /a/	52,241	12	$2.00	$24.00	$1,253,784
General Service (small) (51 kV.A and up)	22,774	12	$15.00	$180	$4,099,320
General Service (medium)	3,712	12	$50.00	$600	$2,227,200
General Service (large)	303	12	$200.00	$2,400	$727,200
Total revenue					$13,910,916
Total program cost					$15,494,337
Late fee revenue					$1,583,421

NOTES:

/a/ Includes seasonal customers. While seasonal customers are billed twice a year, monthly revenue is assigned to each account. (RCM/TREE/MH-I-65(a)).

The Late Fee Revenue

To supplement the meters charge revenue proposed above, cost recovery should be paid, in part, from residential late fee revenue collected by Manitoba Hydro. In 2009, Manitoba Hydro billed $3.8 million in residential late fees. (RCM/TREE/MH-I-43). An average of more than 84,000 residential customers each month were billed a late fee in 2009. (RCM/TREE/MH-I-44). Manitoba Hydro imposes a late fee of 1.25% per month. (RCM/TREE/MH-I-76(a)).

[80] In fact, however, the rate increases will be much lower. This calculation of a percentage increase does not account for any decreases in normal operating costs caused by the low-income rate.

It is appropriate to use a portion of the late fee revenue to support the low-income affordability initiative. The late fee is not imposed as a cost-justified charge. (RCM/TREE/MH-I-45). Manitoba Hydro does not submit its late charge for review and approval by the Manitoba Public Utilities Board. (RCM/TREE/MH-I-47). The revenues from late fees are not allocated to any particular customer class; rather, they are considered miscellaneous revenues to the utility that are "taken into consideration" in deciding whether to seek rate increases at any particular time. (RCM/TREE/MH-I-77).

Not only does the Manitoba Hydro late fee lack a cost basis,[81] it lacks any basis as an incentive to make payment either for residential customers in general (RCM/TREE/MH-I-54) or for low-income residential customers in particular (RCM/TREE/MH-I-55). The most that Manitoba Hydro could say about what effect its late fees have on customer payments is that such fees are "relevant and comparable" to the fees charged by other utilities. (RCM/TREE/MH-I-54). Nonetheless, the Company concedes that it "has not conducted a formal study, nor is it aware of any external studies, specifically documenting the effectiveness of late payment charges as an incentive for residential customers to pay." (RCM/TREE/MH-I-54, RCM/TREE/MH-I-55 [identical statement for low-income customers]). In contrast, rate affordability programs (combined with arrears management) have repeatedly been found to improve low-income customer payment patterns.

Capturing $1.6 million in late fee revenue for the low-income affordability program devotes the late payment revenue to purposes similar to those for which the revenue is collected. The use of $1.6 million of late fee revenue roughly offsets the administrative costs of the low-income program. When measured by the Company's own standard for imposition of the late charge ("relevant and comparable"), this use of late charge revenue is more reasonable than treating such dollars as miscellaneous revenues.

Summary of Cost Recovery

A Manitoba Hydro low-income rate affordability program does not impose unreasonable costs on the Company or its ratepayers. Structured as a fixed credit program, the proposed rate offers substantial discounts to customers with the highest home energy burdens (where the highest arrears are likely to be), with more modest discounts to customers with burdens that are lower, but nonetheless still more than 6% of income. Cost recovery is proposed on a per meter basis. Recovering the program costs through a meters charge minimizes intra-class rate impact differentials. Large users do not pay a correspondingly higher proportion of program costs.

In addition to the recovery of program costs through a meters charge, the cost recovery mechanism proposes to offset a portion of program costs through application of a portion of residential late charge revenues. Through this process, late charge revenues, likely to be paid in large part by the very persons for whose benefit the low-income affordability program is being delivered, are used for the purposes for which they are imposed with which to begin.

[81] In addition to the fact that Manitoba Hydro submits no cost justification for its late fees, the late fee can not be viewed as a mechanism for recovering "collection costs." Collection costs are not separately budgeted by Manitoba Hydro. (RCM/TREE/MH-I-52). Moreover, when Company staff are not engaged in collection activities, they are engaged in other non-collection activities. (RCM/TREE/MH-I-72(d)).

A bill comparison with and without the proposed meters charge demonstrates that the bill impact of the proposed rate affordability program will be minimal. Even without taking into account the cost reductions generated by the rate affordability program, residential bills will increase by less than 2% per year for substantially more than half of all customers. The bill impact would be even less to the extent that the Company takes into account the resulting expense reductions generated by the program.

LOW-INCOME ENERGY EFFICIENCY FOR MANITOBA

In contrast to rate affordability assistance, energy efficiency programs targeted to the poor reduce bills and promote affordability by reducing consumption. Efficiency investments can be an effective tool to use in reducing low-income energy needs for some, but not all, households.

Energy efficiency investments are an effective supplement to the distribution of fuel assistance to address low-income energy needs over the long term. Energy efficiency provides continuing benefits year-in and year-out. Investments in residential energy efficiency help deliver efficient end-uses to consumers. In both the medium- and long-term, energy efficiency will reduce the costs of the rate affordability program.

The effectiveness of the role that energy efficiency can play in addressing home energy affordability, however, is limited by several considerations:

- For many low-income customers, energy efficiency cannot deliver affordable home energy service because unaffordability is driven by income rather than consumption. Even an extremely low consumption level yields a bill that imposes an unaffordable home energy burden on the household.

- For many low-income customers, energy efficiency cannot deliver affordable home energy service because consumption is driven by factors that are beyond the ability of efficiency investments to control. Even a substantial reduction in energy consumption leaves annual usage at high levels.

- The need for affordability assistance in Manitoba extends to tens of thousands of low-income households per year, a number significantly beyond the ability of the utility to treat through efficiency services.

- For many low-income customers, energy efficiency cannot deliver affordable home energy service because the unaffordability is driven by arrears rather than by current consumption. Even if efficiency services were to reduce future bills for current use to an affordable burden, the asked-to-pay amount of the customer would exceed the ability-to-pay due to the need to retire arrears.

A multi-state study of affordability programs in the United States found that “every state that has adopted a home energy affordability program has incorporated an energy efficiency component into that affordability initiative.” The study found that “these [low-income efficiency] programs

can effectively complement the impacts of affordability programs."[82] The study reported that energy efficiency "programs can have the greatest overall impact if they target lower income households, households with vulnerable household members, and customers that are participating in a ratepayer-funded affordability program."

The Manitoba Hydro program advanced in this paper proposes just that: (1) to use energy efficiency to complement the impacts of the rate discount; and (2) to maximize the "overall impact" of the efficiency investments by targeting those investments to high use program participants.

The conclusion to be drawn from the above discussion is not that the limitations of energy efficiency as an affordability strategy counsel that low-income energy efficiency investments should not be pursued. The limitations simply indicate that an investment in efficiency measures, while necessary and appropriate, cannot be the focus of an affordability program.

Manitoba Hydro should continue to fund the direct participation of low-income customers in energy efficiency programs in response to high and unaffordable home energy bills. This recommendation for continued funding is supported by two observations.

- First, unless specifically funded, low-income consumers are systematically excluded from having access to energy efficiency investments.

- Second, low-income energy efficiency programs reduce the overall expenses of public utilities.

Accordingly, there should be a mandated minimum amount of energy efficiency funding directed toward low-income customers. Each of the reasons supporting this conclusion is reviewed below.

Low-income energy efficiency programs should deliver a full range of efficiency services. These services would include, but not be limited to energy audits and air sealing, weatherization, insulation, heating and cooling system replacement with high efficiency equipment, hot water heater replacement, and appliance upgrades.

Given the positive role that cost-effective energy efficiency can play in reducing utility costs, while at the same time helping to improve the affordability of home energy to low-income customers, the Manitoba Public Utilities Board should continue to require efficiency programs as part of Manitoba Hydro's response to unaffordable home energy.

[82]Carroll, Colton and Berger (2007). *Ratepayer Funded Low-Income Energy Programs: Performance and Possibilities*, at 132, Apprise, Inc.: Princeton (NJ)..

Low-Income Efficiency Programs Help Reduce Overall Utility Expenses.

The delivery of energy efficiency investments to low-income customers not only yields resource conservation and avoided cost benefits to the affected utility, but delivers a broad range of other utility cost reductions as well. Accordingly, low-income energy efficiency programs should be implemented not only as a resource efficiency measure, but also as an important tool in controlling other systemwide utility costs. Avoided costs commonly associated with low-income energy efficiency would include savings such as reduced arrears, reduced working capital, reduced credit and collection expenses, and the like.

In this fashion, low-income energy efficiency programs are closely akin to low-income rate affordability programs in their ability not only to serve the social function of addressing energy unaffordability problems, but also in serving the business purpose of reducing the business costs associated with an inability-to-pay.

The existence of direct financial benefits to utilities arising from energy efficiency programs targeted specifically to low-income households has been recognized for more than 20 years. The presence of such avoided costs was first postulated in 1987. That analysis stated that targeted electric energy efficiency programs had advantages that went beyond the traditional energy and capacity savings associated with energy efficiency measures:

> The cost-effective reduction of system costs is relevant and important in every part of the business operations of the utility, not simply to the power supply function. Accordingly, a utility should be concerned with the problem of nonpayment, overdue payment, and partial payment of utility bills. Bad debt arises when ratepayers demand power from the system and then do not pay for it on a timely basis. . . .[A] new conservation program [can be proposed] that is justified on an avoided cost basis. The proposal rejects the historical view that avoided costs include only an energy and a capacity component. Instead, it introduces the notion of avoided bad debt. As long as the energy efficiency program costs less than the bad debt it will avoid, the program is cost-justified.[83]

In this 1987 article, "bad debt" was defined to include all aspects of costs associated with payment troubles. The term was used to include not only written-off accounts, but credit and collection expenses, working capital expenses, and a host of other expenses related to nonpayment. Since that time, the existence and importance of such expanded avoided costs has become generally-accepted. Analysts have since repeatedly confirmed that low-income energy efficiency generates benefits beyond simply energy and capacity savings.

These benefits are not theoretical. They are both real and substantial. Pennsylvania's natural gas and electric utilities operate what that state's Public Utility Commission (PUC) calls the Low-Income Usage Reduction Program (LIURP). LIURP involves the offer of the following types of usage reduction packages to low-income households: (1) an electric space heating package; (2)

[83] Roger Colton and Michael Sheehan (1987). "A New Basis for Conservation Programs for the Poor: Expanding the Concept of Avoided Costs," 21 *Clearinghouse Review* 135, 139.

an electric water heating package; (3) a baseload electric package; and (4) a natural gas heating package.

Pennsylvania's electric utilities deliver "baseload" electric LIURP services to homes that do not heat with electricity. Since LIURP first began in 1989, baseload electric jobs have represented roughly two-in-five (115,098 of 292,071 total jobs: 39.4%) of all LIURP homes.[84] Over a 20-year period, baseload electric usage reduction jobs have outnumbered every other type of usage reduction treatment, including the treatment of electric space heating homes (n=85,999 jobs).

The objectives established for the Pennsylvania LIURP initiative are similar to the objectives that should underlie a low-income efficiency program in Manitoba Hydro, including:

- To assist low-income residential customers in conserving energy by reducing their energy consumption;
- To assist participating households in reducing their energy bills;
- To decrease the incidence and risk of customer payment delinquencies and the attendant utility costs associated with customer arrearage and uncollectible accounts; and
- To reduce residential demand for electricity and gas, and peak demand for electricity.

According to the January 2009 Penn State University evaluation of the LIURP initiative:

> To meet these goals, LIURP is targeted toward low-income households with the highest energy consumption. Of these households, those with payment problems and high arrearages are targeted. Since the program's inception in 1988 through 2006, the major electric and gas companies required to participate in LIURP have spent over $330 million to provide weatherization treatments to more than 292,071 low-income households in Pennsylvania.

In January 2009, Penn State University released a comprehensive long-term evaluation of the LIURP program. Prepared for the Pennsylvania PUC, the evaluation examined data over the first 18 years of program operation. The evaluation provides important lessons for the offer of electric usage reduction services in Manitoba. The LIURP evaluation reported:

- "LIURP is a cost-effective method of reducing both energy consumption and energy bill arrearages. . .Sixty nine percent of LIURP households reduce their energy consumption following weatherization treatments, with an average reduction of 16.5 percent." Electric baseload jobs generated a usage reduction of 698.2 kWh, or 19.1%.

[84] Customer Services Information System Project, Pennsylvania State University (January 2009). *Long-Term Study of Pennsylvania's Low-Income Usage Reduction Program: Results of Analyses and Discussion*, prepared for Pennsylvania Public Utility Commission, Penn State University: State College (PA).

- "Of those households with energy bill arrearages, 40 percent reduce their arrearage following weatherization services. Thirty-seven percent of electric industry households reduce their arrearages. . ."[85] LIURP was targeted to households with arrears (within the population of high use consumers). The LIURP evaluation found that "by the end of the year following weatherization, 68 percent of the households have an energy bill arrearage, a decrease of 29 percent. . .Although the average number of full payments made does not vary from the pre- to post-period, the percent of households with missed payments decreased and the average number of partial payments increased."[86]

- "The [third] most significant, and most common, variable that is positively related to reductions in energy consumption is the amount of arrearage owed in the pre-period [before usage-reduction treatments are installed], suggesting that households with large arrearages are motivated to make the necessary behavioral changes to contribute toward additional reductions in energy consumption. It therefore makes sense to target households with higher arrearages when prioritizing LIURP jobs."

While low-income energy efficiency investments generate the traditional benefits (i.e., avoided energy and capacity costs) associated with usage-reduction programs, as is evident, the benefits flowing from low-income efficiency extend far beyond those traditional benefits.

In sum, funding for low-income energy efficiency measures should be made available in the amount needed to make efficiency investments fully accessible to low-income residential customers. Where low-income consumers cannot access energy efficiency programs, Manitoba Hydro should spend additional funds to ensure that its programs ***are*** fully accessible.

Determining Eligibility for Low-Income Efficiency Programs

Determining the eligibility for participation in a low-income energy efficiency program has several components to it. On the one hand, eligibility should be determined based on income considerations. In addition, however, low-income efficiency programs should have a ***targeting*** component to them. A utility-funded efficiency program directed toward low-income customers should be explicitly ***targeted*** to help advance the resolution of payment troubles and improve the affordability of home energy in addition to simply reducing home energy usage.

Identifying Basic Income Eligibility.

Basic eligibility for low-income energy efficiency programs funded by Manitoba's electric and natural gas utilities should be set at 125% of LICO. Use of LICO for income eligibility purposes

[85] The LIURP evaluation found that this result was consistent with prior U.S. Department of Energy (DOE) research, which found that "low-income families who receive weatherization have a lower rate of default on their utility bills and require less emergency heating assistance." Bruce Tonn, et al. (2001). "Weatherizing the Home of Low-Income Home Energy Assistance Program Clients: A Programmatic Assessment," U.S. Department of Energy: Washington D.C.

[86] The evaluation noted that participation in LIURP was associated with increased participation in energy assistance programs. It was difficult to distinguish the impact of the two.

was discussed in detail above with respect to the rate affordability program. Wherever an income eligibility line is drawn, however, there will be some households that have incomes marginally in excess of that line. It would thus be appropriate to set-aside a pre-determined proportion of low-income energy efficiency funding for households that have income marginally in excess of the income eligibility standard. For example, Pennsylvania's 20% set-aside has worked well.

Targeting Based on Customer Characteristics.

In addition to defining income eligibility, an equally important task is to define the population to which the low-income energy efficiency programs will be *targeted* even within the total eligible population. Maximizing benefits to all utility customers, whether through reduced traditional avoided costs or through the reduction of costs associated with low-income payment troubles, is dependent upon an appropriate targeting of the low-income program. Two primary alternative decision rules exist to guide targeting a low-income efficiency program:

- To target those with the highest energy usage, believing that these households present the greatest potential for energy savings; or

- To target those with the greatest payment problems, believing: (a) that payment problems and high usage are positively associated; and (b) that these households present the greatest potential for improved energy affordability.

To a certain extent, the difference between the two principles is artificial if one accepts the premise that energy efficiency measures can not only generate traditional avoided costs, but can generate avoided costs associated with a reduction in payment troubles as well. It has become well-established over the years that payment-troubles are often associated with higher than average utility consumption. By targeting customers with payment troubles, in other words, a utility implicitly targets its high use customers as well. As is documented above, this appears to be true for Manitoba Hydro.

The Pennsylvania Public Utility Commission (PUC) has explicitly considered this tie-in between high usage and payment-troubles and the use of each for implementation of the Pennsylvania Low-Income Usage Reduction Program (LIURP). The Pennsylvania PUC found as follows:

> . . .we would like to clarify the distinction between LIURP eligibility criteria and the prioritization criteria for the receipt of program services. LIURP eligibility criteria has evolved into a two-part requirement. First, income must be at or below 150% of the federal poverty guidelines. There is an exception to this rule. Up to 20% of the LIURP budget may be spent on customers with an income level in the range 150% to 200% of the federal poverty level.[87] Second, the LIURP experience over the past nine years has shown that high usage is the strongest predictor of high energy savings. Consequently, each of the major electric companies has established company specific minimum usage requirements for each of the three major job

[87] The Federal Poverty Level is the U.S. equivalent to Canada's LICO.

types for electric jobs: heating, water heating and baseload. The bottom line is that all income eligible customers do not have a usage profile that warrants the provision of LIURP services.

Prioritization for the receipt of program services is as follows. Most importantly, usage is the driver. Once again, we emphasize that in the actual delivery of LIURP services, each electric company has established minimum usage guidelines for each of the three electric job types. It is only after the usage requirement is met that the prioritization scheme is applied. The prioritization process follows two steps. First, among customers meeting the threshold for usage, participation is further prioritized from highest arrearage to no arrearage. Second, a further prioritization is done to further delineate equal usage and equal arrearage candidates. This is done by prioritizing from lowest to highest income.

* * *

The primary goal of LIURP is to achieve bill reduction through usage reduction. We have elaborated above that high usage is the best indicator for achieving this primary goal of LIURP. Another LIURP goal states that the reduction in energy bills should decrease the incidence and risk of customer payment delinquencies and the attendant utility costs associated with uncollectible accounts expense, collection costs and arrearage carrying costs. In view of this program goal, arrearage prioritization has been appropriately listed as the first prioritization among the highest users.[88]

Manitoba Hydro should use the above-quoted Pennsylvania PUC language to guide its pursuit of low-income energy efficiency. An identical two-step process (involving: (1) eligibility-setting; and (2) priority-setting amongst eligible customers) should be adopted in Manitoba.

- Basic income eligibility should be set at 125 percent of LICO;
- Approval should be given for a modest set aside for customers with income marginally in excess of this income level;
- Prioritization should be directed toward the customers that are the highest users;
- Amongst equally-situated high users, if additional prioritization is necessary and appropriate, priority should be given to high users with the highest arrears. This second prioritization, however, should only be implemented given equally high usage.

[88] Pennsylvania Public Utility Commission, Re Guidelines for Universal Service and Energy Conservation Programs, No. M-00960890, 178 P.U.R.4 508 (July 11, 1997).

Establishing Funding Targets for Low-Income Energy Efficiency

One of the key questions, perhaps *the* key question that Manitoba Hydro must resolve in considering energy efficiency programs is the proper funding of the low-income component. Conceptually, funding for low-income efficiency improvements should be the amount that is required to make energy efficiency programs fully accessible to low-income residential consumers. Where low-income consumers cannot access energy efficiency measures, Manitoba Hydro should spend additional funds to ensure that programs are fully accessible.[89]

A direct investment in low-income energy efficiency measures is needed by Manitoba Hydro. In the absence of such a direct investment, low-income investment in energy efficiency, even if cost-effective from the customer's perspective, is not likely to occur.

A variety of barriers impede low-income investment in energy efficiency measures irrespective of whether such investments are cost-effective. Barriers that are either unique to the poor, or that disproportionately impede low-income efficiency investments, include:

- **High initial capital costs**: The barrier posed by high initial capital costs is one of the primary barriers to low-income investment in energy efficiency. The payback period for any particular energy efficiency measure becomes irrelevant if the household does not have the investment capital with which to begin. The impact of this market barrier, for example, is often ignored in the reliance on appliance rebate programs. Such a program may pay the incremental cost of moving a customer from the purchase of a less energy efficient new refrigerator to a more energy efficient new refrigerator. In such a program, if the less efficient refrigerator costs $600 and the more efficient refrigerator costs $700, it may well be cost-effective for the utility to pay the $100 difference to prompt the purchase of the more efficient appliance. This program, however, will automatically exclude households that are not in the market to purchase new refrigerators with which to begin. It is axiomatic to note that not many low-income households recently spent $600 for a new refrigerator.

- **High implicit discount rates/payback periods**: Low-income households tend to have extremely high implicit discount rates (also sometimes known as hurdle rates or internal rates of return). In a report for the Electric Power Research Institute (EPRI), Cambridge Systematics found that the implicit discount rate for low-income households ranged up to the 80 - 90 percent level.[90] For residential households in general, however, the hurdle rate for energy efficiency investments was 30 percent; that translates into a payback period of roughly three years. To the extent that an efficiency program thus strives to bring an energy efficiency investment only within the 30-percent range, it excludes by implication all households which have a higher hurdle rate. One entire category of excluded households consists of low-income households.

[89] Fully accessible means that no lost opportunities exist for cost-effective energy efficiency investments.
[90] Cambridge Systematics (1988). Hurdle rates for energy efficiency by income, Cambridge Systematics: Cambridge (MA).

- **High proportion of low-income renters**: A disproportionate number of low-income households tend to live in rental dwellings. This observation has significance in two respects for the design of energy efficiency programs. First, tenants have little or no incentive to improve their landlord's property. They do not receive any of the increased value of the property and, in fact, may face rent hikes as a result of the improvements. Second, tenants generally do not have dominion interest over their homes; they do not have the authority to make decisions about major energy-consuming systems. Finally, low-income tenants tend to be more mobile. As a result, even in those instances where a tenant may wish to invest in an energy efficiency measure, and assuming a financial ability (*e.g.*, sufficient liquidity) to do so, the payback period required to justify such an investment would need to match the household's tenure. A low-income household, in other words, will not invest in a measure with a three-year payback if that household intends to move to a different dwelling after 24 months.

Given these low-income barriers, Manitoba Hydro should establish a long-term objective to be achieved through the expenditure of low-income efficiency funds. Rather than relying on an arbitrary annual budget amount, in other words, the low-income budget should be viewed as a means to an identified end. Establishing the budget in this fashion allows Manitoba Hydro to measure not merely its activities (e.g., how many dollars were spent; how many homes were treated), but also allows the Company to measure its progress toward that objective. After measuring its progress, the Company will further be able to determine what, if any, changes (programmatic or financial) should be made if appropriate progress is not realized.

The Company reports that it had roughly 93,000 low-income customers at the time of its 2003 energy survey. (RCM/TREE/MH-I-153, RCM/TREE/MH-I-154).[91] Of those 93,000 low-income customers, more than 40% (37,447 or 40.2%) had annual electric bills that were greater than the residential average (see, Table 9).[92] Manitoba Hydro should establish a goal of treating the full range of low-income customers with bills above the residential average within a time-span of 10 years. The low-income efficiency budget should be sufficient to achieve this objective.

The proposed decision rule is that funding for low-income energy efficiency improvements should be the amount that is required to treat the full range of customers with consumption at or above the Company average within a ten year time frame. Progress toward that goal should be continuously measured, with program and/or financial adjustments if progress is inadequate.

Summary

In sum, the following critical elements of the utility energy efficiency program are supported by the discussion above:

- Funding for low-income efficiency improvements should be the amount that is required to make energy efficiency programs fully accessible to low-income residential consumers. Where low-income consumers cannot access conservation

[91] By the time of the 2009 survey, the number of low-income customers had increased to more than 105,000.
[92] 13,447 electric heating customers had bills above the residential average of $1,517; 24,000 gas heating customers had bills above the residential average of $1,753. (RCM/TREE/MH-I-149; RCM/TREE/MH-I-150).

techniques, Manitoba Hydro should spend additional funds to ensure that programs are fully accessible. “Accessibility” is to be determined by whether there are lost opportunities for cost-effective measures that can be implemented;

- Program funding should be set so that Manitoba Hydro will treat all low-income customers with bills exceeding the residential average within ten years;

- After eligibility is established, efficiency investments should be targeted not only on the basis of high usage, but on the existence of payment troubles as well;

- A full range of energy efficiency services should be delivered, including but not limited to energy audits and air sealing, weatherization, heating and cooling systems, and appliance upgrades;

- Basic income eligibility should be set at 125 percent of LICO. A designated proportion of total low-income funding should be set aside for households with incomes marginally exceeding the income eligibility guideline.

PART 4:
ASSESSING THE "BUSINESS CASE" OF THE LOW-INCOME PROGRAM

A business case can be made for the low-income program advanced in this paper. This business case approach is at odds with Manitoba Hydro's reasoning for rejecting the promulgation of a meaningful low-income program. On the one hand, the business case supports the conclusion that the utility, as a utility, should be adopting the program proposed herein. On the other hand, the business case is contrary to the conclusion that the affordability program should be pursued exclusively at public expense. No reason exists for the public, through state legislative action, to be the exclusive funder of activities that will generate real and substantial financial benefits to the utility.

Manitoba Hydro objects to providing low-income affordability assistance as a matter of principle. According to Manitoba Hydro, "the issue of whether energy is affordable is outside the scope of Manitoba Hydro's mandate and is a matter of policy for legislators and government agencies responsible for these matters." (RCM/TREE/MH-I-94). The "concept of 'energy burden'," the Company says, "is not used in the design or assessment of Manitoba Hydro's Affordable Energy Program." (PUB/MH-I-213). While Manitoba Hydro asserts in its Affordable Energy Program that existing low-income energy burdens do not place low-income customers at a "crisis level," the Company declines to define what it means by the term "crisis level," (RCM/TREE/MH-I- 105(a) – (b)). Moreover, the Company declines to indicate what level of energy burden *would* place a customer at a "crisis level." (RCM/TREE/MH-I- 105(c), RCM/TREE/MH-I-108).

The Company, as a matter of principle, argues that a low-income discount is in "conflict with" principles of "maintaining social equity for the general body of ratepayers." (RCM/TREE/MH-I-91). The Company argues that "to the extent that it is apparent that these programs represent

cross-subsidies from other ratepayers to low income customers," this conflict exists. (RCM/TREE/MH-I-91).

Manitoba Hydro misses the point when it urges, without a thorough review of the implementation of low-income programs in other jurisdictions, that utility regulation seeking to establish rates that are cost-based, and which do not discriminate between or within customer classes, is in "conflict with" a low-income affordability program. In this chapter, after briefly reviewing the parallels between low-income energy efficiency and low-income affordability programs, the discussion will consider the elements of a "business case" for a low-income affordability program such as has been proposed in this paper. The discussion will further review the regulatory basis for a low-income affordability program as has been adopted in three different jurisdictions. This business case is not presented in lieu of the social benefits discussed above. It is presented to show that addressing the social problems can also be good business.

THE PARALLELS BETWEEN JUSTIFYING LOW-INCOME ENERGY EFFICIENCY AND LOW-INCOME RATE AFFORDABILITY

Manitoba Hydro fails to acknowledge the parallels between the need for special low-income rate programs and the need for special low-income energy efficiency programs. Manitoba Hydro, along with most utilities offering energy efficiency programs directed toward residential customers generally, offers special energy efficiency programs directed specifically toward low-income customers. The offer of these low-income programs is based on a foundation grounded in the following principles:

- Energy efficiency serves not only a business objective in providing least-cost service, but also a social goal. Cost-effectiveness calculations acknowledge these social benefits through the use of methodologies such as the Total Resource Cost (TRC) test.[93] Through these cost-effectiveness calculations, the total range of societal benefits --including utility benefits, environmental benefits, public health and safety benefits and the like -- are considered.

- Without special programs, low-income customers would be systematically excluded from participation in utility energy efficiency programs. Whether due to a lack of liquidity, or due to their frequent mobility, or due to the high hurdle rates that accompany low incomes, without special dispensations, low-income customers would be effectively locked out of efficiency initiatives directed toward residential customers generally. The special dispensations are designed to respond to the specific characteristics of low-income customers.

[93] The Total Resource Cost Test is the primary DSM-program-evaluation tool used in most jurisdictions in North America. It is a test that measures the net cost of a DSM program as a resource option based on the total costs of the program, including both the participant's and the local distribution company's. See, Mark Winfield and Tatiana Koveshnikova (June 2009). *Applying the Total Resource Cost Test to Conservation and Demand Side Management Initiatives of Local Electricity Distribution Companies in Ontario: Assessment and Recommendations for Reform*, York University: Toronto (ONT).

- Despite their exclusion from, and the effective denial of the ability to derive any direct benefits from, energy efficiency programs, low-income customers would pay higher costs because of the programs. Not only would the low-income nonparticipants pay the direct costs of the energy efficiency programs, but they would also pay the higher rates associated with spreading fixed costs over a lower consumption base.

In much the same fashion, affordable rate programs for low-income customers can be based on these same principles.

- Rate discounts serve not only a business function, but serve a social goal as well. The business function includes, but is not limited to, responding to and reducing the costs of nonpayment. It includes also the utility goals of enhancing internal productivity, retaining load, and promoting sales by creating a program that enhances economic development and positively influences locational decisions. The social goals include responding to the health, nutrition, public safety, housing and educational consequences that can be attributed to the unaffordability of home energy.

- Without special programs, low-income customers are systematically excluded from the full range of payment options available to non-low-income customers with affordable bills. Customers in arrears, for example, do not have the same access to levelized budget billing that customers not in arrears have. (TREE/RCM/MH-I-56). Moreover, customers who cannot afford to keep one payment plan are not allowed to continue to participate in the deferred payment plan program. (CAC/MSOS/MH-I-100(e)).

- Despite their effective exclusion from the full range of payment options available to non-low-income customers, low-income customers pay higher costs because of their inability to pay. For example, low-income customers are required to pay the non-cost-based, non-substantively supported, fees which purport to respond to nonpayment (e.g., late fees).

As can be seen, in much the same way, and based on much of the same reasoning, just as special energy efficiency programs are offered to low-income customers, special rate affordability programs can be justified as well.

The parallels identified above can be seen in the May 26, 2010 order of the Manitoba PUB with respect to the Centra Gas Manitoba Furnace Replacement Program (FRP). As the Manitoba PUB notes, the "FRP is a low-income DSM program designed to assist low-income homeowners with the replacement of low efficiency gas furnaces with new high efficiency furnaces."[94] Centra Gas expressed concern about how to continue with its FRP given Natural Resource Canada's March 31, 2010 decision to accept no new applications for the ecoEnergy program.

[94] Centra Gas Manitoba, Inc. 2010/11 Cost of Gas Application and Other Matters, Order 55/10, at 44 (May 26, 2010).

The Manitoba PUB ordered Centra Gas to continue with it FRP investments. Not only is this decision important, but so, too, is the rationale articulated by the PUB in support of its order. The Board said:

> The Board reiterates its position that the societal benefits of the FRP outweigh the costs, and seeks an expanded and extended RFP effort. In addition to the immediate benefits available to the FRP participant (of reduced energy bills, and improved space heating), there are societal benefits which include:
>
> - Increased jobs as community groups and MH require additional home energy auditors and furnace contractors require additional installers;
>
> - Training of the additional home energy auditors and furnace installers;
>
> - Vastly reduced GHG emissions –a high efficiency furnace operates at 90% or more efficiency compared to 60% or less for a conventional furnace;
>
> - Improvement of the housing stock in Manitoba, increasing property values; and
>
> - Improvement to the health and safety of FRP beneficiaries through the replacement of old furnaces that could be leaking carbon monoxide, and by homeowners then able to set their thermostats at a comfortable temperature.
>
> The Board recognizes the validity of Centra's view that the current remaining stock of conventional furnaces are well-past their expected service life and that within ten years most of these furnaces will have to be replaced – the question is how will low-income households replace the furnaces in the absence of fiscal support.[95]

The direct applicability of this PUB reasoning to the analysis presented in this paper is evident. There are clear "societal benefits" of the proposed low-income program that "outweigh the costs" of the program. In addition to the immediate benefits of the low-income affordability program proposed in this paper, and in addition to the societal benefits, there are significant utility benefits as well. The programs proffered by Manitoba Hydro neither serve the need nor are capable of generating the individual, the societal, or the utility benefits. The same query advanced by the PUB with respect to high efficiency furnaces can be advanced in this proceeding: "how will low-income households replace their current non-payment patterns in the absence of fiscal support."

[95] Order 55/10, at 47.

SUPPORT OF AFFORDABILITY ASSISTANCE BASED ON TRADITIONAL REGULATORY PRINCIPLES.

A review of the basis for the adoption of two of the oldest low-income rate assistance programs in the United States reveals that such programs are not grounded simply on the social pressure to help those in need of rate assistance. Rather, low-income rate assistance programs are found to serve fundamental regulatory purposes quite apart from, and in addition to, their social functions. The regulatory foundation for these low-income programs is reviewed below. As will further be shown by an examination of the more recent Indiana low-income programs, that regulatory foundation remains applicable after two decades.

The programs that are reviewed below support the conclusion that, no matter how many times Manitoba Hydro urges that the low-income rate affordability programs are exclusively "social programs" that are, at a minimum, in a tension with regulatory principles, in reality, such programs have sound regulatory foundations grounded in fundamental utility regulatory principles.

Ohio's Percentage of Income Plan (PIP)

The State of Ohio initiated the first straight Percentage of Income Payment Plan (PIPP) in the United States.[96] The Ohio PIPP was developed by the Public Utility Commission of Ohio (PUCO). The PUCO created the Ohio PIPP in 1983 in response to an emergency arising from the inability of low-income Ohio residents to maintain their home energy service.[97] The Commission found that the disconnection of utility service for nonpayment by those who were financially unable to pay constituted an "emergency" as described by Ohio statute.[98]

The Ohio PIPP, as initially conceived by the PUCO, did not represent a discounted rate for low-income customers. Instead, the PIPP was designed to enable low-income customers to retain their utility service by entering into an agreement pursuant to which the customer would make a utility bill payment equal to a prescribed percentage of income. Customers entering into such agreements, however, would not be relieved of paying bills in excess of the percentage of income. Rather, customers would continue to be liable for those arrears. Those accrued arrears would be subject to repayment by the customers when such customers left the PIPP.

In its 1983 decision, the PUCO found that there were both legal and "practical" reasons to adopt the proposed PIPP. According to PUCO, no legal impediment existed to the adoption of PIPP:

> Contrary to the arguments of those who oppose the percentage of income payment plan, the plan adopted by the Commission. . .does not constitute income redistribution, and is reasonable and lawful. This plan does not constitute income redistribution because those customers who qualify for the plan are still liable for any arrearages on their bills. There is no debt forgiveness. The Commission is just

[96] A "straight PIPP" is a rate that bases bills on a percentage of household income for income-qualified customers. It stands in contrast to a "fixed credit" program or a "tiered discount" program, both of which are income-based.
[97] Docket No. 83-303-GE-COI (November 23, 1983).
[98] O.R.C., § 4909.16 (2007).

> foreclosing one method by which a utility may exercise its rights to collect for the debt. The utility still has available to it all of its other remedies at law. Because the customer is still liable for his/her arrearages, the Commission's percentage of income payment plan does not constitute free service or a rebate as charged by opponents to the plan. . .Nor does the plan adopted by the Commission unlawfully discriminate. All residential consumers similarly situated can take advantage of this plan. The policy of this Commission to prevent those without the present ability to pay their utility bills from freezing is a valid state purpose and is the basis upon which the Commission has established this plan. We believe it to be a rational basis.[99]

The PUCO proceeding that gave rise to Ohio's PIPP in 1983 considered a broad range of issues relating to payment plans, deposits, and voluntary fuel check-offs as a means to generate energy assistance funding. Early in the proceeding, the PUCO declared that an "emergency" existed because of the number of residential gas and/or electric customers who were unable to obtain service for the winter heating season because of the disconnection for nonpayment attributable to economic recession, increases in the cost of gas and electric service, and a decrease in the level of governmental assistance. Based on that emergency, PUCO prohibited the disconnection of gas or electric service during the ensuing winter season, and ordered the reconnection of service by customers who paid either one-third of their outstanding balance or $200, whichever was less. Commonly referred to as the Winter Reconnect Order, that Order is still issued annually as an "emergency" measure, though the payment requirement has been changed to $175 with customers using the rule required to enroll in a payment plan; PIPP is one of the optional payment plans.[100]

Consideration of the PIPP arose out of ***utility*** objections to the Commission's "failure to take into consideration a customer's ability to pay before imposing the moratorium. . ." At least in partial response to that objection, the PUCO docketed an investigation into "long-term solutions to the problems arising from the winter emergency situations."

The Commission rejected arguments by Ohio's utilities that proposals such as the PIPP were not "long-term solutions" to winter inability to pay problems. PUCO noted that "the utility position in this proceeding is that the only long-term solution to the problem is economic assistance and that all other proposals, falling short of being long-term solutions, are outside of the scope of this proceeding."

In dismissing that argument, the Commission agreed that "the legislature needs to adequately fund energy assistance and weatherization and conservation programs for low income consumers. That does not mean that such aid is the ***only*** ingredient of a comprehensive solution to the problem, only that it is a necessary ingredient." (emphasis added) Moreover, the PUCO found that the proposed Ohio PIPP best accomplished the goals the Commission sought relative to other available alternatives. The goal, PUCO noted, involves protection of the interests of two disparate groups of ratepayers:

[99] Docket No. 83-303-GE-COI, Opinion and Order, at 14.
[100] Docket No. 06-1075-GE-UNC, Entry (September 6, 2006).)

> We are not willing to stand by while others, too poor to pay for utility service during the winter, freeze. At the same time, we are ever mindful of protecting the vast majority of customers of utilities under our jurisdiction who pay their bills in full from responsibility for greatly increasing uncollectibles.

The proposed PIPP, according to the Commission, best served both of those goals given available alternatives:

> We have in this proceeding looked at such alternatives to the percentage of income plan as maintaining the status quo, extending payment plans from six months to twelve or more months, and having another moratorium. All things considered, the percentage of income plan adopted by the Commission today will do the most to assist those in need to maintain utility service while protecting the companies' remaining ratepayers.

In sum, the PUCO found that "from our perspective, the true long-term solution to the problem is three-fold: adequate tax funded energy assistance programs, adequate tax funded weatherization and conservation programs, and adequate Commission rules. Of those, only the first, energy assistance, is totally outside of this Commission's jurisdiction."

The PUCO's decision to adopt the PIPP for Ohio was affirmed by the state Supreme Court, even though the court originally disapproved the initial cost-recovery mechanism.[101] Despite this disapproval of the PIPP cost recovery,[102] the Supreme Court approved the lawfulness of the underlying PIPP decision. The Court noted:

> Pursuant to its emergency powers under R.C. 4909.16, the PUCO created the PIP plan as a response to growing concern "about the number of residential gas. . .[and] electric customers unable to obtain service as a result of disconnection for nonpayment of bills because of the economic recession, increases in the cost of gas and electric service, and a decrease in the level of governmental assistance . . ." (internal citation omitted). . .[I]t is the opinion of this court that it is clearly within the PUCO's emergency powers under R.C. 4909.16 to fashion such relief as that provided by the PIP plan and we find the plan of the commission to be manifestly fair and reasonable as a solution to the crisis.[103]

In sum, while the Ohio electric PIPP is today embedded in statute, its original development occurred under the general regulatory authority of the Ohio state utility commission. In Ohio,

[101] Montgomery County Board of Commissioners v. Public Utilities Commission of Ohio, 28 Ohio St.3d 171, 503 N.E.2d 167, 171 (Ohio 1986).
[102]The Court informed the PUCO: "while we cannot condone the recovery of arrearages through the EFC rate in light of the specific statutory language of R.C. 4905.01 and 4909.191, we do not express the opinion that the PUCO would be precluded from fashioning an alternative accelerated recovery mechanism which is not contrary to statute, including recovery of arrearages on a more current basis rather than only after a twelve-month delinquency." Id., at fn4. The PUCO quickly approved an alternative cost recovery mechanism. Docket No. 87-244-GE-UNC.
[103] 503 N.E.2d at 170 (internal footnotes omitted).

the commission has authority to take action under circumstances that it deems to be an "emergency." Having declared that emergency, the commission was authorized to develop payment plans responding to that emergency. The Ohio courts declared the Ohio PIP to be "manifestly reasonable."

Pennsylvania's Customer Assistance Program (CAP)

The rate affordability programs operated by Pennsylvania natural gas and electric utilities for their low-income customers began nearly 20 years ago with a small pilot project by Columbia Gas Company.[104] Since that time, the universal service concept has expanded for Pennsylvania's energy utilities so that the companies now devote more than $360 million each year to support their low-income customers.[105] While the genesis of the Pennsylvania universal service programs can be found in the Pennsylvania PUC's generic authority over the operations of energy utilities, the preservation of those programs has since been written into statute.

Two utilities in Pennsylvania pioneered the use of affordable rates as a means to address the payment troubles experienced by low-income customers. Columbia Gas Company responded with a willingness to pursue a program first proposed by the state Office of Consumer Advocate. Equitable Gas Company also proposed an income-based rate for its low-income customer population.

The Columbia Gas of Pennsylvania Energy Assurance Program (EAP)

The Pennsylvania Office of Consumer Advocate (OCA) proposed that Columbia Gas Company adopt an "Energy Assurance Program" (EAP) as part of Columbia's 1990 rate case. According to the OCA, the issue was one of collection efficiency. "The issue in this proceeding," OCA said, "is not to devise a social response to the broad inability to pay problems of low-income households. The issue is one of what is the most cost-effective means of collection. It is the same issue as whether a utility should pursue new central station capacity, cogeneration or conservation. . .The requirement that utilities provide least-cost service should govern utility collection activities too."[106] The OCA continued: "the issue is this: how can Columbia Gas most effectively and least expensively collect as much as possible from households [that] cannot afford to pay?"[107]

The Pennsylvania Commission agreed. The Commission found that "it is incumbent upon us to initiate a pilot project to test empirically some of the claims made by [OCA] for an EAP. Hopefully, the results of the pilot will prove [OCA's] thesis that EAP will enable more customers to avoid termination and collection actions, while also reducing the uncollectible

[104] Pennsylvania Public Utility Commission v. Columbia Gas of Pennsylvania, R-891468, Final Order, at 150 – 160 (September 19, 1990). (hereafter Columbia Gas EAP Order).
[105] Pennsylvania PUC, Bureau of Consumer Service, 2008 Report on Universal Service Programs and Collections Performance of the Pennsylvania Electric Distribution Companies and Natural Gas Distribution Companies, at 48 – 49 (2008). (Electric CAP delivered benefits of $190 million in 2008; natural gas CAP delivered benefits of $175 million in 2008.)
[106] Columbia Gas EAP Order, at 152.
[107] Id., at 153.

expense that can be anticipated if existing approaches remain unchanged."[108] The PUC then articulated its philosophy that would govern Pennsylvania's regulatory policy for the next two decades:

> We, in conjunction with utilities, and social service agencies, have all worked hard to devise ways to [e]nsure that low-income Pennsylvanians have utility services which really are necessities of life as the tragic fire deaths associated with the loss of utility service underlined. . .
>
> However, for the poorest households with income considerably below the poverty line, existing initiatives do not enable these customers to pay their bills in full and to keep their service. . .Consequently, to address realistically these customers' problems and to stop repeating a wasteful cycle of consecutive, unrealistic payment agreements that cannot be kept, despite the best of intentions, followed by service termination, then restoration, and then more unrealistic agreements, we believe that new approaches like PECO's CAP program and the OCA's proposed EAP program should be tried.[109]

Based on this analysis, the Commission directed Columbia Gas to begin a 1,000 customer pilot EAP.

The Equitable Gas Low-Income Rate

Shortly after directing Columbia Gas to implement a pilot low-income rate affordability program, the Pennsylvania commission further approved a proposal by Equitable Gas Company to pursue a similar program.[110] Unlike the Columbia Gas program, which had been proposed by the state Office of Consumer Advocate (and not opposed by the Company), the Equitable Gas program originated with the gas utility, itself.[111] According to the Company, the proposed program was:

> Needed to (1) remove these customers from the discouraging and expensive collection cycle, (2) motivate them to increase conservation, (3) increase their annual participation in available funding assistance programs, and (4) encourage consistent bill-payment efforts.[112]

The Equitable Gas program was, at first, disapproved by the hearing examiner who decided the Equitable rate case. While the program is "an apparently well-intentioned attempt to assist those of Equitable's ratepayers who most need assistance in paying their bills," the hearing examiner "concluded that this Commission is without authority to approve a program such as the EAP."

[108] Id., at 158.
[109] Id., at 159.
[110] Pennsylvania Public Utility Commission v. Equitable Gas Company, Docket No. R-901595, Final Order, at 63 – 74 (November 21, 1990). (hereafter Equitable Order).
[111] Equitable Gas had been working with the state Bureau of Consumer Services (BCS), a bureau of the state utility commission, to develop an appropriate program design. Equitable Order, at 63.
[112] Id., at 63.

The hearing examiner reasoned that if the commission "were to approve the subject [energy affordability] program, our action would be tantamount to authorizing a utility to collect money from one group of ratepayers and to use that money for another group of ratepayers for a reason completely unrelated to the ratemaking process (the subsidization of low-income individuals who are unable to pay their utility bills)."[113] The hearing examiner finally concluded that "neither judicial precedent nor the Public Utility Code discuss our statutory authority for the implementation of utility rates based solely on 'ability to pay.'"[114]

The Pennsylvania commission, however, reversed the hearing examiner's disapproval of the proposed Equitable Gas low-income program. Noting that "we are aware that this Commission's main function in ratemaking is to assure that every rate made, demanded, or received by any public utility shall be just and reasonable," the commission found that the Pennsylvania statute prohibits only ***unreasonable*** preferences or advantages to any person. The statute, the commission said, prohibits any ***unreasonable*** difference as to rates between classes of service.[115] "The relevant question, therefore, is whether or not the funding of Equitable's proposed [energy affordability] program results in the 'unreasonable' rate discrimination prohibited by the Public Utility Code."[116]

According to the Pennsylvania commission, "a mere difference in rates does not violate" the Pennsylvania statute.[117] The commission then found, on a number of bases, that "the record in this proceeding clearly demonstrates that any 'preference' that EAP would yield to program participants is reasonable, and further, the creation of EAP is in the best interest of all Equitable ratepayers, not just program participants."[118]

The commission found that "the company's total costs of service will be less with implementation of [the program] than they would be in the program's absence." While the company currently collects approximately 7.5% of household income of prospective EAP participants, the commission found, the program requires a payment of 8% of income toward their gas bill, thus increasing revenues.[119] In addition, the commission said, the program cost is substantially less than the uncollectible expense associated with the program participants. Customers that are eligible for the Equitable Gas program "who currently have payment arrangements either negotiated by BCS or the Company pay on average little more than 50 percent of the presubscribed amount." In sum, the commission concluded that:

> This analysis suggests that the $1.8 million future test year [program] expenses should result in an overall reduction to the Company's cost of service, through its uncollectible expense and savings in credit and collection expenses.[120]

[113] Id., at 66.
[114] Id.
[115] Id., at 69 (emphasis in original).
[116] Id., at 69.
[117] Id., at 70.
[118] Id., at 70.
[119] Id., at 71.
[120] Id., at 71.

In sum, the commission said that "we commend Equitable for taking the initiative to propose the [energy affordability] pilot. This program could make it one of the leaders among utilities in the uncollectible arena."[121]

The Permanent Pennsylvania Low-Income Affordability Programs

Only two years after initiating the Columbia Gas pilot, the Pennsylvania PUC decided to expand the use of universal service programs to the state's other natural gas and energy utilities.[122] Consistent with its view of the function of such programs as expressed in the early Columbia Gas decision, the policy decision of the Commission was that low-income rate affordability programs were a necessary tool for utilities to use in combating the problem of nonpayment. Indeed, the decision to implement what would become known as Pennsylvania's Customer Assistance Programs (CAPs) arose out of the PUC's investigation into the control of uncollectible accounts.[123] Through that investigation, the Pennsylvania PUC's Bureau of Consumer Services (BCS) had developed recommendations for implementation of CAPs.

> CAPs provide alternatives to traditional collection methods for low-income, payment troubled customers. Generally, customers enrolled in a CAP agree to make monthly payments based on household family size and gross income. These regular monthly payments, which may be for an amount that is less than the current bill, are made in exchange for continued provision of utility service.[124]

The Commission continued:

> As a result of our investigation, the Commission believes that an appropriately designed and well implemented CAP, as an integrated part of a company's rate structure, is in the public interest. To date, few utilities have implemented CAPs. The purpose of this Policy Statement is to encourage expanded use of CAPs and to provide guidelines to be followed by utilities who voluntarily implement CAPs. These guidelines prescribe a model CAP which is designed to be a more cost-effective approach for dealing with issues of customer inability to pay than are traditional collection methods.[125]

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[121] Id., at 73.

[122] The Commission directed that utilities adopt pilot projects. The PUC decision was based on the BCS recommendation that CAP pilots "should be large enough to provide some relief to the low-income, payment-troubled customer problem and at the same time small enough that changes can be made to the programs without incurring major costs." Bureau of Consumer Service, Final Report on the Investigation of Uncollectible Balances, Docket No. I-900002, at 115 (February 1992). (hereafter BCS Uncollectibles Report). The Commission directed that pilot programs were to involve either 1,000 customers or 2% of a company's residential customer base, whichever was greater.

[123] In the Matter of the Investigation into the Control of Uncollectible Accounts, Docket No. I-900002 (initiated October 11, 1990).

[124] Policy Statement on Customer Assistance Programs (CAP), Docket No. M-00920345, at 2 (July 2, 1992).

[125] Id., at 2. This Commission decision was supported by the BCS Final Report, which indicated: "The Bureau's position is that ratepayers are already bearing significant costs attributable to the problems of payment troubled customers and uncollectible balances. Further, BCS believes that incorporating the following recommendations into utility operations will lead to a more rational and cost effective use of existing resources. Over time, proper

In sum, while preservation and expansion of the CAP programs was eventually written into statute as part of the restructuring of the electricity and natural gas industries, the Pennsylvania CAP programs were initiated by the state PUC without explicit statutory authorization. Instead, the PUC found that CAPs should be an "integrated part of a company's rate structure." The purpose of these programs, the Commission found, was not a social purpose. Rather, the CAPs represent "a more cost effective approach for dealing with issues of customer inability to pay than are traditional collection methods."

