



2018-2019 Research Plan

Updated November 28, 2018

MARKET REVIEW OF NATURAL GAS LIQUIDS IN WESTERN CANADA

This study conducts qualitative and quantitative analysis to understand how different market factors could foster or constrain Western Canadian Natural Gas Liquids (NGLs) market development. An in-depth analysis of the Western Canadian NGLs market strengths, weaknesses, opportunities, and threats (SWOT), at the industry level, as well as for each commodity was conducted. A large contributing part of the study were interviews with businesses, governments, regulatory agencies and associations which shared their views regarding the further development of the market.

Study Released: November 2018

ECONOMIC AND ENVIRONMENTAL IMPACTS OF METHANE EMISSIONS REDUCTION IN THE NATURAL GAS SUPPLY CHAIN

This study will quantify the economic and environmental impacts of methane emissions reduction throughout the full supply chain of natural gas. The gas supply chain is broadly divided into upstream, midstream and downstream segments where sources of methane emissions are identified, and mitigation technologies are assessed on cost and emission mitigation basis. The analysis includes three abatement scenarios: maximum emission reduction, uniform reduction and optimal reduction. The study will also include a discussion of hydrogen additions to the natural gas stream and methane release and capture from municipal solid waste facilities and other similar locations.

Anticipated Release: January 2019

ECONOMIC AND EMISSIONS IMPACT OF PASSENGER AND FREIGHT TRANSPORTATION ELECTRIFICATION IN SELECT CITIES

Fuel sales for passenger and freight vehicles are underpinned by wholesale and retail infrastructure. This investment plus commodity sales has a major impact on the Canadian economy. Without the sale of transportation fuels, these investment costs, commodity sales and tax revenues will have no value. However, changing the transportation system to reduce GHG emissions through new technology adaptation is being proposed as a major mechanism to achieve climate change mitigation goals. Some common examples are fuel switching and electrification of transportation.

Updated: November 2018

The primary objective of this study is to assess the economic and environmental impacts of electric and hydrogen fuel cell vehicles in comparison to gasoline or diesel vehicles used for both freight and passenger transportation. The study will assess these impacts at the municipal level.

The cities that will be assessed in this study are Halifax, Ottawa, Calgary, and Yellowknife. These cities are selected to gain insights into the unique challenges at the municipal level with respect to energy supply, existing infrastructure, demographic conditions, and economic conditions. This study is developed around six scenarios that represent a combination of technology and urban planning options that can be used to reduce GHG emissions from transportation.

Anticipated Release: February 2019

ECONOMIC AND ENVIRONMENTAL IMPACTS OF A CLEAN FUEL STANDARD

The government of Canada plans to put in place Clean Fuel Standard (CFS) Regulations under the Canadian Environmental Act, 1999 to reduce Canada's greenhouse gas (GHG) emissions. The objective of the proposed regulations is to achieve 30 megatonnes of annual reductions in GHG emissions by 2030, contributing to Canada's effort to achieve its overall GHG mitigation target of 30% emission reduction below 2005 levels by 2030.

The CFS will establish lifecycle carbon intensity requirements separately for liquid, gaseous and solid fuels that are used in transportation, industry and buildings. The goal is to have a performance-based approach that would incent innovation, development and use of a broad range of low carbon fuels, energy sources and technologies.

This research will evaluate economic and environmental impacts of moving to a clean fuel standard in Canada. The project will document the GHG emissions reduction expected from such a standard and what the overall cost of CFS in terms of dollars per tonne of GHG emissions reduction be. Two types of costs associated with CFS: consumer costs and fiscal costs will be presented.

Anticipated Release: March 2019

ECONOMIC IMPACTS AND EMISSIONS PROFILES OF THE PETROCHEMICAL INDUSTRY

This project will consider the economic impacts of the petrochemical industry in Canada. It will also assess the emissions profiles of the various petrochemical sub-sectors in Canada, the US and South Korea. In assessing the emissions profiles, CERI will examine potential technologies to reduce emissions.

Anticipated Release: March 2019

THE BUSINESS CASE FOR ELECTRICITY STORAGE SYSTEMS

Electric energy storage (EES) systems are in a rapid development phase. They are considered as critical to enabling transitioning to a cleaner a more versatile electric power system. The most commonly cited application of EES is arbitraging variable generating sources such as solar and wind matching them with the demand. However, there are numerous other applications of EES in traditional and modern grids, such as ramping, black start, demand response, voltage support etc. The perceived benefits of EES have led to new EES technology developments, demonstration projects, and research projects that quantify the benefits of EES systems. Despite these developments, implementations of EES systems have been limited to demonstration projects. A significant uptake of EES has not been observed. The high capital costs of EES systems have been identified as one main barrier to deployment. In addition to the capital costs, other non-technical barriers include some regulatory treatments of EES that may prevent them from tapping into multiple revenue streams and limitations of evaluation methods utilized to quantify benefits of EES.

This study will evaluate the full value of EES by applying a techno-economic modelling framework to electric power systems of Canadian provinces. The study intent to provide insights into market opportunities for different storage technologies, attributes of different technologies should carry to provide intended services, and contributions of EES to achieve energy, environmental, and economic goals set by different provinces.

Anticipated Release: April 2019

CANADIAN OIL SANDS SUPPLY COSTS AND DEVELOPMENT PROJECTS (2019-2039)

As part of an annual update, this study will conduct a 20-year production forecast of oil sands bitumen and Synthetic Crude Oil (SCO). In addition to updating the production outlook, supply costs of oil sands projects and GHG emissions profile, economic impact analysis will be evaluated using Input/Output models for Canadian and US impacts.

Anticipated Release: May 2019

CANADIAN CRUDE OIL AND NATURAL GAS PRODUCTION, SUPPLY COSTS, ECONOMIC IMPACTS AND EMISSIONS OUTLOOK (2019-2039)

As part of an annual update, this study will examine the next 20 years of Canada's conventional crude oil and natural gas industries, including production forecasts, supply costs and GHG emissions profile. This study covers onshore and offshore conventional oil, including shale and tight oil activity, conventional natural gas, coalbed methane, tight and shale gas, and the associated natural gas liquids (pentanes plus and condensate only), but does not include oil sands. Also, to updating the production costs and production forecast, economic impact analysis will be developed using Input/Output models for Canadian and US impacts.

Anticipated Release: May 2019

Ongoing Research:

1. **Maintenance of CERI Models and Programs** - Ongoing maintenance and upgrading of CERI computer models and programs.
2. **Maintenance of CERI Databases** - Ongoing maintenance and upgrading of CERI databases.
3. **Natural Gas Report** - Research and updating of CERI's quarterly Natural Gas report, the results of which are used in other ongoing projects.
4. **Oil Report** - Research and updating of CERI's quarterly Oil report, the results of which are used in other ongoing projects.
5. **Electricity Report** - Research and updating of CERI's quarterly Electricity report, the results of which are used in other ongoing projects.
6. **Geopolitics of Energy** - a monthly journal on geopolitical developments affecting global energy markets. It provides analysis, information, perspectives and fresh ideas on the political and economic factors affecting energy and their impact on national energy policies, the international environment and prices.