

# **IMPACT OF INCREASES IN ELECTRICITY RATES ON LOW AND NON LOW INCOME HOUSEHOLDS IN MANITOBA**

**Prepared for the  
Public Interest Law Centre**

**By  
Harvey Stevens  
and  
Wayne Simpson**

**February 2014**

<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>EXECUTIVE SUMMARY</b>	<b>3</b>
<b>INTRODUCTION</b>	<b>4</b>
<b>METHODOLOGY</b>	<b>4</b>
<b>Data</b>	<b>4</b>
<b>Variables and Procedures</b>	<b>5</b>
<b>RESULTS</b>	<b>6</b>
<b>Consumption Patterns of Low and Non Low Income Households</b>	<b>6</b>
<b>Response of Households to Increases in the Cost of Electricity</b>	<b>7</b>
<b>Impact of the Requested Annual Rate Increases on Low and Non Low Income Households</b>	<b>9</b>
<b>SUMMARY</b>	<b>11</b>
<b>APPENDIX 1 – A PROFILE OF THE LOW INCOME POPULATION OF MANITOBA</b>	<b>12</b>
<b>APENDIX 2 – METHODOLOGY FOR SETTING THE AVERAGE ANNUAL ELECTRICITY RATES.</b>	<b>23</b>

## EXECUTIVE SUMMARY

This paper addresses the impact of proposed electricity rate increases (4% per year over a 17 year period from 2015 to 2032 according to the *Need For and Alternatives to Report* (NFAT ch.11, pp.7-11) on the low and non low income households in Manitoba. Using 10 years of annual data from Statistics Canada's Survey of Household Spending (SHS) and supplementary data provided by Manitoba Hydro on electricity rates and consumption patterns, the paper addresses the following key questions:

1. How do the spending patterns of low income households compare to those of the near and non low income household?
2. How have real, inflation-adjusted electricity rates varied between 2000 and 2013 in Manitoba?
3. What impact have these variations in electricity rates had on the consumption patterns of Manitoba households?
4. In light of these impacts, what can we expect to be the effect of the proposed increases in electricity rates on low and near low income households in Manitoba?

This paper reveals that,

1. Low income households spend more of their budget on basic necessities like electricity, food, shelter, household operations and health care than non low income households. Also, on average, they run a deficit which is 13 per cent of their total consumption. By comparison, near low income households run a slight surplus of 3 per cent of total consumption while the non low income household has a surplus of 26 per cent of their total consumption budget.
2. In the period covered by the analysis (2009 to 2013), the real, inflation-adjusted (2009\$) cost of electricity first fell from \$6.80 per 100 kWh in 2000 to \$6.42 in 2003, fluctuated up and down between 2003 and 2007 and then rose to \$6.81 in 2009. The change from high to low to high rates ranged from -5.1 to +5.9 per cent. By 2013, it stood at \$7.08 per 100 kWh.
3. This variation in the real price of electricity resulted in shifts in how low and non low income households allocated their spending and in their overall household balance. Higher electricity rates resulted in low income households spending more on electricity but less on food, shelter, clothing, transportation, reading and education and a decline in the overall household balance. By comparison, the near low income households overall balance declined even more while that of the non low income household improved.
4. Manitoba Hydro projects a 2% (real) increase in electricity prices (NFAT, Appendix D, p. 55) over the period of 2015 to 2032. This will lead to small but statistically significant annual changes in the consumption patterns of low and near low income households. Moreover, a sustained 17 year annual real 2 per cent increase in electricity rates will lead to a worsening of the deficit already experienced by low income households and the movement of many near low income households into a deficit position.

## **INTRODUCTION**

The Need For and Alternatives To (NFAT) hearings commissioned by the Public Utilities Board (PUB) of Manitoba are intended to provide intervenors with the opportunity to comment on Manitoba Hydro's proposed plans to build a number of hydro electric generation facilities in northern Manitoba. The intervenors will cover a number of topics including an examination of Manitoba Hydro's assumptions regarding future demand for electricity, the costs of building additional hydro electric generation, the risks of doing so in the facing of changing demand by U.S. utility companies and the impact of the future rate increases on low income Manitobans to finance the additional facilities.

This paper addresses the impact of proposed electricity rate increases (4% per year over a 17 year period from 2015 to 2032 according to the *Need For and Alternatives to Report* (ch.11, pp.7-11)) on the low and non low income households in Manitoba. It begins by describing the data used to undertake the analysis and the analytical methods used to arrive at its findings. It then describes the differences in the consumption patterns of the low and non low income households in Manitoba and follows with an analysis of the impact of the changes in the electricity rates over the ten year period from 2000 to 2009 on those consumption patterns. It closes with a summary of the impact of the proposed annual 4 per cent increase in electricity rates on low and non low income households in Manitoba.

By way of supporting documentation, Appendix 1 of this paper provides an explanation of how low income is defined and measured and the trends in low income in Manitoba since the late 1980's. Appendix 1 also provides a summary explanation of the principal causes of low income in Manitoba and a description of the consumption patterns of low and non-low income Manitoba households.

## **METHODOLOGY**

### **Data**

The primary data source for this analysis are 10 years (2000 to 2009) of cross-sectional surveys undertaken by Statistics Canada to capture the spending decisions of households in Canada. (As of 2010, Statistics Canada stopped making its micro data sets available for public use.) These annual *Surveys of Household Spending* (SHS) obtain detailed information on how much households spend on a range of consumer items including – food, shelter, utilities, clothing, household operations, household equipment and furnishings, transportation, recreation, reading and education, tobacco and alcohol and other items such as financial services, dues, insurance payments, retirement fund payments, gifts and contributions. In addition, the surveys collect information about the urban/rural location of the household, total household income before and after taxes, the type of dwelling lived in including its age, number of rooms and ownership status and the type of household items owned by the household including, appliances and vehicles. Between 2000 and 2006, an average 1438 Manitoban households were interviewed each year, falling to 1304 in 2007 and to 845 in 2008 and 2009. In total, 13,061 households formed the data base for the analysis. The data reflect the high quality of surveying and response rates achieved by Statistics Canada.

In addition to these cross-sectional surveys, three other data sources were used to construct the key analytical variables for the analysis. One is the Statistics Canada CANSIM Table #202-0808 which provides the household income thresholds for the after-tax Low Income Measure (LIM-AT) for each of the ten years covered by the SHS data sets. A second is the *Monthly Degree Days Heating and Cooling History in Winnipeg* data provided by Manitoba Hydro for use in the analysis of the household's annual cost of electricity. The third is the schedule of *Historical Residential Electricity Rates* from April 1, 1997 to May 1, 2013 provided by Manitoba Hydro along with data it supplied on the average annual usage of electricity for Electric and Non-Electric Heat billed customers and their breakdown by Winnipeg and non-Winnipeg location as well as the monthly distribution of residential customers by amp service (greater or less than 200 amps), and by consumption up to June 2008 (greater or less than 175kWh) and consumption after June 2008 (greater or less than 900 kWh).

### **Variables and Procedures**

From the SHS data, a set of variables were created which express the amount of money spent on each major type of household consumption item as a per cent of the total amount of money spent by the household on all consumption items. Thus, the key analytical variables are those that describe each item's percentage share of the total value of the household's consumption in each of the ten years. The key consumption categories measured by the data include – electricity, food purchased in stores, shelter (excluding electricity), clothing, household operations, household equipment and furnishings, transportation, personal care, health care, recreation goods, vehicles and services, reading materials, education, tobacco and alcohol and other items (financial services, dues, gifts and contributions, etc.).

In addition, a 'household balance' variable was created which measures the *difference* between the household's after-tax income and its total consumption as a per cent of the total consumption; i.e.  $[(\text{Household Income} - \text{Total Consumption}) / \text{Total Consumption}] \times 100$ . This variable takes on positive values if the household income exceeds what it spent and negative values if the household's income is less than what it spent. In any one year, a deficit would be financed either by drawing down savings or by using credit.

In addition to these consumption variables, the following socio-economic variables were created for the analysis: Winnipeg/non-Winnipeg location, home ownership status, number of people in household, number of rooms in dwelling, number of electrical appliances, number of vehicles, electric heating, hot water electric heating, electric cooking appliances, the after-tax household income, the low-income status of the household and the year of the data.