The focus of the Pennsylvania CAPs as a tool to respond to low-income payment troubles has continued throughout the years. CAPs were considered to be an *alternative* to a way of doing business that simply wasn't working. The objective of CAP was "to stop repeating a wasteful cycle of consecutive, unrealistic payment agreements that cannot be kept, despite the best of intentions, followed by service termination, then restoration, and then more unrealistic agreements. . ."

Indiana's Universal Service Programs (USP)

Two major Indiana natural gas utilities have adopted low-income tiered discount programs in recent years. The two programs reach tens of thousands of low-income Indiana residents each year, distributing millions of dollars of benefits. The Indiana utilities grounded their low-income programs in the flexible regulation provided by statute to the Indiana Utility Regulatory Commission (IURC).[126] The flexible regulation allowed under this Indiana statute permits the Indiana commission to set aside traditional regulation for all or part of a utility's rates or services.

The Indiana Affordability Program Designs

In response to the statute allowing utilities to propose alternative regulatory plans, two Indiana utilities (Citizens Gas & Coke Utility; Vectren Energy) submitted proposals for low-income tiered rate discount affordability programs.

The Citizens/Vectren program design offers income-eligible customers a discount off of the natural gas bill they would otherwise receive from the respective companies. Both companies divide their low-income customer population into three tiers. Customers are placed in each tier based on the "State Benefit Matrix" used in the distribution of federal fuel assistance through the federal Low-Income Home Energy Assistance Program (LIHEAP). Low-income customers must participate in LIHEAP in order to receive the utility discounts. Enrollment in LIHEAP automatically places the customer into the respective utility discount program.

Citizens provides a discount of either 9%, 18% or 24%; Vectren provides a discount of 15%, 26% or 32% applied to their residential gas service bill. When combined with LIHEAP benefits, the combined benefit of the discount tiers and LIHEAP will represent an approximate reduction

implementation of the recommendations may result in a reduction of total utility costs." BCS Uncollectibles Report, at 120

[126] Indiana Code, §§ 8-1-2.5-1, et seq. (2007).

of 27%, 40% or 50% reduction in the overall heating costs to Citizens eligible low-income customers. Vectren's low-income customers will experience a reduction of approximately 35%, 50% or 60%. The highest benefits go to the households with the lowest income. The discount tiers are designed so that, when combined with LIHEAP benefits, the resulting bills to low-income customers will approximate an affordable home energy burden under average incomes and usage levels.

Application of Indiana's Statutory Standards

The two Indiana utilities proposed their respective low-income programs pursuant to the Indiana statute allowing an Indiana energy utility to submit a plan to the state utility commission[127] seeking state regulatory approval of a plan for alternative regulation.[128] In setting forth the framework for flexible regulation, the Indiana legislature "declared" that "the provision of safe, adequate, efficient and economical retail energy services is a continuing goal of the commission in the exercise of its jurisdiction."[129] Moreover, the Indiana legislature said, "the public interest requires the commission to be authorized to issue orders and to formulate and adopt rules and policies. . .giving due regard to the interest of consumers and the public, and to the continued availability of safe, adequate, efficient, and economical energy service."[130]

When an Indiana utility requests approval of its decision to elect to operate under a plan of alternative regulation, the state utility commission must commence a proceeding to determine whether to approve the utility election. The issue in such a proceeding is whether the commission should "decline to exercise, in whole or in part, its jurisdiction over either the energy utility or the retail energy service of the energy utility, or both." In deciding that question, the commission is required to consider four factors, including in relevant part:

- Whether. . .operating conditions. . .render the exercise, in whole or part, of jurisdiction by the commission unnecessary or wasteful;

- Whether the commission's declining to exercise, in whole or in part, its jurisdiction will be beneficial for the energy utility, the energy utility's customers, or the state;

- Whether the commission's declining to exercise, in whole or in part, its jurisdiction will promote energy utility efficiency; and

- Whether the exercise of commission jurisdiction inhibits an energy utility from competing with other providers of functionally similar energy services or equipment.[131]

[127] The Indiana statute provides that the statutory sections on alternative regulation "do not apply to an energy utility unless the energy utility voluntarily submits a verified petition to the commission stating the energy utility's election to become subject to such section or sections." Indiana Code, §8-1-2.5-4 (2007); see also, Indiana Code, §8-1-2.5-8 (2007).
[128] Indiana Code, §8-1-2.5-4 (2007).
[129] Indiana Code, §8-1-2.5-1(1) (2007).
[130] Indiana Code, §8-1-2.5-1(6) (2007).
[131] Indiana Code, §8-1-2.5-5 (2007).

Under the statute, when a utility petitions for an alternative regulatory plan, the state utility commission is explicitly authorized to "establish rates and charges that are in the public interest as determined by consideration of the [statutorily-prescribed] factors. . ."[132]

The Indiana utilities electing to proceed with an alternative regulatory plan for their low-income customers noted a variety of circumstances that justified their proposals under the statute. Primarily, however, according to their petition, the plan was developed "in recognition of the concerns over price volatility resulting from imbalances between gas supply and demand, as well as weather-related price spikes often occurring during the heating season, and the resulting increased financial needs of the[…] low-income customers."[133]

An Alternative to Unnecessary and Wasteful Regulation of Collections

In justifying their low-income rates under the ARP statute, Indiana's utilities discussed the statutory criteria underlying their alternative regulatory plans. First, they noted, that collection responses allowed (or required) by IURC regulation simply don't work for the companies' low-income customers under the identified operating circumstances involving high and volatile natural gas prices. The existing state regulatory regime mandating a series of notices leading up to the disconnection of service, and the offer of payment plans that do not address the underlying affordability of current bills, is ineffective and wasteful. The existing regulatory regime, according to the companies, resulted in the companies continuing to disconnect low-income customers, and writing-off low-income accounts as bad debt, while spending considerable utility money in the pursuit of collection actions that cannot be expected to succeed.

In contrast, the companies said, the alternative regulatory plans proposed by each company would improve collections and reduced unpaid bills. Citizens Gas/Vectren both noted that the proposed alternative regulatory plan would increase the efficiency of their respective utilities by reducing the number of utility terminations and decreasing payment defaults and untimely payments, all of which contribute to higher collection and uncollectible costs to the Company.[134]

Benefits to the Utility, to Customers, and to the State as a Whole

The proposed rate affordability programs, Indiana's utilities asserted, would generate benefits to the utilities, to their customers, and to the state under the alternative regulatory plan statute. One attribute of the public interest that Indiana regulators are required by statute to consider in administering public utility regulation involves public health and safety. Citizens Gas and Vectren both noted that there were public safety issues involved with providing affordable rates to their low-income customers. Reporting that more than 11,000 of their customers received

[132] Indiana Code, §8-1-2.5-6(a)(1) (2007).
[133] Verified Joint Petition of Indiana Gas Company, Inc., Southern Indiana Gas and Electric Company and the Board of Directors for Utilities of the Department of Public Utilities of the City of Indianapolis, as Successor Trustee of a Public Charitable Trust, d/b/a Citizens Gas & Coke Utility, Pursuant to Ind. Code §8-1-2.5, et seq. For Approval of an Alternative Regulatory Plan Which Would Establish a Pilot Universal Service Program, Case No. 42590, Verified Joint Petition, at 4, March 4, 2004. (hereafter 2004 ARP Petition).
[134] 2004 ARP Petition, at 7 – 8.

LIHEAP assistance but nonetheless "still failed to meet one or more payment obligations for gas service during a twelve month period," these two companies asserted that one goal of their program was "to protect the health and safety of Petitioners' low income customers by helping them to maintain affordable natural gas service."[135]

Efficient Utility Operations

Finally, the proposed alternative regulatory plans, according to Indiana's utilities, would not only promote the efficient operation of the utility, as described above, but would also promote the efficient use of energy by low-income customers. When a customer has no hope of being able to pay for their bill in the first place, the utilities posited, that customer loses much of his or her incentive to control the underlying home energy use. In contrast, when a low-income affordability program makes possible the complete payment of bills, the customer can be expected to manage their bills to stay within a payable range. According to Citizens Gas and Vectren, "because the Program envisions participating customers to continue to be responsible for the payment of a significant portion of their gas usage, customers will continue to have an incentive to monitor and control usage, if possible, and better to manage their monthly gas bills."[136]

The Regulatory Program Approvals

In a series of orders from 2004 through 2006, the Indiana Utility Regulatory Commission (IURC) approved the initiation and continuation of the Indiana low-income rate affordability programs. The IURC accepted testimony documenting that the utilities had met the statutory criteria set forth for alternative regulatory plans.

The Indiana utilities argued, and the Indiana commission agreed, the tiered discount programs advanced by Citizens Gas & Coke Utility and Vectren Energy were in compliance with the statutory criteria underlying an alternative regulatory plan.

The companies noted that the current conditions under which they operate (including high and volatile natural gas prices) created the need for the plans. They noted that continuing the traditional collection processes contemplated by the existing regulatory regime is ineffective, inefficient and wasteful. They noted how their respective programs would improve not only the efficiency of their operations, but the efficient use of energy by low-income customers. They documented how the proposed alternative plans would generate health and safety benefits for their customers (and the population as a whole), and would improve the competitive posture of the business and industry in their respective service territories.

POLICY PITFALLS AND PRATFALLS TO AVOID.

In reviewing the empirical analysis of low-income energy assistance programs, several myths should be noted with respect to frequent critiques of "Lifeline" rates. These "myths," while they

[135] 2004 ARP Petition, at 3 – 4.
[136] 2004 ARP Petition, at 8.

have been repeated for more than two decades, are worthy of repetition. With grateful acknowledgement to Professor Michael Hennessy,[137] his observations are presented somewhat condensed, but more or less intact.[138]

The Myth of Complete Knowledge and Perfect Research

> This first myth often translates into a discussion of not how much we know, but how much residual error there remains to be explained. More importantly, the myth of perfect knowledge is often used as an implicit criticism of a particular research effort rather than a measure of our general ignorance. The implication is often given that *other* researchers, *other* data bases, or *other* methodologies would have provided a more accurate, more complete, or more valid set of results. Of course, these alternative researchers, data or methods are never produced, so the actual research is always compared with some idealized concept of the possible – a sort of ideal type research design with no flaws. Given this theoretical comparison, obviously any particular research study can be found seriously defective.
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>
> Such techniques of research defamation have two negative consequences. First, they give the misleading impression that unflawed research is possible. McGrath has cogently argued that given the constraints of the research process and the inherently contradictory demands of "good research," it is impossible to maximize all positive features in any single research design. Hence, all research will be flawed. In fact, it is not possible to do an unflawed study. . .The power of the idealized study is contrasted nicely with the flawed (but empirical) method when McCloskey discusses theory testing. He says, "a conceivable but practically impossible test takes over the prestige of the real [but flawed] test, but free of its labor."
>
> The apparent perfection of simulation studies is another case in point here. Of course, in these studies, there are no flaws at all since the studies are not sullied by authentic (but recalcitrant) empirical data. The appeal of simulations is exactly that they remain pristinely abstract and quite amenable to the will of the researcher. McCloskey, however, also points out that the difference between simulations being *amenable* to the will of the researcher and simply *being* the will of the researcher is often vanishingly small. (emphasis added).
>
> However, the Myth of Complete Knowledge and Perfect Prediction is more than just an academic parlor game. If that were all, the myth would be merely amusing rather than pernicious. But if policy makers accept the premise of this myth, their

[137] Through the power of the Internet, even though these comments were authored over 25 years ago, Professor Hennessy was located and interviewed. These comments are presented herein with his permission.
[138] Michael Hennessy. "The Evaluation of Lifeline Electricity Rates: Methods and Myths," 8 *Evaluation Review* 327 (1984).

> reliance on the flawed, incomplete and partial knowledge provided by empirical research will ever decrease. And this will inevitably change the basis of rational decision making over to other even more incomplete, error-filled and partial methods like [special favors based on political connections], special pleading by interest groups, and bureaucratic rationales of system maintenance.

The Myth of Maximum Benefit and Minimum Burden

The second "myth" identified by Professor Hennessy is that sufficiently detailed inquiry will result in the discovery of "a potential policy that benefits all and burdens none." He dismisses the search for such a policy as not only bound to fail, but also as being harmful in the meantime.

> The pervasiveness of this particular myth in the lifeline literature is quite amazing. The review of survey simulations. . .shows that in virtually every case lifeline rates are superior to the alternative rate structure, with greater percentages of targeted households benefiting and lesser proportions of non-targeted households burdened. Yet lifeline rates are routinely criticized (and rejected) for always producing some proportions of the targeted who are burdened and some proportions of the non-targeted who are benefited. As Berg states; "opportunities are missed when our lack of complete understanding causes unnecessary delays. The goal of perfect policies is one of the greatest enemies of the achievement of good policies."[139]

ASSESSING THE BUSINESS CASE FOR AFFORDABLE LOW-INCOME RATES

Assessing the business case for a low-income affordability program involves performing the following steps:

- Articulating the outcomes the program seeks to accomplish;
- Assessing the effectiveness of the program in achieving those outcomes;
- Assessing the productivity of the program in achieving those outcomes;
- Comparing the costs of the low-income program against the costs of alternatives that would achieve the same or comparable outcomes.

[139] Methods and Myths, at 340. Contrast this discussion of "research myths" to the decision of the Minnesota Public Service Commission, which held in approving a Conservation Rate Break for customers consuming less than 300 kWh per month: "There is no question that lifeline is a blunt edged sword in attacking the utility problems faced by low-income users. The Commission readily admits that it will favor some persons who do not need the favor and provide only modest assistance to others who need much more. However, the Commission believes that these infirmities are far outweighed by the overall benefits to the large number of needy persons who are able to conserve energy usage. . .We are not required to choose between issuing an order which reduces all evils or issuing no order at all." Cleveland State University (1980). *Lifeline Electric Rates and Alternative Approaches to the Problems of Low-Income Ratepayers: Ten Case Studies of Implemented Programs*, at 253, National Technical Information Center: Washington D.C.

Each of these steps is examined in greater detail below.

Articulating the Objectives of a Low-Income Program

Articulating the objectives of a low-income program is a necessary first step in assessing the business case for a low-income rate affordability program. Without having first identified the business objectives it seeks to accomplish, a utility cannot hope to assess whether it is spending money wisely or unwisely. Identifying the program objectives helps a utility to determine up-front the extent to which it is committing resources in furtherance of some purpose.

For purposes here, the objectives of a low-income affordability program are limited to those objectives that are exclusively related to the utility as a utility. Without endorsing the notion that any social function is beyond the purview of ratepayer dollars –utilities certainly spend money on such "social" functions as workplace safety, environmental protection (including clean air and water), and workplace diversity—for the purposes of the instant analysis, the social function of providing affordable rates because of the social benefits generated by affordability (e.g., housing, public health and safety, nutrition, business competitiveness) is set aside for the moment.

Having done that, the business objectives of a low-income rate affordability program are two-fold:

- To provide an uninterrupted supply of the products and services the utility seeks to sell; and

- To collect the revenue from those sales in a full and timely fashion.

Effectiveness of an Affordability Program in Achieving Business Outcomes

A business case for a low-income program affordability program must consider the effectiveness of the program in accomplishing the articulated outcomes. No matter what level of cost is being incurred, by the program or by the alternatives against which the program is being compared, to the extent that the business objectives are not being accomplished, a "business case" cannot be made for that activity.[140] With this in mind, assessing the business case of a low-income program first considers whether the identified desired outcomes are being accomplished.

[140] Consider the farmer who is assessing the "business case" for how to keep the grass in his back pasture short. He identifies three alternatives: (1) a push mower (with a low capital investment but high labor costs); (2) a power mower (with a high capital investment but low labor costs); and (3) a herd of sheep. The first question the farmer asks is ***not*** "what is the cost?" The first question must be: is the grass being kept short?

The Effectiveness in Maintaining Uninterrupted Service

A low-income rate affordability program can be a more effective mechanism for providing an uninterrupted supply of the products and services which the utility seeks to sell than existing alternatives. For purposes of this analysis, the "interruption of sales" is measured by the involuntary disconnection of service for nonpayment.[141] In turn, the disconnection of service is measured in two ways: (1) the frequency of disconnections; and (2) the duration of disconnections.

The impact of a low-income affordability program on the disconnection of service was directly studied for the rate affordability programs offered by two Indiana utilities. The evaluation of Indiana's disconnections for nonpayment compared the disconnections without the program to the disconnections with the program. It further compared the rate of disconnections for program participants to the rate of disconnections for the residential customer base as a whole.[142]

The Indiana "Universal Service Program" (USP) was more effective in achieving the outcome of uninterrupted service than was the status quo (i.e., delivering undiscounted bills coupled with collection activity, payment plans, and the like). The empirical evaluation found:

- The USP succeeded in reducing the low-income shutoff rate to virtually the same level as the residential population as a whole. In the "high disconnect" months of April and May,[143] while Vectren Energy disconnected 13 accounts for each 1,000 residential accounts, the Company disconnected between nine (9) and 18 accounts within the low-income population.

- If one limits the comparison to accounts with arrears, the low-income program participants outperformed the residential population as a whole. While Vectren disconnected services for nonpayment to between 13 and 15 of each 100 residential accounts at least 60 days in arrears, the company disconnected service to between 10 and 11 accounts of each 100 low-income program participants who were at least 60 days in arrears.

The improved performance could be attributed to the rate affordability initiatives. In November 2006, the evaluation found, "it is evident that the households who would eventually become program participants were performing less well than the total population. This is true for all three metrics (DNPs[144] to total accounts; DNPs to accounts in arrears; DNPs to accounts 60+ days in arrears). It is not until after the Vectren program delivers its bill payment assistance

[141] A second way to measure service interruptions would involve an examination of "final bills." The level of final billed accounts is a more comprehensive metric in that it picks up the voluntary disconnection of service, including the voluntary disconnection associated with frequent mobility. See generally, Colton (1996). The Road Oft Taken: Forced Mobility and Childhood Education in Missouri, 2 *Journal on Children in Poverty* 23.
[142] Colton (2007). *An Outcome Evaluation of Indiana's Low-Income Rate Affordability Programs,* Citizens Gas and Coke Utility/Vectren Energy Delivery/Northern Indiana Public Service Company. See also, *An Outcome Evaluation of Indiana's Low-Income Rate Affordability Programs: 2008 – 2009 Program Year,* Citizens Gas and Coke Utility/Vectren Energy Delivery/Northern Indiana Public Service Company.
[143] Manitoba Hydro experiences these same high disconnect months.
[144] A "DNP" is "disconnect for nonpayment."

during the winter months that the DNP performance begins to substantially improve." Low-income customers receiving payment assistance experienced a decrease in disconnections, while low-income customers not receiving such assistance continued to see an increase in the number of disconnections they experienced.

The performance of Indiana's rate affordability participants was far superior to the performance of low-income customers statewide in Indiana. The 2006 annual "Billing and Collections Report" reported that, statewide, a low-income account in Indiana receiving a shutoff notice was more likely to move to the actual disconnection of service than was a residential account in general. The rate affordability program reversed that result for program participants.

In addition to reducing the *frequency* of involuntary disconnections for nonpayment, the Indiana USP reduced the *duration* of disconnections as well. The Indiana evaluation found that "Vectren succeeded in lessening the duration of service disconnections for nonpayment when compared to the total residential customer base as a whole."[145] The evaluation reported that "low-income customers consistently outperformed the total residential customer base in having their service quickly reconnected. In no month did the reported proportion of short-term reconnections for low-income program participants fall below the proportion of residential customers generally."

The Effectiveness in Collecting Billed Revenue

In addition to the success in maintaining the uninterrupted supply of product, the Indiana rate affordability program generated positive outcomes regarding the collection of revenue as well. This positive outcome was measured in terms of whether the program generated revenue neutrality. Revenue neutrality examines the extent to which, if at all, a low-income rate affordability program generates the same dollars of revenues to the utility despite the offer of discounted rates or bills. Revenue neutrality occurs when the discounted rates or bills improve payment patterns sufficiently to offset any reduced billings through the offer of the rate discount.

Revenue neutrality for Indiana's rate affordability program was measured by comparing low-income program participants to customers known to be low-income but not participating in the rate affordability program. One impact of the rate affordability program was to significantly increase the rate at which low-income customers paid their Vectren bills. Customers that participated in the Vectren program paid 82% of their Vectren bill, compared to a payment of 50% for Vectren low-income non-participants.

The results of the Citizens Gas and Coke Utility (CGCU) rate affordability program, while not as substantial, nonetheless demonstrated the same outcome. While CGCU participants paid 79% of their current utility bill, non-participants paid only 64%. The Indiana evaluation found: "As can be seen, the [rate affordability program] was better than revenue neutral to Citizens Gas. While [program] participants were billed 90% of what nonparticipants were billed, they paid 111% of what nonparticipants paid."[146] Table 19 presents the results:

[145] 2007 Indiana Outcome Evaluation.
[146] 2007 Indiana Outcome Evaluation.

Table 19. Billings and Revenues Under CGCU Rate Affordability Program			
Population	Billed Revenue	Collected Revenue ($s)	Collected Revenue (%)
Program participants	$273,627	$215,897	79%
Program non-participants	$304,072	$194,577	64%
Ratio: participant : nonparticipant	0.90	1.11	--
NOTES: Based on study sample.			

As the Indiana evaluation found, had the low-income non-participants paid at the same rate as program participants did, they would have paid nearly $46,000 more than they actually paid (on a base billing of $304,000).

Similar results were found in the recent evaluation of the Xcel Pilot Energy Assistance Program (PEAP) operated by Xcel Energy in Colorado. The PEAP evaluation found that program participants paid 67% of their current bills, compared to PEAP non-participant payments of 51%. According to the PEAP evaluation, rather than collecting $533,684 from customers if they had not participated in PEAP, Xcel Energy collected $701,278 from customers enrolled in PEAP, a gain of $167,469 attributable to the program.[147]

Productivity of an Affordability Program in Achieving Business Outcomes

In addition to assessing the effectiveness of a low-income program in accomplishing desired business outcomes (relative to the alternatives), it is necessary to judge the productivity of the program (i.e., the efficient use of company resources) in accomplishing the desired outcomes. Assessing productivity supplements the assessment of "effectiveness" from two different perspectives.

Addressing the productivity of utility efforts helps the utility assess whether there is a proper match between the tool being employed and the type of payment problem that is sought to be remedied. On the one hand, in other words, evaluating the productivity of the program (relative to its alternatives) helps to identify when inappropriately extensive tools are being employed by the utility. An involuntary disconnection of service, for example, is not a collection tool that addresses temporary inability-to-pay. The bill would be paid whether or not the disconnection was employed. In these circumstances, the disconnection serves no business purpose. It is not "productive," in that it generates no additional revenue.

On the other hand, evaluating productivity will help the company evaluate whether it is using a tool that is insufficient given the types of problem extent on the utility's system. Considering productivity, in other words, helps identify when tools are being employed that have no hope for success. A deferred payment plan, for example, is not a tool that addresses chronic inability-to-pay. If a customer could not pay his or her full bill in the past because of a lack of money, it lacks good sense to use a tool that would require that customer to pay the full bill ***plus*** some

[147] Colton (2010). *Interim Report on Xcel Energy's Pilot Energy Assistance Program (PEAP): 2010 Interim Evaluation*, Xcel Energy: Denver (CO).

increment to retire arrears in the future. In these circumstances, the tool is likely to be unsuccessful. It is not "productive," in that it generates no additional revenue.

Productivity implies not only some absolute level of output (i.e., "effectiveness") but some level of output given a designated level of input as well.[148] In order to evaluate productivity, both the input and the output data are needed.

Enhanced Productivity of Individual Collection Activities

The use of a rate affordability program helped the Indiana utilities discussed above to enhance the productivity of their collection efforts. Vectren Energy's rate affordability program, for example, allowed that company to move to an increased reliance on payment plans as a collection device for its low-income program participants rather than relying on the disconnection of service for nonpayment when low-income customers falls into arrears. Table 20 shows that that while the payment plan-to-disconnect ratios are similar for all customers and for low-income customers in the early study months, as the company implemented its rate affordability program, it consistently moved to a greater reliance on payment plans rather than on service disconnections to respond to low-income arrears. In the pre-winter month of November, the ratios of payment plans to service disconnections for nonpayment were virtually identical.[149] The data is disaggregated by the three "tiers" of the rate affordability program (called USP, "Universal Service Program").[150]

- In April, while USP3 customers have 11.1 payment plans for each disconnection for nonpayment, the residential customer base as a whole had only 2.7 payment plans;

- In May, while USP1 customers had 6.9 payment plans for each disconnection, the residential customer base as a whole had only 1.6 payment plans.

[148] If one were to compare the effectiveness of two district offices in collecting bills, the absolute amount of revenue collected would not be the exclusive performance factor to use in the comparison. Even assuming that both offices faced identical numbers of payment-troubled customers with identical payment problems, it would be invalid to say *ipso facto* that one office was more "productive" if it collected 10% more revenue. If the office which collects more had twice the staff, but collected only 10% more revenue, the revenue collection per staff member would be much lower. If the office that collected more had a substantially greater investment in equipment (e.g., auto-dialers), but collected only 10% more revenue, the revenue collection per dollar of capital investment would be much lower.

[149] The Table presents ratios. A ratio of 1.0 means that for every disconnection of service for nonpayment, there is an account on a deferred payment plan. If there were 100 disconnections for nonpayment, in other words, there were also 100 accounts on payment plans. A ratio of 3.0 means that for every one account subject to disconnection, there were three accounts on a deferred payment plan.

[150] The Tiered Rate Discount has three tiers to the Discount. "USP1" includes the low-income program participants in the highest income tier; "USP3" includes the low-income customers in the lowest income tier. "USP" represents Universal Service Program, the name of the Tiered Rate Discount.

Table 20. Ratio of Deferred Payment Arrangements to Disconnections for Nonpayment: Pre- and Post-Winter Heating Season: 2006/2007 (Vectren) /a/

	Nov 2006	April 2007	May 2007
All residential	3.1	2.7	1.6
USP 1	4.4	9.1	7.7
USP 2	3.7	12.1	8.2
USP 3	2.8	11.1	6.0

NOTES:

/a/ Winter months not considered given Indiana's winter shutoff moratorium.

The ability to treat the arrears of its low-income customers in a less intensive fashion is also evident from an examination of the ratio of field collections to the number of other collection activities. Table 21 presents data on the ratio of field collection activities to mail collection activities. If the ratio is 1.0, there is one field collection activity for every 100 mail collection activities. If the ratio is 3.0, there are three field collection activities for every 100 mail collection activities. A higher ratio evidences a greater reliance on the more intensive (and more expensive) field collection activities.

Table 21. Ratio of Field Collection Activities to 100 Mail Collection Activities: Pre- and Post-Winter Heating Season: 2006/2007 (Vectren) /a/

	Nov 2006	April 2007	May 2007
All residential	4.7	6.7	10.0
USP 1	5.3	3.1	3.8
USP 2	7.8	2.4	2.9
USP 3	8.9	2.7	4.2

NOTES:

/a/ Winter months not considered given Indiana's winter shutoff moratorium.

The Vectren rate affordability program allowed it to move to a less intensive collection activity directed toward its low-income customers when compared to its residential customer base as a whole. In the pre-winter/pre-program month of November, the ratio of field collection activities per 100 mail collection activities was similar between the low-income population and the residential population as a whole. If anything, the intensity of collection effort was greater for a significant portion of the low-income population (USP2 and USP3), with noticeably more field collection activities per 100 mail collection activities than for the residential customer base as a whole.

After operating its rate affordability program, however, Vectren could collect its low-income revenue with less intensive collection activities. Contrary to the pre-program results, after the company implemented its rate affordability program for low-income customers, the company was

exerting between two and three times more field collection activities (per 100 mail collection activities) for its residential customer base as a whole than it was for its low-income population.[151]

Enhanced Productivity of Aggregate Collection Activities

In addition to considering the impact of a low-income affordability program on individual collection activities, a productivity analysis should look at the overall collection effort as well. The level of collection effort is an important constraint on any evaluation of revenue collection. Two groups of customers, each of which have paid 80% of their bills for current usage, present substantially different pictures of cost and risk to the utility if one group makes payments with little or no collection effort while the other makes the same dollar payment, but only after the utility exerts considerable collection interventions directed toward the customers.

Improvements in the productivity of collection activities can occur in either of two ways:

- The need for collection interventions can be reduced thus allowing an increased payment per each collection intervention performed; in the first instance, improvement can be seen even if total dollars collected remains the same (but the interventions needed to generate those dollars decreases); or

- The customer response to the collection activity can improve thus allowing an increased payment per each collection intervention performed. In this second instance, improvement can be seen if the total number of collections activities remains the same but the dollars generated by those activities increase.[152]

In essence, this evaluation process considers the effectiveness and efficiency of collection activities from two different but related perspectives. On the one hand, it examines how much revenue is generated by each collection intervention. On the other hand, it examines how many collection activities are associated with the generation of the revenue.

In the discussion below, the effectiveness of collection activities directed toward participants in the Indiana rate affordability program is measured by reference to the average payment per collection activity month.[153] The Indiana utilities exhibited the ability to generate greater payment advantage for its longer-term USP participants. In eleven of the seventeen study months, customers who had participated in USP for both 2007 and 2008 paid more per collection month than did customers who began their USP participation in 2008. This payment productivity increased as the length of participation in the rate affordability program increased. An increase in the average payment per collection month occurs for one or both of two reasons: (1) the

[151] These results are consistent with the "theory" of a low-income program. A low-income program will not likely result in an absolute decrease in the number of collection activities. Instead, a low-income program allows a utility to switch its commitment of collection resources away from low-income customers, where the collection activity is not likely to be effective, to non-low-income customers where the activity is more likely to have a positive effect on revenue collection.

[152] Productivity is measured by the ratio: DC / CE, where "DC" = dollars collected; and "CE" = collection effort. In the first illustration, "CE" (the denominator) is reduced. In the second illustration, "DC" (the numerator) is increased.

[153] A "collection activity month" is a month in which any level of collection activity occurs.

payments made in response to collection activity increases; and/or (2) the number of payments made without need of any collection activity increases. The cumulative average payment of the CGCU USP participant by the end of the study period was $366, compared to $291 for the nonparticipant.[154]

Putting it Together: The Cost-Effectiveness of Achieving Business Outcomes

It is finally possible to dollarize the increase in collections efficiency for purposes of assessing whether the utility delivers benefits to its ratepayers through a low-income program. While such an analysis is not required to build a business case based on the increased effectiveness and productivity of a utility in achieving its business objectives,[155] some decisionmakers expect to see such an approach.

The analysis of benefits should take the following form. The analysis considers the costs of collecting the revenue deficit occurring with and without the rate affordability program. The analysis thus takes into account both of the factors that have been considered above: (1) the effectiveness of the programs in generating payments; and (2) the impact of the programs on the productivity of the collection effort needed. If the rate affordability program is less effective at collecting revenue, the "revenue deficit" increases as does the total cost.[156] In addition, if the rate affordability program is less productive at collecting revenue, the number of "needed collection activity months" will increase as does the total cost.

Finally, through the use of this Effectiveness/Productivity Analysis, the utility can further assess the impact of other utility activities. A utility might, for example, change the parameters of the analysis by adopting a budget-billing plan. Through a budget billing plan, the revenue deficit or the payment per collection activity month might change, thereby changing the relationships in the calculation. Through application of this analysis, however, the utility would be able to determine whether such a supplemental effort enhances or impedes (or has no effect on) the effectiveness and productivity of collections. If the supplemental efforts increase the effectiveness or productivity, the benefits will have been enhanced. If it decreases the effectiveness or productivity, the benefits will have been impeded.

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[154] Vectren experienced a similar improvement.

[155] ". . .many opponents of [cost-benefit analysis], defined as a procedure that seeks to monetize benefits, do not oppose cost effectiveness analysis. . .Cost effectiveness analysis evaluates the costs of different means of achieving a pre-determined goal." Driesen (2005). *Is Cost-Benefit Analysis Neutral*, Syracuse University College of Law. A significant body of literature exists distinguishing a "cost-effectiveness" analysis from a cost-benefit analysis. See generally, Stewart, A New Generation of Environmental Regulation, 29 *Cap.U.L.Rev.* 21, 41 (contrasting cost effectiveness analysis with cost-benefit analysis); Hahn et al., Empirical Analysis: Assessing Regulatory Impact Analysis: The Failure of Agencies to Comply with Executive Order 12866, 23 *Harv.J.L. & Pub.Pol'y* 859, 872-74 (2000) (cost effectiveness analysis does not involve monetization of benefits); Anderson et al, Regulatory Improvement Legislation: Risk Assessment, Cost-Benefit Analysis, and Judicial Review, 11 *Duke Ent'l L. & Pol.* 89, 93 (2000 – 2001) (cost effectiveness analysis is used instead of cost-benefit analysis for many applications in public health and medicine); Posner, Transfer Regulations and Cost-Effectiveness Analysis, 53 *Duke L.J.* 1067, 1069 (2003) (cost effectiveness analysis compares different means of achieving the same regulatory end).

[156] Presumably, if the rate affordability program is less effective at collecting revenue, the productivity (i.e., payment per collection activity) will also decrease.

Table 22. Effectiveness/Productivity Cost-Benefit Ratio
for CGCU Rate Affordability Program (RAP)

	Billed Revenue	Collected Revenue	Payment per Collection Activity Month	Needed Collection Activity Months	Cost per Collection Activity Month /a/	Total Cost
CGCU Initial Collections						
With RAP	$273,627	$215,897	$360	599.7	50	$29,986
No RAP	$304,072	$194,577	$291	668.6	50	$33,432
Sub-total benefit						$3,447
CGCU Deficit Collections						
With RAP	$273,627	$215,897	$57,730	$360	160.4	$50	$8,018
No RAP	$304,072	$194,577	$109,495	$291	376.3	$50	$18,814
Sub-total benefit						$10,796
Total benefit (sum sub-totals)						$14,242
Adjusted benefit /b/						$35,562

NOTES:

/a/ It does not matter what this cost is given that it is a constant.
/b/ The "adjusted benefit" sums the gain or loss in collections due to the increased/decreased collections percentage on the original billed revenue.

Table 22 shows the positive financial benefits generated by the low-income program in two ways. On the one hand, Table 22 shows the positive financial benefits attributed to the increased collection productivity.

- On the initial revenue collection, the Company spent $3,447 less to collect the $215,897 than it did to collect the $194,577;
- On the deficit revenue collection, the Company spent $10,796 less to collect the $57,730 "deficit" than it did to collect the $109,495 "deficit."

Clearly, the rate affordability program presents the more productive and lesser cost approach to collecting low-income revenue. The benefits to Vectren were even greater.

Finally, the "adjusted benefit" in Table 22 further accounts for the gain or loss in revenue from the base billing. Had the original discount resulted in a revenue loss, this loss would be used as an offset to the collections gain. The decreased billing through the rate affordability program, however, resulted in an absolute (and percentage) increase in collected revenue. That increased revenue resulted in an even greater positive financial benefit to CGCU.

As can be seen, the business case to the utility arises through two different benefits:

- On the original billing, the utility offering a rate affordability program can be expected to collect both a higher proportion and a higher absolute dollar amount, while spending fewer dollars on the process of collection.

- On the deficit between the billing and initial collections, the utility can also be expected to spend fewer dollars on the process of collection to eliminate the deficit.[157]

The ultimate conclusion is that a low-income program can be justified through a business case analysis. The low-income programs that have been implemented in other jurisdictions have found that the result is both an improved effectiveness in collecting revenue, and an improved productivity in collecting revenue (both on an individual collection activity basis and an aggregate collection activity basis). In addition, the low-income programs help utilities to achieve their objective of providing an uninterrupted supply of the product that they seek to sell.

Adding in the Indirect Business Benefits of Affordable Low-Income Home Energy

Aside from the direct financial benefits of promoting home energy affordability as discussed above, the provision of affordable rates will generate considerable additional financial benefits to Manitoba Hydro as well. These benefits should be considered by the utility as instrumental uses in furthering business objectives.[158] The extent of these instrumental uses document that the offer of low-income affordability programs can be "grounded in economic rationality and self-interest."[159] In this respect, the consideration of these additional business benefits should be viewed in the same way that the business benefits of Canadian multiculturalism are viewed. As the Department of Canadian Heritage found:

> Another problem that emerges in respect of cross-cutting, strategic policies, such as multiculturalism, is the public nature of the benefits they produce. Expenditures on multicultural policies oftentimes yield non-specific benefits (externalities) that cannot be entirely appropriated by any one agency or department. This is a situation that chronically leads to under-investment, even where there is a business case to be made because overall benefits outweigh costs.[160]

The benefits of providing affordable energy are much akin to the business benefits of providing multiculturalism in these regards. The affordability of home energy yields "non-specific benefits" (e.g., public health, public safety, improved nutrition, improved education) that cannot be entirely

[157] The utility receives further benefit through the collection of additional revenue from nonprogram participants because of the ability of the utility to deploy the resources freed-up by the increased productivity of low-income collections.
[158] See e.g., The Conference Board of Canada (1995). *Dimensions of Diversity in Canadian Business: Building a Business Case for Valuing Ethnocultural Diversity*, The Conference Board of Canada: Ottawa (ONT); see also, Taylor (1995). Building a Business Case for Diversity, *Canadian Business Review*, 22(1):12-14.
[159] Compare, Burstein (2004). *Developing the Business Case for Multiculturalism*, at 9, Outreach and Promotion Directorate, Multiculturalism and Human Rights Branch, Department of Canadian Heritage: Ottawa (ONT); see also, Gandz (2001). *A Business Case for Diversity*, Richard Ivey School of Business, University of Western Ontario.
[160] Business Case for Multiculturalism, at 12.

appropriated by Manitoba Hydro as the utility providing the energy. As a result, the utility traditionally under-invests in affordability programs.

Workforce Impacts/Internal Productivity

Initiatives such as the affordable home energy program proposed herein can deliver business benefits through enhanced staff productivity. The inability (or unwillingness) to effectively manage the growing presence of factors creating conflict creates business costs that impede "desired organization and business outcomes."[161] According to a February 2010 analysis of the costs and benefits of promoting workplace diversity by the U.S. Military Leadership Diversity Commission, "such costs can be direct (i.e., produced by turnover and absenteeism among employees who are the minority in their work group) or indirect (i.e., the result of conflict or reduced communication between employees who are different)."[162]

The provision of affordable low-income rates allows utility customer service representatives to avoid imposing similar direct and indirect productivity costs on the company. The provision of affordable low-income rates provides utility staffpersons greater satisfaction in their jobs. By enhancing home energy affordability on the front-end, utility staff face fewer customer confrontations, have a greater number of options available leading to successful conclusions from the customer/company interaction, generate a higher success rate in obtaining payment, and reduce the daily stress imposed on staff addressing nonpayment situations.

Improving employee satisfaction delivers business benefits to the utility.[163] "[E]mployees with supportive workplaces are the most satisfied with their jobs and the most loyal, which leads to reduced turnover among workers as well as a reduction in the costs related to such turnover."[164] As the Military Leadership Diversity Commission found, "retention and turnover of personnel are fundamental concerns for. . .businesses. There are significant costs associated with recruiting for replacements, and organizations make considerable investments in training each individual."[165] Helping to reduce "avoidable turnover costs" may have "real bottom-line financial implications for firms."[166] Costs are associated with retention, recruitment, training and related employee activities.

[161] Military Leadership Diversity Commission (2010). *Business-Case Arguments for Diversity and Diversity Programs and Their Impact in the Workplace*, 2, Issue Paper #14, Military Leadership Diversity Commission: Arlington (VA).
[162] Id.
[163] Duboff and Heaton (Jan/Feb. 1999). Employee Loyalty: A Key Link to Value Growth, *Planning Review*, 27(1).
[164] Fairfax (2003). The bottom line on board diversity: A cost-benefit analysis of the business rationales for diversity on corporate boards, 2005 *Wisconsin Law Review* 795, 829 (2005); see also, Harter et al. (2002). Business-Unit-Level relationship between employee satisfaction, employee engagement, and business outcomes, *Journal of Applied Psychology, 87*, 268 – 274,
[165] Business-Case Arguments for Diversity, at 3.
[166] McKay et al. (2007). Racial differences in employee retention: Are diversity climate perceptions the key?, *Personnel Psychology*, 60, 35-62; see also, Jackson et al. (1991). Some differences make a difference: Individual dissimilarity and group heterogeneity as correlates of recruitment, promotions and turnover, *Journal of Applied Psychology*, 76, 675-689.

Revenue Impacts: Business Locational Decisions.

Offering affordable rates to low-income customers can be expected to have long-term positive impacts for the utility from the perspective of maintaining and expanding its revenue base. The provision of a strong social safety-net so that individuals and households do not face the deprivation of basic household necessities is a strong and growing factor in businesses making locational decisions. These locational factors are particularly important for high technology firms, which represent a particularly strong future growth potential for the economy. Research for Ontario's Ministry of Enterprise, Opportunity and Innovation, in collaboration with the Institute for Competitiveness and Prosperity, reports that sound economic development policy includes ensuring that "the right social investments are made to ensure social harmony."[167]

These results are confirmed by research looking specifically at the relationship between poverty and business competitiveness. The *Competitive Assessment* of the Indiana economy was prepared by Market Street Services for the Indiana Department of Commerce. According to the final report, released in January 2002, the purpose of that Department of Commerce sponsored study was "to help the State clearly assess its competitive position both in relation to other states and the nation." The Indiana Department of Commerce report said:

> The Corporation for Enterprise Development (CFED) identified several key challenges that must be overcome at the state level in particular, to achieve successful economic development in the near future. The *primary barriers or problems that exist today* include sprawl and unmanaged growth, the negative impacts of globalization, such as fragmenting markets and global competitors, *and income inequality from unequal earnings*.[168]

(emphasis added). The *Indiana Competitive Assessment* reported that "cost of living is a common consideration for employers making expansion and relocation decisions as they attempt to retain and recruit qualified employees." The Department of Commerce's report then found: "Regional meeting participants stated time and again that they feel Indiana is a very affordable place to live *for people of all income levels*. Participants felt that the moderate cost of living *helps their competitive* [posture] with other Midwestern states as well as places around the country." (emphasis added). The report then finally noted that Indiana should: "keep[…] in mind that pockets of poverty –whether the businesses locate there or not—is not a business climate asset overall."

While this assessment was made with respect to telecommunications, it is consistent with the continuing statements made throughout the Indiana *Competitive Assessment* report about the

[167] Gertler (2002). *Competing on Creativity: Placing Ontario's Cities in North American Context*, report produced for the Ontario Ministry of Enterprise, Opportunity and Innovation and the Institute for Competitiveness and Prosperity. In this sense, affordable home energy can be viewed in the same way that health and education are viewed. "There are numerous empirical studies that demonstrate the links between education, health and competitiveness. In particular, both health and education are correlated with superior economic outcomes such as higher productivity, higher per capita incomes, and faster growth." Business Case for Multiculturalism, at 8.
[168] Market Street Services. *Indiana Competitive Assessment*, at 8, Indiana Department of Commerce: Indianapolis (IN).

need, from the perspective of maintaining the competitiveness of Indiana business and industry, to address pockets of poverty to ensure that these pockets are not "left behind."

The observation here is being increasingly recognized as relevant to various services. "It should be noted that businesses focus on quality of life considerations when making location decisions because they are relevant for attracting a high quality workforce."[169]

> Economic developers are increasingly recognizing the importance of quality of life in business location decisions. Quality of life has been deemed particularly influential for companies involved in research and development and high technology, and in enterprises employing highly skilled workers in information or knowledge-based services and production. Evidence of this observation is a study conducted by Love and Crompton in which they surveyed 174 decision makers of businesses that had initiated, expanded or relocated to Colorado in the previous five years. . .quality of life was considered the second most important factor for prompting the business move and not selecting a specific community, as well as the third most important factor in the final selection of a specific community.[170]

The connection between assuring access to basic household necessities and maintaining the competitiveness of the local economy has been recognized throughout Canada.[171] Given the reliance of utility sales, revenues and profit on a strong economy, to the extent that Manitoba Hydro contributes to this local competitiveness, the company will derive benefits as a result. In this regard, as the local utility, Manitoba Hydro is not merely a participant in the local economy, but is a direct and active beneficiary of a thriving local economy.

Reputational Capital.

The adoption of an affordable home energy program will benefit Manitoba Hydro in that it will expand the "reputational capital" of the utility. Adopting a low-income program allows the utility to acknowledge that it is taking proactive efforts to ensure the availability of home energy as a basic human need. Pursuing such programs allows the utility to speak from a position of strength of community involvement. The enhanced ability of the utility to speak with "moral authority" is a business asset that adds value to the corporation.[172]

This notion of "moral authority" is not a theoretical construct that has little practical meaning to the financial performance of the utility.[173] It is associated with "reputational capital," which in turn has

[169] Taylor, et al. (2006). *A Cost-Benefit Analysis of Universally-Accessible Pre-Kindergarten Education in Texas,* Bush School of Government and Public Service, Texas A&M University: College Station (TX).
[170] Id. (citations omitted).
[171] *Improving the Competitiveness and Standard of Living of Canadians: Common Position of Provincial and Territorial Finance Ministers* (December 1999); see also, Human Resources and Skills Development Canada, *Social and Economic Impact of Labor Standards* (March 2008); Pindus et al. (2007). *Place Matters: Employers, Low-Income Workers and Regional Economic Development,* The Urban Institute: Washington D.C. ("racial inclusion and income equality can enhance regional economic growth") (citations omitted).
[172] Business Case for Multiculturalism, at 9.
[173] "A University of Pittsburgh Business School review of 46 studies on the links between [corporate social performance] and [corporate financial performance] found a positive relationship between social and financial

multiple operational (and thus financial) implications. On the one hand, corporations that enhance their reputational capital through programs such as the low-income discount proposed in this paper help to preserve what the Center for Corporate Citizenship refers to as their "license to operate" (sometimes referred to as their "freedom to operate"). "In coming years, it will be important for companies to find ways to prevent or reduce the cost of challenges to their projects and operations. By developing a presence as corporate citizens through positive actions in communities and society, businesses can preserve and enhance their license to operate."[174] Viewed in this way, the business benefits associated with this impact arise with respect to projects ranging from construction/development proposals to acquisition strategies, both of which are particularly applicable to electric utilities. Enhanced reputational capital attributable to social performance has been found, for example, to allow companies to forego and/or minimize costly battles for site placement with communities and/or government officials.[175]

The contribution which an affordable home energy program makes to enhanced reputational capital generates business benefits to Manitoba Hydro in a number of ways.[176] An enhanced reputational capital affects the full-range of stakeholders in the Manitoba Hydro community: customers, employees, regulators, and the broader community. Each of these stakeholders with whom Manitoba Hydro interacts will contribute to the financial benefits derived by the Company.

Economic Development

Low-income rate affordability programs generate substantial economic development impacts in the jurisdictions in which they operate. As a significant contributor to economic development, low-income rate affordability programs provide substantive benefits to the utility as well as to all customer classes. Because rate affordability programs contribute to additional disposable income within the low-income population, it helps drive additional job creation, income generation, and economic activity for local businesses.

A study for Entergy Services Corporation, a major electric utility serving the Middle South, found that a low-income rate affordability program would be a significant generator of jobs, economic activity, and income throughout the region. The report found:

> The distribution of energy assistance first creates economic activity for the Entergy states through the direct delivery of benefit dollars. In addition to the dollars of cash benefits, however, the delivery of energy assistance will also free up

performance. . .thirty-two studies found a positive relationship between social and financial performance. Five studies found a negative relationship between social and financial performance. Fourteen studies found no effect or an inclusive relationship between social and financial performance." Roman at al. (1999). The Relationship Between Social and Financial Performance. *Business and Society* 38(1).

[174] Determining the Value of Corporate Community Involvement, at 7.

[175] Waddock and Graves (March 1996). Good Management and Good Stakeholder Relations; Are They Synonymous," presented at the Annual IAMBS Annual Meeting.; see also, Waddock and Graves (1997). The Corporate Social Performance-Financial Performance Link, *Strategic Management Journal*, 18(4). 303-319.

[176] Rochlin and Googins (2005). *The Value Proposition for Corporate Citizenship*, at 12, Center for Corporate Citizenship: Boston College, Chestnut Hill (MA); citing Nelson and Bergrem (2003). *Values and Value: Communicating the Strategic Importance of Corporate Citizenship to Investors*, World Economic Forum/International Business Leaders Forum.

> household dollars that would have been devoted to the costs arising from the payment and behavior consequences of energy bill unaffordability. These dollars, too, can then instead be spent (and circulated) in the local economy.
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> * * *
>
> While the discussion of the economic impacts of energy assistance looks at economic benefits on a statewide basis, in fact, the economic impacts provide particular advantage to low-income communities. Existing research indicates that low-income households tend to shop at local retail establishments. For food in particular, low-income households tend to shop at small, local food stores. Moreover, not only are low-income *households* more likely to shop locally, but the *businesses* serving low-income households are more likely to shop locally as well. It is clear, therefore, that not only will the provision of energy assistance provide income and employment to low-income households, but the earnings and employment that are delivered to such households will likely be spent, retained and re-circulated within the low-income community as well.[177]

Ultimately, the Entergy study found that "Energy assistance serves as an economic stimulant for the economy in three distinct ways. It creates economic activity. It generates additional earnings. It supports jobs."

Summary and Conclusions

The discussion in this section documents how promoting affordable home energy, in addition to generating the "public benefits" (referred to as "social benefits" above), generates an entire range of corresponding business benefits where the Company *does* capture a part of the benefits arising from those social impacts. These business benefits are not merely associated with the positive social impacts, they are inextricably tied to the social impacts.

Simply because these benefits involve "complex, multi-dimensional outcomes" does not mean they should be ignored. As the Center for Corporate Citizenship reports: "current evidence suggests that corporate social performance and corporate financial performance are positively linked, that they can influence one another, and that both directions of causality are statistically significant and positive."[178]

It would be inappropriate, and in error, for Manitoba Hydro to refuse to consider these financial benefits in any assessment of the "business case" for adopting the low-income affordability program proposed in this paper.

