

# Exploring the Future for Natural Gas Supply and Demand For Centra Gas

## U.S. and Canada Gas Market and Portfolio Option Overview

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# INTRODUCTION

## The current Centra gas supply portfolio is structured around two primary factors



1. Centra is dependent on the TransCanada Pipeline for natural gas deliveries.
  - WCSB production
  - Natural gas withdrawals from storage in Michigan
  - U.S. supply from the Gulf Coast, or Mid-Continent
  
2. Centra has long term agreements with ANR for natural gas storage capacity in Michigan.
  - Contracts expire on March 31, 2013

## Recent market developments have changed the planning environment



- Declines in gas exports from the WCSB have driven up TransCanada rates.
- TransCanada pipeline capacity from Empress to the Centra citygate is unconstrained, hence the value of holding long term firm capacity on TransCanada is reduced.
- Availability of highly discounted backhaul capacity from ANR storage on Great Lakes Gas Transmission to Emerson and economic backhaul on TCPL from Emerson to the Centra Citygate may be declining, potentially resulting in increases in the cost of using Michigan Storage.
- New storage options have become available since Centra contracted for ANR storage.
- Changes in market structure enable Centra to purchase natural gas at the Centra citygate on both a seasonal and peak day basis.

*The expiration of the ANR storage contract, and associated pipeline capacity on ANR and Great Lakes in 2013 provides an opportunity to reevaluate the physical and contractual basis for natural gas deliveries to the Centra citygate.*



# NORTH AMERICAN GAS MARKET OVERVIEW

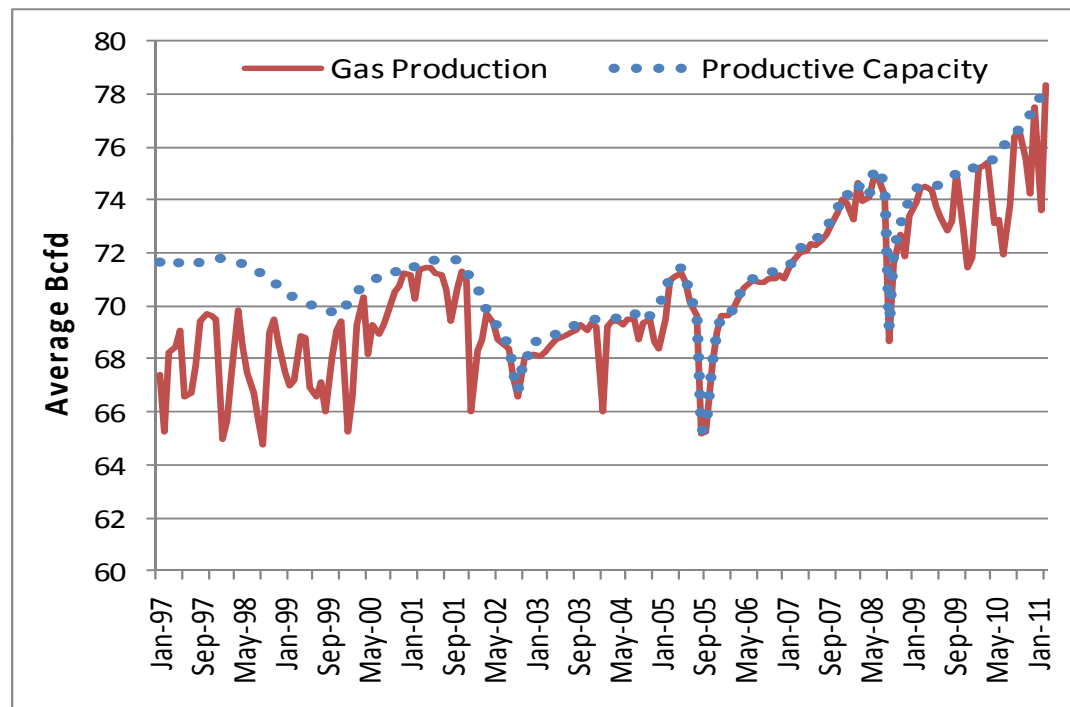


# Natural gas markets have changed dramatically over the last fifteen years



- Gas deliverability is a measure of the productive capacity of existing wells.
  - The last major “Gas Glut” ended in around 2000, when demand (and production) caught up with productive capacity.
  - Between 2000 and 2008, gas production was very near 100% of deliverability, leading to wide swings in price needed to balance supply and demand.
  - Over the past two years, low prices have led producers to reduce, or “shut in” production from some wells.

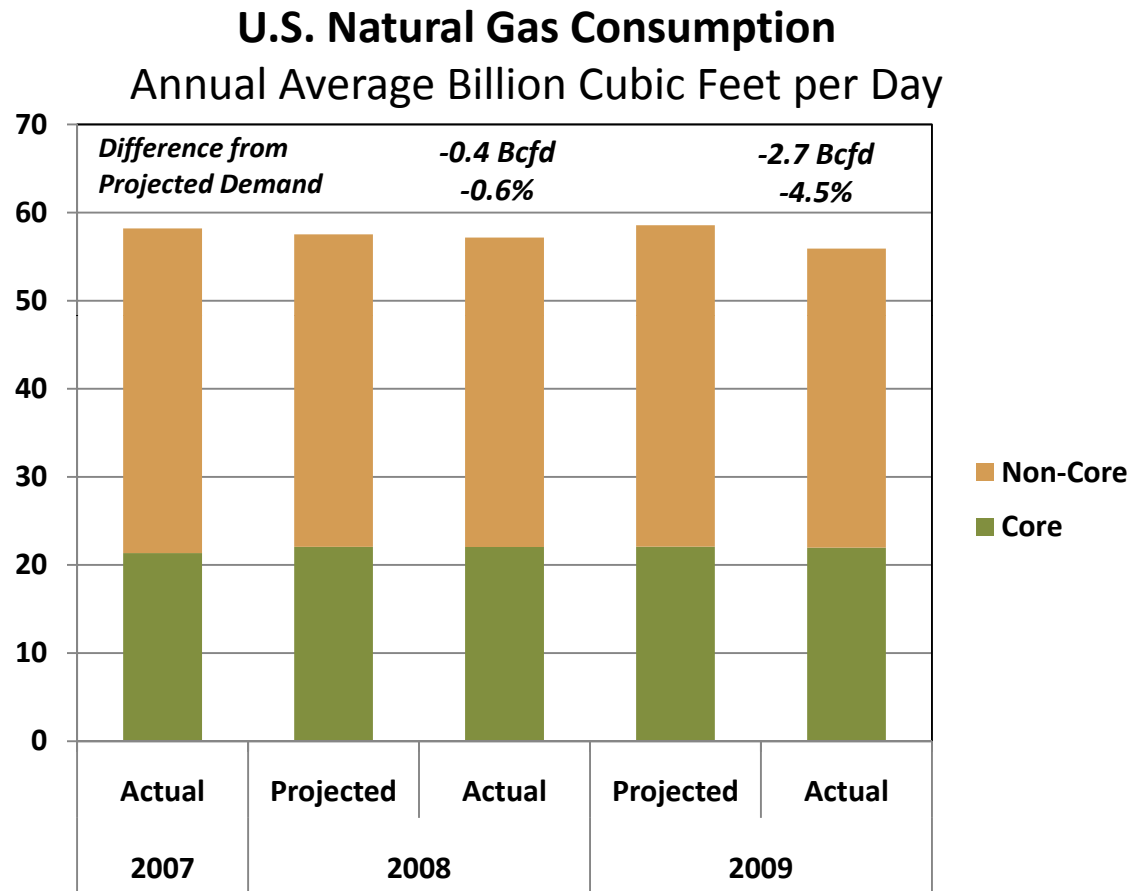
**U.S. and Canada  
Gas Production and Deliverability, Bcf/d**



# The Recession Caused Gas Demand to Decline



- Instead of growing modestly, gas use declined by about 5 percent, consistent with the decline in economic activity from 2007-09.
- Nearly all of the decline occurred in non-core gas use, primarily in the industrial sector.
- However, demand appears to be rebounding.

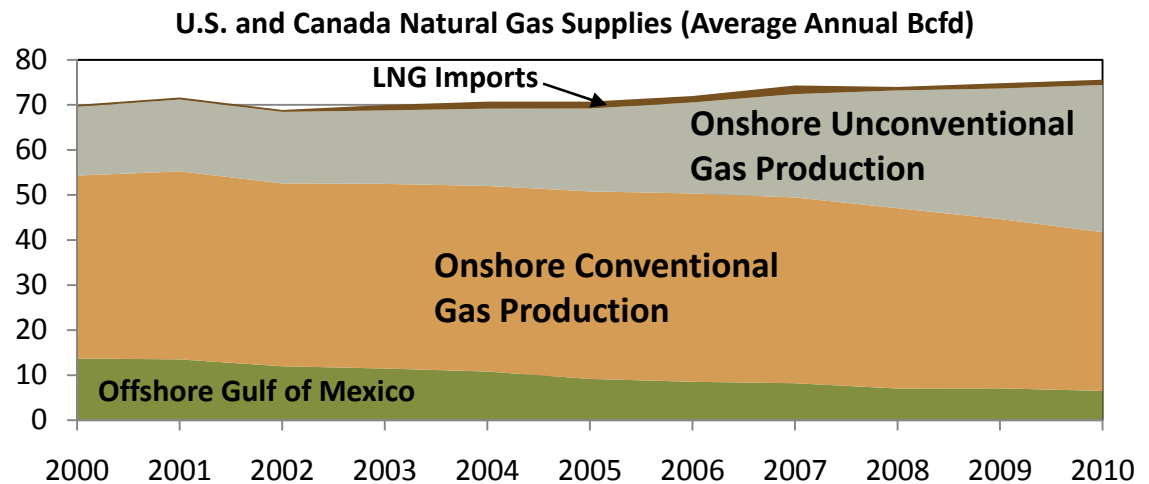
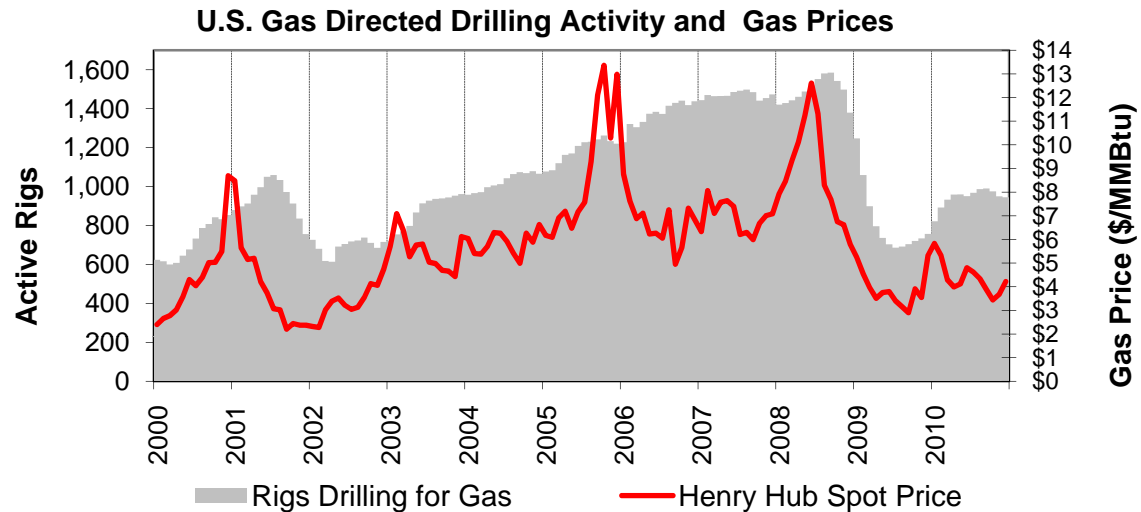


Core demand includes the residential and commercial sectors.  
 Non-core demand includes the industrial and power generation sectors.  
 Projected values are from ICF's November 2007 gas market projection.

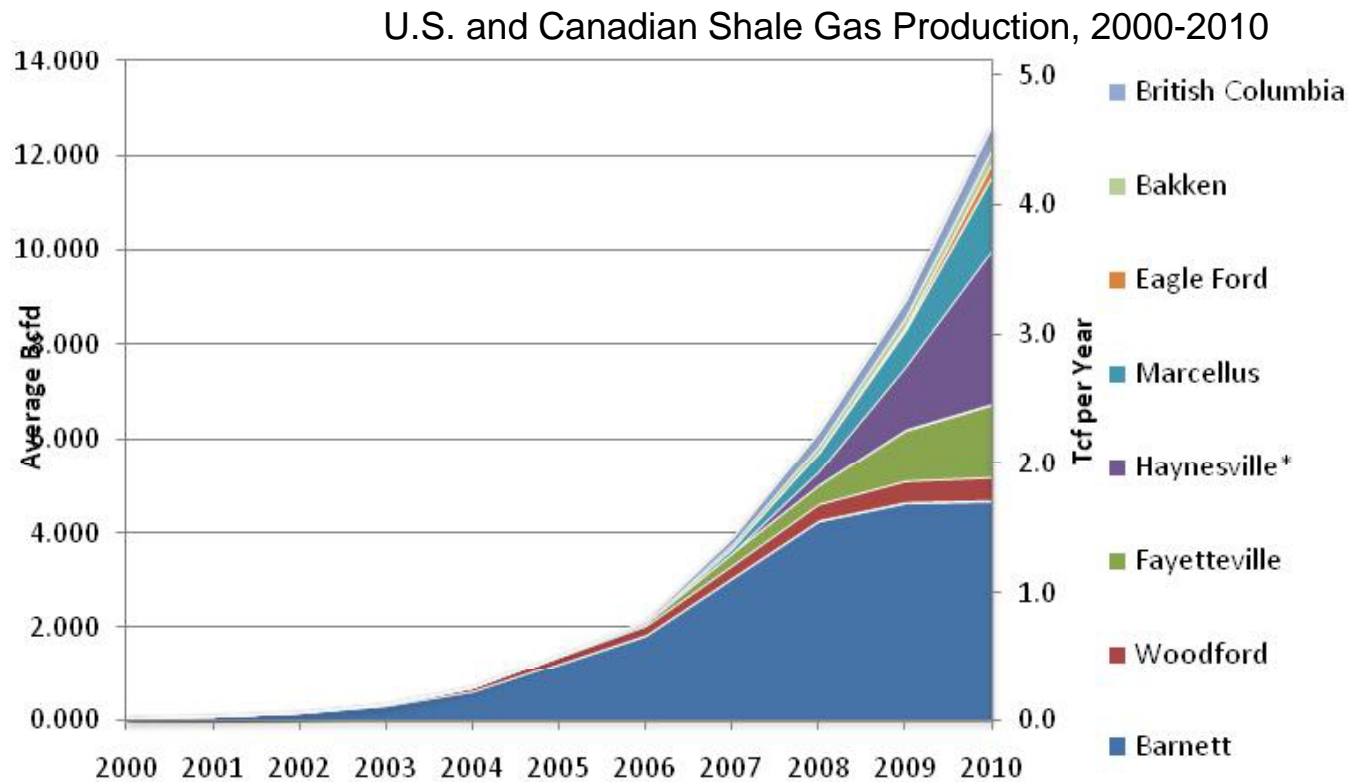
# But, the Recession Has Had Less Impact on Gas Supply



- Drilling activity continued to rise until late 2008 in response to relatively high gas prices.
- A significant decline in activity occurred in late 2008 and early 2009 in response to the collapse in prices.
- Over the past year, activity has rebounded, but the focus is on horizontal wells.
- In the past five years, increases in unconventional gas production have more than made up for the declines in onshore conventional and offshore production.



# Shale gas has been the primary contributor to growth in unconventional gas supply



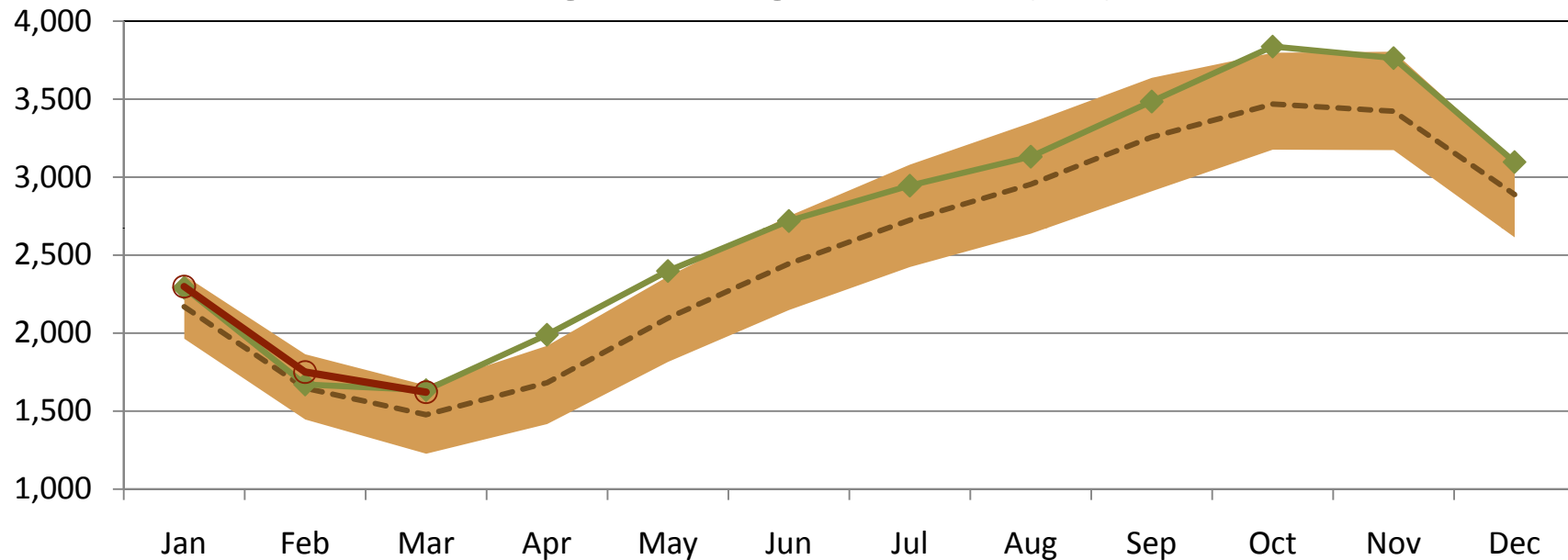
\*Haynesville production shown here includes gas from other shale plays in vicinity, e.g., the Bossier Shale.

