

December 22, 2015

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: EB-2015-0179 – Union Gas Limited (“Union”) – Community Expansion Technical Conference Undertaking Responses

Please find attached Union’s responses to the Undertakings received in Technical Conference on December 15, 2015. These will be filed in RESS and copies will be sent to the Board.

Responses to JT1.2, JT1.3, JT1.11 and JT1.14 are not final and will be filed on January 5, 2016.

Please note, the documents requested in JT1.12 (correspondence between Union and the government) are not included in this electronic filing due to the file size. They will be filed under separate cover to the Board and labelled accordingly in RESS. Paper copies and a CD containing the correspondence will be sent by courier to the Board and are also available on Union’s website.

In addition, as stated in response to JT1.13, a live excel spreadsheet as requested has been provided to the requesting party via email, copying the Board. Other parties who wish to receive a copy of the documents can contact Union directly.

If you have any questions with respect to this submission please contact me at 519-436-5476.

Yours truly,

[original signed by]

Chris Ripley
Manager, Regulatory Applications

Encl.

c.c.: C. Keizer, Torys
EB-2015-0179 Intervenors

UNION GAS LIMITED

Undertaking Response
To Mr. Wolnik

To provide the normalized reinforcement costs over the last five years that have been charged to the indices.

The normalized reinforcement applied to the Rolling Portfolio and the Investment Portfolio are listed below in \$ millions.

Year	2011	2012	2013	2014	2015
Union South	\$6.11	\$5.84	\$5.75	\$6.25	\$5.39
Union North	\$2.03	\$2.11	\$2.08	\$2.00	\$2.50
Total	\$8.13	\$7.96	\$7.83	\$8.26	\$7.89

UNION GAS LIMITED

Undertaking Response
To Ms. Brazil

To provide a copy of any of the source data or calculations or estimates that were used to come up with that \$45 figure.

To determine the \$45 per metre excess footage charge, Union used the average residential service costs for the three-year period from 2007 to 2009. The average residential service cost over this period was \$46.09 per metre. As a result, Union proceeded with a \$45 per metre charge.

UNION GAS LIMITED

Undertaking Response
To Mr. Quinn

To provide the target PI for the project.

The target P.I. for the Red Lake Expansion Project was 0.9.

UNION GAS LIMITED

Undertaking Response
To Mr. Quinn

To provide an agreement if it exists with the Municipality in order to get the CIAC.

Please see Attachment 1 (Amending Agreement #4) which identifies the Municipality of Red Lake's Aid-to Construction ("CIAC") payment structure.

AMENDING AGREEMENT #4

THIS AGREEMENT effective as of May 17, 2012, between The Corporation of the Municipality of Red Lake ("Counterparty") and Union Gas Limited ("Union") witnesses that

WHEREAS Union and Counterparty are parties to a funding agreement ("Contract") dated March 31, 2012;

AND WHEREAS the parties have amended certain dates within the Contract via Amending Agreement #1 dated April 16, 2012, Amending Agreement #2 dated May 2, 2012, and Amending Agreement #3 dated May 11, 2012;

AND WHEREAS the parties wish to amend the Contract as more fully set out herein;

NOW THEREFORE for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

1. **Amendment.** The Contract is hereby amended as follows:

1.1 Within section 1.2 (the definition of Maximum Funds), add the following below (b):

"... plus (c) Seven Hundred and Fifty Thousand Dollars (\$750,000) directly from the Municipality".

1.2 Within section 1.2 (the definition of Modified Phase II) the date shall be changed to May 25, 2012.

1.3 Section 4.1 of the Contract is hereby deleted and replaced with the following:

"Funds Provided. The Municipality shall:

- (a) provide the Recipient up to the Maximum Funds for Eligible Project Costs for the purpose of carrying out the Project;**
- (b) subject to the terms and conditions of this Agreement, provide the Funds to the Recipient in accordance with the payment terms within Schedule "D";**
- (c) issue a cheque in the Recipient's name or deposit the Funds into an account designated by the Recipient provided that the account:**
 - (i) resides at a Canadian financial institution; and**
 - (ii) is in the name of the Recipient and**
- (d) despite any other clause or section in this Agreement, the Municipality may defer payment of up to \$750,000 to Union as per the following schedule, without interest:**
 - Payment of \$187,500 must be made by not later than May 1, 2013**
 - Payment of \$187,500 must be made by not later than May 1, 2014**
 - Payment of \$187,500 must be made by not later than May 1, 2015**
 - Payment of \$187,500 must be made by not later than May 1, 2016**

1.4 Section 4.3 of the Contract is hereby deleted and replaced with the following:

"Limitation on Payment of Funds. The Municipality's obligation to make payment hereunder is limited to the payment of funds actually received from the Province and Fednor and to a limit of \$750,000 directly from the Municipality."

1.5 Article 13 of the Contract is hereby deleted and replaced with the following:

“ARTICLE 13 CONDITIONS PRECEDENT

The obligations of Recipient to carry out the Project hereunder are subject to the following conditions precedent (a) through (e) inclusive, which are for the sole benefit of Recipient:

(a) Recipient shall have obtained, in form and substance satisfactory to Recipient, and all conditions shall have been satisfied under, all governmental, regulatory and other third party approvals, consents, orders and authorizations, that are required to carry out the Project;


(b) Recipient shall have obtained all internal approvals that are necessary or appropriate to carry out the Project;

(c) Phase I of the Project shall have been completed;

(d) Recipient shall have received sufficient funds from the Municipality, consistent with the terms hereof; and

(e) Recipient and Municipality shall have agreed on the reduced scope for Modified Phase II by May 25, 2012.

Recipient and Municipality shall use reasonable efforts consistent with their obligations hereunder to satisfy and fulfill conditions (a), (c), (d) and (e). Recipient shall notify Municipality forthwith in writing of the satisfaction or waiver of each condition precedent. If Recipient concludes, acting in a commercially reasonable manner, that any of the conditions precedent (a) (b) (c) (d) or (e) has not or will not be satisfied or waived by Recipient, Recipient shall promptly deliver written notice to Municipality, terminating this Agreement. ~~For greater clarity, if Recipient terminates this Agreement, Municipality will pay all Eligible Project Costs incurred by Recipient to the date of termination, including all costs arising from said termination.~~



The obligations of the Municipality hereunder are subject to the following condition precedent which is for the sole benefit of the Municipality.

(f) The Municipality shall have entered into an agreement with Industry Canada, Fednor pursuant to which Fednor agrees to provide \$2.7M in funding on terms satisfactory to the Municipality.

Condition precedent (f) must be satisfied or waived by the Municipality by May 25, 2012. Unless Municipality delivers a written notice of termination of this Agreement to Recipient by May 25, 2012, Municipality shall be deemed to have waived condition precedent (f). For greater clarity, if Municipality terminates this Agreement, Municipality will pay all Eligible Project Costs incurred by Recipient to the date of termination, including all costs arising from said termination.”


1.6 Schedule B is hereby amended by the addition of the following to the columns labelled Project Funding: Under the Column entitled Third Party Funding Source, add the word “Municipality”; and under the column labelled Amount, add “\$750,000” directly aligned with the word Municipality.

2. **Acknowledgement.** The parties acknowledge that save as otherwise indicated herein, the Contract shall continue unamended, is in all respects confirmed, ratified and preserved.

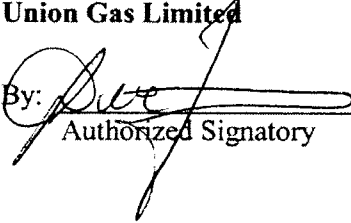
3. **Further Assurances.** The parties shall, at all times hereafter at the reasonable request of the other, execute and deliver to the other all such further documents and instruments and shall do and perform such acts as may be necessary to give full effect to the intent and meaning of this Agreement.
4. **Governing Law.** This Agreement shall be governed by and interpreted in accordance with the laws of the Province of Ontario, without regard to the principles governing the conflict of laws.
5. **Counterparts.** This Agreement may be executed in any number of counterparts. Each executed counterpart shall be deemed to be an original. All executed counterparts taken together shall constitute one agreement.


IN WITNESS WHEREOF the parties have executed this Agreement as of the date first written above.

The Corporation of the Municipality of Red Lake

By: 
Authorized Signatory

Union Gas Limited

By: 
Authorized Signatory

By: 
Authorized Signatory

**BEING A BY-LAW TO AMEND BY-LAW NO. 1605-12,
BEING A BY-LAW TO AUTHORIZE THE CORPORATION TO ENTER
INTO AN AGREEMENT WITH UNION GAS LIMITED**

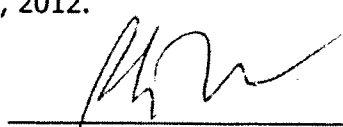
WHEREAS the Council of The Corporation of the Municipality of Red Lake passed By-Law No. 1605-12 on March 31st, 2012; and


WHEREAS it is deemed necessary to amend By-Law No. 1605-12;

NOW THEREFORE the Council of The Corporation of the Municipality of Red Lake hereby **ENACTS AS FOLLOWS:**

1. **THAT** the Agreement is amended as per Amending Agreement No. 4, attached hereto as Schedule "A", and forming a part of this By-Law.
2. **THAT** the Mayor and Clerk are hereby authorized to execute the said Amendment No. 4 referred to in Section 1 behalf of the Municipality.
3. **THAT** By-Law No. 1605-12 is hereby amended.
4. **THAT** this by-law shall come into force and take effect on the final passing thereof.

READ a FIRST and SECOND TIME this 22nd day of May, 2012.


Phil T. Vinet, Mayor


Shelly L. Kocis, Clerk

READ a THIRD TIME and FINALLY PASSED this 22nd day of May, 2012.


Phil T. Vinet, Mayor


Shelly L. Kocis, Clerk

UNION GAS LIMITED

Undertaking Response
To Ms. Brazil

To provide the copies of the presentations or any written advice that was given to the Municipality.

There are no presentations or “written advice” from Union to the Municipality Red Lake to assist the Municipality in determining not only the amount of financial contribution to be paid but how that amount was to be generated.

UNION GAS LIMITED

Undertaking Response
To Mr. Mondrow

To clarify the provision.

The provision referenced is provided below:

“c) The P.I. analysis for commercial and industrial services shall be individually calculated reflecting the site specific lateral length, pipeline sizing, costs, gas usage and margins. Commercial and Industrial customers shall be required to contribute Aid to Construction (“CIAC”) or the TCS if necessary to achieve a minimum P.I. of 1.0, unless part of a Community Expansion Project. For services in Community Expansion Projects, the minimum P.I. for commercial and industrial attachments will match that approved for the Project until such time as the TES has been in place for 24 months.”¹

The provision allows for the P.I.’s of commercial/industrial services connecting to Community Expansion Project areas to match the P.I. for the Community Expansion Project provided they connect within 24 months of the TES being put into place (or in other words within 24 months of the Project being placed in service). This is not an error in evidence. Union set this period intentionally.

Union set this period at 24 months in recognition that the decision making and budgeting cycle often extends to two years in larger businesses. If a CIAC is required, or if significant investment is needed to convert equipment to natural gas, these businesses may not be able to commit to a connection to the system prior to the system being placed in service. Union does not feel a longer time period is warranted.

In the case of non-contract commercial industrial additions (Rates M1, M2, 01, 10), they will be required to pay the TES applicable to the Project if they connect at any time through the Project’s TES term, and the revenue from the TES will be recognized in the economic analysis of their connection. In the case of contract customers in other rate classes, the economies of system construction related to common Project costs, referenced at Exhibit B.CCC.12, will no longer be available after the system is placed into service. For this reason Union did not propose to extend this reduced P.I. period any longer than what was necessary to accommodate the business decision and budgeting cycle period.

¹ Exhibit A, Tab 1, Appendix H, p. 6

UNION GAS LIMITED

Undertaking Response
To Mr. Mondrow

To provide a booklet called our bold plays.

Please see Attachment 1.

ONTARIO'S ECONOMIC RENAISSANCE FUELLED BY NATURAL GAS



uniongas

A Spectra Energy Company

02	EXECUTIVE SUMMARY
05	IT'S TIME TO JUMPSTART ONTARIO'S ECONOMY
06	REPATRIATION OF MANUFACTURING JOBS
10	ONTARIO IS POSITIONED TO EXPLOIT NATURAL GAS FOR ITS OWN MANUFACTURING RENAISSANCE
12	UNLOCKING ONTARIO NATURAL GAS ADVANTAGE INVOLVES FIVE BOLD PLAYS
15	FIRST BOLD PLAY: ENSURING SUPPLY AND ATTRACTING ENERGY INTENSIVE BUSINESSES
21	SECOND BOLD PLAY: MAKING THE TRANSPORTATION OF GOODS AND PEOPLE CLEANER AND MORE AFFORDABLE
31	THIRD BOLD PLAY: CONNECTING RURAL ONTARIO FAMILIES AND BUSINESSES
37	FOURTH BOLD PLAY: EXPANDING SUSTAINABILITY THROUGH COMBINED HEAT AND POWER
45	FIFTH BOLD PLAY: FUELING THE RING OF FIRE USING NATURAL GAS
51	CONCLUSION: BOLD ACTION IS REQUIRED TO UNLOCK ONTARIO'S GROWTH POTENTIAL

EXECUTIVE SUMMARY

Ontario’s easy proximity to North America’s largest reserves of clean, affordable Natural Gas represents one of this Province’s single biggest opportunities for jumpstarting economic development and job creation. Competitor states such as Ohio, Michigan, New York and Pennsylvania are already utilizing low cost natural gas to revitalize their manufacturing sectors.

Unlike Alberta, Ontario is not blessed with abundant fuel resources of its own. But Ontario’s geographic location combined with the strategic advantage provided by the Dawn natural gas storage hub, Canada’s largest integrated underground storage complex, means that Ontario can compete with and beat the competition for jobs and manufacturing investment - if it effectively leverages these attributes. Ontario is at a fiscal and economic crossroads. The fragile recovery from the 2008/9 recession has been slow and has been constrained by high energy costs. The Ontario government must make the critical decisions necessary to ensure that the provincial recovery does not falter. A crucial means of ensuring the economic success of the province will involve attracting private investment – most notably in the manufacturing sector.

As evidenced in the American “rust belt” states, growth in manufacturing has been central in reducing the unemployment rate and increasing GDP.

As the power play of the 21st century, natural gas is a secure, abundant, affordable and flexible energy source that can be used to reduce input costs, attract new manufacturing industries, and create jobs to jumpstart economic growth. Innovations in shale gas technology have fundamentally changed the natural gas industry and provided Ontario with access to

more competitive and diverse sources of supply in close proximity to the province. As a key feedstock for many manufacturing processes, as well as a means of electricity and heat production, natural gas holds many opportunities for stable, sustainable economic growth.

Natural gas has become a major strategic advantage for North America. North American natural gas prices are the lowest in the world, and huge reserves will ensure that this remains the case for years to come. These affordable prices are bringing energy intensive industries back to North America.

Ontario has the robust storage and pipeline infrastructure necessary to deliver the clean, affordable and reliable energy solution that Ontario families, businesses and industrial job creators need. This can be a competitive advantage for the province.

Ontario needs a specific long term natural gas strategy to complement its Long Term Energy Plan. This strategy needs to be developed and implemented by a cross-government working group to ensure coordination.

No one ministry alone can take the actions needed to seize this major opportunity to build our province’s economy.

The right public policy framework and strong government leadership will incent private sector investment to exploit the opportunities presented by natural gas. Union Gas believes that Ontario can unlock the economic development potential of its position at the nexus of the North American natural gas network through Five Bold Plays:



UTILIZING NATURAL GAS AS A STRATEGIC ASSET TO ATTRACT INDUSTRY

As an abundant, affordable fuel, natural gas can help existing energy-intensive industries in Ontario become more competitive and can lure new energy-intensive industries to Ontario.



CONNECTING RURAL ONTARIO FAMILIES AND BUSINESSES

Thousands of rural families and businesses currently do not have access to natural gas due to a lack of infrastructure. Supporting the expansion of Ontario’s natural gas infrastructure to these communities would support economic development, job creation, and a more affordable cost of living for rural Ontario.



FUELING THE RING OF FIRE

The delivery of reliable, affordable natural gas in large volumes to this previously inaccessible region can act as a major catalyst for the economic development of this large-scale economic transformation of this remote region of Ontario.



MAKING THE TRANSPORTATION OF GOODS AND PEOPLE CLEANER AND MORE AFFORDABLE

Natural gas holds promise for reducing the cost and environmental impact of Ontario’s transportation fleets by powering heavy duty and large-scale transportation fleets. Incenting the use of natural gas for transportation can reduce emissions and cut the cost of transportation for businesses, making Ontario business more competitive.



EXPANDING SUSTAINABILITY THROUGH COMBINED HEAT AND POWER

Low natural gas prices, combined with rising electricity prices, have improved the attractiveness of CHP to enable businesses to better manage energy costs. CHP can play an important role in meeting Ontario’s energy needs, and positively impacting local economies and supporting Ontario’s policy goals.

IT'S TIME TO JUMPSTART ONTARIO'S ECONOMY

The first decade of the millennium was not kind to Ontario's economy. The 2008 financial crisis hit Ontario hard, increasing unemployment substantially and forcing governments to assume massive debt in order to prevent the economy from entering into freefall. These factors, along with the high Canadian dollar, resulted in a loss of competitiveness and a lack of investment by the private sector throughout the province. From 1997 to 2010, Ontario's GDP grew at an average rate of 2.5% relative to the U.S.'s 4%¹, and Ontario's productivity grew at an average rate of 1.2% compared to the U.S.'s 2.65%².

While the recession has ended and both employment and output are beginning to recover, the province still needs to address the long-term performance of the economy – in particular, the performance of its manufacturing industries. Even without the impact of the recession, data indicates that Ontario has been performing poorly over the last decade when compared to many other provinces and competitor states. Productivity and income growth have lagged. Manufacturing jobs have been lost in unprecedented numbers.

The Ontario economy needs a jumpstart. While the province's tax environment and skilled labour force are internationally competitive, Ontario risks losing out on economic opportunities due to its high cost of electricity. Competitor U.S. states are exploiting new sources of natural gas to help fuel a manufacturing resurgence.

Ontario's easy proximity to North America's largest reserves of clean, affordable natural gas represents one of this province's single biggest opportunities for jumpstarting economic development and job creation.

Natural gas is the power play of the 21st century. By tapping into the advantages offered by natural gas, Ontario can strengthen its economic competitiveness to become an economic triple threat – low taxes, skilled labour, and affordable energy. This White Paper sets out a path for Ontario to pursue in fueling an economic renaissance, particularly in growing its manufacturing base, through North American natural gas.