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[177] Roger Colton (August 2003). *The Economic Development Impacts of Home Energy Assistance: The Entergy States*. Entergy Services Corp: Little Rock (AR).

[178] Rochlin (2000). *Making the Business Case: Determining the Value of Corporate Community Involvement*, at 2, Center for Corporate Citizenship at Boston College: Chestnut Hill (MA) ("a compelling new argument contends that the traditional view of corporate involvement in social issues –that of being a soft 'add-on' which may distract from core functions—is outmoded. Today, observers from a variety of sectors propose that not only is corporate citizenship consistent with good business practice, it is in fact a business essential." Id., at 4).

SUMMARY

Manitoba Hydro is wrong when it asserts that "the issue of whether energy is affordable is outside the scope of Manitoba Hydro's mandate. . ." (RCM/TREE/MH-I-94). Any number of stakeholders fall within "the scope of Manitoba Hydro's mandate." These stakeholders include customers, employees, suppliers, local economic participants, and the community at-large. In considering the business case for affordable low-income rates, it becomes evident that the impacts of such rates on these various stakeholders all contribute to business benefits for Manitoba Hydro. It would be wrong for Manitoba Hydro to assign the exclusive responsibility for generating those business benefits to "policy for legislators and government. . ."

PART 5:
SUMMARY OF RECOMMENDATIONS FOR MANITOBA HYDRO

The information and analysis discussed above leads to the following recommendations for Manitoba-Hydro. Each of these recommendations was discussed in more detail above:

1. Manitoba Hydro should establish an electric low-income affordability program directed toward households with income at or below 125% of LICO. This program should consist of the following components:

   - A rate affordability component
   - An arrearage management component
   - A crisis intervention component
   - An energy efficiency component

2. Manitoba Hydro should implement a rate affordability program using a Fixed Credit model. The Fixed Credit Program should be directed toward customers with income at or below LICO x 125 percent.

3. Manitoba Hydro should implement an arrearage management program designed to retire pre-existing arrears over no more than a three year period. The Company should impose a customer copayment of $5 per month in support of the arrearage management program.

4. Manitoba Hydro should implement a crisis intervention program. The crisis intervention program should not be income-tested, but should instead be administered by local community-based organizations responsive to individual needs of company customers.

5. Manitoba Hydro should recover the costs of the proposed low-income affordability program through a combination of using a fixed monthly meters charge and an allocation of residential late fee revenue.

6. Manitoba Hydro should expand its Low-Income Energy Efficiency Program (LIEEP). The Company should establish a goal of treating all low-income customers with consumption at or above the Company average residential usage within a ten-year period.

7. In addition to targeting low-income (i.e., LICO x 125%) customers, the Company should set aside a reasonable portion of low-income efficiency budget dollars to direct toward customers moderately in excess of the income guidelines.

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Long Term Study of Pennsylvania's Low Income Usage Reduction Program: Results of Analyses and Discussion

Consumer Services Information System Project
Penn State University

Long Term Study of Pennsylvania's Low Income Usage Reduction Program: Results of Analyses and Discussion

January, 2009

John Shingler
Consumer Services Information System Project
Penn State University

Disclaimer

The views expressed in this report are those of the Consumer Services Information System Project and do not represent the views of Penn State University or the Pennsylvania Public Utility Commission.

Long Term Study of Pennsylvania's Low Income Usage Reduction Program: Summary of Key Findings

Pennsylvania's Low Income Usage Reduction Program (LIURP) is a statewide program designed to help low-income households reduce their energy bills and energy consumption through weatherization and education. The program is overseen by the Pennsylvania Public Utility Commission and implemented by individual electric and gas distribution companies. Households with high energy bill arrearages and high energy consumption are targeted for services. Since the program's inception in 1988, over $330 million have been spent on weatherization treatments for more than 292,071 households in Pennsylvania.

Ongoing evaluation has been built into the LIURP process since its initial implementation. Accordingly, companies collect data on each LIURP household for the thirteen month period prior to and following the installation of weatherization treatments. These data are reported to the Pennsylvania Public Utility Commission on a yearly basis. This report analyzes data for all households receiving LIURP from 1989 through 2006. Our analyses concludes that LIURP is a cost-effective method of reducing both energy consumption and energy bill arrearages but there is also room for possible modifications. The following is a summary of the key findings:

Profile of LIURP Households

- The head of the typical LIURP household is a 47 year old white female, with a high school diploma, who owns her home. She earns an average annual income of nearly $12,000 and has an arrearage on her energy bill.

- The average energy burden for LIURP households is 15.3 percent of annual household income, compared to 4 percent for all households nationwide.

Reduction of Energy Consumption

- Sixty-nine percent of LIURP households reduce their energy consumption following weatherization treatments, with an average reduction of 16.5 percent.

- Thirty-one percent of LIURP households experience no change in energy consumption or increase their energy consumption following weatherization, with an average increase of 19.9 percent. This is referred to as the "rebound" or "take-back effect," and has been attributed to a variety of factors, including correcting heating levels in households that did not heat properly prior to weatherization, and increases in family size.

- Small multi-unit households are most likely to increase their energy consumption following weatherization.

- Households receiving gas heating jobs are least likely to increase their energy consumption following weatherization.

- The greater the energy consumption in the pre-weatherization period, the greater the potential for energy savings. The amount of household energy usage in the pre-period is one of the factors most strongly associated with reductions in energy consumption.

- The greater the energy bill arrearage in the pre-period, the greater the reductions in energy consumption.

- The more residents in the household, the less the reduction in energy consumption.

Energy Conservation Treatment Measures

The most common measures used in the various weatherization jobs are:

Installation of more efficient lighting and lighting fixtures
Pipe insulation
Walk-through or pre-weatherization energy audits, without blower doors
Faucet aerators installed in either the kitchen or bath
Miscellaneous chimney, window and electrical repairs
Removal/replacement of old refrigerators/freezers with energy efficient models
Installation of low-flow showerheads
Furnace maintenance

- Removing or replacing inefficient refrigerators or freezers is the greatest contributor to reductions in electric energy consumption.

- Installing more energy efficient lighting is associated with reductions in electric energy consumption.

Costs of Weatherization Measures

The greatest amount of variance in energy usage from pre to post-period can be explained by examining the costs of the weatherization and energy conservation treatment measures, as opposed to the actual use of them.

- Side wall and attic insulation costs are positively associated with reductions in both electric and gas energy usage.

Reductions in Arrearage

- Of those households with energy bill arrearages, 40 percent reduce their arrearage following weatherization services.

- Thirty-seven percent of electric industry households reduce their arrearage, compared to 54.4 percent for the gas industry.

- The number of residents in the household is negatively associated with reductions in arrearage.

Energy Conservation Education

- Remedial energy conservation visits for households that fail to reduce their energy consumption are effective at reducing the "rebound" or "take-back" effect. Without such visits, the rebound effect could be considerably higher.

- The most effective education services are those that are provided as in-home visits.

- Because the number of people living in a household is negatively associated with both reductions in energy consumption and arrearage, education should involve all members of the household.

Other Findings

- Hispanic households may be underrepresented in LIURP. The number of Hispanic households in poverty has increased in recent years while the number of households in LIURP headed by Hispanics has decreased from 2.3 percent to 0.7 percent.

What Works and What Does not work

Our study finds that the following contribute toward reductions in energy consumption:

- Change outs of inefficient refrigerators and freezers

- Side wall and attic insulation

- Installation of more energy efficient lighting

- Targeting single family households with high energy usage and/or energy bill arrearages

- In-home educational visits

- Remedial energy conservation visits for households that are not reducing their energy consumption

The following do not contribute to reductions in energy usage or arrearage:

- Furnace maintenance

- Window and door treatments, and repairs (for electric baseload jobs)

Policy Recommendations for LIURP

LIURP is a cost effective and successful at meeting its goals of reduced energy consumption and energy bill arrearage. However, with modifications designed to reduce the rebound effect and to reach a greater number of eligible households, LIURP can be even more effective. With this in mind, we recommend the following:

- Explore methods for adjusting the percentage of the federal poverty level to determine eligibility for LIURP.

- Explore what percentage of reduced arrearage is due to reduced energy consumption and what is due to education, receipt of assistance such as LIHEAP, or participation in CAP. Doing this would require additional data gathering in order to have complete information on energy assistance.

- Specifically tailor energy conservation education to address the rebound effect and involve all household members. Companies should focus on in-home education rather than mailings or telephone calls.

- Explore methods to increase public awareness of the need for energy conservation in general and the existence of LIURP in particular.

- Examine the LIURP outreach and referral process for each company. Compare LIURP participants to census data for each service area to determine if any groups are underrepresented or not being reached. If so, companies should make efforts to include these households in LIURP.

- Place more emphasis on cooling needs in LIURP.

- Conduct a detailed study of a sample of LIURP households to gain a better understanding of behavioral impacts on energy conservation, and other factors not currently recorded in the LIURP database or reported on an optional basis.

- Examine LIURP itself for what changes may be needed in the data collection and reporting in order to answer relevant policy questions.

- Study the pilot programs of various companies to see if new techniques are working that should be adopted by other companies, and encourage companies to share information on the impacts of new or experimental weatherization measures.

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Section I
Introduction

This report examines the Low Income Usage Reduction Program (LIURP) as one option for meeting Pennsylvania's need for energy efficiency and conservation. LIURP is a utility-implemented weatherization program aimed at reducing the energy usage and utility bill arrearage of Pennsylvania's low-income population. This report analyzes LIURP's performance from its second year of operation[1] (1989) to the most recent year for which there is complete post-weatherization data (2005). Based upon the results of these analyses, the report offers recommendations for energy policy in Pennsylvania.

The Low Income Usage Reduction Program

The Low Income Usage Reduction Program (LIURP) is a statewide, utility-implemented energy conservation program mandated by the Pennsylvania Public Utility Commission (PUC) and administered through its Bureau of Consumer Services (BCS). The goals of the program are:

1. To assist low-income residential customers in conserving energy by reducing their energy consumption.

2. To assist participating households in reducing their energy bills.

3. To decrease the incidence and risk of customer payment delinquencies and the attendant utility costs associated with customer arrearage and uncollectible accounts.

4. To reduce residential demand for electricity and gas and peak demand for electricity.

To meet these goals, LIURP is targeted toward low-income households with the highest energy consumption. Of these households, those with payment problems and high arrearages are targeted. Since the program's inception in 1988 through 2006, the major electric and gas companies required to participate in LIURP have spent over $330 million to provide weatherization treatments to more than 292,071 low-income households in Pennsylvania. The majority of LIURP jobs (89.3 percent) are performed by the electric industry. While electric industry jobs outnumber gas jobs by nine to one, the electric industry spends approximately twice as much on energy conservation as does the gas industry.

It is expected that LIURP services will reduce energy consumption, thereby reducing energy bills and easing payment problems, which in turn reduce the collections and

[1] Data from 1988 was considered trial data during the initial implementation of the program and is not as complete as later data.

termination costs for companies. By reducing these costs, the level of rate increases for all utility customers may also decline. There are also many other societal benefits from reduced energy demand, discussed elsewhere in this report.

Eligible LIURP households must have utility-provided heating service in their homes and must have an annual income at or below 150 percent of the federally established poverty level.[2] Utility companies install weatherization treatments intended to reduce household energy consumption and repair existing housing defects, provided the condition of the dwelling does not pose a hazard to the safety of the work crew. Companies also provide programs to educate customers on how to conserve energy, refer eligible customers to payment assistance programs, and coordinate services with other energy companies when necessary.

Evaluation of Data

Evaluation has been an integral part of LIURP since its initial proposal. In accordance with this requirement, each participating company must submit to the BCS on a yearly basis information on each weatherized household, including full pre- and post-year energy usage and bill payment data. Because a post-year is required for effective evaluation, the most recent data available for analysis in 2008 (the year in which this report is being prepared) are for households weatherized during the 2006 calendar year.

All data are passed through several screening procedures before being included in analyses. Consequently, not all of the data submitted by companies makes it into the analyses due to missing variables or incomplete information. In order to strengthen the statistical integrity of the results, analyses are conducted on an individual case level. Depending on the specific variables essential to each analysis, extreme outlier values for those variables are also removed from analysis. (More detailed information on the data screening process is included in the section on LIURP household characteristics.) Therefore, the amount of cases available for each analysis varies due to the completeness of the information for those variables required for the analysis.

Throughout this report, reference is made where appropriate to several past studies conducted on the LIURP program, as well as to other literature on energy conservation. Also, due to the unique nature of its data,[3] the PECO Energy Company (PECO) is sometimes analyzed separately from the other energy companies. Whenever PECO differs substantially from the other companies, this difference is noted.

[2] Companies do have some flexibility to provide services to a small number of households that are not at or below 150 percent of the federal poverty level.

[3] PECO is a dual service provider—providing both electric and gas service. Because of this, and other factors unique to PECO, their LIURP jobs are categorized by a different set of codes than other companies.

The Need for Energy Conservation

The need for energy conservation cannot be overstated, nor is it new in the United States. Research has called for government policies directed toward reducing energy consumption and increasing energy efficiency since at least the 1970s.[4] By reducing the demand for energy in the present, energy conservation and efficiency programs are the most cost-effective method of ensuring more energy in the future. Conserving now reduces construction costs for new energy facilities, helps reduce utility rate increases, and ensures greater energy reserves for future use. Reductions in energy consumption and increased efficiency of current energy use are also the most effective, quickest, and relatively inexpensive method for reducing greenhouse gas emissions. While most policies designed to reduce greenhouse gas emissions are directed toward transportation and industry, most experts agree that approximately 50 percent of gas emissions in the United States come from commercial and residential buildings[5]. Therefore, it is essential to have energy conservation and efficiency programs tailored specifically to buildings and residences.

The Need for Low-Income Energy Usage Reduction Programs

There are several approaches to meeting the home energy needs of low-income households in the United States. One approach is to provide monetary assistance for paying winter heating bills. Another is weatherization and other modifications to the housing structure to reduce energy consumption. Other approaches include educating households on how to change their energy consumption behavior and the promotion of more energy efficient technologies.

To date, payment assistance for energy bills has typically received the most funding, although such assistance is often just a temporary solution. Education is sometimes dismissed by experts as being ineffective, or difficult to measure in terms of its impacts. Recently, attention has been focused on promoting new energy-efficient technologies, often not accessible or affordable to low-income households with substantial needs for energy conservation. Most experts agree that, in the long run, the approach with the greatest impact for low-income households, as well as many other households, is weatherization.

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[4] According to the American Council for an Energy Efficient Economy, since 1970 energy efficiency has met 77 percent of the demands for new energy service in the United States, while new energy supplies provided for the other 23 percent of new energy service demands (Prindle, 2007).

[5] Depending on which factors are taken into account, studies generally estimate between 38 and 51 percent of greenhouse gas emissions come from buildings. According to Hal S. Knowles, in a paper presented at the 2008 International Emission Inventory Conference, buildings in the United States account for 48 percent of annual greenhouse gas emissions, with 36 percent of direct energy related to greenhouse gas emissions and an additional 8 to 12 percent of emissions related to the production of materials used in building construction. The residential sector within the United States specifically consumes approximately 20 to 25 percent of primary energy use, accounting for about 50 percent of the gas emissions within the U.S. buildings sector.

In recent years, many energy efficiency programs have been made available to consumers. However, the low-income sector of the population faces many barriers to participating in these programs. A review of energy efficiency and conservation programs offered by utilities and other organizations finds that most of these programs are available only to households with good payment histories.[6]

Low-income households rarely have the expendable money to afford energy efficient retrofits to their homes, and many have poor payment histories and thus are not eligible for the programs they desperately need. Because these homes are often older and less energy efficient, their energy usage may be higher than other homes, while the household's available income for paying for energy usage is less. The average growth in energy bills among low-income households exceeds any corresponding growth in income. Only weatherized homes are, on the average, able to buy as much energy now as they did six or seven years ago without spending a larger portion of their income.[7]

An Economic Opportunity Study in 1990 found that 30 percent of U.S. households (27.9 million) were qualified for federal energy assistance. According to the Energy Information Administration, this percentage increased to 33.8 in 2001 and has since risen to 38.6 percent in 2005. Two programs meet most of the energy needs of low-income households nationally. LIHEAP is designed to assist low-income households with their heating bills, while federal weatherization programs (WAP) are available to promote energy conservation. In 2004, the average annual income of LIHEAP and WAP eligible households was estimated at $22,428, compared to $53,817 for all U.S. households.

It is not surprising that the low-income population has payment problems when it comes to their utility bills. To put this in perspective, consider the concept of energy burden. Energy burden is defined as the percentage of annual income that goes toward paying energy bills. In 2004, the average household in the United States paid 3 to 4 percent of their income toward their energy bills, whereas low-income households paid an average of 13 to 19 percent.[8] Energy burden varies by area of the country. For the mid-Atlantic region, where Pennsylvania is located, the energy burden was 19 percent for low-income households in 2006, compared to 17 percent in 2001. In a 1994 study on natural gas heating bills, Osterberg and Sheehan concluded that "energy burdens are much more important to examine than energy bills."

Under these conditions, many low-income families must choose between paying their utility bill and paying for other essential bills such as rent, mortgage, food, medical care, schooling or transportation. In many situations, it is simply impossible for low-income

[6] Our review of energy conservation and efficiency programs offered by utilities and other organizations consisted of reviewing the eligibility criteria and application forms in both program brochures and online web sites.

[7] See "Low-Income Consumers' Energy Bills and Energy Savings in 2003 and FY 2004," a report by Meg Power for the Economic Opportunity Studies group.

[8] These percentages are a general range found in the literature. Some researchers show this figure to be as high as 27 percent for specific subgroups of the low-income population, depending on their source of income. See Oppenheim and MacGregor (2000), "Low Income Consumer Utility Issues; A National Perspective" for a more detailed discussion.

households to pay all of their utility bills. Thus, it is generally agreed that these high energy burdens result in non payment of utility bills, which result in arrearage, possible termination of service, and increased collections costs for companies.

Energy burden is not uniform among the low-income, but varies. For low-income households with the highest energy burden in 1990, the average annual residential energy expense was $1,175. However, this group had lower-than-average income, only $5,419, compared to $10,048 for all low-income households. For this group, the energy burden was 30.1 percent.

So far, our discussion has focused mainly on low-income households. At times we have specified those households with annual incomes at or below the federal poverty level. It is generally recognized that there are substantial numbers of households above the poverty line in need of energy assistance and conservation services, which, although not officially living in poverty, are still, for all practical purposes, "low-income." A study by the National Consumer Law Center concluded that energy bill payment problems are not strictly the result of low-income or high energy usage.[9]

Several reports for Economic Opportunity Studies have also noted this, discussing the concept of "fuel poverty" as opposed to poverty itself. Fuel poverty is fundamentally a result of the quality and costs of housing.[10] As such, fuel poverty is not exclusive to the low-income but extends to many other families. In 2005, 36 percent of the fuel-impoverished households had incomes higher than the federal poverty level. Further, 39 percent of the households living in fuel-poverty are headed by residents who are 65 years of age or older, and half of these live alone. This fact is significant because the elderly population of the United States is rapidly increasing and only 7.3 percent of the elderly eligible for assistance such as LIHEAP in 2003 actually received it.[11] Further, many households which would not generally be considered low-income also face circumstances which make it difficult for them to pay their energy bills.

Weatherization services are often seen as the best solution for households living in fuel poverty. As Power and Clark (2005) state, "There is a far stronger connection between housing [condition] and the incidence of energy hardships than between income and non-payment of bills." Their findings emphasize the need for roof repairs and electrical work as weatherization investments. Weatherization produces savings in the form of avoided consumption and lower energy bills, or by diminishing increases in energy consumption that would otherwise occur. Power and Clark conclude that "a home in good repair is

[9] See "Utility-Financed Low-Income Energy Conservation: Winning for Everyone," a report published in 1991 by the National Consumer Law center.

[10] The figures on Fuel Poverty noted in this paragraph are from Meg Power's "Fuel Poverty in the USA: The Overview and the Outlook," published in the March 2008 issue of Energy Action.

[11] See Bruce Tonn and Joel Eisenberg's "The Aging US Population and Residential Energy Demand," a report published in 2007 in Energy Policy. This report also finds that elderly persons generally use more residential energy than younger persons.

significantly less likely to run up bills beyond the resident's means."[12] In fact, a 2001 study by the U.S. Department of Energy concludes that "low-income families who receive weatherization have a lower rate of default on their utility bills and require less emergency heating assistance."[13]

The benefit of weatherization services are not just related to reduced energy consumption and bills, or reduced collection costs by utilities. These services are usually administered through a network of local agencies and subcontractors. Thus, weatherization programs produce jobs in the local economy. Additionally, weatherized homes provide a healthier environment for residents. To the extent that families can avoid service termination and resorting to unsafe alternate sources of heat, public safety is increased. Further, as the quality of housing stock increases, property values are improved.

The Increasing Need for Energy Assistance in Pennsylvania

Pennsylvania has the sixth largest population in the United States. However, its proportion of elderly residents is the second largest in the country. While the number of elderly is growing, the Commonwealth's population has remained relatively stable at about 12 million since 1970.[14] In addition, its housing stock is also aging. Since 2000, Pennsylvania has ranked as the sixth lowest state in new housing construction in the country.[15] It is not uncommon in Pennsylvania for payment troubled, low-income families to live in substandard housing. Both of these trends have strong impacts on the growing energy burden of Pennsylvania's low-income population, the percent of households in fuel-poverty, and the increasing need for energy conservation and energy efficiency in general, and for weatherization services in particular.

Although Pennsylvania has a number of energy efficiency initiatives, there is room for considerable improvement. In many ways Pennsylvania lags behind its neighboring states in the northeast and mid-Atlantic regions, spending less per capita on energy efficiency than either New Jersey or New York.[16] Further, while New York and New Jersey are fifth and sixth on the list of the nation's leading cost-effective energy efficiency programs, Pennsylvania is the only state in the northeast not to have Energy Efficiency Public Benefit Funds.

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[12] These quotes are from a paper presented by Meg Power and Jennifer Clark at the National Weatherization Training Conference, 2005: "Weatherization-Plus for Payment-Troubled Energy Customers: Can It Solve Utility Bill Collection Problems?"

[13] The study, "Weatherizing the Home of Low-Income Home Energy Assistance Program Clients; A Programmatic Assessment," by Bruce Tonn, Richard Schmoyer, and Sarah Wagner, finds that the need for LIHEAP does not diminish, but the need for crisis funds does.

[14] These statistics are from the 2000 census. Since the 1990's, Pennsylvania's population growth rate of 3.4 percent is higher than only two other states – West Virginia (0.8 percent) and North Dakota (0.5 percent).

[15] Data on housing stock and new construction are from a 2007 report by The Pennsylvania Housing Research Center, "Potential Benefits of Implementing a Statewide Residential Energy Efficiency Program in Pennsylvania."

[16] Figures reported by Liz Robinson, Executive Director of the Energy Coordinating Agency in Philadelphia, at the ACI Pennsylvania Home Energy Forum in Harrisburg, September 5, 2007.

As of the last census update, Pennsylvania has 4.8 million households. Of these, 4.6 million have electric utility service and 2.7 million receive gas heating bills. LIHEAP and WAP service approximately 4,000 low-income households in Pennsylvania each year, reducing their heating consumption by 20 to 25 percent.[17] Still, it is difficult to keep up with the demand for services. In August, 2007, a report by the state Auditor General's Office found that it would take up to nine years to clear the backlog of more than 9,000 applicants for weatherization services from WAP[18] in Pennsylvania. This is partly due to management problems discussed elsewhere in this report, but is also due to the fact that need for energy conservation services increases faster than the resources to meet it.

The average heating cost in Pennsylvania in 2005 was $1,400. By 2007, this cost rose to $1,800. These increases have significant impacts on low-income households. For example, between 1999 and 2007, the average low-income household heating costs in Philadelphia rose from $711 to $1,877, resulting in increased bill payment problems and more need for energy assistance.[19]

The passage of Chapter 14[20] by the Pennsylvania Legislature in 2004 has also contributed to the number of households in need of assistance. Chapter 14 essentially reduced the number of consumer protections and made it easier for utility companies to terminate service to low-income households.[21] In fact, the number of electric, natural gas and major water utility terminations in Pennsylvania increased from 181,695 in 2004 to 283,598 in 2005.[22] According to the Pennsylvania Public Utility Commission's Cold Weather Survey, 13,762 households entered the winter of 2008 without heat-related utility service.

About the same time that the impacts of Chapter 14 were being studied, the Pennsylvania Public Utility Commission voted in September, 2006 to initiate an investigation into demand side response (DSR), energy efficiency and conservation needs and advanced metering infrastructure. This investigation was in response to rising energy prices and their impacts on rates paid by utility customers. The objective was to identify and

[17] These figures are from a presentation given by David Carroll, of the Applied Public Policy Research Institute for Study and Evaluation, at the ACI Pennsylvania Home Energy Forum in Harrisburg, September 5, 2007.
[18] WAP refers to the federal Weatherization Assistance Program.
[19] Figures reported by Liz Robinson, Executive Director of the Energy Coordinating Agency in Philadelphia, at the ACI Pennsylvania Home Energy Forum in Harrisburg, September 5, 2007.
[20] Chapter 14 was added to Title 66 utility regulations by Act 201, which went into effect December 14, 2004. The intent of the Act was to "protect responsible bill paying [utility] customers from rate increases attributable to the uncollectible accounts of customers that can afford to pay their bills, but choose not to pay."
[21] See, for example, "Final Report: Inquiry into the Implementation and Correctness of Act 201," published in 2007 by Joseph Rhodes, Jr. Rhodes concludes that not only was Act 201 not necessary, but it has also created an "unfair and potentially dangerous set of rules for utility service terminations, connections and reconnections" and threatens the "fair and balanced provision of utility services in [Pennsylvania]."
[22] From the Pennsylvania Public Utility Commission 2005 Annual Activity Report.

recommend cost-effective energy conservation and efficiency policies that could be implemented in Pennsylvania.[23]

Part of the emphasis for conducting this investigation had to do with the fact that electricity rate caps in Pennsylvania are currently expiring. These rate caps have already expired in several neighboring states, resulting in substantial rate increases. For example, when rate caps expired in 2005 for Baltimore Gas and Electric, electric rates rose by 70 percent. In Delaware, residents experienced a 60 percent rate increase.[24]

As this report is being prepared, rate caps have expired for 15 percent of Pennsylvania's electric customers. Customers of Penn Power have already experienced a 30 percent increase in rates, while customers of UGI utilities experienced a 35 percent increase, and customers of Pike County Light and Power received a 70 percent rate increase. The remainder of Pennsylvania residents will experience rate increases due to the removal of their rate caps in 2009 and 2010. As noted in the Public Utility Commission's December 2008 report on the implementation of Chapter 14, the current projections for rate increases are cause for concern when combined with diminishing purchasing power for customers in our recent economic climate. These factors make it more challenging and difficult for the electric industry to manage its collection performance and costs.[25]

Taken together, the aging population of Pennsylvania, the reduced consumer protections of Chapter 14, and the removal of rate caps for electric utility service, framed against the background of global warming and diminishing energy reserves, point to a strong need for increased emphasis on energy conservation and efficiency services, especially for the low-income population of Pennsylvania.

[23] The information on this study is taken from a presentation by Shane Rooney of the Pennsylvania Public Utility Commission, given at the ACI Pennsylvania Home Energy Forum in Harrisburg, September 5, 2007

[24] The information presented here on the expiration of rate caps is taken from the lead article in the November 2007 issue of Etcetera, the CET Engineering Newsletter.

[25] See page 38 of the Pennsylvania Public Utility Commission's Second Biennial Report to the General Assembly and the Governor Pursuant to Section 1415: Implementation of Chapter 14, published in December, 2008.

Section II
The LIURP Study Data Set and Regression Models

The Data Set Used in this Study

In order to evaluate any changes in energy consumption or payment behavior for households in LIURP, we need at least a full year of data for both the pre- and post-weatherization period, including monthly energy consumption, bill amounts, payment history, and arrearage amounts. However, as noted by Michael Blasnik in a 1989 paper on attrition bias, "Consumer fuel savings evaluation methodologies require more consumption data than are available for many participants in low-income weatherization programs. These data requirements often lead to sample attrition rates greater than 50 percent." Hence, it is not surprising that all of the 292,071 households receiving LIURP services between 1989 and 2006 are not suitable for analyses. The most common reason for a job being excluded from analyses is the reporting of incomplete data. This can happen for a variety of reasons, such as the household occupants moving before the LIURP data gathering period is over[26] or otherwise being dropped from the program before the LIURP job is complete, or simply because of incomplete or unreliable record keeping on the part of the LIURP provider. Common reasons for being dropped or excluded from analyses include an insufficient number of meter reads or non-continuous service due to service terminations.

Another requirement for inclusion in analyses is that all energy usage reported for a household must be weather-normalized. Weather normalization is a process by which energy usage figures represent the amount of energy that would be typically used from year to year in the same location, controlling for variations in weather that might occur from one year to the next and result in abnormally low or high energy usage. In other words, it is a method for determining how much energy would be used if weather conditions were the same in both the pre- and post-LIURP periods. This process thus removes the impact of weather on variations in reported energy usage. There are several methods available for weather-normalizing energy consumption. Companies can use any of these methods as long as both the pre- and post-period usage is normalized using the same technique.

To ensure that the same households are included in the majority of analyses for both the pre- and post-weatherization period, we excluded any households that were missing key variables necessary for our study in either period. We also excluded households where the company reporting the data indicated that other funding was leveraged with LIURP to complete a job. After this screening process was completed, the data set for this study consists of 164,871 households, or approximately 56.5 percent of the total households

[26] A household receiving LIURP is assumed to have moved or otherwise experienced a change in composition when the ratepayer on record changes. Census figures indicate that the low-income residential mobility rate is around 24 percent yearly.

weatherized by LIURP. All of the analyses in this report are run on the households in this data set.

The complete study data set is not used in all of the analyses contained in this report. This is because not all variables are reported for every household, and "missing" variables are removed from specific analyses that depend on that specific variable. For example, if all of the variables are reported for a given household except for the number of rooms in the home, this household would be included in most analyses but excluded from any reporting that involves the number of rooms.[27] Therefore, each individual analysis in this report is run for the total number of households for which the necessary variables for that particular analysis are available. However, 92,361 households are common to the majority of analyses in this report. This represents 31.6 percent of the total number of LIURP households (292,071), and 56 percent of the study's data set (164,871).

Most of the statistics cited in this report, unless otherwise indicated, come from the above described data set. Some variables reported in LIURP are excluded from specific analyses because of coding changes implemented in the data gathering process for households receiving LIURP services as of January 1, 2000. In some analyses it is possible to use variables for the entire period of 1989 through 2006 and in other cases it is not. Therefore, some analyses are run on a subset of the study's data set. Further, some variables are optional and not reported by all companies. These "optional" variables allow for another subset of data for analyses (these analyses are indicated as such in the text of this report). Finally, the LIURP program has undergone periodic reviews, during which variables have been added or deleted, providing a basis for yet another subset of the study's data set.[28]

Regression Models

To determine which factors are positively and negatively associated with reductions in energy consumption at a statistically significant level, we developed several regression models. Regression models test the relationship between various "independent" variables and designated "dependent" variables. For example, to determine the relationship between the number of residents in a household and the changes in energy consumption from the pre to the post weatherization period, we would designate the number of residents in the household as an independent variable, and the change in energy consumption as the dependent variable. The number of residents would be entered into the model along with other variables which are also thought to impact on changes in energy consumption, such as the age of the housing structure, the total amount of heated space, or the type of weatherization measures installed. The results of the model will identify the degree to which each independent variable contributes to the changes in energy consumption and the statistical significance of this contribution as well as how much variance in energy consumption between the pre- and post-weatherization period

[27] More information on specific analyses is presented in Appendix B: Technical Notes.
[28] A condensed history of the LIURP program is presented in Appendix A: History of LIURP.

the overall model accounts for. It is possible to observe the interaction of different variables, and to control for differences in type of weatherization job and other relevant factors. We ran the model with various combinations of variables to get the model that accounts for, or "explains," the most variance in energy consumption between the pre- and post-period. By withholding certain variables, such as weatherization measures, we can obtain an initial value for explained variance. Running the model a second time with the weatherization measures added will give us a different value. The difference between the first value and the second value will give us some indication of how much additional variance in the changes in energy consumption is explained by the addition of the specified weatherization measures.

We ran our models for the following dependent variables: household energy burden, percentage of the change in energy consumption from the pre- to post-period, and the change in energy bill arrearage from the pre- to post-period.[29] Each of these models was run for several data categories: type of LIURP jobs, type of household, industry (electric and gas), and those households that reduced their energy consumption following weatherization versus those that did not. Each of these models was first run without weatherization measures, and then with individual measures added. Next, they were run with measures condensed into the general groups defined in the LIURP Codebook,[30] including water-heating, infiltration control, mobile home, attic insulation, floor insulation, interior foundation insulation, miscellaneous/repairs, furnace work, audits, and appliance/lighting. Each model was also run with the costs of measures included. Finally, we ran a separate regression model to observe the impact of consumer education programs on reductions in energy consumption or arrearage. (Models run with the weatherization measure groups did not give many meaningful results and are not included in this report.)

Because of differences in the data structure and variable coding, PECO data was run in a separate model from the other companies and is noted where results are significantly different. Finally, the models were also run for each individual company to identify any individual company programs that varied significantly in its results from other companies. In general, we do not specify individual companies by name in this report unless its results vary substantially from the other companies. Occasionally, a specific company may be excluded from an analysis for failure to report correctly coded data for the necessary variables.

The basic regression model for most analyses included the following variables: annual household income, number of residents, amount of heated space, number of rooms, normalized energy usage in the pre-period, the amount of arrearage in the pre- and post-

[29] Because the regression models are dependent on the degree of change in energy consumption or utility bill arrearage, it is essential that enough data points be available for these variables to accurately calculate annual energy consumption and arrearage levels. Households without the necessary number of data points are excluded from the model.

[30] The LIURP Codebook is produced jointly by the PUC's Bureau of Consumer Services and the Penn State Consumer Information System Project, and defines each variable collected and reported as part of the LIURP data gathering process, and is updated periodically. See Appendix B for the general measure categories, as well as a list of the individual weatherization measures reported for LIURP companies.

period, the age of the home, whether the home was owned or rented, and percent of energy burden.[31]

Results of regression models are considered to be statistically significant if their P value is less than 0.05. The P value represents the amount of error present in determining that the values observed are more extreme than what would occur just by chance. A value of 0.05 or less indicates that there is 5 percent error or less in the results. Only the strongest, most significant associations are reported in the text. Detailed tables for each regression model are included in Appendix D.

[31] Prior to running the regression models we ran correlation reports for all of the available variables to identify which variables were highly correlated with one another. In such cases, both variables cannot be included in the model because their interaction can confound the results. We ran preliminary regression models with all possible combinations of suitable independent variables and chose our "basic" model from the combination that explained the highest degree of variance for each designated dependent variable. This group of variables resulted in the greatest amount of explained variance in energy consumption from the pre- to post-weatherization period.

Section III
Characteristics of LIURP Households and Jobs

Type of LIURP Job

Since 1989, LIURP jobs have been performed in over 1,854 communities, in every county in Pennsylvania. The highest concentration of jobs in our study's data set has been in Philadelphia (23.5%) and Pittsburgh (11.1%).[32] There are four types of LIURP jobs: electric heating, electric water heating, electric baseload, and gas heating. Baseload jobs are defined as services performed by electric utility companies where the electricity is not used for heating. The following table shows the breakdown of job types for the 92,361 households that are included in the majority of analyses, compared to the total number of LIURP jobs.

Table 1
Number of LIURP Job Types in the Study Data Set
and Percentage of Total Jobs Included in Analyses

Job Type	Number of jobs in majority of analyses	Number of jobs in overall program	% of total jobs performed
Electric Heat	16,489	85,999	19.2
Electric Water Heat	21,764	59,788	36.4
Electric Baseload	28,216	115,058	24.5
Gas Heat	25,892	31,226	82.3
TOTAL	92,361	292,071	31.6

The most common jobs in the study's data set are classified as electric baseload. The distribution of jobs in the overall LIURP program is compared to the distribution in the study data set in Table 2. As can be seen in both Tables 1 and 2, the gas companies appear to report many more households with complete data that is suitable for analysis. Thus, a higher percentage of the total number of gas heat jobs makes it through the data screening process.

[32] The total number of LIURP jobs in the study data set for each county is included in the appendix.

Table 2
Comparison of Job Types in the Study Data Set
to Total LIURP Job Types

Job Type	Job Types in Majority of Analyses		Job Types in Total LIURP households	
	N	%	N	%
Electric Heat	16,489	17.8	85,999	29.4
Electric Water Heat	21,764	23.6	59,788	20.5
Electric Baseload	28,216	30.6	115,058	39.4
Gas Heat	25,892	28.0	31,226	10.7
TOTAL	92,361	100.0	292,071	100.0

Type of Housing

LIURP jobs are available to all types of housing. For the purpose of analysis, type of housing is collapsed into four categories: single family detached dwellings, mobile homes, small multi-family and large multi-family units. The majority of the treated housing stock is detached single-family or duplexes (75 percent). The category of single-family homes includes all architectural styles and both single and multi-story structures. The category of small multi-unit family homes includes row houses[33]

There is substantial variation in the type of LIURP housing across Pennsylvania. For example, only 1 percent of LIURP jobs in Philadelphia are mobile homes, compared to 15.7 percent for the remainder of the state.

The following table compares the LIURP housing types in the study data set to the same categories for Pennsylvania. It must be noted that LIURP housing information is only for low-income households, whereas the information for Pennsylvania is for all households.[34] As can be seen in the next table, it is possible that multi-unit housing has been under-represented in LIURP in recent years, but this is most likely a result of increasingly effective targeting policies on the part of LIURP providers.

[33] Prior to the year 2000 we distinguished between row homes in the middle as opposed to row homes on the end, with an exterior wall exposed to the elements. Analyses of the data for just the years prior to 2000 reveal no significant difference in energy savings between end and middle row homes.

[34] We were unable to obtain housing type by income level from the census Bureau in time to include it in this report.

Table 3
Breakdown of Housing Type Receiving LIURP Services
and Comparison to Pennsylvania Housing Types

Housing Type	N	%	Percent for All of Pennsylvania[35]
Single Family	67,011	75.0	53.0
Small Multi-Family	4,375	4.9	22.0
Large Multi-Family	4,956	5.5	20.0
Mobile Home	13,041	14.6	5.0
Total	89,383	100.0	100.0

Type of Housing by Year

The breakdown of type of housing receiving LIURP services has changed over the years. Overall, there has been an increase in single family homes while small and large multi unit households have decreased to nearly zero percent of LIURP jobs (see Table 4).

From 1989 through 1994, the percentage of single detached dwellings gradually increased from 40.5 percent to 53.8 percent, while large multi-unit jobs decreased from 30.4 percent of total LIURP jobs in 1989 to 16.6 percent in 1994, with a low of 11.8 percent in 1993. During this period mobile homes accounted for approximately 20 percent of the LIURP jobs and small multi-units accounted for between 11 and 14.9 percent.

However, beginning in 1995 and continuing until 1999 there was a shift in the distribution of types of homes receiving LIURP. Single family homes jumped sharply to 63 percent in 1995 and continued to rise, while large multi-unit jobs decreased sharply from 16.6 percent in 1994 to 7.1 percent in 1995 and continued to decrease, with a low of 0.8 percent in 1998. During this period, mobile homes accounted for between 9 and 19 percent of LIURP jobs and small multi-unit homes accounted for between 8.6 and 11.8 percent of LIURP jobs.

Beginning in 2000 a third shift occurred in the distribution of housing types. Single family homes continued to increase, reaching a high of 87.9 percent in 2006. Mobile homes continued to account for between 12 and 19.7 percent of LIURP jobs, but have held steady at 12 percent for both 2005 and 2006. Both small and large multi-unit homes decreased sharply, accounting for zero or near-zero percent of the total LIURP jobs from 2000 through 2006.

[35] Percentages of housing types for Pennsylvania are taken from the Pennsylvania Housing Research Center 2007 report, "Potential Benefits of Implementing a Statewide Residential Energy Efficiency Program in Pennsylvania."

Table 4
Trends in Housing Type for LIURP Jobs, 1989 to 2006

Housing Type	% 1989 – 1994	% 1995 – 1999	% 2000 - 2006
Single Family	40 – 53.8	63.3 – 72.2	79 – 87.9
Small Multi-Family	11 – 14.9	8.6 – 11.8	0.1 – 2.3
Large Multi-Family	11.8 – 30.4	0.8 – 7.1	0 – 0.04
Mobile Home	14.6 – 22.3	8.1 – 19.1	12 – 19.7

These patterns are the same for all individual companies, with the exception of PECO, which generally services many fewer mobile homes than the other companies. The uniformity of this pattern most likely indicates an increase in the effectiveness of targeting policies among LIURP providers. Research indicates that single family dwellings typically use more energy than multi-unit residences.[36] In our study data set, single family homes use on the average 69 percent more energy than large multi-unit households and 37.9 percent more than small multi-unit households. Given that the greater the energy usage, the greater the potential for energy savings,[37] it makes sense that LIURP providers target their limited resources at those households with both the highest usage and the greater potential for reductions in energy usage.

Age of Homes Receiving LIURP

The housing stock in Pennsylvania is relatively old, with 80 percent built prior to 1980.[38] The average age of homes in Pennsylvania receiving LIURP is 63.7 years. As with housing type, the average age of homes receiving LIURP varies throughout Pennsylvania. For example, the average age for LIURP homes treated by PECO in the Philadelphia area is 69.24 years, compared to 56.51 years for the rest of the state.

When LIURP began, it was thought by some program evaluators that the older housing stock might be treated first. However, the opposite has been true. Although there have been fluctuations, overall the age of the housing stock receiving LIURP has increased

[36] The 2001 Residential usage Consumption Survey, conducted by the Energy Information Administration, finds that single family homes use an average of 61.8 percent more energy than large multi-unit housing residences and 27.2 percent more than small multi unit housing residences. In a 2005 paper presented to the National Housing Conference in Australia, found that, controlling for socio-economic factors, single family dwellings use 18 percent more electricity than multi-unit dwellings.

[37] This is a common finding in the energy conservation research. See, for example, Linda Berry and Martin Schweitzer's 2003 report, *Meta Evaluation on National Weatherization Assistance Program Based on State Studies, 1993-2002, which states "households with larger pre-weatherization gas or electric usage will save more energy once weatherized."*

[38] This information is from a presentation on Pennsylvania's housing stock given by Mark Fortney, director of The Pennsylvania Housing Research Center, at the ACI Pennsylvania Home Energy Forum In September, 2007.

over time. From 1989 to 2006, the average age of the housing stock increased from 42.6 to 63.7 years.

Size of Treated Homes

There are two ways of thinking about the size of the homes treated in LIURP. One is the amount of heated space in the household. The other is the number of rooms in the house. Some energy conservation studies have found that the number and type of rooms is more closely related to reduction in energy usage than total amount of space. This is especially true for electric baseload jobs, where the energy usage is heavily determined by the number and type of household appliances. The more bedrooms that a house contains, for example, the greater likelihood it will have more televisions or computers. The greater number of bathrooms, the greater the potential use of heated water. Unfortunately, the LIURP program does not collect information on the type of rooms in a treated house. It does, however, report the total number of rooms for each home. The average LIURP home has 6.3 rooms and 1410 square feet of heated space. The amount of heated space for PECO customers is less than for the other companies, averaging 1220 square feet.

Section IV
Profile of LIURP Recipients

The LIURP program initially collected a substantial amount of information on each participating LIURP household. However, in an effort to streamline the data collection process for LIURP providers, many of these demographic and social background variables were changed from "required" to "optional" beginning with households weatherized in the year 2000. Most companies continued to report some, but not all, of the optional variables until 2004, at which point only a few companies continued reporting the optional variables. The profile of LIURP recipients presented in Table 5 is, except where noted, for required variables.

In general there are no significant differences between households that reduce their energy consumption and those that do not. To illustrate this fact, Table 5 presents information for the study data set and then for energy "non-saver" households and "energy saver" households.

Table 5
General Profile of Overall Study group, Energy Savers and Non-Savers

	Entire Study Group	Energy Non-Savers	Energy Savers
Average number of residents	3.0	3.1	3.0
Average household income	$11,980	$11,675	$12,496
Percent with utility-bill arrearage	88.8	87	90.7
Percent who own their home[39]	68.5	68.1	68.7
Percent who rent their home[40]	31.4	31.8	31.2
Average age of household head[41]	47.0	44.7	48.1
Percent of white heads of household	80.4	81.8	78.6
Percent with female heads of household	62.0	61.4	64.3
Percent completed high school or GED	49.1	51.9	48.5
Percent unemployed	38.7	37.6	39.1
Percent Employed full-time	30.3	29.7	30.5
Percent with arrearage on energy bill	87.8	44.9	54.4

[39] According to the American Community Survey for 2005, conducted by the US census, the home ownership rate for the US in 2005 was 67.3 percent. The rate for Pennsylvania was 71.7 percent.
[40] The reason that owners and renters do not add to 100 percent is that 0.1 percent of LIURP households indicate that they neither own nor rent their residence.
[41] Note that age of head of household is only available for the years 1989 through 2000.

Taken together, the head of the "typical" LIURP household is a 47 year old white female, who completed high school or obtained her GED, is either employed full-time or unemployed, owns her home, earns nearly $12,000 per year, and has an arrearage on her energy bill.

Primary Source of Household Income

The primary source of income for households in the study group is shown in Table 6.[42] The most common source of income is employment (either full or part-time), followed by a pension, retirement plan, or social security, and public assistance.[43]

Table 6
Source of Income for LIURP Households

	Number of LIURP Households	%
Employment	30,846	42.2
Pension/Retirement/Social Security	12,030	16.5
Public Assistance	8,639	11.8
Unemployment Compensation	6,486	8.9
Disability	6,269	8.6
Other	8,786	12.0
Total	73,056	100.0

Race of Head of Household

As indicated in Table 7, the majority of LIURP recipients (heads of household) are white. When these data are examined by individual year, there is a shift in the percentage of LIURP households with African American head of households beginning with the year 1997. Prior to 1997, 9.6 percent of the LIURP households had African American heads of household. This percentage increased to 28.5 percent for the years 1997 through 2006, with a high of 37 percent in 2005.

[42] Because source of income is only collected at the beginning of the pre-period for most LIURP households, it is possible for source of income to change during the study period and not be reflected in the LIURP coding.

[43] Some critics of assistance programs argue that the further the "distance" of the income from actual employment, the less likely the household is to reduce expenses. Applying this logic to LIURP, it would be assumed that those households on public assistance would be less likely to reduce their energy consumption because they are not spending money they "earned" toward paying for their energy bill. This study finds no support for this assumption. Households receiving public assistance as their primary source of income are no more or less likely to reduce their energy consumption than households whose primary source of income is full-time employment.

Table 7
Race/Ethnicity of Head of Household

	N	%
White	74,308	80.4
African American	15,218	16.5
Hispanic	2,015	2.2
Other	870	0.9
Total	92,361	100.0

The percentage of Pennsylvania households in poverty headed by African Americans has remained relatively stable since 1990: 23.2 percent in 1990, 23.0 percent in 2000, and 23.8 percent as of 2006.[44] It appears that prior to 1997 African American households were underrepresented in LIURP, but this has been corrected in the more recent program years (see Table 8). However, Hispanic households remain underrepresented, as the number of Pennsylvania households in poverty headed by Hispanics has increased from 4.7 percent in 1990 to 7.5 percent in 2006 while the percentage of LIURP households headed by Hispanics has decreased from 2.2 percent to 0.7.

Table 8
Race/Ethnicity of Head of Household by Year

	% 1989 – 1996	% 1997 - 2006
White	86.9	69.1
African American	9.6	28.5
Hispanic	2.2	0.7
Other	2.3	1.7
Total	100.0	100.0

[44] Note: The figures for each racial group (Anglo, African American, and Other Race) for Pennsylvania are imputed based on the subtraction of the proportion of Hispanic individuals from each racial group. Source: The U.S. Census Bureau. The 1990 and 2000 figures are derived from the decennial censes, and the 2006 figures are derived from the American Community Survey.

Other Social Background Characteristics

The majority of households in the study data have female heads of household (see Table 9). Most are either unemployed (43.4 percent) or work full-time (31.6 percent) (see Table 10). About 49 percent completed high school or received a GED (see Table 11).

Table 9
Gender of Head of Household

	N	%
Male	41,365	38.0
Female	67,188	62.0
Total	108,553	100.0

Table 10
Employment Status of Head of Household

	N	%
Full-time	28,337	30.3
Part-time	12,180	13.0
Unemployed	36,187	38.7
Retired	9,840	10.5
Homemaker	4,490	4.8
Other	1,912	2.7
Total	92,946	100.0

Table 11
Education Level of Head of Household

	N	%
No formal education	1,420	1.5
Some grade school	7,209	7.6
Completed grade school	2,872	3.0
Some high school	17,244	18.1
Completed high school or GED	46,764	49.1
Some college or technical school	12,619	13.3
Completed college or technical school	3,263	3.4
Some graduate school	663	0.7
Technical or Associate degree	2442	2.6
A graduate degree (Masters, Doctorate)	565	0.6
Other	75	0.1
Total	95,136	100.0

Utility Bill Arrearage

Nearly 88 percent of the LIURP households in the study data set have an arrearage on their energy bill at some point during the pre- and post-periods. Because LIURP only collects this information at four points in the LIURP process it is possible that this percentage is even higher.

Use of Supplemental Heat

Because the presence of supplemental heat is an optional variable, it is only available for a limited number of households. The majority of households for which these data are available (75.1 percent) do not have supplemental heat in the pre-period. Of those that do, electric heat is the most common source (these are households with gas as their primary heating fuel) (see Table 12).

