Brief to the Standing Senate Committee on Energy, the Environment, and Natural Resources on Transitioning to a Low-Carbon Economy

MAIN POINTS PRESENTED IN OUR BRIEF (SUPPORTING INFORMATION ATTACHED)

- **Canadian energy resources should function as an integrated sustainable energy system**

  The concept of a sustainable *energy system* is not new. The 2006 Natural Resources Canada report [a Powerful Connections](http://publications.gc.ca/collections/Collection/M4-40-2006E.pdf) stated “*a systems approach is essential to maximizing the benefits to energy technologies and effectively managing energy innovation.*” Since then energy projects, including how we use energy, have continued to operate in silos with minimal effort to define an *energy system* that would capture synergies among its components. The integration characteristics are illustrated in the graphic [b](http://publications.gc.ca/collections/Collection/M4-40-2006E.pdf). The upper arrow represents a pathway to Reduced Emissions integrated with the lower arrow pointing to Increased Revenue and Jobs. Implementing an energy system policy will identify how the *Electricity, Transportation, Oil and Gas, Emission Intensive Trade Exposed Industries and Buildings* can contribute to a low carbon, growing economy and meeting Canada’s emission targets.

- **An organizational pathway should be established to manage a Sustainable Canadian Energy System**

  Implementing a sustainable energy system requires an organization to develop a pathway to manage Canada’s energy resources, assets and markets and will require visionary leadership, resolve and collaboration. An example of an effective cooperative approach was Premier Peter Lougheed’s 1974 establishment of the Alberta Oil Sands Technology and Research Authority (AOSTRA), which over a fifteen year period established a new industry.

RECOMMENDATIONS FOR INCLUSION IN THE STANDING COMMITTEE REPORT

1) **Adopt a sustainable energy system policy** to guide Canada’s transition to a low carbon economy.

2) **Establish a Canadian Interprovincial Technology and Research Authority (CITRA)** to enhance innovation and accelerate development of Canada’s energy resources, assets and markets in the *Electricity, Transportation, Oil and Gas, Emission Intensive Trade Exposed Industries and Buildings* sectors.

3) **Premiers and Territorial Leaders should advance their 2015 Canadian Energy Strategy with its goal of improving Canadians quality of life and with a high standard of environmental and social responsibility.**

---


[b] Energy System graphic January 2017 copyright by Bowman Centre for Sustainable Energy
Supporting Information

Brief to the Standing Senate Committee on Energy, the Environment, and Natural Resources on Transitioning to a Low-Carbon Economy

INTRODUCTION TO THE BOWMAN CENTRE FOR SUSTAINABLE ENERGY (BCSE)

The BCSE is a not for profit organization\(^1\) dedicated to catalyzing big energy projects that generate sustainable wealth and jobs while meeting our regional, national and international environmental commitments. This document expands on the Brief provided by Dr. Clement Bowman\(^2\), Associate of the Bowman Centre, and founding chairman of the Alberta Oil Sands Technology and Research Authority (AOSTRA).

BCSE associates bring centuries of leadership and experience spanning all sub sectors of the energy world; hydro-electric, small renewables, power transmission, nuclear, coal, oil and gas, pipelines, petrochemicals, transportation, energy storage, energy education, environmental as well as climate change implications and more. This leadership experience includes executive, management, business administration, technical, operations, regulatory, environmental, corporate governance, and stakeholder engagement functions. In pursuit of its vision, the BCSE has collaborated with the Canadian Academy of Engineering, Alberta Innovates, Canadian Society of Senior Engineers and a range of technical and professional engineering organizations.

Our brief is based on the premise that achieving a low-carbon economy will require a strong economy. It's not 'either/or'. Both must be met or neither will be achievable.

ALL ASPECTS OF CANADIAN ENERGY SHOULD FUNCTION AS AN INTEGRATED SUSTAINABLE ENERGY SYSTEM

The Senate Committee on Energy, the Environment and Natural Resources has been authorized to examine and report on the effects of transitioning to a low carbon economy, as required to meet the Government of Canada’s announced targets for greenhouse gas emission reductions. We understand the Committee is focusing on the electricity, oil and gas, transportation, buildings and trade-exposed energy intensive industry sectors. We note that the Committee has also been authorized to examine and report on cross-sector issues and undertake case studies if necessary.

Typically, past studies treated each of these sectors as silos and therefore missed many of the benefits that would accrue from viewing contributions from each sector in the context of an integrated energy system. That disconnected approach served us in the 20\(^{th}\) century to address local, regional and national issues of the time. Such an approach is not appropriate for the 21\(^{st}\) century.

\(^1\) www.bowmancentre.ca
We encourage the Committee to fully examine these sectors as components of an integrated energy system, as recommended in a 2006 NRCan Report ‘Powerful Connections’.

Understanding the interactions among the components of the system would help define and overcome political, social, technical and economic barriers and enable each province and community to optimize energy extraction, processing, delivery and use.

A SUSTAINABLE ENERGY SYSTEM POLICY FOR CANADA

We urgently need to break the ‘economy vs. environment’ paradigm. We are positioned to identify a path forward to a strong economy and environment through a mix of energy options.