From the residential electricity rates schedule provided by Manitoba Hydro and the additional information it supplied on the average annual electricity consumption by type of heating and the distribution of residential customers by amperage of service and level of consumption, a weighted average annual cost of electricity per kWh was calculated. Appendix 1 provides a detailed description of how the annual weighted average costs were calculated. These annual average costs were converted to

*real* (2009\$) amounts by multiplying each annual amount by the following conversion factor: (2009 CPI/Yearly CPI), where 'CPI' is the annual Consumer Price Index for all items for Manitoba. Thus, electricity prices are expressed relative to changes in the cost of the "all-items" basket of household goods contained in Statistics Canada's Consumer Price Index.

The principle method of analysis is regression analysis. Regression analysis is a statistical technique that analyzes the observed correlation between an outcome variable of interest and one or more predictor variables in such a way that it determines the trend line (or weight) for each predictor variable that jointly minimizes the unexplained variation in the outcome variable.<sup>1</sup> Two types of regression analyses were used: Ordinary Least Squares (OLS) and Tobit. OLS is the standard regression technique that is suitable for variables like household balance and electricity which do not have limiting values (such as zero expenditures). Tobit is a conventional regression technique used for those consumption items for which some households showed no expenditure for the item.

All analyses are based on weighted data, with the weights being those assigned by Statistics Canada to each observation in the annual SHS data sets.

## RESULTS

### Consumption Patterns of Low Income and Non-Low Income Households

Table 1 presents a descriptive picture of how low and non low income households allocate their total household spending to each of the major consumption items included in the SHS. It reveals that low income households spend proportionately more than non low income households on the following items: electricity, food purchased from stores, shelter, household operations, health care, personal care, education, tobacco & alcohol. These items (with the exception of education) are those with an elasticity of less than 1.0 indicating that demand for these items is 'inelastic'; i.e. as household income falls the proportion of the budget spent on these items rises. Items with an inelastic demand are typically necessities such as utilities, food, shelter, personal needs and household operation. Thus, as the price of these items increase, household expenditures on these items increases, with the low income household bearing a larger burden of the cost increase than higher income households as a proportion of their total consumption budget.

Note, in particular, the proportion of total consumption that is spent on electricity for low income, near low income, and higher income households, which falls from 3.1% to 2.7% to 2.1% as the income of the household rises. This is reflected in the elasticity measure of 0.59 in the final column of Table 1, which is a summary measure of the change in the proportion of the household budget spent on electricity as

---

<sup>1</sup> This is the case for Ordinary Least Squares, which also satisfies the maximum likelihood criterion (the coefficients chosen maximize the joint probability of occurrence of the data). Tobit regression is a variant of Ordinary Least Squares that also satisfies the maximum likelihood criterion and is appropriate for those cases where the data is limited at some point (zero in this case). When there are no limiting values (no zeros in our case), Tobit and Ordinary Least Squares regressions coincide.

household income rises. It indicates that a rise of 10% in household income results in only a 5.9% rise in spending on electricity, leaving additional room for spending on the other items in Table 1 and resulting in a decline in the proportion of the household budget that is devoted to electricity expenditure. This is the case for other items with an elasticity below one in Table 1—food, shelter, household operations, health and personal care, reading, and tobacco and alcohol—while other items with elasticities above one take up a larger proportion of the household budget as income rises.

**Table 1: Percent of Total Consumption Allocated to Household Goods and Services  
Manitoba – 2000 to 2009 – by Low Income Status**

Consumption Item	Low Income (Below LIM) <sup>1</sup>	Near Low Income (1.0-1.5 x LIM) <sup>1</sup>	Higher Income (1.5 + x LIM) <sup>1</sup>	Elasticity <sup>2</sup>
<b>Electricity</b>	<b>3.1%</b>	<b>2.7%</b>	<b>2.1%</b>	<b>0.59</b>
Food Purchased from Stores	15.7%	13.5%	10.4%	0.54
Shelter Excluding Electricity	24.3%	21.8%	19.4%	0.70
Clothing	4.8%	5.3%	5.8%	1.17
Household Operations	7.4%	7.0%	6.5%	0.78
Household Equipment & Furnishings	3.3%	3.6%	4.4%	1.31
Transportation	15.1%	18.8%	21.4%	1.50
Health Care	4.3%	4.3%	3.6%	0.62
Personal Care	2.3%	2.3%	2.2%	0.90
Recreation	6.2%	7.2%	9.3%	1.34
Reading	0.6%	0.6%	0.7%	0.87
Education	2.2%	1.7%	2.1%	3.83
Tobacco & Alcohol	4.1%	3.7%	3.1%	0.88
Miscellaneous	1.6%	1.9%	2.5%	1.28
Household Balance	-13%	+3%	+26%	--

Source: Statistics Canada, Survey of Household Spending, Public Use Microdata Files.

Notes: <sup>1</sup> The after-tax Low Income Measure (LIM) is used to measure low income status because it applies to 'households' which form the unit of analysis. Appendix 1 (pg. 12) describes how the LIM is measured.

<sup>2</sup> Elasticity is the per cent change in the consumption item due to a per cent change in the total value of consumption. An elasticity below(above) 1.00 indicates that consumption of that item declines (increases) as a percentage of total consumption as income rises.

The other thing to note in Table 1 is the household balance of the low and non low income households. On average, low income households are carrying a negative household balance of -13 per cent (of their total consumption), meaning that they are either using credit or savings to purchase their consumption bundle. By comparison, the 'near poor' household is running a small surplus of +3 per cent while the highest income households have 26 per cent surplus, on average.

## The Response of Households to the Changing Real Cost of Electricity

Over the ten year period covered by the analysis (2000 to 2009), the average real cost of electricity (in 2009\$) at first fell from \$6.78 per 100 kWh in 2000 to \$6.42 in 2003 (-5.2%), then rose slightly to \$6.59 per 100 kWh in 2005, again falling slightly to \$6.49 in 2007 and rising to \$6.81 per 100 kWh in 2009 (+5.9% of the 2003 rate). Only by 2009 had the real value of electricity rates risen above the 2000 level. Since 2009, the average real cost of electricity has risen to \$7.09 per 100 kWh in 2013 (in 2009\$). The projected annual 4 per cent nominal increase in rates desired by Manitoba Hydro between 2015 and 2032 which amount to 2 per cent increases, in real terms, relative to the projected 2 per cent increases in the CPI, will push the real rate to \$10.12 per 100 kWh (in 2009\$).<sup>2</sup> Figure 1 shows the trend in these actual and projected rates.

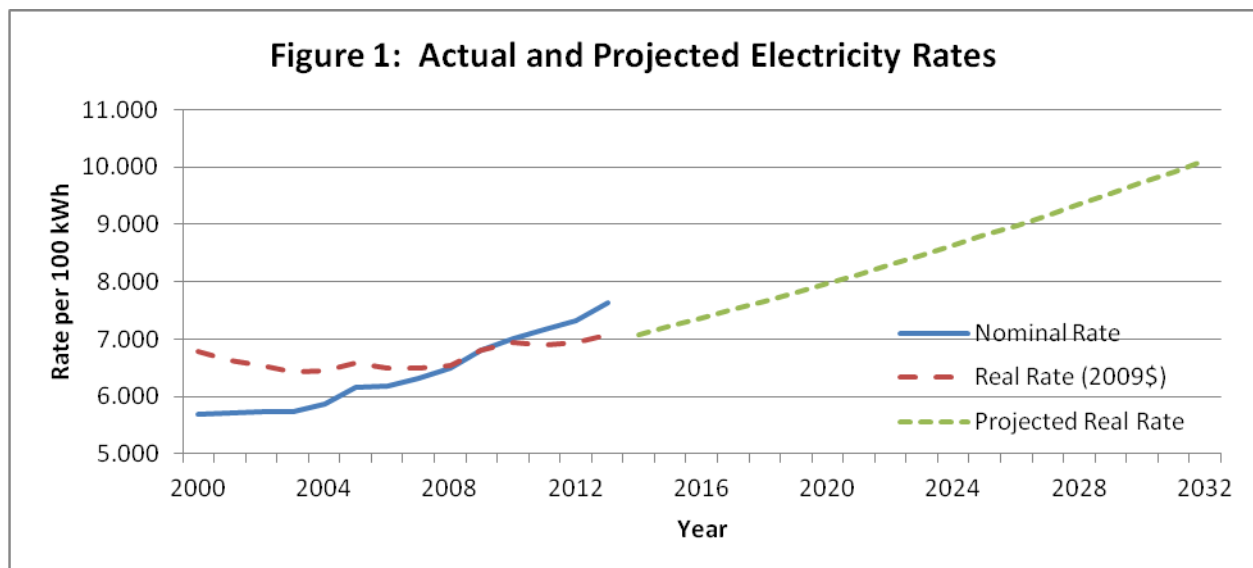


Table 2 presents the effect of these changes in the real electricity rates on the consumption of each of the household items listed above in Table 1 for the low income, near low income and not low income households in Manitoba. OLS regression was used with the electricity, food and household balance variables while Tobit regression was used with the other consumption items because of the presence of '0' values. The key independent variable was the average annual hydro electric rates expressed as the cost per 100 kWh in 2009 dollars. The other control variables used in each regression analysis were real after tax household income, household size, year, Winnipeg location and home ownership status. All