Source: ICF

## And, Storage Levels Have Been Relatively High Compared to the Five-Year Average



**U.S. Natural Gas Storage Working Gas Levels (Bcf)**



Source: EIA

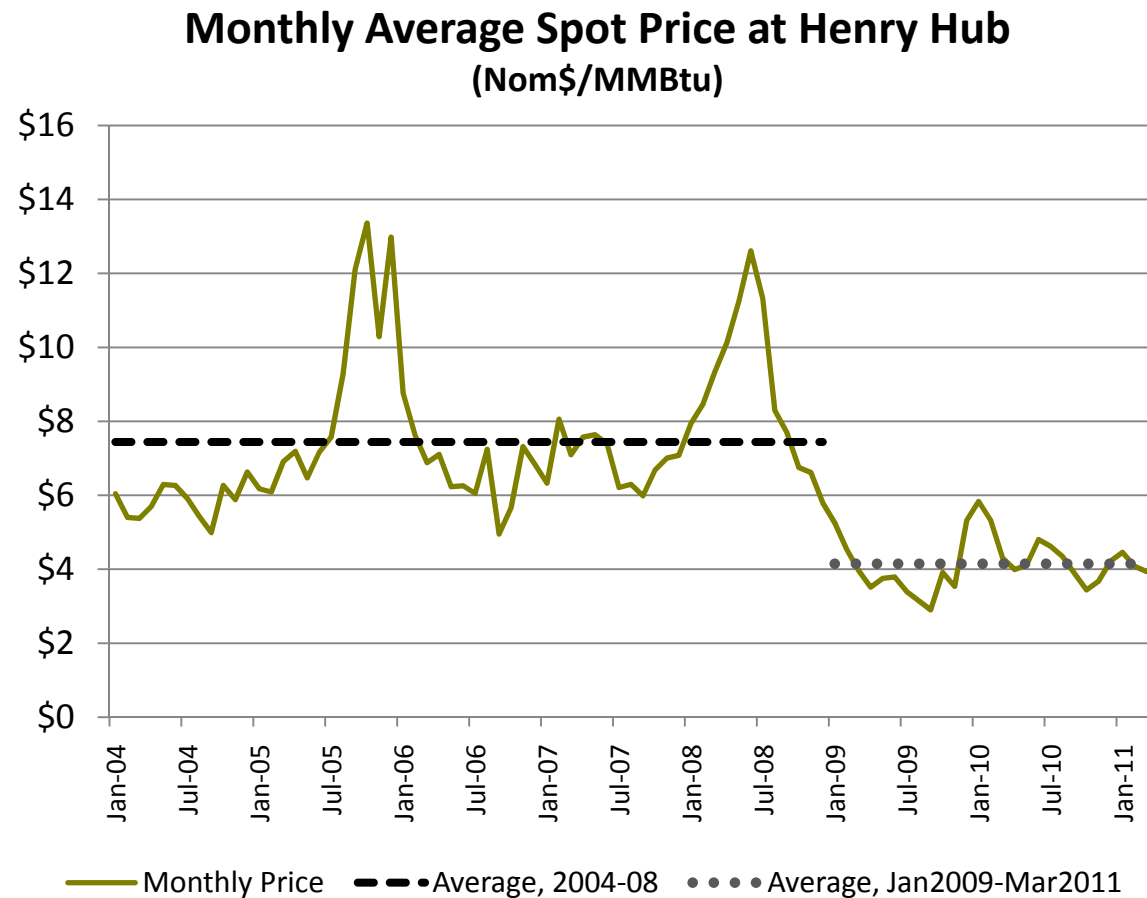
Range, 2005-2009    
  Average, 2005-09    
 
◆
 2010    
 
○
 2011 YTD

- Strong production growth and modest demand have kept working gas levels well above the five year average throughout 2010.
- Recent increases in demand, particularly in the power sector, have reduced storage injections this spring, but working gas levels remain relatively high.

## Natural Gas Prices Reflect the Loose Supply/Demand Balance and Relatively High Working Gas Levels



- Prices since 2009 have averaged about \$4 per MMBtu, or roughly half of the average for the prior 5 years.



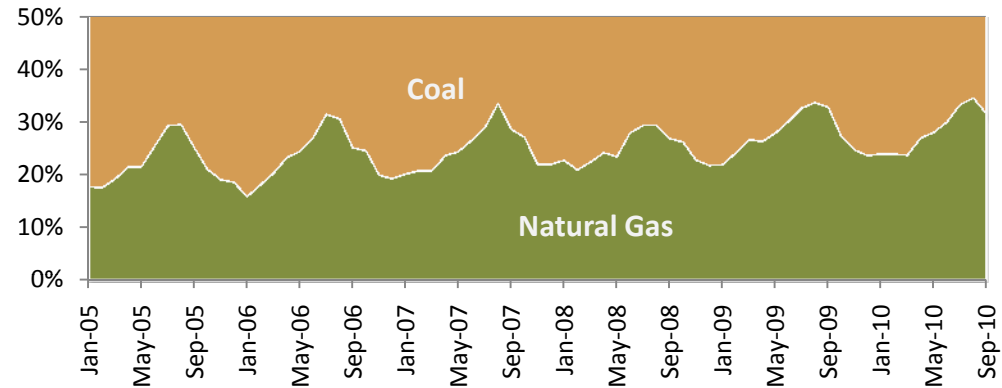
Source: Platts

# Coal-to-Gas Switching for Electric Power Generation in a Low Gas Price Environment

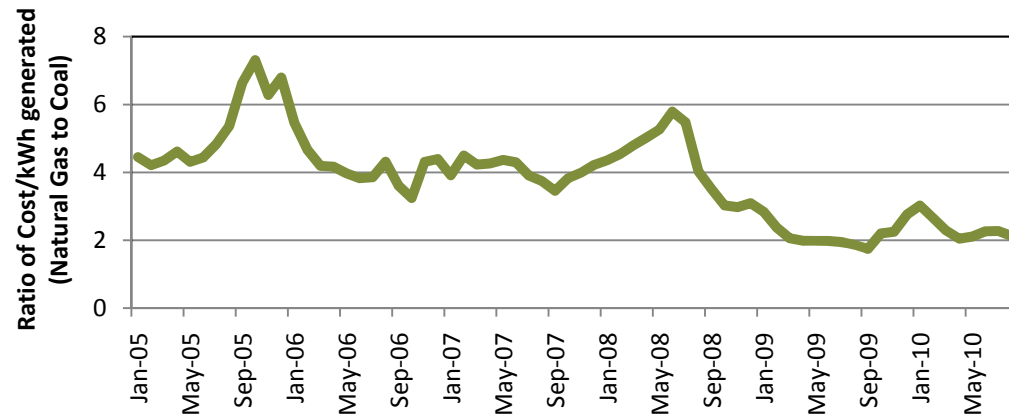


- The market share of natural gas versus coal in power generation reached 33 percent on a monthly basis in August 2007 and has equaled that mark twice since, in August 2009 and most recently in July and August 2010.
- The cost of natural gas relative to coal reached a 10-year low in the 2<sup>nd</sup> half of 2009; cost of gas fell to below two times the cost of coal for the first time since 1999.

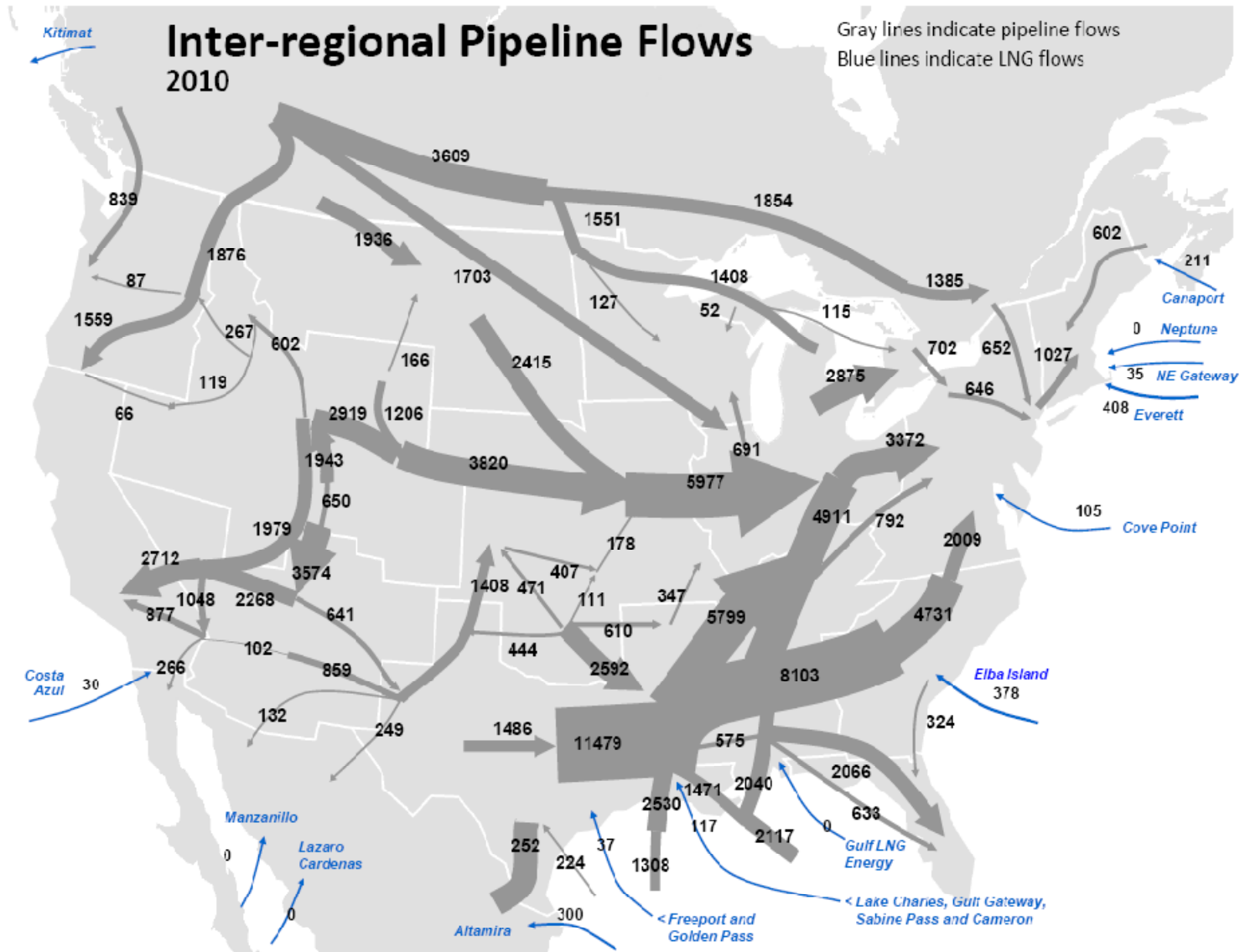
Share of Natural Gas vs Coal in Power Generation Market



Relative Cost of Natural Gas for Power Generation

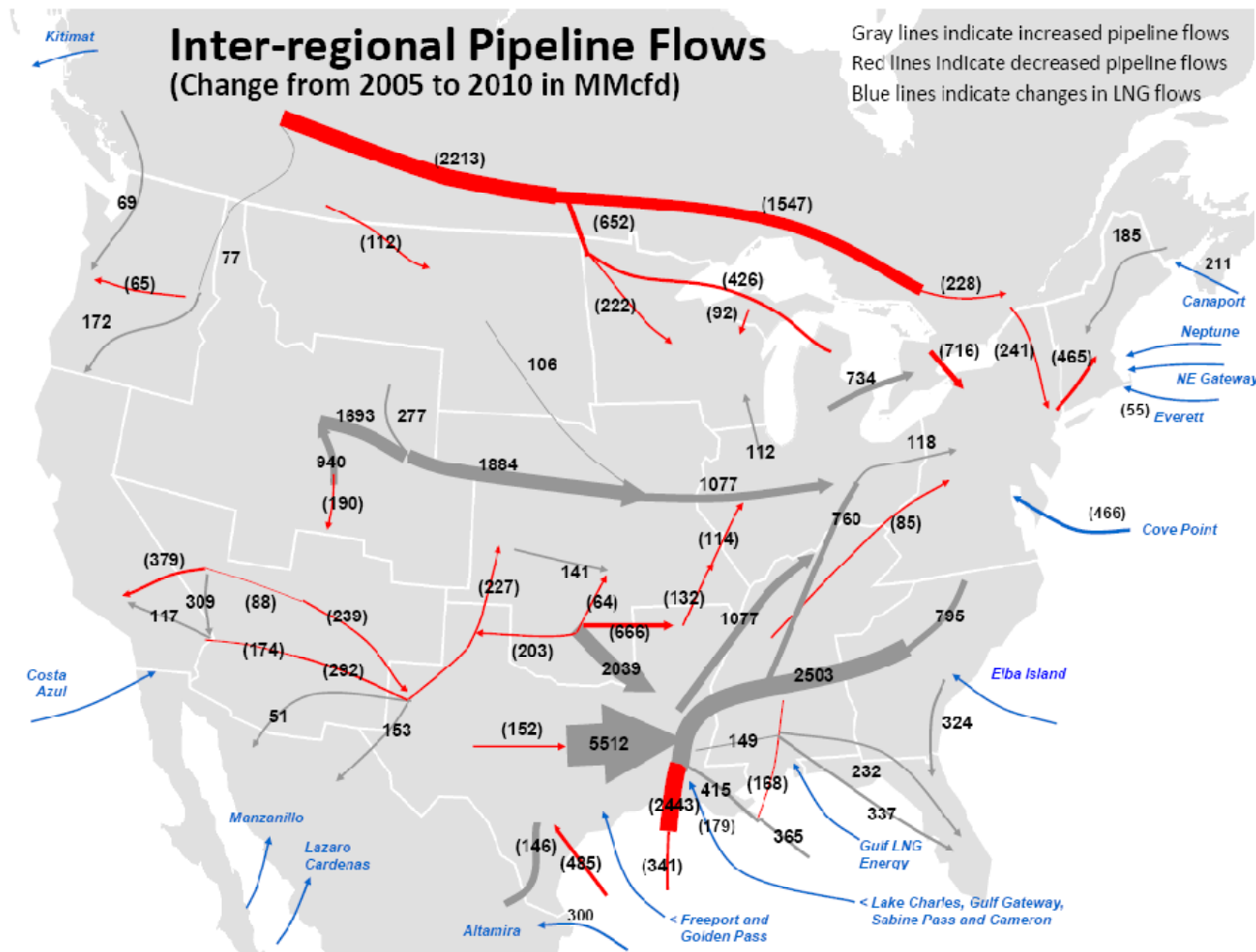


Source: EIA





# Recent changes in gas supply patterns have changed Inter-regional pipeline flows





# Key Assumptions in ICF's Projection

# Key Assumptions Behind ICF's Natural Gas Market Projection



The projections in this document were developed using the Gas Market Model (GMM<sup>®</sup>), ICF's proprietary model of the North American natural gas market, based in part on the following assumptions:

- U.S. GDP grows at a constant rate of 2.8% per year.
- Electricity demand growth decelerates over time, averaging 1.4% per year through 2035.
- Electric generation gas demand is driven by the projections for generating capacity and gas-fired generation from ICF's Integrated Planning Model (IPM<sup>®</sup>).
  - ICF's electric generation and natural gas forecasts both assume a policy limiting CO<sub>2</sub> emissions is in effect after 2018.
  - All nuclear units are assumed to have a maximum operating life of 60 years. As a result, about 11 GW of retirements are projected between 2029 and 2035.
  - New generating capacity is built to satisfy load growth, subject to the costs of each competing technology.
- Demand side management and conservation measures continue to occur, consistent with recent trends.
- Gas supply is developed in GMM<sup>®</sup> based on the amount of resource available and the E&P finding and development costs associated with the different types of gas resources.
- In the near term, pipeline and storage capacity additions are built based on announced. In the longer term, projects are added based on economic merit.

# The North American Natural Gas Resource Base Could Support Current Levels of Gas Use for about 150 Years



- In total, the U.S. and Canada have almost 4,000 Tcf of resource that can be economically recovered using current exploration and production (E&P) technologies.
  - At current levels of consumption, this is enough resource for about 150 years.
  - As technologies improve and new discoveries are made, the total gas resource is likely to grow.
- Over 50% of the assumed resource is shale gas.

## U.S. and Canada Natural Gas Resource Base (Tcf of Economically Recoverable Resource, Assuming Current E&P Technologies)

	Proven Reserves	Unproved Plus Discovered Undeveloped	Total Remaining Resource	Shale Resource <sup>1</sup>
Alaska	7.7	153.6	161.3	0.0
West Coast Onshore	2.3	24.6	27.0	0.3
Rockies & Great Basin	66.7	388.3	454.9	37.9
West Texas	27.6	47.7	75.3	17.5
Gulf Coast Onshore	70.1	684.7	754.8	476.9
Mid-continent	37.0	205.0	241.9	133.9
Eastern Interior <sup>2,3</sup>	18.6	1053.7	1072.3	986.1
Gulf of Mexico	14.0	238.6	252.5	0.0
U.S. Atlantic Offshore	0.0	32.8	32.8	0.0
U.S. Pacific Offshore	0.8	31.7	32.5	0.0
WCSB	60.4	664.0	724.4	508.8
Arctic Canada	0.4	45.0	45.4	0.0
Eastern Canada Onshore	0.4	15.9	16.3	10.3
Eastern Canada Offshore	0.5	71.8	72.3	0.0
Western British Columbia	0.0	10.9	10.9	0.0
<b>US Total</b>	<b>244.7</b>	<b>2,860.6</b>	<b>3,105.3</b>	<b>1,652.5</b>
<b>Canada Total</b>	<b>61.3</b>	<b>807.6</b>	<b>868.8</b>	<b>519.1</b>
<b>US and Canada Total</b>	<b>306.0</b>	<b>3,668.1</b>	<b>3,974.1</b>	<b>2,171.6</b>

1. Shale Resource is a subset of Total Remaining Resource

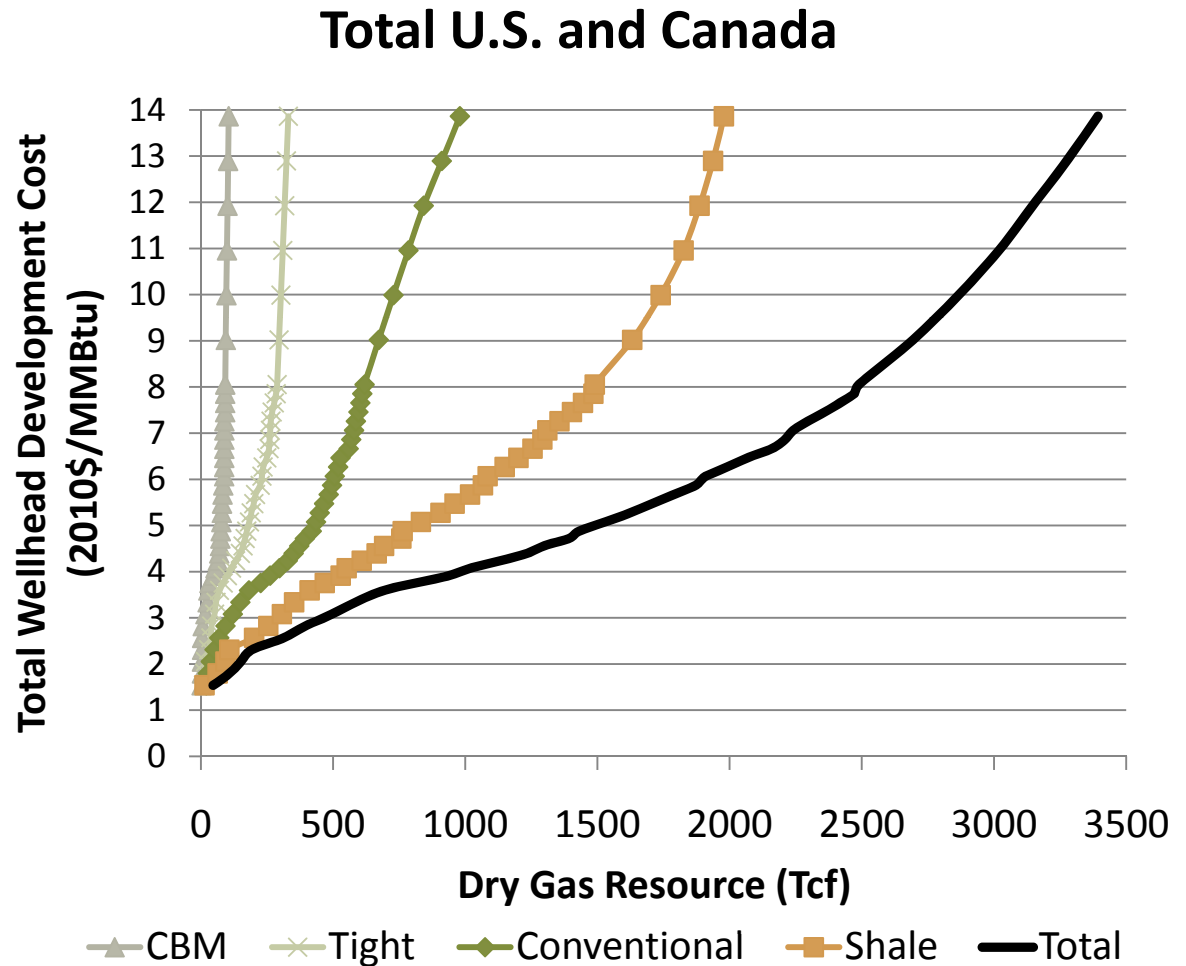
2. Eastern Interior includes Marcellus, Huron, Utica, and Antrim shale.

