

NATURAL GAS: ACHIEVING THE FULL POTENTIAL?

Prepared by: Atlantica Centre for Energy, June 2010

Natural gas markets in New Brunswick

In December 1999, the Maritimes & Northeast Pipeline (M&NP) introduced Sable Island natural gas to areas in New Brunswick, Nova Scotia and Maine¹. Before the M&NP pipeline, natural gas was widely available across Canada for industrial, commercial and residential uses in all provinces except Atlantic Canada. In August 1999, Enbridge Gas New Brunswick² (EGNB) was awarded a 20-year renewable franchise to develop a natural gas distribution system in the province. First gas deliveries to customers occurred in March 2001 and expanded to other municipalities and industrial users in close proximity to the M&NP pipeline and laterals.

Over the past 10 years, EGNB has built a 750+ kilometres distribution system that serves approximately 10,000 customers in nine municipalities (Fredericton, Moncton, Dieppe, Riverview, Oromocto, Sackville, Saint John, St. George and St. Stephen) and has the current capability of attaching approximately 30,000 customers. The current nine municipalities served make up 33% of the private households in New Brunswick (110,000 households). An estimated 55% to 60% of all New Brunswick households and over 60% of businesses in the province are located in the St. Stephen-Saint John-Fredericton-Moncton corridor. EGNB is regulated by the New Brunswick Energy and Utilities Board (EUB).

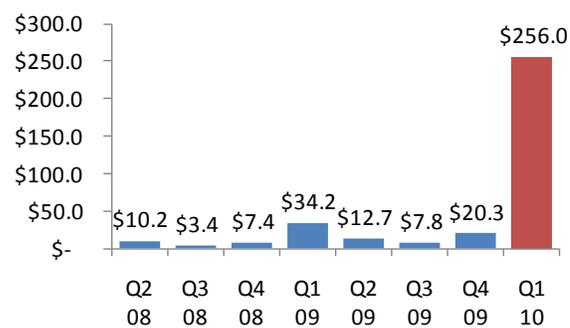
Since the launch of EGNB, there have been two other natural gas developments in New Brunswick. First, local sources of natural gas have been found and are being extracted. Corridor Resources Inc. has been operational in the McCully field near Sussex since 2003 and began delivering gas into the M&NP pipeline in 2007. A large amount of additional exploration is underway. In addition, the first liquefied natural gas (LNG) terminal in Canada was built in Saint John and began operations in June 2009. Canaport LNG has a maximum capacity of 1.2 billion cubic feet (BCF) or 28 million cubic metres of natural gas per day. Having these local sources of natural gas brings diversity of supply and maturity to the market in New Brunswick.

New Brunswick is becoming a major gas exporter. According to National Energy Board statistics there are four companies that are shipping natural gas to U.S. markets through New Brunswick: Emera Energy Inc., Nextera Energy Resources, Repsol and Shell Energy North. Exports of natural gas from New Brunswick reached an all time high in the first quarter of 2010 as a result of Canaport natural gas shipments into New England (Figure 1).

The Challenges

From the perspectives of economic development and public policy, there are several current challenges associated with the natural gas system in New Brunswick. First, a large portion of natural gas usage in New Brunswick is not part of the EGNB distribution system. During the initial stages of setting up the system, several large industrial users were provided with single end use franchises and were not required to become customers of EGNB³. The volume of gas required by these single end use franchisees created the market for M&NP to build lateral lines off the main pipeline.

Figure 1: Natural Gas Exports from New Brunswick (\$M)



Source: Statistics Canada. Most recent 24 months worth of exports (NAICS 21111 - Oil and Gas Extraction).

¹ Local sources of natural gas were used in parts of New Brunswick in the early 20th Century.

² Enbridge Inc. owns more than 70% of, and operates, Enbridge Gas New Brunswick.

³ There is an annual fee of \$50,000 to maintain the franchise. Recent legislation prohibits the issuance of any new single end use franchises.