REPATRIATION OF MANUFACTURING JOBS

The 2000’s witnessed acceleration in the loss of manufacturing jobs in North America. For U.S. manufacturing, the first decade of the new millennium was the worst since the Great Depression with 5.7 million jobs lost and manufacturing jobs declining to just one-third of total American employment³.

This significant decline was due in large part to China and other export powerhouses gaining a competitive edge as low-cost manufacturing bases.

The story in Canada, particularly in the manufacturing heartland of Ontario, has been no less challenging. From 2004 to 2011, Canada lost more than 300,000 manufacturing jobs, with Ontario accounting for two-thirds of these losses⁴. In less than a decade, Ontario lost one-quarter of its manufacturing job base⁵. And, while there is some evidence that, after a decade of loss, manufacturing is stabilizing on a national basis⁶, Ontario is likely to continue struggling with continued expected losses in auto industry jobs over the coming decade⁷.

While the outlook in Ontario remains mixed, there is increasing optimism about U.S. manufacturing regaining its competitive edge, particularly in the “rust belt” states that compete with Ontario. The country’s exports have been growing more than seven times faster than GDP since 2005⁸. This revival of U.S. manufacturing could create 2.5 to 5 million jobs by 2020, reducing the unemployment rate by as much as 2 to 3 percentage points⁹.

According to a recent report issued by the Boston Consulting Group, the U.S. now has distinct production-cost advantages over other developed economies in labour, natural gas, and electricity – advantages that are attracting manufacturers back to the U.S.¹⁰. The most disruptive of these cost advantages to global manufacturing lies in access to natural gas. Innovations in shale gas drilling technology (ie. Horizontal Directional Drilling) have fundamentally changed the industry by making previously inaccessible formations accessible. As a result, the supply of natural gas in North America is extremely robust. The price of natural gas has fallen

and is expected to increase only modestly over at least the next twenty years¹¹.

Hydraulic fracturing has now been employed over one million times without a single documented incidence of drinking water contamination. Studies conducted by respected authorities have all concluded that hydraulic fracturing is safe. The U.S. Environmental Protection Agency (EPA), Ground Water Protection Council (GWPC) and the Interstate Oil and Gas Compact Commission (IOGCC) have all found hydraulic fracturing non-threatening to the environment, our ecosystems, or public health. Jurisdictions where shale gas is found continue to put in place tough regulatory standards and continue to enact new regulations to ensure that public health and the environment are protected. With proper regulation and the utmost care, hydraulic fracturing can be done safely and reliably. It’s too big of an opportunity not to get it right.

Natural gas is now being produced in quantity from basins like Marcellus and Utica, which were thought to be inaccessible just a few years ago. New supply is set to be produced from other non-traditional areas such as Oklahoma and Appalachia.

The significant increase in natural gas production has helped to push down the U.S. wholesale price of natural gas by 51 % since 2005¹², and has caused the U.S. to surpass Russia as the world’s leading producer of natural gas¹³.

By 2020, recovery costs from shale are expected to be half of what they were in 2005¹⁴, ensuring a long-term and affordable domestic source of natural gas that results in a competitive advantage for the United States. Natural gas prices in North America are now the lowest in the world. The huge reserves mean that they are expected to stay that way for years to come. This has important implications for the U.S.’s manufacturing industries, as natural gas can be used as a key feedstock for chemicals and plastics manufacturing, and can be used in gas-fired power plants to generate reliable, affordable energy. With these technological advances increasing supply and

decreasing price, U.S. natural gas has become the energy power play of the century, helping to fuel the country’s economic recovery.

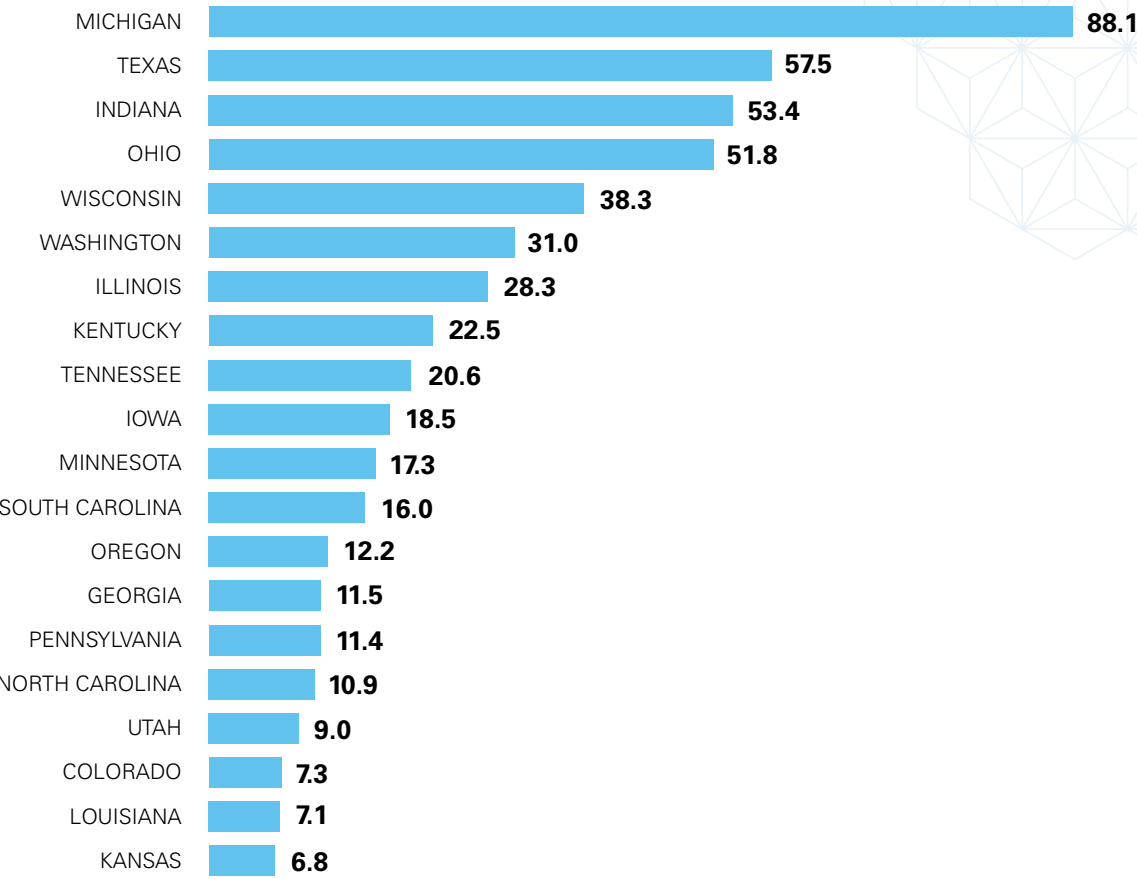
U.S. federal and state governments are exploiting this strategic energy advantage in their collective focus on rebuilding U.S. manufacturing and jobs. President Obama’s 2012 election platform committed to doubling U.S. exports by 2015 through the National Export Initiative and creating one million new manufacturing jobs¹⁵.

U.S. federal government initiatives are being matched by state government efforts to increase manufacturing investment and employment – an integrated approach that is succeeding. The abundance of natural gas energy both as feedstock to industrial processes and for the generation of affordable and cleaner electricity

is playing an important role in the revitalization of the rust belt. Since 2010, rust belt states such as Michigan, Ohio, Wisconsin, Indiana, and Illinois have been leading manufacturing job growth (see Figure¹⁶).

According to a Wall Street Journal report, “plunging prices have turned the U.S. into one of the most profitable places in the world to make chemicals and fertilizer, industries that use gas as both a feedstock and an energy source. And they have slashed costs for makers of energy-intensive products such as aluminum, steel and glass.”¹⁷ In fact, the U.S. boom in natural gas and oil production is projected to create 3.6 million new jobs by 2020 and increase U.S. GDP growth by two to three percent annually¹⁸, with the rust belt states expected to be major participants in economic and job growth.¹⁹

TOP 20 STATES FOR MANUFACTURING JOB CREATION¹⁶
December 2009 to March 2013 (in thousands of workers)

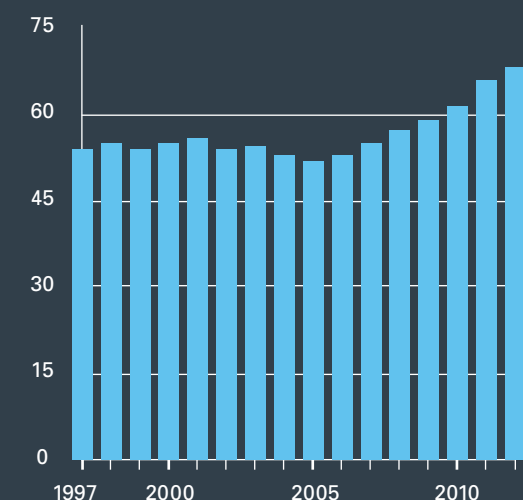


RISING TIDE

A NATURAL-GAS BOOM IS RESHAPING THE U.S. INDUSTRIAL SECTOR.²⁰

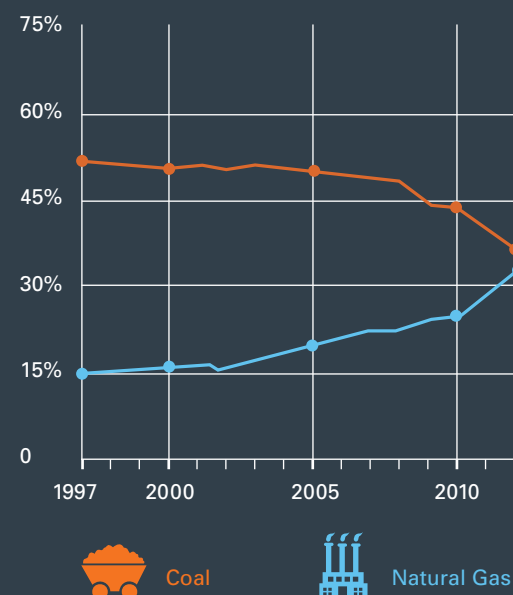
U.S. PRODUCTION OF NATURAL GAS HAS CLIMBED...

Production, in billions of cubic feet per day.



AND NATURAL GAS NOW RIVALS COAL AS A SOURCE OF ELECTRIC POWER...

Consumption by end-use, average for the first nine months of 2012, share of total electric power generation.



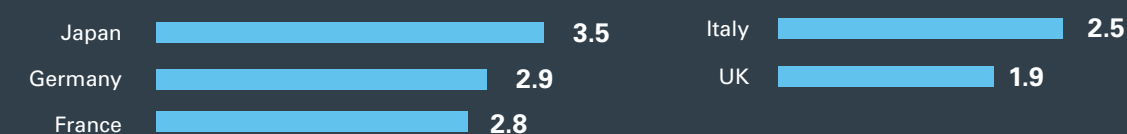
WITH A BIG SLICE OF THE DEMAND FOR GAS COMING FROM INDUSTRY...

Consumption by end-use, average for the first nine months of 2012, in billions of cubic feet a day.



WHICH GIVES U.S. COMPANIES AN EDGE OVER GLOBAL COMPETITORS

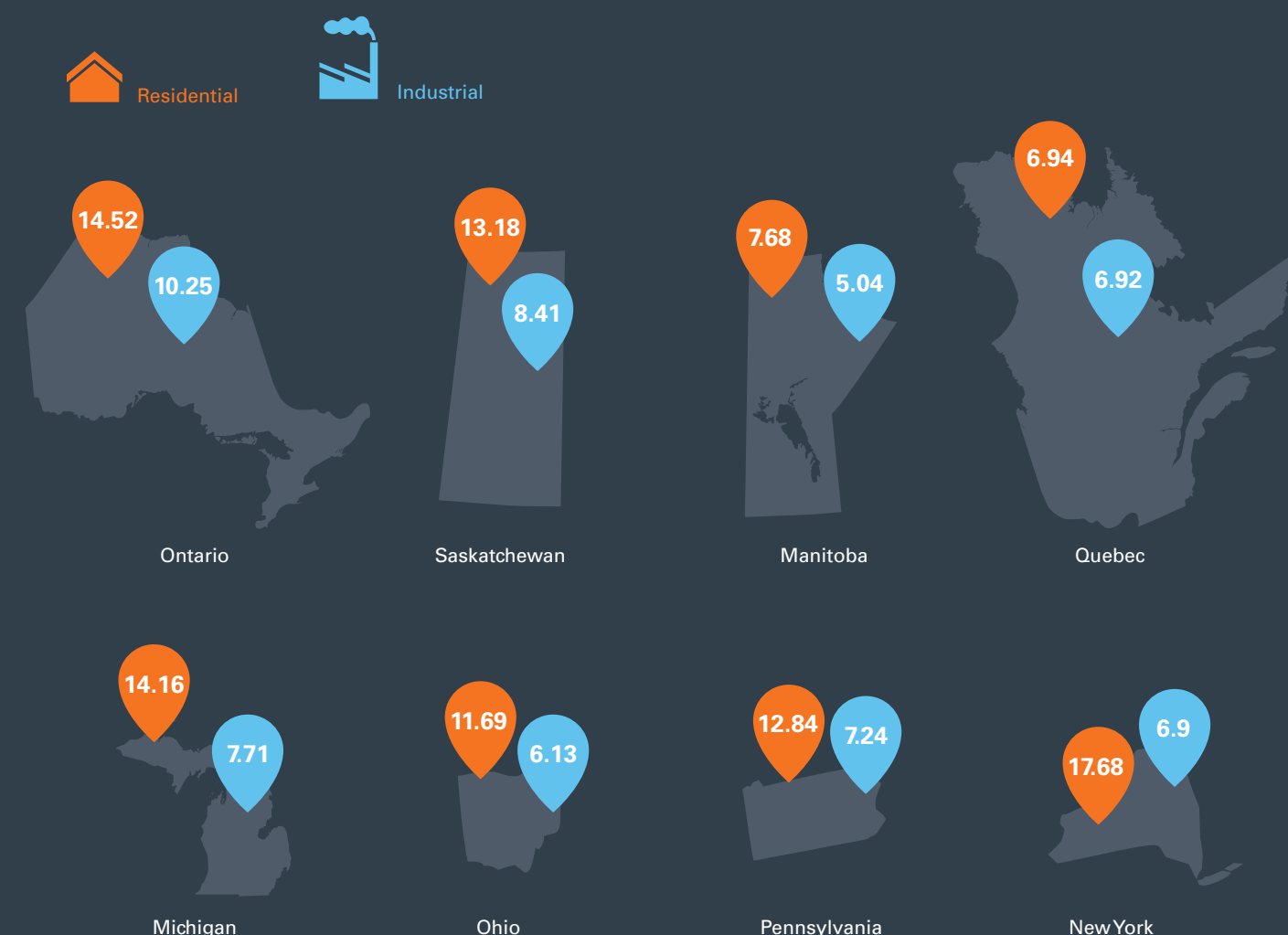
Natural-gas prices in other major manufacturing economies as multiples of U.S. prices; 2001 averages



ONTARIO'S ELECTRICITY RATES VS. SURROUNDING PROVINCES/STATES

(BASED ON AVERAGE RESIDENTIAL AND INDUSTRIAL CONSUMPTION HOEP + GLOBAL ADJUSTMENT)²²

In contrast, industrial energy prices in Ontario, particularly in the GTA, are significantly higher than those in competing jurisdictions²¹. This puts the province at a disadvantage relative to its rust belt competitors, who are aggressively leveraging affordable natural gas to restore manufacturing jobs and growth. Ontario must formulate an integrated economic and energy policy response to compete and foster a manufacturing renaissance of its own.



The ability to transport natural gas to all regions of Ontario is critical to realizing the benefits that the natural gas boom offers. With the completion of currently proposed expansions and reinforcements discussed further in this paper, Ontario will have the robust storage and pipeline infrastructure necessary to deliver the clean, affordable and reliable energy solution that Ontario families, businesses and industrial job creators need. The right public policy

framework and strong government leadership will incent private sector investment to exploit the opportunities presented by natural gas.

Natural gas supplies and the low prices they have brought are a major strategic competitive advantage for North America. Many U.S. states are seizing this advantage. Ontario cannot afford to be left behind.

ONTARIO IS POSITIONED TO EXPLOIT NATURAL GAS FOR ITS OWN MANUFACTURING RENAISSANCE

For Ontario, as for its most immediate competitors, natural gas is a secure, abundant, affordable and flexible energy source that can be used to reduce input costs, attract new manufacturing industries and create jobs to jumpstart economic growth. Natural gas also trades on an open, North American market, further reinforcing security of supply and long-term pricing.

Ontario can compete with the U.S. for new manufacturing industries and jobs because of its strategic position within the North American natural gas network. Ontario's proximity to North America's most abundant and most affordable supplies of natural gas gives this Province an energy platform on which to build a manufacturing resurgence. A key strategic aspect in this respect is the Dawn hub outside of Sarnia, which puts Ontario at the centre of natural gas distribution in North America.

The Dawn storage hub is one of the top three physical trading hubs in North America and its strategic location provides direct access to North America's major supply basins, as well as to emerging natural gas supplies in Utica and Marcellus (both located just south of the Great Lakes). Dawn is the largest integrated natural gas storage facility in Canada, with 23 underground storage pools, strong 365 day markets in Ontario, Quebec and the northeastern U.S., and the ability to interconnect with 10 major pipelines²³. This pipeline infrastructure will be expanded further over the coming years, providing even more access to the most important supplies of affordable natural gas²⁴. This is important for Ontario because it gives the province the ability to provide existing and prospective manufacturers secure access to abundant, affordable and flexible energy.



UNLOCKING ONTARIO NATURAL GAS ADVANTAGE INVOLVES FIVE BOLD PLAYS

When Ontario released its first Long-Term Energy Plan (LTEP) in 2010, it predicted that natural gas would only be used for specific purposes²⁵. The provincial government's current review of its energy policy provides an opportunity to re-position natural gas as a strategic competitive advantage for the economic development of the province.

The key to unlocking the power of natural gas will be to recast Ontario's energy policy from one focused solely on electricity production to one

focused on providing energy diversity that can serve the wide variety of industrial inputs that are impacted by the cost of energy. A diversity of energy sources is vital to ensuring long-term affordable electricity across the province and, more broadly, to ensuring that the right kinds of energy are available for other uses, such as transportation, where it is a key input. Union Gas believes Ontario can unlock the economic development potential of its position at the nexus of the North American natural gas network through Five Bold Plays:

Natural gas production will contribute another \$576 billion to Canada's economy over the next two decades, supporting roughly 129,000 jobs²⁶. Affordable North American natural gas offers a significant competitive advantage to users and is attracting energy intensive industries back to North America. North America has the world's lowest natural gas prices. This strategic advantage is expected to continue for many years to come. Ontario needs to be bold and seize this opportunity if it is to compete and win. The Five Bold Plays in

this White Paper will help put Ontario back on the world's manufacturing map.