Table 12
Use of Supplemental Heat among LIURP Households

	N	%
No supplemental heat	22,251	75.1
Electric	4,336	14.6
Fuel oil/kerosene	1,281	4.3
Wood	764	2.6
Utility gas	273	0.9
Coal	223	0.8
Bottled gas/propane	136	0.5
City steam	82	0.3
Solar	10	0.0
Other	259	0.9
Total	29,615	100.0

The use of supplemental heat is also recorded for the period following the installation of LIURP measures. However, the number of households for which this information is recorded is substantially lower than in the pre-period. Therefore, we are unable to say with certainty whether the use of supplemental heat increases or decreases during the post-period. Examining those households for which these data are recorded in both the pre- and post-period results in a relatively small data set of 15,893 households. Based on these data, it appears that the use of supplemental fuel decreases by 3 percent in the post-period.

Section V
Energy Burden for LIURP Households

The concept of energy burden has been discussed in a previous section of this report. The average energy burden for LIURP households is 15.3 percent, which is consistent with other research that places the average energy burden for low-income households at 14 to 16 percent, compared to 4 to 5 percent for all U.S. households.[45]

Energy burden is calculated using annual household income and annual energy expenditures. The average income for LIURP households is $11,980. The average annual energy bill for LIURP households is $1,150, with a minimum of $982.50.[46] To place the income of LIURP households in perspective, consider the fact that for 2005 average income for LIURP households was $14,035, compared to an average income of $52,848 for all Pennsylvania households.

Energy burden for LIURP households varies from year to year but in general has increased since the 1989 program year. In 1989 the average energy burden was 10.9 percent. By 2003, the average energy burden rose to 19.3 percent, before falling to 12.5 in 2005, and 8.8 in 2006. However, as rate caps are lifted for Pennsylvania's energy companies over the next several years, rates are expected in increase by a greater amount than income, resulting in increased energy burdens.

Energy burden can vary with the severity of the winter and with company rates. In LIURP, PECO customers have the highest energy burden of 28.2 percent. This is at least partly due to higher rates for PECO customers. According to the 2006 Public Utility Commission Rate Comparison Report, Allegheny Power residential heating customers using 2000 KWH paid $144.38, compared to PECO customers who paid $195.74 for the same amount of energy.

Results of Regression Model for Energy Burden

Various studies explain that although energy burden is defined as annual household income divided by annual energy bills, there is more to understanding energy burden than just these factors. Other factors include housing age, geographic location, age of home owner, type of heating fuel, and length of time in the residence.[47] To explore this notion, we developed a regression model using the LIURP data for the 1989 through 2005 program years. Energy burden was designated as the dependent variable. The purpose of this exercise was to discover which variables reported in the LIURP data set tend to

[45] Exact numbers vary slightly from study to study. Our figures are taken from several reports by Dr. Meg Power, and the 2007 Department of Energy report, "Reducing the Energy Burden on Needy Families."
[46] The energy burden is calculated for only those households that report both income and annual energy bills, and is computed on the individual case level, then averaged rather than being the average energy bill divided by the average income.
[47] See "Fuel Poverty in the USA," by Meg Power, in Energy Action, issue No. 98, March, 2006.

associate with, and possibly explain, variations in the amount of energy burden. The best model explained only 2.3 percent of the variance in energy burden, indicating that the vast amount of variance in energy burden is not explained by variables collected as part of the LIURP data gathering process. The following variables were found to be positively associated to a statistically significant degree with increases in energy burden:

- Number of household residents
- Amount of heated space
- Amount of energy payments made in the pre-period
- Age of head of household

The fact that the amount of energy bill payments made is positively associated with increases in energy burden suggests that households with higher energy burdens may actually pay a greater amount of their monthly energy bills, and may be less likely to miss a payment. Unfortunately, we do not have the necessary data to examine this relationship more closely.

Note also that, as the age of the head of household increases, so does the energy burden, suggesting that the elderly would be more likely to have higher energy burdens.

Finally, we also examined the difference in energy burden for households that reduced their energy consumption following weatherization and those that failed to reduce their energy consumption, and found no statistically significant differences between these groups. For the majority of years, average energy burden is higher for the households that reduce their energy consumption, but only by a small amount. For example, in 1994 energy burden for households that did not reduce consumption was 14.8 percent, compared to 16 percent for those that did reduce consumption. Similar differences exist for those few years in which the energy burden of households that reduced their consumption is lower than that of those that failed to reduce consumption. For example, in 1989 households that did not reduce their consumption had an average energy burden on 10.2 percent, compared to 8.9 percent for those that did reduce consumption. These differences are representative of the majority of years.

Section VI
Changes in Energy Consumption

Slightly less than a third of LIURP households either experience no change in energy consumption or increase their consumption after receiving weatherization treatments (see Table 13). This percentage is consistent across the years from 1989 to 2005. As for those households that reduce their energy consumption following weatherization, the average energy savings is 16.5 percent. This compares favorably with reviews of national weatherization programs. As noted by Michael Blasnik, many WAP evaluations find savings of 10 to 15 percent.[48]

Table 13
Comparison of LIURP Households that
Reduce and Do Not Reduce Energy Consumption

Households that do not reduce energy consumption:	
Percent of households that do not decrease energy consumption	31.0%
Average percent of increased energy consumption	19.9%
Households that reduce energy consumption:	
Percent of households that decrease their energy consumption	69.0%
Average percent of decreased energy consumption	16.5%

It is not uncommon for some weatherized households to increase their energy consumption following weatherization. One possible explanation for this increase is often referred to as the "take-back" or "rebound" effect.[49] While some studies have found no take-back effects, others have found take-back effects as high as 50 percent. For low-income households receiving weatherization or other efficiency measures, the take-back effect is often 30 to 35 percent, consistent with the pattern observed in LIURP. This take-back effect is often used as a basis for criticizing low-income weatherization programs. For example, an energy company in Texas claimed that its low-income weatherization program and programs that replaced inefficient appliances with more energy efficient models actually *cause* energy consumption to increase in low-income households.

[48] From the presentation, "Energy Conservation: What are my choices? What can I save?" presented at the 2007 National Low Income Energy Conference.

[49] See Horace Herring's contribution, "Rebound Effect," to Encyclopedia Earth, , 2006, and the article "Energy Efficiency and Consumption – The Rebound Effect – A Survey," by Lorna Greening, et al. published in Energy Policy, No. 28, 2000, pp. 398 - 401.

A large part of the reason for increased energy consumption is thought to be behavioral.[50] As noted by Verhallen and Raaij (1981), "improved" homes have a strong impact on energy consumption behavior – occupants will either adopt behavior in terms of saving energy or will instead enter into an "energy wasting mode." Most take-back effects for weatherized homes involve the increase in indoor temperature settings, which take back as much as 20 percent of potential energy savings in some studies. Other studies show that energy consumption for space heating jobs can increase by as much as 30 percent. Some experts explain this pattern by noting that many low-income households are accustomed to cutting back energy use to uncomfortable levels and once they receive energy conservation services they feel more justified in increasing the comfort level of their homes.

Other studies have shown that homes without attics or the ground floor units of apartment buildings are more likely to increase their consumption following weatherization. In LIURP, small multi-unit dwellings are most likely to increase their energy consumption, by 40.5 percent, compared to less than 30 percent for the other housing types (see Table 14). (Remember, however, that multi-unit households may be underrepresented in LIURP.) As for the type of LIURP job, homes receiving gas heating treatments are least likely to increase their energy consumption in the post-period (see Table 15).

Table 14
Change in Energy Consumption by Type of Housing

	Detached single family/duplex	Small multi-unit	Large multi-unit	Mobile homes
No change or increased energy consumption	29.6	40.5	24.0	29.0
Decreased energy consumption	70.4	59.5	76.0	71.0
Total	100.0	100.0	100.0	100.0

Table 15
Change in Energy Consumption by Type of LIURP Job

	Electric heating	Electric water heating	Electric baseload	Gas heating
No change or increased energy consumption	32.8	33.0	35.5	18.6
Decreased energy consumption	67.2	62.0	64.5	81.5
Total	100.0	100.0	100.0	100.0

[50] Verhallen and Raaij's study, for example, stated that household occupant behavior can account for up to 26 percent of the variance in energy consumption following the installation of energy conservation measures. The LIURP database does not include behavioral variables, so changes in occupant behavior cannot be taken into account when running regression models to explain variance in energy consumption from the pre- to pos-weatherization periods.

Several LIURP companies make an effort to determine why some weatherized households increase their energy consumption while others do not. The most common reasons given by First Energy can also be found in the energy conservation literature. They include:

- An increase in the use of electricity for supplemental heating or a change in the main heating fuel
- The heating of additional rooms that were not heated prior to weatherization because households no feel they can afford to heat them
- The addition of a major appliance
- An increase in the number of occupants or other change in the family
- A decision to increase the comfort level of the home (prior to weatherization occupants were purposely reducing their thermostats below their comfort level).

As noted in Section II, all calculations concerning energy consumption in this report are based on a full year of energy consumption prior to receiving weatherization services and a full year of energy consumption following these services. The average unit change in energy consumption from the pre- to post-period for households that reduced their energy consumption is shown in Table 16 and the average energy reduction by type of LIURP job is shown in table 17 below.

Table 16
Average Unit Change in Energy Consumption from the Pre- to Post-Period

Electric heating	1197.6 KWH
Electric water heating	443.4 KWH
Electric baseload	698.2 KWH
Gas heating	29.8 MCF

Table 17
Average Energy Reduction by Type of LIURP Job

Electric heating	20.3 %
Electric water heating	15.1 %
Electric baseload	19.1 %
Gas heating	21.4 %

Weather Normalized Energy Consumption

As noted previously, all energy usage data should be weather-normalized before being reported by LIURP companies. Average normalized energy consumption is presented in Table 18 for each industry.[51]

Table 18
Average Weather-Normalized Energy Usage by Industry

	Pre-Period	Post-Period	% Change
Electric (KWH)	13,559.3	12,665.0	6.6
Gas (MCF)	182.0	151.1	17.0

Costs Per Unit of Reduced Energy Consumption

The LIURP data set includes the costs of all weatherization services provided to each household[52] and the total cost of each LIURP job. Therefore, it is possible to compare the costs of services provided to each household with the resulting change in energy consumption, or calculate the dollar cost per unit change in energy consumption. Table 19 shows the costs per reduced units of energy consumption for KWH and MCF for the LIURP study data set.[53]

[51] The three job types for the electric industry are collapsed into a single category for this table.
[52] Where possible, labor and materials costs are reported separately for each weatherization measure or service provided to each household. This analysis uses total cost for each job (both material and labor).
[53] Table 19 includes data for both households that reduced their energy consumption and those that did not. It only includes those households for which enough data are reported to calculate both the percent change in energy usage and the average cost in dollars. Allegheny Power's data are not included in Table 19 because there are several years for which Allegheny Power reported incorrectly coded variables necessary to perform these calculations. PECO Energy is not included due to inconsistent job type categories for several years of cost data.

Table 19
Average Costs per Unit of Energy Saved by Job Type and Company

Type of Job	Average KWH/MCF Pre use	Average KWH/MCF Saved	% Change	Average Cost in Dollars	Cost per 100 KWH/MCF Saved
Electric Heating (KWH)	**17,790**	**1,564**	**8.8**	**$1,640**	**$105**
Duquesne	13,068	1,998	15.0	881	44
Met Ed	17,056	1,220	7.2	1,474	121
Penn Electric	18,684	1,699	9.1	1,451	85
Penn Power	24,094	1,716	7.1	1,525	89
PP&L	17,581	1,629	9.3	1,737	107
UGI Electric	20,658	1,250	6.1	1,060	85
Electric Water Heat (KWH)	**11,076**	**481**	**4.3**	**391**	**81**
Duquesne	11,095	187	1.7	314	168
Met Ed	11,132	485	4.4	512	105
Penn Electric	10,786	626	5.8	368	59
Penn Power	13,243	642	4.8	429	67
PP&L	10,117	613	6.1	467	76
UGI Electric	13,988	1,808	13.0	574	32
Electric Baseload (KWH)	**11,039**	**788**	**7.1**	**533**	**72**
Duquesne	9,681	934	9.6	418	45
Met Ed	12,602	596	4.7	777	130
Penn Electric	11,900	651	5.5	516	79
Penn Power	12,991	730	5.6	578	79
PP&L	11,038	750	6.8	581	78
UGI Electric	14,285	2,278	16.0	492	22
Gas Heating (MCF)	**180**	**30**	**17.0**	**1809**	**64**
Columbia	177	37	21.0	2,913	79
Dominion Peoples	198	46	23.0	1,930	42
Equitable	260	63	24.0	3,090	49
National Fuel	207	53	26.0	3,011	57
Philadelphia Gas Works	160	14	8.6	600	44
T.W. Phillips	149	22	15.0	2,058	94
UGI - Central Penn	194	22	11.0	1,704	77
UGI – Gas	158	26	16.0	1,896	73

Results of Regression Models for Change in Energy Consumption

Table 20 shows the amount of variance in the change in energy consumption explained by each model. Adding the individual weatherization measures into the model consistently increases the amount of explained variance. Adding the costs of each measure into the model in place of the actual measures generally results in the biggest increase in explained variance. As shown in the table, our basic model explains 11.7 percent of the variance in energy consumption from the pre- to the post-period for households that do not reduce their energy consumption, and 12.5 percent of the variance for households that do reduce their energy consumption. Once we add the weatherization measures to the model, this amount of explained variance increases to 13.3 percent for households that do not reduce their energy consumption, and 16.9 for those that do. Adding the costs of the measures to the model in place of the actual measures, results in an explained variance of 14.9 and 22.4 percent respectively.

Even though the above results are statistically significant, the models account for 22.4 percent of the variance at best. Therefore, at least 87.6 percent of the variance in energy consumption from the pre- to the post-period is unexplained for the LIURP households. This does not mean that all of this unexplained variance is not attributed to some aspect of LIURP. Instead, it means that it cannot be accounted for by the variables we have available for analysis. This is particularly true for assessing the impact of the educational component of LIURP. Changes in energy consumption behavior, [54] which are the target of education, and which the research literature suggests play an important role in determining reductions in energy consumption, are not collected by LIURP, and may account for some of this unexplained variance. (The energy education component of LIURP is discussed in more detail in Section VII.) Note also that household changes from the pre- to post-period are not recorded in LIURP, and many changes, such as children leaving, and new additions to the household, such as births or children moving back home, can impact on energy consumption.[55]

[54] Examples of such behavior include setting back thermostats or closing off unused rooms. Energy conservation tips such as these are included in the energy education programs that accompany the implementation of the LIURP weatherization measures.

[55] This discussion of unexplained variance is applicable to the results for each regression model in this report.

Table 20
Percent of Variance in Change in Energy Consumption
Explained by Regression Models for Households That
Did Not Reduce Their Energy Consumption and Those That Did

	Basic Model: % Variance Explained	Measures Added: % Variance Explained	Measure Costs Added: % Variance Explained
Households that:			
– Had no change or increased energy consumption in post-period	11.7	13.3	14.9
– decreased energy consumption in post-period	12.5	16.9	22.4

Table 21 shows the amount of variance explained by the models for the electric and gas industry. Each industry is also subdivided for households that reduced their energy consumption and households that did not. Overall, our models explain a greater amount of variance in energy consumption for the electric industry than for the gas industry. However, when the industries are subdivided into savers versus non-savers, the highest amount of variance is explained for gas industry households that failed to reduce energy consumption.

Table 21
Percent of Variance in Change in Energy Consumption
Explained by Regression Models for the Electric and Gas Industry

	Basic Model: % Variance Explained	Measures Added: % Variance Explained	Measure Costs Added: % Variance Explained
Electric Industry	**20.8**	**25.5**	**26.6**
No change or increased consumption	16.0	18.2	19.6
Decreased energy consumption	9.2	14.4	14.8
Gas Industry	**13.8**	**13.8**	**19.8**
No change or increased consumption	21.4	22.7	29.2
Decreased energy consumption	7.2	9.4	21.9

When examined by type of job, we find that electric heating jobs have the greatest amount of explained variance (see Table 22). This amount is substantially greater than the other job types. This fact suggests that other variables, unaccounted for in LIURP, play a greater role in determining the reduction of energy consumption for the other job types.

Table 22
Percent of Variance in Change in Energy Consumption
Explained by Regression Models for Type of LIURP Job

	Basic Model: % Variance Explained	Measures Added: % Variance Explained	Measure Costs Added: % Variance Explained
Type of Job—Overall change in energy consumption from pre- to post			
Electric heating	52.0	55.1	56.0
Electric water heating	8.6	12.5	12.5
Electric baseload	13.6	19.9	21.6
Gas heating	8.2	9.5	19.8

Weatherization and Energy Conservation Treatment Measures

Up to 20 weatherization measures are coded for each weatherized household. There are 122 possible individual measures to choose from, grouped into the following categories: water heating, infiltration control, mobile homes, attic insulation, floor insulation, interior foundation insulation, furnace work, audits, appliance/lighting, and miscellaneous/ repairs.[56] The category of miscellaneous/repairs includes treatments such as chimney work, general roof repairs, off peak/time of day conversions, repairing wall plaster, sealing air vents, work on exhaust vents, connecting dryer vents, and work on ceiling fans.

Because the models run with the grouped categories did not yield meaningful results, we focus the rest of analyses concerning weatherization measures on the most commonly used measures. Each of the previously run regression models were run a second time with these individual measures added. These measures are listed in Table 23, along with the percentage of occurrences for each in the study's data set. The most commonly occurring measure is replacing lighting and fixtures with more efficient lighting (compact fluorescent lighting).

[56] There are also several other categories not listed here because they are rarely coded in the database. Also, a few of the categories listed here are an aggregation of several sub-categories.

Table 23
Most Commonly Used Weatherization Measures in LIURP

Measure	% of households receiving the measure
Install efficient lighting/fixtures	67
Pipe insulation	28
Walk through audit, excluding blower door	28
Faucet aerator – bath	26
Miscellaneous/Repairs	26
Change refrigerator/freezer	25
Low-flow showerhead	24
Pre-audit, excluding blower door	20
Furnace maintenance	16
Faucet aerator – kitchen	14

In general, national studies have found the following weatherized treatments to be effective at reducing energy consumption: Attic, wall and floor insulation (which are treated as separate variables in LIURP), low-flow showerheads, water heater insulation, and the replacement of inefficient heating systems. Lower energy savings are associated with storm window and door replacement or repair. [57] In the Pennsylvania Public Utility Commission's 1994 LIURP study, sidewall insulation and attic insulation were positively related to reduced energy consumption.

Michael Blasnik, in his recent review of weatherization programs,[58] finds that window replacements, heating system tune-ups and floor insulation do *not* contribute substantially towards reduced energy consumption. For electric baseload jobs, he finds that changing out refrigerators and freezers and replacing lighting with more efficient bulbs and fixtures are important contributors to reduced energy consumption. Our results more closely resemble Blasnik's findings than those of other studies.

Results of the Regression Models for Weatherization Measures

The following discussion summarizes the results of the regression models with the most explained variance in energy consumption between the pre- and post-weatherization period (those models containing either the individual weatherization measures or the weatherization measure costs). Results are presented for both households that reduced their energy consumption and those that did not, and by industry, type of job, and type of housing. The following discussion focuses on what "works" in terms of reducing energy

[57] See, for example, "Determinants of Program Effectiveness: Results of the National Weatherization Evaluation," written by Marilyn A. Brown and Linda G. Berry, and published in Energy, Vol. 20, No. 8, 1995, pp. 729 – 743.
[58] From a presentation, "Energy Conservation: What are my choices? What can I save?" presented at the 2007 National Low Income Energy Conference.

consumption, and what does not "work," or only works under certain circumstances and in certain situations. Detailed tables with the level of significance and specific degree of explained variance for individual variables are included in Appendix D.[59]

Our regression models found the following factors to be significantly associated with reductions in energy consumption. These factors are listed in order of their contribution to reductions in energy consumption, from strongest contribution to least. Each contribution is statistically significant.

Positively associated with reductions in energy consumption:

- Replacement of inefficient refrigerators and freezers
- The amount of energy used by the household in the pre-period
- The amount of energy bill arrearage in the pre-period
- Installation of more energy efficient lighting.

Negatively associated with reductions in energy consumption:

- Furnace maintenance
- Number of household residents
- Number of rooms in the household

Factors Positively Associated with Reductions in Energy Consumption

The largest single contributor toward reduction in energy consumption appears to be the changing out of refrigerators and freezers. Some of the LIURP companies have programs in which they identify inefficient or unnecessary refrigerators and freezers and offer to replace these with more energy efficient models. For example, these programs will swap two inefficient refrigerators for one new, energy efficient refrigerator, or maybe replace three with two. If such inefficient appliances are identified and swapped, even as part of gas heating jobs, this can contribute to significant reductions in energy consumption.

The second most consistent predictor of reduced energy consumption is the amount of energy used during the pre-period. Households with the largest energy usage tend to have the largest reductions in energy consumption following weatherization. This finding is consistent with various studies and noted in Berry and Schweitzer's "meta-evaluation" of national weatherization programs based on State studies from 1993 to 2003.

The next most significant, and most common, variable that is positively related to reductions in energy consumption is the amount of arrearage owed in the pre-period, suggesting that households with large arrearages are motivated to make the necessary

[59] Note also that there are, on occasion, some seemingly contradictory results when we look at households that reduce energy consumption versus households that do not, or compare results of individual measures to their costs.

behavioral changes to contribute toward additional reductions in energy consumption. It therefore makes sense to target households with higher arrearages when prioritizing LIURP jobs.

Factors Negatively Associated with Reductions in Energy Consumption

Furnace maintenance is the variable most negatively associated with reductions in energy consumption. A review of the literature finds that this is not uncommon. A 1986 report on New Jersey weatherization programs argues that this is due to the fact that many homes are not sufficiently heated because their furnaces do not work correctly and, once repaired, the furnaces now heat the home properly and to the correct levels, thus increasing energy usage. Most studies conclude that while tune-ups may prolong the life of the furnace, they do not necessarily reduce energy consumption.

The total number of household residents and the number of rooms in the home are also negatively associated with reductions in energy conservation. The number of rooms is more likely to be negatively associated with the reduction in energy consumption than amount of heated space.[60] This is consistent with the findings of several recent studies.

Costs of Measures

Costs of the measures were added to the regression model in a separate set of analyses from the actual treatment measures. When costs are included in the model, many more weatherization measures emerge as being related to the reduction of energy consumption. For the most part these costs are positively associated with reduced energy consumption, indicating that money spent on energy reduction treatments is a sound investment.[61] However, when examined by industry, the positive relationships are concentrated for the gas industry and negative relationships are more commonly significant for the electric industry.

Overall, we found the following measure costs to be significantly associated with reductions in energy consumption. As with the previous section, these costs are listed from the strongest contribution to reductions in energy consumption to the least. Each contribution is statistically significant.

Positively associated with reductions in energy consumption, for the electric industry:

- Attic insulation costs (for electric heating jobs)
- Sidewall insulation costs (for electric heating and baseload jobs)
- Baseload costs (for electric baseload jobs)

[60] This indicates a potentially important area of impact for energy education programs, in that they often recommend closing off rooms not used during the winter months.

[61] The vast majority of studies examining weatherization programs have concluded that they are cost-effective.

Positively associated with reductions in energy consumption, for the gas industry:

- Sidewall insulation costs
- Attic insulation costs
- Heating system costs
- Audit costs
- Other insulation costs

Negatively associated with reductions in energy consumption for the electric industry:

- Repair costs (for baseload jobs)
- Window and door costs
- Heating system cost (for baseload jobs)

Factors Associated with Changes in Energy Consumption

The cost of repairs is negatively associated with reductions in energy consumption for electric baseload jobs. Repairs include the costs of chimney, window and electrical repairs, which are reported together. The presence of such repairs is generally found to be positively related to reduced energy consumption (consistent with the findings of Meg Power), but as the costs increase in LIURP the amount of reduction in consumption apparently lessens.

The costs of wall and attic insulation are associated positively with reductions in energy consumption for electric heating and gas heating jobs. The cost of sidewall insulation is also positively related to reductions in energy consumption for electric baseload cases.

Heating system costs are positively associated with reduced energy consumption for the gas industry but are negatively associated for electric baseload jobs.

Housing Type

Examining measure costs by the type of housing reveals the following measure costs positively associated with reductions in energy consumption for single family dwellings: sidewall insulation, baseload, attic insulation, other insulation, heating system, audit, and cooling system costs. Considerably fewer measure costs are found to be significant for the other housing types.

Very few large or small multi-unit housing jobs have been done in recent years, suggesting that utility companies do not view them as cost-effective jobs. For large multi-unit housing jobs prior to 1995, heating system and sidewall insulation costs are statistically significant and positively related to reductions in energy consumption. (1995 is the year in which the percentage of multi-unit jobs sharply decreased.)

Optional Variables

In order to better understand the impact of the optional variables on the change in energy consumption from the pre- to post-period, we entered each of these variables into the regression model for just those companies and years for which they are reported. None of the demographic/social background variables, such as race, gender of head of household, education level or employment status have a significant impact on the change in energy consumption. Models were also run for households that do not reduce their energy consumption versus those that do, housing type, and type of job. None of these variables were significant for any of our models.

When the optional educational variables (educational contacts, remedial contacts and home visits), were entered, however, we found that the number of in-home educational visits is positively associated with reductions in energy consumption. (Note that the education program is examined in more detail in Section VII.)

We next entered the supplemental heat variables into the regression models. These variables include the presence or absence of supplemental heat, the type of supplemental heat and the amount of supplemental heat for both the pre- and post-period. Overall, the presence of supplemental heat is positively associated with reductions in energy consumption. Examining these data by type of LIURP job, the presence of supplemental heat in the pre-period is positively associated with reduction in energy consumption for electric baseload jobs, but negatively associated during the post-period for these same jobs. However, the supplemental heat variable is reported for substantially fewer LIURP jobs in the post period, and this may influence these results.

As noted previously, eligibility for many energy usage reduction programs is based upon having a good payment history. When the optional LIURP payment variables – number of full, partial or complete payments in the pre- and post-period – are entered into the regression model, the number of missed payments and full payments are not associated either positively or negatively with changes in energy consumption.

Due to coding changes and other changes in data reporting procedures, limited data are available for the number of household residents in different age groups. For overall change in energy consumption, the number of occupants over the age of 60 is not significant in any of the models. Nor is the number of small children. However, the number of teenagers is negatively associated with reduced energy consumption. When examined by type of job, the number of children is negatively associated with reductions in energy consumption and the number of persons over 60 years old is positively associated for electric baseload jobs only.

Section VII
Energy Bill Arrearages

One of the goals of LIURP is to decrease energy bill arrearages in the post-weatherization period. It is possible to say two things regarding changes in arrearage from the pre- to post-period for the LIURP data set. First, the average energy bill arrearage declines from the pre- to post-period. Second, it is not possible to assess how much of this reduction LIURP is directly responsible for. This is because part of the LIURP process is to recommend to, and enroll eligible households in payment assistance plans whenever possible, and the variables collected as part of LIURP are not specific enough to separate the impact of weatherization measures from the impact of payment assistance on reduced arrearages. For this reason, we can only look at general trends with regard to arrearage amounts.

Complete arrearage data for the pre- and post-period is reported for 41 percent of LIURP households. Arrearage is collected at four points in the LIURP process, at the beginning and end of the twelve month period prior to receiving weatherization services, and at the beginning and end of the twelve month period following the weatherization treatments. These four points allow us to compare the overall slope of arrearage of the year prior to weatherization and the year following weatherization. If LIURP is achieving its goal, this slope should be less in the post-period (see Figure 1).

The amount owed at the end of the pre-period is often identical to the amount owed at the beginning of the post-period. For this reason, Table 24 compares the average arrearage at the beginning of the pre-period to the average amount owed at the point of weatherization and the average amount owed at the end of the twelve months following weatherization.

Seventy-one percent of the households with complete arrearage data have an arrearage twelve months prior to receiving LIURP treatments. This amount increases to 97 percent at the month when LIURP services are received.[62] Hence, the percent of LIURP households with an arrearage increases by 26 points during the year prior to receiving weatherization services. By the end of the year following weatherization, 68 percent of the households have an energy bill arrearage, a decrease of 29 points.[63] Further, there is also an increase in the percent of households with a credit on their energy bill during this period, from 106 households at the beginning of the pre-period to 2705 households by the end of the post-period.

[62] Note that in Section IV we said that 88 percent of LIURP households have an arrearage on their energy bill "at some point during the pre- and post-periods." This figure included all households for which an arrearage was reported *at any point* during the LIURP data gathering process. In order to calculate the slope shown in Figure 1 and change in arrearage from the pre- to post-weatherization periods, we need to have all the arrearage data points reported. Therefore, the households included in this analysis are a subset of those discussed in Section IV.

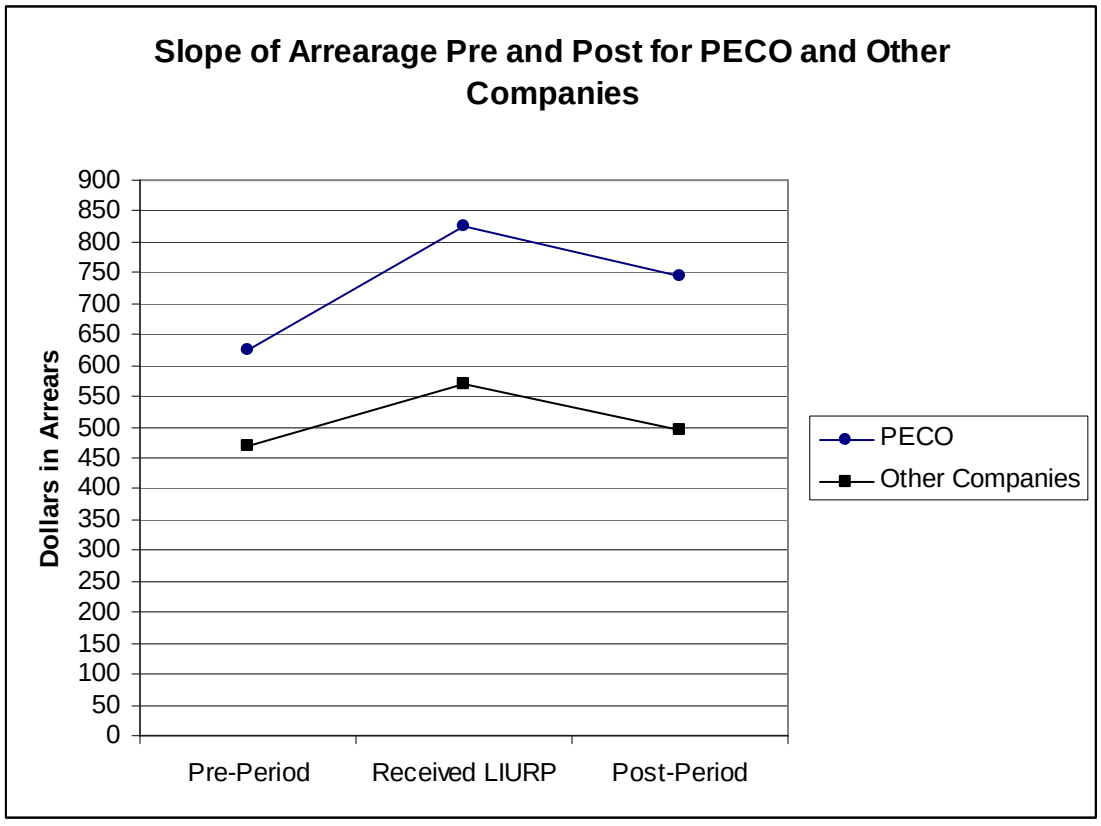
[63] Examining arrearage patterns by individual program years reveals that the decrease in arrearage for the post-period is consistent for all years except 1993. A Table showing average arrearage for each LIURP program year is included in Appendix C.

Several things are obvious from Table 24. First, arrearages for PECO households are from 33 to 51 percent higher than arrearages for other company households. Second, arrearage for PECO households increases faster than for other households. PECO households, for example, have a 32 percent increase in average arrearage during the pre-period, compared to 19.3 percent for other companies. Third, average arrearages decrease in the period following LIURP – by 10 percent for PECO and 12 percent for other companies.

Table 24
Average Energy Bill Arrearage for Pre and Post LIURP Period

	Average Arrearage at Beginning of Pre-Period	At End of Pre-Period/ Beginning of Post-Period	At End of Post-Period
PECO	$625.20	$825.49	$745.59
All other Companies	$442.94	$528.41	$465.45

Figure 1



To get a sense of the average change in arrearage, we calculated the change in utility bill arrearage for the pre- and post-period for each individual household. The average overall change in the pre-period is an increase of $240.90 for PECO and $72.85 for all other companies. In the post-period the average overall change in arrearage is a decrease of $43.79 for PECO and $52.36 for other companies.

Payment History

Various studies conclude that weatherization also improves payment behavior.[64] LIURP records the number of full, partial, and missed payments for each household for both the pre- and post-period. Because these variables are optional, we have only limited data available for analyses. Although the average number of full payments made does not vary from the pre- to post-period, the percent of households with missed payments decreased and the average number of partial payments increased (see Table 25).

Table 25
Average Energy Bill Arrearage for Pre and Post LIURP Period

	Pre-Period	Post-Period
Percent of households with at least one missed payment	89.3	80.8
Average number of partial payments	2.8	4.6

Changes in Energy Bill Arrearage

Overall, 40 percent of LIURP households reduce their arrearage during the post-period. Separate regression models were run to examine what factors are related to reduction in arrearage. Before running these models, it was necessary to control for the those households that received LIHEAP or were enrolled in Customer Assistance Programs (CAP)[65] in either the pre- or post-period, or both, since both of these programs have an effect on bill payments.

When we examine changes in arrearage by industry, a higher percentage of LIURP households in the gas industry reduce their arrearage in the post-period (see Table 26).

[64] For example, Tonn, Schmoyer and Wagner (2003) find that weatherized households have a lower default rate on energy bills, as well as require less energy assistance.

[65] Customer Assistance Programs are offered by utility companies in Pennsylvania to assist customers who have trouble paying their utility bills. Companies review billing data on the customer and determine a monthly payment amount that is less than the energy usage-based billing and consistent with their PUC-approved universal service plan. Typically, companies offer an arrearage forgiveness component for full CAP payments.

Table 26
Reduction of Arrearage by Industry

	Electric	Gas
No reduction in arrearage	63.0	45.6
Reduction of arrearage	37.0	54.4
Total	100.0	100.0

We also looked at whether renters or owners were more likely to reduce their arrearage, but found no difference (see Table 27).

Table 27
Change in Arrearage by Home Ownership Status

	Own	Rent
No reduction in arrearage	60.6	61.0
Reduction of arrearage	39.4	39.0
Total	100.0	100.0

Results of Regression Models for Changes in Arrearage

Any attempt to study the impact of LIURP variables on reductions in arrearage is limited because there are so many uncontrolled factors that influence how much money households can devote to paying their energy bills. Even though a 2004 statewide study of households with utility payment problems revealed that making utility payments was among the highest household budget priorities,[66] there are still many common household expenses that compete for a family's available dollars that are not recorded in LIURP, such as school, food, or medical expenses.

In general, our regression analyses yielded the following results:

Positively associated with reductions in energy bill arrearage:

- Change in energy usage from the pre- to post-period
- Cost of energy education (electric industry only)
- Total Annual household income (gas industry only)

[66] This survey was conducted by the Consumer Services Information System Project at Penn State University, using a sample of consumers who contacted the Pennsylvania Public Utility Commission seeking payment arrangements for utility bill arrearages. A report on the results was prepared in 2005.

Negatively associated with reductions in energy bill arrearage:

- Number of household residents
- Amount of heated space
- Age of dwelling (for electric heating jobs)
- Number of rooms (for electric industry)

Factors Associated with Changes in Arrearage

We initially ran the arrearage model twice, once with the amount of energy consumed in the pre-and post-periods included as an independent variable, and once with the change in energy consumption from the pre- to post-period. The model was run twice because these variables are highly correlated, as the amount of energy consumption in the pre-period is strongly associated with the amount of change in energy consumption from pre- to post-period. The model with the amount of energy consumed in the pre- and post-periods explained 9.6 percent of the observed variance in arrearage. Replacing these variables with the change in energy consumption from the pre- to post-period increased the explained variance to 12.7 percent. Thus, the change in energy usage from the pre- to post-period exerts the greatest influence on the reduction in arrearage. The only other factor to be positively associated with reduced arrearage is the cost of energy education services provided to the households.

Of those factors that are negatively associated with reductions in arrearage, the number of household residents has the greatest impact. It makes sense that the greater the number of residents, the greater the number of expenses that compete with energy bills. Other factors that are negatively associated with reducing energy bill arrearage include the age of the dwelling and amount of heated space.

Preliminary analyses suggested that there may be differences between the electric and gas industry in terms of what factors influence the reduction in arrearage. Running the regression model for each industry reveals that a few differences do exist. For example, whereas educational costs are positively associated with reductions in arrearage for the electric industry, they are not significant for the gas industry. Further, the number of rooms is negatively associated with reductions in arrearage for the electric industry. For the gas industry, annual household income is positively associated with reduced arrearage.

We next looked at the degree of reduced arrearage for two groups: those who fail to reduce their utility bill arrearage and those who succeed in reducing their arrearage in the post-period. For the first group, we are interested in seeing what variables influence a lesser increase in arrearage as opposed to those that are associated with a greater increase. In both models, change in energy usage from the pre- to post-period is positively associated with either reducing arrearage, or increasing arrearage to a lesser degree. Educational costs are also positively associated with reductions in arrearage for both

models. The number of household residents and the age of the dwelling are negatively associated with arrearage reduction in both models, and the amount of heated space is associated with greater increases in arrearage following weatherization.

When examined by type of job, the change in energy consumption from the pre- to post-period continues to be positively associated with reductions in arrearage for all job types. Age of the dwelling is negatively associated with reduced arrearage only for electric heating jobs, while the number of residents is only significant for electric baseload and gas heating jobs. Note also that total annual household income is positively associated with arrearage reduction for gas heating jobs, but negatively associated with arrearage reduction for electric water heating and electric baseload jobs.

Finally, we examined the reduction in arrearage for both those households that reduced their energy consumption and those that did not. In both models, change in energy usage from the pre- to post-period is positively associated with reducing utility bill arrearage. The number of residents and age of the dwelling are negatively associated with arrearage reduction.

In conclusion, the single factor that most influences changes in arrearage is the change in energy consumption from the pre- to post-period. The factor that is most consistently associated with failure to reduce arrearage is the number of household residents.

Section VIII
The Impact of Energy Conservation Education on Reduced Energy Consumption and Utility Bill Arrearage

LIURP is designed to include energy conservation education as part of the weatherization process. As noted in previous sections, the number of in-home education contacts is positively associated with reductions in energy consumption, and the amount of money spent on education is positively associated with reductions in energy bill arrearage. As part of the data gathering process, information is collected on the number and type of educational contacts for each LIURP household in both the pre- and post-weatherization period. While these variables were made optional beginning in 2000, the costs of the educational contacts is still a required variable. Because education costs have shown to be significantly related to reductions in energy consumption and arrearage, to varying degrees in different models, we desired to learn more about the nature of the relationship between energy education and reductions in both energy consumption and utility bill arrearage. To do this, we developed separate regression models for just those years and companies for which the contact information is reported. The analyses presented here differs from the earlier analysis in that we have calculated for each household the number of each type of educational contact, during both the pre- and post-weatherization period. The data set is therefore limited only to those households for which enough data were reported to make these calculations.

The following independent variables were included in the regression model:

In-home educational contacts, pre-period
Other education contacts (telephone or mail), pre period
In-home educational contacts, post-period
Other education contacts (telephone or mail), post-period

Most company programs are designed so that households that fail to reduce energy consumption in the post-period receive follow-up, or remedial, energy education visits and contacts. Depending on when energy usage is monitored and remedial visits or contacts are scheduled, it is possible for a household to receive remedial energy education early in the post-period and still reduce their energy consumption by the end of the post-period. Thus, although it is natural to assume that remedial educational contacts will more often be associated with households that fail to reduce energy consumption, this may, in fact, not be the case.

Results of regression Models for Energy Conservation Education

The results of the regression model for the education data set, without the education contact variables included, explains 10.96 percent of the variance in the change in energy consumption from the pre- to post-period. Including the education contact variables increases this explained variance to 14.95 percent. These results differ from the previous

analyses of optional variables in that remedial in-home educational visits are positively associated with reductions in energy consumption while pre-period in-home educational contacts are negatively related with reduced energy consumption.

Refining this model by running it for those household who did not reduce their energy consumption versus those that did, remedial in-home contacts is only significant for households that did not reduce their energy consumption. It thus appears that remedial energy education visits may be effective in minimizing the impact of the "rebound effect." In other words, these educational visits contribute toward households increasing their energy consumption to a lesser degree than if they did not receive such visits. However, non-in home contact methods, such as telephone calls or mailings, do not have a significant impact in changes in energy consumption.

When examining the different job types, the remedial in-home contacts are most effective for gas heating jobs and pre-period in-home contacts are significant for electric heating and electric water heating jobs.

The same basic pattern of relationships also exists for changes in arrearage, with a few exceptions. When run without the educational contact variables, the model explains 10.95 percent of the variance. Adding the contact variables increases the explained variance to 11.66 percent.

When examined by type of job, pre-period in-home visits are positively associated with reductions in arrearage for the gas heating and electric water heating jobs.

Remedial in-home educational visits are positively associated with reductions in arrearage for both those households who fail to reduce their overall arrearage and those that do, and for households that fail to reduce their energy consumption and those that do. Thus, remedial educational visits appear to present a unique opportunity for companies to increase energy savings. The earlier that companies can identify non-saving households, the more impact they can have on reducing the rebound effect.

These results, although based on a limited number of households, suggest that education plays an important role in both the reduction of energy consumption and the reduction in energy bill arrearage. Remedial in-home educational visits appear to be particularly important, and should be emphasized when possible.

Section IX
Conclusions and Discussion

LIURP is successful in both reducing energy consumption and heating energy arrearages in treated homes. Additionally, LIURP is particularly well suited to Pennsylvania. Because Pennsylvania's housing stock is old and new housing construction is relatively scarce, especially for low-income families, the focus on existing housing stock is very important in meeting Pennsylvania's overall needs for energy conservation. Further, the focus on weatherization is the most effective means of reducing energy consumption for low-income households. The number of low-income homes weatherized by LIURP each year is also important due to the back-log of the federal WAP program.

Whereas the Auditor General found many problems with the implementation of WAP, including poor data keeping, lack of coordination among agencies, unreliable subcontractors, lack of feedback and evaluation, and a need to develop prioritizing procedures,[67] most of these criticisms do not apply to LIURP. Evaluation has been built into LIURP from its very inception, and coordination has been emphasized repeatedly. However, there are opportunities for further research and changes to LIURP that could result in improved performance and service to a larger number of needy households.

Summary of Findings

Although energy consumption and the amount of arrearage in the pre-period are significant predictors of the degree to which households reduce their energy consumption, there are also specific weatherization measures that have powerful impacts on reduced energy consumption. Most notably, the replacement of refrigerators and freezers with more efficient models, or the removal or disconnection of unnecessary units, is positively related to energy savings.

The number of residents in a household and the number of heated rooms are negatively associated with reductions in energy consumption. Furnace maintenance is the LIURP service most associated with the failure to reduce energy consumption following weatherization. One reason for this may be the increasing of comfort levels in the home once the furnace is properly working.

Analysis of costs associated with the weatherization measures reveals that LIURP is cost-effective, and that companies are seeing reductions in energy consumption for the money spent on weatherizing homes. When costs are taken into account, several other treatments become significantly associated with reduced energy consumption, most notably wall and attic insulation. The cost of repairs is negatively associated with reductions in energy conservation for electric baseload jobs.

[67] See the Pennsylvania Auditor General's Special report on the Department of Community and Economic Development's Weatherization Assistance Program, published in August, 2007.

Energy Conservation Education

Results indicate that energy education can play an important role in reducing both energy consumption and energy bill arrearage. Even though educational contacts are driven by the degree to which households are reducing their energy consumption, it is possible that these contacts also have impacts on improved bill payment behavior. Further study is needed to ascertain the exact nature of consumer education on bill paying behavior.

The fact that slightly less than one-third of LIURP households increase their energy consumption following weatherization is consistent with the figures found in other studies of the "take-back" or "rebound" effect. Our findings suggest that targeting education to households experiencing increased energy consumption following weatherization might be particularly effective in reducing the amount of "take-back" that might otherwise occur without the remedial education. The effectiveness of energy conservation education may be increased if it is specifically tailored to those factors that contribute to the rebound effect. The lack of specific household behavioral variables in the LIURP database prevents this study from making more specific recommendations. However, it is important to note that remedial in-home educational contacts are more effective than mailing informational brochures or making telephone calls. Because the number of people living in a household is negatively associated with both reductions in energy consumption and arrearage, education visits should include all members of the household.

It may also be beneficial to implement educational and informational programs designed to increase public awareness of LIURP and other energy assistance programs. Evidence suggests that LIURP may not be reaching all the eligible households. In particular, it appears that Hispanic households may be under represented.

Possible Changes to LIURP

Throughout this study the primary focus has been on reducing energy consumption. Although replacing inefficient air conditioners and other cooling-based treatments are available, most of LIURP is directed toward weatherizing homes in terms of heating. However, cooling needs account for a high degree of energy usage and should not be neglected. This is especially important because cities with a history of heat waves are likely to experience even more intense and frequent heat waves as a result of global climate change. It may thus be beneficial to place greater emphasis on cooling needs in LIURP. Doing this could especially benefit the elderly population.

Considerable evidence exists to indicate that there are households above 150 percent of the poverty level that are living in fuel poverty, and that this number will grow in the near future. For this reason, policymakers may want to consider expanding LIURP to a larger population and raising the eligibility limit to as high as 200 percent of the federal poverty level. In recent years, some cities such as New York have started exploring alternatives

to the federal poverty level as a basis for determining legitimate need for assistance, and for establishing program eligibility.[68] There are a variety of tools available for assessing the poverty level that will allow LIURP to serve the greatest legitimate need. One possible method is a combination of Sensitivity Analysis and the Self Sufficiency Standard Index, developed by Diane Pearce at the University of Washington. Using this technique, a study conducted by the Consumer Services Information System Project at Penn State found that 185 percent of the poverty level was much more effective at meeting the need for utility bill payment assistance than 150 percent.[69]

Further, it may be beneficial to re-examine the most recent socioeconomic and census data for company service districts to determine if any groups are underrepresented or not being reached in LIURP. If so, company outreach programs should be examined with the objective of finding ways to better reach potentially eligible households.

Suggestions for Future Study

A potential criticism of LIURP is that evaluation is limited by the single year of post-weatherization data and the lack of behavioral variables, as well as the fact that several potentially useful variables are optional. Further, the true impact of many measures may not show up for several years.

While no single theory or model explains complicated energy-usage behaviors, applying some basic social science techniques with the proper data can yield meaningful information. It would be useful to conduct a survey of each company's LIURP households. Ideally, the sample for the survey should be structured to take into account all program years and changes in the households since receiving weatherization, but mobility of the population may make it more practical to restrict such a study to more recent years. The survey itself should include demographic and social background variables, changes in family composition, changes in income and employment status, and questions on energy conservation behavior. Some of the companies already collect such data and could possibly provide them for analyses. Participation of the companies in such additional data gathering could be either required or voluntary, depending on the needs of policymakers and regulators.

The community agencies and subcontractors currently assisting with the administration of LIURP provide a strong foundation for implementing any changes or added provisions. They are also an effective tool for increasing and tailoring home educational visits, and for implementing surveys.

LIURP reporting has remained relatively constant even though there have been significant changes in policies and technologies. We recommend a review the reports

[68] See "Bloomberg Seeks New Way to Determine Who is Poor," in the December 30, 2007 edition of the New York Times.
[69] See "A Comparison of Two Measures of Income Adequacy for Utility Consumers in Pennsylvania," by Asa Mukhopadhyay, Penn State University, 2005.

produced on a yearly basis to determine if they are meeting current reporting needs. If there are needs that are not being met, it is advisable to include additional variables in the LIURP reporting requirements. Even without adding new variables, it is possible to modify existing reports or create new reports.

Consider also the fact that no major revisions have been made to the LIURP data collection process since 2000. In the past, when revisions were made, the focus has been on streamlining the amount of information requested. It may be time to add some variables, depending on the type of questions policy makers would like answered. Another option is to expand some of the coding for existing variables. For example, it may be useful to be able to distinguish row houses and duplexes as distinct housing types in future analyses. As noted, these additional variables of interest, or expanded coding categories, may be better suited for a survey of a sample of households for each company.

It has already been noted that there are opportunities to further explore the nature of the relationship between consumer education and bill payment behavior, and for determining the relative contributions of energy assistance, payment programs, and reduced energy consumption to corresponding changes in utility-bill arrearage. Various other opportunities for further study also exist. Possible analyses of interest include a detailed examination of households that drop out of the LIURP program, and a more focused examination of households that fail to reduce energy consumption. It would be especially beneficial to collect additional information on energy assistance programs such as LIHEAP or customer payment assistance programs, so that the effects of such programs can be analyzed in conjunction with reductions in energy consumption and changes in arrearages and payment behavior.

Further, some companies implement pilot programs within LIURP in order to test new measures or approaches to energy conservation. The LIURP database contains a variable to identify households that participated in various pilot programs. It might be advantageous to complete specialized studies of these pilot households and determine which pilot studies produce the greatest reductions in energy consumption or arrearages.

Another option is to identify weatherization measures that are implemented primarily by specific companies and develop models to analyze the impacts of these measures on energy consumption. If such cases are identified and studied, recommendations may be developed for other companies regarding changes they may wish to consider making in their own programs, or new treatment measures they may wish to begin implementing.

Summary

In summary, LIURP is an effective program that has been successful in meeting its goals. However, there are still many eligible households to be served. There are several options for more detailed research into LIURP, which would allow us recommend changes that could enhance its effectiveness. Specifically, there are benefits to be gained from more

detailed analysis into cost-effectiveness, energy conservation behavioral changes, the impact of education services, long-term energy savings, and the relationship between payment assistance programs and energy conservation programs. Some modifications to LIURP could potentially result in more effective targeting of needy households, further reductions in energy consumption, a decrease of the take-back effect, and a more comprehensive view of energy conservation.

