



New Brunswick
ENERGY
INSTITUTE

INSTITUT DE
L'ÉNERGIE
Nouveau-Brunswick

ENERGY ROUNDTABLE SUMMARY REPORT

November 21, 2013 Meeting

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BACKGROUND

The New Brunswick Energy Institute (NBEI) is comprised of scientists with expertise in air and water quality, hydrology, geology, biology, toxicology, social sciences and earth sciences. The Institute's mandate is to commission and oversee scientific research in New Brunswick, peer review relevant research from other jurisdictions, and provide access to the information for New Brunswickers in an easily understood format so it can be considered in forming opinions about appropriate courses of action in the energy sector.

The NBEI is a not-for-profit corporation funded through a provincial government grant. As illustrated in the figure below, the Chair serves as the President and CEO of the Institute and is supported by the Executive Director in the management of the day-to-day operations.

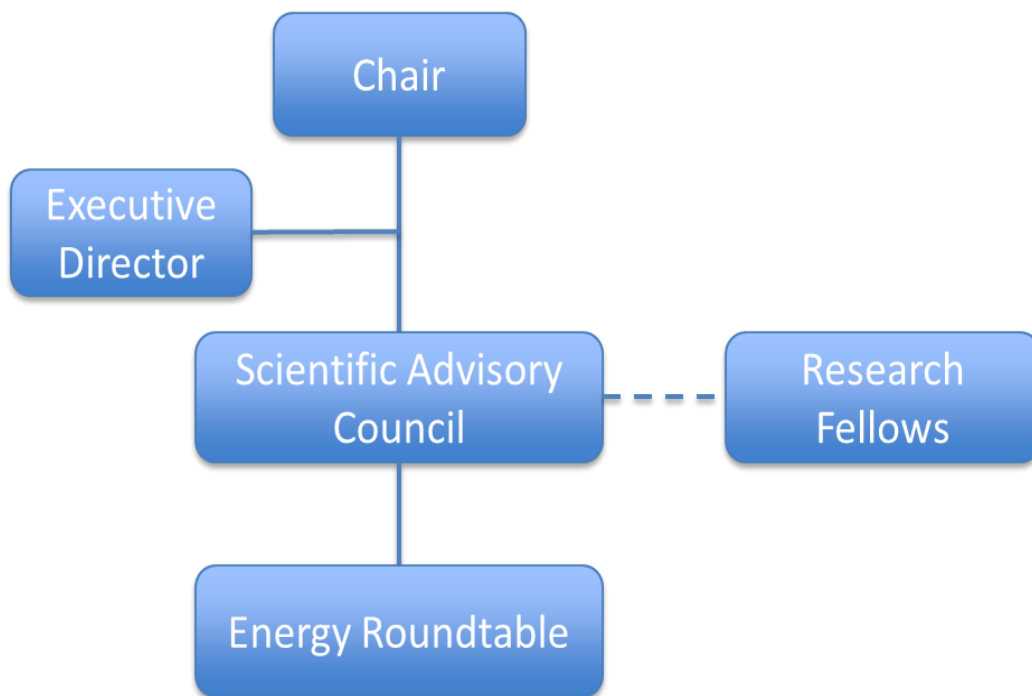


Figure 1. Structure of the New Brunswick Energy Institute

The Scientific Advisory Council (SAC) is comprised of scientists and other specialists who serve as the board of directors of the Institute. The SAC is charged with identifying, initiating and overseeing the research objectives, monitoring activities of the Institute and ensuring the scientific accuracy and relevance of the Institute's research and reports. They also advise the Chair and provide information to the Energy Roundtable relevant to the scientific direction of the Institute. The SAC is supported by other qualified scientists, recruited from across North America, who bring particular expertise that can be used and learned from for the benefit of New Brunswick. This support group, known as the Research Fellows of the Institute, may be called upon when additional external expertise is needed.

The Energy Roundtable of the NBEI has been created to provide a forum for discussions and debate on issues associated with energy development in New Brunswick. Energy Roundtable members engage in direct dialogue with each other and the SAC and Chair to help map out the Institute's research objectives and priorities.