<sup>2</sup> The 'nominal' rate reflects the price of electricity in effect in each year. The 'real' rate converts the nominal rate into the cost of electricity in the given year; i.e. 2009 in this study. To convert each year's nominal rate into the real 2009\$ rate, one multiplies each annual rate by the factor (2009 CPI/Yearly CPI), where CPI is the overall average Consumer Price Index for all items for Manitoba.



coefficients reported in Table 2 are significant at the 0.001 level except for the ones noted in the table as (n.s. = not significant at the 0.10 level).

Table 2 reveals that an increase in the real annual hydro rate results in an *increase* in electricity's share of total consumption which is stronger for the low income household than the near low income household but not the not low income household (+0.37 vs. +0.11 and +0.56). These numbers indicate that a \$1.00 per hundred kWh increase in the real hydro rates over this 10 year period resulted in an increase of 0.37 percentage points of electricity's share of the household's total consumption for low income households. Among low income households, a similar positive pattern is observed for household operations and equipment/furnishings, health and personal care, recreation, tobacco & alcohol and other items. For most of these items, the strongest positive effect is among the low income household.

**Table 2: Impact of Increasing Real Electricity Rates on Each Consumption Item's Share of Total Household Consumption**

<b>Consumption Item</b>	<b>Low Income (Below LIM)</b>	<b>Near Low Income (1.0 to 1.5 x LIM)</b>	<b>Not Low Income (1.5+ x LIM)</b>
Electricity	+0.37	+0.11	+0.56
Food	-0.28	-2.23	-0.02(n.s.)
Shelter (Excluding Electricity)	-4.91	+3.10	+2.21
Clothing	-0.53	+0.14	+0.20
Household Operation	+1.76	+0.01(n.s.)	-0.50
Household Equipment	+1.23	-0.18	-0.05
Transportation	-2.32	-1.56	-0.44
Health Care	+0.68	+0.94	+0.08
Personal Care	+0.81	+0.36	+0.08
Recreation	+1.26	-0.46	-0.20
Reading	-0.05	+0.04	-0.13
Education	-3.93	-1.43	-0.63
Tobacco & Alcohol	+3.52	-2.05	-1.71
Other	+0.35	+0.20	+0.77
Household Balance	-0.89	-3.74	+2.46

By comparison, increases in the hydro rates result in a *decrease* in the share which food, shelter, clothing, transportation, reading and education comprise of the low income household's total consumption. The effect is particularly strong for shelter (-4.91), transportation (-2.32) and education (-3.93). For some of these items like shelter and clothing, among the non low income households, the rise in electricity rates is associated with increases in their share of total consumption.

Overall, a \$1.00 per 100 kWh increase in real electricity rates resulted in a 0.9 percentage point decline in the low income household's overall balance, compared to a 3.7 decline for near low income households and a 2.5 percentage point increase in the overall household balance of non low income households.

### **Impact of Annual Rate Increases by Manitoba Hydro on Low Income Households**

As noted above, Manitoba Hydro is proposing 2 per cent real increases in electricity rates for the 17 year from 2015 to 2032. In order to estimate the impact of a 2 per cent real increase in electricity rates on the consumption patterns of Manitoban households, the regression equations used to estimate the impacts in Table 2 were evaluated twice – first at the actual electricity rates and then with those rates increased by 2 per cent. The difference in the two estimates provides the impact of a 2 per cent increase, all other factors (including real household incomes) unchanged. Given that the regression estimates are based on the analysis of electricity rates that varied by +/- 6 per cent between 2000 and 2009, the projections of the impact of a 2 per cent increase are well supported by the data. Table 3 presents the results. The actual values for each household were used in the estimation and not the average values for each variable.

The pattern of increases and decreases is that reflected in Table 2: A 2 per cent real increase in electricity rates results in increased shares of the total consumption budget of the low income household for electricity, household operations, equipment and furnishings, health and personal care, recreation, tobacco & alcohol and other items. By comparison, expenditures on food, shelter, clothing, transportation and education decrease in response to a 2 per cent real increase in electricity rates for the low income household. Overall, there is a decline in the overall household balance of 0.11 percentage points for the low income household and a 0.49 percentage point drop for the near low income household.

While many of these impacts are small in magnitude, the cumulative effect of the proposed annual 2 per cent real increases in electricity rates over 17 years will be much greater. For example, the cumulative effect over 17 years on electricity prices would be a 0.85 per cent increase in the share of the household budget going to electricity which must be financed by reductions in the consumption of other goods and, perhaps in the short term, by borrowing. Our estimates suggest several areas where household consumption might suffer. For example, the household balance could drop by 1.9 percentage points for the low income household and by as much as 8.3 percentage points for the near low income household while the share going to shelter could drop by 10.9 percentage points, that going to transportation by 5.1 percentage points and that going to education by 8.7 percentage points, for low income households.

**Table 3: Impact of a 2 Per cent Real Increase in Electricity Rates on the Pattern of Consumption of Manitoban Households (Percentage Point Change in the Share of Total Consumption)**

<b>Consumption Item</b>	<b>Low Income (Below LIM)</b>	<b>Near Low Income (1.0 to 1.5 x LIM)</b>	<b>Not Low Income (1.5+ x LIM)</b>
Electricity	+0.05	+0.01	+0.07
Food	-0.03	-0.29	-0.01
Shelter (Excluding Electricity)	-0.64	+0.41	+0.29
Clothing	-0.06	+0.02	+0.03
Household Operation	+0.23	0.00	-0.07
Household Equipment	+0.16	-0.03	0.00
Transportation	-0.30	-0.20	-0.06
Health Care	+0.11	+0.04	+0.01
Personal Care	+0.10	+0.04	+0.02
Recreation	+0.17	-0.06	-0.03
Reading	0.00	+0.01	-0.02
Education	-0.51	-0.19	-0.09
Tobacco & Alcohol	+0.46	-0.27	-0.22
Other	+0.05	+0.02	+0.11
Household Balance	-0.11	-0.49	+0.33

## **SUMMARY**

Over the ten year period between 2000 and 2009, real electricity rates showed a fluctuation of – 5 per cent to + 6 percent –first falling between 2000 and 2003, then eventually rising by 6 per cent in 2009 to a cost of \$7.08 per 100 kWh. The proposed real rate increases of 2 per cent per year between 2015 and 2032 will result in a rise in the cost of electricity to \$10.12 in 2009\$.

This analysis has shown that the historical fluctuations in the price of electricity affected how households allocated their spending as well as the overall balance they achieved between their available income and expenditures. The rising cost of electricity resulted in lower consumption of necessities like food, shelter, clothing and transportation by the low income household and a worsening of their already deficit position. Among the near low income household, there was an even more pronounced drop in spending on food and an even larger negative impact on their household balance. By comparison, for the non low income household, their overall household balance will improve.

The analysis has shown that an annual increase of 2 per cent in the real price of electricity will result in relatively small impacts on household consumption and the overall household balance. However, the cumulative impact of 17 years of annual 2 per cent increases will be substantially greater. Thus, the impacts of continuous real rate increases will negatively affect the low and near low income households of Manitoba.

