Submission to the Expert Panel: National Energy Board Modernization

Trottier Energy Futures Project
Sponsored by
The Trottier Family Foundation
The Canadian Academy of Engineering
The David Suzuki Foundation

March 28, 2017

1. This submission addresses the subject of energy information, more specifically the need for coherent, comprehensive and impartial energy information to promote sound policymaking and public understanding of energy and its interaction with the economy and the environment.

2. This submission is based on the experience gained by the team members during the conduct of the Trottier Energy Futures Project (TEPF) and the expertise of these same team members. It is endorsed by the Trottier Family Foundation, the David Suzuki Foundation and the Canadian Academy of Engineering. The TEFP, completed in April 2016, is undoubtedly one of the most comprehensive quantitative assessments on energy and climate change ever undertaken in Canada. During the course of the project, it confronted the many challenges associated with the lack of meaningful data resulting in some incomplete analysis of important policy options for longer term GHG mitigation.

3. TEFP background

   The Trottier Energy Futures Project was a five year project sponsored by the Trottier Family Foundation, the Canadian Academy of Engineering and the David Suzuki Foundation.

   The objective of the project was to assess pathways for deep reductions in greenhouse gas (GHG) emissions in Canada by as much as 90% of 1990 levels by 2050. The full technical report and modelling results were published and are available to the public through the sponsors' web-sites. The approach was based on the use two quantitative dynamic energy systems models to identify alternative pathways to a low carbon energy system for Canada and to find optimal pathways with respect to cost. A significant effort was devoted to the development and enhancement of the NATEM model, an implementation of the MARKAL-TIMES optimization model for Canada developed by ESMIA Consultants, and the CanESS energy systems simulation model created by whatIf? Technologies Inc.

4. What the TEFP analysis revealed:
   a. Major data gaps, including but not limited to the following
      i. Data from the engineering and scientific community on processes that transform energy sources into energy carriers (fuels and electricity), on processes that use energy carriers to provide useful heat and work, and on technologies for storing

energy are available in the scientific literature, but it is incomplete, fragmentary and often conflicting. An authoritative and systematic compilation of such data is lacking.

ii. Similarly, data on energy sources including resources and reserves of hydro-carbons, hydro-electric potential, wind and solar availability is fragmentary and incomplete.

iii. Statistics Canada does compile data on the supply and disposition of energy carrying commodities, such as electricity, oil, gas coal, that indicate the quantity and value of energy commodities produced and consumed in each sector. But this data does not indicate how and why the energy commodities are consumed. It is necessary to understand how energy carriers meet needs for energy end-uses such as space heat, process heat, lighting, stationary mechanical energy, mobile mechanical energy and electrical plug load. To this end it is necessary to keep track of the stocks of the facilities that use energy carriers such as buildings, appliances, fixtures, vehicles, machinery and equipment and the flows of energy carriers needed to operate those stocks. The stock data is at best fragmentary and it is seldom possible to relate the stock to the energy carrier used to operate the stock.

iv. There is a paucity of data on fugitive emissions from processes that extract, transform and transport hydro-carbons.

v. There is little data on emissions from agricultural activities including changes in the stock of carbon in soils that can be attributed to specific agricultural cropping and tillage regimes and livestock management practices.

vi. Data on other non-combustion emissions, for example from cement making or aluminium refining are not available.

vii. Little is known about the thermal characteristics of the existing stock of residential, institutional and commercial buildings.

b. Major gaps in the understanding of energy and its interaction with the economy, population health, and the environment, for examples the health impacts of criteria air contaminant emissions, and the degree to which energy from non-human sources, robotics and automated process control systems have displaced human labour in the past and could continue to do so.

c. The existing stock of energy systems models in government, academia and business enterprises are not adequate to meet the needs of sound policymaking and public understanding of energy and its interaction with the economy and the environment. Energy systems models are needed to quantify how aspirations for system improvements can be met and what policies might be implemented to help enable these aspirations. Models provide the conceptual framework within which the energy system can be understood and they embody the data that quantify past states of the system and the relationships among the components of the system. To be effective in public policymaking, models must be both accessible to all interested parties and fully transparent. There are several models of the Canadian energy system, none of which meet both of these two important criteria. Most lack transparency. Some are proprietary

to consulting companies and are accessible only to paying clients. Some are proprietary to government agencies that are not mandated to provide access and support to all interested parties. All are underfunded.

5. Conclusions and observations with respect to energy information
    a. Energy information in Canada is in a dire state: it is fragmented, incoherent, somewhat inaccessible, and without clear organizing principles and standards.
    b. The existing stock of energy systems models in government, academia and business enterprises are not adequate for sound policymaking and public understanding of energy and its interaction with the economy and the environment: they too are inaccessible, lack transparency and are underfunded.
    c. Serious consideration should be given to Michael Moore's paper entitled "A Proposal to create a Pan-Canadian Energy Information Organization". The US Energy Information Administration (EIA), with an annual budget of 122 million USD for FY 2016. sets a precedent for an organization with a mandate to "collect, analyze, and disseminate independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment"
    d. There is an urgent and pressing need in Canada for the development of capacity to collect, analyse, and disseminate energy information independently and impartially so as to promote sound policymaking and public understanding of energy and its interaction with the economy and the environment.
    e. The Canadian energy system can only be understood in a global context. Energy, greenhouse gas emissions and global warming are all global issues that are strongly interrelated. The mandate of the organization proposed should be extended to informing the Canadian public with respect to the climate and energy at the global scale.

Robert Hoffman Oskar Sigvaldason

On behalf of the Trottier Energy Futures Project
Sponsored by
The Trottier Family Foundation
The Canadian Academy of Engineering
The David Suzuki Foundation