In order to quickly and fully embrace this opportunity Ontario's government should develop a natural gas strategy implemented by a special task force that is capable of driving change and decision-making across the entire government. This 'whole of government' approach will provide the critically needed leadership necessary to leverage this unique opportunity to jumpstart economic renewal and job creation.

FIVE BOLD PLAYS

1

Utilizing Natural Gas as a Strategic Asset to Attract Industry

As an abundant, affordable fuel, natural gas can help existing energy-intensive industries in Ontario become more competitive and can lure new energy-intensive industries to Ontario.

2

Making the Transportation of Goods and People Cleaner and More Affordable

Natural gas holds promise for reducing the cost and environmental impact of Ontario's transportation fleets by powering heavy/medium duty and large-scale transportation fleets. With the decoupling of natural gas prices from oil and gasoline prices, natural gas has a significant competitive advantage. Incenting the use of natural gas for transportation will reduce emissions and cut the cost of transportation for businesses, making Ontario business more competitive.

3

Connecting Rural Ontario Families and Businesses

Natural gas is taken for granted in urban Ontario, with nearly every urban Ontario resident having access to this fuel source in their home. Unfortunately, many rural families and businesses currently do not have access to natural gas due to a lack of infrastructure. Supporting the expansion of Ontario's natural gas infrastructure to these communities would support economic development, job creation, and a more affordable cost of living for rural Ontario.

4

Expanding Sustainability through Combined Heat and Power

Combined Heat and Power (CHP) is the simultaneous production of electricity and heat from a single fuel source – in this case natural gas. Low natural gas prices, combined with rising electricity prices, have improved the attractiveness of CHP to enable businesses to better manage energy costs, giving institutions and businesses an incentive to install CHP systems to save on costs. CHP can play an important role in meeting Ontario's energy needs, positively impacting local economies and supporting Ontario's policy goals.

5

Fueling the Ring of Fire

The 'Ring of Fire' is one of the most significant mineral regions in the province and includes the largest deposit of chromite ever discovered in North America. Affordable, flexible, and efficient energy can help unlock this opportunity. The delivery of reliable, affordable natural gas in large volumes to this previously inaccessible region can act as a major catalyst for this large-scale economic transformation of this remote region of Ontario.

FIRST BOLD PLAY: UTILIZING NATURAL GAS AS A STRATEGIC ASSET TO ATTRACT INDUSTRY

THE OPPORTUNITY

Ontario's manufacturing industry operates in a highly competitive global market, where affordably priced energy is a key determinant in locating facilities. With ten times the energy needs of other sectors²⁷, manufacturing industries regard energy as a key input cost in operations. As Ontario's manufacturing sector continues to struggle to defend its eroding competitive position, finding new ways of attracting industry will be central to job creation and economic growth for many local economies. Energy is also an important input cost in other industries where Ontario competes for jobs and investment, meaning that our access to reliable, affordable natural gas can be a competitive advantage.

WHY IT MATTERS TO ONTARIO

Natural gas is an abundant, affordable fuel that can help existing energy-intensive industries in Ontario increase their output and can lure new energy-intensive industries to Ontario. Reliable, affordable natural gas must be a part of the provincial government's pitch to manufacturers considering investments in Ontario. Establishing a diversity of energy sources is key to ensuring long-term energy security and, more widely, ensuring that energy is available for other uses, such as manufacturing.

Some of Canada's most energy-intensive industries are mining, iron and steel, glass, primary metals smelting, industrial chemicals, cement, and pulp and paper²⁸. Their processing plants are often very large and, often, are the mainstay of local or regional economies²⁹. Enabling Ontario to attract more of these industries by leveraging its natural gas advantage, industry-specific jobs, as well as jobs associated with energy production, will present new and exciting opportunities for Ontario workers.

Ontario's access to natural gas can be a strategic selling point in attracting and retaining manufacturers³⁰. Shell Canada's LNG facility in Sarnia Lambton is an example where access to highly reliable, competitively priced natural gas services was a critical factor underpinning the company's decision to invest in Ontario³¹. Capitalizing on the province's robust network of natural gas infrastructure, the government can collaborate with the natural gas industry to champion the increased use of natural gas as an affordable alternative for energy-intensive industries.

Foreign energy-intensive companies should be made aware of the cost-efficiencies inherent in relocating to Ontario as well; for instance, Union Gas recently worked with the Ministry of Economic Development and municipal economic development organizations to encourage large fertilizer plants to locate in southwestern Ontario³².

While Ontario has significant natural gas infrastructure already, there is a need to expand this infrastructure to ensure that Ontario natural gas users continue to have secure and reliable access to new and cost effective supplies. New pipeline infrastructure in and around the Greater Toronto Area is necessary for longer-term access to low-cost, stable supply. TransCanada's proposal to partially convert the natural gas mainline to oil could put cost and supply pressures on the Ontario market if not properly designed.³³

With low fuel costs and lower capital investment costs, natural gas can also help exert downward pressure on electricity prices. Natural gas can provide greater flexibility as well as long-term supply and cost certainty. Reliable and affordable electricity is a critical requirement for business and a major input cost. Increasing electricity prices make Ontario less and less competitive with our neighbours. Making greater use of Ontario's existing natural gas power plants could help reduce expected electricity price increases. With natural gas expected to remain so affordable, the use of natural gas for base load power should be seriously considered. This will reduce the burden on Ontario consumers and contribute to making Ontario's energy-intensive industries more competitive.



**ONTARIO MUST MOVE QUICKLY
TO COMPETE**

The U.S. economy is facing significant challenges, similar to those faced by Ontario: sluggish job growth, mounting debt and economic uncertainty. The U.S.'s five most energy-intensive industries - chemicals, pulp and paper, iron and steel, refining, and non-metallic minerals – consume approximately one half of the energy used in the industrial sector³⁴. President Obama's 2012 election platform committed to making the U.S. a magnet for manufacturing jobs. Obama's platform stated a goal of doubling U.S. exports by 2015 through the National Export Initiative and creating one million new manufacturing jobs domestically³⁵. This strategy, paired with the goal of reducing energy prices, is designed to ensure that the U.S. remains attractive to potential investors and job creators.

To date, this strategy has been relatively effective. Advances in environmentally sustainable shale gas extraction technology are supporting millions of jobs, boosting trade and contributing to a rebuilding of America's competitiveness around the world. Several American firms, including Caterpillar, GE and Dow, have announced that they are shifting manufacturing operations back to the U.S. due to increasing production and energy costs overseas³⁶. Many industrial companies in Europe are now planning to build new factories in the U.S. due to its low energy prices. Natural gas is playing a leading role in the repatriation of U.S. manufacturing jobs. North America's natural gas price advantage is proving itself to be a strategic advantage that Ontario needs to seize. Ontario's proximity to these same reservoirs of affordable, abundant natural gas, along with its strategic infrastructure assets, means that this province can also enjoy a resurgence of manufacturing jobs.



**IN ORDER TO ATTRACT AND
RETAIN MANUFACTURING JOBS
USING ONTARIO'S NATURAL GAS
ADVANTAGE, ONTARIO SHOULD:**

**Approve critical projects to ensure
security of supply**

To ensure continued security of supply, the Government of Ontario should provide policy and regulatory support for essential (privately funded and built) infrastructure projects.

First, there are a number of projects in planning or being built in the Western GTA by Enbridge, Union Gas, and TransCanada. When complete, these projects will ensure that there is adequate capacity to transport natural gas between Dawn and the GTA. This will:

- Relieve a growing bottleneck that threatens the ability to diversity and secure affordable natural gas supplies for Ontario.
- Assist in serving a growing demand for natural gas in central, eastern and northern Ontario, as well as Quebec and the U.S. northeast.
- Help to increase the diversity of natural gas supply (reducing dependence on declining supplies of western gas available to move east to Ontario) while supporting the development of new natural gas infrastructure in Ontario.

Second, it is essential to ensure that Ontario consumers and businesses have improved access to the Marcellus and Utica basins - reliable supplies of affordable natural gas. Improved pipeline transportation infrastructure is needed to support growing demand for clean-burning natural gas and to help offset the decline in traditional western Canadian supplies. Projects to connect the Dawn Hub to these growing sources of affordable, abundant natural gas are currently in the evaluation phase.

These and other important projects will require a number of regulatory approvals including OEB approval,

environmental assessments, and permitting from the Ministry of Natural Resources, the Ministry of Environment, the Ministry of Tourism, Culture and Sport and the Ministry of Transportation. The Ontario government should deal expeditiously with the regulatory applications for these time sensitive, critical projects. The government should focus on the critical supply changes taking place in North America and what Ontario needs to do and support to ensure diverse, secure and affordable natural gas supply access going forward. Municipal governments can also do their part to contribute to economic growth by ensuring that permitting processes proceed expeditiously on these time sensitive projects.

**Actively pursue companies in energy
intensive industries and those that use
natural gas as a feedstock**

In collaboration with the natural gas industry, the Ontario government should identify and pursue significant strategic investments that private sector players may consider making in Ontario as a result of the province's geographic location and access to affordable and reliable energy. Working together, industry and the government would identify companies who are attracted to Ontario due to its many advantages and are reliant on affordable natural gas as an energy source. Once a potential investment opportunity has been identified, it would be evaluated for its potential viability and impact on the economy. If a decision is reached to pursue the opportunity the province would activate a "one window team" mandated to pursue the opportunity. This team, led by a senior public servant, would be tasked with aggressively pursuing the opportunity utilizing existing government tools. It would be designed to co-ordinate and leverage the cross-functional strengths of Finance, Economic Development, Energy, and other departments. The one-window team would also assist the company in navigating the various licensing, regulatory and other approvals processes as well as provide advice on issues related to municipal, aboriginal and other issues generally associated with establishing or expanding large industrial footprints in Ontario.

SECOND BOLD PLAY: MAKING THE TRANSPORTATION OF GOODS AND PEOPLE CLEANER AND MORE AFFORDABLE

CNG VS. LNG³⁷



Compressed Natural Gas

CNG is stored on the vehicle in high-pressure tanks - 3,000 to 3,600 psi³⁸. A distinctive odour is normally added to natural gas to facilitate leak detection. Natural gas will typically dissipate in the case of a leak, providing a significant safety advantage compared to gasoline³⁹.



Liquefied Natural Gas

LNG is natural gas stored as a cryogenic liquid. Natural gas becomes a liquid at -160oC (-256 oF) LNG offers an “energy density comparable to petrol and diesel fuels, extending range and reducing refueling frequency”⁴⁰. There exists, however, a high cost of cryogenic storage on vehicles as well as the major infrastructure requirements of LNG dispensing stations, production plants and transportation facilities⁴¹.

THE OPPORTUNITY

Natural gas presents an exciting opportunity to reduce the cost and environmental impact of Ontario’s transportation fleets. With the decoupling of natural gas prices from oil and gasoline prices, natural gas now holds significant competitive advantages for powering heavy duty and large scale transportation vehicles. This has created new and emerging opportunities for liquefied natural gas (LNG) and compressed natural gas (CNG) to fuel heavy duty long-haul transport and return-to-base fleets.

Natural gas fuelled vehicles are quiet and clean compared to the fuels they replace; they use newly abundant supplies of natural gas, which is more affordable than conventional diesel fuel. Furthermore, the environmental and related health benefits associated with reducing emissions provide clear incentives for considering LNG and CNG transportation fleets⁴². Incenting the switch from diesel to natural gas for transportation will reduce GHG emissions and cut transportation costs for businesses and industry, making Ontario a more competitive and environmentally responsible marketplace.

Canada was an early leader in developing codes and standards for CNG vehicles, stations, and components⁴³. Canada has well-established CNG vehicle and station codes and the Canadian Standards Association (CSA) recently re-established the Committees that oversee these codes. Work is underway to review both codes, with updates expected later this year. Liquefied natural gas (LNG) vehicles and stations are new to the Canadian market. Industry and government are working to develop all necessary regulation. It is expected that Canada will soon have an LNG refueling station code, which will be added as an amendment to Canada’s existing industrial LNG code, *CSA Z276 – Liquefied Natural Gas Production, Handling & Storage*.

The development of an LNG vehicle code is currently under review by the CSA B109 Committee⁴⁴.

WHY IT MATTERS TO ONTARIO

LNG is already fueling hundreds of long-haul fleet vehicles in the U.S., and with the right strategy and collaboration between the private sector and government, Ontario could enjoy similar adoption and benefits. LNG is ideally suited to heavy duty long-haul vehicle fleets where significant, sustained horsepower is required to power the vehicle over long distances, something electric power, for example, cannot accomplish. The highway 401 corridor is the busiest highway in North America⁴⁵. Approximately 60% of Canada's road travelled trade with the U.S. occurs on this corridor.

There is also great opportunity to fuel marine shipping through LNG, as well as potentially rail locomotive applications. By contrast CNG is an ideal solution for on site and short-haul situations where vehicles return to base on a daily basis, for example garbage trucks, city buses and construction vehicles.

The conversion to natural gas vehicles is a proven, commercially available option for reducing carbon emissions using lower cost fuel. Notably, this provides benefits to both businesses and the environment, particularly as the price of oil and diesel rises; as such, it provides a 'win-win' scenario for government and policy-makers. The advantages to businesses with natural gas fleets are substantial: natural gas is up to 44% less expensive than gasoline and up to 45% less so than diesel. These decreased transportation costs for businesses would contribute to Ontario's economic competitiveness. There are approximately 100,000 Class 8 trucks in Ontario, with an annual turnover of 10% or 10,000 new vehicles each year. If even one in ten of those new vehicles were powered by natural gas, the fleet would grow rapidly.

Furthermore, a shift towards natural gas fueled transportation holds the promise of jobs and economic development. Demand for new engines is already creating opportunities in the manufacturing sector in the U.S. and Canada. Developing the fuelling infrastructure for natural gas vehicles would require a significant engineering and construction workforce, thereby also contributing to job creation in the province.

The conversion to natural gas vehicles could substantially reduce GHG emissions, positively impacting Ontario's environment. According to the Natural Gas Vehicle Alliance, the transportation sector is the second largest energy user in Canada, and accounts for 29% of Canadian energy demand and was responsible for 27% of Canada's greenhouse gas emissions in 2008⁴⁶. Furthermore, natural gas provides a significant carbon advantage, with a 20-25% lower lifecycle of greenhouse gas emissions when compared to traditional transportation fuels⁴⁷. The entire natural gas fuelling system is sealed, meaning that emissions will not evaporate while refueling, or contaminate soil or groundwater at station sites⁴⁸.

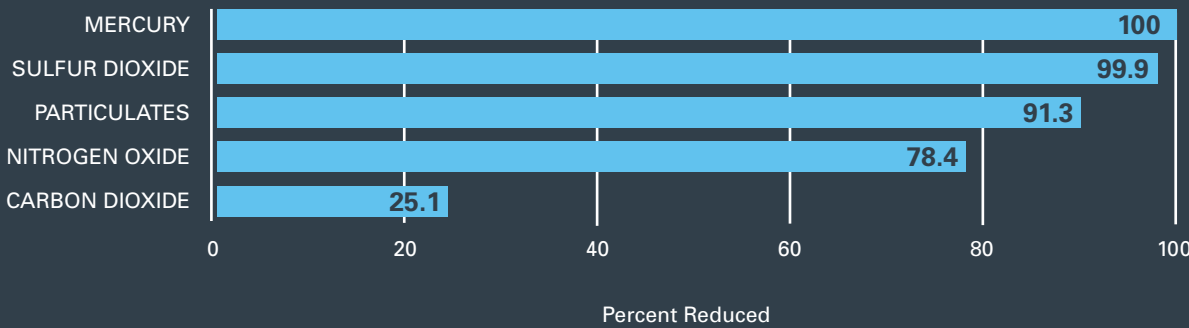


NATURAL GAS EMISSION REDUCTIONS AS A % OF GASOLINE⁴⁹

(Source: EIA)



Displacing 1 Gasoline Gallon Equivalent (GGE) of vehicle fuel with Natural Gas



THERE ARE A NUMBER OF BARRIERS TO THE IMMEDIATE ADOPTION OF NATURAL GAS VEHICLES. THESE INCLUDE:



A lack of LNG and CNG infrastructure

The Canadian Natural Gas Vehicle Alliance describes the lack of commercially -available LNG in Canada, coupled with very extensive underground natural gas distribution system as having limited “the development of LNG refueling station infrastructure in Canada”⁵⁰. There are currently only a handful of CNG fuelling stations in Canada, most not open to the public.

Ontario has just one LNG plant (out of four that currently exist in Canada). Located in Hagar Ontario, it is currently only producing LNG as part of the integrated natural gas LDC operations. Owned by Union Gas, an application is soon to be submitted to transform this plant and enable LNG to be provided for broader transportation fuel applications.

CNG refueling stations can be installed wherever there is a natural gas pipe in the ground, and refuelling facilities can be publicly accessible at retail sites or installed at private sites⁵¹. Canada has a network of approximately 80 public refueling stations located in five provinces, and there are currently seven public access CNG stations in Ontario.



Vehicle cost premium needs to be addressed

The cost premium for a vehicle to run on CNG or LNG instead of diesel can be as high as \$80,000 per vehicle for an LNG system in a heavy-duty truck⁵². This high price of entry has been a momentous barrier in the wider adoption of natural gas as a transportation fuel. Vehicle purchasers face another disincentive in the form of weight restrictions. CNG and LNG systems add weight to a vehicle, reducing the amount of cargo that a truck can carry while still meeting the total Gross Vehicle Weight (GVW) allowance on provincial highways. The government should seriously consider increasing the GVW for natural gas vehicles to remove this disincentive.

Key corridor infrastructure

Cost and a lack of CNG infrastructure are hampering the development of CNG service stations. LNG distribution infrastructure, on the other hand, is widely developed. The lack of refuelling infrastructure, however, is a key barrier to wider adoption of both technologies.

Inconsistent CNG Regulatory Requirements

Inconsistencies between provincial and territorial regulatory regimes for CNG vehicles have resulted in a weak overall system for the implementation of natural-gas powered transportation vehicles in Canada. Ontario has the strictest regulations for CNG vehicles and refueling stations relative to other provinces and territories⁵³; it indirectly references CSA B51-03 (Boiler, Pressure Vessel, and Pressure Piping code) in its provincial adoption of the National Fire Code and in its Technical Standards and Safety Act. Ontario also has additional regulatory requirements for compressed gas and certification requirements for conversion shop personnel⁵⁴.

With respect to refueling infrastructure, the provinces and territories are fairly consistent in terms of the relative strength of their regulations; nonetheless, Ontario has the most stringent regulatory requirements, referencing the Boiler Pressure Vessel and Pressure Piping Code in its Fire Gas and Propane Installation Code and the Propane Storage and Handling Code in its Technical Standards and Safety Act⁵⁵.