## APPENDIX 1

### A PROFILE OF THE LOW INCOME POPULATION OF MANITOBA

#### DEFINITIONS AND MEASURES OF LOW INCOME

##### Definitions & Measures

Statistics Canada maintains three measures of low income through its annual surveys of family and household incomes.<sup>3</sup> While it does not refer to them as measures of 'poverty', they are used by analysts as indicators of income poverty. They are called, a) Low Income Cutoffs or LICOs; b) Low Income Measure (LIM); and, c) Market Basket Measure (MBM). The LICO and LIM definitions are measured on both a pre- and post-tax basis while the MBM is based on income after taxes and other expenses have been deducted. Each measure is characterized by a set of income thresholds or cut-offs that define whether the household or family is low income. It should be noted that low income or poverty is not measured for people living on Indian Reserves or for members of the armed forces, as these two groups are excluded from the annual income surveys conducted by Statistics Canada. In addition, the provision of free housing on reserve makes the application of both the LICO and MBM measures inappropriate. Only the census every five years allows for a measure of income of those living on reserves.

LICOs are income thresholds below which a family will likely devote a larger share of its income on the necessities of food, shelter and clothing than the average family. The approach to setting the thresholds first involves determining what per cent the average family spends on food, clothing and shelter and then adding 20 percentage points to that amount. The most recent base for constructing the LICO determined that the average Canadian family spent 43 per cent of its after-tax income on food, shelter and clothing. Accordingly, the LICO was set at 63 per cent. Based on regression analysis of expenditures on food, clothing and shelter by after-tax family income, the family income levels at which 63 per cent is devoted to these basics is established.

LIMs are defined as 50 per cent of the median adjusted household income for all Canadians, regardless of where they live. In order to calculate LIMs, 'equivalent household income' is calculated for each household by dividing household income by its adjusted size which is the square root of the number of persons in the household. Then, assign this adjusted household income to each person and calculate the median<sup>4</sup> value of this adjusted household income. The LIM for a household of one person is then 50 per

---

<sup>3</sup> The economic family and unattached individuals are the units for which both the LICO and MBM low income measures are constructed. Economic family refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption. A couple may be of opposite or same sex. Foster children are included. An unattached individual is a person living either alone or with others to whom he or she is unrelated. The LIM is based on household income where households are all persons sharing the same dwelling unit.

<sup>4</sup> The 'median' is that amount where half of all individuals will be above it and half below.

cent of this median value and the LIMs for other sizes of households are the one-person LIM multiplied by their adjusted size.

MBMs are measures of low income based on the cost of a specific basket of goods and services representing a modest, basic standard of living. It includes the costs of food, clothing, footwear, transportation, shelter and other expenses for a reference family of two adults aged 25-49 and two children aged 9 and 13. The cost of this market basket is priced annually within each province and sub-areas within each province, providing a finer break down of costs than the LICO which presents national thresholds only by size of area of residence. These costs are then compared to the 'disposable' income of families to determine low income status. Disposable income is defined as total family income less total income taxes paid, compulsory payroll deductions, child support payments, out-of-pocket spending on child care and non-insured but medically prescribed health-related expenses. Compared to the after-tax income definitions used with the LICO and LIM, the MBM disposable income definition includes more deductions and thus a lower level of income to compare to the thresholds.

Table 1 presents the income thresholds for each of these measures of low income for Manitoba for the year 2011.

**Table 1: Low Income Cutoffs for the LICO, LIM and MBM for Manitoba – 2011**

Family/Hhld Size	After-tax LIM	After-tax LICO			Market Basket Measure		
		Wpg.	Urban < 30,000	Rural	Wpg.	Urban < 30,000	Rural
1	\$19,930	\$19,307	\$14,454	\$12,629	\$16,807	\$17,219	\$16,570
2	\$28,185	\$23,498	\$17,592	\$15,371	\$23,769	\$24,352	\$23,434
3	\$34,520	\$29,260	\$21,905	\$19,141	\$29,110	\$29,825	\$28,701
4	\$39,860	\$36,504	\$27,329	\$23,879	\$33,614	\$34,439	\$33,141
5	\$44,565	\$41,567	\$31,120	\$27,192	\$37,581	\$38,504	\$37,053
6	\$48,818	\$46,099	\$34,513	\$30,156	\$41,168	\$42,179	\$40,589
7	\$52,730	\$50,631	\$37,906	\$33,121	\$44,467	\$45,558	\$43,841

Source: Statistics Canada, CANSIM Tables 202-0801, 202-0808, 202-0809.

In comparing the thresholds, there are several things worth noting.

1. The LIM is based on the national average of after-tax income and thus is not sensitive to differences in the cost of living across the country. Also, it is based on incomes alone with no reference to the cost of living. It is a completely relative measure.
2. By comparison, both the LICO and MBM are based on the cost of living with the LICO making reference only to what all Canadian families spend, on average, on food, shelter and clothing and then using an arbitrary 20 percentage point increase to define greater need. The LICO differentiates only by size of area of residence across all communities of that size; whereas,

the MBM establishes its thresholds based on the cost of living within each province and area within the province and bases its thresholds on a larger basket of goods and services than the LICOs. In effect, both the LICO and MBM thresholds reflect the cost of living of a minimally adequate basket of goods and services; whereas, the LIM thresholds only reflect a low level of household income.

3. The MBM thresholds for Winnipeg are lower than the LICO thresholds, largely because of the lower cost of shelter in Winnipeg compared to other cities of 500,000 and over in Canada. By comparison, the MBM thresholds for small urban and rural areas are higher than the LICO because the MBM includes the cost of owning and operating a modestly priced vehicle while the LICO ignores the cost of transportation in its threshold.

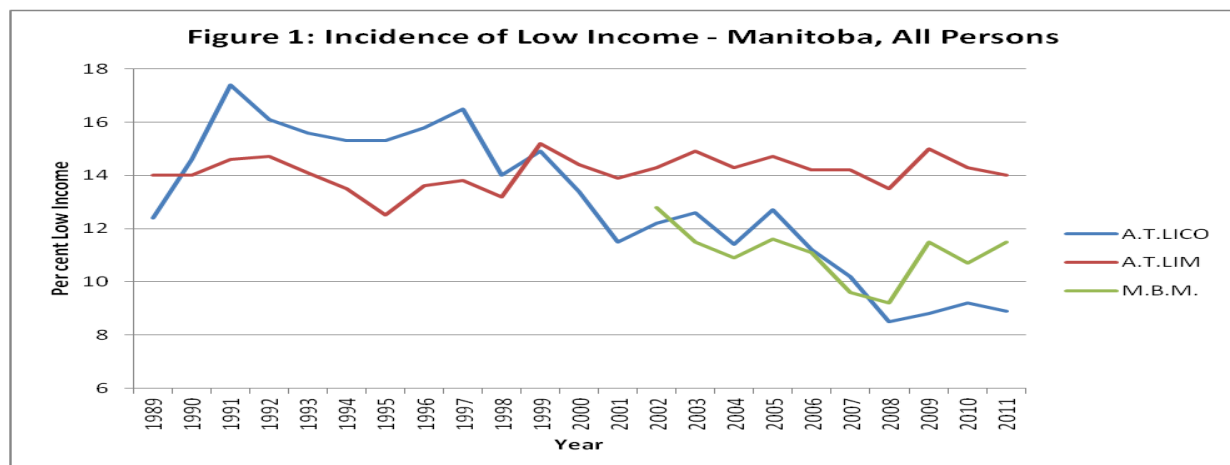
### Metrics

For each of these measures of low income, Statistics Canada regularly publishes three low-income indicators: incidence of low income, depth of low income and duration of low income. The incidence of low income is the per cent of the population with incomes below the thresholds. The depth of low income is the average percent by which the incomes of low income families are below the low income thresholds; and, the duration of low income is the number of years the family/household's income is below the thresholds, over the following six-year period.

### TRENDS IN POVERTY IN MANITOBA FOR THE OFF-RESERVE POPULATION

#### All Persons<sup>5</sup>

Figures 1, 2 and 3 present the trends in the incidence, depth and persistence of poverty in Manitoba, for all persons, since 1989 for each of the three poverty measures. As the MBM was developed later, there are data only since 2002. All three are based on after-tax income measures.



<sup>5</sup> All Persons refers to all the individuals in an economic family or household, including those unattached persons living alone. Statistics Canada presents its low income statistics in its electronic CANSIM series for persons instead for families, unattached person and households.