Second, EGNB is operating under a regulated 'market-based' formula for the pricing of natural gas. The formula sets gas prices based on savings over the cost of using a competing fuel (such as electricity or oil). Historically the commodity price of natural gas moved in tandem with the price of oil. In recent years, the price of the two fuels have diverged (natural gas going lower and oil remaining relatively high). As a result the market-based formula has resulted in comparatively high natural gas prices for industrial customers served by the Enbridge distribution system.

Because of this model and other factors mentioned here, the delivered cost for natural gas in New Brunswick for industrial users is well above every other jurisdiction in North America except Hawaii (Figure 2). Unfortunately, industrial users and manufacturers are not competing against other fuels, they are competing against other jurisdictions where the current market prices for gas are very low.

Third, because natural gas is new to the province the EUB considers EGNB to be in a 'development period' where cost of service exceeds its distribution revenues. In the development period, EGNB is allowed to defer the shortfall between distribution revenues and the cost of service during the development period for recovery in future rates. This was never anticipated to be a significant amount but it has grown to \$155 million at the end of 2009. According to EGNB documents, the recovery period is forecast to start in 2015 and end no sooner than December 31, 2040. This will have the effect of limiting the potential of rate decreases into the future.

Fourth, the original ambitious targets for natural gas in New Brunswick were based on the assumption that laterals would be built into more communities than was ultimately the case. They also assumed a broader residential uptake but the cost of conversion and other factors have held back adoption.

Figure 2: Annual Natural Gas Costs (\$000s)
Metal Components Fabrication Facility



*Assumes a monthly gas consumption of 28,895 m3. Shown in U.S. Dollars.
Source: KPMG Competitive Alternatives 2010.

POLICY OPTIONS: THE WAY AHEAD

Before addressing the potential policy options, it is important to point out that each of the main stakeholders in the natural gas industry in New Brunswick (including M&NP, EGNB, single end use franchisees and the EGNB large industrial customers) are doing what they could be reasonably expected to do to conform to government regulation and meet their internal business objectives. We recognize that the market has not developed as quickly as originally anticipated, but it is important now to find the best way to move forward.

The potential natural gas death spiral and the virtuous cycle

Similar to the relationship between industrial customers for electricity in the province, there is the potential for a kind of 'death spiral' associated with the industrial customers for natural gas. The current price level is comparatively high pushing these large industrial users into an uncompetitive position and forcing them to consider alternatives ranging from switching to another source of energy to exiting New Brunswick altogether. Losing users from the system will drive redistribution of this revenue requirement either a) on to other industrial, commercial or residential customers (under cost of service rates) or b) into the deferred revenue account. Continuing loss of load could therefore lead to more customers exiting the system, forcing even higher rates and setting in motion the death spiral.

The fundamental point is that industrial companies form an important part of EGNB’s mix of customers, and help to ensure a strong business model where the distribution costs are shared among as many customers as possible – large and small. More customers translates into more competitive rates evolving into a virtuous and reinforcing cycle.

Accelerating natural gas usage is key

No matter what policy decisions are made, a fundamental objective should be to accelerate more usage of natural gas in New Brunswick. One of the key advantages from bringing natural gas to the province was that it would diversify energy options for residential, institutional and industrial organizations. A broader rollout and increased usage will drive down the distribution costs over time and create a more viable market and ultimately lower costs.

Currently, only about 2-3% of New Brunswick households are using natural gas. In Ontario, 60.4% of households use it as their principal fuel source and in Saskatchewan over 72% of households report using natural gas. All provinces from Ontario west have well developed natural gas markets for both residential and industrial users.