3. Reference case assumes drilling levels are constant at today's level over time, reflecting restricted access to the full resource development.

# North American Gas Supply Curves



- The existing North America resource base includes about 1,500 Tcf of gas that is economically recoverable at \$5 per MMBtu.
  - Shale gas accounts for over half of the gas economically recoverable at \$5 per MMBtu.
- Total cost of developing new resource includes exploration, development and O&M costs (both fixed and variable cost).



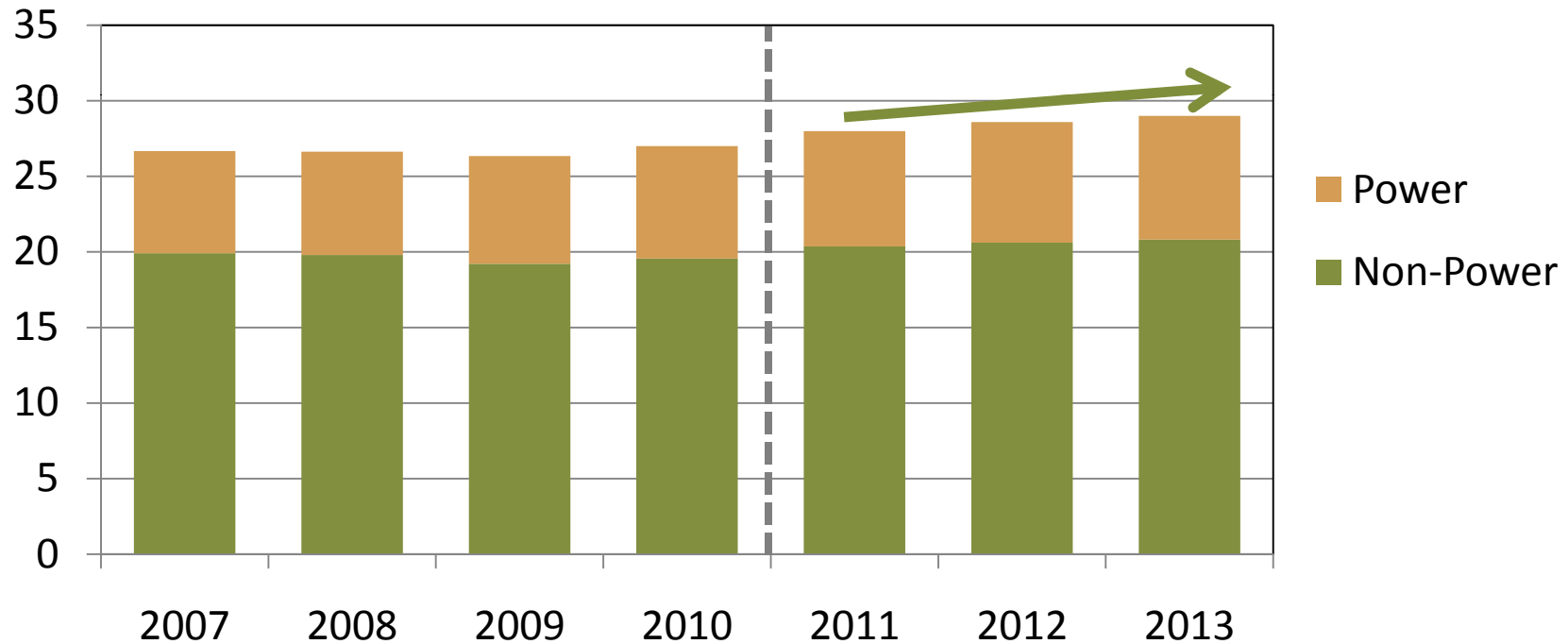


# ICF's Gas Market Outlook

# Near-term Gas Demand Will Rebound, Assuming Positive Economic Activity



## U.S. and Canadian Gas Demand (Tcf per Year)

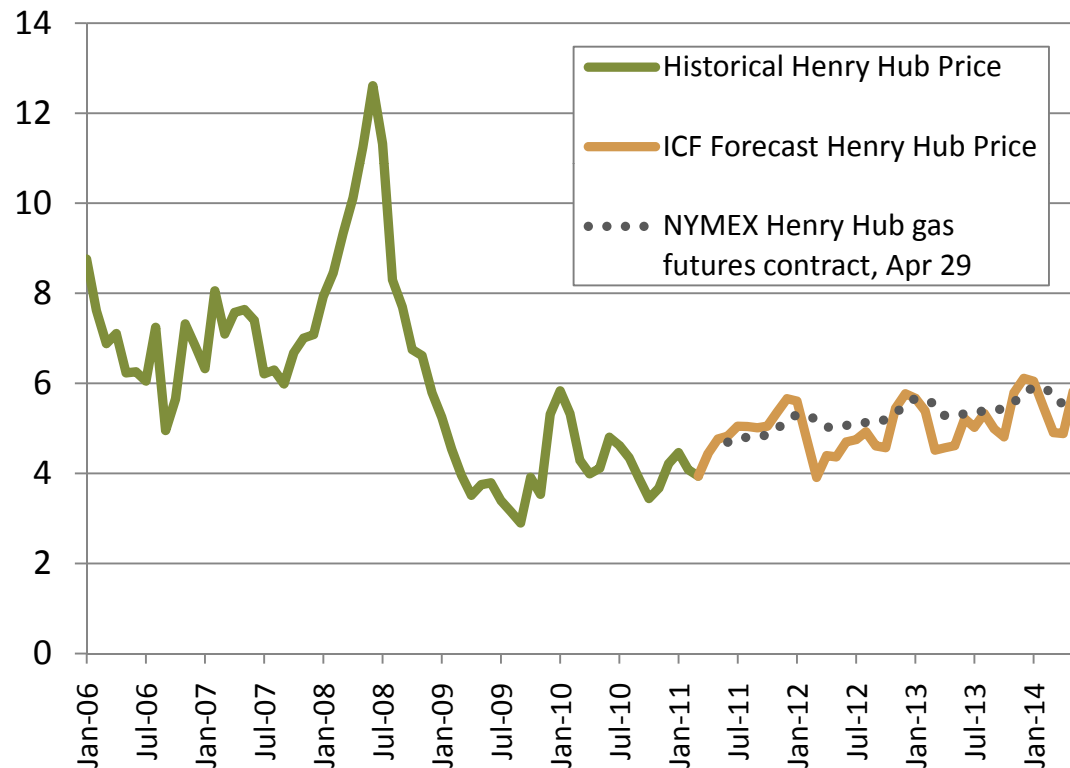


# Gas Prices are Likely to Remain Relatively Low over the Next Three Years



- Gas prices over the next 3 years are projected to average around \$5 per MMBtu.
  - On average our projection is similar to the trend in futures prices, although we project more seasonal variability.
- Shoulder-month prices find a floor around \$4 per MMBtu, while winter prices reach \$6 per MMBtu.
  - All of ICF's projections assume normal (30-year average) weather.

**Projected Natural Gas Prices Versus NYMEX**  
Nominal Dollars per MMBtu



Historic and futures contract prices from Platts

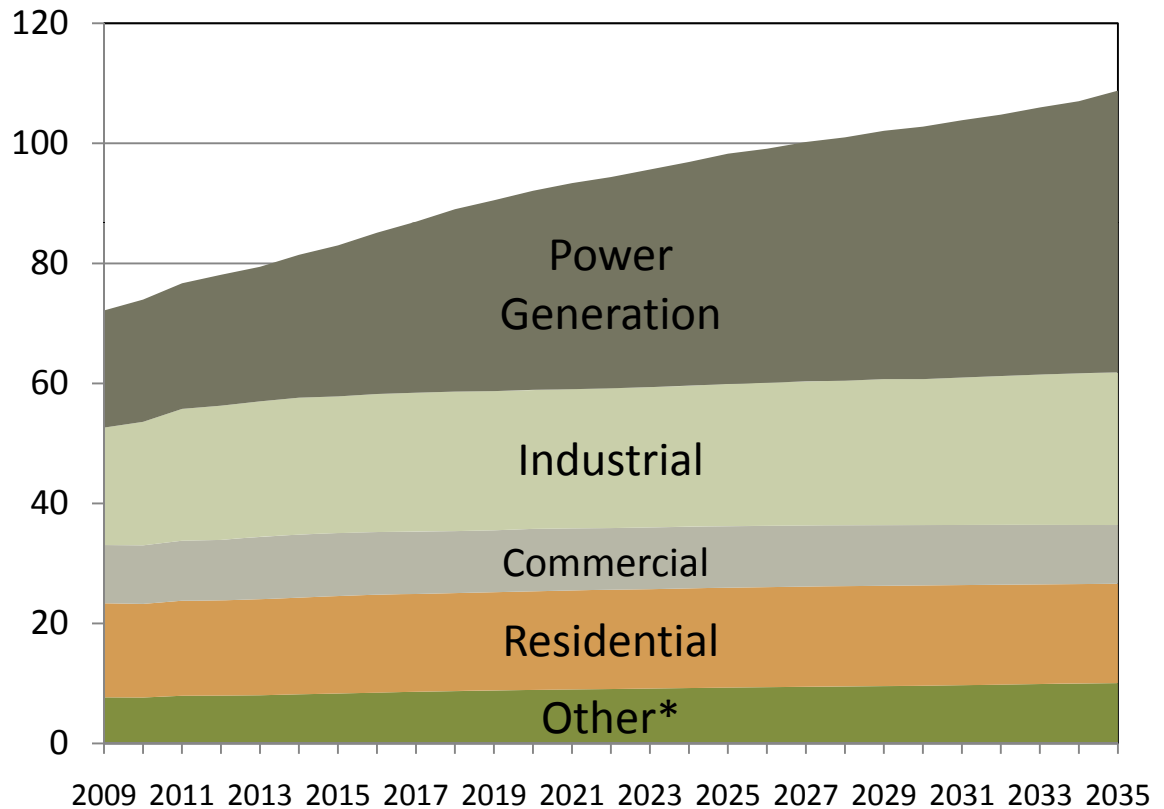


# In the Longer Term, Growth in Gas Consumption Will Continue to be Driven by Growth in Gas Use for Electric Generation



- Total gas consumption is projected to increase at a rate of 1.6% per year
  - By 2035, total gas consumption in the U.S. and Canada is projected to approach an average of 110 Bcf per day.
- About 75% of the incremental demand growth is in the power sector.
  - Power sector gas consumption is projected to more than double by 2035.
- In aggregate, very little demand growth occurs in the other sectors.

**U.S. and Canadian Gas Consumption (Average Annual Bcfd)**



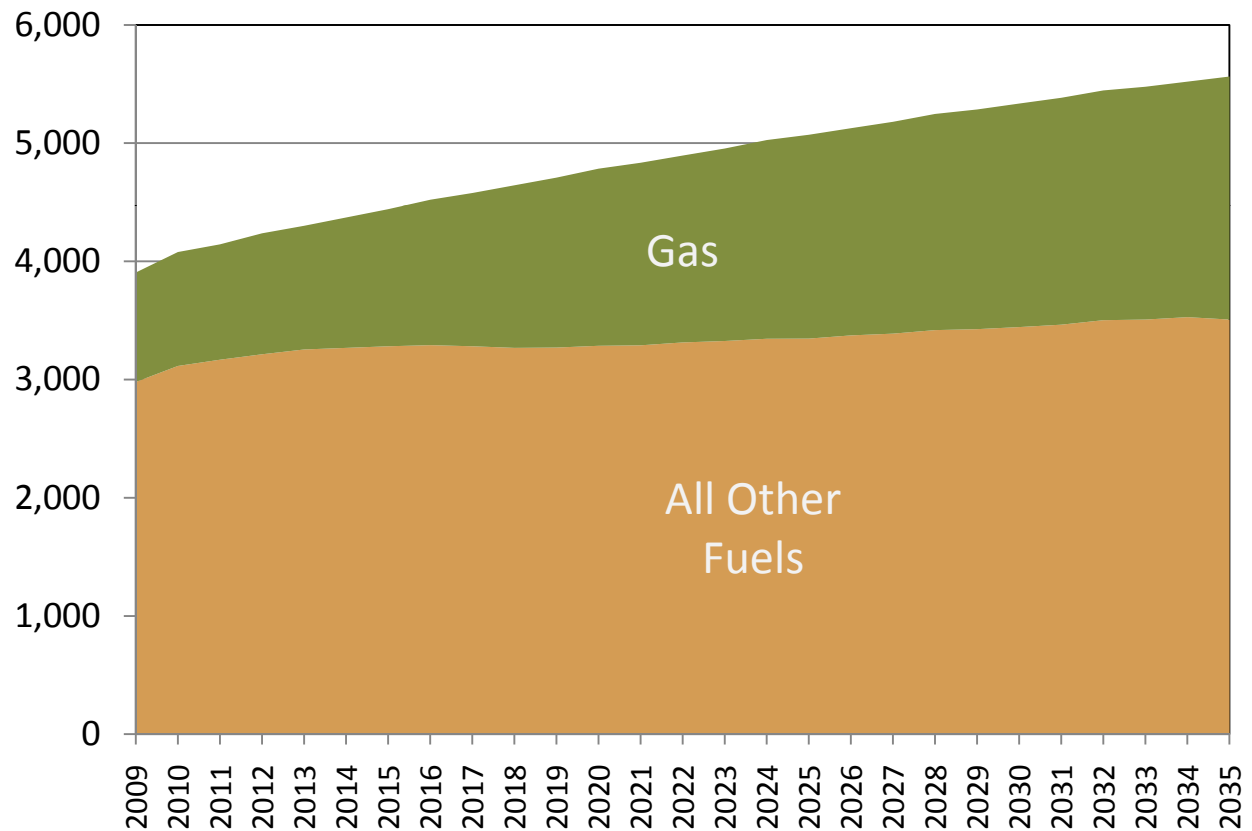
\* Other includes lease, plant, and pipeline fuel gas use.

# Gas-fired Generation Grows from 23% to 37% of Total Generation by 2035



- The U.S. has about 460 GW of gas-fired generating capacity, much of it new combined cycle units added in the past 15 years.
- Current utilization rates for gas-fired plants are relatively low, so existing plants can provide much of the incremental growth in gas-fired generation.
- Gas is an important fuel for carbon policy.
  - Generation from existing coal plants is likely to decline.
  - Renewable generation is expected to grow at a rapid pace, but from a relatively small base.
  - Nuclear generation may decline if plants are forced to retire as they reach 60 years of operation.

**U.S. Electricity Generation (TWh per Year)**

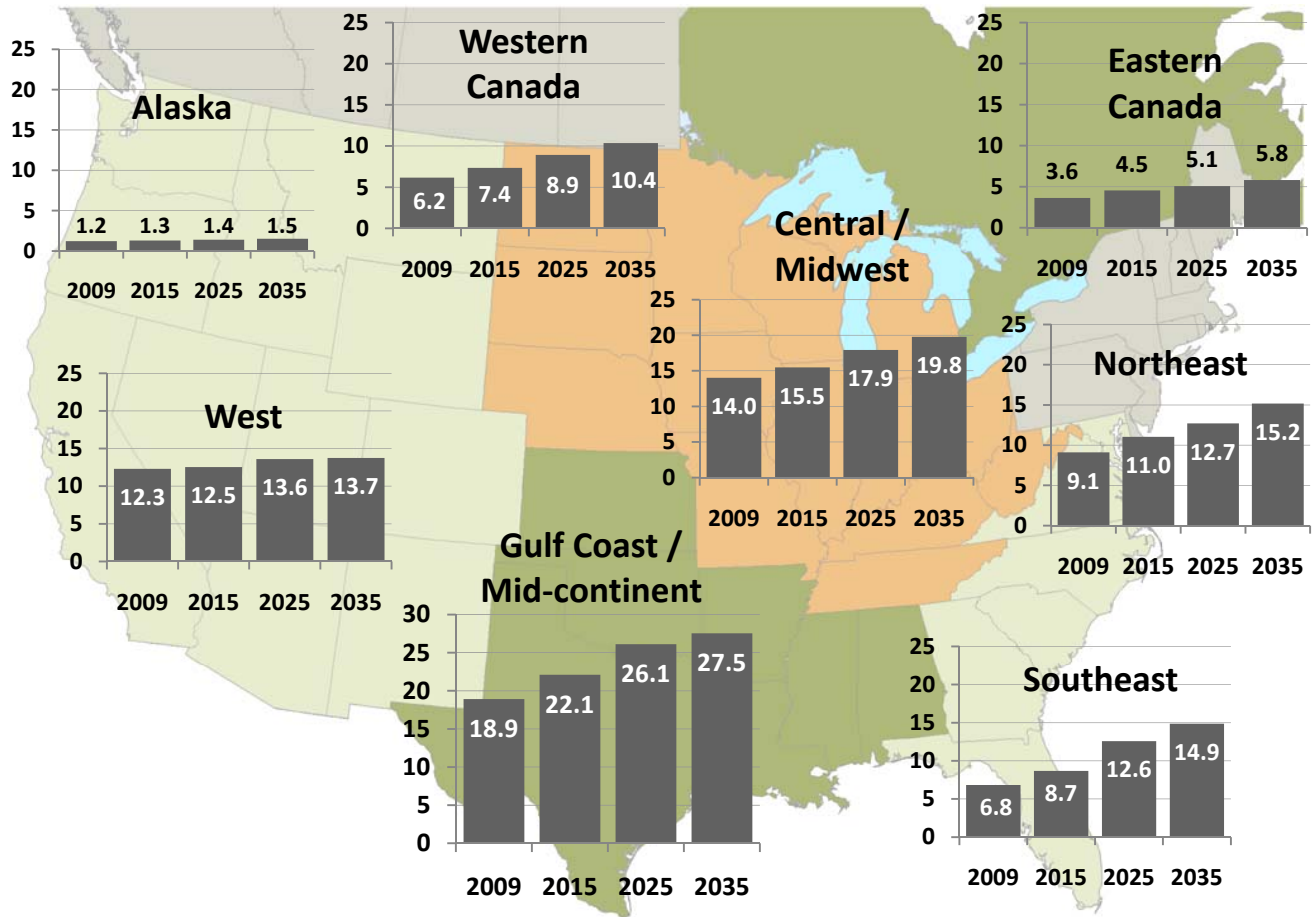


# Demand for Natural Gas Grows Across the U.S. and Canada



- Most of the regional growth in gas demand is due to increased gas use for electric generation.
- The largest increases occur in the Gulf Coast and Mid-continent and the Southeast.
  - Together, gas consumption in these regions increases by over 16 Bcfd through 2035.
- Demand growth in Western Canada is primarily driven by increased gas use for oil sands development.
  - Oil sands gas use is expected to increase by 3 to 4 Bcfd by 2035.