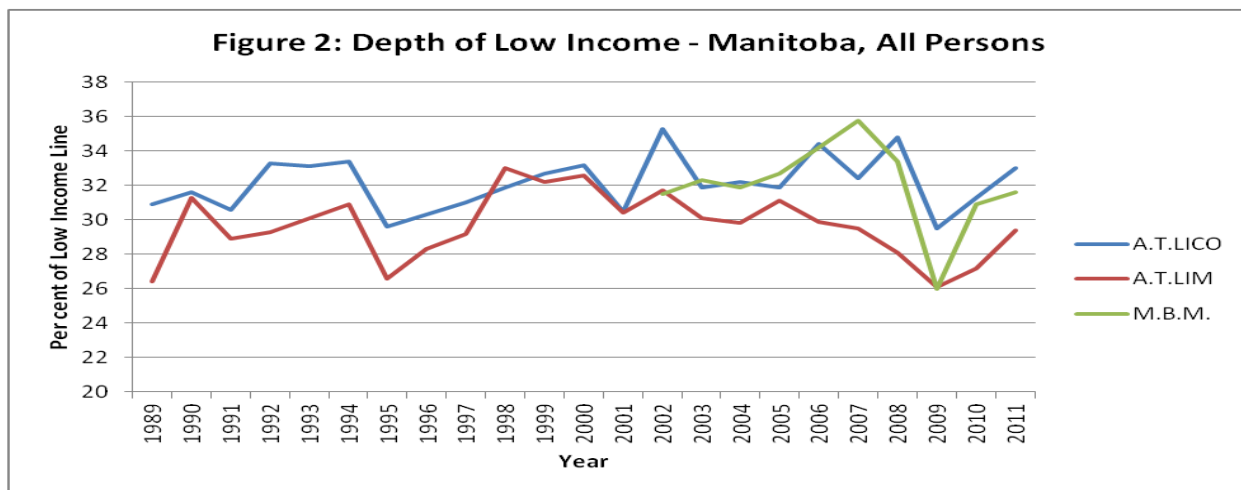
Figure 1 reveals that both the after-tax LICO and MBM show a declining rate of low income. The LICO reveals that the incidence of poverty rose sharply with the recession of the early 1990s' and remained high until 1997, after which it fell sharply, increasing only slightly with the economic downturn in 2008. By 2011, the rate of low income was just over 8 per cent, half of what it was in 1997 and below the 12 per cent it had been in 1989. The MBM also shows a drop in the poverty rate between 2002 and 2008, closely tracking the trend for the LICO over that time period but rising more sharply as of 2009.

By comparison, the after-tax LIM poverty rate was relatively constant over the same 22 year period. This is because it is based on average incomes alone and not the cost of living. The flat trend line indicates that the relative income position of the low income population in Manitoba remained largely unchanged. By comparison, the LICO and MBM trend lines indicate that the incomes of the low income population grew at a faster rate than the cost of living, thus lowering the number unable to afford the standard of living set by the income thresholds.

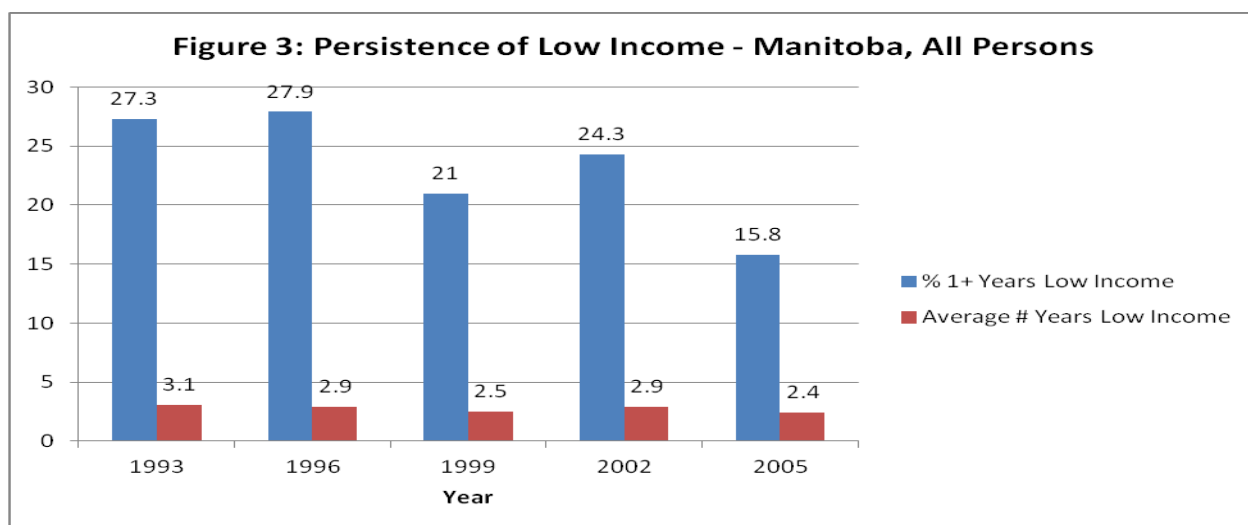
Figure 1 reveals that both the after-tax LICO and MBM show a declining rate of low income. The LICO reveals that the incidence of poverty rose sharply with the recession of the early 1990s' and remained high until 1997, after which it fell sharply, increasing only slightly with the economic downturn in 2008. By 2011, the rate of low income was just over 8 per cent, half of what it was in 1997 and below the 12 per cent it had been in 1989. The MBM also shows a drop in the poverty rate between 2002 and 2008, closely tracking the trend for the LICO over that time period but rising more sharply as of 2009.

Figure 2 tells a different story. For the after-tax LICO, it shows an increasing depth of poverty as the incidence of poverty fell between 1997 and 2008 and a falling depth of poverty after that. This reverse trend is largely due to the changing composition of the low income population. When the poverty rate is falling, those most likely to leave the low income group are those whose incomes are the closest to the poverty line. When they leave the ranks of the poor, those remaining have lower incomes thus increasing the depth of poverty.

By comparison, the LIM depth of poverty trend shows a decline in the depth of poverty since 1998 when the incidence remained about the same. This trend shows that the incomes of the low income group were improving over that time period.



Finally, Figure 3 shows the change in the persistence of poverty at successive three year intervals between 1993 and 2005, using the after-tax LICO measure of low-income. 1993 was the first year that the longitudinal survey of incomes was introduced in Canada which tracked the same person's income over the next six years. Given the six year window, 2005 is the latest baseline year for which the panel data are available. It shows that the persistence of poverty also has decreased since 1993. From a high of 28 per cent of all persons being poor for 1 or more years in 1996, the per cent being poor for 1 or more years as of 2005 had dropped to just under 16 per cent. As well, the average number of years in poverty for those who were poor declined from 3.1 years between 1993 and 1997 to 2.4 years between 2005 and 2010.



Another picture of the persistence of low income, as measured by the after-tax LICO, is provided by Table 2 which shows the per cent of those low-income for any of the 6 years commencing in 2005 who are low income for 1 or more years.

**Table 2: Per cent of Manitobans Who are Low-Income for 1 to 6 years, as of 2005**

0 Years	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years
84.2%	6.2%	3.6%	2.6%	1.1%	0.9%	1.4%
--	39%	23%	16%	7%	6%	9%

Source: Statistics Canada CANSIM Table 202-0807

Table 2 shows that over half (52%) of those who are ever low income over the 6 year period remain low income for 1 or 2 years only. By comparison, only 15 per cent of the ever-poor remain so for at least 5 of the 6 years. Thus, the spells of low income for most who experience it are short-lived.

In all, these three figures indicate that considerable improvement has occurred in the incidence, depth and persistence of poverty since the 1990's. Substantially fewer families are unable to afford the



essentials and a modest standard of living, those who are poor are less poor and they remain poor for a shorter period of time.

Anticipating a later section of this report, the trend line in Figure 1 also shows how sensitive the risk of poverty is to the state of the economy. When the economy went into recession in 1991, the poverty rate rose sharply and remained high for the next 6 years. Similarly, when the economy weakened in 2008 and 2009, the poverty rate and the depth of poverty rose once again.