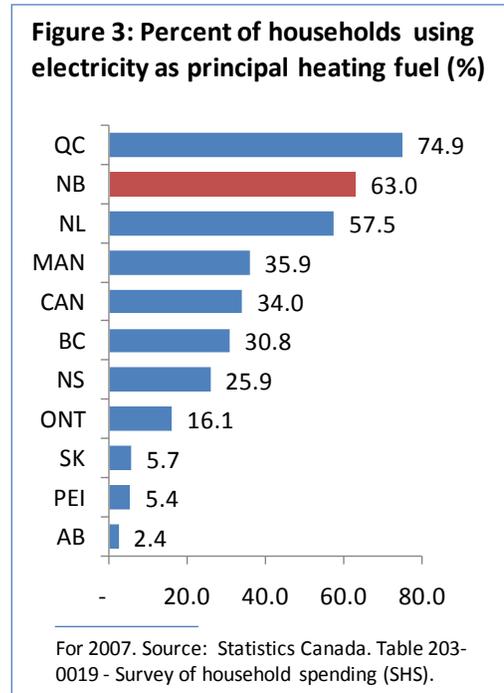
It may be unrealistic to set having natural gas distribution to all parts of New Brunswick as a goal. However, over half of the provincial population lives in the area encompassing St. Stephen, Saint John, Fredericton and Moncton.

EGNB's challenges with natural gas uptake have been partly based on the high cost of converting electric baseboard heating systems, partly on broader market conditions and partly on a general lack of experience with natural gas among the population. It is undervalued and underutilized in New Brunswick.

New Brunswick has the second highest percentage of households that use electricity as their principal heating fuel among the 10 provinces in Canada (Figure 3). This very high reliance on electric baseboard and other electricity heating systems requires NB Power to either have a large surplus of electricity generation assets to cover the peak demand period in winter or to purchase this additional load when required. Continuing to build new housing stock with electric baseboard heating exacerbates the problem. It also makes New Brunswick households and businesses more exposed to escalating electricity costs. The remaining households are primarily using oil-based heating systems. In addition, 62% of all New Brunswick households have heating equipment that is over 10 years old.

New Brunswick's significant reliance on electricity and oil for heat and the fact we have among the oldest heating equipment among the 10 provinces in Canada is an indication of the need for change.

There are a number of public policy options that would accelerate the usage of natural gas in New Brunswick. For the residential market, government could provide a tax incentive or other support to encourage the transition to natural gas.



A key problem for residences with electric baseboard heating is the significant cost of conversion. A limited program was put in place in 2008 through Efficiency NB. The *Residential Off-Electric Baseboard Conversion Project* was offered to 300 homeowners and provided \$10,000 to help pay for conversion of electric baseboard heating and electric water heating systems to natural gas. EGNB covered \$7,000 of the total incentive amount.

The government could also either mandate or incentivize all new housing construction within EGNB service areas be built with natural gas. While there is some cost to the taxpayer from these options there is the added economic benefit of significant new construction activity around the province. Electric baseboard heating systems are expensive to convert without significant modifications to the house. Electric baseboard heating is much less efficient (energy in versus energy out) than any other form of heating⁴.

There are other potential uses such as in natural gas vehicles. Across the United States, natural gas usage to power vehicles has tripled in the past 10 years due in large part to direct subsidies and tax incentives.

For the industrial market, there are also options. Natural gas could be used for more electricity generation in the province⁵. Natural gas-fired electricity plants are quicker and cheaper to build, and cleaner to operate compared to other fossil fuels. They are also a good way to balance large scale deployment of renewable energy systems such as wind, solar and tidal. These systems only generate electricity at certain times (for example when the wind is blowing) and a natural gas-fired plant is a good source of load balancing electricity generation because it can be fired up quickly (unlike coal or nuclear plants).

Cost competitive industrial natural gas could also be part of an energy park to attract investment and high paying jobs. New Brunswick does not have special industrial zones to accommodate and attract energy investment. These parks are successful when there are synergies between the various infrastructure - energy, co-generation, steam, by-products, etc.

The overriding challenge is finding a pricing mechanism that would cover the cost of the distribution system and be attractive for large scale uses. The current regulated pricing regime may be too high to attract new investment that requires large scale natural gas.