ONTARIO'S COMPETITORS ARE AGGRESSIVELY PURSUING NATURAL GAS FOR TRANSPORTATION

Leading vehicle manufacturers are pursuing natural gas vehicles in a variety of markets to reduce carbon emissions and environmental impacts while providing a cost-effective alternative to foreign crude oil. Natural gas is becoming increasingly attractive for transportation purposes, as the technology has greatly improved with respect to efficiency, affordability, and safety. Various U.S. states, including all of Ontario's direct competitor states, have put in place policy frameworks and supporting investment incentives to encourage the conversion of transportation fleets. The following illustration summarizes the initiatives in key competitor states⁵⁶.



THE INITIATIVES IN KEY COMPETITOR STATES

Michigan



Initiatives by the Michigan state government include:

- Tax exemption for properties used for high technology activities including those related to alternative vehicles;
- Permitting exemptions for natural gas storage and handling facilities; and
- Exemptions from emissions inspections for CNG, propane and electric vehicles.

Illinois



Initiatives by the Illinois state government include:

- Purchase and conversions incentives;
- Marketing opportunities for fleets using alternative fuels;
- School bus retrofit reimbursements;
- Alternative "Public Utility" definition for natural gas and electricity providers providing fuel for transportation; and
- Government fuel-efficient vehicle acquisition goals

New York



Initiatives by the New York state government include:

- Vouchers for CNG vehicles and grants for fuel stations;
- Exemptions from state sales and use taxes for CNG;
- Elimination of exclusivity agreements allowing franchisees to sell alternative fuels; and
- State acquisition requirements for alternative vehicles.

Pennsylvania



Initiatives by the Pennsylvania state government include:

- Purchase and conversion incentives;
- Grants for LNG and CNG stations; and
- Participation in multistate initiative to encourage natural-gas vehicle procurement.

Ohio



Initiatives by the Ohio state government include:

- Purchase and conversion incentives;
- Emissions reduction programs for heavy duty vehicles;
- Exceptions to gross vehicle weight provisions; and
- Requirements for state vehicles to use alternative fuels.

In Canada, a number of provinces have recognized that the use of natural gas to fuel transportation fleets is safe and cost-effective for business. Quebec has adopted tax measures which provide accelerated capital cost allowances on new trucks. The province's Assistance Program for Improving Energy Efficiency in Road, Rail and Marine Transportation (PEET) funded up to \$15,000 per truck for alternative fuel conversion until March 2013⁵⁷. The Quebec government recently announced they will subsidize 30% of the incremental cost for natural gas vehicles up to a maximum of \$75,000 and also invested in infrastructure for the "Blue Corridor," which will establish Canada's first liquefied natural gas-fuelled freight transportation corridor along the 20/401 highway between Quebec City and the Greater Toronto Area⁵⁸. In Alberta, the government updated infrastructure regulations to provide for increased weight allowances for LNG HD trucks on the road⁵⁹. The natural gas distribution company ATCO Gas has also allowed public access to its private fueling station in Lethbridge, inducing more consumers to use natural gas vehicles despite the limited availability of public natural gas infrastructure⁶⁰.

British Columbia has perhaps been the most active on the policy front in terms of embracing natural gas and its potential. In 2012, the BC government released

its Natural Gas Strategy which recognized that investments in natural gas vehicles will lead to economic growth and new jobs. To support the implementation of the natural gas strategy, the BC government enabled regulated utility companies to:

1. Offer incentives to transportation fleets that would use natural gas for vehicles such as buses, trucks or ferries;
2. Build, own and operate CNG fueling stations or LNG fueling stations; and
3. Provide training and upgrades to maintenance facilities to safely maintain natural-gas-powered vehicles⁶¹.

FortisBC established the FortisBC Natural Gas for Transportation Program based on the government's 2012 Natural Gas Strategy. FortisBC provides incentive funding of up to 80% of the difference in cost for eligible medium and heavy natural gas vehicles⁶². Similarly, the Clean Energy Vehicles for BC program offers \$5,000 in incentive funding for factory-built dedicated light CNG vehicles⁶³.

A made-in-Ontario natural gas strategy can help Ontario catch up to its competitors.



ONTARIO CAN CREATE THE POLICY ENVIRONMENT NEEDED TO UNLOCK PRIVATE SECTOR INVESTMENT

There are a number of actions the Ontario government can take to unlock private sector investment and promote the use of natural gas as a cost-effective and environmentally friendly fuel to power heavy duty and large-scale transportation fleets. In order to do this, the government should:

Promote natural gas as a policy direction for Ontario

The government should revise its energy policies to promote natural gas use, particularly in the transportation sector. Such revisions would give the province an opportunity to consider whether the role of natural gas should change in the coming years, and could promote utility companies delivering natural gas transportation programs for Ontarians.

The integration of natural gas initiatives into the provincial policy has occurred in British Columbia, with success. By formally recognizing the utility of natural gas vehicles in its provincial strategy, as well as developing private sector incentive programs, British Columbia has prompted several major trucking companies to begin seriously considering converting to natural gas.

The Ontario government should support policy that drives industry investment. Implementing policy that clearly indicates that the government is committed to increased use of natural gas will help to ensure buy-in from industry and the public, and signals to the private sector that their investments are aligned with the government's overall policy direction. This could include time-limited incentives, in the form of accelerated depreciation, to support the purchase of new CNG or LNG vehicles and the conversion of existing vehicles to use these fuels. This will promote investment and create jobs while providing the private sector with incentives to invest in this new fuel source.

Incentivize private sector investment in LNG liquefaction plants and LNG refueling stations

The government should also incentivize private sector investment in LNG liquefaction plants and LNG refueling stations. For instance, Ontario could join with the Province of Quebec and seek to mirror existing provincial legislation that provides incentives for the establishment of a "blue road" between Quebec City and Windsor, supporting the rollout of technologies designed to unlock emerging economic opportunities for fleet operators, while delivering a clear environmental win for the province in the process. Alternatively, the government could allow accelerated depreciation of fuelling equipment to spur development.

Harmonize regulatory approaches to natural gas vehicles and refueling infrastructure

Finally, the Government of Ontario could aid in the development of regulatory standards across the transportation industry which would remove barriers to adoption. A possible means of accomplishing this would be to adopt a common transportation code for the provinces, territories, and the federal government, which covers all of the areas specified in CNG and LNG. Such a common code would require a common set of mandatory certification requirements⁶⁴. Ontario could take a leadership role in national harmonization.

Another approach would be to agree on increased adoption of international standards for CNG vehicles, such as those developed by the International Organization for Standardization (ISO). The regulatory regime for CNG refueling infrastructure is less fragmented than it is for CNG vehicles, but there are differences with respect to the stringency of each jurisdiction's respective regulations. The adoption of a comprehensive code would be one possible way to ensure a more consistent, unified system of regulations for CNG refueling infrastructure.

THIRD BOLD PLAY: CONNECTING RURAL ONTARIO FAMILIES AND BUSINESSES

THE OPPORTUNITY

Although natural gas is taken for granted in urban Ontario, the majority of rural families and businesses are currently without access to this important energy source. Due to a lack of infrastructure, less than 20 percent of Ontario's rural residents have access to natural gas; instead, they must rely on oil, propane, or electric heat for homes and businesses, which comes at a significantly higher cost⁶⁵.

This absence of natural gas services in rural Ontario is a significant barrier to economic development for these communities. The inability to access this affordable energy source impedes a community's ability to attract business and benefit from economic growth; meanwhile, the extra costs borne by residents for energy in their homes limits their ability to contribute to the local economy and makes it tougher to make ends meet.

Given the low cost of natural gas relative to other fuel sources, un-serviced towns and villages throughout Ontario are expressing serious interest in finding ways to connect to natural gas. Union Gas has identified over 40 communities with populations of 500 or more which could benefit from improved access to natural gas. ⁶⁶Kincardine, Milverton, Bancroft and Marathon, among others, recognize the disadvantage of their current situation and acknowledge that natural gas would give them a competitive advantage in attracting and retaining businesses.

In surveys, large numbers of people say they would convert to natural gas⁶⁷. Supporting the expansion of Ontario's natural gas infrastructure to these communities would result in economic development, job creation, and a more affordable cost of living for rural Ontario, by giving consumers and businesses access to significantly lower energy costs.

In most cases, these communities would be connected to the natural gas pipeline grid. In some cases, however, it may be more economically viable to deliver CNG/LNG to a community by truck with local pipeline distribution. Both options should be studied.

WHY IT MATTERS TO ONTARIO

Rural communities are significant contributors to the Ontario economy. Rural Ontarians, however, are struggling due to a lack of employment opportunities and a relative decline in population, as more families move to urban and suburban centres.

Natural gas is North America's most affordable and versatile energy source. Expanding Ontario's natural gas infrastructure would encourage economic development in rural communities, and provide economic stimulus opportunities by significantly reducing energy expenses for business and families, reducing heating costs in agricultural and commercial sectors and boosting the competitiveness of these communities.

Expanded access to affordable natural gas in rural communities can deliver annual savings of more than \$40 million in energy costs to families and businesses. Compared to current energy costs, residential consumers in rural communities could save an average of 70-80% (\$1,500 to \$2,500) in costs per year by using natural gas for heat and hot water, depending on their current energy source. Savings for businesses are magnified, with some medium sized commercial businesses able to save up to \$15,000 per year.

As Ontario's rural communities are significantly removed from the existing natural gas system, they are not viable to serve under the current Ontario Energy Board (OEB) economic test⁶⁸. The OEB does not currently allow for medium or long term subsidization of new infrastructure by existing gas consumers, nor does it allow new assets to be treated as network assets⁶⁹. As a result, small communities are unable to access natural gas commercially, because they cannot pay the full freight for connecting to the existing natural gas system. Due to the great distances of these communities to existing natural gas infrastructure, they will not gain access to natural gas without significant economic support and/or the removal of the regulatory constraint that currently prevents the cross-subsidization involved in expanding the network from existing utility gas customers to new customers in rural regions⁷⁰.

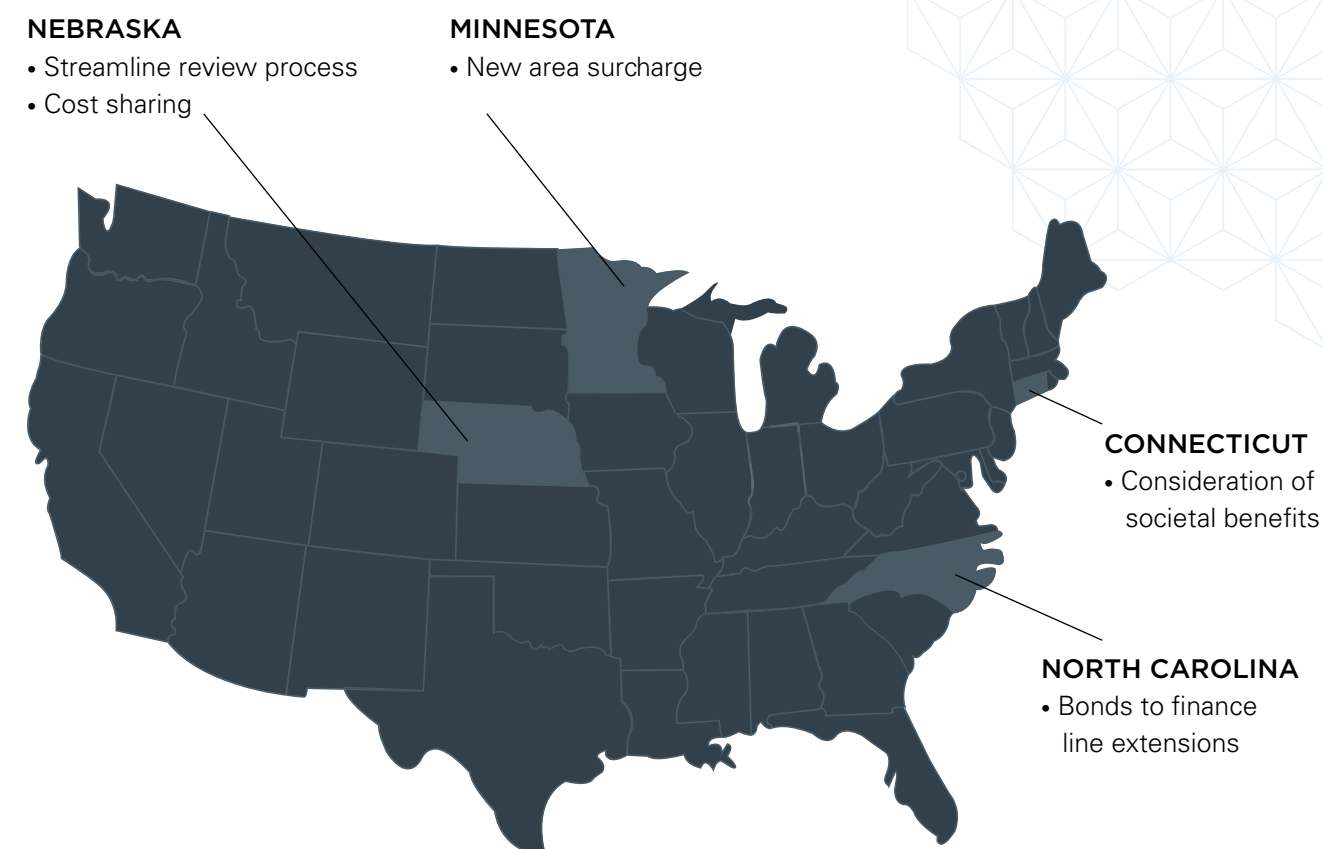
If all of Ontario is to benefit from the economic potential of natural gas, then rural Ontario needs to be connected.

OTHER JURISDICTIONS RECOGNIZE THE IMPORTANCE OF CONNECTING SMALL AND RURAL COMMUNITIES

Throughout the U.S., governments are realizing that switching to natural gas has the potential to save energy consumers substantial sums of money and contribute to a more robust economy and a cleaner environment. The low price of natural gas has sparked interest in growing the use of this energy source in the U.S., and "current and expected natural gas

prices make it economically sensible for more energy consumers to switch from oil or propane to natural gas⁷¹. "According to Dr. Ken Costello of the National Regulatory Research Institute, "from an operational standpoint, the integration of new lines into a utility's existing distribution network can lead to internal efficiencies ⁷²." These benefits can lower the average cost of a utility service. A summary of just a few U.S. initiatives to connect more Americans to natural gas are presented in the illustration below.

SELECTED U.S. MEASURES TO CONNECT RURAL COMMUNITIES



Minnesota⁷³

Throughout Minnesota, gas utilities have developed a New Area Surcharge (NAS) for new customers in previously un-serviced locations. This program was developed based on policy concerns that individual contributions could be so high that prospective customers may decide not to switch to natural gas, despite the fuel being the most cost- beneficial from a lifecycle perspective. To calculate the yearly surcharge, gas utilities take the present value of the annual difference between the expected and required revenue for a line extension and then divided it and charge it across the rate base. This provides for a gradual and affordable repayment of the capital and additional operating costs incurred to develop a new line⁷⁴.

Nebraska

Nebraska has passed legislation facilitating the expansion of gas lines into new areas, an initiative that was promoted as being about economic development. The legislation streamlines the regulatory review process and allows utilities to spread the costs of line extensions to all of their ratepayers. It requires the creation of line extension plans examining the economic effect on the area, economic feasibility, and other options that would better advance the public interest.

The legislation allows for several mechanisms to pay the cost of the line extension, including cost recovery from all of the utility’s customers if the plan promotes economic development in an un-served or underserved area. The legislation also allows remote municipalities fund line extensions for the purpose of economic development.

North Carolina

North Carolina legislation authorizes the issuance of bonds for natural gas extensions that are not economically feasible. It also allows for the creation of expansion funds for the extension of gas service to un-served areas. Gas utilities can apply the funds only to economically infeasible expansions.

This legislation facilitates the development of natural gas infrastructure in remote areas of the state where the economics would otherwise preclude development. Funds can come from a surcharge imposed on existing ratepayers, supplier refunds, or other sources approved by the regulator.

Connecticut

On June 14, 2013, Connecticut’s three gas distribution companies filed a plan to expand service to about 280,000 new customers over the next 10 years. The Plan is part of an effort to meet the gas expansion plans proposed in Governor Dan Malloy’s Comprehensive Energy Strategy (CES). Recognizing that “conversion to natural gas promises a cheaper, cleaner, and more reliable fuel for heating, power generation, and perhaps transportation”, the CES calls for an expansion of Connecticut’s natural gas distribution infrastructure to increase access to natural gas to potential new residential and commercial customers across the state over the expansion period.

To allow for this expansion, the CES includes consideration of societal benefits in economic modelling and a unique system expansion rate to recover a portion of the expansion driven revenue requirements from existing customers. New customers as of January 1, 2014 will be placed on a different rate schedule that, in effect, will have all its distribution rates increased by a pre-determined percentage amount. The percentage will be set in order to allow each class of customers to retain the majority of the differential between oil and gas prices. In this manner, the proposal allows new customers to recoup their initial investment over time, while still contributing a significant amount towards the cost of the necessary expansion of the gas system.

**ONTARIO CAN ENSURE THE
CONNECTION OF THOUSANDS
OF ONTARIANS WITH THE
STROKE OF A PEN**

The Ontario government should examine options and implement time limited solutions (for a period of five years) appropriate to specific circumstances to allow rural communities to be supplied with natural gas. This rural community economic development will benefit the entire economy as communities become more self-sustaining. A barrier to local economic development would be removed, and annual energy savings of up to \$40 million would be injected into the local economies. It is also a province-building strategy, providing energy choice for all Ontarians. Options include a combination of the following measures:

Direct Government Capital Contribution

The province could provide a direct financial contribution to the projects recognizing the economic development potential that the pipeline would bring to the community. For example, a commitment of \$200 million over 5 years would enable expansion to as many as 40,000 homes and businesses in over 40 towns and villages.

Provide direction to the OEB

The Ontario government could direct the Ontario Energy Board to treat new natural gas connections as network assets to allow for some greater level of cross-subsidization of expanding the network from existing utility gas customers to new customers in rural regions. This would be consistent with practices observed in jurisdictions such as Minnesota and Nebraska, where expansions can be bundled and funded through the full rate base. Any cross-subsidization model should keep impacts on existing customers minimal (approximately 1% or \$3.50/year for residential customers).

A tax based approach

The province could make a change in tax regulations that would allow municipalities to voluntarily forego pipeline related property taxes until such time as total economic contributions required for a project have been collected.

Extension of Local Improvement Charges

The province could support and promote the use of Local Improvement Charges in order to help municipalities finance their contribution to the expansion project even though the community and the customers would not own the pipeline asset. This mechanism could be used to fund both a municipal and a customer contribution to the projects.