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Appendix A
History of LIURP

Preliminary research for LIURP was conducted by the Bureau of Consumer Services and the Pennsylvania State University, which surveyed each state's weatherization services offered and the amount of need not being met by existing programs. Next, various experts in the fields of energy conservation and education were consulted and a policy paper was prepared in 1985 recommending the specific provisions of the LIURP program. This policy paper was submitted to the Pennsylvania Public Utility Commission for consideration. A program was subsequently outlined and regulations were drafted.

At its meeting on April 17, 1986, the Commission directed the publication for public comment of the proposed Low Income Usage Reduction Regulations. These regulations were subsequently published in the November 1, 1986 edition of the Pennsylvania Bulletin. Thereafter, the Attorney General, the Senate Consumer Protection and Professional Licensure Committee and the House Consumer Affairs Committee approved the proposed regulations. However, at its public meeting on December 1, 1986, the Independent Regulatory Review Commission (IRRC) disapproved the proposed regulations, and the Commission asked for, and received, an extension to submit a revised set of regulations.

The Commission subsequently made various modifications to its proposed regulations in response to the concerns of IRRC. Then, at its Public Meeting of May 22, 1987 the Commission issued an order adopting the regulations to establish residential low income usage reduction programs for eligible utility customers. These regulations were later approved by IRRC at its Public Meeting.

These regulations required affected utilities to establish fair, effective and efficient energy usage reduction programs for low income customers consistent with the provisions set forth under 52 Pa. Code §§501 and 1501. Monitoring and evaluating the implementation of these regulations was assigned to the Public Utility Commission's Bureau of Consumer Services. Before implementing specific programs for each company, a series of meetings were held with all participating companies. In these meetings, the Bureau of Consumer Services, Penn State University and representatives of each company developed the essential requirements for each company and designed a systematic evaluation procedure. Input was also solicited from consumer advisory panels and various consumer advocacy groups. As a result, each company was given flexibility in designing programs that met the specific needs of its service district and also involved local community agencies whenever possible while adhering to the regulatory requirements and fundamental program goals. Specifically, utility companies were given considerable freedom in designing their education program and were encouraged to develop, implement and evaluate new innovative methods for achieving usage reduction, including the implementation of pilot programs.

By the end of 1991, expenses for the program were incorporated in the rates of almost all of the major utilities required to participate in the program. Since federal funding for low income energy related programs had reached critically low levels, LIURP constituted good public policy for Pennsylvania. Furthermore, annual evaluation of program results showed that LIURP was successful in meeting its goals. Consequently, the Public Utility Commission recommended the continuation of the program.

Faced with a successful program that was soon scheduled to expire, the Commission revised the regulations and recommended a five year extension. By order adopted May 14, 1992 and entered June 2, 1992 at L-920065, the Commission initiated a proposed rulemaking to extend LIURP for another 5-year period. (LIURP was scheduled to expire on or before January 28, 1993.) In that order, the Commission recognized that LIURP's weatherization and conservation services had achieved significant benefits for both utilities and low income customers, and that the program would continue to do so in the future.

Based on the Commission's consideration of the comments received regarding the LIURP program, including the comments of IRRC and the House and Senate standing committees, the Commission proposed adoption of the final-form regulations. Accordingly, under 66 Pa. C.S. §§501, 1501 and 1505(b) and the Commonwealth Documents Law (45 P.S. §1201 et seq.) and the regulations promulgated thereunder at 1 Pa. Code §§7.1-7.4, the Commission proposed adoption of the final-form regulations at 52 Pa. Code §§58.1-58.18. The regulations of the Pennsylvania Public Utility Commission, 52 Pa. Code were amended by deleting §§69.151-69.168 and by adding §§58.1-58.18 to read as set forth in Annex A[70].

On July 7, 1992, the Office of Attorney General issued its approval of the proposed regulations as to form and legality. On July 15, 1992, copies of the proposed rulemaking were delivered to the Chairman of the house Committee on Consumer Affairs, the Chairman of the Senate Committee on Consumer Protection and Professional Licensure, the Independent Regulatory Review Commission (IRRC) and to the Legislative Reference Bureau. The proposed rulemaking was published for comment at 22 Pa.B. 3908 (July 25, 1992).

The House Committee on Consumer Affairs and the Senate Committee on Consumer Protection and Professional Licensure approved the proposed regulations on September 4, 1992 and September 15, 1992, respectively. On September 23, 1992, the Commission received comments from IRRC on the proposed regulations, as well as written comments from various other parties. Continuance of LIURP was recommended for several reasons. Evaluation studies showed that LIURP was successful in providing assistance to customers of electric and gas utilities by reducing the impact of energy costs on low income families, improving end-use energy efficiencies and improving their ability to pay

[70] Note: The text of the regulations amended in this annex was originally codified in Chapter 69 in error. Therefore, upon final adoption of these amendments, the text was moved from §§69.151-69.168, Pennsylvania Code pages 69-48-69-62, serial pages (126876)-(126888) and (140331)-140333) to §§58.1-58.18, the text of which appeared in Annex A.

for utility services. Furthermore, it provided benefits to the utilities and all ratepayers in terms of reduced costs of electric generation or natural gas acquisition, less impact on the environment and reduced peak demand growth.

On October 22, 1992, the Commission adopted an order promulgating final-form regulations extending the LIURP program for another 5-year period. From 1986 to 1992, this program provided weatherization and conservation services to over 62,000 Pennsylvania households. LIURP services were to be funded by a charge of 0.2 percent of utility revenues (or 2 cents for each ten dollars the utility collected). On December 2, 1992, the Independent Regulatory Review Commission approved the final-form regulations and on January 16, 1993 they were published in the Pennsylvania Bulletin, effective immediately. With the later implementation of the customer choice programs for the electric industry, LIURP was included under the Universal Service provisions (in 2000 for electric companies and 2002 for gas).

LIURP, from its inception, was intended to be modified as needed based upon yearly evaluation results, changes to regulatory policy, technology, service districts, and the field experience of the companies. After reviewing program results from the first several years and assessing the overall effectiveness of LIURP, including any problems encountered during the initial implementation years, the Commission made several revisions to LIURP, which went into effect on January 18, 1993.

Among the changes, electric utilities were allowed to provide usage reduction for high use baseload customers. Electric baseload measures addressed residential usage other than electric space heating and electric water heating. For some companies, the introduction of a baseload reduction component was new, while for other companies the baseload reduction proposal represented a continuation of proven, effective measures and an introduction of new, more sophisticated measures. The Commission expected that baseload treatments in LIURP would evolve as utilities gained experience and as technology improved in this rapidly developing area.

Another program modification was intended for households that received both gas and electric service. In such cases, participating utilities were required to coordinate the provisions of program services in order to promote a more comprehensive delivery of usage reduction measures. For example, when a gas utility provided gas heating usage reduction services to a customer that had electric water heating and baseload service provided by a covered electric utility, the gas utility was required to provide usage reduction education and low cost measures designed to reduce electric consumption. These low cost measures included the installation of efficient light bulbs where appropriate, and the installation of devices to reduce the flow of hot water in showers and faucets. Similarly, electric companies were required to provide, when applicable, natural gas conservation education and perform gas hot water tank wraps and pipe wraps, and install faucet aerators, where necessary.

Additionally, a twelve-year simple payback criterion for specific usage reduction measures was implemented, where the expected life time of the measure installed must

exceed the payback period. However, all unspecified measures continue with a seven-year payback as stated in the original LIURP regulations. Specified measures include sidewall insulation, attic insulation, space heating system replacement, and water heater replacements. The extension from seven to twelve years for the specified measures was made because the specified measures are long-term, passive measures with a potential for substantial energy savings.

As noted elsewhere in this report, there are two primary methods for assisting low-income households with paying their energy bills. One is to reduce their energy consumption through weatherization programs such as LIURP. The other method is to provide payment assistance programs to assist with paying winter heating bills. The primary program of this type is LIHEAP. Other programs have been developed over the years to assist with promoting regular year-round utility bill payments and to reduce arrearages. In 1994, a major study of LIURP recommended coordinating these services whenever possible to provide the most comprehensive assistance to eligible households and to have maximum combined impact on both energy consumption reduction and improved bill payment behavior. In the years following this study, renewed emphasis was placed on coordinating these programs, where companies refer eligible LIURP households to both LIHEAP and customer payment assistance programs.

Finally, it must be remembered that LIURP is not a static program. Adjustments are made as technologies and regulations change. Companies can also make adjustments to their programs as they become more experienced with what works and what does not. Periodically, LIURP is reviewed with an eye toward adding variables that help with analyses and eliminating those that are not very useful or difficult to obtain. In 1994, various coding changes were made to the data reporting process, and again, in 2000, major coding changes were made to streamline the data gathering process. At this time, several variables were made optional and others were redesigned or eliminated, while variables were also added to capture information on changes in the regulatory environment. Further, specific measure codes are added when companies try new treatments. In recent years, companies have also had the option of implementing pilot studies within LIURP to test new treatments.

The PUC and Penn State continue to evaluate LIURP on a yearly basis and submit reports to each LIURP company. In 1994 the PUC published a major review of LIURP entitled, “LIURP: Historical Report and Program Analysis.” Updated statistics on LIURP are also included in each Public Utility Commission annual report, and in the yearly Universal Services reports.

Appendix B
Weatherization Treatment Measures

WATER HEATING

- Faucet Aerator – Bath
- Faucet Aerator – Kitchen
- Low Flow Showerhead
- Water Heater Jacket R-11
- Pipe Insulation
- Tank Temp Setback
- Leaky Faucet Repair
- Test/Replace Elements
- Water Heater Replace
- Water Heater Jacket R-8
- Repair Hot Water Leaks/Plumbing Repairs
- Gravity Fill Exchange Installed
- Heat Tape
- Faucet Replacement
- Solar Water Heating

INFILTRATION CONTROL – GENERAL

- Infiltration Work Including Blower Door
- Infiltration Work Excluding Blower Door
- Blower Door Test
- Caulking
- Switch & Outlet Gasket
- Air Conditioner Cover
- Wall Insulation
- Create Attic Hatch

INFILTRATION CONTROL – EXTERIOR DOOR

- Sweep
- Weather strip
- Fix Lock
- Replace Lock
- Repair
- Replace
- Construct
- Storm Door

INFILTRATION CONTROL – INTERIOR DOOR BETWEEN TWO HEATED AREAS

- Weather strip
- Replace Lock
- Construct

INFILTRATION CONTROL – INTERIOR DOOR BETWEEN A HEATED AND NON -HEATED AREA

- Construct
- Insulate with Rigid Bd.

INFILTRATION CONTROL – PRIME WINDOW

Replace Crkd Glass with Glaze
Reglaze Only
Repair/Replace Sash
Replacement Window
Window Quilt
Window Film

INFILTRATION CONTROL – STORM WINDOW

Interior Storms
Exterior Storm Repair
Install Exterior Storms

MOBILE HOME

Install Combination Door/Storm
Replace Ext Prime Door
Interior Storm Windows
Replace Prime Windows
Skirting
Roof Coating
Ceiling Insulation
Floor Insulation
Wall Insulation
Install Roof Cap
Install Zone Heating System

ATTIC INSULATION

Non Facd Batt Fiberglass R-19
Blown Insulation R-8
Blown Insulation R-10
Blown Insulation R-19
Blown Insulation R-20
Blown Insulation R-25
Blown Insulation R-27
Blown Insulation R-30
Blown Insulation R-38
Hatch Boxing
Attic Acc/No Stairs
Attic Acc/Fold. Stairs
Recessed Lighting Boxing
Add Roof Vent
Add Soffit Vent
Soffit Chutes

FLOOR INSULATION

Facd Bat Fiberglass R-11 16”
Facd Bat Fiberglass R-19 16”
Facd Bat Fiberglass R-19 24”

FLOOR INSULATION OVER UNCONDITIONED AREA

Facd Bat Fiberglass R-11 16”
Inst Vap Bar Crawl Space

STILL BOX INSULATION

Facd Bat Fiberglass R-11 16”

INTERIOR FOUNDATION INSULATION

Facd Bat Fiberglass R-19 24”
Insulate Knee Wall

GARAGE INSULATION MEASURE

Thermax Board
Facd Bat Fiberglass R-19

MISCELLANEOUS/REPAIRS

Misc. Repairs/Measure-Chimney/Windows/ Electrical Repairs
Off Peak Rate, Time of Day Conversions
Roof Repairs: General
Interior Repairs – Floor, Wall, Ceiling
Repair Floor Under Bath
Repair Wall Plaster
Repair Ceiling Plaster
Pre-Air Sealing Repairs
Exhaust Vents:
Replace/Install Kitchen and
Bathroom Exhaust Fan
Vent Exhaust Fans Outdoors
Dryer Vents:
Install Vent Duct and Hood
Connect Duct to Hood
Ceiling Fan
Clothes Line

FURNACE WORK

Heating System/Furnace Repairs & Retrofits
Efficiency Test (CO_2)
Furnace Sizing
Duct Work Sizing & Repair
Duct Work Insulation
Burner Replacement
Boiler Replacement
Heat Exchanger Replacement
Furnace/Heating System Replacement
Baseboard Repair/Replacement
Furnace Maintenance:
Tune-up
Replace Filters
Replace Thermocouple/Clean Blower
Furnace Filter

AUDIT

Pre-Audit/Audit, Including Blower Door.
Pre-Audit/Audit, Excluding Blower Door.
Walk-Through Audit, Including Blower Door.
Walk-Through Audit, Excluding Blower Door.

APPLIANCE/LIGHTING

Change out Refrigerator/Freezer
Change out Air Conditioner
Change out Other Appliance
Install Efficient Lighting/Fixtures
Other Appliance Efficiency Improvements
Waterbed Retrofit
Window Air Conditioner Unit
Air-Conditioner Filter
Appliance/Air Conditioner Timer

Other Measures Installed

Cooling System Maintenance, Repair and Retrofit
Cooling System Replacement
Thermostat (Regular) – Recalibrate/Relocate/ Replace
Install Setback Thermostat
Miscellaneous Measures/ Multi-Family
Common Areas (prorated by units treated)

Appendix C
Additional Tables

Table C-1
Average Energy Bill Arrearage in Dollars by Year

	Average Arrearage in Pre-Period in Dollars	Average Arrearage at end of Pre-Period/ Beginning of Post-Period	Average Arrearage at end of Post-Period in Dollars
1989	340.45	499.77	220.19
1990	225.75	314.64	230.91
1991	176.37	283.78	218.28
1992	213.68	362.05	316.04
1993	223.20	289.07	298.89
1994	385.41	524.32	419.11
1995	504.74	599.34	473.69
1996	508.92	649.51	514.94
1997	808.25	833.45	717.48
1998	481.33	545.39	502.11
1999	609.44	741.73	684.20
2000	447.39	557.59	503.28
2001	441.70	571.42	519.31
2002	466.71	539.05	490.72
2003	372.58	501.93	481.62
2004	738.87	737.09	649.05
2005	723.09	728.56	649.13
2006	504.62	558.00	512.86

Appendix D
Detailed Results of Regression Models

The following tables are presented in the order in which they are discussed in the text. Two first column lists the independent variables found to be significant in the various regression models. The second column shows the Parameter Estimate for each variable which indicates the degree of change in the dependent variable for each observed unit change in the independent variable. The third column shows the level of statistical significance for the observed relationship shown in the second column. For example, in the first table, the change-out of refrigerators or freezers is associated with a reduction in energy consumption of 5.8616 percent, and this association is significant at the 0.0001 level.

Table D-1
Results of Basic Regression Model for Changes in Energy Consumption
For Households that Fail to Reduce Energy Consumption
And Households that do Reduce Energy Consumption

	Parameter Estimate	Level of Significance
Households that Have No Change or Increase their Energy Consumption		
Positive Relationship:		
• Amount of energy usage in pre-period	0.00106	<0.0001
• Amount of arrearage in pre-period	0.00416	<0.0001
• Number of residents in the household	0.79474	0.0011
• Total annual household income	0.00012	0.0489
Negative Relationship:		
• Furnace maintenance	-6.5857	<0.0001
• Chimney, windows, electric repairs[71]	-3.9212	0.0018
• Amount of space heated	-0.0009	0.0040
Households that Reduce Their Energy Consumption		
Positive Relationship:		
• Replace refrigerator/freezer	5.8616	<0.0001
• Chimney, windows, electrical repairs	2.5658	<0.0001
• Amount of energy used in the pre-period	0.00132	<0.0001
• Amount of arrearage in the pre-period	0.00132	<0.0001
Negative Relationship:		
• Furnace maintenance	-2.73464	<0.0001
• Number of residents in the household	-0.35248	0.0001
• Number of rooms in the home	-0.10463	0.0055
• Percent of energy burden	-0.00734	0.0163

[71] Miscellaneous Chimney, windows and electrical repairs are reported together in the data set and cannot be separated.

Table D-2
Results of Basic Regression Model for Changes in Energy Consumption
By Industry

	Parameter Estimate	Level of Significance
Electric Industry		
Positive Relationship:		
• Replace refrigerator/freezer	8.91799	<0.0001
• Amount of energy used in the pre-period	0.00154	<0.0001
• Amount of arrearage in pre-period	0.00601	<0.0001
• Install more efficient lighting	3.84603	0.0091
Negative Relationship:		
• Furnace maintenance	-22.01315	<0.0001
• Number of residents in the household	-0.99360	<0.0001
• Low flow shower heads	-3.00377	0.0006
• Chimney, windows and electric repairs	-2.82306	0.0027
Gas Industry		
Positive Relationship:		
• Amount of energy used in the pre-period	0.04427	<0.0001
• Chimney, windows and electric repairs	2.02033	0.0078
• Amount of arrearage in pre-period	0.04427	0.0263
Negative Relationship:		
• Number of rooms in the home	-0.53989	0.0044
• Low flow shower heads	-2.13023	0.0431
• Furnace maintenance	-1.36307	0.0496

Table D-3
Results of Basic Regression Model for Changes in Energy Consumption
By Type of LIURP Job

	Parameter Estimate	Level of Significance
Electric Heating Jobs		
Positive Relationship:		
• Amount of energy usage in the pre-period	0.00110	<0.0001
• Amount of arrearage owed in pre-period	0.00685	0.0004
Negative Relationship:		
• Furnace maintenance	-6.88141	0.0034
• Amount of heated space	-0.00137	0.0129
• Number of residents in the household	-1.87690	0.0401
• Number of rooms in the house	-0.97848	0.0431
Electric Water Heat Jobs		
Positive Relationship:		
• Replace refrigerator/freezer	6.52831	<0.0001
• Amount of energy used in the pre-period	0.00142	<0.0001
• Amount of arrearage in pre-period	0.00483	<0.0001
Negative Relationship:		
• Number of residents in household	-1.62406	<0.0001
Electric Baseload		
Positive Relationship:		
• Replace refrigerator/freezer	13.13593	<0.0001
• Amount of energy usage in the pre-period	0.00158	<0.0001
• Amount of arrearage owed in pre-period	0.00670	<0.0001
Negative Relationship:		
• Number of residents in the household	-0.66996	0.0041
• Number of rooms in the house	-0.56531	0.0502 (borderline)

Gas Heating Jobs		
Positive Relationship:		
• Amount of energy used in the pre-period	0.04427	<0.0001
• Amount of arrearage in pre-period	0.00149	0.0278
Negative Relationship:		
• Number of in-home education contacts	-1.69772	0.0006
• Number of rooms in the home	-0.53986	0.0044
• Costs of educational services	-0.01637	0.0249
• Furnace maintenance	-1.36307	0.0496

Table D-4
Results of Basic Regression Model for Changes in Energy Consumption
By Type of Housing

	Parameter Estimate	Level of Significance
Detached Single Family/Duplex		
Positive Relationship:		
• Replace refrigerator/freezer	11.76177	<0.0001
• Amount of energy usage in the pre-period	0.00030	<0.0001
• Amount of arrearage owed in pre-period	0.00270	<0.0001
• Chimney, windows, electric repairs	3.03920	<0.0001
Negative Relationship:		
• Lighting	-9.44380	<0.0001
• Educational costs	-0.02914	<0.0001
• Number of in home education contacts	-3.09092	<0.0001
• Low Flow shower head	-5.66653	<0.0001
Small Multi-Unit		
Positive Relationship:		
• Energy burden	27.83488	<0.0001
• Replace refrigerator/freezer	10.62629	0.0093
Large Multi-Unit		
Positive Relationship:		
• Amount of energy usage in the pre-period	0.005445	<0.0001
• Amount of heated space	0.01334	0.0019
Negative Relationship		
• Lighting	-10.23427	0.0084
• Pre audit excluding blower doors	-7.14912	0.0394
Mobile Homes		
Positive Relationship:		
• Educational costs	0.7591	<0.0303

Table D-5
Results of Regression Model with Measure Costs
For Changes in Energy Consumption
For Households that Fail to Reduce Energy Consumption
And Households that do Reduce Energy Consumption

	Parameter Estimate	Level of Significance
Households that Have No Change or Increase their Energy Consumption		
Positive Relationship:		
• Sidewall insulation costs	0.01046	<0.0001
Negative Relationship:		
• Heating system costs	-0.02780	<0.0001
• Repair costs	-0.00802	<0.0001
• Window and door costs	-0.00366	<0.0001
Households that Reduce Their Energy Consumption		
Positive Relationship:		
• Sidewall insulation costs	0.00548	<0.0001
• Attic insulation costs	0.00416	<0.0001
• Heating system costs	0.00372	<0.0001
• Baseload costs	0.01004	<0.0001
• Audit costs	0.01263	<0.0001
• Other insulation costs	0.00223	0.0348

Table D-6
Results of Regression Model with Measure Costs
For Changes in Energy Consumption
By Industry

	Parameter Estimate	Level of Significance
Electric Industry		
Positive Relationship:		
• Baseload costs	0.01037	<0.0001
Negative Relationship:		
• Repair costs	-0.00872	<0.0001
• Window and door costs	-0.00579	<0.0001
Gas Industry		
Positive Relationship:		
• Sidewall insulation costs	0.00564	<0.0001
• Attic insulation costs	0.00544	<0.0001
• Heating system costs	0.00357	<0.0001
• Audit costs	0.01464	0.0050
• Other insulation costs	0.00432	0.0101

Table D-7
Results of Regression Model with Measures
For Changes in Energy Consumption
By Type of LIURP Job

	Parameter Estimate	Level of Significance
Electric Heating Jobs		
• Audit costs	0.15071	<0.0001
• Attic insulation costs	0.00928	<0.0001
Electric Water Heat Jobs		
• Repairs costs	-0.00768	0.0207
Electric Baseload		
• Baseload costs	0.01075	<0.0001
• Heating system costs	0.03513	0.0017
• Repair costs	-0.02397	<0.0001
Gas Heating Jobs		
• Heating system costs	0.00351	<0.0001
• Sidewall insulation costs	0.00570	<0.0001
• Attic insulation costs	0.00539	<0.0001
• Other insulation costs	0.00119	0.0088
• Audit costs	0.01496	0.0025

Table D-8
Results of Regression Model with Measure Costs
For Changes in Energy Consumption
By Type of Housing

	Parameter Estimate	Level of Significance
Single Family/Duplex		
• Sidewall insulation costs	0.00638	<0.0001
• Baseload costs	0.01749	<0.0001
• Attic insulation costs	0.00714	<0.0001
• Heating system costs	0.00422	<0.0001
• Audit costs	0.01247	0.0001
• Other insulation costs	0.00636	0.0003
• Cooling system costs	0.10462	0.0155
Small Multi-Family		
• Sidewall insulation costs	0.01046	0.0004
• Infiltration costs	0.00852	0.0139
• Baseload costs	0.01461	0.0272
Large Multi-Family		
• Attic insulation costs	0.01078	0.0250
Mobile Homes		
• Repair costs	0.01362	0.0279

Table D-9
Results of Regression Model with Optional Variables
For Changes in Energy Consumption

	Parameter Estimate	Significance
Overall change in energy consumption		
Number of teenagers	-0.4535	0.0108
Electric baseload jobs		
Number of children	- 0.80413	0.0530
Number of seniors	+2.20916	0.0136

Table D-10
Results of Basic Regression Model for Reduction in Utility Bill Arrearage

	Parameter Estimate	Level of Significance
Positive Relationship:		
• Change in energy usage from pre to post	4.07004	<0.0001
• Educational costs	0.57312	0.0001
Negative Relationship:		
• Number of residents in household	-22.17368	<0.0001
• Age of dwelling	-0.03824	<0.0001
• Amount of heated space	-0.02074	0.0100

Table D-11
Results of Basic Regression Model for Reduction in Utility Bill Arrearage
By Industry

	Parameter Estimate	Level of Significance
Electric Industry		
Positive Relationship:		
• Change in energy usage from pre to post	4.3767	<0.0001
• Education costs	1.17992	<0.0001
Negative Relationship:		
• Number of residents	-9.01938	0.0013
• Number of rooms	-5.27652	0.0348
Gas Industry		
Positive Relationship:		
• Change in energy usage from pre to post	2.90797	<0.0001
• Annual income	0.00327	0.0201
Negative Relationship:		
• Number of residents	-16.21513	0.0009

Table D-12
Results of Basic Regression Model for Reduction in Utility Bill Arrearage
For No Reduction in Utility Bill Arrearage and Reduced Arrearage

	Parameter Estimate	Level of Significance
Households that Have No Change or Increase their Energy Bill Arrearage		
Positive Relationship:		
• Change in energy usage from pre to post	1.36717	<0.0001
Negative Relationship:		
• Number of residents in household	-33.02652	<0.0001
• Age of dwelling	-0.02087	0.0001
• Amount of heated space	-0.02387	0.0049
Households that Reduce Their Energy Bill Arrearage		
Positive Relationship:		
• Change in energy usage from pre to post	3.63514	<0.0001
• Education costs	0.47066	0.0003
Negative Relationship:		
• Number of residents in household	-22.42562	<0.0001
• Age of dwelling	-0.06496	<0.0001
• Annual household income	-0.00404	<0.0001

Table D-13
Results of Basic Regression Model for Reduction in Utility Bill Arrearage
By Type of LIURP Job

	Parameter Estimate	Level of Significance
Electric Heating Jobs		
Positive Relationship:		
• Change in energy usage from pre to post	3.06850	0.0011
Negative Relationship:		
• Age of dwelling	-0.03135	0.0001
Electric Water Heat Jobs		
Positive Relationship:		
• Change in energy usage from pre to post	3.35163	<0.0001
Negative Relationship:		
• Annual household income	-0.00343	0.0292
Electric Baseload		
Positive Relationship:		
• Change in energy usage from pre to post	7.83292	<0.0001
• Education costs	5.00741	<0.0001
Negative relationship:		
• Number of Residents in Household	-41.08931	<0.0001
• Annual household income	-0.00941	0.0001
Gas Heating Jobs		
Positive Relationship:		
• Change in energy usage from pre to post	2.38567	<0.0001
• Annual household income	0.00423	0.0081
Negative Relationship:		
• Number of residents in household	-21.10043	0.0001

Table D-14
Results of Basic Regression Model for Reduction in Utility Bill Arrearage
For Households that Reduce Energy Consumption
And Households that Do Not

	Parameter Estimate	Level of Significance
Households that Have No Change or Increase their Energy Consumption		
Positive Relationship:		
• Change in energy usage from pre to post	3.52386	0.0113
Negative Relationship:		
• Number of Residents in Household	-23.2528	0.0006
• Age of dwelling	-0.01523	0.0501
Households that Reduce Their Energy Consumption		
Positive Relationship:		
• Change in energy usage from pre to post	5.27378	<0.0001
• Education costs	0.67142	<0.0001
Negative Relationship:		
• Number of residents in household	-22.42562	<0.0001
• Age of dwelling	-0.04633	<0.0001
• Amount of heated space	-0.02377	0.0110

Table D-15
Results of Regression Model for Energy Conservation Education
And Changes in Energy Consumption

	Parameter Estimate	Level of Significance
Positive Relationship:		
• Remedial in-home educational visits	3.68905	0.0002
Negative Relationship:		
• Pre in-home educational visits	-4.72308	<0.0001

Table D-16
Results of Regression Model for Energy Conservation Education
And Changes in Energy Bill Arrearage

	Parameter Estimate	Level of Significance
Positive Relationship:		
• Remedial in-home educational visits	4.76040	0.0003
Negative Relationship:		
• Pre in-home educational visits	-5.73279	<0.0001

Best Practices:
Low-Income Rate Affordability Programs

Articulating and Applying Rating Criteria

Prepared For:

Hydro Quebec Distribution Company
Montreal, Quebec

Prepared By:

Roger D. Colton
Fisher, Sheehan & Colton
Public Finance and General Economics

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GLOSSARY

Affordable home energy burden: A home energy bill which, as a percentage of household income, can regularly be paid on a full and timely basis without substantial household hardship. An affordable home energy burden can be calculated for a household's total home energy bill or for specific fuels (e.g., electricity, natural gas). Contrast to *un*affordable home energy burden.

Arrearage forgiveness: A program or process through which a utility grants credits to retire an unpaid past-due bill owing the company.

Case management: A process through which a utility seeks to address not only the utility-related payment problems of a customer, but the holistic socio-economic conditions of the household giving rise to the payment problems.

Crisis assistance: A cash payment made to a utility on behalf of a utility customer designed to prevent a scheduled disconnection of service for nonpayment or to resolve amounts outstanding sufficiently to permit a reconnection of service after a disconnection for nonpayment.

Customer copayment: A customer payment required to be made in order to trigger a credit by a rate affordability program to be applied against a pre-existing arrears.

Direct vendor payment: A cash payment from a rate affordability program paid directly to a utility on a customer's behalf rather than being paid to the customer.

Empirical evaluation: A program evaluation based on data collected from a utility or other entity associated with the administration of a low-income rate affordability program rather than being based on generalized knowledge or on data not specific to the program or program service territory.

Empirical needs assessment: A needs assessment for a low-income rate affordability program in a specified geographic area that is based on data collected from the area served by the program rather than being based on generalized knowledge or on data not specific to the area.

External benefit program: A low-income rate affordability program under which funding is provided to a non-utility entity, whether a state agency or independent third party administrator, for the purpose of distributing benefits to a utility on behalf of a rate affordability program participant.

External source of funding: A source of funding generating a stream of revenue intended to be provided to a non-utility entity, whether a state agency or independent third party administrator, for the purpose of distributing benefits to a utility on behalf of a rate affordability program participant.

Federal Poverty Level: The dollar amounts, referred to by this phrase, published annually by the U.S. Department of Health and Human Services demarcating the income level, disaggregated by household size, which represents being "poor" in the United States. The Federal Poverty Level is sometimes referred to simply as "Poverty Level." Separate Poverty Levels are published for the 48 contiguous states (plus the District of Columbia), for Hawaii and for Alaska.

Fixed credit (fixed credit program): A utility rate affordability program under which a program participant receives a fixed dollar payment toward his or her monthly bill individually calculated to reduce the bill to an affordable home energy burden assuming the bill remains no higher than historic levels. Under a "fixed credit," the program participant is responsible for paying the difference between the fixed credit amount and the monthly bill at standard residential rates.

Fixed monthly system benefits charge: A funding mechanism imposed on utility ratepayers under which the per-customer payment is the same irrespective of consumption. A fixed monthly system benefits charge may impose a uniform charge on all customers, or may impose a uniform charge on all customers within any given customer class (with charges differing between customer classes).

Home energy affordability gap: The dollar difference between actual home energy bills and affordable home energy bills. The Home Energy Affordability Gap can be calculated on a per-household basis or can be aggregated for geographic areas (e.g., states, utility service territories). Historic calculations of Home Energy Affordability Gap data for various jurisdictions in the United States can be found on-line at: *www.HomeEnergyAffordabilityGap.com*.

Home energy burden: A household's home energy bill as a percentage of the household's gross income. Home energy burdens can be calculated for total home energy bills or for the bills associated with specific fuels (e.g., electricity, natural gas).

Levelized budget billing: A utility billing process under which customers are asked to pay a levelized monthly bill calculated by dividing the estimated annual bill by 12. Some utilities offer 11-month levelized budget billing amounts. Some, but not all, utilities subtract federal fuel assistance benefits from the annual bill before calculating the levelized budget-billing amount.

LIHEAP: The federal Low-Income Home Energy Assistance Program.

Low-income Home Energy Assistance Program: The United States federal home energy assistance program through which federal funding is provided primarily for heating and cooling assistance to be distributed through state program administrators.

Low-income rate affordability program: A program or rate directed to low-income households designed to reduce utility bills to an affordable level by supplementing bill

payments or by reducing billed revenue independent of usage. Low-income rate affordability programs are to be distinguished from programs aimed at usage reduction, household budgeting, or credit and collection alternatives not involving reduced bills.

Means-tested financial assistance program: A financial assistance program the eligibility for which is determined by a household's income and/or the ratio of the household's income to the Federal Poverty Level.

Net program donor: In a state where low-income rate affordability programs are not operated on a utility-specific basis, but rather on a statewide basis, a utility where the aggregate system benefits charge revenue paid by its customers exceeds the aggregate rate affordability assistance received by its customers.

Net program recipient: In a state where low-income rate affordability programs are not operated on a utility-specific basis, but rather on a statewide basis, a utility where the aggregate rate affordability assistance received by its customers exceeds the aggregate system benefits charge revenue paid by its customers.

Overpayment of rate affordability assistance: A payment of rate affordability assistance to an individual customer which is *more* than the amount needed to reduce the customer's home energy bill to an affordable home energy burden.

Percentage-of-income based program: A low-income rate affordability program that is explicitly designed to reduce the utility bills of program participants to a predetermined home energy burden.

Poverty Level: The Federal Poverty Level published annually by the U.S. Department of Health and Human Services (HHS).

Pre-existing arrears: The arrears of a participant in a low-income rate affordability program incurred prior to the date the participant enrolled in the program.

Preprogram arrears: See, pre-existing arrears.

Program cost offsets: In reviewing the ratemaking treatment of total expenditures on a low-income rate affordability program, a set of credits to be applied against the total gross expenditures on the program to reflect both: (1) reduced expenditures on the normal operating costs of the utility created by the program; and (2) those expenditures on the program that have already been reflected in the utility's base rates for other purposes.

Program eligibility: That set of characteristics that a customer must necessarily exhibit in order to qualify to receive low-income rate affordability assistance should an application for such assistance be made. Eligibility criteria may include income criteria (e.g., household income at or below 150% of Federal Poverty Level) or non-income criteria (e.g., household must be payment-troubled).

Program entry: The process by which an eligible household applies for and is enrolled in a low-income rate affordability program.

Program recertification: The process by which a participant in a low-income rate affordability program periodically demonstrates to the satisfaction of the program administrator that the household remains eligible to continue participating in the program.

Public benefit program: A low-income rate affordability program under which benefits are distributed to a customer through a cash payment to the customer or a cash payment to a utility on the customer's behalf to be reflected as a payment on the customer's bill. A "public benefit" program is to be contrasted to a "rate structure" program.

Rate structure program: A low-income rate affordability program under which the customer receives a reduced bill from his or her utility. The utility offering the reduced bill may be compensated for the foregone revenue either by receiving payments from an external fund or by a funding mechanism directed to the utility's own customers. A "rate structure" program is to be contrasted to a "public benefit" program.

Reconcilable rate rider: A ratemaking process by which actual expenditures on a low-income rate affordability program are collected through a rate rider independently of a utility's distribution rates. A rate rider is reconcilable when the actual expenditures in an historic period are periodically compared to the revenues generated by the rate rider in that period, with over-collections or under-collections rolled over into the calculation of the appropriate level of the rate rider to be charged in a future period.

Retail choice: A program or process through which retail electric and/or natural gas customers are given the choice of selecting the provider of their supply service.

System Benefits Charge: A mandatory charge imposed on all or some portion of a utility's customers to fund a low-income rate affordability program. A System Benefits Charge may be imposed on a volumetric or on a fixed monthly charge basis.

Tariffed discount: A bill reduction underlying a low-income rate affordability program appearing in the tariffs of a natural gas or electric utility. A tariffed discount may be either: (1) a percentage discount off bills at standard residential rates; or (2) a percentage-of-income based rate. A tariffed discount is to be contrasted to low-income rate affordability assistance received from an external party and reflected as a payment on the customer's bill.

Tiered rate discount: A program or billing process under which a participant in a low-income rate affordability program receives a bill for current usage set at a predetermined percentage of the bill at standard residential rates. A rate discount is "tiered" when the predetermined percentage discount varies based on household income or the ratio of household income to the Federal Poverty Level.

Unaffordable home energy burden: A home energy bill which, as a percentage of household income, either: (1) can not regularly be paid on a full and timely basis, or (2) can not regularly be paid on a full and timely basis without substantial household hardship.

Underpayment of rate affordability assistance: A payment of rate affordability assistance to an individual customer which is *less* than the amount needed to reduce the customer's home energy bill to an affordable home energy burden.

Volumetric system benefits charge: A funding mechanism imposed on utility ratepayers under which the per-customer payment varies based on consumption. A volumetric system benefits charge may impose a uniform volumetric charge on all customers, or may impose a uniform charge on all customers within any given customer class (with charges differing between customer classes).

Weatherization Assistance Program (WAP): The federal low-income energy efficiency program administered by the U.S. Department of Energy. For purposes here, weatherization assistance provided with funding through "oil overcharge" funds are deemed to be part of WAP.

EXECUTIVE SUMMARY

The analysis presented in this paper examines selected low-income affordability programs currently in operation around the United States as determined by the author to be best-in-class. Eight United States programs have been reviewed in addition to the low-income initiatives of Electricité de France (EDF) in France.

Necessary Program Components

Based on this analysis, we conclude that a best-in-class low-income rate affordability program has five necessary components to it. A low-income rate affordability program should:

- Reduce bills for current usage to an affordable percentage of income. The program should recognize the essential role played by home energy burdens in defining home energy affordability.

- Retire pre-existing arrears within a reasonable time period, without raising the overall monthly asked-to-pay amount to an unaffordable level.

- Protect against unexpected monthly bill volatility associated with changes in price and/or weather through facilitating or requiring entry into levelized budget billing plans.

- Promote the efficient use of energy, both through investments in usage reduction measures for the housing unit and the preservation of conservation incentives within the affordable rate structure.[1]

- Preserve funding to address crisis situations caused by the fragility of income experienced by poverty-level households.

Lessons Learned

In addition to these necessary components, the analysis below supports the following lessons learned from best-in-class programs:

- **Lesson #1:** A best-in-class rate affordability program should recognize the essential role played by home energy burdens in defining home energy affordability.

[1] Conservation incentives can be preserved through mechanisms such as offering percentage-of-income based benefits through a fixed credit on the bill or imposing bill or benefit caps.

- **Lesson #2:** A best-in-class rate affordability program addresses not simply the affordability of charges for future consumption, but the charges for pre-existing arrears as well.

- **Lesson #3:** A best-in-class rate affordability program must be reasonably open to all households in need, both in terms of the scope of eligibility and in terms of the ease of entry into (and retention in) the program.

- **Lesson #4:** A best-in-class rate affordability program targets its rate affordability assistance to eliminate or minimize the underpayment or overpayment of benefits.

- **Lesson #5:** A best-in-class rate affordability program allows a full and timely recovery of program expenditures, responsive to changes in factors affecting program expenditures in ways outside the ability of a utility to control.

- **Lesson #6:** A best-in-class rate affordability program integrates its low-income initiative into its existing rate structure within the constraints of efficient program spending.

- **Lesson #7:** A best-in-class rate affordability program represents a more cost-effective approach for dealing with issues of customer inability to pay than are traditional collection methods.

- **Lesson #8:** A best-in-class rate affordability program recognizes that low-income home energy affordability consists of more than helping a customer to pay their bill for current usage.

- **Lesson #9:** A best-in-class rate affordability program need not be explicitly authorized by the government's legislative body, so long as the local distribution utility offers the program as a mechanism to improve the effectiveness and/or efficiency of utility operations, rather than exclusively as a social benefit.

- **Lesson #10:** A best-in-class rate affordability program provides for reasonable certainty in both the level and timing of program funding through utility-based funding.

- **Lesson #11:** A best-in-class rate affordability program provides for timely cost recovery through periodic reconcilable rate riders.

- **Lesson #12:** A best-in-class rate affordability program views the program expenditures as a cost of operating as a public utility, the payment of which all ratepayers must share some responsibility.

- **<u>Lesson #13</u>:** A best-in-class rate affordability program, in its program cost recovery, accounts for the benefits generated by the program as well as the expenditures made to support the program.

PART 1. INTRODUCTION

The analysis presented in this paper examines selected low-income affordability programs currently in operation around the United States as determined by the author to be best-in-class. Eight United States programs have been reviewed, in addition to the low-income initiatives of Electricité de France (EDF).[2] The purpose of the assessment is three-fold:

- To articulate a set of standards by which to measure the design and operation of a low-income rate affordability program;
- To identify a set of design decisions and implementation practices that favorably distinguish particular programs from their low-income counterparts in other states or service territories; and
- To apply those standards, design decisions, and implementation practices to a set of programs to determine their prevalence among best-in-class programs.

The analysis will focus exclusively on rate affordability programs. Initiatives involving usage reduction programs, as well as credit and collection practices directed primarily at low-income households,[3] are set aside not because they are unimportant, but rather simply because they are beyond the scope of this review.

The analysis below examines nine programs:

- New Jersey's Universal Service Fund (USF);
- The Columbia Gas Customer Assistance Program (CAP) (Pennsylvania);
- The Equitable Gas Company Customer Assistance Program (CAP) (Pennsylvania);
- The Ohio Percentage of Income Payment Plan (PIPP);
- The Citizens Gas & Coke Utility/Vectren Energy Delivery Universal Service Program (USP) (Indiana);
- The National Fuel Gas Distribution Corporation Low-Income Rate Assistance (LIRA) program (Pennsylvania);

[2] Because the EDF "social tariff" is different in kind from the United States affordability initiatives, this analysis describes the program, but does not apply the best-in-class criteria to the French program. Such application was found to seek to compare what are fundamentally non-comparable programs.

[3] Such practices might include deferred payment plans, the waiver of late fees or other designated charges, or the use of alternatives to the disconnection of service (e.g., service limiter adapters).

- The Electric Assistance Program (EAP) (New Hampshire);
- The Electric Universal Service Program (EUSP) (Maryland); and
- The "social tariff" of Electricité de France (France).

After providing a brief description of the structure of each program and its funding, the discussion below will consider the background of each program. That background will review what events triggered the promulgation of each program and the market environment within which the program now operates. Finally, the discussion below will apply the best-in-class criteria to each program.

Before turning to a discussion of each program, however, the first section below will provide a brief overview of the criteria that will be used to determine best-in-class.

PART 2.
DEFINING THE BEST-IN-CLASS CRITERIA FOR RATING LOW-INCOME RATE AFFORDABILITY PROGRAMS

Five criteria have been applied in the review of whether the programs below constitute a set of "best in class" low-income rate affordability programs. Each individual criterion, in turn, has different components to it. The criteria include:

2.1 Criterion #1: Is the program reasonably open to all households in need?

A best-in-class program should be reasonably open to all households in need. This criterion is comprised of multiple components. To be reasonably open to all households in need, the program administrator must be able to empirically define those customers in need. While it is possible to do that in the abstract, programs that have an empirical needs assessment examining the specific territory to be served are more favorably viewed.

A program must be open to all households in need based on both the scope of eligibility and on the ease of entry into the program. The scope of eligibility should recognize the breadth of an inability-to-pay problem without imposing artificial eligibility criteria unrelated to the lack of affordability. Ease of entry refers to the actual process of enrolling in the program. Being "eligible" for an affordability program does not deliver benefits to a household if that household cannot actually participate in the program. Enrollment generally consists of applying for, and being found eligible for, the program. Ease of entry finally involves not only *becoming* a program participant, but also *remaining* a program participant over time.

2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need"?

Low-income home energy affordability consists of more than helping customers to be able to pay their bill for current usage. The unaffordability of home energy does not always manifest itself through an unpaid bill. When home energy burdens –energy burdens are the home energy bill as a percentage of household income--[4] reach a certain point, the household will *either* not be able to pay the bill on a full and timely basis *or* not be able to pay the bill without substantial household hardship. For a low-income program to represent best-in-class, the program should recognize the essential role played by home energy burdens in defining home energy affordability.

[4] A household with an annual income of $8,000 and a home energy bill of $1,600 will, in other words have a home energy burden of 20% ($1,600 / $8,000 = 0.20).

Paying the bill for current usage, however, can not be the exclusive focus of home energy affordability. Addressing the affordability of bills for current usage does not provide comprehensive assistance to a household if that household has incurred substantial pre-existing arrears because of a past inability-to-pay. The affordability of home energy consists of the *total* asked-to-pay amount, not simply the bill for current usage. If a customer cannot afford to pay a total home energy bill, it makes no difference whether the bill's unaffordability is caused by the charges for current usage or by the charges for pre-existing arrears. Not only should a program address the affordability of future consumption, but the program must address pre-existing arrears as well.

The affordability of home energy bills generally involves the size of the *annual* home energy bill. Best-in-class programs address the affordability of annual home energy bills relative to annual household income. The volatility of bills, however, in addition to the magnitude of bills, also contributes to home energy unaffordability. Volatility can occur through seasonal variations in bills. Volatility can also occur through atypical changes in weather and prices.[5] Best-in-class low-income programs help protect customers against unexpected bill volatility associated with changes in price and/or weather.

Finally, while the unaffordability of home energy is generally caused more by the lack of income than by excess energy consumption, investments in the efficient use of energy can be an important tool to use in reducing energy consumption (and thus reducing home energy burdens). Efficiency investments cannot be the exclusive tool for several reasons. At certain levels of income, nearly *any* energy consumption will impose an unaffordable home energy burden. Even reasonably low consumption can be unaffordable when such bills are combined with extremely limited household incomes to yield high home energy burdens. Moreover, low-income energy efficiency programs can reach perhaps thousands of households each year in a typical jurisdiction. In contrast, the need for home energy affordability programs typically requires addressing the home energy needs of tens (or even hundreds) of thousands of customers. Investments in energy efficiency address an important affordability need, but cannot be the exclusive affordability tool.

2.3 Criterion #3: Does the program efficiently use program funding?

Having created a low-income home energy affordability program, a best-in-class program will adopt specific program elements that promote the efficient use of program funding. An affordability program is not simply a mechanism through which to supplement the resources of a low-income household. It is instead designed to redress an excessive home energy burden.[6] As a result, a best-in-class program seeks to avoid underpaying or overpaying assistance to program participants. A program underpays if the assistance to the household is insufficient to reduce the home energy burden to an affordable level. A program overpays if the assistance to the household is more than is necessary to reduce

[5] Atypical changes in price are often associated with, or even caused by, atypical weather patterns.
[6] The excess bill over an affordable home energy burden is generally called the Home Energy Affordability Gap. For a comprehensive review of the Home Energy Affordability Gap in the United States, see generally, the materials at http:\\www.HomeEnergyAffordabilityGap.com.

the home energy burden to an affordable level. In the first case, the program is not likely to be able to achieve its affordability objectives (e.g., reducing bill nonpayment, reducing the non-energy consequences of paying unaffordable bills). In the second case, the program is devoting more resources than needed to achieving its affordability objectives.

Quite aside from matching program payments to household home energy affordability needs, an efficient use of program funding recognizes that minimum customer payments and maximum benefit payments are appropriate tools. It is not unreasonable for a program to require a program participant to make a minimum payment, so long as such payments do not substantially violate affordability provisions. While minimum monthly customer payments of $30 to $50 may be unreasonable, payments that equal fixed monthly customer charges are not. Conversely, affordability programs need not be open-ended in their payments either. Placing reasonable limits on either consumption (or bills) to be covered by an affordability payment helps prevent a program from paying for wasteful participant consumption.[7]

Finally, a home energy affordability program should not operate independently of other public and private initiatives that are designed to provide assistance to customers in need. Private utility initiatives, for example, might include levelized budget billing to help address the unaffordability issues associated with seasonal bill volatility. Public initiatives might involve partnerships with government energy assistance programs;[8] they may also involve programs designed to supplement household resources for non-energy expenses. Integrating a home energy affordability program with other public and private initiatives is a best-in-class efficient use of program funds.

2.4 Criterion #4: Does the program provide for continuous improvement?

Best-in-class home energy affordability programs engage in a process of continuous self-assessment and improvement. The first step in such an assessment and improvement is the generation of standardized periodic data reporting on program operations and outcomes. Developing standardized data reporting requires the program to identify those data elements that are needed to evaluate the efficacy of program operation. Only then, can the program put into place the processes and technology needed to ensure that this data is generated and retained in accessible form when called upon. Ad hoc data collection too frequently results in data that has either not been retained, or that has been retained in a format that cannot be reasonably accessed. In such circumstances, evaluations are based on data that is available rather than data that is appropriate to

[7] Such benefit ceilings should have an exception for consumption or bills that are outside of the ability of the participant to control.

[8] Government "energy assistance" can come through non-energy programs. In the United States, for example, the federal Food Stamp program has an income-offset for "excess shelter burdens." Shelter costs that exceed 50% of a household's income are used to reduce household income for purposes of calculating the amount of Food Stamp benefits. The "shelter costs" used include both rent/mortgage payments and all utilities (including telephone). Through this program, high energy bills relative to income may result in increased Food Stamps even if they do not result in increased energy assistance.

answering the evaluation questions. Developing and implementing standardized data reporting has implicit within it not only the data generation and capture, but also the planning processes needed to determine what data is necessary and appropriate to use in program evaluation. Standardized data collection, in other words, involves formulating appropriate questions in addition to capturing appropriate pieces of data.

The data must not only be generated, but should be periodically used to evaluate the affordability program in order to determine what, if any, improvements should be implemented. Program evaluations should be scheduled frequently enough to be meaningful, but not so frequently as to be repetitive or to fail to allow the program's outcomes and operations to manifest themselves over time.

2.5 Criterion #5: Does the program provide for reasonable cost recovery?

Best-in-class home energy affordability programs should provide for reasonable certainty in the level and timing of program funding. Given the nature of the home energy affordability problem, all customer classes should contribute to the funding of these programs. As one regulatory staff found, "the problem of the inability of some low income customers to pay their entire home energy bills is caused primarily by societal economic conditions that *are unrelated to any one rate class*. The costs for [low-income rate affordability] programs should be viewed as a cost of operating as a public utility for which all ratepayers must share the costs."