It is intended for the Energy Roundtable to include representation from a variety of backgrounds and interests, including the following:

- Aboriginal Representation
- Business Community
- Oil and Gas Industry
- Municipal Government
- Regional Government
- Environmental Representation
- Citizens at Large
- Rural Community Industries
- Health Practitioners
- Representative of Oil and Gas Trades
- Technical Institutions/Community Colleges
- Work Safe NB

ENERGY ROUNDTABLE MEETING

The inaugural, introductory meeting of the Energy Roundtable was held in Moncton, NB at the Chateau Moncton Hotel on August 21-22, 2013. This two-day meeting focused on developing a common understanding of the science behind exploration and development of natural gas resources in the province. This was achieved through a number of technical presentations from geologists, academic researchers and government representatives, in addition to a field trip to visit the current natural gas installations in the McCully Gas Field, located near Sussex, NB.

The most recent Energy Roundtable meeting on November 21, 2013 was held specifically to discuss the research needs and priorities around energy development in New Brunswick. The meeting agenda (see Appendix I) included presentations from invited guests during the morning session, followed by a facilitated roundtable discussion in the afternoon.

PRESENTATIONS

The following presentations were given in order to inform Energy Roundtable participants on the current energy initiatives in the province and on recent and ongoing New Brunswick air and water monitoring studies related to hydraulic fracturing. Electronic copies of these presentations can be found on the NBEI website, www.nbenergyinstitute.ca,

Energy Mix at NB Power, “A Transformation to Smart Grid”

Michel Losier
NB Power

New Brunswick Shale Gas Air Monitoring Study: A Joint Initiative of Health Canada and the New Brunswick Department of Environment and Local Government

Darrell Welles
New Brunswick Department of Environment and Local Government

A Study of Groundwater Quality from Domestic Wells in the Sussex and Elgin Regions, New Brunswick

Dr. Tom Al
University of New Brunswick

In addition to technical presentations, Energy Roundtable members also heard a presentation from the Executive Director defining the Energy Institute’s mandate and new structure (see Figure 1 on page 2), and outlining focus areas and specific research objectives as proposed by the Scientific Advisory Council for discussion and review. It was emphasized that the NBEI approach would be to learn from knowledge gained elsewhere, and dedicate research activities to issues that are unique to New Brunswick.

PROPOSED RESEARCH OBJECTIVES

The following research objectives were proposed by the SAC to the Energy Roundtable for review and discussion during the facilitated session. It was noted that these proposed objectives were specific to natural gas development, due to the current questions around this energy sector in the province, but that the NBEI would also be examining possible research projects in other energy sectors in the future.

Freshwater Resources

Groundwater Quality

- Groundwater quality baseline
 - Comprehensive survey of domestic wells
 - Document and interpret water-quality data (natural vs. anthropogenic influences)
 - Time-series monitoring of domestic wells proximal to operations (protocols need attention)
- Isotopic fingerprinting of natural gas with depth
 - Mud-gas logging data for C isotopic ratios with depth
 - Use of gas fingerprinting to identify gas sources in aquifers
- Investigate methods for monitoring during/following operations
 - Close to source at well pad
 - monitoring down casing annulus?
 - challenges with monitoring wells in fractured bedrock aquifers

Deep – Shallow Groundwater Interaction

- Pilot study could be developed around an operation as it moves through Exploration toward Development and Production (collaboration with industry)
 - Define stratigraphy
 - Characterize the hydrogeology
 - connections between deep and shallow system?
 - groundwater/porewater pressure distribution versus depth
 - multi-level monitoring system
 - permeability of the stratigraphic sequence
 - packer testing
 - Characterize the hydrogeochemistry
 - freshwater – saltwater interface
 - methane, ethane, propane concentrations and isotopes
 - groundwater/porewater residence time

Surface Water

- Surface water quality baseline
 - Need to have understanding of chemical and biological conditions in surface waters prior to any development, information will be critical to assess whether changes of concern are occurring after development
 - For this, need to understand appropriate methods (what, when, how) for baseline data collections of chemistry and biology in streams and other surface waters that can be used to assess changes if fracking occurs in that area
 - Need to conduct baseline surveys of surface waters in areas that may be potentially affected by energy development
- Support of surface water quality monitoring during/following any gas development operations

Waste Water Treatment

- Review current literature on wastewaters and how these wastes are being treated in other jurisdictions
- Review of compounds used in hydraulic fracturing, and prioritization of chemicals based on environmental and health risks, and analytical methods for those compounds that are in flowback and produced waters. Reviews of hydraulic fracturing chemicals are underway that can be used (e.g. U.S. E.P.A. study will be available late 2014; <http://www2.epa.gov/hfstudy>)
- Better understand treatment technologies and options for NB
 - Methods specific to saline aqueous solutions
 - Issues specific to marine discharge of effluents
- Assessment of deep well disposal of clear waste liquids
 - Deep strata with high permeability?
 - Seismological implications of deep well injection in NB