U.S. and Canada Regional Natural Gas Consumption (Average Annual Bcfd)



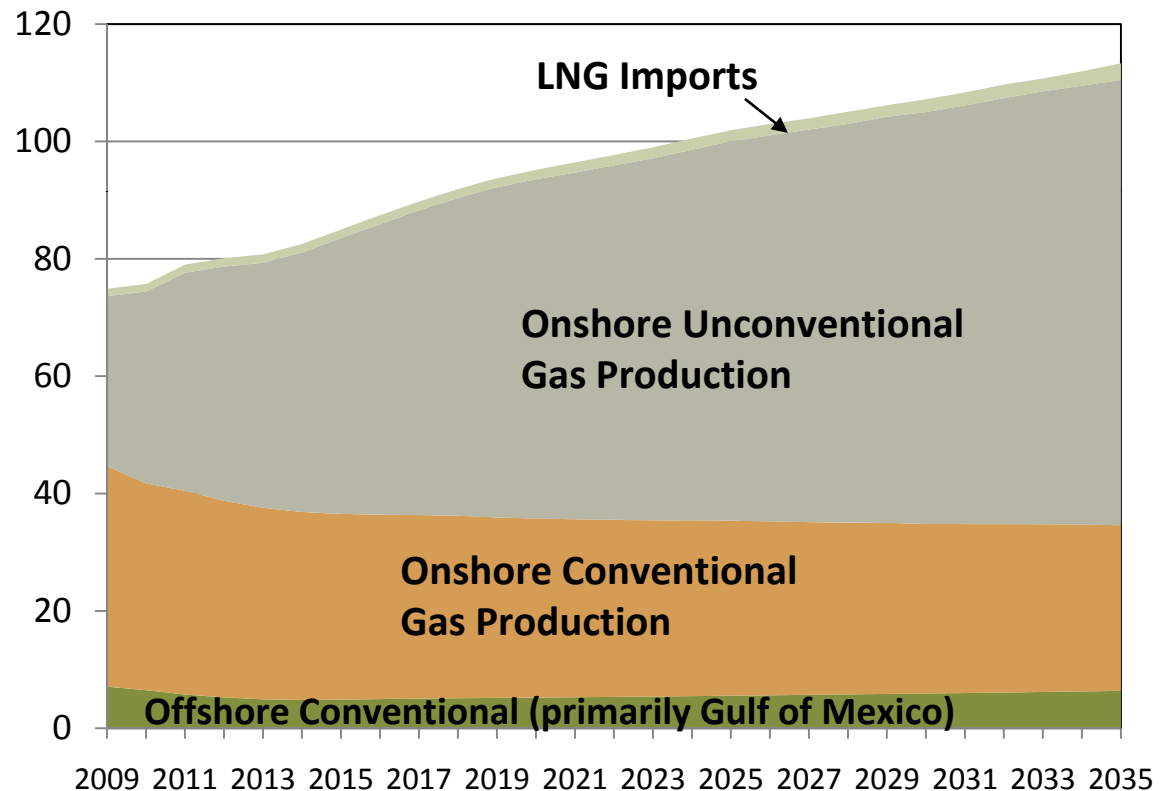
Source: ICF International

# Future Supply Growth Continues to Depend on Unconventional Gas Supplies



- Onshore conventional and offshore gas production continues to decline, while unconventional production grows robustly.
- Unconventional production comprises two-thirds of the total supply by 2035.

U.S. and Canadian Natural Gas Supplies (Average Annual Bcfd)

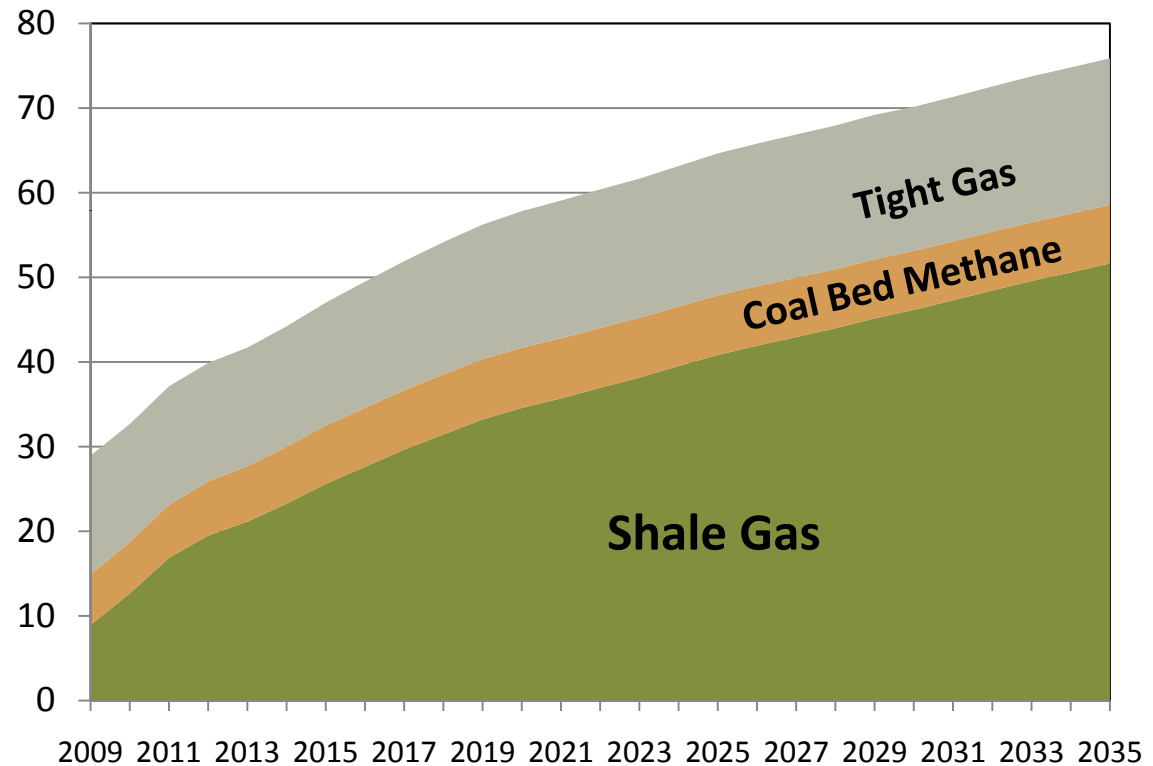


# Shale Gas is the Largest Source of Growth in Unconventional Gas Supplies



- Unconventional gas production increases by over 40 Bcfd between 2010 and 2035.
- Over 90% of the increase in unconventional gas production is due to increases in shale gas.

U.S. and Canadian Unconventional Gas Production (Average Annual Bcfd)

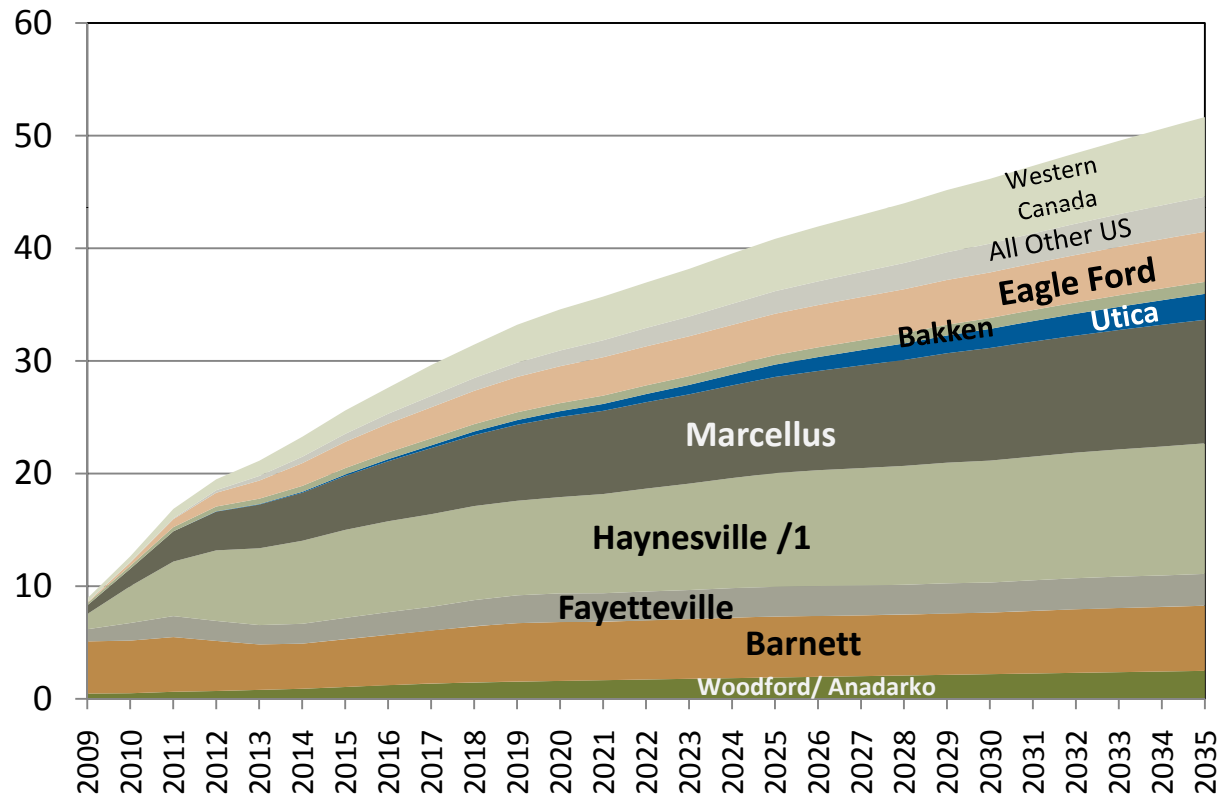


# Shale Gas is a “Game Changer” for North American Gas Markets, Providing Most of the Supply Growth Over the Next 25 Years



- The shale gas plays are among the fastest growing production areas worldwide.
- Total U.S. and Canada shale gas production is expected to increase from about 12.6 Bcfd in 2010 to 52 Bcfd by 2035.
- Barnett has been under development for 10 years, while development of Eagle Ford began in 2009.
- The strength of the shale plays was evident during the recession, when development continued despite relatively low natural gas prices.
- However, concerns over water use and disposal of fracturing fluids could limit the pace of future development.

**U.S. and Canadian Shale Gas Production (Average Annual Bcfd)**



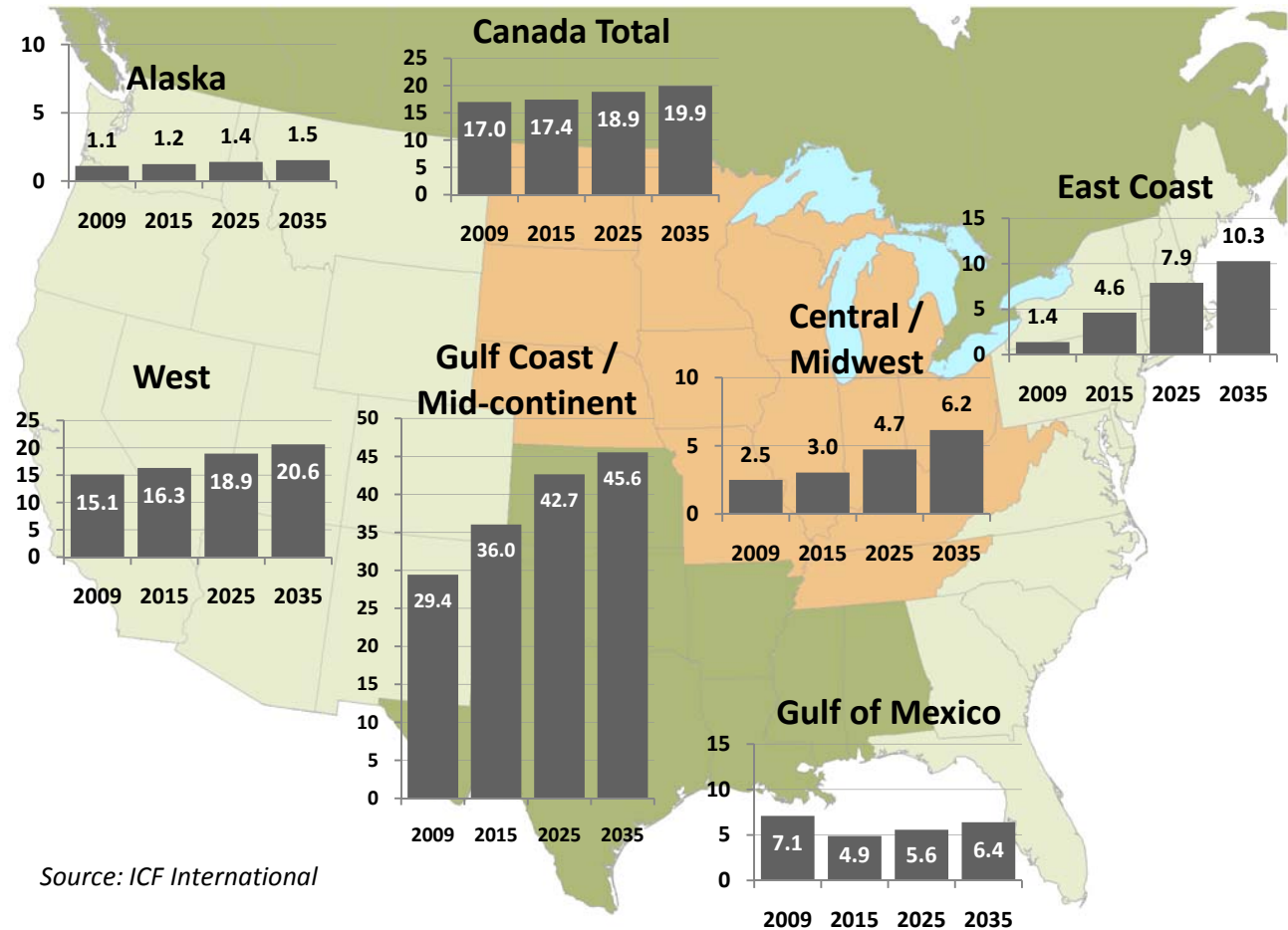
\*Haynesville values shown here include production from other shales in the vicinity, e.g., the Bossier Shale.

# Supply Growth is Concentrated in Areas with Growing Shale Production



- Areas with the greatest growth in production are the Gulf Coast and Mid-continent and the East Coast.
  - These areas have high concentrations of shale gas resource.
- Central/Midwest production increases due to growth of Marcellus (in West Virginia) and Utica (in eastern Ohio).
- Canadian production will rebound as conventional production in Alberta declines, but shale gas production in British Columbia increases.
- Gulf of Mexico production continues a near term decline, but long run increases in Deep Water plays should offset declines in Shallow Water production.

**U.S. and Canada Regional Natural Gas Production (Average Annual Bcfd)**



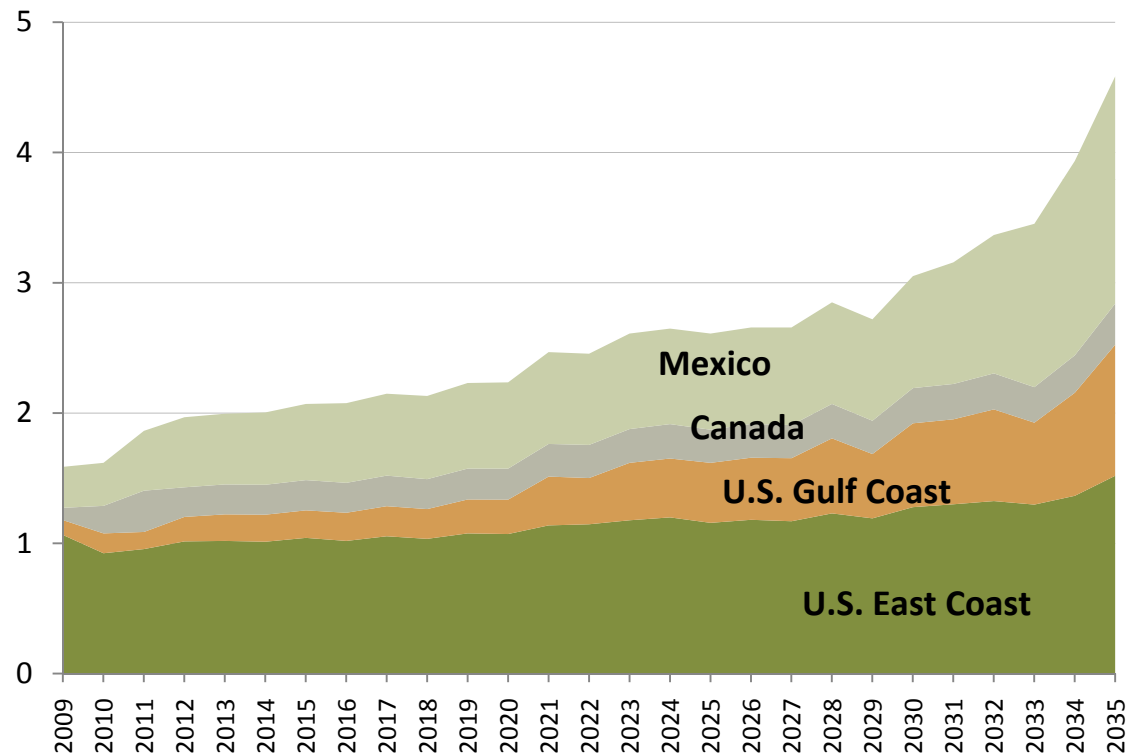
Source: ICF International

# By 2035, LNG Imports Account for only 2% of U.S. and Canadian Natural Gas Supplies



- U.S. and Canadian LNG imports are expected to grow from about 1.3 Bcfd in 2010 to 2.8 Bcfd by 2035.
  - LNG imports to Mexico also increase.
  
- Competition from European and Asian natural gas consumers, plus relatively low domestic gas prices limit North American LNG imports.
  - On average, North American LNG import terminals are expected to operate at only about 10% to 15% of their rated receipt capacity.

**North American LNG Imports (Average Annual Bcfd)**



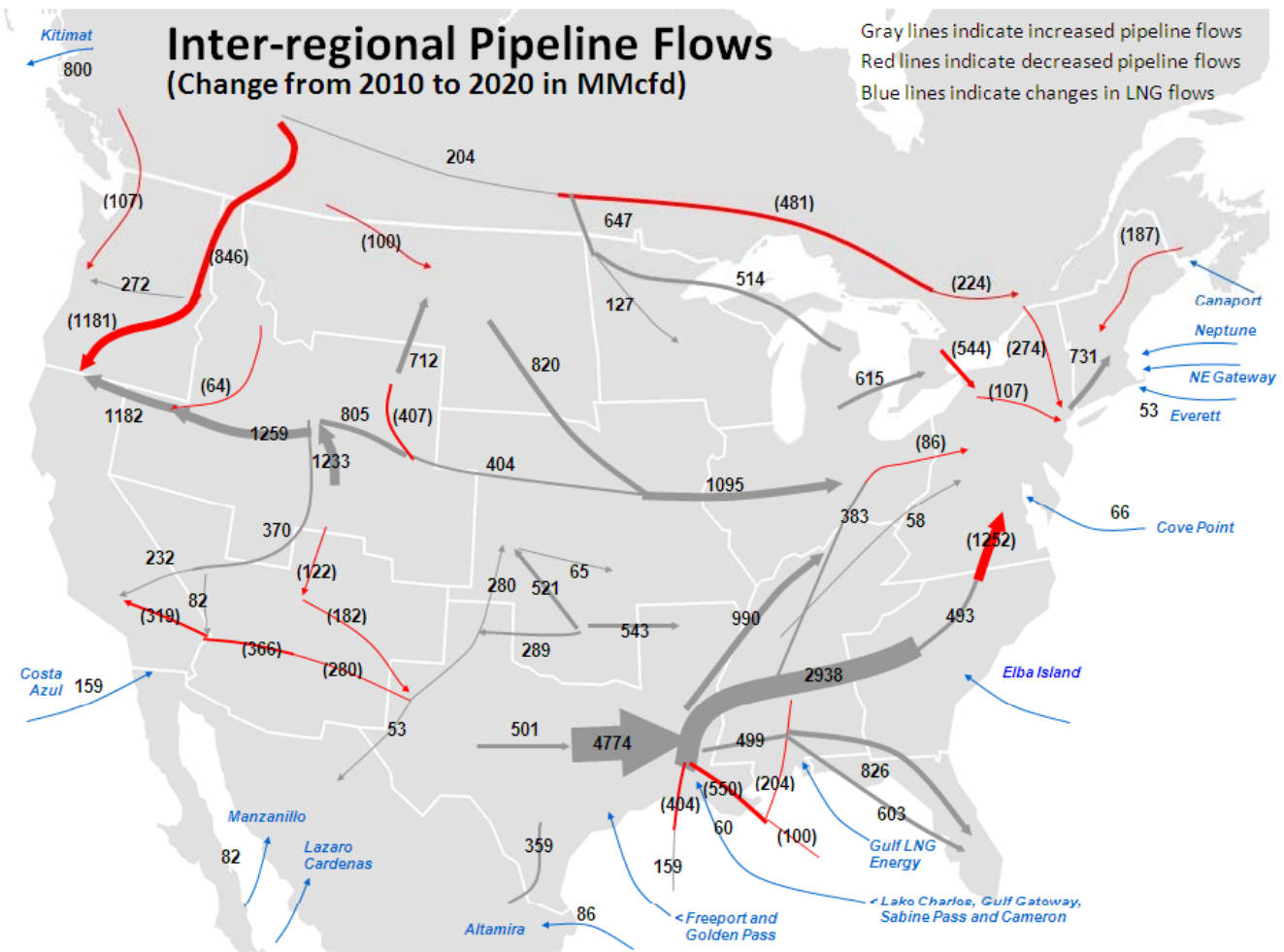
Source: ICF International



# Changes in Supply and Demand Will Significantly Change Pipeline Flow Over the Next 10 Years



- Increases in flows from the Gulf Coast to the east are due to increases in Mid-continent shale gas production.
- REX Pipeline enables increasing flow from the Rocky Mountains eastward.
- Marcellus gas production growth displaces gas flows into the Northeast U.S. (Shifts within the Northeast are not depicted on this interregional flow map).
- Declining conventional production in Alberta and increasing gas consumption for oil sands development causes flows from Western Canada to decline.