Given this cost recovery, a program should be allowed prompt program cost recovery and a reasonably certain year-to-year stream of revenue. Program expenditures that are subject to year-to-year uncertainty, in either their existence or their magnitude, impede efficient program operations. Program planning processes are interrupted, staff retention and training is impeded, and even medium-term capital expenditures (often in information technology hardware, software, or programming time) are avoided. Cost-recovery should be complete and reasonably timely as part of a best-in-class program.

Cost-recovery also should not be limited to specific utility service territories. It is unreasonable to expect that needs and resources will be equal between service territories. Statewide funding of programs, allowing for a distribution of funds based on need, allow for a greater certainty that funding will be adequate. Indeed, utility service territories with the greatest number of low-income customers, and thus the highest level of need, may be least able to be self-supporting in their offer of rate affordability funding. Funding not tied to specific utility service territories further ensures that program benefits to individual households will be similar, rather than being dependent on the fortuity of where a customer lives.

Finally, cost-recovery should recognize that program expenditures generate cost offsets as well as cost expenditures. To the extent that a home energy affordability program helps reduce payment troubles, a participating utility should realize savings in credit and collection costs and reduced write-offs. To the extent that a home energy affordability

program reduces participant arrears, a participating utility will realize reductions in the working capital associated with carrying those arrears. Not all cost-offsets involve cost reductions. Some offsets simply account for program costs that are already incorporated into a utility's cost-of-service and which, accordingly, can not be separately attributed to the low-income rate affordability program.[9] A best-in-class affordability program should account for the cost offsets generated by the program as well as the expenditures made to support the program.

2.6 Summary

Best-in-class home energy affordability programs can be demarcated by five general criteria. These criteria define the design of the program, the availability of the program, the operation of the program, and the funding of the program. The criteria, all of which have implementing metrics, include:

- Whether the program is reasonably open to all in need;
- Whether the program recognizes and incorporates the multi-faceted nature of "need";
- Whether the program efficiently uses program funds;
- Whether the program provides for continuous improvement; and
- Whether the program provides for reasonable funding.

The table below provides a more detailed assessment of what is involved with each of these best-in-class criteria.

[9] Perhaps the best example of this involves labor costs devoted to the rate affordability program which, in the absence of the program, would otherwise be associated with other utility customer service activities.

Best-in-Class Criteria for Low-Income Rate Affordability Programs

1 Reasonably open to all in need

a. Considers empirical needs assessment.

b. Provides appropriate scope of eligibility.

c. Allows ease of program entry.

d. Allows open enrollment.

e. Provides ease of recertification.

2 Recognizes and incorporates multi-faceted nature of "need."

a. Addresses affordability of bills for current usage.

b. Addresses resolution of pre-program arrears.

c. Targets assistance to high usage/high benefit participants.

d. Allocates risk of bill volatility based on weather and/or prices.

3 Efficiently uses program funds.

a. Matches payments to needs.

b. Imposes maximum benefit/minimum payment.

c. Integrates with other utility payment processes (e.g., budget billing).

d. Integrates financially with other energy assistance programs.

e. Incorporates conservation incentives.

4 Provides mechanism for continuous improvement.

a. Provides for periodic outcome evaluation relative to objectives.

b. Provides for standardized data reporting.

5 Provides for reasonable cost recovery.

a. Spreads costs over appropriate customer base.

b. Ensures timely and reasonably certain recovery of program costs.

c. Accounts for cost offsets generated by program.

d. Recovers program costs independently of utility service territory limits.

PART 3.
ASSESSING NINE LOW-INCOME RATE AFFORDABILITY PROGRAMS

In this chapter, the criteria that demarcate best-in-class home energy affordability programs are applied to a series of existing low-income programs across the United States to determine the prevalence of best-in-class practices. In addition, because of the unique relationship which Quebec maintains with France, the low-income initiatives of Electricité de France (EDF), the major French distribution electric utility, are considered as well.

The programs below have been selected to represent a range of best-in-class practices. Not all programs have every best-in-class practice. Indeed, the programs have been selected to provide a range of practices. Conversely, not all programs that exhibit best-in-class practices are included. Appendix A provides information on the applicability of best-in-class criteria to each program. Appendix B rates each program relative to each best-in-class criterion.

3.1 Program #1: The New Jersey Universal Service Fund (USF)

The New Jersey Universal Service Fund (USF) is a creature of statute. In directing the state to move to electric retail choice, the New Jersey legislature also provided that "there is established in the Board of Public Utilities a non-lapsing fund to be known as the Universal Service Fund." The legislation provided that the Board of Public Utilities, the state utility regulatory commission, was to determine, amongst other things:

- The level of funding and appropriate administration of the USF;
- The "purposes and programs" to be funded with monies from the fund;
- Which "social programs" should be provided by an electric utility "as part of the provision of its regulated services";
- How to integrate the other public funds available for low-income energy assistance with the USF.

The New Jersey commission established the Universal Service Fund through a proceeding devoted exclusively to this issue. With the legislation enacted in 1999, the New Jersey commission adopted an "interim" rate affordability program in 2001 and a permanent program in 2003.

3.1.1 An Outline of the Program

In the first "full" year of the permanent program, the New Jersey USF enrolled roughly 133,000 accounts (or about 100,000 households, since some households have separate natural gas and electric accounts). Roughly 22,000 of the initial households were paying more than 20% of their pre-tax income on energy bills, even after federal and state energy assistance was applied against their bills. Another roughly 35,000 families were paying between 15% and 20% of their pre-tax income on energy. According to the Commission, "without USF, it would be very difficult for any of these customers to consistently pay their energy bills."

3.1.1.1 Program Description

The purpose of the USF, the commission said, was to "ensure that low-income customers have access to affordable energy." The commission determined that the program design should:

- Operate on a statewide basis;
- Be available to households with income at or below 175% of the Federal Poverty Level; and
- By available to customers "with automatic screening for eligibility from means-tested financial assistance programs."

The New Jersey commission included an arrearage program under which USF participants with arrears greater than $60 could participate. Under the arrearage program, if a program participant pays his/her monthly utility bill for a 12-month period, then all of his/her remaining arrears will be forgiven at the end of the 12 months. The program does not require a customer to make 12 consecutive on-time payments. Instead, customers will be evaluated at the end of the 12-month period to see if they have made the required payments. Customers that do not receive forgiveness after the 12-month period will have a 3-month grace period to make-up the payments.

3.1.1.2 Relationship to Utility Rate Structure

The basic affordability benefits provided through the New Jersey USF are delivered through a percentage-of-income-based "fixed credit" program. The fixed credit provided through the New Jersey USF was designed to reduce participant natural gas and electric bills to an affordable percentage of income, deemed to be 6%. For customers taking natural gas and electric service from different utilities, no more than 3% of income would be devoted to each service respectively. In contrast, in 2006, the electric burden for households with statewide average incomes in New Jersey was 1.8%; the natural gas burden for New Jersey residents with average incomes was 1.2%.

The New Jersey USF is a blended rate structure/public benefit program. The blended nature of the program appears most clearly in the delivery of benefits. On the one hand, The affordability benefits provided by New Jersey's USF do not appear as payments from an external third party. Rather, they are bill credits provided by the utility. In addition, each customer's benefit is individually determined based on the actual bills that the customer is expected to pay to the utility. In this respect, the USF has attributes of a rate structure program.

The dollars provided in the form fixed credits, however, are not simply collected from each utility's own ratepayers. Rather, the statewide USF compensates each utility for the affordability benefits credited against bills. Depending on the amount of credits provided as affordability assistance, a utility can be either a net donor or a net recipient from the statewide Fund. Through this process, it is the utility that receives money from the statewide Fund, not the client. Moreover, each utility's contributions to the USF fund are tied to statewide funding needs, not to the specific needs of the utility's own customers. In this sense, the program adopts characteristics of an external benefit program. As can be seen, the USF has characteristics of both a rate structure program and an external benefit program.

3.1.1.3 Program Funding

The New Jersey commission approved the collection of universal service costs through a system benefits charge (SBC). This SBC is structured as a uniform volumetric charge imposed on the electric and natural gas bills of all customers. Since the SBC is set prospectively each year, *actual* program expenditures may be greater than or less than the program revenues generated by the SBC. Should this occur, the difference between actual SBC costs and SBC recoveries is subject to deferral. The SBC is then reset annually to amortize the over- or under-recovered balances in addition to providing for current program cost recovery in the immediately ensuing year.

Finally, the commission decided that it would "segregate the USF revenues and benefits for gas and electric customers such that the total USF recoveries from gas customers will be used to provide payment assistance to gas customers and the total revenue recoveries from electric customers will be used to provide payment assistance to electric customers." This matching of revenues and benefits, however, does not occur on a utility-by-utility basis. Some companies may be net donors while other utilities may be net recipients.

3.1.1.4 Program Background

The New Jersey legislature enacted the USF when it approved the state's move to retail choice for the electric industry. The state-funded Division of Ratepayer Advocate (DRA) had long-advocated for a low-income rate affordability program. The DRA urged the state's utility commission to incorporate a low-income program into each retail choice plan filed with the commission pursuant to the 1999 statute. Rather than implementing a rate affordability program on a utility-specific basis, the commission initiated a single

proceeding through which to establish a uniform statewide program. Since 1999, a competitive retail market has not developed for residential customers in New Jersey.

3.1.2 Application of Best Practices Criteria

The New Jersey USF is one of the best designed and implemented utility rate affordability programs in the United States. The program is rated "exceptional" in ten of the 20 best-in-class criteria.

3.1.2.1 Criterion #1: Is the program reasonably open to all households in need.

The New Jersey program is reasonably open to all households in need. The program defines income eligibility at 175% of the Federal Poverty Level.[10] The program commits to serving all customers in need with no ceiling on participation rates. To the extent that participation increases, program funding will be expanded to meet that need.

The New Jersey USF leads the nation in its ease of program entry. Program enrollment may occur year-round. Households enrolling in the federal fuel assistance program (called the Low-Income Home Energy Assistance Program, LIHEAP) are automatically enrolled in the USF as well. While program participants must recertify their income annually, they may do so either in-person through local community-based organizations or by mail through the state USF administrator.

3.1.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The New Jersey program recognizes the multiple facets of energy affordability "need." The program defines an affordable home energy bill as one that does not exceed 6% of household income for both natural gas and electricity (or for all electric homes). In those circumstances where customers use natural gas for heating, the affordable home energy burden is allocated equally between natural gas (3%) and electricity (3%).

The USF provides the opportunity for program participants to earn the forgiveness of preprogram arrears over a reasonable time period. The program provides a reasonable opportunity for participants to "cure" missed payments in order to earn their forgiveness.

One potential problem with the New Jersey USF is that it does not yet allocate federal fuel assistance benefits over multiple months. Instead, federal fuel assistance is applied against a customer account in a lump sum, thus creating bill credits on participant bills in

[10] The generally accepted measure of "being poor" in the United States today indexes a household's income to the "Federal Poverty Level" published each year by the U.S. Department of Health and Human Services (HHS). The Poverty Level looks at income in relation to household size. This measure recognizes that a three-person household with an annual income of $6,000 is, in fact, "poorer" than a two-person household with an annual income of $6,000. The federal government establishes a uniform "Poverty Level" for the 48 contiguous states. A household's "level of Poverty" refers to the ratio of that household's income to the Federal Poverty Level. For example, the year 2005 Poverty Level for a two-person household was $12,830. A two-person household with an income of $6,415 would thus be living at 50% of Poverty.

the early months of each year of program participation. The result of these bill credits is that program participants frequently skip bill payments in months where they receive a credit on their bill. Without these regular monthly payments, subsequent high winter bills sometimes prove to be unaffordable in the month received.[11] If customer payments had been made each month, if fuel assistance had been allocated across multiple months, or if bills had been rendered on an equal monthly budget billing basis, these months of unaffordable bills might have been avoided.

3.1.2.3 Criterion #3: Does the program efficiently use program funding?

The New Jersey USF efficiently uses program funding. The individual calculation of home energy burdens ensures that program funds do not underpay or overpay benefits relative to need. While no minimum customer payment has been established, the program does establish a maximum benefit amount.[12]

The USF integration with the federal fuel assistance program provides substantial program efficiencies. Affordable energy burdens are determined after subtracting federal fuel assistance dollars to avoid the overpayment of benefits.[13] The automatic enrollment of program participants through the federal fuel assistance program also provides an efficiency of operation.

The program finally provides significant conservation incentives. USF benefits are distributed as a fixed-credit on the bills of program participants. To the extent that program participants can reduce their bills through energy efficiency efforts, the participants are allowed to retain the bill savings, thus creating a conservation incentive. The "down" side of this approach is that by making the level of the credit fixed, any fluctuation in bills yields a fluctuation in customer payment responsibility. Under this approach, it is the customers that bear the complete risk of bill volatility attributable to extreme weather or price fluctuations. If winter heating bills increase because of extreme cold, for example, program participants must pay the increase.

3.1.2.4 Criterion #4: Does the program provide for continuous improvement?

The USF provides for a reasonable, though not exceptional, process of continuous improvement. Program objectives have been articulated by statute and commission decision. Based on those stated objectives, the New Jersey utility regulatory commission requires regulated state utilities to provide limited standardized data reporting on program outcomes. While the commission has contracted for a program evaluation –this evaluation was completed in 2007—a regular evaluation of the USF, at prescribed time intervals, has not been incorporated into the program design.

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[11] Monthly bills, in other words, can be unaffordable even if the annual home energy bill is not.

[12] Whether the ceiling on benefits is *appropriately* set is not considered at this juncture.

[13] For example, if a household's income is $10,000, a home energy bill of $2,000 would result in a home energy burden of 20%. If the household receives $500 in federal fuel assistance, however, the home energy burden is considered to be only 15% (($2,000 - $500) / $10,000 = 0.15).

3.1.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

New Jersey provides for stable, adequate funding of its USF program. Program budgets are estimated on an annual basis, with a proceeding before the state utility regulatory commission to determine the volumetric charge needed to generate those program dollars. Cost recovery is obtained from all customer classes, both to recognize the benefits provided to the utility as a whole along with its various customer classes, and to recognize the societal commitment to support universal service for essential home energy needs. The New Jersey USF, however, does not account for the cost savings generated by the program. To this extent, participating utilities receive windfall benefits on an inter-rate-case basis.[14]

3.2 Program #2: The Columbia Gas Customer Assistance Program (CAP) (Pennsylvania)

The Columbia Gas Company (Pennsylvania) Customer Assistance Program (CAP) is one of the oldest low-income rate affordability programs in Pennsylvania. Begun as a pilot program in 1990, the program was seen by the Pennsylvania utility regulatory commission as a way "to address realistically these customers' problems and to stop repeating a wasteful cycle of consecutive, unrealistic payment agreements that cannot be kept, despite the best of intentions, followed by service termination, then restoration, and then more unrealistic agreements. . ."

3.2.1 An Outline of the Program

The Columbia Gas CAP is one of the biggest natural gas home energy affordability programs in the state of Pennsylvania.[15] As of December 31, 2006, Columbia Gas served more than 24,000 low-income customers, roughly 40% of its confirmed low-income eligible population.[16] In 2006, Columbia Gas provided bill credits averaging $965 to participating customers. Customers with preprogram arrears received an additional $72 in arrearage credits each year.

3.2.1.1 Program Description

The Columbia Gas CAP is a percentage of income-based program. Bill credits are provided to CAP participants so as to reduce annual natural gas bills to an affordable percentage of income. In fact, Columbia Gas offers three primary payment options to participating customers. Customers may pay the lowest of a bill based on a percentage of income payment (either 7% or 9% depending on income) or a flat rate of 50% of their

[14] At the time of a base rate case, the determination of revenue requirement will capture any cost reductions generated by a universal service program and pass those cost reductions on to ratepayers on a going forward basis through a reduced revenue deficiency.

[15] Two natural gas utilities serving the Philadelphia metropolitan area have more participants, PECO and the Philadelphia Gas Works.

[16] The participation rate would be much lower if the rate reflected the estimated number of eligible customers rather than the number of confirmed low-income customers.

budget billing amount.[17] In contrast, in 2006, the electric burden for Pennsylvania households with statewide average income was 2.0%. The natural gas burden for households with statewide average income was 1.5%.

In every case, a customer must pay at least the average of the bill payment made in the year before entering the program. The program is available to payment-troubled heating customers in the Columbia Gas service territory.

Columbia Gas provides for the forgiveness of preprogram arrears over a maximum of a six year period. Customers are required to make a $5 monthly copayment and to maintain complete and timely payments in order to earn their arrearage forgiveness credits.

3.2.1.2 Relationship to Utility Rate Structure

The Columbia Gas CAP is an integral part of the company's rate structure for low-income customers. The program is operated under guidelines promulgated by the Pennsylvania utility regulatory commission. Bills are reduced; the asked-to-pay amounts are lower. The program does not simply provide a standard bill with external assistance payments credited against the bill.

In mandating low-income programs, the Pennsylvania commission found that "an appropriately designed and well-implemented CAP, as an integrated part of a company's rate structure, is in the public interest." The Commission stated that its "guidelines prescribe a model CAP that is designed to be a more cost-effective approach for dealing with issues of customer inability to pay than are traditional collection methods."

3.2.1.3 Program Funding

The Pennsylvania legislature included in its statute providing for the move of Pennsylvania to retail choice a requirement that the utility regulatory commission "ensure that universal service and energy conservation policies, activities and services are appropriately funded and available in each electric distribution territory." Moreover, the statute defined the low-income programs operated by the state's electric utilities (known as Customer Assistance Programs, or "CAPs") as a component of universal service. Similar language was also subsequently included in the natural gas retail choice statute.

While the statute provided that each CAP be "appropriately funded" and "available" in each utility service territory, the statute further mandated that sponsoring utilities would be allowed to "fully recover" their universal service costs, including CAP costs. The Commission has since held that this statutory language allows each utility to recover its CAP costs through a reconcilable rate rider should it choose to do so.

[17] A "Senior CAP" provides that seniors (over age 60) with no history of bill payment troubles may pay 75% of the budget amount.

3.2.1.4 Program Background

The Pennsylvania Office of Consumer Advocate (OCA) proposed that Columbia Gas Company adopt an "Energy Assurance Program" (EAP) as part of Columbia's 1990 rate case. According to the OCA, the issue was one of collection efficiency. "The issue in this proceeding," OCA said, "is not to devise a social response to the broad inability to pay problems of low-income households. The issue is one of what is the most cost-effective means of collection. It is the same issue as whether a utility should pursue new central station capacity, cogeneration or conservation. . .The requirement that utilities provide least-cost service should govern utility collection activities too." The OCA continued: "the issue is this: how can Columbia Gas most effectively and least expensively collect as much as possible from households [that] cannot afford to pay?"

Columbia Gas did not completely oppose the OCA's proposal given its experience with the Ohio Percentage of Income Payment Plan (PIPP). "Columbia reiterated its policy position that it is not philosophically opposed to percentage of income payment plans, provided that the plan fully recognizes the costs of such a program and provides for the timely and full recovery of such costs."

The Pennsylvania utility regulatory commission ordered the company to implement a 1,000 participant pilot project. The Company expanded its program after the Pennsylvania legislature mandated continuation of such programs as part of the move to retail choice. After filing its initial comprehensive universal service plan in 1999, and obtaining temporary funding for that plan, the company received a permanent funding stream in 2003 through its distribution charge. The funding is adjusted on a quarterly basis as part of the quarterly gas cost adjustment proceeding.

The Columbia Gas CAP operates in a retail choice environment. Indeed, Columbia Gas sought to aggregate the participants in its CAP in Pennsylvania. Columbia Gas began its aggregation program in 1997. The CAP customers were grouped together for the purpose of obtaining lower cost gas from a marketer/supplier. Columbia served as the appointed purchasing agent for CAP customers. The aggregation program, however, no longer generates savings from CAP participants. Columbia Gas reported in 2004 that no marketer was participating in its CAP aggregation, a situation that continues through today. Marketers could not procure gas at prices below that which Columbia Gas could for its residential ratepayers generally.

3.2.2 Application of Best Practices Criteria

The Columbia Gas CAP is one of Pennsylvania's best-designed, and most mature, low-income rate affordability programs. The program is rated "exceptional" in nine of the 20 best-in-class criteria.

3.2.2.1 Criterion #1: Is the program reasonably open to all households in need.

The Columbia Gas CAP is reasonably open to all households in need. Columbia Gas defines income eligibility as 150% of the Federal Poverty Level. The Company limits its program participation to payment-troubled customers. Payment-troubled refers to any customer that has failed a payment plan within the prior 12 months or has been identified as payment-troubled through cross-referral or credit scoring. Any customer that self-declares himself or herself as a payment-troubled customer in a contact with the company's call center is referred to dedicated universal service staff to determine the customer's eligibility for CAP. CAP enrollment is open year-round. The company places no ceiling on CAP enrollment.

Columbia Gas requires customers to recertify their program eligibility annually. However, customers participating in the federal fuel assistance program or in some other Columbia Gas universal service program are exempted from recertification. In addition, elderly and disabled program participants are allowed biannual recertification.

3.2.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The Columbia Gas CAP provides exceptional rate affordability assistance. The program limits customer bill payments for current usage to the *lesser* of either 7% or 9% of income (based on Poverty Level) or a designated percentage of the customer's budget bill for current usage. A customer, however, must pay at least the average of what he or she has paid in the past twelve months immediately preceding program enrollment (for customers on the Columbia Gas system for at least six months).

The company provides arrearage forgiveness for customers who maintain current bill payments and make a $5 copayment toward their preprogram arrears. One weakness in the Columbia Gas program, however, is its requirement that preprogram arrearage forgiveness be spread over a six year period, longer than that which is reasonable.

High usage customers are given priority for treatment by the company's low-income usage reduction program. Customers are enrolled in all available weatherization programs at the same time they are enrolled in the CAP.

3.2.2.3 Criterion #3: Does the program efficiently use program funding?

Columbia Gas appropriately matches benefit payments to customer needs. Individual determinations are made of the most affordable bill payment option available to the customer, so long as the customer pays at least as much as he or she paid in the year prior to entering the program. While matching benefit payments to customer-specific needs, the company does impose both minimum customer payment requirements ($25) and benefit ceilings.

The Columbia Gas CAP is not integrated administratively with the federal fuel assistance program. No automatic referral or enrollment exists between the fuel assistance program and CAP. Program participants are required to apply for federal fuel assistance, however, with fuel assistance dollars being used to reduce the shortfall between the customer's affordable payment and the bill for current usage at standard residential rates.

The company seeks to integrate its CAP with other aspects of its residential customer service operations. Customers who self-declare themselves as payment-troubled are automatically referred to a dedicated, specially-trained universal service staff to determine eligibility for the CAP. The company waives deposits for its CAP participants. It does not, however, require mandatory levelized budget billing.

3.2.2.4 Criterion #4: Does the program provide for continuous improvement?

Columbia Gas complies with state-imposed requirements for standardized data reporting to the Pennsylvania state utility regulatory commission. That commission further provides, by regulation, for periodic program evaluations performed by an independent third party. In addition to these mandatory program evaluations, Columbia Gas performs independent empirical evaluations of particular program operations in support of decisionmaking regarding proposed program modifications. In 2003, for example, Columbia Gas undertook a study of why customers did not complete the enrollment process to enter CAP. In 2005, the company undertook a study of the barriers to program recertification and why customers failed to remain on CAP.

3.2.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

The Columbia Gas CAP provides for reasonable certainty in funding and a timely cost recovery for the company. The company's cost recovery mechanism is adjusted quarterly to take into account program participation rates and the amount of bill credits provided. Over- and under-collections are rolled forward into the next quarter's cost recovery mechanism. One weakness in the Columbia Gas program involves the decision to recover CAP costs only from the residential customer class. In addition, Columbia Gas does not take cost offsets into account in establishing its cost recovery.

3.3 Program #3: The Equitable Gas Company Customer Assistance Program (CAP) (Pennsylvania)

The Equitable Gas Company Customer Assistance Program (CAP)[18] is a utility-funded rate affordability program based on energy burdens. First adopted as a pilot program in 1990, according to the company, the program was:

[18] Prior to 2007, the Equitable Gas CAP had been referred to as the Energy Assistance Program (EAP). The company decided to change the name to CAP, both to standardize it with similar rate affordability programs offered by other Pennsylvania utilities and to avoid customer confusion with the federal fuel assistance program (LIHEAP).

> Needed to (1) remove these customers from the discouraging and expensive collection cycle, (2) motivate them to increase conservation, (3) increase their annual participation in available funding assistance programs, and (4) encourage consistent bill-payment efforts.

The Equitable program is available to customers with income at or below 150% of the Federal Poverty Level.

3.3.1 An Outline of the Program

The Equitable Gas CAP is an explicit percentage of income program, with customer payments tied directly to an affordable percentage of income. It is a utility rate program, with revenues foregone from the utility discount collected from the company's own ratepayers as part of the rate structure. By 2007, the Equitable Gas program was projected to serve more than 22,000 low-income customers.

3.3.1.1 Program Description

The Equitable Gas CAP is an explicit percentage of income program. The program ties its affordable percentages to three levels of the Federal Poverty Level. Affordable home energy burdens range from 7% (0 – 50% of Poverty Level), to 8% (51 – 100% of Poverty Level), to 10% (101 – 150% of Poverty Level). In contrast, in 2006, the electric burden for Pennsylvania households with statewide average income was 2.0%. The natural gas burden for households with statewide average income was 1.5%.

The affordability provisions of the Equitable Gas CAP differ from most percentage of income programs. Under the Equitable Gas program, a customer must make his or her affordable monthly payment in order to earn a credit equal to the difference between the affordable bill and the bill for that month's consumption at standard residential rates. If a customer does not make a complete and timely payment, he or she forfeits the affordability credit. A missed monthly payment cannot be "cured" such that the credit can be earned after-the-fact.

Equitable Gas offers arrearage forgiveness as part of its CAP program as well. The Equitable Gas arrearage forgiveness is based on matching credits. The first five dollars ($5) of each customer payment is deemed to be a payment toward arrears. For each arrearage payment made in a timely fashion, the company matches the customer payment with an arrearage credit of $15 (a match of $3 credit for each $1 of customer payment). If a customer payment is not made, or not timely paid, no matching credit is provided.

3.3.1.2 Relationship to Utility Rate Structure

The Equitable Gas CAP is an integrated part of the company's rate structure. The company provides discounts to its low-income customers. In approving the Equitable Gas initiative in 1990, the Pennsylvania state regulatory commission noted that "we are aware that this Commission's main function in ratemaking is to assure that every rate

made, demanded, or received by any public utility shall be just and reasonable." The commission said that "the relevant question. . .is whether or not the funding of Equitable's proposed [energy affordability] program results in the 'unreasonable' rate discrimination prohibited by the Public Utility Code." In holding that it did not, the Pennsylvania commission held that "a mere difference in rates does not violate" Pennsylvania statutes. The commission then found, on a number of bases, that "the record in this proceeding clearly demonstrates that any 'preference' that EAP would yield to program participants is reasonable, and further, the creation of EAP is in the best interest of all Equitable ratepayers, not just program participants."

3.3.1.3 Program Funding

As with funding for other low-income affordability programs offered by Pennsylvania utilities, funding of the Equitable Gas CAP is provided through the company's ratepayers. The natural gas utility collects its non-administrative costs through a reconcilable rate rider imposed only on residential customers. The rider is reconciled on an annual basis based on the actual number of CAP participants and the actual credits provided to those participants. Those credits may vary based on weather, prices, the mix of program participants between income tiers –a higher mix of lower income customers would result in lower percentage of income payments and thus higher amounts of affordability credits—and the number of program participants actually earning their credits by making full and timely payments.

3.3.1.4 Program Background

As with the National Fuel Gas and Columbia Gas affordability programs discussed elsewhere, the Equitable Gas Company CAP was offered to the Pennsylvania utility regulatory commission as a cost-effective way for the company to respond to low-income nonpayment. The Pennsylvania legislature, in adopting its natural gas retail choice statute, provided that universal service programs offered by natural gas utilities were to be continued in a retail choice environment. Universal service programs, defined to include each company's CAP, were to be appropriately funded and "available" in each company's service territory.

Retail choice has not developed a competitive residential natural gas market in Pennsylvania. Spiraling natural gas prices since 2005, however, have dramatically increased the need for the affordability programs such as that offered by Equitable Gas.

3.3.2 Application of Best Practices Criteria

The Equitable Gas CAP is one of Pennsylvania's best-designed low-income rate affordability programs. The program is rated "exceptional" in eleven (11) of the 20 best-in-class criteria.

3.3.2.1 Criterion #1: Is the program reasonably open to all households in need.

The Equitable Gas CAP program is reasonably open to all households in need. Income eligibility is set at 150% of the Federal Poverty Level. In addition to being income-eligible, customers must also be payment-troubled, as is the case with other Pennsylvania low-income rate affordability programs. The company prepares a periodic needs assessment that empirically determines the number of estimated low-income customers in its service territory and reports the number of "confirmed" low-income customers (along with the proportion of those confirmed low-income customers that are payment-troubled).

The company has committed to serving all customers in need. Program enrollment is open year-round. There is no ceiling on program participation.

The company makes exceptional efforts to ease program entry. Payment-troubled customers may enter the Equitable Gas CAP through either customer service representatives at the company or through designated community-based organizations. Rather than requiring substantial income documentation, however, Equitable Gas accepts self-certification of income. The company then randomly audits 10% of its CAP participant base each year to determine whether the self-certification process results in significant eligibility errors. To date, it has not.

In addition to easing entry into the program, Equitable Gas seeks to facilitate customers remaining in the program as well. Equitable Gas requires recertification once every three years to remain in the program. Recipients of federal fuel assistance, however, are automatically re-enrolled. Moreover, the company engages in a data exchange with electric companies serving a coterminous service area and automatically re-enrolls program participants who are also participating in the corresponding electric company CAP.

3.3.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The Equitable Gas CAP recognizes the multiple facets of energy affordability need. The company provides a three-tier home energy burden by which to measure energy affordability for bills for current usage. The energy burdens deemed to be affordable range from 7% for households at 0 – 50% of the Federal Poverty Level, to 8% for households with income between 51% and 100%, to 10% for households with income at 100% to 150% of Poverty. Given the income-based asked-to-pay amount, the risk of bill volatility attributable to prices or extreme weather rests with the program and not with the low-income program participant.

In addition to the program component directed to current bills, Equitable Gas incorporates arrearage forgiveness into its CAP. The company deems the first $5 of each customer payment to be a payment toward preprogram arrears. For each such payment made, Equitable provides a matching $15 arrearage credit (a matching grant of 3-for1).

Equitable Gas finally recognizes the need for energy efficiency investments as a way to address low-income affordability problems. High usage program participants are not only referred to the company's usage-reduction program, but are also given priority for the receipt of usage reduction services. Bill reductions achieved through usage reduction not only protect program participants against bill volatility and high bill burdens (in the absence of the CAP), but also protect the CAP against bill volatility and high program expenditures so long as the customer remains on CAP.

3.3.2.3 Criterion #3: Does the program efficiently use program funding?

The Equitable Gas CAP has implemented a variety of program measures that promote the efficient use of program funds. Bill assistance benefits are individually determined on a household-specific basis. Payments are, as a result, neither too little nor too much, to reduce the household's bill for current usage to an affordable burden. Despite this individual affordability determination, the company requires program participants to take some minimum bill payment responsibility by making at least a minimum payment each month. The company also imposes a benefit cap on program benefits to ensure that the program does not pay for wasteful usage. Exceptions to the benefit cap can be granted to the extent that current usage is beyond the ability of the program participant to control.

Unlike most bill affordability programs, the Equitable Gas CAP requires program participants to make their monthly bill payment on a complete and timely basis in order to earn their monthly bill credit. If payments are *not* made, the bill credit for current usage is charged back to the customer account. Moreover, a customer does not earn a matching arrearage credit unless the current bill has been paid in a full and timely fashion. Past missed payments must be resolved before future bills credits may be earned. Customers are required to participate in the company's levelized budget billing plan to participate in the CAP.

3.3.2.4 Criterion #4: Does the program provide for continuous improvement?

Equitable Gas complies with data reporting and evaluation requirements imposed by the Pennsylvania utility regulatory commission. Standardized data reporting on program operations and outcomes are provided on a monthly basis.[19] Regular periodic evaluations are prepared by an independent third party evaluator and submitted to both the company and the regulatory commission. The evaluation considers uniform evaluation questions prescribed by the commission for all Pennsylvania utilities and offers program design and operations recommendations based on the empirical analysis. A new "universal service" plan is submitted to the commission on a triennial basis and considered for implementation after opportunity for hearing.

[19] The actual submission of data may be done less frequently than monthly. Each submission, however, is of monthly data.

3.3.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

Equitable Gas has reasonable certainty in its budgeting and cost recovery process. The company recovers its CAP costs through a rate rider that is reconciled on an annual basis. Reconciliation of actual against budgeted expenditures may find differences based on the number of program participants, the price of natural gas, the mix of participants by income, and other relevant factors.

The Equitable Gas cost recovery is problematic in that it assigns cost recovery only to the residential class. Cost recovery also does not account for cost savings to the company (e.g., reductions in working capital, bad debt, credit and collection expenditures) generated by the operation of the program.

3.4 Program #4: The Ohio Percentage of Income Payment Plan (PIPP)

The Ohio Percentage of Income Payment Plan (PIPP) is a creation of the Ohio state utility regulatory commission. The Ohio PIPP is an affordability program designed to limit low-income home energy bills to an affordable home energy burden. First approved in 1983, the Ohio PIPP had grown to serve nearly 210,000 households in 2006.

3.4.1 An Outline of the Program

The Ohio Percentage of Income Payment Plan (PIPP) is an explicit percentage of income program. Customer bills are tied directly to a percentage of income deemed to be affordable by the state.

3.4.1.1 Program Description

Under the Ohio PIPP, customer bills are limited to a prescribed percentage of income. For customers taking service from two separate utilities, the customer is required to pay 10% of his or her income toward his or her primary heating source (generally natural gas), with 5% of income being paid to the electric company. Customers with income at or below 50% of the Federal Poverty Level are required to pay only 3% of income for non-heating electric service. In contrast, in 2006, the electric burden for Ohio households with the statewide average income was 2.0%; the natural gas burden for households at the statewide average income was also 2.0%.

The Ohio PIPP also offers arrearage forgiveness to low-income customers. The most common *electric* arrearage forgiveness program involves the Ohio PIPP's "graduate" program. Under this program, in the first year after a customer leaves PIPP, the customer's bills are still limited to the percentage of income payment. In the second year, the customer's bills are set equal to the residential bill at standard residential rates. In the third year, and years thereafter, a customer is required to make a monthly arrears payment of an amount not to exceed $20. The utility matches these payments on a dollar-for-dollar basis.

Ohio's natural gas utilities offer a somewhat more generous arrearage forgiveness program. Preprogram arrears are forgiven over a three-year period in the Ohio natural gas PIPP. In order to gain arrearage forgiveness, a PIPP participant must make his or her payments on a full and timely basis. When such payments are made, one-third (33%) of the preprogram arrears are forgiven at the end of the first year of participation, one-half (50%) of the arrears are forgiven at the end of the second year, and the remaining 17% of arrears is forgiven at the end of the third year.

3.4.1.2 Relationship to Utility Rate Structure

The Ohio PIPP is part of the rate structure of each natural gas and electric utility. The revenue shortfall between bills at standard residential rates and the percentage of income payment requirement are tracked individually by each utility and recovered from that utility's ratepayers through either a rate rider or a system benefits charge.

Despite these linkages to the utility rate structure, the Ohio PIPP is not *completely* a rate structure program. The program administrator pays the bills of program participants. Customer payments, federal fuel assistance dollars, and monies generated by supportive rate riders and system benefits charges are aggregated by the administrator as the pool from which to generate payments. To the extent that the Ohio PIPP does not simply reflect a discount off of the asked-to-pay amount of program participants, it can be viewed as an external program rather than as a low-income component to the rate structure.

3.4.1.3 Program Funding

Under Ohio's statutory framework, the universal service fund is to include revenues from a variety of sources, dedicated exclusively to the statutorily-created universal service fund. The statute provides that Ohio's electric universal service programs are to be funded through a "universal service rider." In addition to the revenues generated by this rider, the fund is to include all revenues previously collected through previously-established riders approved by the state utility regulatory commission, revenues from federal energy assistance programs, and general fund appropriations. The rider, which is placed under the jurisdiction of the utility regulatory commission, is to be sufficient to "provide adequate funding for these programs." The programs to be funded include rate assistance through PIPP, weatherization, and consumer education.

The Ohio universal service rate rider is applied to all "retail electric distribution service rates," so long as the regulation commission action in setting or adjusting the rider does not "shift among the customer classes of electric distribution utilities the costs of funding low-income customer assistance programs."

Natural gas cost recovery is somewhat different. Cost recovery for the difference between low-income percentage of income payments and low-income bills at standard residential rates revenue is through a PIPP Rider which is embedded in distribution rates.

Utilities file to increase or decrease the rider based on their judgment regarding the need to adjust revenues to cover the shortfall in customer payments.

3.4.1.4 Program Background

The Public Utility Commission of Ohio (PUCO) created the Ohio PIPP in 1983 in response to an emergency arising from the inability of low-income Ohio residents to maintain their home energy service. The commission found that the disconnection of utility service for nonpayment by those who were financially unable to pay constituted an "emergency" as described by Ohio statute.

The Ohio PIPP, as initially conceived by the state regulatory commission, did not represent a discounted rate for low-income customers. Instead, the PIPP was designed to enable low-income customers to retain their utility service by entering into an agreement pursuant to which the customer would make a utility bill payment equal to a prescribed percentage of income. Customers entering into such agreements, however, would not be relieved of paying bills in excess of the percentage of income. Rather, customers would continue to be liable for those arrears. Those accrued arrears would be subject to repayment by the customers when such customers left the PIPP.

The regulatory proceeding that gave rise to Ohio's PIPP in 1983 did not exclusively concern establishment of the PIPP. Instead, the proceeding considered a broad range of issues relating to payment plans, deposits, and voluntary fuel check-offs as a means to generate energy assistance funding. The proceeding was initiated by Columbia Gas, who filed a proposal to allow for the reconnection of service to customers upon payment by those disconnected customers of one-half of the outstanding arrears and entry into an agreement through which the remaining half would be paid in equal monthly installments.

Early in the proceeding, the state regulatory commission declared that an "emergency" existed because of the number of residential gas and/or electric customers who were unable to obtain service for the winter heating season because of the disconnection for nonpayment attributable to economic recession, increases in the cost of gas and electric service, and a decrease in the level of governmental assistance. Based on that emergency, the commission prohibited the disconnection of gas or electric service during the ensuing winter heating season and ordered the reconnection of service by customers who paid either one-third of their outstanding balance or $200, whichever was less.

Consideration of the PIPP arose out of *utility* objections to the commission's "failure to take into consideration a customer's ability to pay before imposing the moratorium. . ." At least in partial response to that objection, the commission docketed an investigation into "long-term solutions to the problems arising from the winter emergency situations." In responding to that search for long-term solutions, the commission found that the proposed PIPP "will do the most to assist those in need to maintain utility service while protecting the companies' remaining ratepayers."

Since the inception of Ohio's PIPP, the state has sought to promote the development of a competitive retail choice environment for both natural gas and electric service. While some municipal aggregation has occurred for electric service, efforts to bring competition to the provision of PIPP services have failed.

The State of Ohio sought to reduce the unaffordability of natural gas prices for participants in Ohio's Percentage of Income Payment Program (PIPP). In Ohio's PIPP, the home energy bills of income-qualified households are capped at a designated percentage of income. Bills in excess of the designated percentage of income are paid through dollars generated by a System Benefits Charge. The State of Ohio first sought to reduce the cost of the Ohio PIPP program through the aggregation of natural gas PIPP customers. For natural gas PIPP customers, the aggregation initiative resulted in minimal dollar savings. The failure to generate savings occurred because PIPP customers were a tough pool to serve. Efforts to aggregate natural gas PIPP customers were eventually abandoned.

The effort to aggregate Ohio's electric PIPP customers never succeeded either. Ohio's state LIHEAP office (the Ohio Department of Development or "ODOD") issued a Request for Proposals (RFP) in 2002 seeking a supplier to aggregate electric PIPP customers, either statewide or in selected regions or utility territories. ODOD received three bids, but did not find savings significant enough to accept any of them. The RFP was re-issued in 2004 but was subsequently withdrawn. Aggregation would have required expensive and time-consuming technology and accounting changes for all parties. At the time, ODOD concluded that any savings were likely to be minimal, and the change possibly could result in higher rather than lower PIPP costs.

3.4.2 Application of Best Practices Criteria

The Ohio Percentage of Income Payment Plan (PIPP) is one of nation's oldest low-income rate affordability programs. The program is rated "exceptional" in five of the 20 best-in-class criteria.

3.4.2.1 Criterion #1: Is the program reasonably open to all households in need.

The Ohio Percentage of Income Payment Plan (PIPP) is reasonably open to all households in need. The Ohio PIPP is open to households that have income at or below 150% of the Federal Poverty Level. The program imposes no non-income-based eligibility criteria. The program commits to serve all customers in need. The program accepts enrollment year-round. No ceiling is placed on program enrollment.

The Ohio PIPP allows reasonable, though not exceptional, access to the affordability program. Customers must make in-person application (and provide income verification) through local community-based organizations. The application for PIPP is a uniform application allowing customers to apply for all available fuel assistance (including energy efficiency programs) at the same time.

The Ohio PIPP requires program participants to recertify annually. The program seeks to ease the process of recertification. In this process, the program first matches PIPP participants to participants in the federal fuel assistance program to determine if the information required for recertification has already been obtained. If not, recertification can be achieved through the mail; in-person income verification is not required.

3.4.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The Ohio PIPP recognizes the full range of energy affordability needs. While Ohio's percentage of income payments (10% for primary heating; 5% for electricity) are considered somewhat too high to be truly affordable, the PIPP nonetheless limits bill payments for program participants to a percentage of income. Households with income at or below 50% of the Federal Poverty Level need pay only 3% of their income toward their electric bill. The Ohio PIPP, as the very first model of utility rates taking account of household energy burdens, does not otherwise tier its percentage of income payments.

The Ohio PIPP provides for limited arrearage forgiveness. Ohio operates separate programs for natural gas and electric arrears. Through each program, program participants may earn the forgiveness of preprogram arrears. The natural gas forgiveness program, which provides complete forgiveness over a three-year period, offers more reasonable relief than the electric matching grant program. The electric program provides matching grants for every dollar paid toward arrears by persons who have "graduated" from the underlying PIPP due to an increase in income. This matching grant program spreads the retirement of arrears over an indefinite period of time after the household leaves PIPP.

Finally, the Ohio PIPP recognizes the need for energy efficiency services. High usage PIPP participants are referred to public and private usage reduction programs and given priority for the receipt of usage reduction services.

3.4.2.3 Criterion #3: Does the program efficiently use program funding?

The Ohio PIPP provides for an efficient use of program funds. Bill affordability benefits are determined on a customer-specific basis, with required bill payments tied to a prescribed percentage of income. No under- or over-payments are made. The Ohio PIPP imposes no minimum customer payment requirement, nor does it impose a ceiling on program benefits.

While the Ohio PIPP does integrate with the federal fuel assistance program, the program does not well integrate with company billing processes. PIPP participants are not required, for example, to participate in budget billing as part of the PIPP program.

3.4.2.4 Criterion #4: Does the program provide for continuous improvement?

The Ohio PIPP has been subjected to an empirical outcome evaluation. Such evaluations, however, are ad hoc and not prescribed by law or program regulation. As with other state programs, the Ohio PIPP is subject to a periodic sunset review. During this review process, potential program modifications and improvements are examined through a multi-stakeholder work group. Proposed regulations governing program operations are further subject to a public hearing process. Despite the lack of periodic outcome evaluations, the Ohio state utility regulatory commission has adopted extensive standardized data reporting by Ohio utilities on their PIPP participants.

3.4.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

The Ohio PIPP provides for reasonable certainty in budgeting and cost recovery. While the specific processes differ, PIPP costs for both the natural gas and electric programs are recovered through a volumetric charge imposed on all customer classes. The volumetric charge may be changed by the Ohio regulatory commission upon application of either the state's utilities or the Ohio Department of Development (ODOD), the PIPP program administrator.

3.5 Program #5: The Citizens Gas & Coke Utility/Vectren Energy Delivery Universal Service Programs (USP) (Indiana)

The Universal Service Programs (USPs) operated by Citizens Gas & Coke Utility (CGCU) and by Vectren Energy Delivery (collectively referred to as Indiana Utilities) are grounded in the flexible regulation provided by statute to the Indiana Utility Regulatory Commission (IURC). The flexible regulation allowed under this Indiana statute permits the Indiana commission to set aside traditional regulation for all or part of a utility's rates or services should the commission find it is in the public interest to do so.

Arguing that the Indiana utility low-income programs met that public interest standard, Carey Lykins, president and Chief Executive Office of CGCU, noted that the objectives of the USP were three-fold: (1) to protect the health and safety of the utilities' low-income customers by helping them maintain affordable natural gas service; (2) to help low-income customers conserve energy and reduce residential heating bills; and (3) to significantly lower the number of payment defaults by low-income customers, thereby benefiting all of the utility's customers.

3.5.1 An Outline of the Program

The Indiana Universal Service Programs represent tiered rate discount programs directed toward participants in the federal Low-Income Home Energy Assistance Program (LIHEAP, known simply as EAP in Indiana). The Citizens Gas program served roughly 17,300 low-income customers during the 2006/2007 winter heating season, while the Vectren USP served 23,800 low-income customers.

3.5.1.1 Program Description

The Citizens/Vectren program design offers income-eligible customers a discount off of the natural gas bill they would otherwise receive from the respective companies. Both companies divide their low-income customer population into three tiers. Customers are placed in each tier based on the "State Benefit Matrix" used in the distribution of federal fuel assistance through the federal Low-Income Home Energy Assistance Program (LIHEAP). The discount tiers are designed to approximate a 4% affordable home energy burden under average incomes and usage levels. In contrast, in 2006, the electric burden for Indiana households with the statewide average income was 2.2%; the natural gas burden for households at the statewide average income was 1.7%.

Low-income customers must participate in LIHEAP in order to receive the utility discounts in Indiana. Enrollment in LIHEAP automatically places the customer into the respective utility's discount program.

3.5.1.2 Relationship to Utility Rate Structure

The Indiana USPs are an integral component of the utility rate structures. Citizens provides a discount of either 9%, 18% or 24%; Vectren provides a discount of 15%, 26% or 32% applied to their residential gas service bill. When combined with LIHEAP benefits, the combined benefit of the discount tiers and LIHEAP will represent an approximate reduction of 27%, 40% or 50% in the overall heating costs to CGCU's eligible low-income customers. Vectren's low-income customers will experience a reduction of approximately 35%, 50% or 60%. The highest benefits go to the households with the lowest income. Vectren's discounts are somewhat higher since the company has somewhat higher rates than Citizens Gas.

3.5.1.3 Program Funding

Program funding for both Indiana low-income tiered rate discount programs is provided through a rate rider imposed on all customer classes. The volumetric charges, while imposed on all customer classes, are not uniform between classes. The per therm residential charge for CGCU, for example, is $0.0048, while the commercial charge is $0.0026 per therm. The corresponding payments by the large volume customers will be $0.0005, but will not exceed $200 per year. Vectren, too, collects is universal service rider volumetrically from all customer classes, but using non-uniform per therm charges.

Both utilities use an annual true-up based on the balance of its USP funds, the projected average residential bill for the upcoming 12-month period, and the projected enrollment/eligibility requirements of the State's fuel assistance program. While neither utility has needed to place a ceiling on program participation, both utilities place a cap on the maximum per therm charge to be imposed. CGCU, for example, agreed that in no event would the per therm charge exceed $0.0068 for residential customers or $0.0036 for commercial customers.

3.5.1.4 Program Background

The Indiana programs were adopted at the behest of the respective utilities. Unlike many other states, the Indiana programs did not arise out of a move to a retail choice environment. According to Niel Ellerbrook, Chairman of the Board and Chief Executive Officer of Vectren Utility Holdings, the parent company of Vectren Energy Delivery, the primary driving factor behind his utility's low-income proposal involved "the dramatic rise in natural gas prices and the resulting impact on customers and the economy." According to Ellerbrook, "the impact of significantly higher energy costs creates especially acute problems for low-income customers." The company CEO justified the program by stating:

> Given the magnitude of the situation, no single solution has been found to ensure that low income customers can obtain and retain utility service that is necessary to sustain life. For Vectren, the Universal Service Fund has been part of the package of efforts designed to help those customers in need of assistance. There is a cost to serve customers who need heat but are unable to pay the full cost of service for any number of reasons, including job loss, cost of medicine, or the number of their dependents. Like other real costs to provide service to our entire customer base, this cost must be recognized and addressed in a constructive manner to assure that people have service.

Ellerbrook concluded by noting that the universal service program "provides an answer in conjunction with LIHEAP and other available programs, by identifying customers with true need, determining in a consistent and accepted manner how much they can pay for service, and providing them with more affordable bills that better match their ability to pay."

As can be seen, rather than being driven by a move to retail choice, the Indiana natural gas low-income programs have been driven by spiraling natural gas commodity prices and the adverse impacts those prices have had not only on low-income customers but also, by extension, on the utilities serving those low-income customers (and their remaining ratepayers).

3.5.2 Application of Best Practices Criteria

The Universal Service Program (USP) operated by Citizens Gas & Coke Utility and by Vectren Energy Delivery is one of the nation's best examples of a "tiered rate discount" program that ties tariffed discounts for low-income customers to a determination of affordable home natural gas bills. The Indiana USPs are rated "exceptional" in five of the 20 best-in-class criteria.

3.5.2.1 Criterion #1: Is the program reasonably open to all households in need.

The Indiana Universal Service Programs (USPs) are reasonably open to households in need. The USPs are directly tied into the administration of the federal fuel assistance program (LIHEAP). A CGCU/Vectren customer enrolling in the fuel assistance program is automatically enrolled into the USPs as well. No separate application forms, and no additional customer steps, are required for the utility program.

The fuel assistance program eligibility has been set at 150% of the Federal Poverty Level in Indiana. While the Indiana utilities contracted for an empirical needs assessment in 2007, such needs assessments are not periodically prepared either by the companies or by the state LIHEAP office.