### Key Demographic Sub-groups

A finer-grained picture of the changes in the incidence and depth of poverty between 1997, when it began its sharp decline, and 2011 is presented in Table 3 which shows the incidence and depth of poverty for key demographic sub-groups.

**Table 3: Changes in the Incidence and Depth of Poverty in Manitoba – 1997 to 2011 – by Sub-Groups, as Measured by the After-tax LICO**

Sub- Group	Incidence of Poverty			Depth of Poverty		
	1997	2011	% Change	1997	2011	% Change
All Persons <sup>1</sup>	16.5%	8.9%	-46	31.0%	33.0%	+6
0 - 17 Years - Total	20.9%	11.3%	-46	29.5%	21.8%	-26
- In 2 Parent Families	14.2%	6.7%	-53	27.0%	26.2%	-3
- In Female Lone-Parent Families	59.7%	38.6%	-35	31.9%	19.6%	-39
18 -64 Years – Total	15.8%	9.2%	-42	33.9%	39.6%	-1
- In Families	11.2%	5.2%	-54	29.8%	29.9%	0
- Unattached	44.7%	31.8%	-29	41.0%	48.0%	+17
65 + Years – Total	11.2%	4.0%	-64	17.2%	13.4%	-22
- In Families	3.7%	0.3%	-92	24.9%	--	--
- Unattached	23.9%	12.8%	-47	15.1%	12.4%	-18

1. Source: Statistics Canada, CANSIM Table 202-0802.

2. Note: <sup>1</sup> All Persons include unattached individuals as well as those living in economic families.

Table 3 reveals the following key changes in the incidence and depth of poverty between 1997 and 2011:

1. The groups most and least at risk of being poor remained the same in both years. Children in female lone parent families were most at risk of poverty, followed by unattached persons 18-64 and unattached elderly. Those in economic families were the least likely to be poor, with the elderly families being the least likely to experience poverty.

2. Persons in economic families experienced the largest decline in their poverty rates, in per cent terms, between 1997 and 2011 with the unattached non-elderly unit experiencing the smallest decline in their rate of poverty (29%).
3. Overall, the depth of poverty increased but fell dramatically for some groups like children in female lone parent families (-39%) and the unattached elderly (-18%). By comparison, the depth of poverty rose among the unattached non-elderly unit by 17 per cent. A key reason for the dramatic decline in the depth of poverty for the female lone parent family was the introduction of the National Child Benefit Supplement in 1998 which targeted increasing benefits to low income families with children.

Comparing across sub-groups, one can see that the young are the most vulnerable with the elderly being the least vulnerable. The young are most vulnerable because of the high rate of poverty for the single parent family. By comparison, the elderly are the least vulnerable because of the income transfers available to them (OAS, GIS) and pensions such as the CPP. Also, one can see that being in a two parent family reduces the risk of poverty with families in each age group being far less likely to experience poverty than single persons. By comparison, the unattached individual non-elderly person experiences both a high rate and depth of poverty because of the absence of income support programs. They receive only the GST credit.

#### **INCOME PROFILE OF THE ON-RESERVE POPULATION OF MANITOBA**

The 2011 National Household Survey (NHS) which replaced the long form of the Census and was sent to every third household in Canada, provides a comparative picture of the level of incomes of those living on Indian reserves in Manitoba. The following summary profile was compiled from the individual community profiles published by Statistics Canada for the 52 Indian reserves with populations over 250 individuals. In total, these 52 reserves represent 98 per cent of the total population of aboriginals living on-reserve in Manitoba.

**Table 4: Proportion of the Aboriginal Population Living On-Reserve, In Winnipeg and All Manitobans with After-tax Household Incomes at the Lowest Income Deciles**

<b>Income Decile</b>	<b>All Manitobans</b>	<b>Winnipeg Aboriginals</b>	<b>Total On-Reserve Aboriginals</b>
Lowest	12.4%	24.2%	56.8%
Second Lowest	11.8%	17.3%	18.5%

Source: Statistics Canada, National Household Survey

This table clearly reveals that the incomes of those living on-reserve in Manitoba, compared to the incomes of Aboriginals living in Winnipeg and all Manitobans, are very low. Over half (57%) of them have household incomes at the lowest income decile, compared to 24 per cent of Aboriginals living in Winnipeg and only 12 per cent of all Manitobans.

## RISK FACTORS FOR BEING IN POVERTY

Given that the family or household's poverty status is based on its level of income, the two key determinants of poverty status are the family or household's level of market incomes and transfer payments. Market income includes both employment income and investments. Transfer payments are cash payments from both the federal and provincial governments. In addition to these two sources of income, there are a range of demographic characteristics that are associated with a higher risk of poverty such as low educational attainment, disability and aboriginal status, single parent status. However, these demographic characteristics are associated with higher rates of poverty because they affect the family's capacity to earn an income and its qualification for government transfer payments. The direct determinants of low income status are the family's level of market income and transfer payments.

Looking first at the determinants of a family's level of market income, Table 5 shows the impact of the number of weeks worked and the weekly earnings on the poverty rate for non-elderly families and unattached individuals, as measured by the after-tax LICO for the year 2008 in Manitoba.

**Table 5: Per cent Low Income by Number of Weeks Worked and Average Weekly Earnings for Non-Elderly Families and Unattached Individuals in Manitoba – 2008**

Weeks Worked Per Adult	Weekly Earnings Per Adult							Total
	\$0	\$1-200	\$201-299	\$300-399	\$400-499	\$500-599	\$600+	
0	18.1%	--	--	--	--	--	--	18.1%
1-39	--	64.6%	66.5%	25.3%	31.4%	10.2%	1.5%	18.9%
40 +	--	59.7%	46.9%	10.2%	10.2%	0.0%	0.0%	7.3%
Total	18.1%	61.2%	52.7%	15.9%	3.7%	2.0%	0.3%	11.7%

Source: Statistics Canada, Social Policy Simulation Database and Model, Version 20.<sup>6</sup>

This table clearly shows the impact on poverty rates of the level of employment (weeks worked per adult) and the level of weekly earnings. While the overall poverty rate for the non-elderly family is 11.7%, it is almost 19 per cent among those with less than 40 weeks worked and drops to 7 per cent for those with 40 or more weeks worked. Similarly, for those earning less than \$200 per week, the poverty rate is 61 per cent and quickly drops as weekly earnings rise. For those earning between \$300 and \$400 per week, the poverty rate is only 16 per cent; and for those earning more than \$400 per week, it drops to less than 4 per cent. Table 5 also reveals that for a given level of weekly earnings, the number of weeks worked still plays a role in reducing the risk of low incomes. For example, for those earning

<sup>6</sup> The assumptions and calculations underlying the simulation results in Tables 5 and 6 were prepared by Harvey Stevens and the responsibility for the use and interpretation of these data is entirely that of the author.

between \$300 and \$400 per week, those working at least 40 weeks per year have a poverty rate of only 10 per cent, compared to a poverty rate of 25 per cent for those who worked less than 40 weeks per year.

The joint impact of the non-elderly family's level of *market income* (earnings + investment income + pensions) and its transfer income from both federal and provincial governments on the family's risk of being low income or poor is presented in Table 6 below.

**Table 6: Per cent Low Income by Level of Market Income and Government Transfer Payments for Non-Elderly Families and Unattached Individuals in Manitoba - 2008**

Per Adult Transfers	Per Adult Market Income					Total
	\$1 – \$5 K	\$5 – \$10 K	\$10 - \$15 K	\$15 - \$20 K	\$20+ K	
\$1 – \$2.5K	100.0%	92.6%	65.9%	17.1%	0.2%	14.3%
\$2.5 - \$5K	91.1%	34.9%	36.1%	14.5%	0.0%	9.5%
\$5 – \$7.5K	100.0%	39.7%	0.0%	7.4%	0.0%	16.5%
\$7.5 - \$10K	100.0%	20.5%	0.0%	0.0%	0.0%	26.6%
\$10+K	54.1%	14.5%	3.5%	0.0%	0.0%	31.7%
Total	81.0%	62.2%	37.4%	12.0%	0.1%	11.7%

Source: Statistics Canada, Social Policy Simulation Database and Model, Version 20.

This table clearly shows the impact of rising levels of market income on the poverty rate of non-elderly families and unattached individuals. For those with market incomes of less than \$5,000 per year, their poverty rate is 81%. The poverty rate steadily drops as their market incomes rise such that no families with a per adult market income of more than \$20,000 per year is low income.