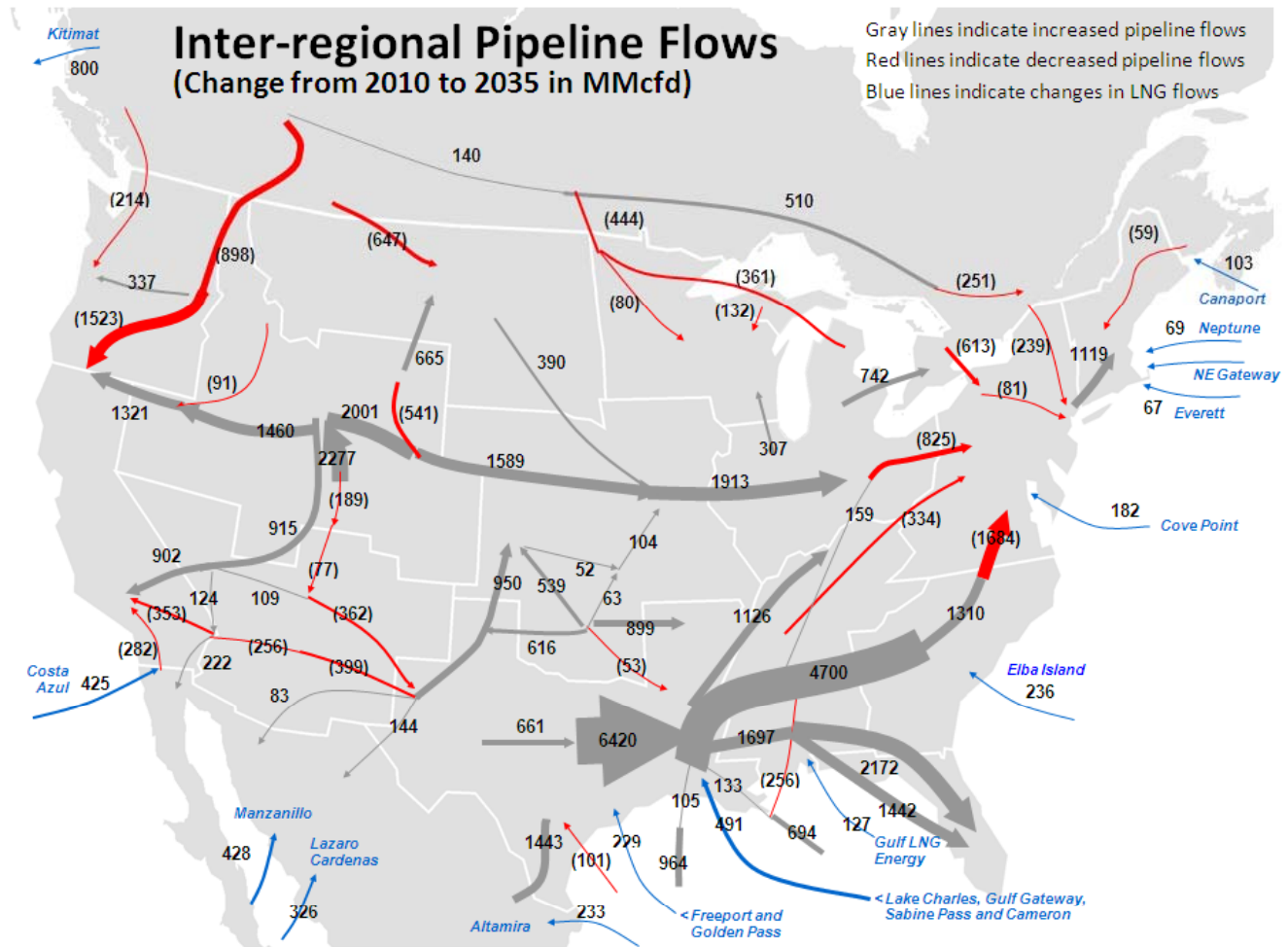


Source: ICF International

# Changes in Supply and Demand Will Continue to Change Pipeline Flow In the Longer Term



- Substantial increases in flows continue to occur out of the Mid-continent shales and the Rocky Mountain producing basins.
- Marcellus gas production growth continues to displace gas flows into the Northeast U.S. (Shifts within the Northeast are not depicted on this interregional flow map).
- Flows on TCPL to eastern markets recover slightly, but remain down in the longer term.



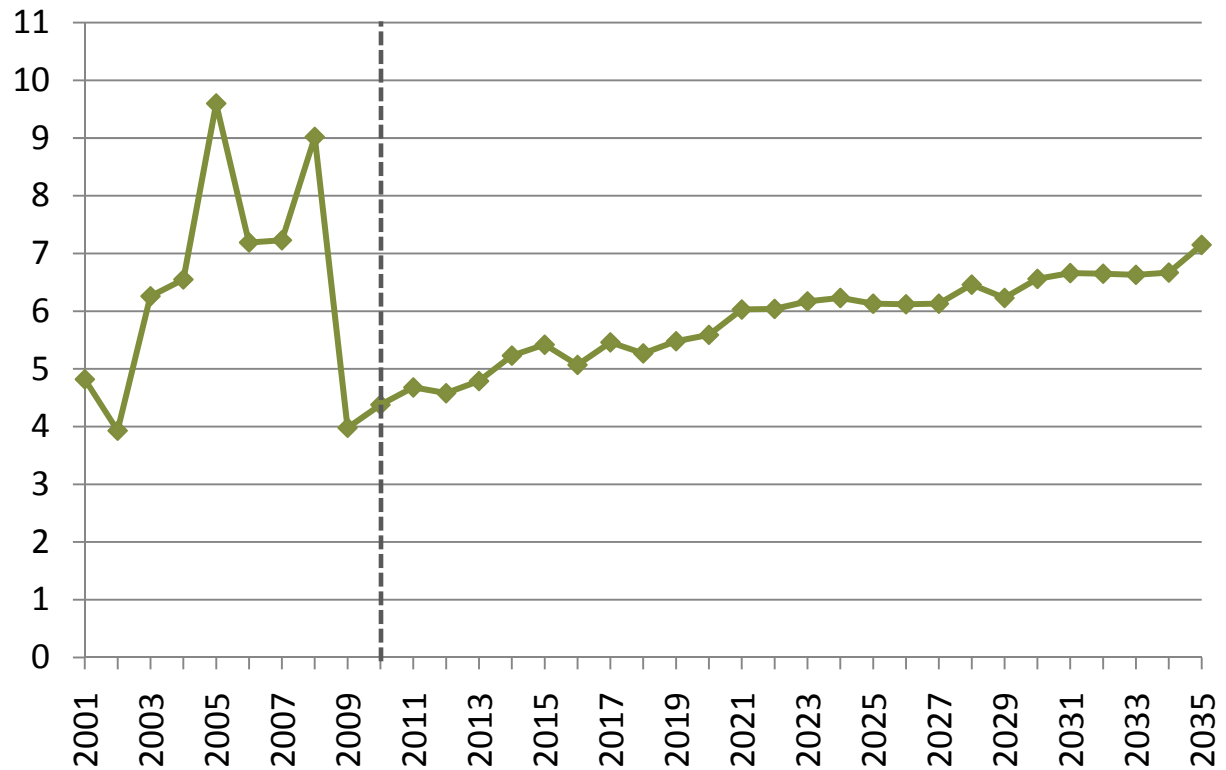
Source: ICF International

# Henry Hub Gas Prices Will Average Between \$5 and \$7 per MMBtu



- Henry Hub natural gas prices are projected to average between \$5 and \$7 per MMBtu.
- Robust growth in gas demand applies upward pressure on gas prices over time.
- \$5 to \$7 gas prices are sufficient to support the levels of supply development in the projection, but not so high as to discourage market growth.

**Average Annual Natural Gas Price at Henry Hub (2010\$/MMBtu)**



Sources: Platts (historic), ICF (projection)



# Conclusions

# Gas Markets will Likely Grow Robustly as Unconventional Gas Supplies Continue to Grow



- Total gas consumption will grow at an average of 1.6 percent per year over the next 25 years, driven almost entirely by growth in gas-fired power generation.
  - Increased efficiency, conservation, and GHG regulations are uncertainties that will have an impact on future growth in gas use.
- Production of shale gas reserves, where a significant portion of remaining gas resources are located, should contribute to a robust increase in North American supplies.
  - Concerns over water use and disposal of fracturing fluids could adversely impact the pace of shale gas development.
  - Exploration and production in the Deep Water Gulf of Mexico also may be limited due to environmental concerns.
- Regional shifts in gas supply and demand will drive future gas infrastructure needs.
  - Construction of new pipeline capacity is likely to continue at a rapid pace over the next 5 to 10 years.

## Natural Gas Prices are Likely to Average Between \$5 and \$7 per MMBtu

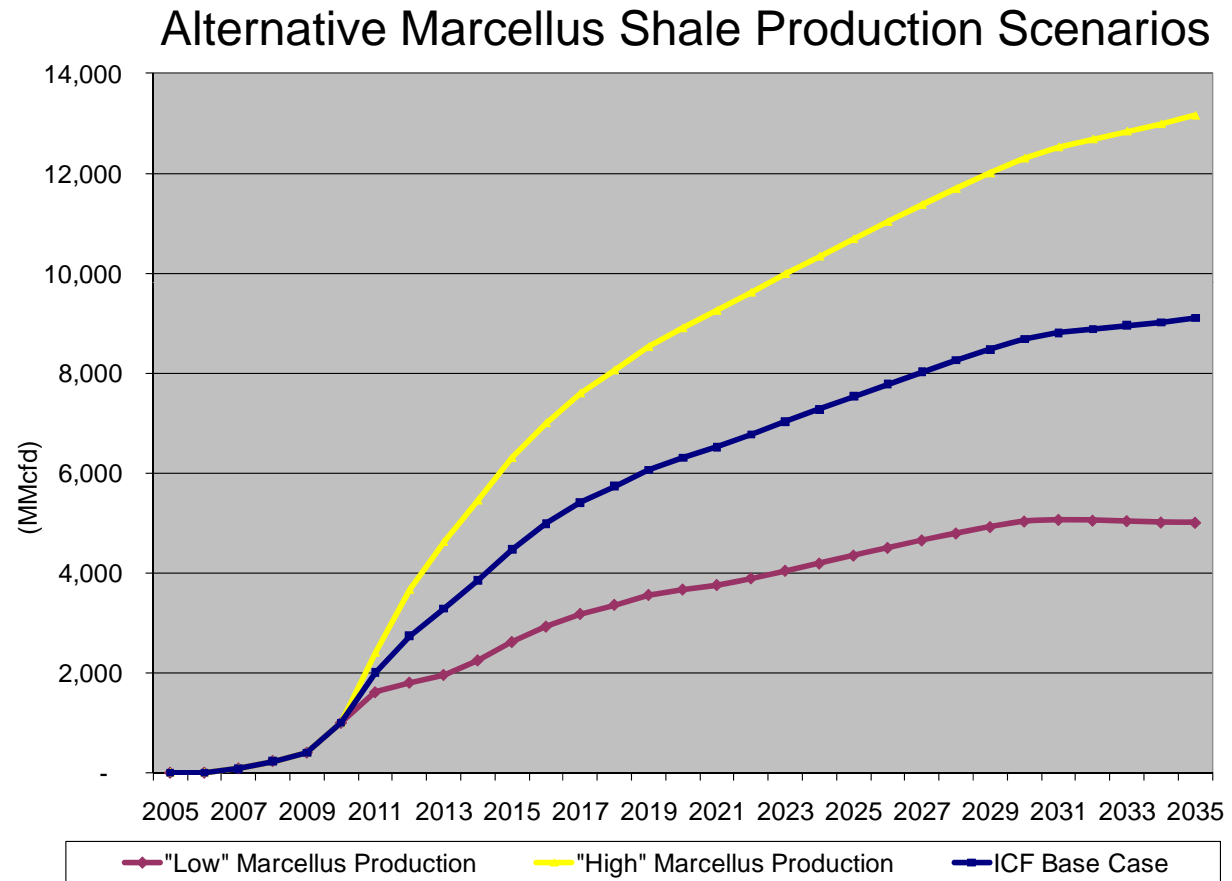


- Projected Henry Hub gas prices are likely to average between \$5 and \$7 per MMBtu through 2035.
  - Prices will be high enough to support the robust supply development projected over time, but not so high as to adversely impact market growth.
- Significant short-term gas price volatility is likely to continue.
  - Abnormal weather events and rapid shifts in economic activity can significantly change gas prices over relatively short periods of time.
  - But, market forces will tend to push gas prices back into the \$5 to \$7 per MMBtu price range.

# Forecast Uncertainty



- Economic Growth
- Environmental Policy
- Natural gas resources and production technologies
  - Marcellus Shale
  - Uinta and other eastern shales
  - Western Canadian shales
- Arctic Gas Supply
- LNG Imports and Exports
- Alberta demand
  - Tar sands and potential GTL
- Storage development
- TransCanada tolls



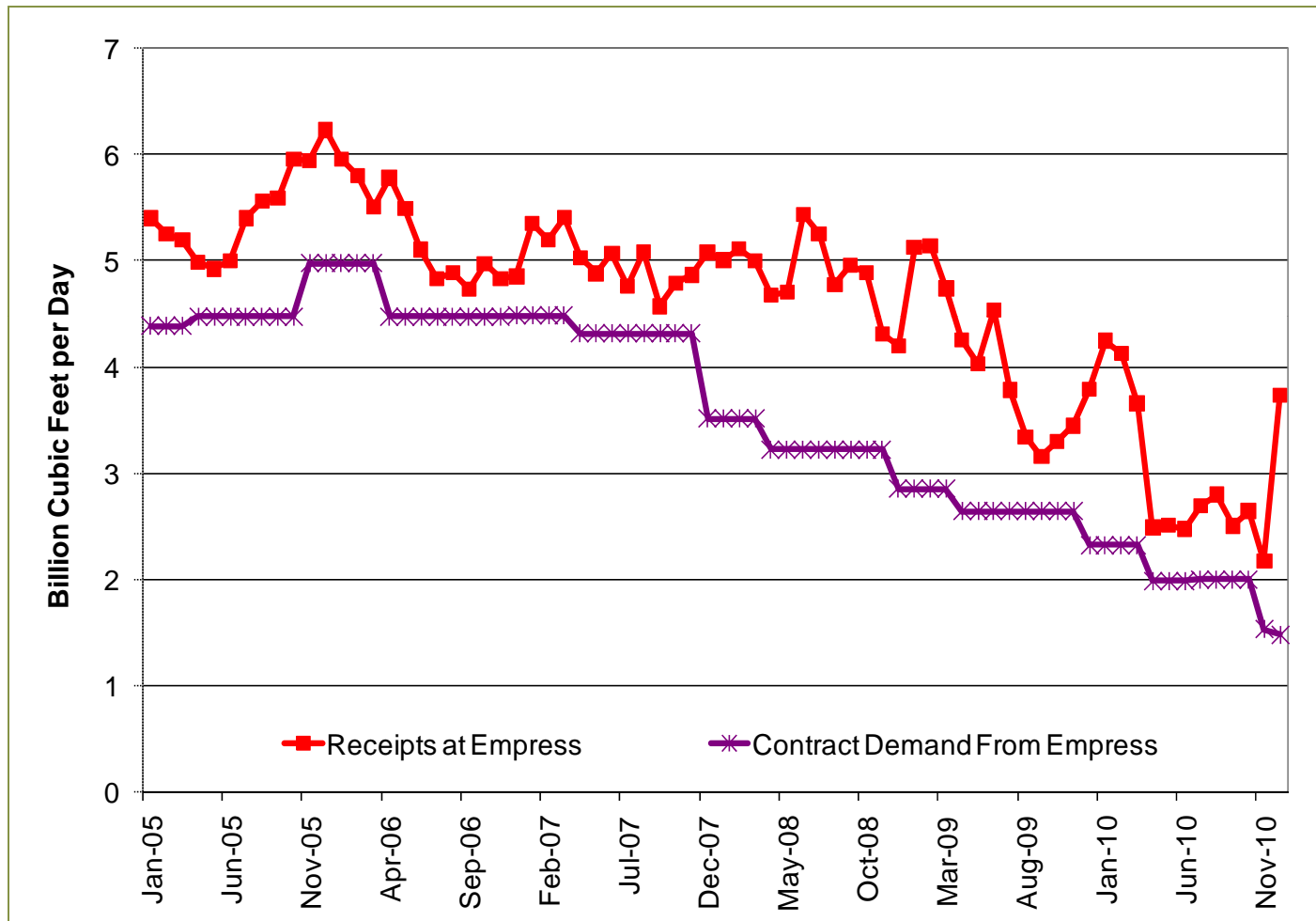
# Alternative Market Scenarios Considered



- **Tight Gas Market Scenario:**
  - Slower growth in North American Shale Gas Production
  - Faster economic recovery and natural gas demand growth than represented in the ICF Base Case.
- **Optimistic Mainline Market Drivers Scenario:**
  - Slow growth in Marcellus Shale Production
  - Low Alberta Demand Growth
  - High growth in WCSB Production and Exports
  - No incremental LNG Exports from North America (E.g., no Kitimat)
- **Pessimistic Mainline Market Drivers Scenario:**
  - High growth in Marcellus Shale Production
  - High Alberta Demand Growth
  - Continuing decline in WCSB Production and Exports
  - BC Shale Gas exported as LNG
- **TransCanada Tolls Scenarios**
  - Eastern Zone toll bracketed at \$1.00, \$1.50, \$2.00, \$3.00
  - For each market scenario