The integration of the company programs with the federal fuel assistance program has both advantages and disadvantages. While tying USP enrollment to enrollment in the federal fuel assistance program eases program entry, it also limits the time period of enrollment to those months in which the federal program takes applications. Since the federal program is primarily a heating program, USP enrollment does not occur year-round. Moreover, no special efforts have been made to ease the retention of program participants from year-to-year. USP participation from year-to-year is simply tied to LIHEAP participation.

3.5.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The Indiana USPs do not fully reflect the multiple aspects of home energy affordability needs. On the one hand, the Indiana programs are designed to promote the affordability of bills for current usage. Citizens Gas and Vectren provide a tiered rate discount, with three tiers tied primarily to the ratio of participant income to the Federal Poverty Level. The discount tiers have been calculated so that, when coupled with the receipt of federal fuel assistance benefits, net participant natural gas bills (i.e., bills minus benefits) are reduced to an affordable percentage of income. The Indiana programs do not address the affordability of electricity.

The Indiana USPs do not offer an arrearage forgiveness program component. While making bills for current usage more affordable has been found to also help reduce pre-existing arrears, and to help prevent the incursion of new arrears, there is no specific initiative to help retire pre-existing arrears so as to bring total bill payments down to an affordable level.

Having said that, unlike most affordability programs, the Indiana utilities do offer substantial crisis assistance as part of their affordability programs. This crisis assistance leverages private funding with utility-sponsored contributions to provide a supplemental source of funding to customers facing the potential loss of service due to outstanding arrears. As with most such crisis assistance programs, the need for arrearage assistance considerably outstrips the amount of funding provided.

Both Indiana utilities fund low-income energy efficiency initiatives. While high-use USP program participants are referred to these usage reduction programs, however, high-use program participants receive no priority over other households that are income-qualified for the low-income efficiency programs.

3.5.2.3 Criterion #3: Does the program efficiently use program funding?

The Indiana utilities provide for reasonable efficiencies in the use of program funding. The integration of the utility program intake and eligibility determinations with the administrative activities of the federal fuel assistance program allows for nearly 100% of utility funding to be distributed as benefits (rather than being devoted to administrative purposes).

The tiered discounts provided by the companies have also been designed to reduce the over- and under-payment of benefits often associated with discount programs. Typically, discounts provide identical benefits to customers with identical usage, irrespective of the income or home energy burden experienced by that customer. As a result, some customers receive more benefits than needed to reduce their bills to an affordable burden while others receive fewer benefits than are needed. This problem of over- and under-payments is exacerbated when the level of discount is not calculated to result in any preset determination of affordability. In contrast, the Indiana tiered rate discounts are explicitly calculated to result, when combined with federal fuel assistance benefits, in an affordable burden. So long as program participants are at average income and consumption level within their tier, benefits will match needs. To the extent that participants diverge from average consumption and income levels, the program will somewhat over- or under-pay benefits relative to need.

The Indiana utilities are seeking to increase the integration of their tiered discount programs with existing bill payment processes. Both companies have announced that they will target the promotion of levelized budget billing to program participants. Neither company, however, will require budget billing as a condition of program participation.

3.5.2.4 Criterion #4: Does the program provide for continuous improvement?

The Indiana utilities engage in a process of continuous improvement based on an empirical review of program operations and outcomes. The companies have agreed to report a set of standardized monthly metrics documenting program impacts on arrears, payments, bills, and various collection activities. The programs have operated with annual evaluations through their first three years of operation. In 2007, the programs were extended for four years with ongoing review and data reporting continuing throughout that time period. A comprehensive program evaluation will occur at the end of three years and serve as the basis for any consideration of additional extensions of the programs.

3.5.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

The Indiana utilities provide for reasonable certainty in program budgeting and cost recovery. Program costs are recovered from all customer classes through a volumetric rate rider. The rate rider is reconciled annually to prevent under- or over-recovery of program costs by the utilities. Customers are protected from excess program costs by a maximum cap placed on the volumetric charge. The 2007 universal service charge, however, is considerably below the allowed cap. In addition to the overall cap on the per unit of energy rate rider charge, a separate cap has been placed on the total payment obligation which can be imposed on any individual industrial customer. This separate cap is to prevent a disproportionate imposition of universal service charges on large user customers.

3.6 Program #6: The National Fuel Gas Distribution Corporation's Low-Income Rate Assistance (LIRA) Program (Pennsylvania)

The Low-Income Rate Assistance (LIRA) program operated by National Fuel Gas Distribution Corporation (NFGDC) is another excellent example of a "tiered rate discount" program that ties tariffed discounts for low-income customers to a determination of affordable home natural gas bills.

3.6.1 An Outline of the Program

The National Fuel Gas LIRA program represents a blending of tiered rate discounts and percentage of income principles. While LIRA is primarily a tiered rate discount program, its discount tiers are explicitly tied to achieving predetermined levels of affordability as defined by home energy burdens deemed to be affordable to low-income customers. By 2007, the NFG LIRA program's blended approach to rate affordability was serving more than 11,300 program participants.

3.6.1.1 Program Description

The National Fuel Gas LIRA program is a blended tiered rate discount program. The calculation of LIRA's affordability benefits is tied to a structure of rate discounts, ranging from 10% to 60% off of bills at standard residential rates. In turn, however, the structure of LIRA discounts is tied to a determination of what discounts are necessary to achieve pre-determined levels of affordability defined by home energy burdens.

The LIRA program calculates its rate discount by beginning with an average bill distinguished by household size. These average bills are recalculated quarterly using actual consumption data for existing program participants. From these bills, the company subtracts the customer's expected percentage of income payment along with the assistance a program participant is expected to receive from the federal fuel assistance program. The resulting net bill (average bill minus percentage of income household payment minus federal fuel assistance benefit) is then converted into a percentage

discount for the customer. If the average bill is, for example, $800 and the net bill is $400, the customer is provided a 50% discount through the LIRA program.

The National Fuel Gas LIRA program also offers program participants arrearage forgiveness. Preprogram arrears can be retired, in exchange for complete and timely payment of bills for current usage, over a 24 month period of time.

3.6.1.2 Relationship to Utility Rate Structure

The LIRA program is an explicit part of the National Fuel Gas rate structure. Discounts provided are calculated by reference to a percentage off the bills that would have been rendered to program participants at standard residential rates. To the extent that bills increase to individual customers during their program participation, whether because of changes in usage, price or weather, the dollar amount of the discount increases as well (even though the percentage discount will remain constant).

3.6.1.3 Program Funding

The revenue shortfall experienced by the company as a result of the discount is tracked by National Fuel Gas and collected from residential customers through a reconcilable rate rider approved by Pennsylvania utility regulators. Reconciliation between actual program expenditures and program revenues generated by the rate rider is performed on an annual basis.

3.6.1.4 Program Background

The National Fuel Gas LIRA program has expanded from a 1,000 customer pilot program in 1991 to a program serving more than 11,000 low-income customers in 2007. The program arose out of the Pennsylvania state regulatory commission's investigation into the control of uncollectible accounts. Shortly after the Pennsylvania commission had approved pilot low-income rates for Columbia Gas Company and Equitable Gas Company, the commission began a further investigation into the control of uncollectible accounts in general. As a result of that investigation, the commission recommended that low-income programs be adopted by other utilities throughout the state. According to the Pennsylvania commission, low-income rate affordability programs were a necessary tool for utilities to use in combating the problem of nonpayment. Through its investigation into the control of uncollectibles, the Pennsylvania commission concluded that:

> As a result of our investigation, the Commission believes that an appropriately designed and well implemented CAP, as an integrated part of a company's rate structure, is in the public interest. To date, few utilities have implemented CAPs. The purpose of this Policy Statement is to encourage expanded use of CAPs and to provide guidelines to be followed by utilities who voluntarily implement CAPs. These guidelines prescribe a model CAP which is designed to be a more cost effective

approach for dealing with issues of customer inability to pay than are traditional collection methods.

While the implementation of CAPs was left to the voluntary decision of the state's energy utilities, the PUC made clear that it believed "alternative programs must be supported as clearly being in the public interest." The National Fuel Gas LIRA program was one of the CAP alternatives approved by the Pennsylvania regulators.

3.6.2 Application of Best Practices Criteria

The National Fuel Gas Distribution Corporation's (NFGDC) Low-Income Rate Assistance (LIRA) program is an excellent example of a utility-specific tiered rate discount. The program is rated "exceptional" in six of the 20 best-in-class criteria.

3.6.2.1 Criterion #1: Is the program reasonably open to all households in need.

The National Fuel Gas LIRA program is reasonably open to all households in need. Program eligibility is set at 150% of the Federal Poverty Level. The program eligibility is supported by an empirical needs assessment that is periodically updated by the company and submitted to the Pennsylvania utility regulatory commission. The program imposes one non-income-based program eligibility requirement, that customers be payment-troubled (i.e., have an arrears at the time of application or have at least one existing, canceled or defaulted payment arrangement). Program enrollment is open year-round. No ceiling on program participation is imposed.

The company, however, creates unnecessary barriers that impede the ease of entry into its LIRA program. In particular, verification and application requirements are more onerous than most other programs. NFG requires that all adults in a household become "customers" in order for a household to enter its program. In addition, NFG imposes documentation requirements (e.g., a copy of the household's deed, mortgage or lease) to enter the program. NFG further requires that all LIRA program participants execute a written "LIRA Service Agreement" in order to participate in the program.

3.6.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The National Fuel Gas LIRA program recognizes the multiple facets of energy affordability "need." While the LIRA program operates as a tiered discount program, its tiered discounts are explicitly tied to reducing bills to an affordable percentage of income. Bill affordability is defined to be 6.5% of income for households at 0 – 50% of Poverty, 8.0% for households with income at 51 – 100% of Poverty, and 9.0% for households with income at 101 – 150% of Federal Poverty Level. In contrast, in 2006, the electric burden for Pennsylvania households with the statewide average income was 2.0%; the natural gas burden for households at the statewide average income was 1.5%.

Irrespective of a household's home energy burden, however, LIRA guarantees a minimum discount of 10%.

National Fuel Gas also incorporates an arrearage forgiveness program for households with preprogram arrears. The LIRA program provides for a forgiveness of preprogram arrears over 24 months. For each month of a full and timely payment, LIRA provides for a forgiveness of $1/24^{th}$ of the preprogram arrears. In any month in which the customer fails to make a full and timely payment, that customer forfeits the forgiveness for that month. If at the end of the 24 months, however, a LIRA participant has a sum of forfeited arrears credits, the customer is given an additional 12 months over which he or she may earn the forgiveness of those forfeited credits through full and timely payments. Only at the end of this additional period does the customer lose the ability to earn forgiveness altogether.

As with other Pennsylvania utilities, National Fuel Gas operates a Low-Income Usage Reduction Program (LIURP) in conjunction with its rate affordability program. While high use LIRA customers are referred to the usage-reduction program, they are provided no particular priority of treatment within that program.

3.6.2.3 Criterion #3: Does the program efficiently use program funding?

The LIRA program is particularly adept at making an efficient determination of affordability benefits within the context of a tiered rate discount program. Unlike most tiered discount programs, which have from three to six tiers (e.g., New Hampshire (6 tiers), Indiana (3 tiers), Maryland (4 tiers)), the National Fuel Gas LIRA program distinguishes its discount tiers by income level and household size. Separate discounts are calculated for each "cell" in an affordability matrix determined by household income and household size. LIRA uses this expanded system of tiers so that it can recognize that household natural gas consumption (and thus household natural gas bills) varies by household size. Given the different levels of income (which vary in increments of $1,000) and household size, National Fuel Gas offers discounts of between 10% and 60% on current bills. Because the company takes into account a detailed disaggregation of customer income, along with disaggregated consumption by household size, the LIRA program provides far less under- and over-payments than do other tiered rate discount programs.

The National Fuel Gas calculation of expected customer payments incorporates not only minimum monthly customer payments ($12 per month), but also minimum discount percentages (10%).

The National Fuel Gas LIRA program provides for an efficient use of program funds, also, by requiring program participants to enter into a levelized monthly Budget Billing plan. Through this levelized billing, LIRA not only promotes the affordability of annual home energy bills, but maintains the affordability of individual monthly bills as well.

3.6.2.4 Criterion #4: Does the program provide for continuous improvement?

National Fuel Gas complies with state-imposed standardized monthly data reporting regarding program costs, operations, and bill payment outcomes. The company engages in a program outcome evaluation by an independent third party evaluator on a prescribed time interval. The company files a new universal service plan with Pennsylvania regulators on a triennial basis, which is subject to review through a public hearing process.

3.6.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

The National Fuel Gas LIRA program provides for reasonable cost budgeting certainty and timely cost recovery. The company recovers its costs through a rate rider imposed on residential customers. Actual program expenditures are reconciled against revenues generated by the rate rider on an annual basis. The company takes limited account of cost offsets for the incremental additions to program participation rates gained since its last base rate case. These cost offsets include primarily savings in reduced bad debt and reduced working capital expenses.

3.7 Program #7: The Electric Assistance Program (EAP) (New Hampshire)

The Electric Assistance Program (EAP) adopted by the New Hampshire state utility regulatory commission is an excellent example of a "tiered rate discount" program that ties tariffed discounts for low-income customers to a determination of affordable home electric bills.

3.7.1 An Outline of the Program

The New Hampshire tiered rate discount is a uniform statewide program that provides electric affordability assistance to participants in the federal Low-Income Home Energy Assistance Program (LIHEAP in New Hampshire. New Hampshire operates a single uniform statewide program extending to each regulated electric utility. By design, the program operates to provide substantial rate discounts to 30,000 low-income customers each year.

3.7.1.1 Program Description

The New Hampshire EAP provides a tiered discount with tiers based on the ratio of household income to the Federal Poverty Level. The program is based on six tiers. The lowest tier is for households with income at or below 75% of Poverty, while the highest tier is for households between 175% and 185% of Poverty Level. Using the Federal Poverty Level, New Hampshire stakeholders agreed, allows the benefits to be better targeted to those with the most need as the Poverty Level takes into account not only income but also the size of the household. Household payments toward their electric bills are expected to range between 4% and 4.5% of gross household income. In contrast, in

2006, the electric burden for New Hampshire households with the statewide average income was 1.7%; the natural gas burden for households at the statewide average income was 0.9%. Discounts range from 5% to 70% off of the total electric bill. Average benefits under the New Hampshire EAP reach roughly $400 per year.

The New Hampshire tiered discount program does not make a distinction for electric heat usage. The program assumes that most households eligible for program benefits will be eligible for LIHEAP benefits for their primary source of heating.

3.7.1.2 Relationship to Utility Rate Structure

The New Hampshire EAP is built right into each participating utility's rate structure. Percentage discounts are applied to the entire bill for electricity.[20] The percentage discounts are gradually reduced with the largest percentage discount applicable to the bills of customers in the lowest income group and the lowest percentage discount applied to the bills of customers in the highest income group.

The New Hampshire EAP, however, differs from the National Fuel Gas and Indiana tiered rate discounts. Both the NFGDC and Indiana programs are funded internally by utility ratepayer funds. Those three utilities (NFGDC, CGCU, Vectren) track the lost revenue attributable to their respective tiered discounts and recoup those revenues through a rider imposed on their own ratepayers. In contrast, New Hampshire utilities access the state's System Benefits Charge as an outside source of revenue to compensate them for their lost revenue. Unlike Indiana and NFGDC, the New Hampshire utilities need not be self-supporting. Indeed, some electric utilities are net donors (with their ratepayers contributing more in SBC funds than the utility's low-income customers use in tiered discounts) while other electric utilities are net recipients.

3.7.1.3 Program Funding

Program funding for the New Hampshire EAP is provided by a statutorily-created System Benefits Charge. The SBC was created as part of New Hampshire's 1996 approval of an SBC of 3.0 mils ($0.003) per kWh, with 1.2 mils being devoted to low-income assistance.[21] The SBC was extended by the legislature in 2005 and is currently scheduled to expire in 2008. The low-income funding was retained at a level basis in the 2005 program extension. The SBC generates roughly $13 million each year to support the EAP.

3.7.1.4 Program Background

The New Hampshire System Benefits Charge (SBC) was adopted as part of that state's approval of legislation approving a move to retail choice in the electric power industry. The SBC was designed to support what many stakeholders considered to be public

[20] An exception to this principle is made for certain state-imposed taxes.
[21] The remainder of the SBC is devoted to the support of energy efficiency programs, though not necessarily low-income efficiency programs.

purposes that would likely not be well-served by a competitive electric marketplace. Since the enactment of the retail choice statute a competitive retail market for residential customers has not developed in New Hampshire.

3.7.2 Application of Best Practices Criteria

The New Hampshire Electric Assistance Program (EAP) is one of the nation's best examples of a tiered rate discount program. Developed by a working group of regulatory staff, energy assistance staff, and representatives of poverty and electric utility stakeholders, the program was explicitly designed to meet the objectives of a percentage of income-based affordability approach while retaining the administrative efficiencies of a tariffed rate discount. The New Hampshire EAP is rated "exceptional" in seven of the 20 best-in-class criteria.

3.7.2.1 Criterion #1: Is the program reasonably open to all households in need.

The New Hampshire EAP is reasonably open to all households in need. The EAP defines eligibility as those households with income at or below 175% of the Federal Poverty Level. Customers who enroll in the federal fuel assistance program are automatically enrolled in the EAP. The program has limitations, however, created by its funding ceiling. As a result, it cannot commit to serve all program applicants. Instead, if the program projects that its committed budget will exceed its stream of revenue through the state's System Benefits Charge, the program will place program applicants on a waiting list. In addition, since program enrollment is tied to enrollment in the federal fuel assistance program, which is primarily a heating assistance program, program enrollment is effectively limited by the enrollment period available for fuel assistance participants.

Despite the challenges facing New Hampshire's EAP in program enrollment, the EAP is well-served by its recertification processes. The EAP generally requires annual recertification by program participants. This recertification can occur by mail. In addition, biannual recertification is allowed for certain classes of customers whose income is not expected to vary by year. Included in this biannual recertification are the aged and disabled.

The New Hampshire EAP is not supported by a periodic needs assessment. Given its intrinsic ties to the federal fuel assistance program, the program operates by reference to past experience with fuel assistance participation. The program is, however, overseen by a multi-party workgroup consisting of representatives of various stakeholders. This workgroup commissions issue-specific empirical studies in support of discussions of specific program modification proposals on an as-needed basis.

3.7.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The New Hampshire EAP is not designed as a comprehensive electric bill affordability program. While the EAP is structured to deliver rate affordability assistance directed

toward bills for current usage, the EAP does not have an arrearage forgiveness component. This lack of arrearage forgiveness is driven not by a lack of recognized need for such assistance, but rather by program funding limitations imposed by the New Hampshire legislation authorizing the program. Neither does the program incorporate a crisis assistance component.

While New Hampshire utilities have implemented energy efficiency programs directed toward residential customers in general, there are no specific low-income efficiency programs that are integrated with the EAP. High use EAP customers are referred to the federal weatherization assistance program (WAP) and to these utility programs, but are given no priority for treatment. No formal integration exists between the low-income rate affordability and residential usage reduction programs.

3.7.2.3 Criterion #3: Does the program efficiently use program funding?

The New Hampshire EAP was developed so that program discounts would reduce low-income electric burdens to an affordable percentage of income. With discount tiers targeted based on the ratio of household income to the Federal Poverty Level, the EAP discounts are designed to reduce non-heating electric bills to between 4.0% and 4.5% of household income.

A six-tier structure allows for reasonable targeting of discounts and a minimization of the overpayment or underpayment of customers whose bills or income diverge below or above the averages used in determining appropriate discount levels. An empirical analysis of program participants found minimum divergence from averages within the multiple rate discount tiers.

There is no minimum payment required in the New Hampshire EAP. An empirical analysis of program participant bills found that the proposed discounts would not result in bills less than the fixed monthly customer charge. Establishing a minimum payment was thus considered to add administrative complexity without adding program efficiencies. There are no maximum benefit amounts. Conversely, however, no program participant receives less than a 5% discount.

3.7.2.4 Criterion #4: Does the program provide for continuous improvement?

The New Hampshire EAP provides for a periodic program evaluation. In 2007, the program adopted required standardized monthly data reporting for participating utilities, along with a prescribed program evaluation. In addition, the program is overseen by a multi-party working group that reviews program operations and, annually, recommends program modifications (if any) to the New Hampshire utility regulatory commission for its consideration. As with other New Hampshire government programs, the EAP also is subjected to a periodic sunset review.

3.7.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

The greatest weakness in the New Hampshire EAP involves the limitations imposed by statutorily imposed budget constraints. The EAP is funded through a statewide System Benefits Charge of 3.0 mils per kWh, of which 1.2 mils is directed toward low-income rate affordability assistance. The SBC has not been increased since the program's inception. The SBC is not indexed to fuel prices or to program participation. Indeed, a statutorily-mandated increase in program eligibility levels resulted in substantial decreases in per-participant benefits as the higher participation levels were met with a fixed program budget.[22]

Conversely, the fixed SBC charge of 1.2 mils per kWh provides a stable annual funding base for EAP program operation. Program administrators need not address the inefficiency of not knowing whether funding will exist in any given year, or what that level of funding might be.

The funding of New Hampshire's EAP is assisted by the requirement that program funding be allocated to all retail customers. In this fashion, the burden of supporting the low-income program does not become too great for any given customer class.

3.8 Program #8: The Maryland Electric Universal Service Program (EUSP)

Maryland's Electric Universal Service Program (EUSP) is a creature of statute. Mandated by the statute directing the state to move to retail choice, the EUSP was statutorily established to deliver bill payment assistance, low-income weatherization, and arrearage retirement to low-income customers. The statute generally provides that the Maryland state utility regulatory commission: (1) shall order a universal service program to be made available on a statewide basis to benefit low-income customers; (2) shall establish a universal service program; and (3) shall have oversight responsibility for the universal service program.

In contrast, the state Department of Human Resources, which is the state agency that administers the federal Low-Income Home Energy Assistance Program (LIHEAP) (also known as the Maryland Energy Assistance Program—MEAP), was statutorily charged with the responsibility for administering the EUSP along with disbursing EUSP funds (with oversight by the commission).

3.8.1 An Outline of the Program

The Maryland EUSP consists of both a rate discount for bills for current usage and an arrearage forgiveness program. The EUSP is available to electric customers who have

[22] The primary benefit reduction was the elimination of heating benefits. The EAP determined that program participants would need to rely on the federal fuel assistance program for heating benefits with EAP benefits limited to non-heating electric bills.

income at or below 175% of the Federal Poverty Level. In Fiscal Year 2007, EUSP provided electric affordability grants to more than 93,000 households.

3.8.1.1 Program Description

Bill payment assistance is the EUSP program component designed to make monthly electric bills more affordable. While benefits are designed to make bills more affordable, EUSP program administrators emphasize that they design their benefits to ensure that the program will never exhaust its funding. This limitation is to ensure that all applicants to EUSP will receive a benefit. Applications are taken on a year-round basis.

EUSP benefits are distributed as annual benefits representing a percentage discount applied to an average electric bill. Benefit amounts reflect a tiered rate discount structure. The program has adopted four tiers for households below 175% of the Federal Poverty Level. The lowest tier is for households at 0 – 75% of Poverty, while the highest tier is for households at 150 – 175% of Poverty Level. An average bill is calculated by applying weighted electricity prices to average statewide consumption for EUSP participants from the previous 12 month program year. Discounts range from 75% for the lowest income participants to 30% for the highest income customers.[23]

In general, in 2006, the electric burden for Maryland households with the statewide average income was 1.9%; the natural gas burden for households at the statewide average income was 0.8%.

The arrearage retirement provision of EUSP is a key benefit provided through the program. This program component provides a one-time opportunity to eliminate past-due bills. Program administrators have recommended that customers have a minimum arrearage of $300 in order to receive arrearage retirement benefits. The minimum arrearage will both help spread limited arrearage retirement funds further and prevent customers from foreclosing future assistance when their need is perhaps greater. EUSP administrators report that they expect that privately available funds can meet the need for customers with arrearages less than $300. Arrearage retirement credits will be provided to customers up to a maximum of $2,000. Arrearage retirement benefits can be provided to customers currently taking service and in arrears or to customers who are currently "off-service" and who seek to re-establish service. Off-service is defined as service that has been terminated *and* the customer has received a final bill.

3.8.1.2 Relationship to Utility Rate Structure

Unlike the tiered rate discounts implemented in New Hampshire and in the National Fuel Gas service territory in Pennsylvania, the Maryland EUSP's tiered rate discount is not a part of any utility's rate structure. Instead, EUSP is administered by a third party agency. The EUSP benefits are distributed to utility customers as a single annual lump-sum payment. The payment is designed to subsidize a program participant's annual electric

[23] Discounts are provided only for non-heating electricity. Heating bills are presumed to be offset by receipt of federal fuel assistance benefits.

bill so as to reduce that bill to an affordable amount. The EUSP benefit, however, is an external benefit, paid as a direct vendor payment to the program participant's electric company. It is not part of the rate structure of the company. It is simply viewed as an additional payment on the customer's account, albeit a payment from non-customer funds.

3.8.1.3 Program Funding

The Maryland EUSP is supported by a cost recovery mechanism that is uniform statewide. The statute provided not only a fixed program budget for the first three years of the EUSP, but that a fixed contribution toward that budget be obtained from each customer class. The residential charge was set at a uniform, statewide monthly fee, of $4.97 to $5.00 annually ($0.41 to $0.42 monthly). A multi-step charge was established for commercial and industrial customers. The commission explained, however, that it sought:

> . . .a funding methodology that results in sets of uniform Statewide fees for commercial and industrial customers that apply irrespective of the service territory in which the customers are located. The use of Statewide fees should not preclude the differentiation of charges by customer size or electric usage, as long as the methodology proposed includes an appropriate cap. . .The commission's primary interest in a proposal of this type is (i) to have flat fees that do not vary each month, thereby avoiding customer confusion, and (ii) to ensure that similarly-situated customer that happen to be located in different service territories pay the same charge, thereby avoiding any questions of competitive advantage.[24]

The statute prohibited collecting the universal service charges on a per kilowatthour basis. In adopting a fixed monthly fee, the commission agreed with the argument by the commercial and industrial representatives that the universal service charge "is similar to a utility 'customer charge,' which is traditionally designed and intended to recover a cost that bears no relationship to a customer's consumption." The Maryland commission now considers a proposed EUSP budget each year and annually sets the appropriate fixed monthly fees to generate the necessary funds.

3.8.1.4 Program Background

The Maryland Electric Universal Service Program (EUSP) was statutorily created as part of that state's move to retail choice in the electric industry. The concern by state legislators was not simply that electricity bills were unaffordable to low-income customers, but also that the move to retail choice would create a market structure under which low-income customers would not be actively solicited by competitive electric service providers.[25]

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[24] Order 75401, at 5.

[25] As it turns out, *no* residential customers are being actively solicited by competitive suppliers in Maryland.

Ultimately, a competitive electric industry did not develop for residential customers, with customers choosing not to abandon their electric distribution utilities, and suppliers choosing not to market to residential customers. Today, in 2007, as price caps continue to be removed from market-based prices offered to residential customers, Maryland consumers are experiencing substantial spikes (60% or more) in their electric prices. In these circumstances, EUSP has become both more important and more stressed, as the need for affordability assistance grows but the burden of meeting that need outstrips the ability to meet that burden.

3.8.2 Application of Best Practices Criteria

The Maryland Electric Universal Service Program (EUSP) is one of the nation's best examples of an SBC-funded external benefit rate affordability program. Adopted as part of the legislation directing Maryland to move to a retail choice electric environment, the EUSP has been implemented to pursue affordability targets within strict budget constraints. The Maryland EUSP is rated "exceptional" in nine of the 20 best-in-class criteria.

3.8.2.1 Criterion #1: Is the program reasonably open to all households in need.

The Maryland EUSP is reasonably open to all households in need. Program eligibility is set at 175% of the Federal Poverty Level. Program enrollment is open year-round. There is no ceiling on program enrollment.[26]

The population to be served by EUSP is supported by extensive empirical analysis. An annual needs assessment is filed with the program operating plan each year. In addition, the program completes an annual report examining the extent to which the EUSP met the expected need within six months after the close of each fiscal year.

EUSP provides reasonable ease of entry into the program. No non-income eligibility criteria are imposed through the EUSP. Unlike the corresponding federal fuel assistance program, however, the EUSP *does* require that the program applicant be limited to the named utility customer (the federal fuel assistance program requires the applicant to be part of the household, but the applicant need not be the named customer). EUSP entry occurs primarily, though not exclusively, through the federal fuel assistance program. The two programs use a unified program application. Ease of entry into EUSP through the federal fuel assistance program is impeded somewhat by the fact that the two programs are on different fiscal years.[27]

[26] In theory, the fixed nature of the EUSP budget would create a ceiling on program participation. The program administrator, however, reports that it consciously sets benefits at a level to ensure that its budget authorization will not be exhausted, so as to ensure that all applicants, at whatever point in the program year, will be assured of receiving program benefits.

[27] As a state program, EUSP is on the state fiscal year (July through June). The federal fuel assistance program is on the federal fiscal year (October through September). A household applying for EUSP in July, August or September, in other words, may *not* also receive federal energy assistance benefits until October, the beginning of the new federal fiscal year.

The EUSP has adopted some, but nonetheless limited, mechanisms to facilitate the required annual recertification. While new applications must be submitted in person, annual recertification applications may be submitted by mail. Unlike other programs, the EUSP does not provide for less than annual recertification, for automatic certification under prescribed circumstances, or for less stringent income verification under prescribed circumstances.

3.8.2.2 Criterion #2: Does the program recognize the multiple facets of energy affordability "need."

The EUSP operates primarily as a bill affordability program for current usage. Bill discounts range from 30% (for households at 150 – 175% of Federal Poverty Level) to 75% (for households with income less than 75% of Poverty). The EUSP has four discount tiers.

The program operates a limited arrearage forgiveness program. By law, however, the budget to be allocated toward preprogram forgiveness is quite limited. As a result, the program administrator has imposed a minimum arrears requirement of $300 before a program participant may access arrearage credits. Once accessed, arrearage credits can be obtained up to a maximum of $2,000. Arrearage retirement credits can be accessed only once.[28]

The EUSP recognizes the role that energy efficiency plays in helping to resolve low-income affordability problems. The statutory budget, however, substantially limits the use of EUSP funding for "weatherization" purposes. Moreover, the state utility regulatory commission has held that the statutory reference to "weatherization" as an allowed use disallows the use of EUSP funds for usage reduction investments not involving traditional building shell improvements. The regulatory commission held, for example, that "the commission does not view appliance replacement as within the scope of a weatherization program."

Even though traditional weatherization measures are often not applicable to an electric affordability program, the inability to address the efficiency needs of electric program participants is largely budget driven. Maryland's regulatory commission held that it "recognizes that there are other measures that also may reduce energy consumption but do not fall within the parameters of weatherization. Energy conservation. . .may come within the scope of 'universal service program,' as defined and may be desirable. However, [the statute] speaks to low-income weatherization and not the broader category of energy conservation. The commission notes that the USP has finite resources. . .With the limited amount of money that can be directed toward weatherization at this time, it is appropriate that the measures undertaken meet the narrower parameters defined above."

[28] A proposal has been advanced by the program administrator to change this one-time only requirement to a limitation of once every seven years.

3.8.2.3 Criterion #3: Does the program efficiently use program funding?

The Maryland EUSP incorporates multiple program components that result in the efficient use of program funding. The EUSP program design does an exceptional job of matching program benefits to individual needs. While the EUSP is a type of a tiered rate discount, the program delivers its benefits as a single lump sum payment based on an individual calculation of customer needs. Discounts vary based not only on the ratio of household income to Federal Poverty Level, but also on the location of the customer within the state (as measured by the electric distribution utility), and by the actual electricity consumption of the household.

The EUSP is well-integrated with both the federal fuel assistance program and the billing processes of the state's regulated utilities. EUSP provides bill affordability assistance only for non-heating electricity. Given the program's integration with the federal fuel assistance program, as with the New Hampshire EAP, the Maryland EUSP provides that the heating component of any electricity affordability benefit should be paid by the federal program. Federal fuel assistance benefits increase rate discounts by 15% (from 75% to 90% for households with income below 75% of the Federal Poverty Level) for electric heating customers.

Integration with utility billing processes helps protect program participants against seasonal bill volatility. Maryland's EUSP requires program participants to enroll in the levelized monthly budget billing programs of their respective electric companies.

3.8.2.4 Criterion #4: Does the program provide for continuous improvement?

The EUSP does a reasonable job of program assessment and continuous improvement. On the one hand, while a comprehensive outcome evaluation was recently completed of the EUSP, neither the program's authorizing statute nor implementing regulations require periodic outcome evaluations. On the other hand, the EUSP program administrator files an annual report in December of each year (after the June close of the prior fiscal year) which outlines the immediately preceding year's program operations. That annual report further assesses the extent to which the needs identified in the annual program operations plan were satisfied. The annual report does *not*, however, comprehensively review program outcomes, including outcomes involving bill burdens or payment patterns and practices.

To this extent, while the EUSP engages in limited standardized data reporting from the program operations side, it falls short in gathering regular, periodic standardized data from participating utilities on the payment practices of program participants.

3.8.2.5 Criterion #5: Does the program provide for reasonable cost recovery?

The EUSP provides for reasonable program budgeting and program cost recovery. EUSP program costs are collected as a fixed customer charge on all customer classes. While the

EUSP statute mandates that program costs be collected from all customers, the statute prohibits that such cost recovery be accomplished on a volumetric basis. The EUSP program administrator submits a proposed annual budget to the Maryland utility regulatory commission each year. Based on that budget submission, the utility regulatory commission establishes the fixed customer charge needed to generate the program budget.

The Maryland EUSP suffers from the lack of any indexing of the program budget to increases in energy prices or program participation. Indeed, increasing prices often drive increasing participation. Unlike programs with reconcilable rate riders through which to collect programs costs, Maryland's EUSP does not have the flexibility to increase its budget to reflect increasing electric prices without legislative approval.

Given the expiration of price caps on electricity prices in Maryland in recent years, and the corresponding spike in electric prices –electric prices have increased by 70% or more in some electric service territories—the failure to adjust the program budget to reflect these changes in the underlying environment has resulted in decreased benefits and increasing hardships on Maryland's low-income customers.

3.9 Program #9: The Electricité de France (EDF) "Social Tariff" (France)

Electricité de France (EDF) serves nearly 28 million customers in that country. According to the company, as a "responsible industrialist," it seeks to "reconcile its management constraints and therefore its constraints related to the strict collection of its accounts receivable with its public service obligations." EDF actions are taken within the context of a legally recognized "right to electricity."

French law first articulated a "right to electricity" in 1998 as the country adopted statutes providing for the "modernization and development" of the electric power industry. In October 2005, EDF signed an agreement that specified certain actions the company would take to promote this right to electricity for "customers with precarious situations." The "right to electricity" is defined to mean "guaranteeing temporary maintenance of the supply of electricity for people faced with precarious situations and contributing to the Housing Solidarity Fund."

3.9.1 An Outline of the Program

The EDF low-income electric affordability program consists of four distinct components:

3.9.1.1 Case Management

EDF seeks to prevent electricity debt through a network of what it calls "solidarity correspondents," "solidarity representatives" and "social mediators." This network of specially-trained company staff provides case management services to customers having

difficulty paying their bills. These staffpersons, located in each Department in France,[29] are charged with maintaining contact with public and private stakeholders, including not merely those who can provide utility assistance but those who can provide health, housing, employment and other types of social assistance. While the primary role of the company staff is to "help [payment-troubled customers] bring their energy bill under control and, together with them, find a method of payment adapted to their situation," that process is tied to helping the customer address his or her underlying financial problems in the meantime.

3.9.1.2 Energy Maintenance Service

EDF provides a system of "minimum electricity supply" in an effort to minimize the number of service disconnections for nonpayment. Known as the Energy Maintenance Service, this system helped reduce the number of nonpayment disconnections from 670,000 in 1993 to fewer than 190,000 in 2004. In 2004, more than 200,000 households benefited from EDF's Energy Maintenance Service.

The Energy Maintenance Service provides a minimum supply of electricity to a customer facing nonpayment disconnections during the time it takes for a government public assistance official to review the customer's file to determine eligibility for public assistance. The Energy Maintenance Service guarantees power of 3,000 watts. The purpose is to allow the household to provide basic lighting, along with the use of a refrigerator, television and one or two appliances.

Through the Energy Maintenance Service program, EDF installs a mini-switch without charge in the home. This switch automatically limits the power consumed in the home. If the electricity consumption exceeds 3,000 watts, the power is interrupted for 15 seconds. Before the switch can remain on, the customer must determine how to reduce consumption.

When the Energy Maintenance Service is begun, the customer must agree, in writing, to submit an application to the appropriate public assistance agency within fifteen days to determine his or her eligibility for such assistance.

The company cannot, of course, always make personal contact with a household prior to the disconnection of service for nonpayment. In such situations, the company installs a switch allowing for 1,000 watts of power to be consumed at any given time. According to EDF, this Minimum Service allows for the customer to operate lighting and auxiliary back-up heating. A customer using this lesser Energy Maintenance Service then is provided five days to contact the company to arrange for bill payment (or to move his or her service to the 3,000 watt service).

[29] A "Department" is the French equivalent to a "state" in the United States or a "province" in Canada. Since 1790, France has been divided into 95 metropolitan *départements*.

3.9.1.3 Solidarity Funds

EDF is a primary contributor to the country's Solidarity Funds, the French equivalent to local fuel funds. According to the company, when a customer's precarious utility bill payment situation is presented to a social services agency, the customer is "likely to benefit from financial assistance equivalent to total or partial payment of their electricity bill."

The funds are operated by local commissions that operate under the authority of the local council which runs each of the 95 French départements. These local commissions include representatives of various public assistance agencies, businesses, and community-based organizations, who seek to resolve not only the specific electricity bill payment problem, but seek also to address the underlying economic situation of the household.

EDF is one of the primary funders of the Solidarity Funds. According to the company, in 2004, EDF provided 27% of the total funding of the Solidarity Funds, more than any other single contributor. The EDF contribution in 2004 reached 17 million Euros. Through this EDF contribution, Energy Solidarity Funds provided financial assistance to 245,000 families with financial problems.

3.9.1.4 Rate for Absolute Essentials

Established by legislation approved in February 2000, the Rate for Absolute Essentials was implemented by EDF effective January 1, 2005. The Rate for Absolute Essentials is expected eventually to be applied to 1.2 million households in France.

Eligibility for the Rate is determined through the country's health insurance organizations. Once such an organization determines that the family income is less than or equal to 400 Euros per month,[30] the health insurance organization provides the appropriate electric distribution utility (of which EDF is one) with the family's contact information. EDF provides an application to the family who must complete it and return it to the company. Once a complete application is returned, the family "automatically benefits from this special rate."

The Rate for Absolute Essentials provides an annual reduction of 30%, 40% or 50% (depending on family composition) off of the first 100 kWh of monthly consumption. The program provides annual benefits of roughly 70 Euros.

Households may participate in the Rate for Absolute Essentials for one year, with an annual confirmation of entitlement being required each subsequent year.

[30] This income level is considered to be an "intermediate level between income ceilings providing entitlement to financial aid and those providing entitlement to universal health coverage."

3.9.2 Application of Best Practices Criteria

The low-income rate initiatives offered by EDF in France differ in kind, and not merely degree, from the universal service rate affordability programs offered in the eight United States jurisdictions assessed in this report. Because of these major differences in program objectives, design and implementation, the Best Practices Criteria have not been applied to the EDF program. To do so would seek to compare fundamentally noncomparable programs. For this reason, and to this extent, the EDF program is not considered to be a best-in-class program as such programs are defined and assessed throughout this analysis.

PART 4. LESSONS LEARNED FROM BEST PRACTICES

The discussion above examines selected low-income affordability programs currently in operation around the United States as determined by the author to be best in class. Eight United States programs have been reviewed, in addition to the low-income initiatives of Electricité de France (EDF) in France.

The analysis focuses exclusively on rate affordability programs. Initiatives involving usage reduction programs, as well as credit and collection practices directed primarily at low-income households,[31] are set aside not because they are unimportant, but rather simply because they are beyond the scope of this review.

The discussion examined nine programs:

- New Jersey's Universal Service Fund (USF);
- The Columbia Gas Customer Assistance Program (CAP) (Pennsylvania);
- The Equitable Gas Company Customer Assistance Program (CAP) (Pennsylvania);
- The Ohio Percentage of Income Payment Plan (PIPP);
- The Citizens Gas & Coke Utility/Vectren Energy Delivery Universal Service Program (USP) (Indiana);
- The National Fuel Gas Distribution Corporation Low-Income Rate Assistance (LIRA) program (Pennsylvania);
- The Electric Assistance Program (EAP) (New Hampshire);
- The Electric Universal Service Program (EUSP) (Maryland); and
- The "social tariff" of EDF (France).

4.1 Fundamentals of a Best Practice Rate Affordability Program.

Low-income rate affordability programs are legitimate utility operations. While directed at low-income customers, the best-in-class programs are designed to pursue utility-oriented objectives. Programs directed toward improving collections, reducing arrears, and addressing inability-to-pay in a more cost-effective and cost-efficient manner than traditional collection activity tend to be best-in-class. There is no single "right" way to

[31] Such practices might include deferred payment plans, the waiver of late fees or other designated charges, or the use of alternatives to the disconnection of service (e.g., service limiter adapters).

implement such a program. There are, however, program attributes that make some programs more effective, more cost-effective, and more cost-efficient than others. Those program attributes are discussed in more detail below.

4.1.1 The Values Underlying an Affordability Program

A best-in-class low-income rate affordability program is directed toward addressing the inability-to-pay problems of income eligible households. Inability-to-pay, however, goes beyond the mere existence of payment troubles. The unaffordability of home energy does not always manifest itself through an unpaid bill. The paid-but-unaffordable bill is a real phenomenon.

When home energy burdens –energy burdens are the home energy bill as a percentage of household income-- reach a certain point, the household will *either* not regularly be able to pay the bill on a full and timely basis *or* not regularly be able to pay the bill without substantial household hardship. Best-in-class programs address the affordability of annual home energy bills relative to annual household income.

Nearly all utilities offering best-in-class rate affordability programs explicitly take home energy burdens into account. Programs such as the New Jersey Universal Service Fund (USF), the Columbia Gas Customer Assistance Program (CAP), and the Equitable Gas CAP, tie their affordable rates to an individually-calculated affordable home energy burden. Even programs such as the tiered discounts offered by the New Hampshire Electric Assistance Program (EAP), the Citizens Gas/Vectren Universal Service Program (USP), and the National Fuel Gas Low-Income Rate Assistance (LIRA) program base the level of their discount on a calculation of what percentage of income burden will be borne by low-income ratepayers as a result.

Lesson #1:

A best-in-class rate affordability program should recognize the essential role played by home energy burdens in defining home energy affordability.

Paying the bill for current usage can not be the exclusive focus of home energy affordability. Low-income home energy affordability consists of more than helping a customer to be able to pay their bill for current usage. Addressing the *future* affordability of bills for current usage does not provide comprehensive assistance to a household if that household has incurred substantial pre-existing arrears because of a *past* inability-to-pay. The affordability of home energy consists of the *total* asked-to-pay amount, not simply the bill for current usage. If a customer cannot afford to pay a total home energy bill, it makes no difference to the customer whether the bill's unaffordability is caused by the charges for current usage or by the charges for pre-existing arrears.

Addressing pre-existing arrears can occur in multiple ways. Programs such as the New Jersey USF, the Columbia Gas CAP and the Equitable Gas CAP provide credits toward pre-existing arrears in exchange for full and timely payment of current bills over a period of time. The National Fuel Gas LIRA program provides matching credits for customer payments toward arrears, offering a $15 match for each $5 customer payment in a given month. The Maryland Electric Universal Service Program (EUSP) provides arrearage credits, but requires a minimum arrears of $300 for customers to be eligible and places a $2,000 cap on arrearage credits. The EUSP further provides an arrearage credit only one time (though proposals have been advanced by the program administrator to modify this to be one-time every seven years).

Lesson #2:

A best-in-class rate affordability program addresses not simply the affordability of charges for future consumption, but the charges for pre-existing arrears as well.

4.1.2 The Legitimacy of an Affordability Program

A best-in-class low-income rate affordability program must balance the interests of a utility's low-income customers, the nonparticipating ratepayers of a utility, and utility investors.

A best-in-class low-income rate affordability program takes account of the interests of the utility's low-income customers by ensuring that the program is reasonably open to all customers in need. The scope of eligibility should recognize the breadth of an inability-to-pay problem without imposing artificial eligibility criteria unrelated to the lack of affordability. Ease of entry refers to the actual process of enrolling in the program. Ease of entry, however, further involves not only *becoming* a program participant, but also *remaining* a program participant over time.

In the United States, best-in-class programs tend to define eligibility exclusively in terms of income-eligibility. Eligibility guidelines are defined by reference to income, taking into account household size (a measure known as Federal Poverty Level). While Pennsylvania's utilities –three of which are listed within the list of best-in-class in this discussion—add the requirement that customers be "payment-troubled" to be eligible for their low-income programs, "payment-troubled" is defined broadly. Overall, utilities operating best-in-class rate affordability programs tend to shy away from imposing non-income-based eligibility requirements.

Moreover, to ease program entry, most of the best-in-class utilities provide for year-round enrollment with no ceiling on the number of customers that may enter the program. Programs without year-round enrollment (e.g., the Citizens/Vectren USP) have tied their rate affordability enrollment to the federal fuel assistance program. While this partnership provides for administrative efficiencies, one "price" to be paid for the

partnership is to limit enrollment in the utility program to the same enrollment time period of the seasonally-based federal fuel assistance program.

Many utilities have specifically addressed not simply the ease of entry into the program, but the ease of remaining in the program from year to year. Nearly all best-in-class programs provide for mail recertification, limiting the need for personal applications to the initial program entry. Programs such as the New Hampshire EAP, the Columbia Gas and Equitable Gas CAP, and the National Fuel Gas LIRA allow for multi-year certification for households whose income is not likely to vary from year-to-year. Equitable Gas and Columbia Gas, in addition to the New Jersey USF, further provide for an automatic re-enrollment of program participants so long as those participants also receive benefits from other programs with similar income eligibility guidelines.

Indeed, Equitable Gas allows for a self-certification of income-eligibility by program applicants, with ongoing testing of whether this self-certification leads to unreasonable error rates in eligibility determination occurring through random audits of a small percentage of program participants.

Lesson #3:

A best-in-class rate affordability program must be reasonably open to all households in need, both in terms of the scope of eligibility and in terms of the ease of entry into (and retention in) the program.

A best-in-class low-income rate affordability program takes account of the interests of the utility's nonparticipating ratepayers by ensuring that program funds are efficiently distributed. An efficient program distributes funding in the amount necessary to accomplish its program objectives, but in an amount no greater than is necessary to accomplish its program objectives.

An affordability program is not simply a mechanism through which to supplement the resources of a low-income household. It is instead designed to redress an excessive home energy burden. As a result, a best-in-class program seeks to avoid underpaying or overpaying assistance to program participants. A program underpays if the assistance to the household is insufficient to reduce the home energy burden to an affordable level. A program overpays if the assistance to the household is more than is necessary to reduce the home energy burden to an affordable level.

The ideal mechanism to use to prevent the underpayment or overpayment of benefits is to individually determine the rate discount needed to reduce a customer's home energy burden to an affordable percentage of income. The New Jersey USF, along with the Columbia Gas and Equitable Gas CAPs, as well as the Ohio Percentage of Income Payment Plan (PIPP), all set natural gas and electric bills at an affordable percentage of income.

Tiered discount programs, such as those adopted by the New Hampshire EAP, the National Fuel Gas LIRA, and the Citizens Gas/Vectren USP, are less well-targeted, but are nonetheless specifically designed to reduce the bills of program participants to an affordable percentage of income. Each of these programs adopts rate discount tiers, taking into account income and household size, within which, so long as the customer is at the average, the customer will pay the targeted home energy burden. To the extent that the customer diverges from the average, however, there will be some overpayment or underpayment. The number of tiers a program uses minimizes this divergence. While, for example, the Indiana utilities (Citizens Gas, Vectren) operate with three tiers, the New Hampshire EAP operates with six. National Fuel Gas creates a separate tier for each income level in increments of $1,000.[32]

Lesson #4:

A best-in-class rate affordability program targets its rate affordability assistance to eliminate or minimize the underpayment or overpayment of benefits.

A best-in-class low-income rate affordability program takes account of the interests of the utility's investors by ensuring that program costs are recovered in a full and timely fashion. Utility expenditures on a low-income rate affordability program will generally vary based on factors largely outside of the ability of a company to control. In particular, programs that explicitly tie affordability benefits to an affordable percentage of income bear the risks of volatility in bills associated with changes in price or weather. Moreover, total program expenditures will vary based on factors ranging from the number of program participants, to the average income of program participants (as average participant income decreases in a percentage-of-income based programs, average participant program benefits will increase), to the level of bills for current usage based on weather and fuel prices.

A rate rider is "reconcilable" when the actual expenditures in an historic period are periodically compared to the revenues generated by the rate rider, with over-collections or under-collections rolled over into the calculation of the appropriate level of the rate rider to be charged in the next period.[33] The period of reconciliation may differ from

[32] A household with an income of $5,000, in other words, is in a different tier than a household with an income of $6,000.

[33] A reconcilable rate rider need not absolutely be adopted to ensure the full recovery of program costs. Maine utilities, which operate programs not considered to be best-in-class for reasons other than cost recovery, book their over-collections and under-collections in a reserve account. Any reserve surplus would be treated as a deduction from rate base in future rate cases. Net reserve deficiencies, if this situation were to occur, would be treated as a rate base addition in future years.

program to program; some programs are reconciled quarterly while most are reconciled annually.[34]

Virtually all best-in-class rate affordability programs allow for program cost recovery through a reconcilable rate rider. All three Pennsylvania rate affordability programs use reconcilable rate riders for program cost recovery. These utilities all operate under a statutory framework which specifically requires "full recovery" of program costs. The Pennsylvania commission rejected proposals to include rate affordability expenditures in base rates, holding that base rate recovery allows only a "reasonable opportunity for cost recovery" rather than the assurance of "full recovery" required by statute. The New Jersey USF, along with the Citizens/Vectren USPs, also adjust their rate riders prospectively, including program over-collections or under-collections from the immediately preceding year as part of their respective budgets.