There is a broader, more strategic reason why we need to develop more local uses for natural gas. The main markets for Sable, Canaport LNG and even indigenous gas are in the United States. The emergence of competitive extraction from Marcellus and other shale gas deposits means increased competition for natural gas markets in New England. Developing more mature domestic markets helps regional industry participants in the Maritime Provinces to maintain their economic activity and continue to contribute to the local economy regardless of the ups and downs of the market cycle in the United States.

⁴ There would also be benefits from either mandating or incentivizing new construction across the province to be built with central heating systems. Whether the system is forced air through ductwork or water circulation to baseboard heating, the important issue is the ability to connect it to a central source of heat. That source can be a natural gas fired furnace, an oil-fired furnace, an electric furnace, maybe even a biomass furnace, each of which can be substituted for another with relative ease.

⁵ There are two natural-gas fired electricity generation plants in New Brunswick: Bayside Power, a 260 MW gas-fired combined cycle power plant and the 88 MW Grandview Cogeneration Plant. Both are located in Saint John.

POLICY OPTIONS

Option 1: Status quo

Instead of being an economic development advantage, high natural gas costs will continue to pose challenges to attracting more industrial investment to the province. Companies considering setting up or expanding in New Brunswick are not looking at alternative fuel costs, they are considering alternative jurisdictions. The use of natural gas for electricity generation or in the context of an energy park will be potentially challenging as well. The residential rollout will continue to be slow and the regulated requirement to pay down the deferral account will put increasing pressure on the business model.

Option 2: Changes to the system to improve utilization of natural gas

EGNB has adapted to local market conditions and is pursuing a slower, measured approach to the development of the natural gas market in New Brunswick than was originally envisioned. An ambitious policy option would be to revisit the current system in its entirety and look for changes that would accelerate usage and strengthen the business model. This would involve entering into negotiations between all the stakeholders with all elements on the table and look to develop a new model that could:

- Lead to more competitive industrial rates. The EUB is currently evaluating a “cost of service” model that could lead to lower industrial rates.
- Develop refinements to the rate structure that would be enticing to large users such as electricity generation.
- Encourage much faster adoption of natural gas among residential and commercial clients and thereby diversify the energy mix in New Brunswick.
- Further encourage migration from electric baseboard heating.

Under this option, the outstanding amount in the deferral account may become in part or whole the responsibility of the government of New Brunswick. However, it may be worth the price to establish a stronger, more viable operating model moving forward.

There is a public interest in having a broader rollout of natural gas in New Brunswick where it makes economic sense. It will provide diversity in energy supply, reduce NB Power's need for high cost peaking generation capacity/power purchase in the winter months, and it will lower provincial carbon emissions. It should also lead to better pricing of natural gas for industrial users, supporting economic development in the province. The benefits are not just for those residents and businesses that convert to natural gas. The development of the natural gas market in New Brunswick generates economic benefits for the province as a whole.

The provincial and federal governments have spent tens of millions of dollars to ensure that broadband telecommunications infrastructure was build across the province. There is a similar public interest in the development of the natural gas system and market in New Brunswick.

Option 3: Reinvesting royalties into strengthening the natural gas distribution system

There is a clear public interest associated with having a broader rollout and far more use of natural gas in New Brunswick among residents and businesses. It brings diversity and security to the energy system, it also helps address the cost challenges related to NB Power and winter peaking costs and it is a far more environmentally friendly source of energy compared to other fossil fuels such as oil and coal. It will also lead to better pricing - particularly for manufacturing and industrial uses - over time. However, as mentioned above, the cost of converting homes and businesses from electric baseboard heating to natural gas can be prohibitive.

One way the government could help address this involves using the economic benefits generated from natural gas exploration to strengthen the natural gas distribution system. A portion of the royalties from natural gas production could be allocated to Efficiency NB to encourage the conversion of residences and businesses to natural gas. This would have a public resonance as people see a direct linkage and value from the extraction of local natural gas.