# TransCanada Mainline FT Contract Demand and Receipts at Empress

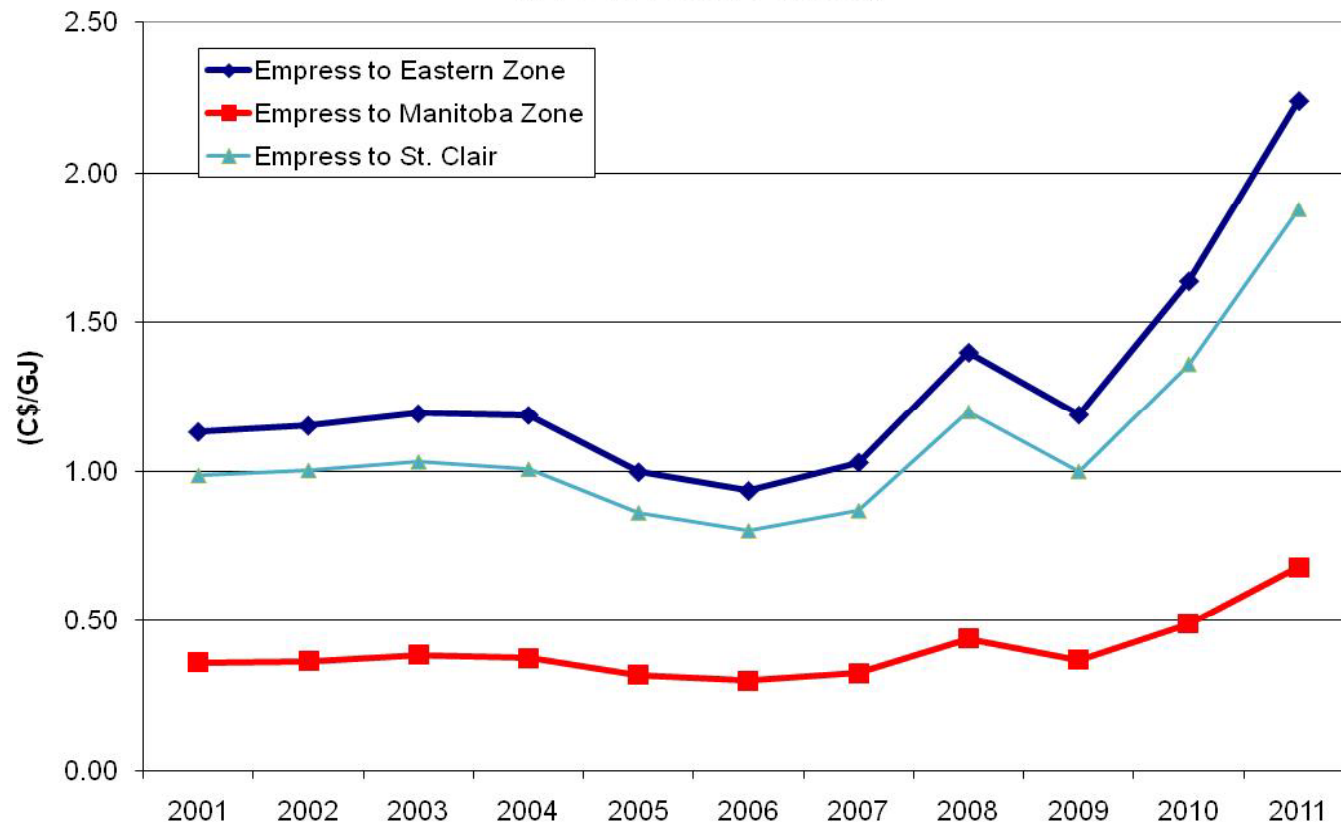


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# TransCanada Mainline FT Tolls (100% Load Factor, Excluding Fuel)

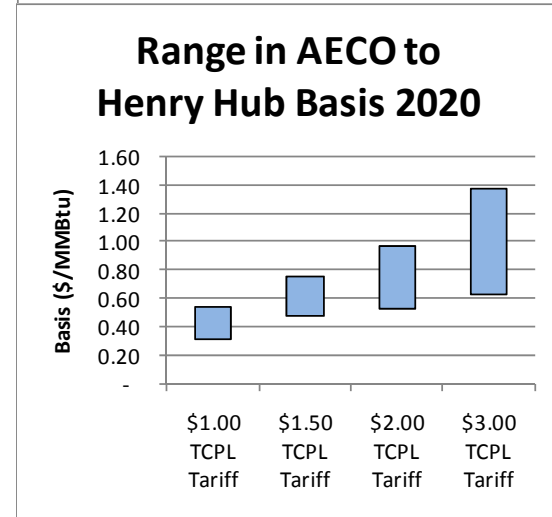
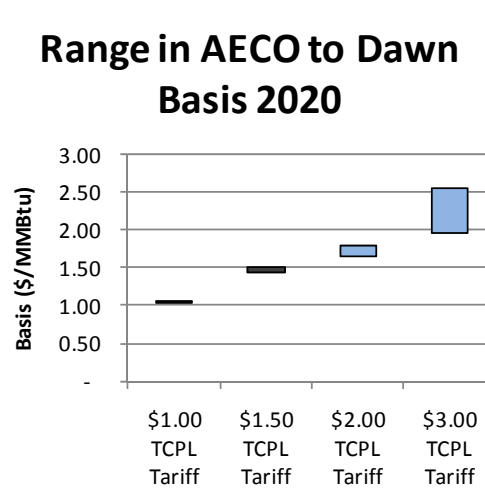
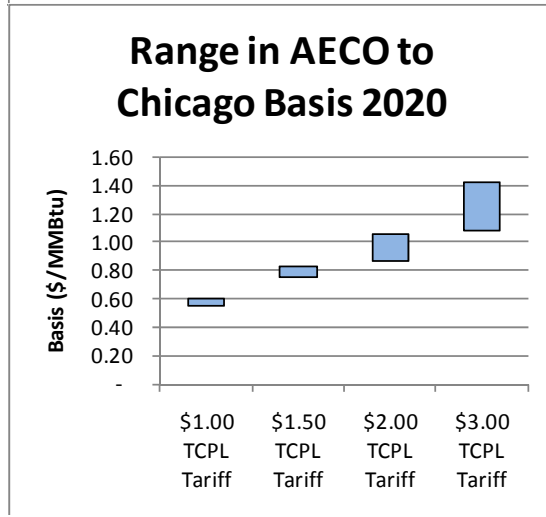
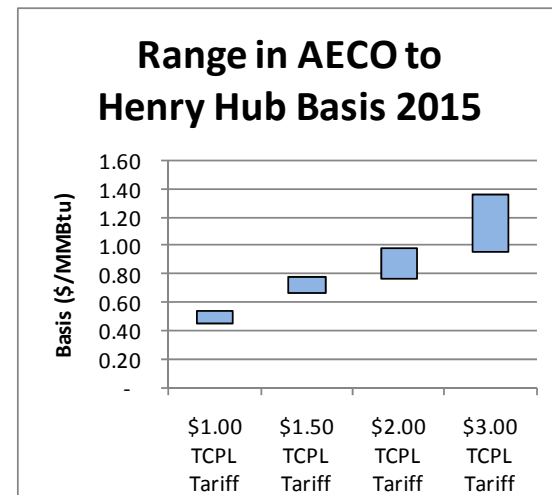
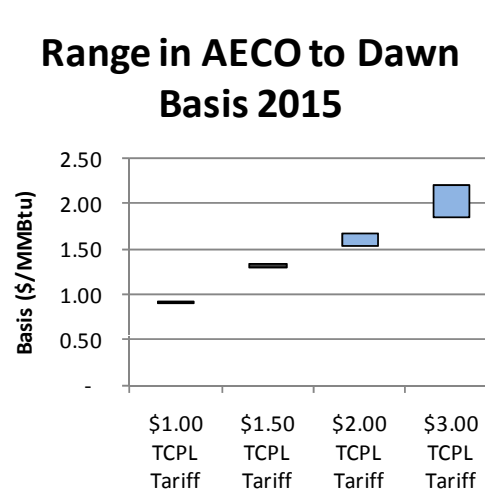
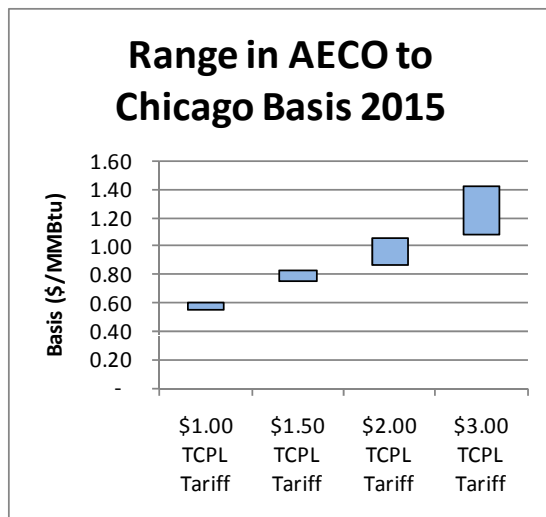


### TransCanada Pipeline Mainline FT Tolls (100 % Load Factor)



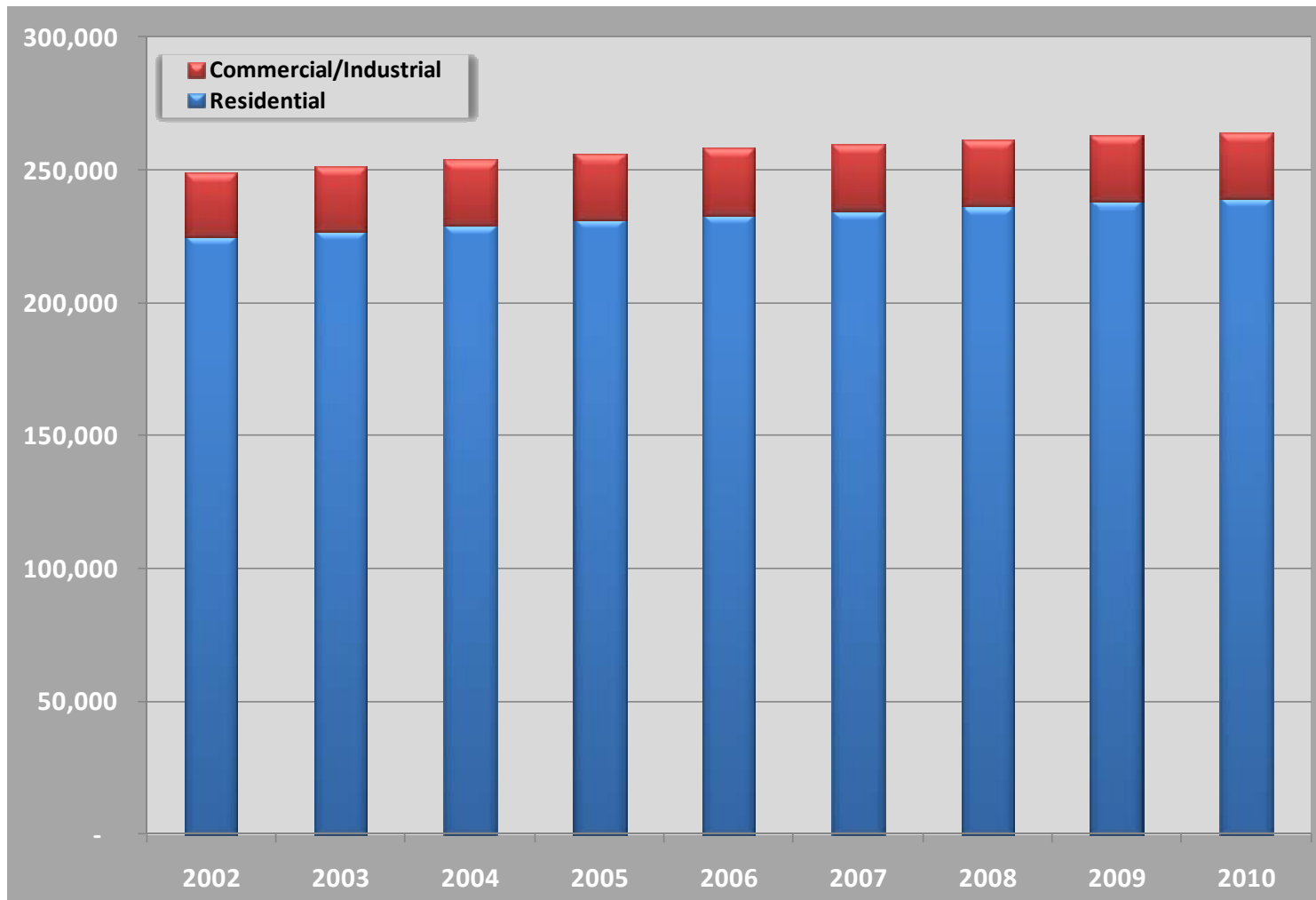
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# Impact of TCPL Rate Structure on Basis



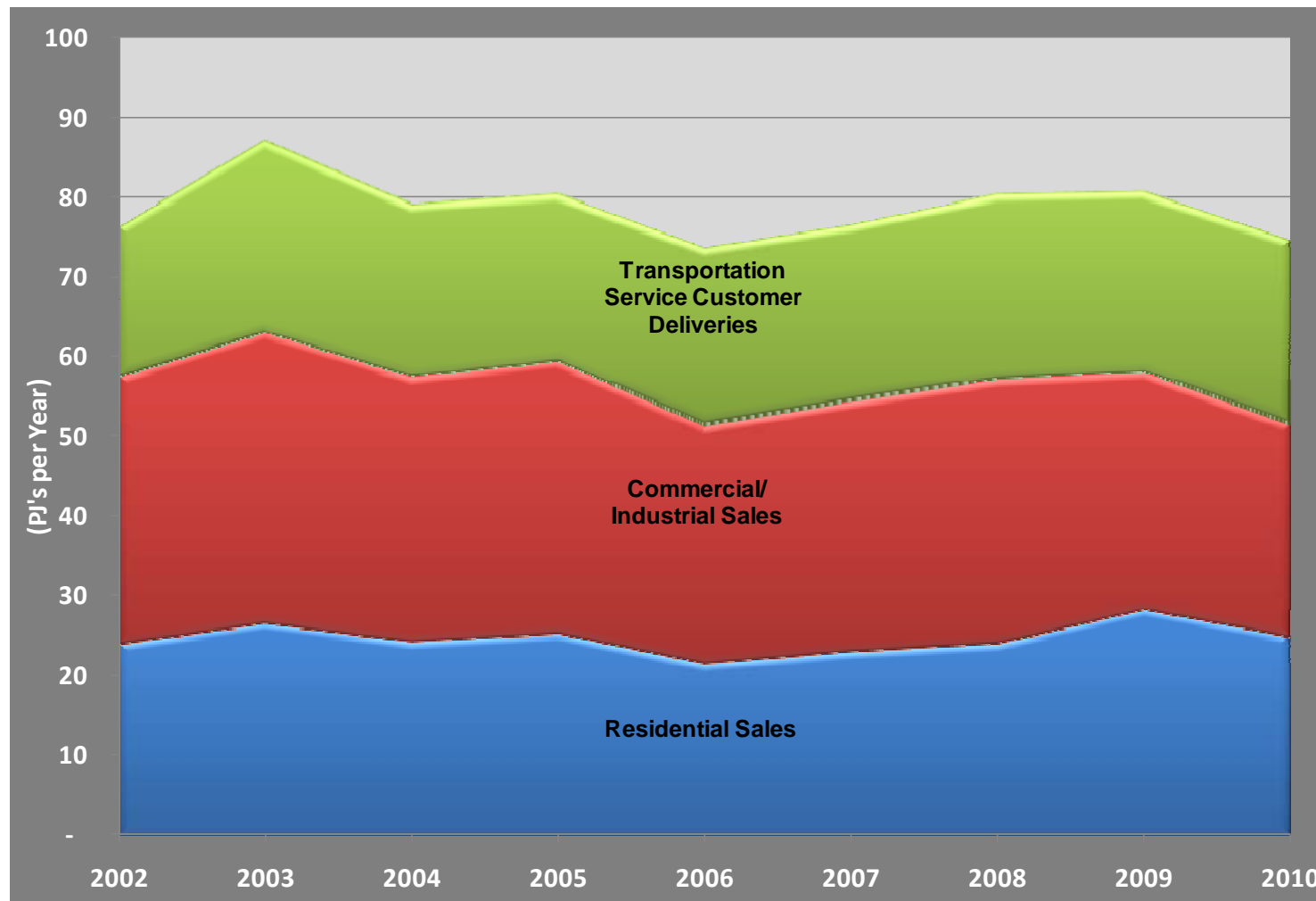
# OVERVIEW OF CENTRA'S CURRENT OPERATIONS

# Centra Natural Gas Customers



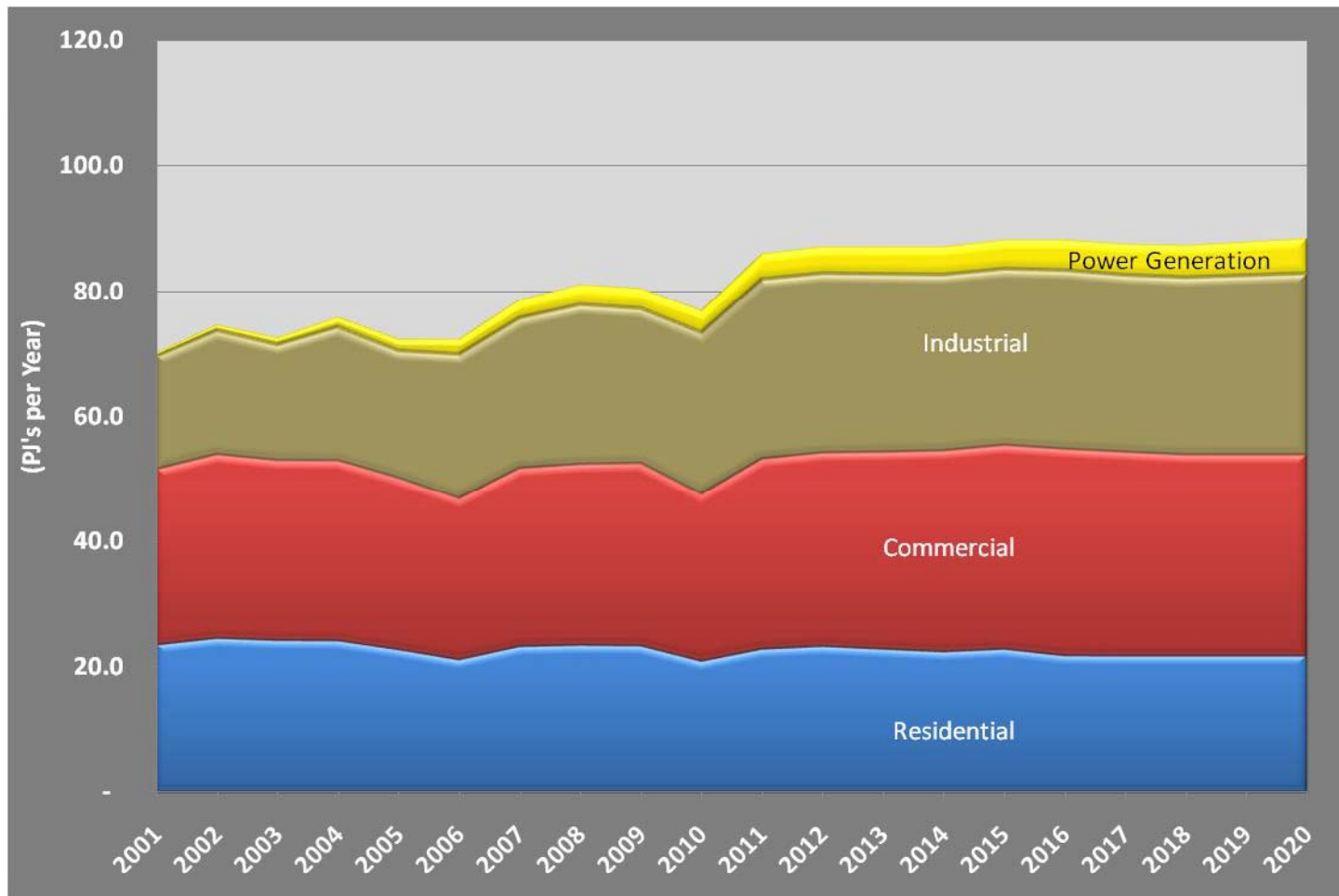
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# Centra Natural Gas Deliveries 2002-2010



