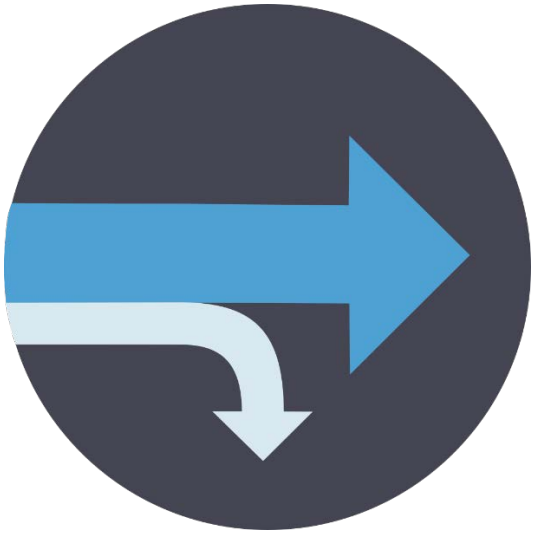
Energy Modelling Initiative – Initiative de modélisation énergétique

Bringing the Tools to Support Canada's Energy Transition – Outiller le Canada pour réussir la transition

Long-Term Plan Proposal



Draft

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Natural Resources Canada Ressources naturelles Canada
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INSTITUT DE L'ÉNERGIE TROTTIER

POLYTECHNIQUE MONTRÉAL

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Context

The mandate for the Energy Modelling Initiative (EMI) has been given by Natural Resources Canada (NRCan) to the Institut de l'énergie Trottier at Polytechnique Montréal (IET), under the leadership of Louis Beaumier (IET), Madeleine McPherson (IESVic) and Normand Mousseau (IET/UdeM). Following a workshop organized by NRCan about the "Development of an Open Modelling Platform for Electrification and Deep Decarbonization Studies", NRCan has sought to facilitate the adoption of federal and provincial policies fostering electrification and deep decarbonisation of Canadian energy systems through a nationally coordinated program; a call for proposal was issued to initiate a dialogue with Canadian Electricity System Modellers and lay the foundation for establishing a modelling network to "support decision making by policy makers and other stakeholders for the transition towards a clean electric future".

The NRCan call for proposal identified the overarching challenge of the initiative as decarbonizing the economy and transforming of the complex energy system in Canada. Given the lack of an independent institution and research coalition that can advise stakeholders on various aspect of these challenges, NRCan called for a regular mechanism to bring together and integrate Canadian energy modelling expertise and develop and sustainably maintain a "Canadian community of electricity system modellers".

In response to the NRCan's call, the proposal for the Energy Modelling Initiative focused on four goals:

1. To establish an inventory of Canadian energy modelling expertise across academia, governments and the private sector;
2. To convene the modelling community in order to foster collaboration;
3. To demonstrate the relevance and value of this community for realizing a Clean Electric Future; and
4. To develop a long-term work-plan for a governance framework and a platform for models and tools to support a strong Canadian Community of Electricity System Modellers.

It is to address the latter that the current proposal has been developed, drawing on the input from conversations at the three regional workshops and comments provided on a straw dog proposal circulated among the network.

This draft proposal will be presented in more detail and its elements discussed at the National Forum – the last convening event of the initiative arranged for December 17th and 18th in Montreal, Quebec.

A final proposal must be submitted to NRCan no later than by the end of March 2020.

Notes to readers:

1. For simplicity and readability, the proposed structure/organisation will be referred to as the **EMI** in this document.
2. This icon ⚠ identifies notes from the authors. These notes either raise specific elements to discuss or give context to the text that they precede.

1. Introduction

This current draft of the EMI, that answers the request for a long-term plan, is the result of numerous reflections and discussions, that took place through workshops, feedback on the straw dog proposal and other exchanges with various stakeholders.

We hope to solicit one last round of feedback for the EMI at the national forum before finalizing the long-term plan proposal for institutionalizing this initiative.

2. Vision, Mission, Values

2.1. Vision Statements

The original vision for the EMI was oriented towards the values of the mandating institution—the Emerging Renewables Power Program of NRCan. As a result, decarbonization, electrification and transition towards a clean electric future have been key values in the original vision statements of this initiate.

However, it had been suggested that instead of a vision oriented towards specific value propositions, the initiative could also be framed in a way that it would support modelling as an objective tool for decision-making. As such, two vision statements have been contemplated and frame for a final round of discussions.

Oriented Vision:

Catalyze Canada's transition towards sustainable, decarbonized, energy systems through sound policy design and investment decisions.

Neutral Vision:

Support fact-based and effective decision-making concerning energy with high quality analysis supported by the Canadian energy modelling community.

2.2. Mission Statement

The mission statement is based on the initial objectives of the initiative and details the means necessary to achieve the vision.

Strengthen the relevance of Canadian modelling expertise by:

- **Convening a network** of energy modellers along with energy sector stakeholders to foster dialogue;
- **Providing a shared platform** to facilitate interactions between stakeholders and sharing resources among the modelling community;
- **Supporting decision making** for policy and economic questions by improving continuity, consistency and timeliness in response, with models that are maintained over time.