It is important to point out there is also a substantial amount of local economic activity generated from converting homes and businesses to natural gas. A full economic impact assessment is beyond the scope of this paper but between 20%-25% of the value of this type of construction activity comes back to the government in the form of tax revenue (Figure 4)⁶.

Royalties could also be used to fund new gas distribution infrastructure.

Figure 4: Economic Impact Per \$1 million in Spending*
Residential Building Construction

Total Output	\$1.31 million
Wages & Salaries	\$370,000
Jobs Created**	9.55
Taxes to governments***	\$200k - \$250k

*Direct and indirect impact in New Brunswick

**Full time equivalent

*** Estimate based on average employment income level

Source: Statistics Canada Input-Output Tables for New Brunswick (2006)

Fostering more exploration and production of natural gas

A second equally important public policy issue is the discovery and development of local natural gas sources. The gas from the McCully field near Sussex has been shipped to markets since 2007 providing royalties and tax revenue to the province. The economic activity from exploration and production activities is increasing. According to the Department of Natural Resources, there are currently 10 companies with 41 tenure agreements for oil and natural gas exploration totalling over 407,000 hectares.

Corridor Resources, Apache Corporation, Southwestern Energy and PetroWorth Resources Inc. are all involved in natural gas exploration programs in the province. There is estimated to be 67.3 trillion cubic feet of shale gas just in the Frederick Brook formation in southern New Brunswick. If it can be successfully extracted, this one deposit is equivalent to 25 times the entire annual natural gas market in Canada.

There is also natural gas exploration underway in Nova Scotia. In 2009, Triangle Petroleum Corporation completed two gas wells in the Horton Bluff Shale, of the Windsor Basin.

The economic benefits of natural gas exploration and production that is sensitive to environmental and local community concerns can be significant. In the past few years, the State of Wyoming has become a hotbed of natural gas exploration and production which has generated thousands of new, high paying jobs and an additional \$2 billion in tax revenue to state government (in 2008).

The economic activity comes from exploration of potential sources, the infrastructure to extract the gas and the pipelines and systems to transport the gas to market. In addition, there is tax and royalty revenue to government from the extraction of the resource.

Understanding the economic potential, a number of jurisdictions have developed aggressive programs to encourage more natural gas exploration. In June 2010, Saskatchewan announced it will not tax up to 25 million cubic meters of natural gas that is drawn from private land. Also, it will place a low 2.5% royalty rate on gas drawn on crown land. In order to encourage shale gas exploration, Alberta recently announced another round of incentives. The new royalty formula cuts rates on hard-to-reach oil and gas deposits and is expected to cost the province \$1.5 billion in revenue.

⁶ Direct and indirect taxation - individual and business income taxes, HST, property taxes, etc.

The government of Newfoundland and Labrador is perhaps the most aggressive. They set up a development company, Nalcor Energy, to take "a leadership role in the exploration and development of our oil and gas resources both offshore and onshore". In addition to taking ownership stakes in offshore projects, Nalcor recently took an average 67% working interest in three onshore exploration permits in the Parsons Pond area on the Great Northern Peninsula. Nalcor is committed to take a 10% equity position in all future oil and gas projects requiring a Development Plan Approval.

Environmental implications

The majority of the natural gas in New Brunswick may be in the form of shale gas. In recent years, the shale gas boom was made possible because of a new process called 'hydraulic fracturing'. This new process makes the extraction of shale gas more economic but it does raise potential environmental concerns. Most of the natural gas extracted across North America is done so in an environmentally responsible way and that objective must be achieved in New Brunswick.

Capturing the Opportunity

Whether it is an incentive royalty structure (Saskatchewan) or a direct involvement in exploration activities (Newfoundland & Labrador), New Brunswick should be looking at the right mix of policies and activities that will maximize and accelerate the potential of this natural resource.

The province should also be educating the public about the potential of natural gas and the regulation in place to ensure environmental and local community issues are addressed. The example of Saskatchewan and other jurisdictions show that natural gas can be explored for and extracted in an environmentally sustainable way. New Brunswickers need to be well informed of the issues.