The picture for the level of transfer incomes, when the family's level of market income is ignored, shows that, as transfer payments increase, the poverty rate increases. But this trend is due to the fact that higher transfer payments go to those with lower market incomes. By comparison, when families with the *same* level of market incomes are compared; e.g. those with market incomes between \$5K and \$10K per year, Table 6 shows that higher levels of transfer payments result in lower poverty rates. Those with less than \$2500 per year of transfer payments have a poverty rate of 93 per cent, compared to a poverty rate of only 14 per cent for those families receiving more than \$10,000 per adult per year in transfer payments. The same declining poverty rate is evident within the other groupings of market incomes, with two exceptions: For those with very low levels of market incomes below \$5,000 per year, it takes more than \$10,000 of transfer payments to lower their poverty rate; and, for those with market incomes over \$20,000, the level of transfer payments do not affect their poverty rate because their market incomes have been sufficient to remove them from poverty. However, for those with per adult market incomes between \$5,000 and \$20,000, the level of transfer payments makes a big difference to the family's likelihood of being poor.

## CONSUMPTION PATTERNS OF POOR HOUSEHOLDS IN MANITOBA

Low Income families and households have different consumption patterns than higher income households. They spend more on the basic necessities of life than higher income households and less on discretionary items, with a few exceptions, as Table 7 below reveals. Table 7 is based on ten years of data from the Statistics Canada Survey of Household Spending for Manitoba from 2000 to 2009. Low income is defined as having income below the after-tax Low Income Measure (LIM) cutoffs which are established for households.

Table 7 shows that, as household income rises from low income to near low income to higher income, households spend proportionately *less* on food, shelter, electricity, household operations, health and personal care and tobacco and alcohol. Conversely, as household income rises, households spend proportionately *more* on clothing, household equipment and furnishings, transportation, recreation and miscellaneous expenditures. Reading and education expenditures are either constant, as household income rises or show a non-linear trend.

**Table 7: Percent of Total Consumption Allocated to Household Goods and Services  
Manitoba – 2000 to 2009 – by Low Income Status**

Consumption Item	Low Income	Near Low Income <sup>1</sup>	Higher Income <sup>2</sup>	Elasticity <sup>3</sup>
Food Purchased from Stores	15.7%	13.5%	10.4%	0.54
Shelter Excluding Electricity	24.3%	21.8%	19.4%	0.70
<b>Electricity</b>	<b>3.1%</b>	<b>2.7%</b>	<b>2.1%</b>	<b>0.59</b>
Clothing	4.8%	5.3%	5.8%	1.17
Household Operations	7.4%	7.0%	6.5%	0.78
Household Equipment & Furnishings	3.3%	3.6%	4.4%	1.31
Transportation	15.1%	18.8%	21.4%	1.50
Health Care	4.3%	4.3%	3.6%	0.62
Personal Care	2.3%	2.3%	2.2%	0.90
Recreation	6.2%	7.2%	9.3%	1.34
Reading	0.6%	0.6%	0.7%	0.87
Education	2.2%	1.7%	2.1%	3.83
Tobacco & Alcohol	4.1%	3.7%	3.1%	0.88
Miscellaneous	1.6%	1.9%	2.5%	1.28

Source: Statistics Canada, Survey of Household Spending, Public Use Microdata Files.

Notes: <sup>1</sup> The near low income group are those whose income is between 1 and 1.5 times the after-tax LIM threshold. <sup>2</sup> The higher income group are those whose income is more than 1.5 times the after-tax LIM.

<sup>3</sup> Elasticity is the per cent change in the consumption item due to a per cent change in the total value of consumption. An elasticity below(above) 1.00 indicates that consumption of that item declines (increases) as a percentage of total consumption as income rises.

The elasticity estimates are consistent with these expenditure patterns: Those items, whose share of total consumption declines with rising incomes, have elasticities less than one, indicating that demand for these products is inelastic. By comparison, those items, whose share of total consumption increases with rising incomes, have elasticities greater than one, indicating an elastic demand for these products. Education is the one item whose elasticity is very high but whose consumption pattern is non-linear.

Of particular importance in this profile is the very low elasticity associated with electricity consumption. This means that the share of electricity in total consumption costs rises sharply as household income (total household consumption) declines. It also suggests that low income households will be most affected by rising electricity costs, since it is a larger share of their consumption budget than it is for households with higher incomes.

Another key difference in the consumption patterns of low and higher income households are the levels of deficit and surplus they incur. Table 8 shows that low income households are far more likely to experience deficits and far less likely to have a surplus. Households experiencing a deficit are those for which the value of their total consumption exceeds their after-tax household income. Those experiencing a surplus are those whose after-tax income exceeds the value of their total consumption. The overall balance indicates whether the household is in a surplus or deficit position and the value of that surplus or deficit as a percent of the total consumption of the household.

Table 8 shows that low income households are almost three times as likely as non low-income households (53% vs. 20%) to run a deficit. It further shows that the deficit of those households with a deficit is equal to 31 per cent of their total consumption compared to a deficit of only 18 per cent for the much fewer non low income households running a deficit. For low income households, on average they are running a deficit equal to 13 per cent of the value of their total consumption. By comparison, the near low income households are, on average, running a slight surplus (+3%) while the non low income households are averaging a surplus of 26 per cent of their total consumption.

**Table 8: Level of Deficit and Surplus Incurred by Low and Not Low Income Households in Manitoba**

Household Deficit or Surplus Status	Low Income (< LIM)		Near Low Income (1.0 to 1.5 x LIM)		Not Low Income (1.5+ x LIM)	
	% of Hhlds	% of Total Consumption	% of Hhlds	% of Total Consumption	% of Hhlds	% of Total Consumption
Deficit	54%	31%	35%	23%	20%	18%
Surplus	47%	20%	65%	27%	80%	43%
Overall Balance	--	-13%	--	+3%	--	+26%

## Appendix 2

### Methodology for Setting the Average Annual Electricity Rate

The following data have been supplied by Manitoba Hydro:

#### 1. Hydro Rates

Charge Categories	Effective Date						
	Rural Apr. 1, 1997	Urban Apr.1,1997	Wpg. Apr.1,1997	Nov.1, 2001	Aug.1, 2004	Apr.1, 2005	Mar.1, 2007
Monthly Basic Charge							
<200 Amp.	\$13.65	\$7.63	\$6.25	\$6.25	\$6.25	\$6.25	\$6.24
>200 Amp.	\$19.90	\$13.88	\$12.50	\$12.50	\$12.50	\$12.50	\$12.48
Energy Charge:							
First 175 kWh@	\$0.07330	\$0.06530	\$0.0578	\$0.0578	\$0.0578	\$0.0578	\$0.0594
Balance of kWh@	\$0.0516	\$0.0516	\$0.0516	\$0.0516	\$0.05496	\$0.05654	\$0.0579

Charge Categories	Effective Date						
	July 1, 2008	Apr. 1, 2009	Apr.1, 2010	Apr. 1 2011	Apr. 1 2012	Sept. 1 2012	May 1, 2013
Monthly Basic Charge							
<200 Amp.	\$6.60	\$6.85	\$6.85	\$6.85	\$6.85	\$6.85	\$7.09
>200 Amp.	\$13.20	\$13.70	\$13.70	\$13.70	\$13.70	\$13.70	\$14.18
Energy Charge:							
First 900 kWh@	\$0.0608	\$0.0625	\$0.0638	\$0.0662	\$0.0677	\$0.0694	\$0.07183
Balance of kWh@	\$0.06123	\$0.0630	\$0.0657				

#### 2. Distribution of Residential Customers by Monthly Basic Charge and Energy Use:

2004 Distribution		2008/09 Distribution	
< 175kWh Total	0.0708	<900 kWh Total	0.5205
>175 kWh Total	0.9292	>900 kWh Total	0.4795
<200 Amp. Total	0.995	<200 Amp. Total	0.9938
>200 Amp. Total	0.005	>200 Amp. Total	0.0062