FOURTH BOLD PLAY: EXPANDING SUSTAINABILITY THROUGH COMBINED HEAT AND POWER

THE OPPORTUNITY

Combined Heat and Power (CHP) is the simultaneous production of electricity and heat from a single fuel source⁷⁵. As an integrated energy system that can be modified depending on the needs of the energy user, CHP ensures superior power quality and reliability while avoiding unnecessary electricity transmission and distribution infrastructure builds. CHP plants are an energy efficient way to produce electric and thermal energy – excess outputs of heat can be used in adjacent buildings, while excess electricity can be sold⁷⁶.

The wider utilization of natural gas CHP systems would strengthen and secure Ontario's electricity system, better serving industry through increased energy security and relieving pressure on the grid. When considered alongside the rising price of electricity, installing natural-gas CHP systems are a cost-efficient means by which businesses can manage energy costs. The use of low-priced natural gas, rather than other energy sources, reduces input costs significantly, while the ability to use excess outputs enables producers to recuperate more of the costs of energy production and significantly increase efficiency. Should the government pursue CHP projects, it would relieve critical pressures on the grid while creating more impetus for businesses to locate in Ontario. Doing so will also help improve the competitiveness of energy-intensive businesses such as greenhouses.

WHY IT MATTERS TO ONTARIO

CHP can play an important role in meeting Ontario's energy needs, positively impacting local economies and supporting Ontario's policy goals. CHP systems can be used in a variety of ways, ranging from the residential scale to large-scale industrial systems⁷⁷. Common applications include:

- Industrial: chemical, pulp and paper, metallurgy, heavy processing, oil refining;
- Critical infrastructure: emergency services facilities, hospitals, water and wastewater treatment plants;
- Institutional: retirement homes, research institutions, government buildings;
- Commercial: hotels, airports, office buildings; and
- District energy: colleges and university campuses, urban centers, military bases⁷⁸.

A number of CHP projects developed in Ontario were driven by the need to increase power reliability and local energy generation. Recent CHP installations include the Windsor Casino (12 MW); the West End Community Centre in Guelph (0.2MW); London Health Sciences (11MW) and the Ferrero Canada in Brantford (5MW; currently under construction)⁷⁹.

BENEFITS OF CHP



Reduced costs and increased competitiveness for businesses

CHP systems help to reduce overall costs and increase business competitiveness for industry and institutions by enabling them to purchase electricity and heating jointly, rather than separately. In this way, CHP systems increase energy efficiency and improve cost management⁸⁰.

Not only do CHP systems offset the capital costs typically associated with the installation of boilers or chillers in new industrial construction, they also recapture the thermal energy emitted during electricity generation that would otherwise be wasted as byproduct⁸¹. In this, CHP systems provide significant savings to industrial users, eliminating the 4-9% of energy lost during conventional electricity generation and transmission.



Energy System Security

CHP systems would enhance energy security by reducing Ontario's energy requirements, and helping businesses be more durable in the face of energy price volatility and potential supply disruptions⁸². By allowing businesses and critical infrastructure to remain online in the event of outages, CHP systems deliver energy security not offered by the grid; furthermore, they increase the resiliency of energy infrastructure by limiting congestion and offsetting transmission losses⁸³.



Increased Energy and Environmental Efficiencies

As CHP systems produce fewer CO2 emissions and other pollutants – approximately 30% fewer CO2 emissions than a combined-cycle natural gas plant⁸⁴ – using CHP systems would help to advance the government's climate change and environmental initiatives in Ontario. Moreover, the integrated nature of CHP systems improves energy efficiency by recovering thermal energy that is normally expended in generation.

CHP systems also reduce the need for distribution infrastructure, as they localize electricity and heat into one system. This helps to reduce general infrastructure investment from the province, and provides locally generated electricity which can be used to address urban supply constraints.

While CHP holds strong economic and environmental promise, the Ontario Power Authority (OPA) seems to have frozen its Standard Offer Program (CHPSOP). The Ontario Power Authority (OPA) seems to have frozen its CHP Standard Offer Program (CHPSOP). In 2010, the OPA received a directive from the Minister of Energy authorizing the procurement of individually negotiated Combined Heat and Power (CHP) projects greater than 20 megawatts (MW) in capacity. Since then, CHPSOP has only made two awards and there are currently 42 applicants on hold⁸⁵. The new directive related to CHP for green-houses is a positive development, but there are further opportunities in CHP that are not being realized. CHP development is also complicated by the lack of a

standardized, transparent process at the LDC level for the Connection Impact Assessment required for any potential CHP project. This assessment establishes the safety and operational impacts of a customer's cogeneration plans on the LDC distribution system. Without a transparent process, potential CHP projects are subject to issues around response times, prioritization of requests, and fairness⁸⁶.

Lastly, CHP development is hampered by the lack of a stand-by rate which establishes a fair system charge to those not connected to the grid⁸⁷. While a stand-by rate is in the process of being developed by the OEB, until it is an appropriate rate is implemented, it will remain a policy barrier to CHP projects in Ontario.



OTHER JURISDICTIONS RECOGNIZE THE VALUE OF CHP PROJECTS

A number of jurisdictions are realizing the value of CHP projects and their ability to provide significant energy, energy system and environmental benefits. In the U.S., achieving greater use of CHP is consistent with President Obama's Executive Order 13626 – Accelerating Investment in Industrial Energy Efficiency, which calls for 40 new gigawatts of cost-effective CHP by 2020. Currently, the chemical industry in the U.S. has the largest share of CHP capacity at 29%, followed by the petroleum industry at 18%, and the pulp and paper industry at 14%⁸⁸.

The United States Environmental Protection Agency (EPA) has developed a CHP Partnership, which seeks to reduce the environmental impact of power generation by promoting the use of CHP⁸⁹. The Partnership works closely with energy users, the CHP industry, state and local governments, and other clean energy stakeholders to facilitate the development of new projects and to promote the environmental, economic and benefits of CHP. This partnership includes partner facilities in the industrial, commercial, district energy and institutional sectors, as well as project developers and equipment suppliers. Other relevant stakeholders include end users of CHP technology, financiers, utilities and other organizations that promote distribute degeneration⁹⁰. In 2012, the EPA CHP Partnership has more than 440 Partners dedicated to promoting and installing CHP, assisting 770 CHP projects and representing 5,700 megawatts (MW) of new CHP capacity⁹¹.

Here in Canada, two workshops have been held to discuss CHP. Early last year Alberta held a workshop hosted by the Canadian Gas Association and facilitated by Alberta-based C3. The workshop engaged representatives from provincial and municipal governments, utilities, technology providers and developers on the potential of CHP for Alberta.

The participants were tasked with identifying barriers, recommending solutions, and offering an action plan that would allow CHP to advance in 'MUSH' (municipal, university, schools and hospitals) organizations and the small industrial sectors⁹².

The CHP workshop concluded with a commitment from participants to work on action items to help make CHP a popular and viable option for meeting energy needs. The results of the workshop then formed the foundation for a second CHP Workshop to be held in Toronto in the fall of 2013⁹³. At the workshop, participants reviewed a step-by-step approach to develop a successful community energy plan and deploy district energy.



**POLICY CLARITY CAN UNLOCK THE
POTENTIAL OF CHP SOLUTIONS**

Ontario can increase the efficiency and sustainability of the electricity system by facilitating the utilization of CHP technologies. In order to do so, the government should:

Provide direction to the Ontario Power Authority (OPA) regarding Combined Heat and Power Standard Offer Program applications

The government should encourage the OPA to release the hold on the CHPSOP applications submitted in 2011 and begin awarding contracts for CHPSOP projects capable of connecting to the grid⁹⁴.

Standardize Local Distribution Companies' Connection Impact Assessments

The Ministry of Energy should develop a standardized process for the Connection Impact Assessment that is completed by LDCs to ensure a timely, fair and transparent process for approving CHP projects⁹⁵.



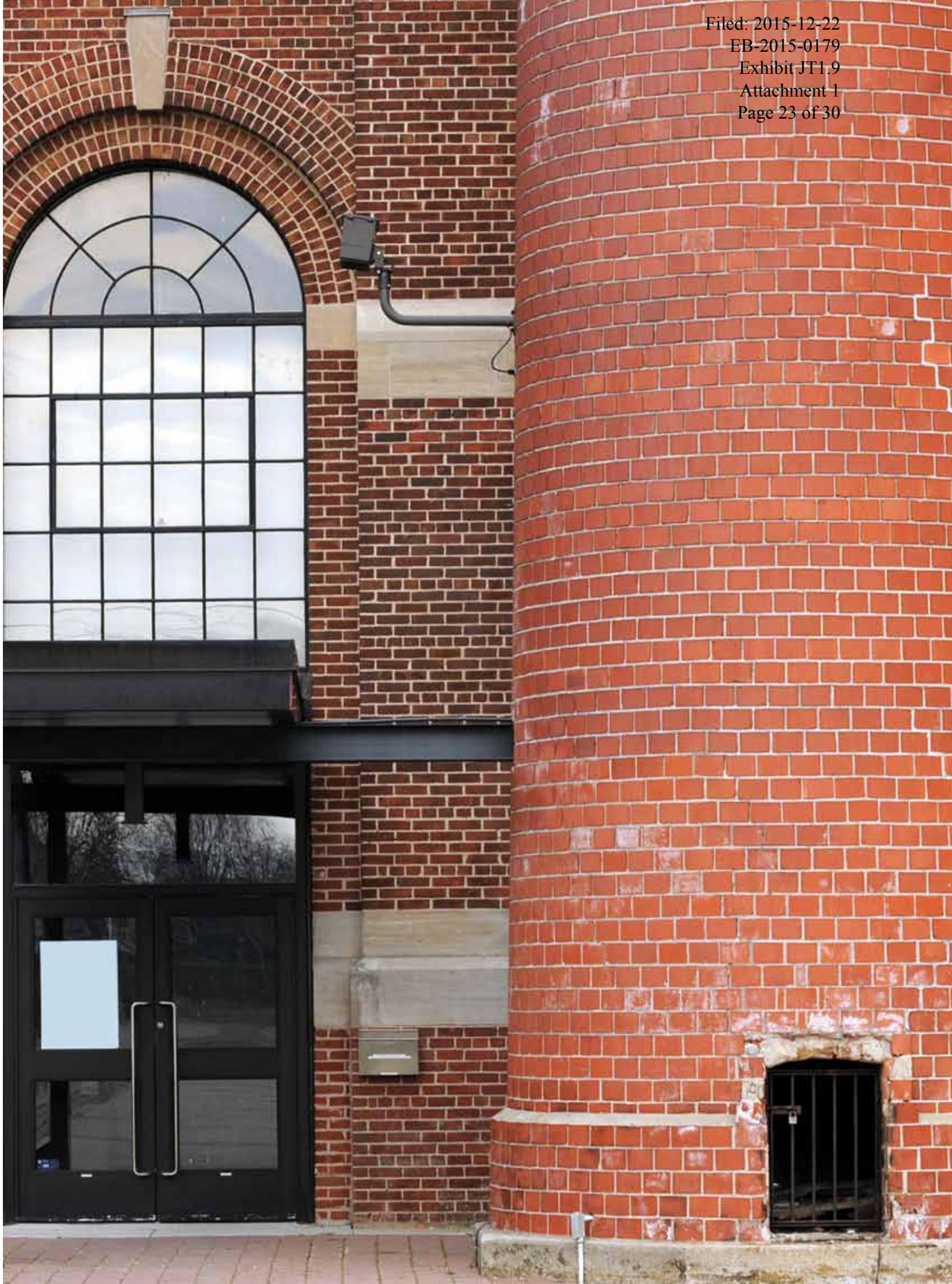
Work with the OEB to establish a fair and equitable stand-by rate

The OEB should establish a stand-by rate that is fair and equitable to ensure that CHP projects are not penalized for being off the grid. A key condition for the economic viability of CHP is that the avoided costs of purchasing electricity from the grid be greater than the capital and operating costs involved in building the facility. Although a customer may generate all or most of its electricity requirements with CHP facilities located on its own premises, it must have access to affordable standby services from the local utility grid. Excessive standby rates and other charges can upset this balance by adding to operating costs, negatively impacting the economics of CHP systems. The stand-by rates established by the OEB should be based on the following principles:

1. Contract demand or reservation charges should be small in relation to the variable charges for peak demand and energy;
2. Contract demand or reservation charges should be designed to reward customers for maintaining and operating onsite generation by giving them a strong incentive to use electric service most efficiently, to minimize the costs they impose on the system, and to avoid charges when service is not taken;

Increase government-industry coordination of CHP initiatives

The Ontario government should undertake efforts to increase coordination and knowledge of CHP initiatives, such as providing assistance for candidate sites by connecting entities looking to convert to CHP to industry partners, such as project developers and equipment suppliers. The U.S. EPA CHP Partnership performs this coordinating service in the United States; similarly, the Ontario government could help promote the use of private sector partnerships for CHP project assistance.



FIFTH BOLD PLAY: FUELING THE RING OF FIRE USING NATURAL GAS

THE OPPORTUNITY

The Ring of Fire is one of the most significant mineral regions in the province, and includes the largest deposit of chromite ever discovered in North America. Five hundred and forty kilometres northeast of Thunder Bay, the region is estimated to contain between \$30B and \$50B worth of minerals⁹⁶, providing jobs for decades to come.

Unfortunately, declines in commodity prices and the high costs of extracting the resources from the region are challenging the economics of developing the finds. Processing chromite and other minerals is extremely energy intensive. Rising fuel costs and difficulties in securing reliable and affordable electricity in an extremely remote region of the province are contributing to these high production costs.

Affordable, flexible and efficient energy can be part of the solution, helping to unlock the Ring of Fire by making production and processing affordable. The delivery of reliable, affordable natural gas in large volumes to this previously inaccessible region could act as a major catalyst for the large-scale transformation of a region with great economic potential for Ontario⁹⁷. It would also be more sustainable than the currently contemplated alternative – subsidized electricity.

WHY IT MATTERS TO ONTARIO

The Ring of Fire represents the greatest economic development opportunity for northern Ontario in several generations.

Currently, approximately 27,000 Ontarians are directly employed in metal mining, and 50,000 Ontarians are employed in jobs associated with mining processing⁹⁸. The mining sector is also the largest private sector employer of Aboriginals in Canada. Tapping into this opportunity would create jobs and economic prosperity in Ontario for decades⁹⁹.

Furthermore, the Ring of Fire is a tremendous investment that will bring tangible benefits for Thunder Bay and other communities in the Northwest, including First Nations communities in the Ring of Fire itself.

Electricity needs will grow as mining within the Ring of Fire develops, and natural gas can meet these demands as an affordable and abundant fuel. Natural gas electricity generation or cogeneration can be built quickly, at the scale required and where needed, avoiding the need for new electricity transmission capacity. Ontario’s advantage not only lies in having access to plentiful and affordable natural gas throughout the province, but also in having a modern and robust storage and transportation network, which creates a unique regional competitive advantage in the north.

THE RING OF FIRE CANNOT BE AN OPPORTUNITY LOST

Slumping commodity prices, environmental questions and delays threaten the Ring of Fire. A primary reason for the delays surrounding the Ring of Fire and other northern development projects is the unpredictability of future electricity costs, as well as a lack of infrastructure.

New energy infrastructure for the Ring of Fire is desperately needed to help ensure predictable future energy costs. Mining extraction energy use has grown 149% since 1990, making this sub-sector the largest industrial user of energy in Canada¹⁰⁰. The mining sector is extremely energy intensive, and faces major energy obstacles prompted by rising fuel costs, challenges in securing reliable and affordable electricity, and carbon policy developments. These challenges have already taken their toll on the Ontario economy: in 2010, Ontario’s high electricity rates caused mining giant Xstrata to move processing operations from Timmins to Quebec, taking 670 jobs along with it¹⁰¹. Without an established, effective energy infrastructure in northern Ontario, the Ring of Fire will be nothing more than a desirable, but unattainable investment.

The recent Cliffs proposal to develop the Ring of Fire relied heavily on subsidized Ontario electricity rates to offset the cost of energy-intensive chromite refining¹⁰². Although this may be a short-term solution, subsidization is unsustainable for long-term northern investment, and creates a significant burden on Ontario ratepayers and taxpayers. Furthermore subsidizing electricity adds to the unpredictability of energy in the province, and leads to uncompetitive electricity rates. Using natural gas as an affordable means of reducing fuel costs and increasing energy sustainability in the north will help to ensure that the Ring of Fire is a successful part of the Ontario economy.

A number of other jurisdictions have recognized the value that affordable natural gas brings to the development of mining sectors. In 2010, a report published by the Yukon Government’s Department of Energy, Mines and Resources identified that the Yukon’s energy requirements might soon surpass its existing renewable energy, particularly if new mines become operational¹⁰³. Citing the unpredictability of future diesel fuel prices, the report concluded that natural gas could meet the Yukon’s projected energy requirements for decades, and would be a low-capital, environmentally responsible alternative to other fuel sources¹⁰⁴. Since the publication of this report, the Yukon government has made changes to the Yukon Oil and Gas Act to allow for the handling, storage and vaporization of natural gas, and is planning to replace a number of diesel power generators with LNG¹⁰⁵.

In addition to being used as an alternative to diesel for Yukon’s energy grid, this natural gas resource will be used off-grid by mining companies that are too big or too far away to access Yukon’s energy power¹⁰⁶.

After almost a decade of paying the highest energy costs in South America, copper miners in Chile are analyzing the use and consumption of shale gas in their processes. Chile is particularly short of power in its northern regions, where much of the mining sector is located. The International Energy Agency (IEA) recently published a report stating that Chile has the third largest reserves of the unconventional fuel in South America¹⁰⁷. Chile has recognized the value of securing domestic sources of natural gas, and the Ministry of Energy is currently in discussions with a number of companies regarding the establishment of special petroleum operation contracts. Chile has also requested to purchase Canadian LNG to help grow its mining industry through affordable natural gas.

ONTARIO CAN SHIFT THE ENERGY PARADIGM TO UNLOCK THE RING OF FIRE

In order to unlock the opportunities in the Ring of Fire, the provincial government must forge partnerships with industry. Securing the natural gas energy infrastructure necessary to fuel new economic activity is a more sustainable solution than building electricity transmission capacity and subsidizing electricity prices. It will, however, require action from the government on two key opportunities:

Establish policy promoting the use of natural gas

Provincial policy should favour natural gas as an energy source for the mining sector's high demands in the Ring of Fire. Ontario should undertake a broader view and policy discussion surrounding LNG and CNG applications for mining development, expansion and operation in northern Ontario. New pipelines or LNG/CNG hubs (as LNG can be trucked to the mine sites) could provide flexibility and prosperity to the region without the need for added and expensive electricity generation or transmission

lines, and could offer widespread access and opportunity to a whole variety of northern communities and economic players.