Lesson #5:

A best-in-class rate affordability program allows a full and timely recovery of program expenditures, responsive to changes in factors affecting program expenditures in ways outside the ability of a utility to control.

4.1.3 The Integration of an Affordability Program with a Utility's Full Service Offerings

A best-in-class rate affordability program integrates the affordability provisions of the low-income program with the existing processes and structures of the sponsoring utility to the extent practicable. Best-in-class programs seek to integrate the affordability initiatives into the sponsoring utility's existing rate structure and collection processes.

A best-in-class low-income rate affordability program integrates the affordability benefits into its existing rate structure within the constraints of efficient program spending.[35] An integrated program can involve either a tiered rate discount or an explicit percentage-of-income based program. Integrating the affordability program into the rate structure makes clear that rate assistance is being provided to the low-income customer from the utility. Programs such as the New Jersey USF, as well as the Columbia Gas and Equitable Gas CAPs, provide credits toward bills for current usage that appear on the face of the bill. The tiered rate discount programs of the New Hampshire EAP, the National Fuel Gas LIRA, and the Citizens Gas/Vectren USP also identify the bill reductions as part of the rate structure. These approaches stand in contrast to the Maryland EUSP, which provides

[34] Some programs adjust their rate riders on a quarterly basis without making those riders reconcilable. Under this approach, any under-collection or over-collection in program costs would result in a prospective adjustment of the rate rider, but the past difference is not rolled forward into the future period.

[35] While a rate discount may, for example, be integrated into a company's rate structure, discounts tend to be inefficient mechanisms through which to distribute affordability benefits. Straight discounts tend to overpay some customers while underpaying others.

the ratepayer funding to a third party administrator who then distributes the money back to low-income customers in the form of an annual benefit payment.

Integrating low-income rate affordability programs into the normal collections process is a second best-in-class practice. By applying normal credit and collection practices to program participants, utilities avoid the need to create special procedures to address nonpayment by program participants. Nonpayment by a low-income program participant is not met with dismissal from the program (with the corresponding need to implement processes to monitor late payments or the cure of missed payments meriting program reinstatement). Nonpayment is addressed by placing the low-income program participant in the same collections process as any other customer, albeit under a separate tariffed rate. Of the best-in-class programs, only Equitable Gas conditions its grant of affordability benefits on full and timely payment of current bills.

Lesson #6:

A best-in-class rate affordability program integrates its low-income initiative into its existing rate structure within the constraints of efficient program spending.

4.1.4 The Impact of an Affordability Program on the General Population

Low-income rate affordability programs have positive impacts on the general ratepayer population. Low-income programs have been found to more effectively address nonpayment problems caused by the unaffordability of home energy to limited income households. In this sense, low-income programs should not be viewed as social service responses to poverty, but rather as a business response to the need to provide essential life services to customers who are likely to have difficulty paying for those services.

In approving the Columbia Gas CAP, the Pennsylvania state utility regulatory commission found that "an appropriately designed and well-implemented CAP, as an integrated part of a company's rate structure, is in the public interest." After investigation, the commission stated that the CAP approach to addressing low-income payment problems is "a more cost-effective approach for dealing with issues of customer inability to pay than are traditional collection methods." As the state Office of Consumer Advocate noted the issue to be: "The issue in this proceeding is not to devise a social response to the broad inability to pay problems of low-income households. The issue is one of what is the most cost-effective means of collection."

The Pennsylvania programs (Columbia Gas CAP, Equitable Gas CAP, National Fuel Gas LIRA) were seen as a way to respond to low-income unaffordability so as "to address realistically these customers' problems and to stop repeating a wasteful cycle of consecutive, unrealistic payment agreements that cannot be kept, despite the best of

intentions, followed by service termination, then restoration, and then more unrealistic agreements. . ."

Adopted at the behest of the respective utilities, the Indiana low-income rate affordability programs were based on a similar finding. According to Niel Ellerbrook, Chairman of the Board and Chief Executive Office of Vectren Utility Holdings, the parent company of Vectren Energy Delivery, the primary driving factor behind his utility's low-income proposal involved "the dramatic rise in natural gas prices and the resulting impact on customers and the economy." According to Ellerbrook, "There is a cost to serve customers who need heat but are unable to pay the full cost of service for any number of reasons, including job loss, cost of medicine, or the number of their dependents. Like other real costs to provide service to our entire customer base, this cost must be recognized and addressed in a constructive manner to assure that people have service." He concluded by noting that "[T]he USF program provides an answer in conjunction with LIHEAP and other available programs, by identifying customers with true need, determining in a consistent and accepted manner how much they can pay for service, and providing them with more affordable bills that better match their ability to pay."

Lesson #7:

A best-in-class rate affordability program represents a more cost-effective approach for dealing with issues of customer inability to pay than are traditional collection methods.

4.2 Common Elements of a Best Practice Rate Affordability Program.

An effective low-income rate affordability program is designed to address the multi-levels of need created by the inability of certain customers to pay for their essential home energy service. Not only should a program address the affordability of bills for current usage, but the program should also address past-due arrears. Not only should a program address the annual unaffordability of bills, but the program should also address the seasonal unaffordability of bills. Not only should a program address the payment of current bills, but the program should also address the consumption underlying those current bills.

To perform these multiple tasks requires a partnership between the utility, community-based organizations, government, and the low-income customers themselves.

4.2.1 The Necessary Components of a Rate Affordability Program

A best-in-class low-income rate affordability program has five necessary components to it. A low-income rate affordability program should:

- Reduce bills for current usage to an affordable percentage of income. The program should recognize the essential role played by home energy burdens in defining home energy affordability.

- Retire pre-existing arrears within a reasonable time period, without raising the overall monthly asked-to-pay amount to an unaffordable level.

- Protect against unexpected monthly bill volatility associated with changes in price and/or weather through facilitating or requiring entry into levelized budget billing plans.

- Promote the efficient use of energy, both through investments in usage reduction measures for the housing unit and the preservation of conservation incentives within the affordable rate structure.[36]

- Preserve funding to address crisis situations caused by the fragility of income experienced by poverty-level households.

Lesson #8:

A best-in-class rate affordability program recognizes that low-income home energy affordability consists of more than helping a customer to be able to pay their bill for current usage.

4.2.2 The Roles of the Different Actors

A best-in-class low-income rate affordability program represents a partnership between multiple stakeholders, each of which plays a key, though not exclusive, role in delivering program benefits. The key roles played by the various stakeholders include:

- A ***utility regulatory commission*** recognizes the need for a low-income rate affordability program as a cost-effective mechanism for addressing the inability-to-pay problems by the poor. The commission provides policy oversight of the program, in addition to providing fiscal oversight and control of program cost-recovery. In each of the best-in-class programs discussed herein, the regulatory commission provides this policy and fiscal oversight.

- The ***local distribution utility*** serves as the delivery agent for the low-income rate affordability program. The delivery agent is the institution through which affordability benefits are posted and communicated to the customer. Rather than providing cash benefits directly to a customer, affordability benefits are delivered either through bill reductions, or through direct vendor payments made to the utility. In each of the best-in-class programs discussed herein,

[36] Conservation incentives can be preserved through mechanisms such as offering percentage-of-income based benefits through a fixed credit on the bill or imposing bill or benefit caps.

benefits are distributed as bill credits, whether calculated by reference to percentage-of-income-based rates (Columbia Gas CAP, Equitable Gas CAP, Ohio PIPP, New Jersey USF), or by reference to tiered discounts (New Hampshire EAP, Maryland EUSP, National Fuel Gas LIRA, Citizens Gas/Vectren USP).

The local distribution utility further plays the primary role in targeting the rate affordability program to payment-troubled low-income customers. This targeting involves recognizing a persistently payment-troubled customer and referring that customer to the appropriate institution to determine whether the customer is income-eligible for the rate affordability program. Only the utility has the capacity to use its existing processes (call center conversations, collection processes) to recognize the persistently payment-troubled customers that would benefit from a low-income rate affordability program.

- The ***state or provincial government***, acting through its legislative body, may act to authorize the implementation of a low-income rate affordability program. While such legislative action should not be necessary so long as the local distribution utility offers the rate affordability program as a mechanism to improve the efficiency and effectiveness of utility operations, rather than exclusively as a social benefit, enactment of legislation may eliminate any ambiguity in regulatory jurisdiction over affordability programs.

  In the event that the legislative body acts, the best-in-class programs find that the legislative action is limited to language either authorizing (you "may" implement an affordability program) or mandating (you "must" implement an affordability program) regulatory agency action. Program design and operational decisions are best *not* placed in legislation, but rather left to the implementing agency.

- ***State and federal government agencies*** (other than the utility regulatory commission) serve as the front-line in determining income eligibility for a low-income rate affordability program. While the local distribution utility company is likely the institution who identifies a potential program participant, referrals for the actual determination of income-eligibility are generally made to a government agency.[37] While some utilities retain the task of determining income-eligibility for in-house utility staff, this is unusual. Programs such as the New Hampshire EAP, the Maryland EUSP, the New Jersey USP, and the Citizens Gas/Vectren USP rely on the federal fuel assistance program nearly exclusively to determine income eligibility for individual program applicants.

[37] These government agencies, of course, frequently operate through contractual relationships with local community-based organizations. The determination of income eligibility for the federal fuel assistance program, for example, is generally made through a contract with a local Community Action Agency.

State agencies can play various roles in administering a low-income rate affordability program. On the one hand, in some of the most successful affordability programs, state agencies are completely divorced from the program. Outside of the utility commission, no state agency in Pennsylvania plays an institutional role in the affordability programs of that state's utilities. In contrast, in some states, the state agency plays the primary role in the program. The Maryland EUSP generates a stream of revenue for the state's Office of Home Energy Programs (OHEP), which then distributes benefits to program participants. The only role for the utility is to receive the payment and post it to the customer's account. In yet other states, the state serves as the financial repository. The utilities in New Hampshire and New Jersey post prescribed bill credits to the accounts of program participants and seek reimbursement from the state. The state holds the funding generated by each state's system benefits charge pending a request for cost reimbursement. Finally, in states such as Indiana, the state plays no role other than serving as the intake agency.

- ***Community-based organizations*** perform critical outreach and intake functions for a low-income rate affordability program. Whether intake is undertaken at the governmental or utility level, the actual field personnel involved with outreach and intake are likely to be those persons who directly interface with low-income customers on a day-to-day basis. The staff of these community-based organizations have both the professional expertise, a well as the connection to the community, to allow them to perform these tasks effectively.

- The ***program participants*** play multiple roles in the success of a low-income rate affordability program. Primarily, a program participant has the obvious role of being responsible for the full and timely payment of monthly bills. Bill reductions can be offered to bring energy burdens into an affordable range, but the ultimate responsibility for bill payment remains with the customer. A program participant who does not pay will be subject to traditional credit and collection processes.

  Moreover, even once bills have been reduced to an affordable home energy burden, program participants have ongoing fiscal responsibilities. Program participants must be aware of their own consumption patterns to prevent program benefits from being curtailed for exceeding bill or benefit ceilings.

  Finally, program participants must also be responsive to the need to maintain their participation in the affordability program. Notice of the need to recertify income for continuing participation will come from the program; indeed, the program may facilitate such recertification in various ways (e.g., allowing mail recertification rather than in-person recertification). The ultimate responsibility for maintaining program participation, however, remains with the customer.

Lesson #9:

A best-in-class rate affordability program need not be explicitly authorized by the government's legislative body, so long as the local distribution utility offers the program as a mechanism to improve the effectiveness of utility operations, rather than exclusively as a social benefit.

4.2.3 The Funding of a Rate Affordability Program

The funding of a low-income rate affordability program has implications for the program, for the sponsoring utility, and for nonparticipating customers. Funding involves not only the level of dollars devoted to the program budget, but also the structure and timing of program funding.

Best-in-class home energy affordability programs should provide for reasonable certainty in the level and timing of program funding. Program expenditures that are subject to year-to-year uncertainty, in either their existence or their magnitude, impede efficient program operations. Program planning processes are interrupted, staff retention and training is impeded, and even medium-term capital expenditures (often in information technology hardware, software, or programming time) are avoided. Reasonable funding is accomplished by building the funding mechanisms into the utility rate structure. In contrast, relying on annual government appropriations leads to year-to-year uncertainty as to whether funding will be provided or what that funding level will be.

The existence of utility-based low-income program funding is universal within the best-in-class programs. The utility-based funding does not depend on the structure of the underlying delivery of benefits. The New Hampshire EAP (tiered discount), New Jersey USF (fixed credit percentage of income program), and Maryland EUSP (tiered discount) all rely on a statewide system benefits charge.[38] In contrast, the Citizens Gas/Vectren USP (tiered discount), Columbia Gas and Equitable Gas CAPs (percentage of income programs), and National Fuel Gas LIRA (tiered discount), all rely on a utility-specific reconcilable rate rider. No best-in-class program relies on state-appropriated funding for its budget.

Lesson #10:

A best-in-class rate affordability program provides for reasonable certainty in both the level and timing of program funding through utility-based funding.

[38] Cost-recovery also should not be limited to specific utility service territories. It is unreasonable to expect that needs and resources will be equal between service territories. Statewide funding of programs, allowing for a distribution of funds based on need, allow for a greater certainty that funding will be adequate. Indeed, utility service territories with the greatest number of low-income customers, and thus the highest level of need, may be least able to be self-supporting in their offer of rate affordability funding.

Just as the certainty of program funding is an attribute of best-in-class low-income rate affordability programs from the program perspective, certainty of cost-recovery is an attribute from the perspective of the sponsoring utility. Certainty of cost-recovery is generally provided through a reconcilable rate rider. The nature and prevalence of reconcilable rate riders is discussed elsewhere in this report within the context of protecting investor-based interests.

Lesson #11:

A best-in-class rate affordability program provides for timely cost recovery through periodic reconcilable rate riders.

A best-in-class low-income rate affordability program should protect the interests of nonparticipating customers by ensuring that all stakeholders equitably contribute to program funding. In particular, given the nature of the home energy affordability problem, all customer classes should contribute to the funding of these programs. The costs for low-income rate affordability programs should be viewed as a cost of operating as a public utility for which all ratepayers must share the costs. As one regulatory staff found, "the problem of the inability of some low income customers to pay their entire home energy bills is caused primarily by societal economic conditions that *are unrelated to any one rate class*. The costs for [low-income rate affordability] programs should be viewed as a cost of operating as a public utility for which all ratepayers must share the costs."

With the exception of Pennsylvania, whose utility commission has chosen to limit cost recovery exclusively to the residential class, low-income rate affordability programs recover their costs from all customer classes. The New Jersey USF, Ohio PIPP, Maryland EUSP, and Citizens/Vectren USPs all impose a system benefits charges (SBC) on all customer classes. In each of these states, the charge varies between classes, but is uniform within the class. In contrast, the New Hampshire EAP is based on a uniform charge across all customer classes.

Lesson #12:

A best-in-class rate affordability program views the costs for low-income rate affordability programs as a cost of operating as a public utility for which all ratepayers must share the costs.

Similarly, while the interests of utility investors should be protected through timely cost-recovery, utility investors should not be the sole beneficiaries of cost reductions generated by a low-income rate affordability program on a between-rate-case basis. Instead, cost-recovery should recognize that program expenditures generate cost reductions as well as cost expenditures. To the extent that a home energy affordability

program helps reduce payment troubles, a participating utility should realize savings in credit and collection costs and reduced write-offs. To the extent that a home energy affordability program reduces participant arrears, a participating utility will realize reductions in the working capital associated with carrying those arrears. A best-in-class affordability program should account for the benefits generated by the program as well as the expenditures made to support the program.

Some, but not all, best-in-class rate affordability programs account for cost savings in their ratemaking. National Fuel Gas agreed to implement a cost offset for the incremental additions to its LIRA program since its last base rate case.[39] Moreover, both Vectren and Citizens Gas have agreed to make investor-contributions to their rate affordability programs in partial recognition of the cost offsets generated by the program. Other programs, such as the New Hampshire EAP, the New Jersey USF, and the Maryland EUSP, have not recognized program cost offsets in their ratemaking treatment of program costs.

Lesson #13:

A best-in-class rate affordability program, in its program cost recovery, accounts for the benefits generated by the program as well as the expenditures made to support the program.

[39] In a base rate case, any cost savings that are generated by a low-income rate affordability program are recognized and accounted for through a reduced revenue requirement. The issue here involves the extent to which, if at all, cost savings are accounted for on a between-rate-case basis.

APPENDIX A:
IDENTIFICATION OF BEST-IN-CLASS CRITERIA

Program Attribute			Universal Service Fund (NJ)	Columbia Gas CAP (PA)	Equitable Gas CAP (PA)	Percentage of Income Payment Plan (OH)	Universal Service Programs (Citizens Gas and Vectren) (IN)	National Fuel Gas Low Income Rate Assistance (PA)	Electric Assistance Program (NH)	Electric Universal Service Program (MD)
1. Reasonably open to all in need										
	a.	Needs assessment prepared as basis for program design.	No	Yes	Yes	No	No	Yes	No	Yes
	b.	Non-income criteria used to establish program eligibility.	No	Payment troubled	Payment troubled	No	No	Payment troubled	No	No
	c.	Rolling year-round program applications accepted.	Yes	Yes	Yes	Yes	No	Yes	No	Yes
	d.	Reasonable definition of "low-income" established as eligibility level.	175% FPL	150% FPL	150% FPL	175% FPL	150% FPL	150% FPL	185% FPL	175% FPL
	e.	Enrollment performed in conjunction with other public benefit programs.	LIHEAP/Food Stamps	No	No	LIHEAP	LIHEAP	No	LIHEAP	LIHEAP
	f.	Multi-year income certification accepted for households with fixed income.	No	Limited	Yes	No	No	Yes	Limited	No
	g.	Ceiling placed on participation numbers.	No	No	No	No	No	No	Yes	No
2. Recognizes and incorporates multi-faceted nature of "need."										
	a.	Bill for current usage tied explicitly to household home energy burden.	Yes	Yes	Yes	Yes	Tiered discount	Tiered discount	Tiered discount	Tiered discount
	b.	Minimum payment required by customer.	No	Past year average or $25	$25/month	No	No	$12/month	No	No
	c.	Programs benefits subject to ceiling.	Yes	Yes	Yes	No	No	Yes	No	Yes
	d.	Risk of increased bills due to weather/prices placed on customer, on program, or shared.	Customer	Program	Program	Program	Shared	Shared	Shared	Customer
	e.	Preprogram arrears forgiven over time.	12 months	6-years	Matching	Matching	No	24-months	No	Limited
	f.	High use program participants automatically referred to usage reduction program.	Referred	Referred	Referred	Referred	Referred	Referred	No	No
	g.	Program includes proactive reminder telephone calling.	PILOT	No	Yes	No	No	No	No	No
	h.	Program offers crisis intervention funding.	No	Fuel fund support	Fuel fund support	No	Fuel fund support	Fuel fund support	No	No
3. Efficiently uses program funds.										
	a.	Uses federal fuel assistance program as intake mechanism.	Yes	No	No	Yes	Yes	No	Yes	Yes
	b.	Service delivered through partnerships with community-based organizations.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	c.	Joint intake/eligibility determination made through federal fuel assistance program/joint application.	Yes	No	No	Yes	Yes	No	Yes	Yes
	d.	Federal fuel assistance dollars explicitly used in setting rate affordability assistance levels.	Yes	No	No	Yes	Yes	Yes	Yes (heating)	Yes (heating)
	e.	Rate affordability assistance combined with mandatory levelized budget billing.	No	No	No	No	Yes	Yes	No	Yes

Program Attribute			Universal Service Fund (NJ)	Columbia Gas CAP (PA)	Equitable Gas CAP (PA)	Percentage of Income Payment Plan (OH)	Universal Service Programs (Citizens Gas and Vectren) (IN)	National Fuel Gas Low Income Rate Assistance (PA)	Electric Assistance Program (NH)	Electric Universal Service Program (MD)
	f.	Conservation incentives designed into the rate structure or specific control features.	Yes	Yes	Yes	No	No	Yes	No	Yes
4. Provides mechanism for continuous improvement.										
	a.	Program objectives explicitly articulated in public document.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	b.	Program outcome evaluation performed at regularly designated time intervals.	No	Yes	Yes	No	Yes	Yes	Yes	No
	c.	Regular periodic standardized data reporting institutionalized.	No	Yes	Yes	Yes	Yes	Yes	Yes	No
5. Provides for reasonable cost recovery.										
	a.	Cost recovery spread over all customer classes.	Yes	No	No	Yes	Yes	No	Yes	Yes
	b.	Program cost recovery annually determined/cost recovery annually adjusted.	Yes	Yes	Yes	No	Yes	Yes	No	Yes
	c.	Cost recovery accounts for program cost offsets generated by program.	No	No	Yes	No	Yes	Yes	No	No
	d.	Cost recovery independent of utility service territory limits.	Yes	No	No	No	No	No	Yes	Yes

APPENDIX B:
RATINGS BASED ON BEST-IN-CLASS CRITERIA

Criteria	Program Rating (see notes)	Notes
1 Reasonably open to all in need		
a. Empirical needs assessment	0	While program evaluation assessed "need," needs assessment is not used to establish program budget or design.
b. Scope of eligibility	*	Sets eligibility at 175% of the Federal Poverty Level.
c. Ease of program entry	*	Automatic enrollment through state-administered federal fuel assistance program eliminates entry barriers.
d. Open enrollment	*	Program commits to serve all in need. Program accepts enrollment year-round. There is no ceiling on participation.
e. Ease of recertification	+	Must recertify annually. Can do in-person at local community based organization or by mail.
2 Recognizes and incorporates multi-faceted nature of "need."		
a. Affordability of bills for current usage.	*	Seeks to reduce combined gas/electric home energy burden to 6% of income, split 3% for electric baseload and 3% for heating (6% for all electric)
b. Resolution of pre-program arrears.	*	Programs "Fresh Start" component provides for the forgiveness of arrears after 12-months of timely payments. May "cure" missed payments within 3-months after first 12-month period. Eligible for Fresh Start forgiveness only once.
c. Targeted assistance to high usage/high benefit participants.	+	High usage USP participants routinely referred to utility-funded "Smart Comfort" energy efficiency program. Explicit tie between USP and Smart Comfort.
d. Allocation of risk of weather/price volatility.	-	"Fixed credit" nature of program benefits places entire risk of increased bills due to weather or prices on program participant.
3 Efficiently uses program funds.		
a. Matches payments to needs	*	Program individually determines an affordable home energy bill for each program participant. No under- or over-payment occurs.
b. Maximum/minimum payment.	0	No minimum customer payment. Program imposes $1,800 ceiling on benefit payment. Ceiling on benefit not indexed.
c. Integrates with other utility payment processes (e.g., budget billing).	-	Program's inability to move to budget billing results in federal fuel assistance creating bill credits in some months and high monthly bills in other months, even though annual energy burden is "affordable."
d. Integrates financially with other energy assistance programs.	+	High integration with federal LIHEAP program. LIHEAP benefits subtracted from bill prior to calculating home energy burden. LIHEAP used as automatic intake for USP.
e. Conservation incentives designed into the program.	*	Fixed credit nature of benefit allows customers to retain benefits of usage reduction. Fixed credit requires customers to pay for increased consumption. Benefits subject to ceiling.
4 Provides mechanism for continuous improvement.		
a. Provides for periodic outcome evaluation relative to objectives.	+	Program outcome evaluation performed under contract to state utility regulatory commission. Periodicity of evaluation not memorialized in program design or regulations.
b. Provides for standardized data reporting.	+	BPU has prescribed limited standardized data reporting by all regulated utilities. Information not compiled and made publicly available.
5 Provides for reasonable cost recovery.		
a. Spreads costs over appropriate customer base.	*	Universal service costs spread volumetrically over all customer classes.
b. Ensures timely and reasonable certain recovery of program costs.	*	State regulatory commission establishes annual budget, and annual USF charge, to cover program budget. Over/(under) cost recoveries for any given utility rolled over into the immediately subsequent program year.
c. Accounts for cost offsets generated by program.	0	Evaluation found inadequate information upon which to form a conclusion one way or the other regarding offsets. State regulatory commission considered efficacy of program cost offsets and postponed consideration for lack of information.
d. Cost recovery independent of utility service territory limits.	*	Statewide funding distributed based on need irrespective of source of funding. Natural gas funding suppo

Notes: Four ratings are possible for each program attribute:

*	Exceptional: An identified program attribute makes it stand out above other programs.
+	Positive: An identified program attribute enhances program operation and success.
0	Neutral: No program attribute enhances or degrades program operation or success.
-	Negatiive: An identified program attribute degrades program operation or success.

Criteria		Program Rating (see notes)	Notes
1	**Reasonably open to all in need**		
a.	Empirical needs assessment	+	Needs assessment periodically prepared as per regulatory commission directives.
b.	Scope of eligibility	+	150% of Federal Poverty Level AND payment-troubled (one failed payment agreement, cross-referral, credit scoring).
c.	Ease of program entry	*	Emphasizes telephonic applications. Must apply for fuel assistance. Specialized dedicated staff trained in universal service program intake. Self-declared payment-troubled customer referred to dedicated universal service staff.
d.	Open enrollment	*	Program commits to serve all in need. Program accepts enrollment year-round. There is no ceiling on program participation.
e.	Ease of recertification	*	Annual receritification required. Mail-in recertification allowed. Participants receiving LIHEAP, fuel fund benefits, or benefits from some other Columbia Gas universal service program exempt from annual recertification. Elderly and disabled allowed bi-annual recertification.
2	**Recognizes and incorporates multi-faceted nature of "need."**		
a.	Affordability of bills for current usage.	*	Gives four payment options: percent of bill, percent of income, 50% of budget billing, or average of last 12-months. Average of last 12 months is minimum payment.
b.	Resolution of pre-program arrears.	-	Arrearages forgiven over six (6) years if regular payment is made (along with $5 copayment toward arrears).
c.	Targeted assistance to high usage/high benefit participants.	*	Halted conservation education as ineffective. Refers high users to company usage-reduction program. Operates pilot program to address high usage in homes previously treated with usage-reduction measures. To be evaluated 2008.
d.	Allocation of risk of weather/price volatility.	+	Percentage of income and average prior payment options place risk on the Company. Percentage of bill shares risk between company and customer.
3	**Efficiently uses program funds.**		
a.	Matches payments to needs	*	Customer offered lowest payment option of four available, with minimum payment of average of last 12 months of customer payments. Percentage of income payment requirements tiered by ratio of income to Federal Poverty Level.
b.	Maximum/minimum payment	+	Program requires minimum customer payment. Program imposes ceiling on benefit level. Neither payment level indexed.
c.	Integrates with other utility payment processes (e.g., budget billing).	+	Waives security deposits for CAP participants. No mandatory budget billing.
d.	Integrates financially with other energy assistance programs.	+	Federal fuel assistance funds used to reduce the shortfall between required customer payments and customer bill at standard residential rates.
e.	Conservation incentives designed into the program.	*	Ceiling on benefits imposed.
4	**Provides mechanism for continuous improvement.**		
a.	Provides for periodic outcome evaluation relative to objectives.	*	Periodic program evaluation prepared pursuant to regulatory commission directive. Program evaluation considers uniform outcome and process questions adopted by regulatory commission. Evaluation prepared by independent third party.
b.	Provides for standardized data reporting.	*	Regular periodic data is reported to state utility regulatory commission as per commission directive. Uniform data reporting required for all regulated gas and electric utilities.
5	**Provides for reasonable cost recovery.**		
a.	Spreads costs over appropriate customer base.	-	Costs of program assigned to residential class only.
b.	Ensures timely and reasonable certain recovery of program costs.	+	Program costs recovered through a reconcilable universal service rider.
c.	Accounts for cost offsets generated by program.	-	Cost recovery does not take into account cost savings to the utility generated by the program.
d.	Cost recovery independent of utility service territory limits.	0	Utility-specific funding.

Notes: Four ratings are possible for each program attribute:

*	Exceptional: An identified program attribute makes it stand out above other programs.
+	Positive: An identified program attribute enhances program operation and success.
0	Neutral: No program attribute enhances or degrades program operation or success.
-	Negatiive: An identified program attribute degrades program operation or success.

Criteria		Program Rating (see notes)	Notes
1	**Reasonably open to all in need**		
a.	Empirical needs assessment	+	Needs assessment periodically prepared as per regulatory commission directives.
b.	Scope of eligibility	+	Income eligibility set at 150% of Federal Poverty Level. Must be payment-troubled to enter program.
c.	Ease of program entry	*	May enter program through company representative or an external community-organization. Company accepts self-certified income. Each year, 10% of participant base randomly audited to determine whether self-certification provided accurate information.
d.	Open enrollment	*	Program commits to serve all in need. Program accepts enrollment year-round. There is no ceiling on program participation.
e.	Ease of recertification	*	Program requires recertification once every three years. Recipients of federal fuel assistance automatically re-enrolled. Participants in corresponding electric program are automatically re-enrolled.
2	**Recognizes and incorporates multi-faceted nature of "need."**		
a.	Affordability of bills for current usage.	*	Tiered affordability tied to ratio of income to Federal Poverty Level. Payment percentages set at 7%, 8% and 10% for households with income at 0 - 50%, 51-100% and 101-150% of Federal Poverty Level respectively.
b.	Resolution of pre-program arrears.	*	Company provides $3 in matching funds for each $1 in customer payment. First $5 of each monthly customer payment is deemed to be toward arrears. Customers may "cure" missed arrearage payments and gain matching credits. Arrears projected to be forgiven over four years on average.
c.	Targeted assistance to high usage/high benefit participants.	*	High usage customers referred to the Company's Low-Income Usage Reduction Program (LIURP). High-usage referrals given priority for receipt of LIURP services.
d.	Allocation of risk of weather/price volatility.	*	Customer bills tied to percentage of income. Risk of volatility in price/weather borne by program.
3	**Efficiently uses program funds.**		
a.	Matches payments to needs	*	Percentage of income payment requirements tiered by ratio of income to Federal Poverty Level. Affordability set at 7%, 8% and 10% for households with income at 0 - 50%, 51 - 100% and 101 - 150% of Federal Poverty Level respectively.
b.	Maximum/minimum payment.	+	Program requires minimum customer payment. Program imposes ceiling on benefit level. Neither payment level indexed.
c.	Integrates with other utility payment processes (e.g., budget billing).	0	Customer must make payment to earn his or her credit toward the bill for current usage. Missed payments must be "made up" to earn future credits.
d.	Integrates financially with other energy assistance programs.	+	Federal fuel assistance funds used to reduce the shortfall between required customer payments and customer bill at standard residential rates.
e.	Conservation incentives designed into the program.	*	Ceiling on benefits provided. Discount nature of program provides for sharing of burden of increased usage.
4	**Provides mechanism for continuous improvement.**		
a.	Provides for periodic outcome evaluation relative to objectives.	*	Periodic program evaluation prepared pursuant to regulatory commission directive. Program evaluation considers uniform outcome and process questions adopted by regulatory commission. Evaluation prepared by independent third party.
b.	Provides for standardized data reporting.	*	Regular periodic data is reported to state utility regulatory commission as per commission directive. Uniform data reporting required for all regulated gas and electric utilities.
5	**Provides for reasonable cost recovery.**		
a.	Spreads costs over appropriate customer base.	-	Costs of program assigned to residential class only.
b.	Ensures timely and reasonable certain recovery of program costs.	+	Program costs recovered through a reconcilable universal service rider.
c.	Accounts for cost offsets generated by program.	-	Cost recovery does not take into account cost savings to the utility generated by the program.
d.	Cost recovery independent of utility service territory limits.	0	Utility-specific funding.

Notes: Four ratings are possible for each program attribute:

*	Exceptional: An identified program attribute makes it stand out above other programs.
+	Positive: An identified program attribute enhances program operation and success.
0	Neutral: No program attribute enhances or degrades program operation or success.
-	Negatiive: An identified program attribute degrades program operation or success.

Criteria		Program Rating (see notes)	Notes
1	**Reasonably open to all in need**		
a.	Empirical needs assessment	0	No periodic empirical needs assessment underlies the Ohio program.
b.	Scope of eligibility	+	Income eligibility set at 150% of Federal Poverty Level. No non-income-based eligibility requirements.
c.	Ease of program entry	0	Household applies through local community-based organization. Must apply for all available energy assistance.
d.	Open enrollment	*	Program commits to serve all in need. Program accepts applications year-round. There is no ceiling on program participation.
e.	Ease of recertification	+	Each customer must re-certify annually. Federal fuel assistance list first checked to determine whether needed information already exists. If not, application sent to customer which can be returned by mail. PIPP participants reporting zero dollar income must re-certify every 90-days.
2	**Recognizes and incorporates multi-faceted nature of "need."**		
a.	Affordability of bills for current usage.	+	Program sets payments at an affordable percentage of income. Program "affordable" payments, however, set home energy burdens at somewhat high levels (5% for electricity; 10% for home heating). If summer electric bills higher than 5% of income, must pay actual bills. Households with income below 50% of Poverty Level pay 3%, not 5%, for non-heating.
b.	Resolution of pre-program arrears.	+	Most common arrearage forgiveness provided through "graduate" program. Year 1: PIPP payment required; Year 2: actual bill required to be paid; Year 3 and after: actual bill plus some increment not to exceed $20 paid. Utility forgives amount equal to the additional amount paid.
c.	Targeted assistance to high usage/high benefit participants.	+	High usage customer referred to, and given priority for, energy usage reduction services.
d.	Allocation of risk of weather/price volatility.	+	For heating customers, risk of bill volatility placed on program since bill is set at percentage of income. For electric customers, risk of bill volatility is placed on customer since customer must pay 5% of income or actual bill, whichever is higher, during non-heating season.
3	**Efficiently uses program funds.**		
a.	Matches payments to needs	*	Bill affordability benefit individually determined for each customer. No under- or over-payment occurs.
b.	Maximum/minimum payment	0	No minimum customer payment. No ceiling on benefit payment. No minimum benefit amount.
c.	Integrates with other utility payment processes (e.g., budget billing).	0	No institutionalized integration of Ohio PIPP with utility bill payment processes.
d.	Integrates financially with other energy assistance programs.	*	Benefits provided to program participants by limiting bill to a percentage of income. The distribution of particular benefits from the state or federal programs performed by state agency and is transparent to customer.
e.	Conservation incentives designed into the program.	0	Referrals of high use customers to usage reduction program, but no structured conservation incentive.
4	**Provides mechanism for continuous improvement.**		
a.	Provides for periodic outcome evaluation relative to objectives.	0	While outcome evaluation of Ohio PIPP has been performed, periodicity of evaluation not set by statute or regulation.
b.	Provides for standardized data reporting.	*	State regulatory commission prescribes standardized data reporting that is filed by utilities on annual basis.
5	**Provides for reasonable cost recovery.**		
a.	Spreads costs over appropriate customer base.	*	Uniform charge per unit of energy imposed on all customer classes.
b.	Ensures timely and reasonable certain recovery of program costs.	+	Utility cost recovery rider set by state regulatory commission. Adjusted on application of program administrator or utilities.
c.	Accounts for cost offsets generated by program.	0	No consideration is given to program cost offsets.
d.	Cost recovery independent of utility service territory limits.	0	Utility-specific funding.

Notes: Four ratings are possible for each program attribute:

- * Exceptional: An identified program attribute makes it stand out above other programs.
- + Positive: An identified program attribute enhances program operation and success.
- 0 Neutral: No program attribute enhances or degrades program operation or success.
- - Negatiive: An identified program attribute degrades program operation or success.

Criteria		Program Rating (see notes)	Notes
1 Reasonably open to all in need			
a.	Empirical needs assessment	+	Empirical needs assessment made a part of universal service plan. Prepared pursuant to regulations of state utility commission.
b.	Scope of eligibility	+	Program extends to households with income at or below 150% of Federal Poverty Level. Customer must be payment-troubled (must have an arrears at the time of application or at least one current, canceled or defaulted payment arrangement).
c.	Ease of program entry	-	Requires all residents of household to become "ratepayer" to enter program. Requires program applicant to provide copy of household mortgage, deed or lease to enter program. Must execute written "LIRA Service Agreement."
d.	Open enrollment	*	Program commits to serving all in need. Program accepts enrollment year-round. There is no ceiling on program participation.
e.	Ease of recertification	*	Household income must be reverified every two years, unless household situation changes or household reports $0 income or household does not receive federal fuel assistance.
2 Recognizes and incorporates multi-faceted nature of "need."			
a.	Affordability of bills for current usage.	*	Affordability tied to tiered percentage of income based on ratio of income to Federal Poverty Level. Affordable burdens set at 6.5%, 8.0% and 9.0% of income for households with income at 0 - 50%, 51 - 100% and 01 - 150% of the Federal Poverty Level respectively.
b.	Resolution of pre-program arrears.	*	Households may earn forgiveness of 1/24th of preprogram arrears for each complete and timely payment. If complete and timely payment NOT made, household forfeits that month of forgiveness. At end of 24 month period, household may earn forgiveness of any forfeited months over 12-month period.
c.	Targeted assistance to high usage/high benefit participants.	+	High usage customers referred to low-income usage reduction program. No priority given to high-use LIRA customers.
d.	Allocation of risk of weather/price volatility.	*	The tiered discount shares the risk of changes in bills (either up or down). Company shares risk to the extent of the level of discount granted. Customer shares risk to the extent the undiscounted portion of the bill increases.
3 Efficiently uses program funds.			
a.	Matches payments to needs	+	Company provides tiered discount based on income and household size. Tiered discount directed toward reducing bills to an affordable percentage of income, tiered by Federal Poverty Level. Discouts ranges from 10% to 60%. Minimum discount of 10% for income eligible household.
b.	Maximum/minimum payment.	+	Program requires minimum customer payment. Program imposes ceiling on benefit level. Neither payment level indexed. Program provides for minimum benefit level.
c.	Integrates with other utility payment processes (e.g., budget billing).	+	Program requires participation in equalized monthly Budget Billing Plan.
d.	Integrates financially with other energy assistance programs.	+	Federal fuel assistance applied to reduce program participant's budget bill, without affecting customer's required percentage of income-based payment.
e.	Conservation incentives designed into the program.	*	Ceiling imposed on benefits provided. Discount nature of program provides for sharing of increased usage.
4 Provides mechanism for continuous improvement.			
a.	Provides for periodic outcome evaluation relative to objectives.	+	Periodic program evaluation prepared pursuant to regulatory commission directive. Program evaluation considers uniform outcome and process questions adopted by regulatory commission. Evaluation prepared by independent third party.
b.	Provides for standardized data reporting.	+	Regular periodic data is reported to state utility regulatory commission as per commission directive. Uniform data reporting required for all regulated gas and electric utilities.
5 Provides for reasonable cost recovery.			
a.	Spreads costs over appropriate customer base.	-	Costs of program assigned to residential class only.
b.	Ensures timely and reasonable certain recovery of program costs.	+	Program costs recovered through a reconcilable universal service rider.
c.	Accounts for cost offsets generated by program.	+	Cost recovery takes into account limited cost offsets for incremental additions to number of participents entering program since resolution of last base rate case.
d.	Cost recovery independent of utility service territory limits.	0	Utility-specific funding.

Notes: Four ratings are possible for each program attribute:

* Exceptional: An identified program attribute makes it stand out above other programs.

\+ Positive: An identified program attribute enhances program operation and success.

0 Neutral: No program attribute enhances or degrades program operation or success.

\- Negatiive: An identified program attribute degrades program operation or success.

Criteria		Program Rating (see notes)	Notes
1	**Reasonably open to all in need**		
a.	Empirical needs assessment	0	No periodic needs assessment prepared for each company. Each company participates in statewide uniform reporting of credit and collections data for all residential customers and for federal fuel assistance particpiants.
b.	Scope of eligibility	*	Customer are antomatically enrolled in the utility programs upon enrollment in the federal fuel assistance program. No extra effort is neede to enroll in the utility programs.
c.	Ease of program entry	+	Utilities work with community-based organizations who enroll customers in federal fuel assistance to promote LIHEAP.
d.	Open enrollment	+	Enrollment in the universal service program is tied to enrollment in the federal fuel assistance program. While this eases program entry, it limits the time period of enrollment to those months in which the federal program takes applications. Since the federal program is primarily a heating program, enrollment does not occur year-round.
e.	Ease of recertification	0	Recertification is performed through the federal fuel assistance program. No special recertification regulations are in effect.
2	**Recognizes and incorporates multi-faceted nature of "need."**		
a.	Affordability of bills for current usage.	*	Companies provide a tiered discount for three tiers of customers. Each tier is structured so that the discount plus the federal fuel assistance grant will, on average, reduce participant bills to an affordable percentage of income.
b.	Resolution of pre-program arrears.	0	No special program component directed toward preprogram arrears. Utilities financially support local fuel fund which provides "crisis" grants.
c.	Targeted assistance to high usage/high benefit participants.	+	Customers with usage at or above 130% of median participant usage referred to each company's usage reduction program.
d.	Allocation of risk of weather/price volatility.	*	The tiered discount shares the risk of changes in bills (either up or down). Company shares risk to the extent of the level of discount granted. Customer shares risk to the extent the undiscounted portion of the bill increases.
3	**Efficiently uses program funds.**		
a.	Matches payments to needs	+	Tiered discount provides some overpayment to low-use customers and some underpayment to high use customers. On average, utility discount plus federal fuel assistance benefit lowers bill to a predetermined affordable percentage of income.
b.	Maximum/minimum payment.	0	No minimum customer payment. No ceiling on benefit payment.
c.	Integrates with other utility payment processes (e.g., budget billing).	+	Both companies have announced their intention to require budget billing as a condition of program participation, at least for a period of months that include the winter heating months.
d.	Integrates financially with other energy assistance programs.	*	Outreach, intake and benefit determination are tied to LIHEAP.
e.	Conservation incentives designed into the program.	0	Referrals of high use customers to usage reduction program, but no conservation incentive structurall incorporated into program.
4	**Provides mechanism for continuous improvement.**		
a.	Provides for periodic outcome evaluation relative to objectives.	+	Annual reporting of monthly data used as basis for periodic evaluation.
b.	Provides for standardized data reporting.	+	Two sets of monthly data. Statewide credit and collection data are reported from all six Indiana utilities. In addition, the three utilities with low-income programs report on a set of agreed-upon 36 program metrics.
5	**Provides for reasonable cost recovery.**		
a.	Spreads costs over appropriate customer base.	*	All customer classes pay something toward programs.
b.	Ensures timely and reasonable certain recovery of program costs.	0	Pre-established funding stream on a per unit of energy basis for term of program (current term is four years).
c.	Accounts for cost offsets generated by program.	+	Without quanitfying program offsets, the companies agree to make investor contributions to programs in light of program cost offsets.
d.	Cost recovery independent of utility service territory limits.	0	Utility-specific funding.

Notes: Four ratings are possible for each program attribute:

*	Exceptional: An identified program attribute makes it stand out above other programs.
+	Positive: An identified program attribute enhances program operation and success.
0	Neutral: No program attribute enhances or degrades program operation or success.
-	Negatiive: An identified program attribute degrades program operation or success.

Criteria		Program Rating (see notes)	Notes
1 Reasonably open to all in need			
a.	Empirical needs assessment	+	No periodic needs assessment memorialized in regulation or statute. Program overseen by multi-party work group of state agencies, electric utilities and community organizations who provide empirical data in support of specific inquiries regarding program operation.
b.	Scope of eligibility	*	Income eligibility set at 175% of Federal Poverty Level. No non-income based eligibility requirements.
c.	Ease of program entry	*	Customers who enroll in federal fuel assistance program automatically enrolled in electric affordability program.
d.	Open enrollment	+	Program enrollment capped by whether commited benefits exceed annual budget. Waiting list maintained. Waiting list participants moved onto main program as budget allows, with priority given to households at lowest Poverty Levels.
e.	Ease of recertification	+	Annual recertification allowed by mail. Biannual recertification provided for customers with types of income not likely to vary by year (e.g., elderly, disabled).
2 Recognizes and incorporates multi-faceted nature of "need."			
a.	Affordability of bills for current usage.	+	Tiered discounts provided so that, at average income and usage level within range of Poverty Level, bills will equal affordable percentage of income.
b.	Resolution of pre-program arrears.	-	No preprogram arrearage provided.
c.	Targeted assistance to high usage/high benefit participants.	0	No institutionalized referrals of high usage customers to usage reduction program.
d.	Allocation of risk of weather/price volatility.	*	The tiered discount shares the risk of changes in bills (either up or down). Company shares risk to the extent of the level of discount granted. Customer shares risk to the extent the undiscounted portion of the bill increases.
3 Efficiently uses program funds.			
a.	Matches payments to needs	+	Some overpayment to low-usage customers and some underpayment to high-usage customers. With five discount tiers, the over- or under-payment is minimized.
b.	Maximum/minimum payment.	0	No minimum customer payment. No ceiling on benefit payment. Program provides at least a minimum rate discount to all eligible customers.
c.	Integrates with other utility payment processes (e.g., budget billing).	0	No systematic program integration with specific utility payment processes.
d.	Integrates financially with other energy assistance programs.	+	Program is administratively and financially integrated with federal fuel assistance. Federal fuel assistance recipients automatically enrolled in electric program. Electric heating benefits are provided through federal program rather than through electric affordability program.
e.	Conservation incentives designed into the program.	+	No structural conservation incentives incorporated into program, but discount nature of program provides for a sharing of increased usage.
4 Provides mechanism for continuous improvement.			
a.	Provides for periodic outcome evaluation relative to objectives.	*	Periodic program outcome evaluation required by monitoring and evaluation manual adopted by state utility commission. Performed by independent evaluator.
b.	Provides for standardized data reporting.	*	Program adopted monitoring and evaluation manual that articulates uniform data reporting by participating utilities.
5 Provides for reasonable cost recovery.			
a.	Spreads costs over appropriate customer base.	*	System Benefits Charge collected on uniform volumetric basis from all customer classes.
b.	Ensures timely and reasonable certain recovery of program costs.	+	Program costs recovered through statutorily established volumetric System Benefits Charge.
c.	Accounts for cost offsets generated by program.	-	Cost recovery does not take into account cost savings to the utility generated by the program.
d.	Cost recovery independent of utility service territory limits.	*	Statewide funding distributed based on need irrespective of source of funding.

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- * Exceptional: An identified program attribute makes it stand out above other programs.
- + Positive: An identified program attribute enhances program operation and success.
- 0 Neutral: No program attribute enhances or degrades program operation or success.
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Criteria		Program Rating (see notes)	Notes
1	**Reasonably open to all in need**		
a.	Empirical needs assessment	*	Annual operational plan filed by program administrator with state regulatory commission contains an empirical needs assessment. Annual program report provided to legislature.
b.	Scope of eligibility	*	Program eligibility goes up to 175% of the Federal Poverty Level. No non-income eligibility requirements.
c.	Ease of program entry	0	Program entry attained through application process at local community-based organizations. Mail-in applications limited to repeat participants.
d.	Open enrollment	*	Program commits to serve all in need. Program accepts enrollment year-round. There is no ceiling on participation.
e.	Ease of recertification	0	Program participants required to annually recertify income. Program recertification may be done by mail.
2	**Recognizes and incorporates multi-faceted nature of "need."**		
a.	Affordability of bills for current usage.	+	Bill discounts are tiered based on ratio of income to Federal Poverty Level. Discounts are 30% (150%-175%), 50% (110% - 150%), 60% (75% - 110%), or 75% (-0 - 75%). For households heating with electricity, bill reductions of an additional 15% are provided through the federal fuel assistance program.
b.	Resolution of pre-program arrears.	-	Program provides limited arrearage forgiveness. Must have minimum of $300 in arrears. Available only once per customer. Preprogram arrears credit can be up to $2,000 per program participant. Arrearage forgiveness may extend to "off-service" customers to help them restore service.
c.	Targeted assistance to high usage/high benefit participants.	0	High usage participants referred to usage reduction program. Usage reduction only provides "weatherization" services and not appliance or other non-building shell services, thus limiting usefulness of efficiency services for the electric affordability program.
d.	Allocation of risk of weather/price volatility.	0	The risk of bill volatility based on weather or price increases is borne by customer. The affordability benefit is paid in one lump sum at the time of the application for assistance.
3	**Efficiently uses program funds.**		
a.	Matches payments to needs	*	The level of the rate discount plus the federal fuel assistance coordinated to reduce the participant's bill to an affordable percentage of income. Household benefit individually calculated for each program participant.
b.	Maximum/minimum payment.	0	No minimum customer payment. Program imposes ceiling on benefit payment.
c.	Integrates with other utility payment processes (e.g., budget billing).	+	Program requires participants to agree to enter into levelized monthly Budget Billing plan.
d.	Integrates financially with other energy assistance programs.	*	Utility affordability application is identical to application for federal fuel assistance, even though programs are on different fiscal years. Amount of utility affordability benefit takes into account level of federal fuel assistance.
e.	Conservation incentives designed into the program.	*	Benefits established using average usage of program participants. Consumption over average must be borne by program participant. Fixed payment nature of bill credit imposes burden for increased usage on program participant.
4	**Provides mechanism for continuous improvement.**		
a.	Provides for periodic outcome evaluation relative to objectives.	0	Program has been subject to empirical outcome evaluation. Periodicity of outcome evaluation not established by regulation or statute.
b.	Provides for standardized data reporting.	+	Program provides annual report to legislature based on standardized program data reporting. No standardized outcome data reporting is obtained from electric utilities.
5	**Provides for reasonable cost recovery.**		
a.	Spreads costs over appropriate customer base.	*	Program costs collected from all customer classes on volumetric basis. System Benefits Charge varies by customer class and, for some customer classes, by size of load of customer.
b.	Ensures timely and reasonable certain recovery of program costs.	*	Annual state regulatory commission proceeding establishes System Benefits Charge to be collected from each customer class.
c.	Accounts for cost offsets generated by program.	-	Cost recovery does not take into account cost savings to the utility generated by the program.
d.	Cost recovery independent of utility service territory limits.	*	Statewide funding distributed based on need irrespective of source of funding.

Notes: Four ratings are possible for each program attribute:

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