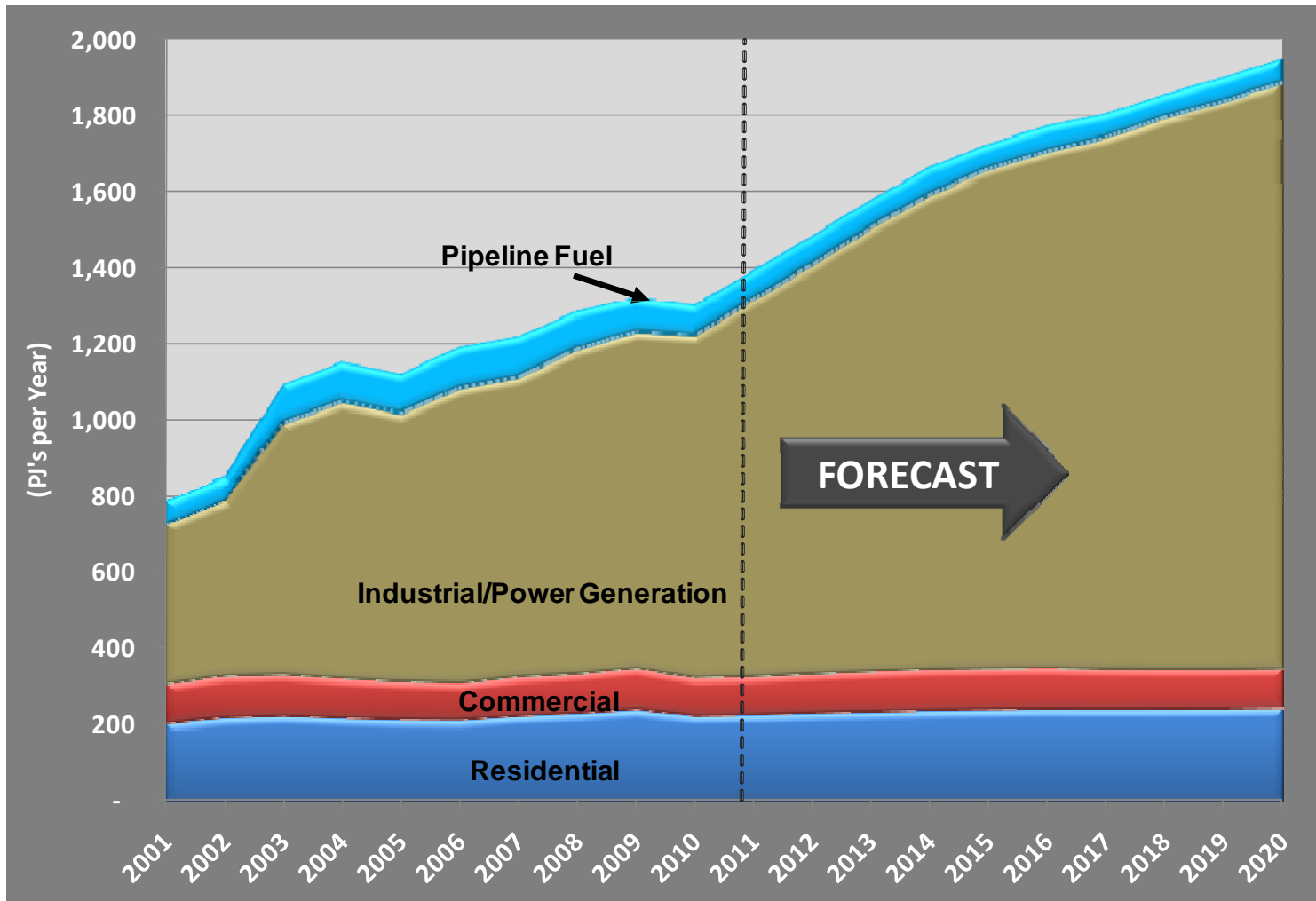
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# ICF Forecast of Manitoba Natural Gas Demand to 2020



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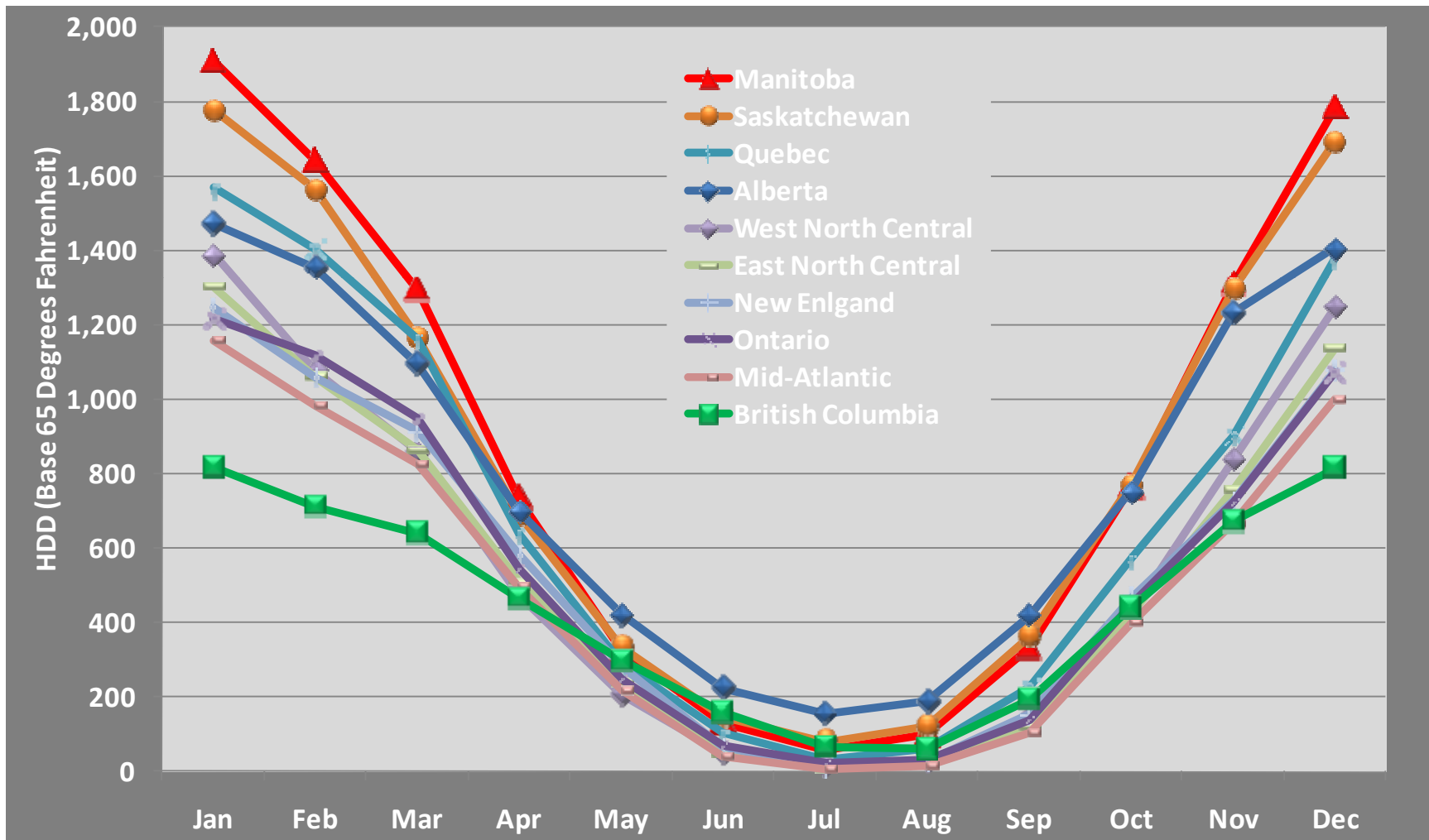
# ICF Forecast of Alberta & Saskatchewan Natural Gas Demand to 2020



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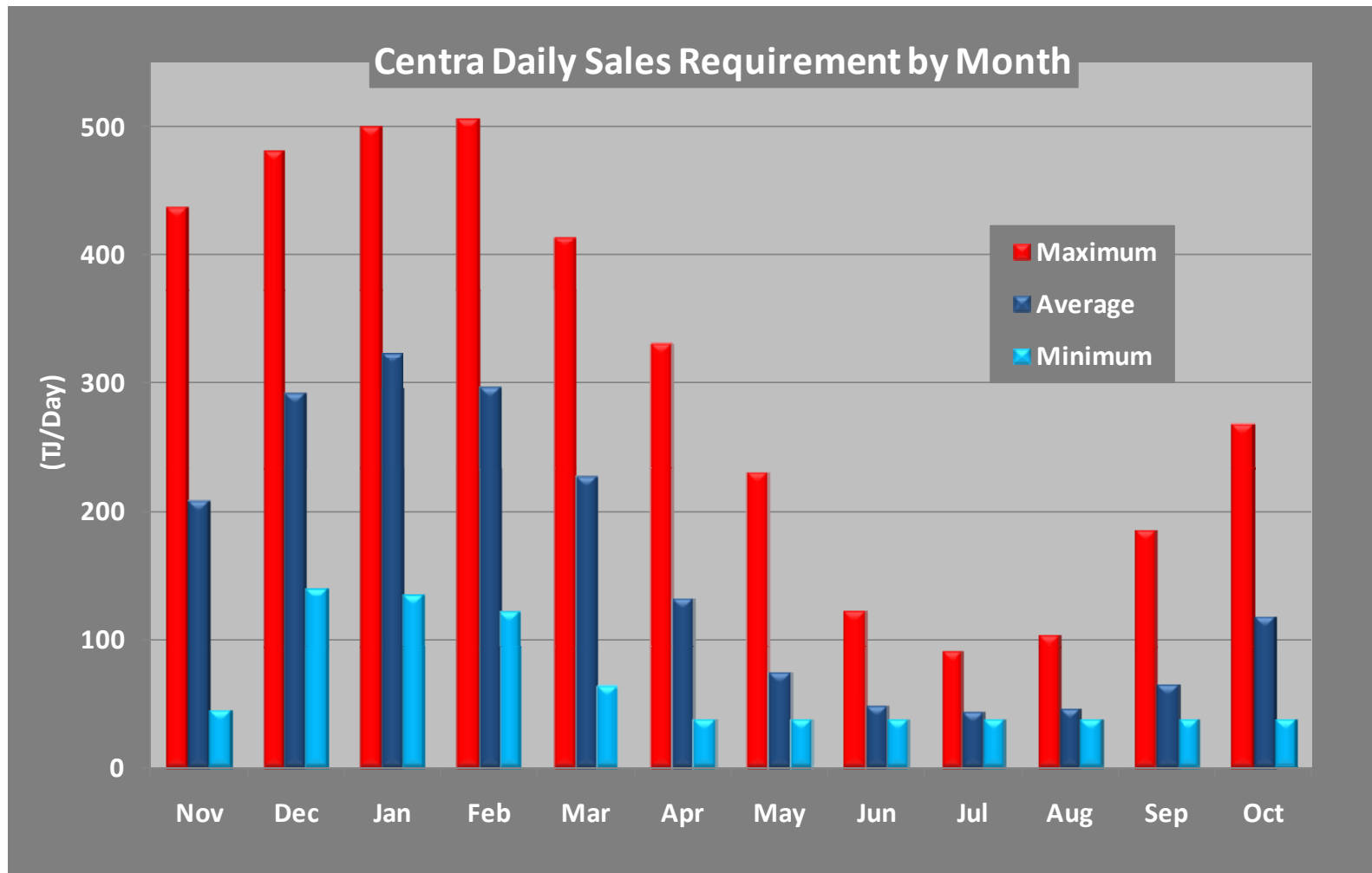


# Monthly Normal Traditional Heating Degree Days



V:\sloan\Centra Manitoba\2010 Nov Files\ DegreeDayCharts\_Fig23 & Table1.xls

# 2010/11 Centra Demand



V:\sloan\Centra Manitoba\2010 Nov Files\ Centra Daily Min Avg Max by month Figure\_24.xlsx

# Annual and Daily Weather Volatility



<b>Comparison of Manitoba Weather to Other Regions Served by WCSB Gas Production (Annual Heating Degree Days)</b>					
	<b>Normal Weather</b>	<b>Warmest Year</b>	<b>Coldest Year</b>	<b>Absolute Range</b>	<b>Relative Range</b>
Manitoba	10,378	9,332	12,301	2,969	29%
Alberta	9,423	8,568	11,146	2,578	27%
Saskatchewan	10,003	9,633	12,370	2,737	27%
British Columbia	5,339	4,846	5,724	878	16%
Ontario	6,582	6,087	7,742	1,655	25%
Quebec	8,338	6,824	8,803	1,979	24%
New England	6,611	5,742	6,967	1,225	19%
Mid-Atlantic	5,911	4,923	6,276	1,353	23%
East North Central	6,497	5,317	7,004	1,687	26%
West North Central	6,750	5,725	7,431	1,706	25%

<b>Standard Deviation of Daily Changes in Temperature (Degrees Celsius)</b>			
	<b>Summer (April - Oct)</b>	<b>Winter (Nov - Mar)</b>	<b>Average</b>
Manitoba (Winnipeg)	3.12	4.96	4.13
Alberta (Calgary)	3.03	4.81	4.01
Saskatchewan (Saskatoon)	3.04	4.67	3.93
Ontario (Toronto)	2.00	3.49	2.83
Quebec (Montreal)	2.70	4.50	3.69
U.S. North East Central (Chicago)	2.93	4.08	3.54
Rocky Mountains (Denver)	3.58	4.43	4.02
New England (Boston)	2.90	3.81	3.38

## Design Firm Peak Day Requirements (As of November 1, 2010)



	<u>GJ/day</u>	<u>%</u>
<b>System Supply</b>	<b>116,406</b>	<b>24.2%</b>
<b>Direct Purchase (WTS)</b>	<b>20,794</b>	<b>4.3%</b>
<b>Total Under FS Transportation</b>	<b>137,200</b>	<b>28.5%</b>
<b>Oklahoma Supply</b>	<b>7,860</b>	<b>1.6%</b>
<b>Storage Withdrawal</b>	<b>208,591</b>	<b>43.3%</b>
<b>Delivered Service</b>	<b>63,269</b>	<b>13.1%</b>
<b>Peaking Delivered Service</b>	<b>64,380</b>	<b>13.4%</b>
	<b><u>481,300</u></b>	<b><u>100.00</u></b>

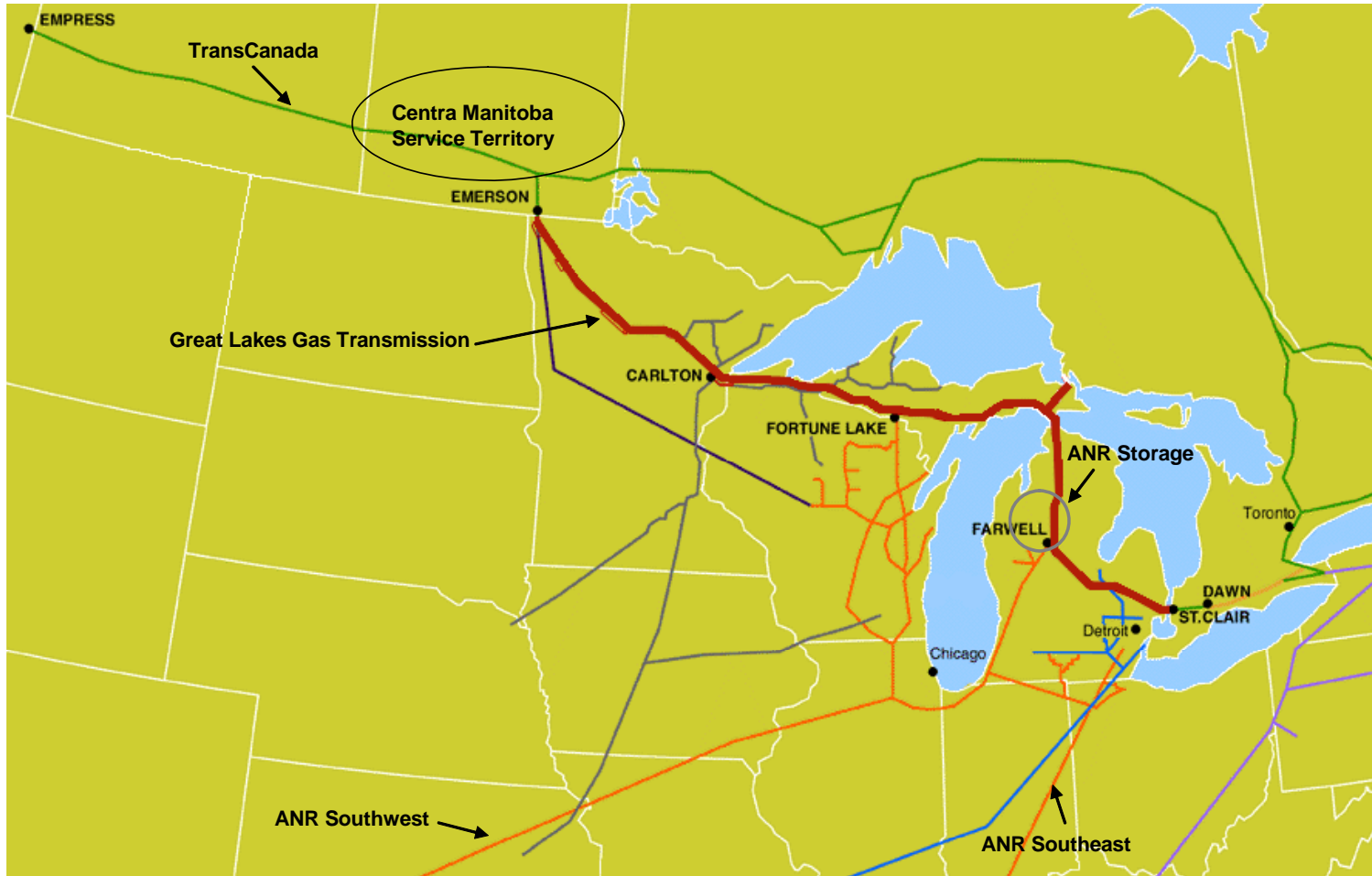
# Existing Centra Pipeline and Storage Arrangements



Services	Type of Service	Annual	Summer	Winter	Expiration
<b>TCPL (GJ/d)</b>					
Empress to Saskatchewan	FS	2,200			10-31-2011
Empress to Manitoba	FS	135,000			10-31-2011
Manitoba to Emerson	STS		54,000		3-31-2012
Emerson to Manitoba	STS			215,614*	
Delivered Service	FS		20,000	63,269	
<b>Great Lakes (GJ/d)</b>					
Emerson to Crystal Falls	FT		53,351		3-31-2013
Deward to Emerson	FT			237,388*	
<b>ANR (GJ/d)</b>					
Crystal Falls to ANR Storage	FTS		52,448		3-31-2013
ANR Storage to Deward	FTS			208,591	
Oklahoma to ANR Storage/Crystal Falls	FTS	7,860			
Louisiana to ANR Storage	FTS		22,380		
<b>ANR Storage</b>					
Storage annual capacity (GJ)	FSS	15,509,323			3-31-2013
Withdrawal (GJ/d)	FSS			208,591	
Injection (GJ/d)	FSS		88,625		