#### 3. Average Annual Electrical Usage for Residential Customers (Electric Heat Billed and Non-Electric Heat Billed)

- Winnipeg = 12,032 kWh
- Non-Winnipeg = 19,887 kWh

#### 4. Distribution of Households by Area in Manitoba in 2000

- a. Wpg = 0.6375; b. Urban/Non-Wpg = 0.1613; c. Rural =0.2012
- b. Non-Wpg.: Urban = 0.445; Rural = 0.555

## 5. Average Annual Rate Calculations:

### A. Energy Charge

Year	Calculation	Average Charge
2000 – Wpg.	$((0.0578*0.0708)+(0.0516*0.9292))$	0.05204
2000 – Urban	$((0.0653*0.0708)+(0.0516*0.9292))$	0.05257
2000 – Rural	$((0.0733*0.0708)+(0.0516*0.9292))$	0.05314
2001 – Wpg.	$((0.0578*0.0708)+(0.0516*0.9292))$	0.05204
2001 – Urban	$[(((0.0653*0.0708)+(0.0516*0.9292))*10)+(((0.0578*0.0708)+(0.0516*0.9292))*2)]/12$	0.05248
2001 – Rural	$[(((0.0733*0.0708)+(0.0516*0.9292))*10)+(((0.0578*0.0708)+(0.0516*0.9292))*2)]/12$	0.05295
2002 – All	$((0.0578*0.0708)+(0.0516*0.9292))$	0.05204
2003– All	$((0.0578*0.0708)+(0.0516*0.9292))$	0.05204
2004– All	$[(((0.0578*0.0708)+(0.0516*0.9292))*7)+(((0.0578*0.0708)+(0.05496*0.9292))*5)]/12$	0.05334
2005– All	$[(((0.0578*0.0708)+(0.05496*0.9292))*3)+(((0.0578*0.0708)+(0.05654*0.9292))*9)]/12$	0.05626
2006– All	$((0.0578*0.0708)+(0.05654*0.9292))$	0.05663
2007– All	$[(((0.0578*0.0708)+(0.05654*0.9292))*2)+(((0.0594*0.0708)+(0.0579*0.9292))*10)]/12$	0.05778
2008– All	$[(((0.0594*0.0708)+(0.0579*0.9292))*6)+(((0.0608*0.5205)+(0.06123*0.4795))*6)]/12$	0.05951
2009– All	$[(((0.0608*0.5205)+(0.06123*0.4795))*3)+(((0.0625*0.5205)+(0.0630*0.4795))*9)]/12$	0.06231
2010 – All	$[(((0.0625*0.5205)+(0.0630*0.4795))*3)+(((0.0638*0.5205)+(0.0657*0.4795))*9)]/12$	0.06422
2011 – All	$[(((0.0638*0.5205)+(0.0657*0.4795))*3)+(0.0662*9)]/12$	0.06583
2012 – All	$((0.0662*3)+(0.0677*9))/12$	0.06732
2013 – All	$((0.0677*4)+(0.07183*8))/12$	0.07045



B. Annual Monthly Charge per Average yearly kWh

Year	Calculation	Average Charge
2000 – Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2000 – Non Wpg.	$((7.63 \times 0.994) \times 0.445 + ((13.88 \times 0.006) \times 0.555)) \times 12 / 19887$	0.00206
2001 – Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2001- Non Wpg.	$((7.63 \times 0.994) \times 0.445 + ((13.88 \times 0.006) \times 0.555)) \times 10 + ((6.25 \times 0.994) + (12.5 \times 0.006)) \times 2 / 12 \times 12 / 19887$	0.00235
2002 – Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2002-Non Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 19887$	0.00379
2003 – Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2003 - Non Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 19887$	0.00379
2004- Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2004 - Non Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 19887$	0.00379
2005- Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2005 - Non Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 19887$	0.00379
2006- Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 12032$	0.00627
2006 - Non Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 12 / 19887$	0.00379
2007- Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 2 + ((6.24 \times 0.994) + (12.48 \times 0.006)) \times 10 / 12 \times 12 / 12032$	0.00626
2007 - Non Wpg.	$((6.25 \times 0.994) + (12.5 \times 0.006)) \times 2 + ((6.24 \times 0.994) + (12.48 \times 0.006)) \times 10 / 12 \times 12 / 19887$	0.00378
2008- Wpg.	$((6.24 \times 0.994) + (12.48 \times 0.006)) \times 6 + ((6.60 \times 0.994) + (13.20 \times 0.006)) \times 6 / 12 \times 12 / 12032$	0.00644
2008 - Non Wpg.	$((6.24 \times 0.994) + (12.48 \times 0.006)) \times 6 + ((6.60 \times 0.994) + (13.20 \times 0.006)) \times 6 / 12 \times 12 / 19887$	0.00390
2009- Wpg.	$((6.60 \times 0.994) + (13.20 \times 0.006)) \times 3 + ((6.85 \times 0.994) + (13.70 \times 0.006)) \times 9 / 12 \times 12 / 12032$	0.00681
2009 - Non Wpg.	$((6.60 \times 0.994) + (13.20 \times 0.006)) \times 3 + ((6.85 \times 0.994) + (13.70 \times 0.006)) \times 9 / 12 \times 12 / 19887$	0.00412
2010 – Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 12 / 12032$	0.00687
2010 – Non Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 12 / 19887$	0.00416
2011 – Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 12 / 12032$	0.00687
2011 – Non Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 12 / 19887$	0.00416
2012 – Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 12 / 12032$	0.00687
2012 – Non Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 12 / 19887$	0.00416
2013 – Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 4 + ((7.09 \times 0.994) + (14.18 \times 0.006)) \times 8 / 12 \times 12 / 12032$	0.00703
2013 – Non Wpg.	$((6.85 \times 0.994) + (13.70 \times 0.006)) \times 4 + ((7.09 \times 0.994) + (14.18 \times 0.006)) \times 8 / 12 \times 12 / 19887$	0.00425

C. Total Annual Hydro Rates per kWh

Year	Calculation	Total Charge – Nominal	Total Charge – 2009\$
2000 – Wpg.	$0.05204 + 0.00627$	0.05831	0.06938
2000 – Urban	$0.05257 + 0.00206$	0.05463	0.06500
2000 – Rural	$0.05314 + 0.00206$	0.0552	0.06567
2001 – Wpg.	$0.05204 + 0.00627$	0.05831	0.06754
2001 – Urban	$0.05248 + 0.00235$	0.05483	0.06531
2001 - Rural	$0.05295 + 0.00235$	0.0553	0.06406
2002 – Wpg.	$0.05204 + 0.00627$	0.05831	0.06653
2002- Non Wpg.	$0.05204 + 0.00379$	0.05583	0.06370
2003- Wpg.	$0.05204 + 0.00627$	0.05831	0.06535
2003- Non Wpg.	$0.05204 + 0.00379$	0.05583	0.06257
2004- Wpg.	$0.05334 + 0.00627$	0.05961	0.06552
2004- Non Wpg.	$0.05334 + 0.00379$	0.05713	0.06280
2005- Wpg.	$0.05626 + 0.00627$	0.06253	0.06693
2005- Non Wpg.	$0.05626 + 0.00379$	0.06005	0.06427
2006- Wpg.	$0.05663 + 0.00627$	0.0629	0.06602
2006- Non Wpg.	$0.05663 + 0.00379$	0.06042	0.06342
2007- Wpg.	$0.05778 + 0.00626$	0.06404	0.06589
2007- Non Wpg.	$0.05778 + 0.00378$	0.06156	0.06334
2008- Wpg.	$0.05951 + 0.00644$	0.06595	0.06636
2008- Non Wpg.	$0.05951 + 0.00390$	0.06341	0.06380
2009- Wpg.	$0.06231 + 0.00681$	0.06912	0.06912
2009- Non Wpg.	$0.06231 + 0.00412$	0.06643	0.06643
2010- Wpg.	$0.06422 + 0.00687$	0.07109	0.07053
2010- Non Wpg.	$0.06422 + 0.00416$	0.06838	0.06784
2011- Wpg.	$0.06583 + 0.00687$	0.0727	0.07006
2011- Non Wpg.	$0.06583 + 0.00416$	0.06999	0.06745
2012- Wpg.	$0.06732 + 0.00687$	0.07419	0.07037
2012- Non Wpg.	$0.06732 + 0.00416$	0.07148	0.06780
2013- Wpg.	$0.07045 + 0.00703$	0.07748	0.07187
2013- Non Wpg.	$0.07045 + 0.00425$	0.07470	0.06929