Driving the country to achieving a greenhouse gas emission reduction target by a specified date at any economic cost is bound to be a failed strategy. Unless Canada maintains a strong economy, we will not be able to build the new pan Canadian infrastructure needed to meet our carbon reduction commitments.

We suggest Canada’s leaders adopt a policy that guides the provinces and territories in identifying how best to use their vast and unique energy endowments. A policy designed to pull our energy assets; natural resources, human capital, assets, markets etc. into a pan Canadian enterprise, or energy system. Doing so would lead to innovative ways to optimize the inherent value in our vast energy system components and meet our climate change commitments.

The policy should guide our development building on a historical Canadian trajectory of nation-building projects, such as railways, hydroelectric power, communication satellites and others.

The Canadian Academy of Engineering, Alberta Innovates, the Canadian Society of Senior Engineers and the Bowman Centre for Sustainable Energy identified major new big project opportunities in reports such as ‘Canada: Winning as a Sustainable Energy Superpower’ and ‘Canada: Becoming a Sustainable Energy Powerhouse’. Through a clear ‘energy system’ policy, we can capture the socio-economic and environmental advances that these projects offer. Such a high-level policy would be formulated to enable Canada to maintain and enhance the social programs that our citizens treasure while fully achieving our environmental commitments.

Adopting an integrated energy system policy would help Canada make holistic energy and climate change decisions leading to large scale Canadian energy development. This would lead

---

to nation-building, wealth generation and high quality job creation. Economy AND the Environment; indeed, we can have both! But success in both will require visionary leadership, innovation, collaboration, courage and resolve.

**ORGANIZATIONAL PATH TO MANAGE A SUSTAINABLE CANADIAN ENERGY SYSTEM**

It is critically important to recognize that our energy resources are owned and managed by the provinces and territories. But interprovincial movement of resources and products across borders and to export markets is under Federal jurisdiction. Establishing a pan Canadian integrated energy system at first glance is a daunting task. But such challenges have been successfully addressed before.

As always, the question comes down to ‘who leads? Is it the public or private sector? Peter Lougheed found an answer in the 1970s when he created the Alberta Oil Sands Technology and Research Authority (AOSTRA), which went where no government had gone before. AOSTRA was established under Alberta provincial legislation around a unique formula:

- a regional/national vision with the government putting the first money on the table;
- projects identified and performed by the private sector;
- program managed by an arms-length authority;
- 50/50 public/private sector funding;
- new technology owned and made accessible by the government.

By advancing technology, AOSTRA created a new industry. Annette Hester and Leah Lawrence documented the details in *‘A sub-national public-private sector strategic alliance for innovation and export development,’* a United Nations initiative. Jim Balsillie, co-founder of Research in Motion, told the Globe and Mail, that AOSTRA was “Our best 20th century example of mission oriented economic development leadership was Alberta Premier Peter Lougheed’s 1974 establishment of AOSTRA, the Alberta Oil Sands Technology and Research Authority”.

The BCSE believes a new ‘mission oriented economic development’ organization should be established to provide the visionary leadership required to help Canada transition to a low carbon economy while adding wealth, prosperity and jobs. This organization, building on the AOSTRA model as template, would lead the implementation of a pan Canadian energy system.

This new organization, conceptually a Canadian Interprovincial Technology and Research Authority (CITRA), would be the appropriate vehicle to:

---

4 A sub-national public-private strategic alliance for innovation and export development: the case of the Canadian Province of Alberta’s oil sands; Annette Hester Leah Lawrence; Economic Commission for Latin America and the Caribbean (ECLAC).

5 “Canadians can innovate, but we’re not equipped to win”; Jim Balsillie; Globe and Mail, May 8, 2015.
a) launch energy system projects to develop resources owned by the Provinces and Territories, and,

b) work with the Federal Government to prepare pathways for interprovincial and international trade. Big nation-building projects supported by CITRA would drive our economy over the next decades AND transition Canada to a prosperous low carbon economy.

Figure 1 illustrates the CITRA concept.

---

**CITRA Scope - The Canadian Energy System**

- Early Stage and Mission-Oriented Technology Development, Licensing and Export Sales
- Application of Metrics and Tracing Impact (e.g., ProGrid Methodology)
- Hydrogen
- Batteries
- Hydroelectric
- Gas Power
- Natural Gas
- Conventional Oil
- Oil Sand

**Domestic and Export Markets**

- Pipelines
- Hydrocarbon
- Value Added

**Future Energy Corridor**

- Aggregate Energy System
- Meets Emission Targets

---

Figure 1 CITRA Model identifying project opportunities, priorities and issue calls for proposals

**BOWMAN CENTRE FOR SUSTAINABLE ENERGY**

BCSE associates would be pleased to meet with the Committee to discuss our recommendations. We would provide more detail on how an energy system might work, how the AOSTRA model could be used as a template for CITRA, discuss desired future states and metrics for measuring progress as well as answer questions from Committee members and their staff.