



## Current Natural Gas and Oil Industry in New Brunswick

- First oil well drilled at Dover in 1859
- 300 wells were drilled in NB by 2010
- 30 natural gas wells are currently producing
- 9 wells have been horizontally drilled (5 gas)
- Since 1990 49 wells have been hydraulically fractured in NB

## Direct Benefits of Domestic Natural Gas Supply

- Royalty regime tax base
- Domestic supply of natural gas
  - Security of supply
  - Diversity of supply
- Complete source for existing industry, new investment, small business and residential users
- Will create a new industrial sector (*e.g.*, petrochemical, additional refining, fertilizer, *etc.*)
- Export potential of domestic natural gas
- Source fuel for energy from hydrogen (minimal or zero GHG emissions)
- Direct employment of skilled labour

## Types of economic benefits

- Direct benefits - the spending by natural gas companies and other sectors of the economy that are also stimulated by these expenditures
- Indirect benefits - supply chain opportunities
- Induced benefits - rounds of transactions throughout the economy set of by workers, hired directly or indirectly, spending their wages on goods and services

## Natural gas workforce information

- Each well requires 420 individuals working in 150 different occupations to complete and produce gas from one well
- Each well creates approx. 13 Direct full-time employees (FTE) per year
- If you include Direct, Indirect, and Induced jobs the estimates are 32 – 58 FTEs per well, varies by jurisdiction

- If NB were to drill 200 wells per year it would mean 2,600 Direct jobs per year and 6,400 to 11,600 total jobs per year, supported by the natural gas industry

## Supply chain opportunities

- Construction, manufacturing and transportation
- Drilling, completion and production
- Geological and geophysical
- Pipeline and associated infrastructure
- Environmental & other consulting services
- Legal & land
- Natural gas distribution
- Service industries, logistics & distribution
- Retail, food, health, education & financial services

## Non-traditional Natural Gas Businesses

- Work boots, uniforms & uniform cleaning
- Well pad cleaning
- Alternate housing – RVs, mini-homes
- Fencing
- Concrete
- Landscaping & irrigation
- Security, EMTs
- Engineers, lawyers, accountants, surveyors, *etc.*
- Home sales, hotels, restaurants, entertainment, retail, auto sales (especially pickup trucks)
- Catering

## Bottom Line - natural gas Development economics in NB

- No gas discovered – minimal impact
- Low end - impact would be in the order of **\$7 billion over 25 years**. This will equate to 202 thousand person years of employment in NB over that period and over **\$8 billion in wages over 25 years in NB**.
- Higher end – impact would be in the order of **\$21 billion in NB tax revenue over 25 years**. This will be 607 thousand person years of employment in NB over 25 years with over **\$24 billion in wages over 25 years in NB**.

## Perceived and Technical Issues

### Groundwater contamination

- From surface - many NB potable wells draw water from aquifers within 50-150 m of the surface for the supply of drinking water. As such, there is a high level of public interest in protecting this resource against contamination. The risks to this resource from contamination by surface activities are real, and not specific to shale gas development (*e.g.*, agricultural effluent, winter road treatment, leaking fuel storage tanks, leaking liquids from landfills, over pumping of aquifers (brackish water intrusion), leaking sewage system, etc.).
- From hydraulic fracturing - there is a publicly perceived threat to shallow groundwater from the practice of hydraulic fracturing. However, this is based on historical issues being documented in other areas where shallow hydraulic fracturing was conducted in formations very near to aquifers being used for the supply of drinking water, or in areas that contain many other wells which provide a pathway between formations. In NB, the formations being explored are very deep (1 – 2 km), and it has been widely concluded that the upward migration of fracking fluids through many layers of rock is highly unlikely.
- From wellbore – methane and other fluids leaking into groundwater has been a real risk faced in other jurisdictions due to poor wellbore construction. Section 2 of the Rules for Industry is dedicated to describing practices and procedures that will ensure wells are properly constructed in NB. The Rules for Industry also include requirements for well leak testing.

### Water availability

There is a public perception that there is not enough water available to support shale gas development. Recent publications from independent NB research teams at UNB have suggested that NB has sufficient water to meet the needs of existing users and a developing shale gas industry. There are provisions in the Rules for Industry (section 6.0) to study water withdrawals prior to approval to ensure that localized issues are avoided.

### Chemicals in fluids used in hydraulic fracturing

There is public concern over the chemicals being used in hydraulic fracturing and the associated health risks associated with the potential for groundwater contamination, or the inadequacy of waste treatment processes. It is reasonable to

conclude that the amount of groundwater contamination from any fluids from the industry can be limited through the use of engineering controls and sound management practices, as discussed above. The current waste treatment infrastructure for these potential waste streams is under development by several local firms, but has not yet been developed. Generally, industry is moving towards using less hazardous wherever possible, so as time progresses these waste streams should become easier to treat and regulate. The Rules for Industry require that a company disclose all chemical used during hydraulic fracturing.

### Earthquakes

It is perceived that certain activities conducted as part of shale gas development can result in increased seismic activity in other areas. However, this appears to be associated with the use of high pressure deep injection wells used for waste storage. The use of deep injection wells for waste storage is not permitted in NB. No earthquakes in NB have been observed during any active hydraulic fracturing processes.

### Socio-economic effects

There has been much debate over the socio-economic effects of a shale gas industry on local communities. The potential positive effects are well documented and easy to understand. Many of the negative effects are associated with the speed at which the industry develops and the community infrastructure not being able to support the new demands. The current regulatory approval process in NB is time consuming, and serves to limit the pace at which an industry can develop. This is not currently an issue in NB as only 10 production wells have been drilled in the past 40 years.

### GHG and climate

The concern over increasing GHG emissions and implications for climate change is as pertinent to the shale gas industry as it is for any other fossil fuel industry. Specific to shale gas there are concerns over leaky wellheads and pipelines. The NB Rules for Industry contain requirements for air quality and leak testing. Natural gas is widely considered one of the cleanest fuels and is anticipated to replace fossil fuels in the near future.