Study the use of CNG/LNG fuelled cogeneration as an alternative to subsidized electricity to meet the energy needs of the Ring of Fire

Subsidizing electricity prices may help attract one company to Ontario, but it is not a sustainable solution, particularly if we want to exploit the vast potential of the Ring of Fire. CNG/LNG could offer an alternative solution to meet the significant energy demands of processing chromite and other minerals. This solution would avoid the need for large investments in transmission infrastructure.

It would also allow for greater flexibility, as cogeneration capacity can be developed quickly, as and where needed. Before making decisions that will subject Ontario ratepayers (including other industries struggling to compete with rivals in jurisdictions with low energy prices) to years subsidizing electricity, the government should consider the compelling natural gas alternative.



CONCLUSION: BOLD ACTION IS REQUIRED TO UNLOCK ONTARIO'S GROWTH POTENTIAL

Affordable North American natural gas is a significant competitive advantage that is already beginning to attract energy intensive industries back to North America. Ontario stands to benefit from this opportunity.

Energy is a key input for Ontario's prosperity. Energy intensive industries like petro-chemicals, steel, mining, and fertilizer production are scouring North America in search of attractive jurisdictions to expand existing production or site new operations, all because of access to affordable natural gas. The province's economic vitality – specifically, the ability to retain existing industry and business and attract new ones – depends in part on cost-competitive energy supplies, especially in relation to competitive regions in North America and internationally. Ontario's advantage lies not only in having access to plentiful and affordable natural gas, but also in having a modern and robust storage and pipeline network that creates a unique regional competitive advantage.

The natural gas price reduction is a North American phenomenon, which implies that there are major benefits to U.S. consumers and the U.S. economy. This means that the size of the U.S. economy will be increased and that U.S. price levels for almost all commodities and services will be reduced. Ontario stands to benefit from this phenomenon as well; however, Ontario requires bold action in which energy policy recognizes the role that natural gas can play to stimulate economic growth and jobs. Union Gas and others in the gas industry are doing their part to fuel Ontario's economy and seize these opportunities. Ontario must recognize and support the opportunity associated with natural gas in Ontario.

UNION GAS HAS DEVELOPED FIVE BOLD PLAYS WHERE THE UTILIZATION OF AFFORDABLE AND STABLE NATURAL GAS CAN STIMULATE GROWTH IN ONTARIO:

- Utilizing Natural Gas as a Strategic Asset to Attract Industry
- Making the transportation of goods and people more affordable
- Connecting rural families and businesses
- Expanding sustainability through combined heat and power
- Fueling the Ring of Fire

Through these opportunities, the increased use of natural gas will drive job creation and retention, economic growth, prosperity and greater competitiveness. With the economic, environmental and societal benefits that will come with the increased use of natural gas, Ontario can build a better future for its residents. All it takes is leadership and a sound strategy.



ONTARIO'S ECONOMIC RENAISSANCE
FUELLED BY NATURAL GAS

UNION GAS LIMITED

Undertaking Response
To Mr. Mondrow

To advise what Union recommended be included in the MOE directive; to file the documents describing the recommendations, if they are not already on the record.

Union provided program outline options for consideration in a meeting with Ministry of Energy staff in January, 2014. The material used in the discussion is provided at Attachment 1.

Rural and Northern Ontario Affordable Energy Infrastructure Program Program Outline Options

Filed: 2015-12-22
EB-2015-0179
Exhibit JT1.10
Attachment 1
Page 1 of 2

Total Investment	<ul style="list-style-type: none"> \$700M gross capital over 5 years Up to 47,000 customers in over 80 communities connected 	<ul style="list-style-type: none"> \$400M gross capital over 5 years Up to 40,000 customers in over 40 communities connected 	<ul style="list-style-type: none"> \$400M gross capital over 5 years Up to 40,000 customers in over 40 communities connected
Stakeholder	Option A	Option B	Option C
Expansion Area Customer	<ul style="list-style-type: none"> Construction contribution totalling \$1,000-\$2,000 through volumetric rate rider, plus Cost of converting equipment averaging \$3,500 		
Municipality	<ul style="list-style-type: none"> Minimum economic contribution (aid) valued at present value of pipeline tax contributions, collected up front or annually until communities meet economic thresholds, and credited against rate base when collected Option to provide incremental funding to improve project economics 		
Gas Utility	<ul style="list-style-type: none"> \$300M capital invested over 5 years 	<ul style="list-style-type: none"> \$200M capital invested over 5 years 	<ul style="list-style-type: none"> \$200M capital invested over 5 years
Government of Ontario	<ul style="list-style-type: none"> <u>Direct Funding: \$400M grant over 5 years</u>, and <u>Directives to OEB</u> to allow for: <ul style="list-style-type: none"> Cross Subsidization of new expansions from existing ratepayers provided resulting annual delivery cost impact is limited to <u>0.5% increase</u>, and Capital pass through to allow recovery in rates, including any expected municipal and customer contributions, prior to end of IR period, and Modified community and portfolio economic thresholds, and Expansion area customer construction contributions collected through a volumetric rate rider, applied until communities meet economic thresholds, and credited against rate base annually when collected 	<ul style="list-style-type: none"> <u>Direct Funding: \$200M grant over 5 years</u>, and <u>Directives to OEB</u> to allow for: <ul style="list-style-type: none"> Cross Subsidization of new expansions from existing ratepayers provided resulting annual delivery cost impact is limited to <u>1.0% increase</u>, (\$3.50/year for residential customers) and Capital pass through to allow recovery in rates, including any expected municipal and customer contributions, prior to end of IR period, and Modified community and portfolio economic thresholds, and Expansion area customer construction contributions collected through a volumetric rate rider, applied until communities meet economic thresholds, and credited against rate base annually when collected 	<ul style="list-style-type: none"> <u>Direct funding: \$100M grant over 5 years</u>, and <u>Directives to OEB</u> to allow for: <ul style="list-style-type: none"> Cross Subsidization of new expansions from existing ratepayers provided resulting annual delivery cost impact is limited to a <u>1.5% increase</u>, and Capital pass through to allow recovery in rates, including any expected municipal and customer contributions, prior to end of IR period, and Modified community and portfolio economic thresholds, and Expansion area customer construction contributions collected through a volumetric rate rider, applied until communities meet economic thresholds, and credited against rate base annually when collected

**Rural and Northern Ontario Affordable Energy Infrastructure Program
Program Outline Options**

Filed: 2015-12-22
EB-2015-0179
Exhibit JT1.10
Attachment 1
Page 2 of 2

Potential Community Screening Mechanisms

- Minimum community size(total number of homes and businesses), first come first served, provided project passes specified economic test threshold after applying a provincial contribution with a ceiling per home/business, or
 - Minimum community size), and following a formal application period each year:
 - Lowest provincial contribution (as % of gross capital) required to meet economic test threshold first, provided project meets specified economic test threshold after applying provincial contribution or
 - Rank order, largest to smallest community, after applying a provincial contribution with a ceiling per home/business, and provided project meets specified economic test threshold after applying provincial contribution
 - Economic test criteria could be set with slightly lowered requirements for larger communities in order to build a hybrid of these two options
- In all cases minimum community size thresholds could be reduced each year. Communities could improve their ability to compete for funding by coming to the table with additional contributions.

UNION GAS LIMITED

Undertaking Response
To Mr. Rubenstein

To provide the documents included in Energy Probe 1, Attachment (A).

Please see Attachment 1.

UNION GAS LIMITED

Undertaking Response
To Mr. Rubenstein

To provide the attachment to SEC 10 in its excel format.

Union provided an Excel version of the Attachment via email, copying the Board. The file calculates the environmental impacts of the Projects. Should any other interested parties wish to receive the document, please contact Union directly.

UNION GAS LIMITED

Undertaking Response
To Mr. Quinn

To provide the table with the underlying assumptions that led to the table, and also the mechanisms or means by which the data was gathered and included within the table.

The Tables below provide additional detail:

Estimated One Time Capital

Item	Capital Cost
CNG Compressor ¹	\$3,500,000 to \$5,369,893
4 CNG Trailers @ 0.35 million	\$1,400,000
CNG Decanting site	\$1,364,200
Distribution mains, services, and metering equipment	\$2,080,392
Total	\$8,344,592 to \$10,214,485

Estimated Incremental Annual Operating Costs

Item	Annual Cost
Electricity	\$39,483
Maintenance	\$29,383
Personnel	\$200,000
CNG Transport	\$71,840
Total	\$340,706

Cost estimates were developed with consulting and modeling support from Change Energy Services of Oakville, Ontario. Underlying assumptions for the above include the following:

- CNG Compressor - Mother Station sized with 500 HP and redundancy to meet the 452 GJ peak daily demand of the community and includes compressors, dryers, ground storage, land, loading rack and all necessary controls and safety requirements.
- CNG Trailers - based on steel tube trailer design (14 tubes per trailer) with net volume of 270,000 standard cubic feet/trailer at 2550 psig capable of meeting the peak daily demand.

¹ CNG Compressor Costs will vary with required fill time; three hour and 10 hour fill options are included above. Annual transport costs are based on larger compressor, and would increase beyond those shown with the smaller (longer fill time) compressor.

- CNG Decanting site – three lane Daughter Station with “back in” design including regulators, heaters, unloading rack and all necessary controls to accommodate the annual gas demand of 81,200 GJ.
- Distribution mains, services and metering equipment – based on total proposed project costs less the cost of 20.5 km of NPS 4 steel main less the regulating station costs.
- Electricity – based on the estimated annual power consumption of the compression and auxillary equipment at \$0.11 per Kwhr.
- Maintenance and Personnel – based on three staff to operate and maintain the equipment in accordance with all Technical Standards and Safety Association (“TSSA”) regulations.
- CNG Transport – based on the full cost (i.e. labour, fuel and equipment) of operating highway tractors to transport tube trailers between the CNG compressor and the decanting site.

UNION GAS LIMITED

Undertaking Response
To Mr. Aiken

To file an undertaking which mirrors Staff 1, with a number in place of the 68 million.

Paraphrased, this Undertaking requested a calculation of the total Aid-to-Construction (“CIAC”) required to meet a P.I. of 1.0 for the 29 Projects listed at Exhibit B.LPMA.16, Attachment 1.

The methodology was to have the length of term for the TES and ITE to be as proposed by Union (the term that meets a P.I. of 0.4 subject to a minimum for four years and a maximum of 10 years).

The total CIAC for the 29 Projects is \$88.0 million.

For clarity, the figures for Milverton, Lambton Shores/Kettle Point First Nation, and Moraviantown First Nation are based on the cost for the minimum design. These three Projects are the only ones with costs related to both a preferred and minimum design.

UNION GAS LIMITED

Undertaking Response
To Mr. Buonaguro

To calculate on a project-by-project basis how much implicit contribution is being funded as a result of .8.

Union assumes this Undertaking is requesting the calculation, on a project-by-project basis, of how much implicit contribution is being funded as a result of a P.I. of 1.0, not 0.8.

The calculations at a P.I. of 0.8 were provided in the response at Exhibit B.LPMA.13.

Attachment 1 reflects the response at Exhibit B.LPMA.13, Attachment 1 with a column added for a P.I. of 1.0.

Required CIAC Summary

		Min PI= 0.5	Min PI=0.6	Min PI=0.7	Min PI=0.8	Min PI=1.0
Row	Community Name	CIAC Required (millions)	CIAC Required (millions)	CIAC Required (millions)	CIAC Required (millions)	CIAC Required (millions)
1	Milverton					
2	Prince Township, Sault Ste Marie				\$0.32	\$0.86
3	Lambton Shores, Kettle Point First Nation					
4	Walpole Island First Nation- main commercial area	Removed from Application				
5	Moraviantown First Nation- main commercial area					\$0.06
6	Lagoon City (Orillia)				\$0.39	\$3.44
7	Hidden Valley/Huntsville				\$0.04	\$0.18
8	Santa's Village/Beaumont Dr, Bracebridge				\$0.11	\$0.27
9	Canal, Gravenhurst			\$0.10	\$0.26	\$0.46
10	Northshore Rd / Peninsula Rd North Bay			\$0.30	\$0.59	\$0.98
11	Hornby		\$0.23	\$0.41	\$0.53	\$0.69
12	Oneida First Nation			\$0.01	\$0.33	\$0.76
13	Auburn				\$0.06	\$0.17
14	Cedar Springs			\$0.05	\$0.18	\$0.34
15	Astorville		\$0.21	\$0.81	\$1.23	\$1.78
16	***Brennan Line, Severn Twp (Gravenhurst)					
17	Nipissing First Nation / Jocko Point		\$0.44	\$1.03	\$1.45	\$2.00
18	***Munsee Delaware First Nation					
19	Chippewa of the Thames First Nation- phase 3 & 4		\$0.06	\$0.17	\$0.25	\$0.36
20	Sheffield		\$0.07	\$0.20	\$0.29	\$0.40
21	Turkey Point		\$0.69	\$1.20	\$1.57	\$2.04
22	Rockton		\$0.16	\$0.28	\$0.37	\$0.49
23	Chippewas of the Saugeen		\$0.17	\$0.30	\$0.38	\$0.49
24	Washago	\$0.48	\$1.25	\$1.75	\$2.10	\$2.55
25	E Floral (T Bay area)	\$0.08	\$0.29	\$0.43	\$0.53	\$0.65
26	Haldimand Shores	\$0.16	\$0.37	\$0.88	\$1.01	\$1.19
27	Latchford, Tri Town	\$0.58	\$0.95	\$1.19	\$1.36	\$1.57
28	Belwood	\$0.61	\$1.71	\$2.43	\$2.92	\$3.57
29	Kincardine. Tiverton, Paisley, Chesley	\$1.90	\$15.74	\$24.57	\$30.83	\$38.88
30	***Little Longlac					
31	Swiss Meadow	\$0.24	\$0.40	\$0.51	\$0.59	\$0.68
32	Boblo Island	\$0.72	\$1.14	\$1.41	\$1.60	\$1.84
33	Village of Warwick	\$0.41	\$0.64	\$0.79	\$0.89	\$1.03
	Total	\$5.19	\$24.54	\$38.83	\$50.19	\$67.73

*** Project does not meet definition of Community Expansion Project so would not be eligible for reduced P.I. without additional project scope. Therefore no data has been provided in this Table.

Additional Notes:

- 1 Union's proposal includes a minimum term of four years and a maximum term of 10 years for TES and ITE.
- 2 It was determined what period of TES and ITE was required in order to arrive at the target P.I. If a 10-year term was used for TES and ITE and the target P.I. was not achieved, then the required upfront CIAC was calculated in order to achieve the target P.I.

UNION GAS LIMITED

Undertaking Response
To Dr. Higgin

To respond to questions file by Dr. Higgin on behalf of Energy Probe.

Please see Attachment 1.

Energy Probe Technical Conference Questions

1) Reference: Rate Matters

OEB Act Section 36 (1), (2) apply and possibly and (4)
[36 (4) conditions and rules respecting calculation of rates]

- a) Can you clarify if as well as rates under 36 1 and 2, Union is applying under Section 34 (4) for conditions and rules respecting calculation of rates.
Specifically the subsidy, the TES (and possibly ITE unless this is deemed a contribution not a rate.)
 - b) Please explain how this will be implemented.
 - c) Provide a sample Rate 1 Rate Schedule
 - d) Show the customer expansion surcharge (rate subsidy) and
 - e) Show for those in the communities the TES rate of 23c/m³
 - f) For both show the disposition of the TES/ITE revenues
-

Response:

- a-b) Section 36(4) is a provision to provide the Board with the power to establish conditions etc. in setting rates under section 36. It is ancillary to any request made in respect of Section 36(1) and (2). Therefore, section 36(4) would apply as determined by the Board in approving Union's request under section 36 of the Act, which is the provision under which Union makes its Application.
- c-f) Please see Attachment 2 for a sample Rate M1 rate schedule including the impacts of the Community Expansion Project proposal. The Temporary Expansion Surcharge ("TES") and the Temporary Connection Surcharge ("TCS") will be identified on the Rate 01, Rate 10, Rate M1 and Rate M2 general service rate schedules. The volumetric charge of 23 cents per m³ is applicable to customers of a qualifying Community Expansion Project (the TES) or to customers of a qualifying small system main extension (the TCS). Customers who qualify for the TES or TCS will see an extra line item on each monthly bill, labelled "*Temporary Expansion Surcharge*" or "*Temporary Connection Surcharge*". Union proposes to record revenue from the TES in the proposed Community Expansion Contribution Deferral Account, as per Exhibit A, Tab 1, Appendix G, p. 2. Union also proposes to include revenue from the Incremental Tax Equivalent ("ITE") in the Community Expansion Contribution Deferral Account.

The forecast net revenue requirement will be included in the distribution rates of in-franchise customers and in the transportation rates of ex-franchise services. Union will include the forecast net revenue requirement of specific Projects in its annual rate filing application in accordance with the Board-approved 2014-2018 Incentive Regulation ("IRM") Application in the year following the approval of the specific Projects. Union proposes to record variances

between the forecast net revenue requirement approved in rates and actual revenue requirement for all Community Expansion Projects in the Community Expansion Project Costs Deferral Account, as per Exhibit A, Tab 1, Appendix G, p. 1.

Union proposes to dispose of the balance in both deferral accounts as part of its annual non-commodity deferral account disposition proceeding. Upon approval in the non-commodity deferral account proceeding, Union will reflect any credit or charge from these deferral accounts with the net impact of all deferral accounts in that proceeding in the “Delivery Price Adjustment” line of the general service rate schedule and on general service customer bills. Credits or charges to contract rate customers will likely be addressed through a one-time adjustment consistent with the disposition of previous deferral account balances.

Policy Questions.

Reference: Exhibit B. Energy Probe.4 and Exhibit A, Tab 1, Appendix H-Distribution New Business Guidelines Exhibit B.Energy Probe.18

Preamble: It is important for us to understand Union's policy position that a review and changes to E.B.O. 188 Decision and Guidelines is warranted.

2) Reference: Exhibit B.Energy Probe.4 E.B.O 188

a) Union believes the intent of the E.B.O. 188 Decision to "hold other customers harmless from the cost of new connections"¹ specifically related to communities that currently do not have access to natural gas warrants review. Union believes the recent provincial policy position supporting extension of natural gas infrastructure to additional rural and northern communities ² are an appropriate reason for this review.

Is it also Union's position a review is also required for EBO 134 that was Issued 10 years earlier and which Union relies on to justify major transmission and Compression projects for System Expansion, often with PIs less than 0.5 ??

Response:

Union's Community Expansion Proposals are intended for distribution projects only. As a result, E.B.O. 134 which deals with pipelines used for ex-franchise gas transportation is not relevant to this Application.