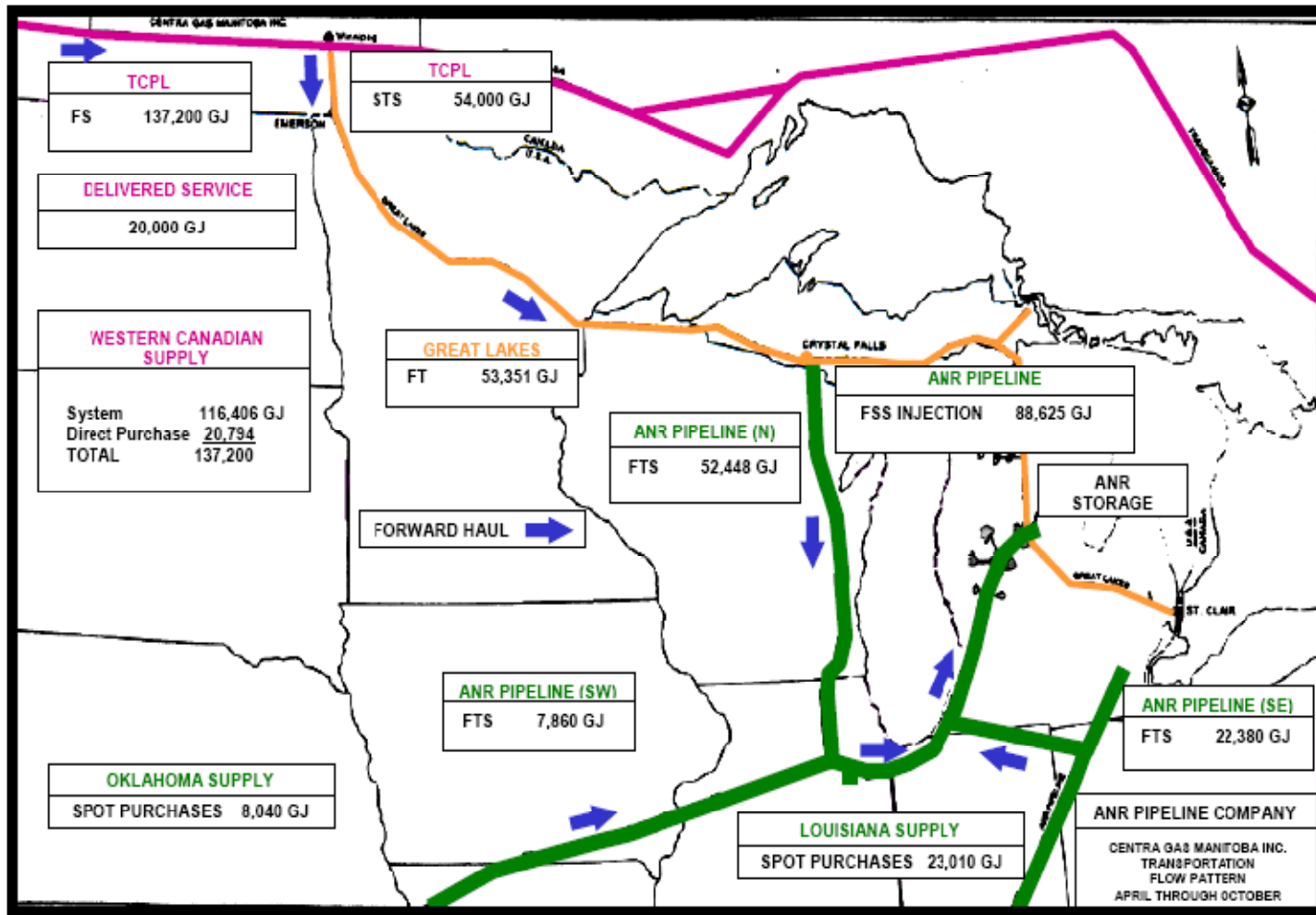
\* Backhaul

# Location of Centra Pipeline and Storage Assets



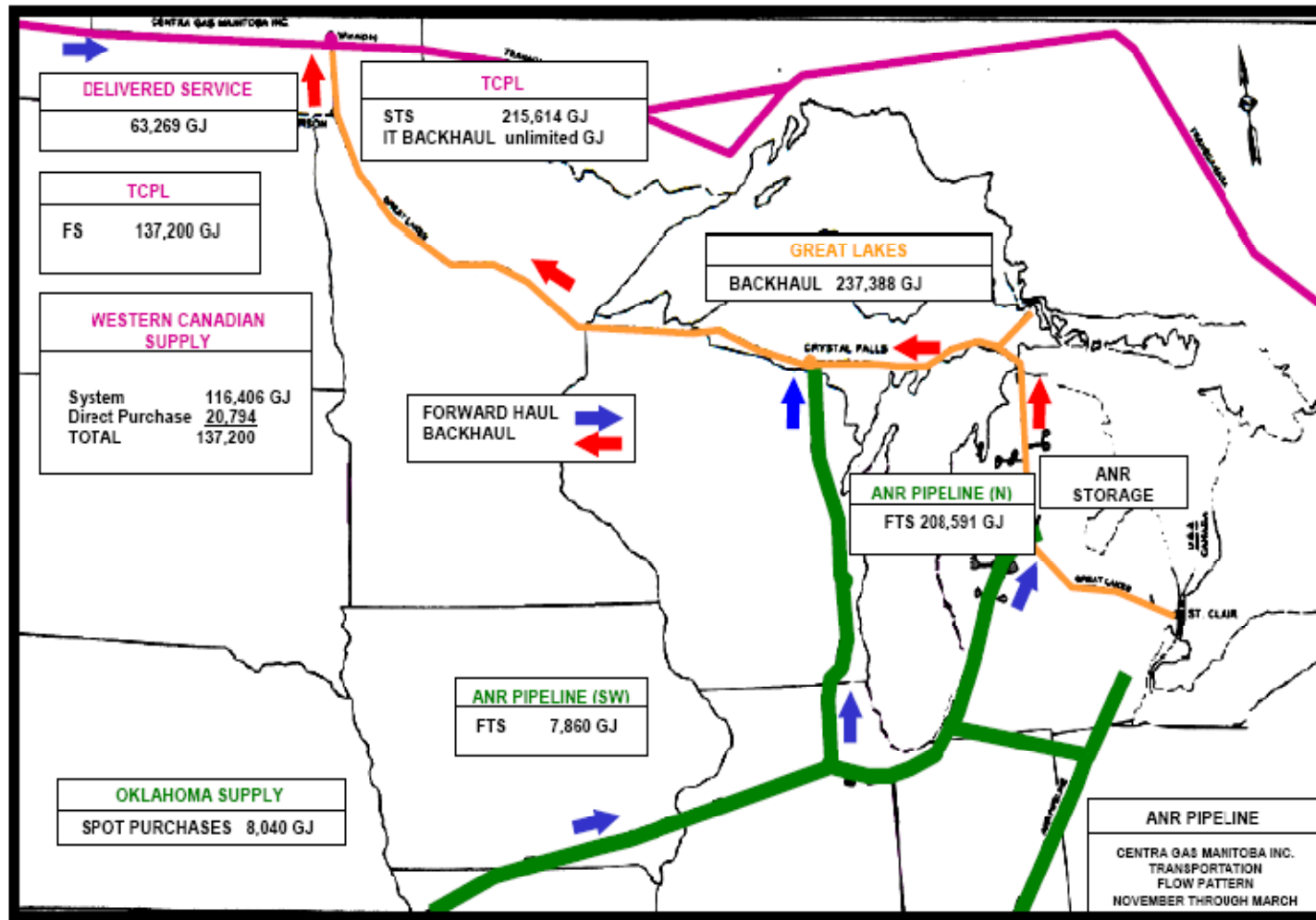
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# Centra Pipeline and Storage Assets – Summer Operations (Apr. 1, 2011 – Oct. 31, 2011)



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# Centra Pipeline and Storage Assets – Winter Operations (Nov. 1, 2010 – Mar. 31, 2011)



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# REVIEW OF POTENTIAL SUPPLY OPTIONS FOR CENTRA

# Key Supply Portfolio Planning Issues



- Where should Centra purchase natural gas?
- How much storage capacity should be used?
  - And where?
- How much pipeline capacity should be retained?
  - On which pipelines?
  - For which services?
- How does Centra minimize risk associated with TransCanada rates and rate structure?

# Alternative Sources of Natural Gas Commodity



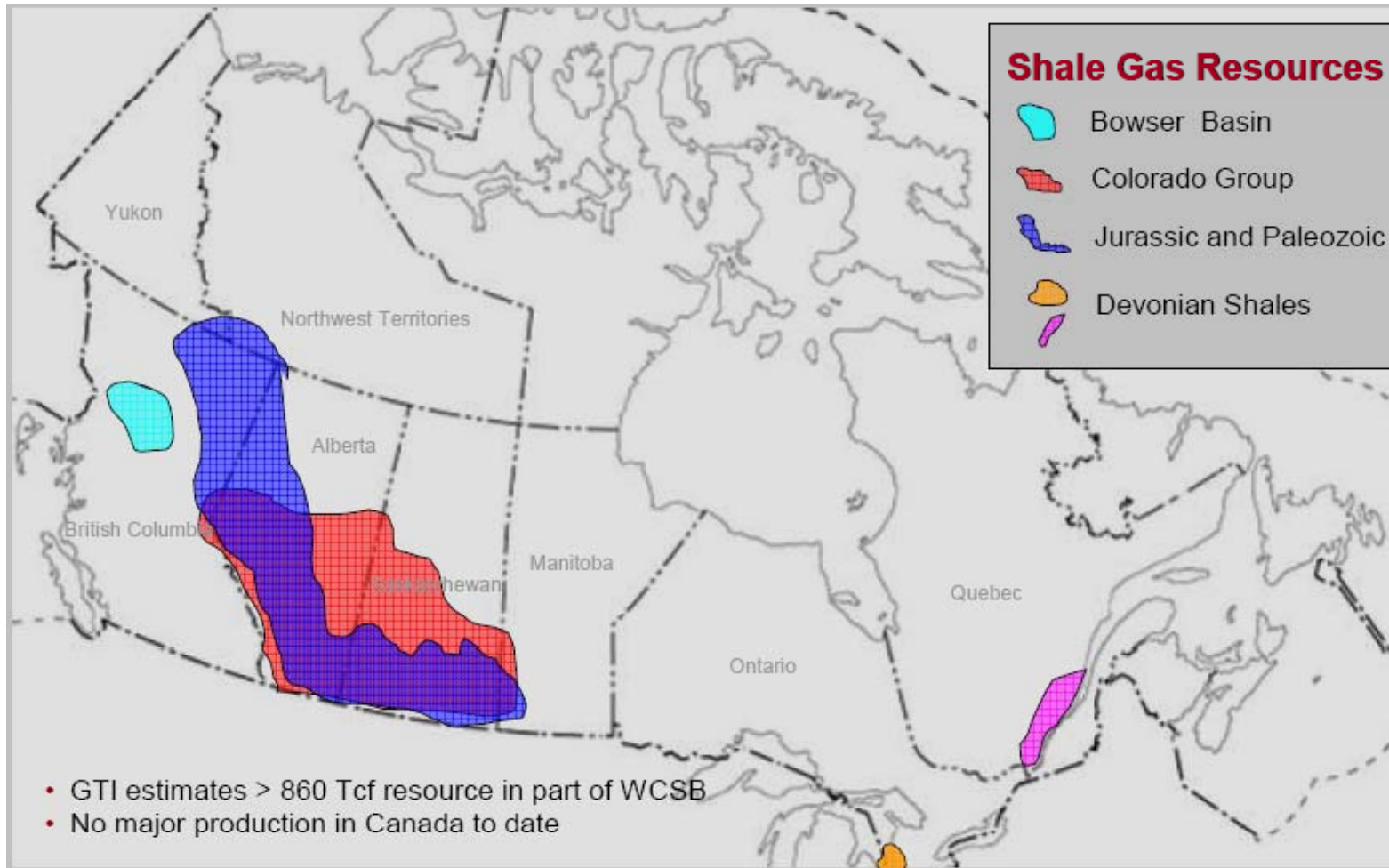
- WCSB supply transported on the TransCanada system from AECO or Empress currently constitutes the primary source of gas commodity for Centra.
- Alternative sources of Canadian supply include:
  - WCSB production in Saskatchewan from existing and potential new sources
  - Associated natural gas production in Manitoba
  - Shale gas production in Manitoba
- Potential sources of U.S. supply include:
  - U.S. Rocky Mountains
  - Mid-Continent and Gulf Coast gas
  - Purchases at MichCon, Chicago, Dawn and other smaller market centers

## Pipeline Transportation Options for WCSB Gas



- The TCPL Mainline is currently the only pipeline from the WCSB production region to serve Manitoba.
- Alternatives to TCPL Mainline would require new construction.
  - Alliance Pipeline:
    - A TCPL interconnect near Regina
    - new—build extension to serve Brandon and/or Winnipeg areas
    - A TCPL interconnect in Manitoba into existing Centra meter stations
  - Direct delivery of Saskatchewan WCSB gas on TransGas.

# Shale Plays in Western Canada



# Alternative Sources of Natural Gas Commodity



- U.S. Rocky Mountain Gas
  - Currently delivered to the U.S. West Coast and the U.S. Midwest.
  - Continuing growth in supply expected from Rocky Mountain shale plays.
  
- U.S. Gulf Coast and Mid-Continent
  - Reliable source of natural gas, with continuing growth coming from the Barnett, Eagle Ford, and other shale basins.
  - Centra currently sources some Gulf Coast and Mid-Continent gas to fill its ANR storage.

## Alternative Sources of Natural Gas Commodity



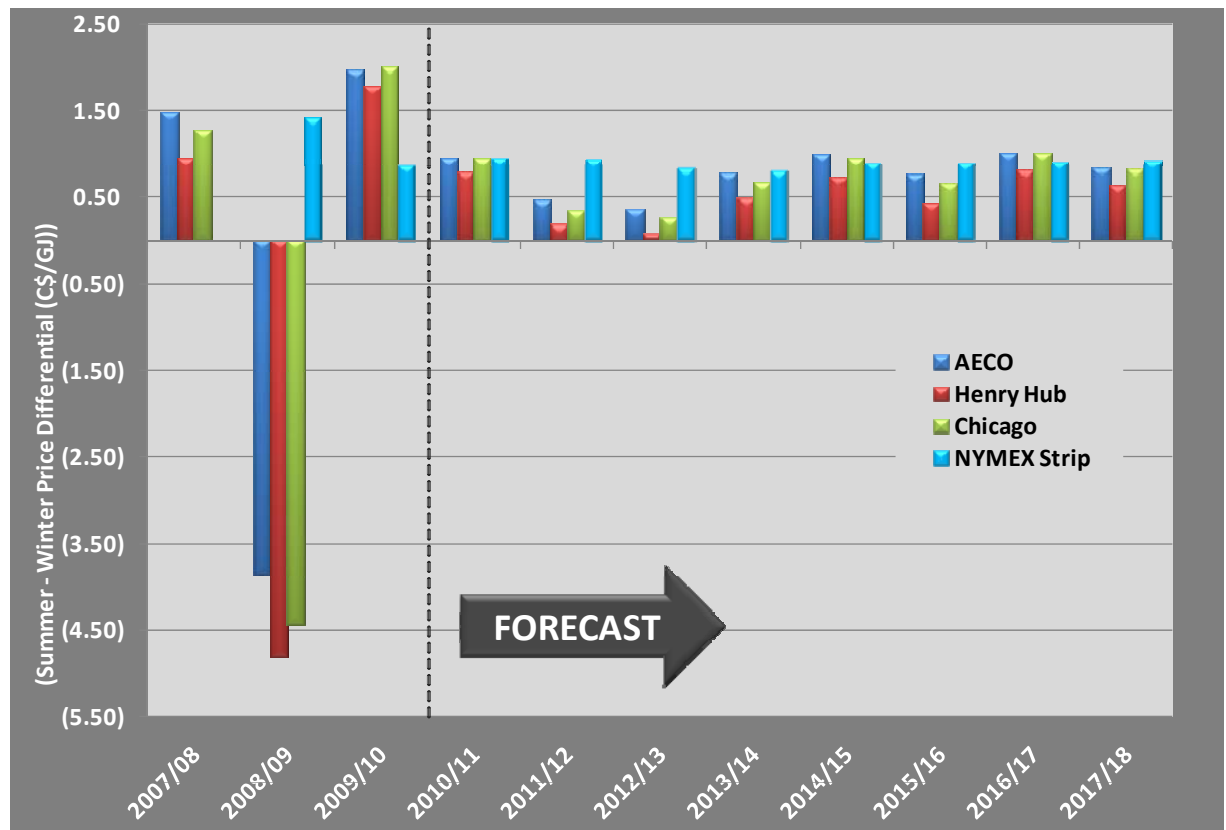
- Direct purchases at MichCon, ANR, Dawn storage or other storage sites and market centers.
  - Chicago, Dawn, and MichCon all offer sufficient liquidity to ensure reliable supply.
- Purchases delivered to the right point can reduce or eliminate need to pay for pipeline capacity for storage injection, and reduce the cost of using storage.
  - Likely available at Dawn, MichCon, and ANR storage locations.

# Natural Gas Storage



- Centra holds 15.5 BCF of storage capacity with ANR Storage that is scheduled to expire on March 31, 2013.
- Renegotiation or replacement of the ANR storage contracts and associated transportation contracts represents a key decision point in Centra’s future supply strategy.
- Timing of renegotiation appears fortuitous.

Seasonal Arbitrage Value of Natural Gas Storage





## Natural gas storage fills a number of critical roles for Centra



- 1) Minimizes costs on the TCPL for additional winter capacity.
- 2) Improves Centra's purchase and transportation load factors for WCSB supply.
- 3) Allows Centra to utilize normal seasonal differences in commodity prices to minimize and hedge annual gas purchase costs.
- 4) Mitigates rate volatility by allowing storage withdrawals at single unit cost.
- 5) Provides daily gas supply flexibility to balance nominated supply to weather-driven demand fluctuations.
- 6) Allows Centra to minimize open market purchases and reliance on swing services.
- 7) Provides increased security of supply during periods of limited supply liquidity or during times when markets are closed.
- 8) Facilitates supply diversity (depending on location) by providing access to gas supplies from remote markets.

## Centra has a number of potential storage options in addition to renewal of ANR Michigan Storage



### 1) Saskatchewan storage

- Existing
- New

### 2) Manitoba storage development

### 3) Michigan storage

- ANR
- Bluewater
- MichCon/DTE

### 4) Ontario storage

### 5) Other storage options

- Alberta Storage
- Williston Basin Interstate Pipeline storage
- Northern Natural Gas Pipeline storage
- Virtual storage
- No storage

## Natural Gas Peaking Options



- **Delivered Service**
  - Changes in market structure have allowed marketers to provide reliable, cost effective delivered services.
  - Reduces the need for FT pipeline capacity.
- **Liquefied Natural Gas Peaking Plant**
  - Costs appear much higher than alternative sources of supply
- **TCPL Pipeline Capacity Conversion to High Deliverability Storage**

# SUPPLY PORTFOLIO OPTIMIZATION ANALYSIS

## Analytical Tools



- ICF's Gas Market Model (GMM<sup>®</sup>)
  - Full supply/demand equilibrium model of the North American gas market
  - Solves for monthly natural gas prices at over 120 market centers throughout North America
- ICF's Gas Storage Valuation Model (GSVM)
  - Uses monthly gas prices projected by the GMM and statistical characterization of daily prices, in addition to variable cost assumptions for storage to create an optimal pattern of utilization for storage capacity

## Factors Considered in Analysis



- Quantitative Factors
  - Weather Volatility
  - Sendout Volatility
  - Natural Gas Price Volatility
- Other Criteria
  - Diversity and Liquidity of different portfolio options