Well Integrity

- Defining issues with well integrity
 - Quantifying well integrity issues
 - Gas migration and integrity issues in legacy wells
 - Quality control through measurements near recently abandoned wells
 - Surface casing vent flow (SCVF) measurements and requirements (limits)
 - Gas migration (outside of the surface casing)
 - Measurement or estimates of gas migration frequency and rates
 - Sources of gas, biogenic or deep formation gas
 - CH₄ emissions to the atmosphere through gas migration
 - CH₄ seepage from gas migration into potable aquifers
- Examining technologies for preventing gas leakage along casing

Socioeconomics

- Take stock of research work completed and in progress
- Identify gaps in understanding of likely socio-economic consequences for New Brunswick
 - including risks such as the “boomtown” effect.
- Develop methodology and plan for filling knowledge gaps
- Make recommendations for addressing risks in a timely manner, maximizing benefits to New Brunswickers and minimizing adverse consequences if decision is made to proceed with exploitation.

RESULTS OF FACILITATED SESSION

The following is a summary of the topics of discussion at the Energy Roundtable meeting held on November 21st, 2013 in Fredericton, NB.

Questions posed to the Roundtable:

*Energy Roundtable focus - What do we need to know?
Other than shale gas, what should the NBEI focus on?*

This was followed by open discussion about the purpose of the NBEI and the role it should play. It was suggested that all research should help to answer the following question:

“Can we develop energy in a way that respects sustainability for all New Brunswickers, including the rights of First Nations?”

To demonstrate that the Institute’s mandate and focus encompasses all forms of energy, it was recommended that the NBEI work to inform the public on where our electrons come from, and the availability and cost of certain types of electricity now and in the future.

The vision of the NBEI was discussed and there was general agreement that the following elements should be considered:

- To educate by determining the scientific facts and presenting them to the public.
- Importance of New Brunswick conducting its own research, while also adding to the scientific studies that are currently underway.
- The NBEI should act as a filter to ensure that New Brunswick doesn’t waste time and money duplicating research that is being done elsewhere.
- In the years to come, citizens should look to the NBEI and their website for good scientific data that is relevant to the province’s energy landscape.

Questions raised by the Roundtable:

- How can NB best position itself to benefit from smart grid technology?
- What is the future of Mactaquac and hydroelectricity – is it clean?
- Would it be cheaper for NB to purchase shale gas (or other types of energy) from elsewhere, as opposed to the cost and impacts of production within the Province?
- Could shale gas production be completed in a safe manner for both the environment and population?
- What would the economic spin-offs be of an industry? Is self-sufficiency possible? Short-term versus long-term economic development.
- What are the dynamics of energy pricing across North America for all types of energy?

Review of Proposed Research Objectives:

During the facilitated session, the research objectives as proposed by the SAC were discussed and reviewed by the Roundtable. There was general agreement from the Roundtable that the NBEI should adopt the proposed research objectives. The following section summarizes the discussion had during the review of the proposed research objectives and identifies other items, not in the research objectives, for consideration by the SAC.

- No need for additional air quality related work for the time being, current Health Canada/GNB study is enough for now.
- Produce a matrix comparing the energy sources and costs (environmental, cost to consumer, water impact) to better understand situation in New Brunswick
- Examine existing research that has been done on shale gas and how it applies, or could apply, to New Brunswick.
- Water
 - Baseline quality and quantity data are needed and could be used for several purposes
 - Assess NB groundwater situation, what data are available and what information is missing to understand sustainable use of this resource?
 - Understand more about methane in water prior to fracking development
 - Wastewater generated from fracking
 - Treatment options for New Brunswick
 - If potential for marine disposal, consider fishing industry concerns
- Well integrity
 - Leaky wells
 - Greenhouse gas emissions
 - Climate change
 - Life cycle of extraction
- Socio-economic:
 - Build framework to develop better understanding of impacts on provincial economy and local communities including:
 - Level and nature of economic activity, including potential downstream consequences
 - Public finances
 - Traffic and road safety
 - Noise and overall disturbance associated with industrial activity
 - Scope and magnitude of possible “boomtown” effects?
- Health impacts from industrialization
 - E.g. information on chemicals used in hydrofracking, potential effects on workers
- First Nations engagement needed in identifying research priorities
- Governance around decision making
 - Do Local Service Districts and communities have a role?
- Training requirements, what is needed to ensure local employment?
- Emergency preparedness

In addition to the focus areas put forward by the SAC, there was discussion from the Energy Roundtable about the potential benefits of future presentations and information on the following:

- Economic realities of New Brunswick (current and beyond)
- Fracking cement and well casing technology. What changes and improvements have been made?
- Options for handling wastewater from fracking
- Methods to examine health impacts of fracking
- Energy East pipeline and current status
- Overall energy situation in New Brunswick and Maritimes (the amount we consume, produce, export)

Suggestions for Roundtable participation and membership going forward:

- Participants agreed to attend meetings 4 times per year
- Members would benefit from reading materials prior to each meeting to better prepare for discussions and presentations
- Meetings should be theme focused to avoid “information overload”
- Need communication and involvement in between meetings
 - “communicate early – communicate often”
- Provide updated factsheets on NBEI and energy related topics.

NEXT STEPS

- Work with First Nations to identify appropriate representation to fill vacancies on SAC and Energy Roundtable, and develop research objectives related to aboriginal issues.
- Develop and release the NBEI's research objectives based on the input received from the Energy Roundtable.
- Establish priorities and develop a detailed work plan with timelines.
- Host a Health Workshop on the topic of energy and health by mid-2014 and work to establish health related research objectives as appropriate.
- Establish working groups in partnership between SAC and Research Fellows to further investigate medium to long-term research project development.
- Complete NBEI website development, including development of materials for a non-scientific audience on a range of energy related topics.

APPENDICES

APPENDIX I

Energy Roundtable Agenda

Thursday, November 21, 2013 at the Fredericton Inn and Conference Centre, Salon B

TIME	AGENDA ITEM	LEADER
8:30 – 9:00	<u>Registration</u>	
9:05 – 9:15	<u>Welcome</u> Opening remarks Situation report Purpose Expectations	Dave Besner
9:15 – 10:00	<u>NB Energy Mix</u> Presentation Context questions	Michel Losier
10:00 – 10:30	<u>Air Quality Monitoring</u> Presentation Context questions	Darrell Welles
10:30 -10:45	<u>Break</u>	
10:45 -11:15	<u>Water Quality Monitoring</u> Presentation Context questions	Tom Al
11:15 – 12:00	<u>NBEI Research Objectives</u> Presentations Context questions	Annie Daigle
1200 – 13:00	<u>Lunch</u> (on-site)	

TIME	AGENDA ITEM	LEADER
13:00 - 14:30	<p><u>NBEI Research Objectives</u> Plenary Discussion Review of presented objectives Other objectives Communication of results Desired research plan</p>	Facilitator
14:30 – 14:45	<u>Break</u>	
14:45 – 15:45	<p><u>NBEI Research Objectives</u> Plenary discussion continued</p>	Facilitator
15:45 – 16:00	<p><u>Wrap-Up</u> Future meeting process Actions Next Steps Closing Remarks Thanks</p>	Facilitator Dave Besner

APPENDIX II

November 21, 2013 Energy Roundtable List of Participants

- Tom Al – UNB Fredericton, SAC Member
- Ashley Bennett - Interested Citizen, RT Member
- David Besner – NBEI Interim Chair
- Glenn Cleland - UNB Centre for Financial Studies
- Annie Daigle – NBEI Executive Director
- Léandre Desjardins – Interested Citizen, RT Member
- Phil Desrosiers - Interested Citizen, RT Member
- Dr. Dan de Yturalde - New Brunswick Medical Society, RT Member
- Maurice Dusseault – University of Waterloo, SAC Member
- Susan Holt - New Brunswick Business Council, RT Member
- Karen Kidd – UNB Saint John, SAC Member
- Stephanie Merrill - New Brunswick Conservation Council, RT Member
- Donald MacPhail - Geologist, Economist, RT Member
- Steven Mazzola - SWN Canada (on behalf of Nicki Atkinson)
- Sam McEwan – NB Department of Energy and Mines
(non-voting government representative)
- Philippe Morin - Agricultural Alliance of New Brunswick, RT Member
- Dena Murphy – Corridor Ressources, RT Member (by telephone)
- Adrian Park – UNB Fredericton, SAC Member
- Sylvain Poirier - CKNB Bathurst, RT Member
- Darryl Pupek – NB Department of Environment and Local Government
(non-voting government representative)
- Richard Saillant – UdeM, SAC Member
- Michel Savoie - Ecologist, RT Member
- Sheri Somerville – CAPP (on behalf of Corridor Resources)

New Brunswick Energy Institute

40 Crowther Lane, Suite 120

Fredericton, NB, E3C 0J1

info@nbenergyinstitute.ca

(506) 455-3232