- 3) Reference: Exhibit A, Tab 1, Appendix H-Distribution New Business Guidelines Exhibit B.Energy Probe.18
- a) Confirm Union's changes to Distribution New Business Guidelines (Appendix H)- are proposed to apply to all System Expansion projects.
 - b) Accordingly confirm if Union is proposing to Change the E.B.O. 188 Guidelines for all Projects as opposed to just Community Expansion exemptions as requested in the Application
 - c) Please explain what are the criteria for separating the EBO 188 Investment Portfolios and Rolling Portfolios. Please list these Criteria
-

Response:

- a) Union's changes to the Distribution New Business Guidelines are proposed to apply to all Distribution system expansion projects. They will not apply to systems used for ex-franchise gas transportation.
- b) Union is proposing exemptions to the E.B.O. 188 guidelines for Community Expansion Projects only, not for other distribution expansion projects.
- c) Both the Investment Portfolio and Rolling Project Portfolio are separated by rate areas which correspond to the former Union (South and West) and Centra Gas Ontario (North and East) franchise areas. The rationale for maintaining separated portfolios in this manner is that the rate schedules differ and the cost allocation methodologies for the areas are distinct from each other because of the high reliance on TransCanada Pipeline transportation service and the absence of underground storage in the northern and eastern areas. Because the intent of both the Investment Portfolio and Rolling Project Portfolio is to help manage the short and long term rate impacts of expansion, it is necessary to maintain distinct portfolios for both areas.

4) Reference: Turn up the Response to SEC 5 that's Exhibit B SEC.5 and page 3 of that Exhibit

These recommendations show major differences to the as filed evidence and IRRs including Exhibit B CCC 8 and several other places

- Minimum PI (natural?) 0.6-0.4
- Separate Portfolios for CE Projects as opposed to applying new Business Guidelines to all projects

Follow up

Were these revisions put to the Union Board? If so provide the relevant materials and Approvals. If in Evidence (e.g. Adobe page 586) please identify specific documents

Response:

The document referenced was a presentation used to guide discussion with the Steering Committee that provided oversight to Union's Community Expansion proposal development. Several Union executives were members of the Steering Committee. The approval to proceed emerged from the dialogue at that meeting and as such there are no additional materials to share.

These changes in approach that Union adopted as an outcome of this discussion included adjusting the proposed minimum P.I. to 0.4 from 0.6 plus requesting an exemption from inclusion in the Investment Portfolio and Rolling Project Portfolio as opposed to lowering the minimum P.I. thresholds for each. These changes were not reviewed by Union's Board, and there was no expectation for them to be reviewed.

5) Reference: CIAC vs Revenue (CIAC vs TES) Exhibit B.Energy Probe 5 and Exhibit B.LPMA.1

c) The TES and ITE treated as revenue is a foundation of Union's proposal and if treated as an aid, an alternative financial proposal would be required.

Treatment as an aid would slightly decrease the 40 year assessment of the revenue requirement relative to Union's proposal although this would not occur until 20 plus years after in service.

Union then provides an illustration of the two approaches in Figures 1 and 2 of the LPMA 1 Response

The Follow up Questions relate to the CIAC/TES approach extending the analysis from Milverton illustration to all 4 projects

For the Initial 4 projects what would be the incremental Utility Rate base and Net fixed Assets under the two proposals and how would Union's return on assets vary over the 40 year horizon. Please Tabulate and Graph the information and discuss the result

Response:

Upon further clarification from Dr. Higgins, the request is to create a schedule and graph to show the Return on Assets for the Milverton Project on the basis of the TES/ITE as revenue and an alternative as an aid.

The Attachments filed with Exhibit B.LPMA.1 provide the data and the information required is from Line 7 from each of Attachments 2 and 3 of Exhibit B.LPMA.1.

Attachment 3 provides the data requested. The shape of the graph is consistent with the graphs provided in the response to Exhibit B.LPMA.1.

Union's proposal for the TES/ITE to be treated as revenue is described in the response to Exhibit B.LPMA.1. The request to chart and isolate the return component does not provide a ratepayer perspective. The more relevant comparison is the total cost to be paid by ratepayers and this is described and charted in the response to Exhibit B.LPMA.1 where the year-by-year and cumulative NPV of the cost is identified.

The Milverton Project has a capital cost of approximately \$4.925 million. The cumulative difference of the revenue requirement after 40 years is \$0.236 million which can be found at Exhibit B.LPMA.1, Attachment 1, Line 12, Year 40. Overall the difference is not material at about 4.8% (236/4925) given that the difference is over 40 years. Notably ratepayers are better off for the first 23 years under Union's proposal.

6) Reference: Summary of Contributions to costs
Attachment 2 Energy Probe 14

Response shows a table that shows the “net present value of contributions to 4 initial projects”

Please provide following details of the calculations.

Is the NPV calculated in the same way as the Stage 1 NPV?(-10 year connections and 40 year cash flow?) Clarify.

Can we reconcile the numbers to Exhibit A Tab2 Sections ABCD where Union provides the PI/NPV calculations for the 4 initial Projects. If not, why not?

Input Assumptions- discount rate, time frame, basis of Revenue Requirements i.e. Rate Base etc.(e.g. Discounted values are based on 5.10% per year, which is Union’s after tax weighted average cost of capital (“WACC”) used in the discounted cash flow analysis.) (LPMA 16)

Can we rely on these numbers to indicate the NPV of the Contributions of the parties to the CES Plan?

New Customers and municipalities \$8.44 million
Existing Customers \$4.34 million
Provincial and Federal Governments 0

Also please provide an Exhibit that shows for the 4 projects the Total costs and Proposed shares in both DCF/NPV and in actual 2015 dollars.

Response:

Paraphrased, the request is to confirm if the assumptions and inputs are the same in the following references: Exhibit B.Energy Probe 14, Attachment 2 and Exhibit A, Tab 2, Sections A,B,C and D.

The chart in Exhibit B.Energy Probe.14, Attachment 2 has two key differences from the DCF found in Exhibit A, Tab 2:

- 1) The revenue forecast in the DCF’s in Exhibit A, Tab 2 are based on the “distribution” portion of the customer rate and the revenue figure in the Exhibit B.Energy Probe.14 response is based on the full revenue from the customer. For a Union South residential customer the distribution portion is approximately \$308 per year out of a full revenue figure of \$335 per year.

- 2) The cost of the preferred design is used in the Exhibit B.Energy Probe.14, Attachment 2, and the minimum design is used in the feasibility DCF in Exhibit A, Tab 2.

These two differences were applied in order to respond to the Exhibit B.Energy Probe.14 “*who will pay how much*” of each Project. The preferred design is used in the Exhibit B.Energy Probe.14 response as this is what will be actually built and the actual revenue from the customers would be the full revenue (the \$335 as illustrated above). The appropriate figures for the DCF feasibility are the minimum design and the distribution portion of the customer revenue.

For comparability, please see Attachment 4 which is a revision to Exhibit B.Energy Probe.14, Attachment 2. It includes a second chart that shows the same request without the two changes noted above.

In all other respects the methodology and parameters are the same.

7) Reference: Capital Pass Through Mechanism. Exhibit B.SEC.20

Union has Confirmed the CE proposal does not meet the requirements under the IRM and the CPM agreed to in the IRM Settlement Agreement.

- a) Why cannot Union not Manage CE projects under the IRM Plan in the same way as the other System Expansion projects in 2013, 2014 (and 2015?) totalling \$145.8 million (and adding 41,400 new customers) (Exhibit B Energy Probe13), Please explain.
- b) Why does Union need approval for Incremental Capital Recovery?
- c) Is the CE CPM a Z factor under the IRM? If so explain why.

Response:

- a) Union has indicated that the Community Expansion proposal meets the intent of the incentive regulation (“IRM”) capital pass-through mechanism (“CPM”), although it does not, and was not intended to, meet each of the specific CPM requirements under the IRM. For that reason Union is proposing a separate and unique capital pass-through mechanism related specifically to Community Expansion Projects.

Other system expansion projects, as summarized in Exhibit B.Energy Probe.13, will continue to occur through the period in which a Community Expansion Program takes place. Over the 2012 to 2014 period, Union added an average of 20,663 customers at a capital cost averaging \$72.3 million each year, all managed within Union’s IRM framework. Projects undertaken within this envelope include servicing new subdivisions, customers converting and attaching where current mains already exist, and short main extension projects as referenced at Exhibit B.Staff.15. In the next few years Union expects to continue adding similar numbers of customers each year, at a similar cost, independent of the Community Expansion proposal. Union will continue to manage costs for these “business as usual” additions within the IRM framework.

The Community Expansion proposal would be in addition to the “business as usual” customers Union expects to add to its system absent that proposal. The potential capital of \$135 million over several years for Community Expansion Projects would be in addition to approximately \$72 million each year managed within Union’s IRM framework.

Since Community Expansion Projects were not anticipated at the time the IRM framework was finalized, the parameters or criteria defined for the CPM were not designed with a Community Expansion Program in mind. The potential capital of \$135 million for a Community Expansion program cannot be managed within Union’s IRM and Union would not proceed with the program without reasonable certainty of cost recovery.

b) See response to part a) above.

c) No. The CPM for Community Expansion is not a Z factor under the IRM, because Union is proposing a separate and unique CPM related to Community Expansion Projects.

8) Reference: Conversion Costs and Connection Rates
Exhibit B Energy Probe 10

This shows Conversion costs for both space and water heating

- a) Why is Conversion from Propane forced air to natural gas so expensive at \$1525?
- b) Please provide Technical details/assumptions
- c) Why are Water Heating Conversion costs so High at \$1500
- d) Why not assume \$26/month Rental Water heater as noted here and in other evidence (e.g. EP 8)
- e) What use is made of the \$4000 average and \$1500 conversion costs in Calculating TES and in Customer attachment forecasts?
- f) Please provide a flow chart that shows how these costs flow into these calculations.
- g) Recalculate the customer conversion payback.
- h) Recalculate the TES period and/or rate with revised propane conversion costs.

Response:

a) Union has assumed that:

- 75% of propane furnaces are dual fuel (propane and natural gas) certified and that they can be converted at a cost of \$700 each.
- 25% of propane furnaces are either not dual fuel certified, or they are old enough that replacement of the furnace will make more sense to the customer than converting. In these cases Union has assumed a replacement cost of \$4,000.

The \$1,525 is the weighted average cost for these two figures ($75\% \times \$700 + 25\% \times \$4,000$). Union is aware that a high proportion of installed furnaces are dual fuel certified. However, the research conducted for the Lambton Shores, Milverton and Prince Township Projects indicated that between 11% and 13% of the consumers in those areas currently have propane forced air systems that are 16 or more years old¹. Union expects in many of these cases that the units will be replaced rather than be converted. The 75% conversion proportion, then, is a conservative figure; it is likely that if the projects represented by this research are representative of other future project areas, that something closer to 88% of propane furnaces can be converted rather than being replaced. In this case the cost of propane furnace conversion/replacement would be estimated at \$1,096 ($88\% \times \$700 + 12\% \times \$4,000$).

b) To convert a furnace from propane to natural gas, typically the manifold orifices need to be replaced or drilled out with larger holes, and the spring in the gas valve needs to be replaced to enable a lower manifold pressure. Union estimates that in these cases, conversion might

¹ Exhibit B.Staff.11, Attachment 1, p. 6, Attachment 2, p. 6, and Attachment 3, p. 6.

require a two hour service call to install a conversion kit. Total cost for this would be less than half of the \$700 Union estimated above. However, in some cases Union believes that the gas fitter may find it necessary to replace the gas valve rather than replace the spring in the gas valve. For this reason, Union assumed the gas valve replacement would be required. This leads to a conservative estimate of \$700 for conversion costs.

- c) Water heater conversion costs are estimated at \$1,500 because in most cases, the water heaters currently existing are electric, so the units will have to be replaced as opposed to being converted from propane. Union's 2011 Market Share Study² found that 74% of the non-gas consumers currently have electric water heaters in areas where homes did not have access to the natural gas system. Because electric water heaters cannot be converted to natural gas; they will have to be replaced with a gas unit. A new 50 U.S. gallon power vented water heater, which is very common for new customers, retails for \$900-\$1,000³. The unit must be installed, natural gas piping extended to it, and plastic venting installed to transmit the vent products outside the house, which leads to Union's \$1,500 per unit estimate.
- d) Union has not assumed any preference for renting a water heater over purchasing a water heater because it's not clear that in all areas in which Union is proposing Projects that the rental option is available. The research conducted for the Lambton Shores, Milverton and Prince Township Projects⁴ indicated that between 79% and 88% of the consumers in those areas currently own their water heaters. Based on this there may be a high preference for owning as opposed to renting a water heater in those areas.
- e) The equipment conversions costs are a key factor, along with estimated annual energy savings, in determining a TES rate that would enable a simple payback for a typical residential customer's equipment conversion/replacement within the proposed timeframe of less than under four years.
- f) Exhibit A, Tab 1, Appendix E demonstrates how the TES rate is calculated. From this schedule, the TES rate calculation is as follows:
- $$(((\text{Payback years}) \times (\text{Estimated energy savings}) - (\text{Equipment conversion or replacement cost})) / \text{payback years}) / (\text{estimated annual consumption}) = [\text{TES Rate}].$$
- g)
- i. A recalculated payback period incorporating the following assumptions is provided in Table 1 below.
- Estimated Propane heating equipment conversion or replacement costs of \$1,096 as noted in a) above;

² Refer to Exhibit B.Sec.9, Attachment 1, p. 10.

³ Current unit price of \$945 at Home Depot, and \$959 at Home Hardware, sourced from their respective web sites as of December, 2015.

⁴ Exhibit B.Staff.11

- Water heater rental costs of \$26.00 per month; and
- All other assumptions from Exhibit A, Tab 1, Table 2.

Table 1: Payback Period at \$0.23/m³ TES Rate, Including Monthly Water Heater Rental

(a) Payback Period (Years)	(b) Annual Consumption (m ³)	(c) Annual Energy Savings	(d)=(a)x(c) Total Energy Savings	(e) One Time Conversion Cost	(f)=(d)-(e) Net Savings	(h)=(e)/(a) Net Savings /Year	(i)=(h)/(a) *Net Savings /m ³
5.09	2,200	\$1,602.01	\$8,154.22	\$5,579.60	\$2,574.62	\$505.82	\$0.230

* Net Savings per m³ equates to the minimum equivalent TES price to enable simple payback within the desired payback period

The payback period would be extended to just over five years after application of the above assumptions. This is not a material enough change that it would cause Union to adjust the proposed TES rate.

- ii. Union is also aware of concerns expressed by Canadian Propane Association (“CPA”) that propane energy savings in its proposal have been based on auto propane prices as opposed to propane prices for home heating use. Although as noted at Exhibit B.CPA.2, Union is not aware of a publically available and reliable source of non-automotive propane prices that span its franchise areas, in order to determine any material impact on Union’s proposed TES rate, Union applied a recent price of \$0.451/litre for Union South, sourced from a local supplier⁵. For Union North, Union applied the historic premium for automotive propane prices in Thunder Bay area over the London area of 15.5%, sourced from data provided at Exhibit B.CPA.2, Attachment 1. The propane cost reduction would result in annual savings of converting from propane at \$688, in comparison to an average of \$1,683 used in Exhibit A, Tab 1, and weighted average savings from all conversions of \$1,453.

This comparison does not incorporate annual natural gas bill reductions approved or proposed for rates in July 2015, September 2015, or January 2016. These annual bill reductions equate to \$54.21 in Union South and \$79.63 in Union North. In addition, oil and propane prices are at recent historical lows, and are projected to increase to a certain extent as shown in the forecast from the U.S. Energy Information Administration at Exhibit B.Energy Probe.5.

A recalculated payback period which includes an adjustment for historically low reduced annual propane savings, along with the assumptions for Table 1 above, is provided in Table 2 below.

⁵ Edpro Energy web site, Zone 2 (London area) price as at December 8, 2015 for an annual volume of 2,500 to 4,499 litres.

Table 2: Payback Period at \$0.23/m³ TES Rate, Including Monthly Water Heater Rental and Adjusted Annual Propane Savings

(a) Payback Period (Years)	(b) Annual Consumption (m ³)	(c) Annual Energy Savings	(d)=(a)x(c) Total Energy Savings	(e) One Time Conversion Cost	(f)=(d)-(e) Net Savings	(h)=(e)/(a) Net Savings /Year	(i)=(h)/(a) *Net Savings /m ³
6.28	2,200	\$1,452.72	\$9,123.08	\$5,950.88	\$3,172.20	\$505.13	\$0.230

* Net Savings per m³ equates to the minimum equivalent TES price to enable simple payback within the desired payback period

The payback period would be extended to just over six years after application of the above assumptions. In cases where a propane furnace can be converted rather than replaced, even when a rental natural gas water heater is included in the conversion costs, customers would still see a simple payback period of under four years. As well, propane prices are expected to increase as noted above. For these reasons, Union does not believe the changes in annual savings are of sufficient magnitude that it would be necessary to adjust its proposals for the TES rate.

- h) In order to maintain a four year simple payback period, the TES rate would have to be reduced to \$0.13 per m³ based on the assumptions in part g) i) above. Union does not recommend changing the TES rate from the proposed level of \$0.23 per m³ because it has been tested with consumers in three Project areas at a similar level (approximately \$450 per year for up to 10 years), and that level was found to be acceptable by many of those consumers.

9) Reference: Exhibit B. Energy Probe.6

- c) Union has a suite of DSM offerings available for customers, as detailed in its 2015-2020 DSM Plan (EB-2015-00291). Union did not take these programs into account when estimating the impacts of its proposals, however, Union believes they would marginally increase savings available on average, but would not materially affect the impacts.

Follow up Questions

- a) Why is Union not targeting new CE customers to use the DSM Programs as a part of the customer connection plan?
- b) Does Union believe that promoting retrofits would be in the spirit of IRP?
- c) Based on Union's analyses for its DSM Program (HOT 2000 or equivalent), what is the average fuel savings for homes with the same profile of the stock in the 4 communities. Provide the assumptions used.
- d) Please provide revised profitability scenarios with a Conservation First approach for the 4 communities. List all assumptions for the analyses including the revised period of the TES. Please discuss the results.

Response:

- a) It is in Union's interest to target the potential customers to use DSM programs for two reasons; i) it would support achievement of Union's DSM targets and, ii) it would improve the value proposition for some customers who are considering converting to natural gas, supporting achievement of the customer forecast targets in the communities.

For these reasons, Union intends to actively pursue DSM opportunities with potential customers, subject to the conditions outlined at Exhibit B. Energy Probe.6. Union intends to provide an overview of DSM offerings to potential customers in marketing literature which will be available at open houses, at the time customers apply for service and, as other opportunities are presented.

- b) Yes.

- c) Union's Home Reno Rebate ("HRR") program as proposed in EB-2015-0029⁶ offers incentives for energy savings measure installation provided the home can achieve a 15% reduction in natural gas use. Post-audit results for the HRR program, which uses HOT 2000

⁶ A Board Decision for this proceeding is pending.

modelling, indicate that an average participant in 2014 was able to reduce annual consumption by 1,579 m³ per year (from 4,614 m³ to 3,035 m³). However, the baseline for quantification of furnace savings has changed in 2015, and the minimum savings eligibility criteria has been reduced from 25% in 2014 to 15% in 2015. These changes are not recognized in the 2014 results.

Based on survey information for the three Projects where demographic information was collected, the housing stock in the new communities is about the same age as the housing stock across non-gas serviced areas within Union's franchise area, as shown in Table 1 below. The difference between the weighted average for the three Projects areas and other areas within Union's franchise are within the margin of error of the 2015 Project surveys⁷.

Table 1: Housing Stock Comparison

	Year Constructed	2011 Study (Ex. B.SEC.9)		2015 Project Surveys (Ex. B.Staff.11)			
		Homes With Gas Access	Homes Without Gas Access	Lambton Shores	Milverton	Prince Township	Weighted Average
Potential Customers				496	818	375	
Forecast Customers				281	526	242	
	<=1970	43%	36%	N/A	N/A	N/A	N/A
	<= 1981*	63%	61%	66%	70%	56%	66%
	<= 1990	80%	82%	N/A	N/A	N/A	N/A

*Estimated for 2011 Study assuming equal distribution of homes built each year between 1970 and 1990

- d) The 2006 DSM framework specifically indicated that the utility should not use DSM funding to support fuel switching to natural gas⁸, and there has been no formal change to this position. Union's current DSM program does not provide incentives for the conversion of equipment from other fuels to natural gas, and DSM stakeholders in the past have not supported any extension of Union's DSM programs for this purpose. For this reason, Union has assumed that the new customers in Community Expansion Project areas who elect to participate in Union's HRR offering will only be eligible for equipment incentives if they have committed to conversion, and install equipment that is more efficient than the minimum levels required by regulation. In addition, they will be eligible for incentives related to building shell improvements. Union's current eligibility criteria, which require a minimum of two measures be installed at the time of upgrade, would apply as well.

Union has estimated annual consumption savings for participants in the Community Expansion Project areas at 692 m³ per year, based on achieving the minimum required 15% savings from a base of 4,614 m³ per year as noted in the response to part c) above. The reason for using a lower figure than the savings achieved by 2014 participants is the changes in modelling implemented in 2015.

⁷ Margin of errors are 7.6%, 5.7% and 7.1% at the 95% confidence level for Lambton Shores, Milverton, and Prince Township, respectively.

⁸ EB-2006-0021

Union's HRR program targets participation increasing to 0.4%⁹ of the residential customer base each year as proposed in EB-2015-0029. Applying this participation rate over the 10 year attachment forecast period would lead to 4% of the customers in the Project areas participating in the offering. However, an additional barrier exists for participation in the Community Expansion Project areas; customers will already be facing the costs of conversion, which could range from \$700 to \$11,000, so they may be reluctant to make any additional investments to upgrade their building shell in the same time period. For this reason Union has estimated HRR participation rate in the Project areas over the 10-year period at 3%.

The forecasted normalized annual consumption reductions resulting from the above participation rate and participant consumption reductions are shown in the Table 2 below. This Table was prepared with a simple assumption that that all forecasted customers in the Project areas will have annual consumption similar to an average residential home.

Table 2: Normalized Annual Consumption Impact

	Lambton Shores	Milverton	Prince Township
Forecast Customers	281	526	242
Forecasted Annual Consumption/Home Absent DSM Program (m3)	2,237	2,237	2,342
Total Forecasted Annual Consumption (m3)	628,597	1,176,662	566,764
DSM Participants	3%	3%	3%
Homes Retrofitted	8	16	7
Annual Participant Consumption Impact per home (m ³)*	(692)	(692)	(692)
Total Consumption Impact From Participation in HRR program	(5,834)	(10,921)	(5,025)
Adjusted Average Annual Consumption per home (m3)	2,216	2,216	2,321
Total Annual TES Impact for Project Area After Attachment Forecast Achievement	\$(1,342)	\$(2,512)	\$(1,156)

* Based on 15% of pre-renovation participant consumption averaging 4,614 m3/year .

The impact of HRR participation on annual TES revenue generated from each of the three Community Expansion Projects when all forecasted customers are connected ranges from approximately \$2,000 to \$4,000 per year. There would also be a reduction in traditional delivery revenue, but it would be even less significant.

Union applied the adjusted average annual consumption figures from Table 2 to the economic models for the four proposed Community Expansion Projects to determine if the proposals for each Project would be affected. Results indicated that all four Projects are still able to meet

⁹ EB-2015-0029, Exhibit A, Tab 3, Appendix A, Page 16 of 118

the minimum P.I. threshold of 0.4 with TES/ITE periods as proposed and none of the Project P.I.'s filed would be changed.

10) Reference: Exhibit A Tab A Table 8; Exhibit B Staff 1b) and Exhibit B Staff 12

- a) Reconcile the Customer Attachment Conversion forecasts in the above evidence.
 - b) Assume the same addition profile of the latest System Expansion projects in the Response to Staff 12. And provide a new forecast.
 - c) Please Update LPMA Spreadsheet to reflect a reduced rate of customer additions based on historic additions.
 - d) Provide a sensitivity of the 2016-2018 Revenue Requirement of the 4 communities based on the lower attachment rate based on the latest actuals.
-

Response:

a) The 9,107 customers referenced at Exhibit B.Staff.1 b) are the forecasted attachments if Union were to complete the 29 Projects that might be feasible at a minimum P.I. of 0.4 under Union's proposal. These Projects are listed at Exhibit A, Tab 1, Appendix D (Updated), lines 1 to 33, but excluding lines 4, 16, 18 and 30. This figure is based on forecasted penetration rates for the Projects as follows:

- Milverton: 64%, based on survey data provided at Exhibit B.Staff.11
- Prince Township: 65%, based on survey data provided at Exhibit B.Staff.11
- Lambton Shores and Kettle Point First Nation: 57%, based on survey data from 2011 for the Lambton Shores area adjusted downward to reflect an assumption of a reduced conversion rate due to the need for a TES, and on discussions with the First Nation representatives for the Kettle and Stony Point First Nation area. The survey results made available after filing the Exhibit A pre-filed evidence, which are provided at Exhibit B.Staff.11 for the Lambton Shores area, reflect the TES surcharge being in place and a potential penetration rate for that area of the Project of 63%.
- Moraviantown: 87% based on discussions with First Nation representatives
- Kincardine: 51% based on data provided at Exhibit B.South Bruce.3 c)
- 24 remaining Projects: 45%

The Projects referenced at Exhibit B.Staff.12, Attachment 1, are previous Community Expansion Projects, put into service in 1995 to 1997. For these Projects, 9,126 customers were attached from the potential base of 16,496 homes and businesses in the first 10 years, which equates to a penetration rate of 55%.

Union has used the data in Exhibit B.Staff.12 to predict the number of forecast customers that will connect to Community Expansion Projects each year over the 10-year customer forecast

period.

These prior projects were undertaken in a period where the price advantage of natural gas relative to other fuel sources was significantly lower than today. As noted at Exhibit B.SEC.22, annual savings in 2000 ranged from \$483 to \$1,287 per year, depending on the fuel source. In 2015, those savings have increased to a range of \$1,683 to \$2,464, as provided at Exhibit B.CPA.1, Attachment 1, p. 3. This is a significant change that would manifest itself in significantly higher penetration rates today relative to those prior projects. Based on this, along with Union's somewhat conservative interpretation of the customer surveys¹⁰, Union does not believe a reduction from the customer forecast is likely to occur.

- b) For the four proposed Projects, Union has provided the impacts of decrease of 10% in penetration rates Exhibit B.South Bruce.6, Attachment 5 (Corrected). Collectively, this 10% reduction would result in forecasted penetration rate for the four Projects of 53%. Since this figure is very close to the 55% achieved for the Projects referenced at Exhibit B.Staff.12, Union has not provided another forecast.
- c) Please refer to part b) above.
- d) Please refer to b) above. Since each of the Projects at a forecasted attachment rate of 55% would still be feasible at a P.I. of 0.4, the revenue requirement would not change from those filed at Exhibit A, Tab 1, Appendix F (Updated).

¹⁰ Union's customer forecasts for the Projects only include those who have indicated they are "extremely likely" or "very likely" to connect, plus 50% of those who have indicated they are "likely" to connect in the surveys.



SMALL VOLUME GENERAL SERVICE RATE

(A) Availability

Available to customers in Union's Southern Delivery Zone.

(B) Applicability

To general service customers whose total consumption is equal to or less than 50,000 m³ per year.

(C) Rates

The identified rates (excluding gas supply charges, if applicable) represent maximum prices for service. These rates may change periodically. Multi-year prices may also be negotiated which may be higher than the identified rates.

a)	Monthly Charge		\$21.00
b)	Delivery Charge		
	First	100 m ³	3.7624 ¢ per m ³
	Next	150 m ³	3.5708 ¢ per m ³
	All Over	250 m ³	3.0757 ¢ per m ³
	Delivery – Price Adjustment (All Volumes)		0.0629 ¢ per m ³ (1)
c)	Storage Charge (if applicable)		0.7027 ¢ per m ³
	Storage - Price Adjustment (All Volumes)		0.0000 ¢ per m ³
	Applicable to all bundled customers (sales and bundled transportation service).		
d)	Gas Supply Charge (if applicable)		
	The gas supply charge is comprised of charges for transportation and for commodity and fuel. The applicable rates are provided in Schedule "A".		
e)	Temporary Expansion Surcharge ("TES") (if applicable) (2)		23.0000 ¢ per m ³
f)	Temporary Connection Surcharge ("TCS") (if applicable) (3)		23.0000 ¢ per m ³

During any month in which a customer terminates service or begins service, the fixed charge for the month will be prorated to such customer.

Notes:

- (1) Includes a temporary charge of 0.0629 cents/m³ expiring March 31, 2016.
- (2) The Temporary Expansion Surcharge rate is applicable to qualifying Community Expansion Projects only.
- (3) The Temporary Connection Surcharge rate is applicable to qualifying small system main extensions only.

(D) Supplemental Service to Commercial and Industrial Customers Under Group Meters

Combination of readings from several meters may be authorized by the Company and the Company will not reasonably withhold authorization in cases where meters are located on contiguous pieces of property of the same owner not divided by a public right-of-way.

(E) Delayed Payment

The monthly late payment charge equal to 1.5% per month or 18% per annum (for an approximate effective rate of 19.56% per annum) multiplied by the total of all unpaid charges will be added to the bill if full payment is not received by the late payment effective date, which is 20 days after the bill has been issued.



uniongas

Effective
2016-01-01
Rate M1
Page 2 of 2

Filed: 2015-12-22
EB-2015-0179
Exhibit JT1.18
Attachment 2
Page 2 of 2

(F) Direct Purchase

Unless otherwise authorized by Union, customers who are delivering gas to Union under direct purchase arrangements must obligate to deliver at a point(s) specified by Union, and must acquire and maintain firm transportation on all upstream pipeline systems. Customers initiating direct purchase arrangements, who previously received Gas Supply service, must also accept, unless otherwise authorized by Union, an assignment from Union of transportation capacity on upstream pipeline systems.

(G) Overrun Charge

In the event that a direct purchase customer fails to deliver its contracted volumes to Union, and Union has the capability to continue to supply the customer, Union will do so. The customer may pay 4.4651 ¢ per m³ for the delivery and the total gas supply charge for utility sales provided in Schedule "A" per m³, plus 7¢ per m³.

(H) Bundled Direct Purchase Delivery

Where a customer elects transportation service under this rate schedule, the customer must enter into a Bundled T Gas Contract with Union for delivery of gas to Union. Bundled T Gas Contract Rates and Gas Purchase Contract Rates are described in rate schedule R1.

(I) Company Policy Relating to Terms of Service

- a. Customers who temporarily discontinue service during any twelve consecutive months without payment of the monthly fixed charge for the months in which the gas is temporarily disconnected shall pay for disconnection and reconnection.
- b. When gas is delivered at an absolute pressure in excess of 101.325 kilopascals, then for purposes of measurement, hereunder, such volume of gas shall be corrected to an absolute pressure of 101.325 kilopascals. Atmospheric pressure is assumed to be the levels shown below in kilopascals (absolute) regardless of the actual atmospheric pressure at which the gas is measured and delivered.

<u>Zone</u>	<u>Assumed Atmospheric Pressure kPa</u>
1	100.148
2	99.494
3	98.874
4	98.564
5	98.185
6	97.754
7	97.582
8	97.065
9	96.721
10	100.561
11	99.321
12	98.883

Effective January 1, 2016
O.E.B. Order # EB-2015-0340

Chatham, Ontario

Supersedes EB-2015-0116 Rate Schedule effective January 1, 2016.

Milverton: Preferred Design
Comparison of TES, ITE as Revenue or Aid

Line	(\$000's CDN)			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
				2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	Required Return	TES/ITE as Revenue	(a)	80	243	244	241	238	234	230	226	222	218	212	205	197	190	182	174	167	159	152	144
2	Required Return	TES/ITE as Aid	(b)	77	226	208	184	167	165	163	161	159	157	154	148	143	137	132	126	120	115	109	104
3	Difference			3	16	36	57	71	69	67	65	63	61	59	57	55	53	50	48	46	44	42	40

For pagination purposes the 2nd 20 years is shown below

				21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
				2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
4	Required Return	TES/ITE as Revenue		136	129	121	114	106	98	91	83	76	68	60	53	45	38	30	23	15	9	6	5
5	Required Return	TES/ITE as Aid		98	93	87	82	76	70	65	59	54	48	43	37	32	26	21	15	10	8	6	5
6	Difference			38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	5	1	(0)	(0)

Notes (a) LPMA.1 Attachment 2 Line 7
LPMA.1 Attachment 3 Line 7

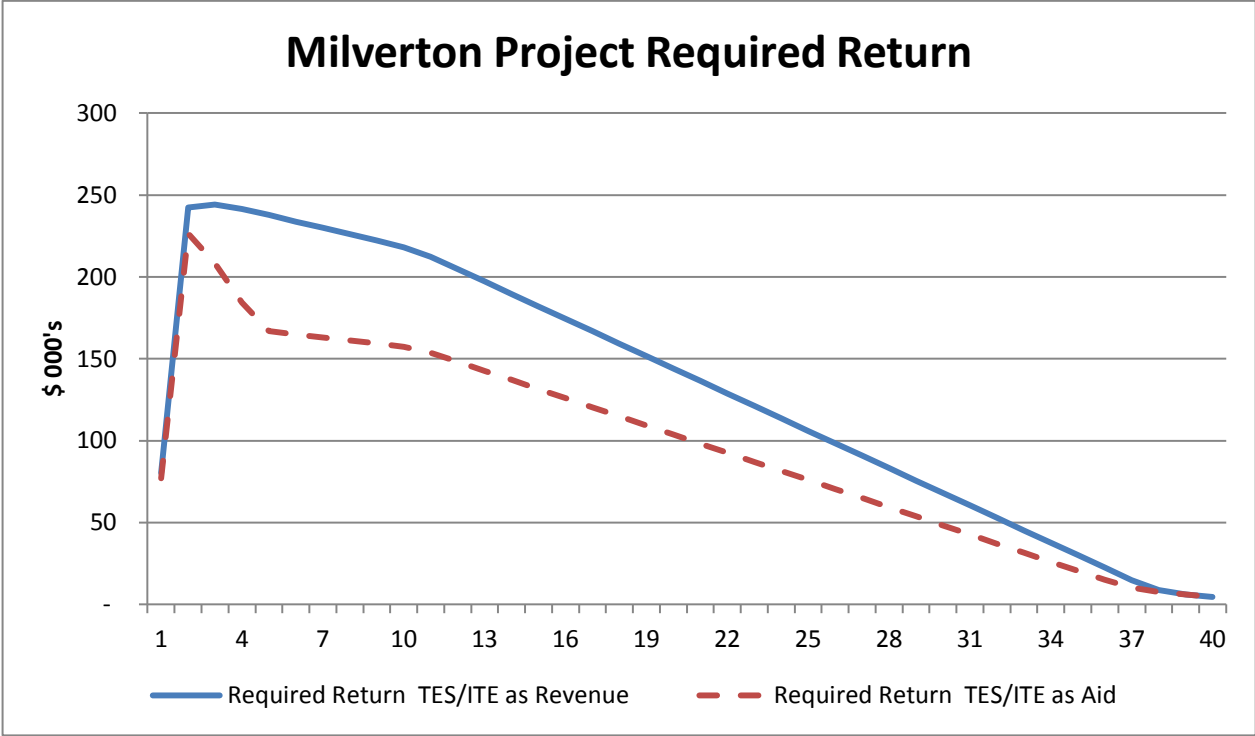


Table 1 (Figures as filed: Preferred Design, full Distribution Revenue)

Figures are NPV in \$ 000's		Project	Project	Project	Project	Total
		1	2	3	4	(e)= Sum (a)
		(a)	(b)	(c)	(d)	to (d)
Line						
1	Distribution Revenue from New Expansion Customers	1,466	2,905	323	1,674	6,368
2	TES Collected from New Expansion Customers	509	1,015	97	223	1,844
3	ITC collected from Municipalities	13	183	18	93	307
4	Provincial Government (Grants and Loans)	-	-	-		-
5	All current and future ratepayers	964	1,832	177	1,274	4,247
6	Total Capital Cost	2,424	4,925	545	2,716	10,610

Table 2: Comparative figures using Minmum Design and Distribution Portion of Revenue

Figures are NPV in \$ 000's		Project	Project	Project	Project	Total
		1	2	3	4	(e)= Sum (a)
		(a)	(b)	(c)	(d)	to (d)
Line						
7	Distribution Revenue from New Expansion Customers	1,257	2,436	282	1,597	5,572
8	TES Collected from New Expansion Customers	509	1,015	97	223	1,844
9	ITC collected from Municipalities	13	153	18	93	277
10	Provincial Government (Grants and Loans)	-	-	-		-
11	All current and future ratepayers	468	1,980	207	1,333	3,988
12	Total Capital Cost	1,793	4,766	491	2,716	9,766
13	Capital cost difference (Line 6-Line 12)	631	159	54	-	844

Notes: Lines 5 and 11 are equal to the NPV (reversing the negative sign)

As of this date the figures for Provincial governments grants and loans is not known

Project	Evidence
1 Kettle Point/ Lambton Shores	Exhibit A, Tab 2, Section A
2 Milverton	Exhibit A, Tab 2, Section B
3 Moraviantown	Exhibit A, Tab 2, Section C
4 Prince Township	Exhibit A, Tab 2, Section D