2.3. Values

The following lists the most prominent values identified throughout the regional workshops and the consultation process:

- Science and evidence-based
- Collaboration
- Transparency
- Openness
- Timeliness

2.4. Stakeholder groups

The following lists stakeholder groups identified and refined throughout the regional workshops and the consultation process. Opinion diverge, however, as to how wide the range of stakeholders should be for the EMI.

- Energy Modellers
- Researchers interested in energy and environmental, economic and climate change policy
- Policy makers
- Energy Regulators
- Utilities
- Industry
- Civil society (NGOs)
- Media (specialist and general)
- Public (key audiences for results?)

3. Activities and Deliverables

Based on the comments from the workshops and the straw dogs, a number of activities and deliverables appear especially important, including: convening modelers, offering training on selected models, facilitating access to data, building reference scenarios and datasets and providing a rapid access to models/modellers for policy makers and other interested parties.

Following are the main expected deliverables and the activities required to answer these needs as well as those identified previously, grouped under the three axes of the mission.

3.1. Convening the network

The convening role of the EMI, which would facilitate exchanges between modellers and stakeholders in general was well supported and often seen as one of the most important roles for the EMI. Modellers particularly emphasized the importance of this role.

3.1.1. Annual Forum

- Organise a gathering of stakeholders to assess progress, review workplan and adjust accordingly;
- Highlight models and showcase capacity.

3.1.2. Thematic Workshops

- Plan workshops on specific activity sectors, regions or modelling issues;
- Use outcomes as inputs for the Annual Forum;
- Respond and contribute to emerging initiatives.

3.1.3. Training

- Develop training material on selected models in order to increase user base.

3.2. Providing a shared platform

There is also a strong support for a shared platform, especially the inventory and reference scenarios and data sets.

Many questions have been raised regarding interaction between the EMI and the newly created Canadian Center for Energy Information.

A recurring concern regards access to data, especially private data that might not be provided through the CCEI. Therefore, we pay a particular attention with respect to the role of EMI for managing the intellectual property (IP) issue and facilitating data sharing.

Finally, while there is some disagreement as to the role of EMI in developing interfaces to facilitate the model and data integration and sharing, many commented positively on this role.

3.2.1. Online Modelling Inventory

- Gather and organize Information on energy-related modelling activities, experts from the academic, non-profit and private sectors, and end-users of those experts' services;
- Update and maintain website and database.

3.2.2. Reference Data Sets

- Gather currently missing data from publicly available sources;
- Design and implement data access control for IP protected data;
- Develop data adaptation tools to streamline data collection on a per source basis;
- Establish criteria and protocols for the selection and labelling of reference data sets;
- Collaborate and coordinate with the *Canadian Center for Energy Information*.

3.2.3. Reference Scenarios

- Establish criteria and basic assumptions for national and regional reference scenarios;
- Liaise and coordinate with stakeholders to update the criteria and assumptions;
- Identify and collaborate with relevant organization to establish reference scenarios.

3.2.4. Model Data Interfaces

- Develop data adaptors to translate reference data sets into model specific data formats to streamline model maintenance and operation;
- Develop processing tools for modelling results.

3.3. Supporting decision making

One of the objectives of this structure is to support decision making, including governments and structures such as the Canadian Institute for Climate Choices. The following activities are therefore targeted at the potential users of the EMI and not the modellers. Numerous comments showed that this aspect was not always well explained. An issue identified particularly early on – and that led to the current exercise – is the fact that it is difficult to maintain models of interest over time, due to the structure of funding in Canada. Such long-time support is essential for year-to-year comparison, benchmarking and more. The support of selected models should not be opposed to funding a wide range of models nor their use by policy makers.

3.3.1. Model Selection Process

- Co-develop a selection process for models that will be supported by the EMI;
- Make the supported models available on the shared platform along with corresponding data sets.

3.3.2. Model Maintenance

- Update selected models with most recent data;
- Support their documentation and facilitate their use;
- Create and update corresponding reference data sets.

3.3.3. Model Operation

- Maintain a list of available trained personnel for selected models;
- Provide additional training when necessary

3.3.4. Reports and Studies

- Maintain a repository of modelling studies that can serve as a reference for inquires and requests;
- Produce short reports on specific models or their application, to raise awareness, disseminate information and build knowledge on modelling.

3.3.5. Project office for modelling services

While there is considerable support for such a project office, some objected that it could bias the choices of policy makers and be detrimental to private consultants, for example. The activities were adapted to address this issue.

- Establish regional points of services for any modelling related request from policy makers and other stakeholders;
- Provide unbiased information on available expertise both public and private and, if needed, direct requests to matching expertise;
- Facilitate the interpretation of requests and communication of results;
- Offer project management and coordination services to help with the timely delivery of results.

4. Proposed structure

The proposed structure emerges from the mandate, the activities and deliverables as well as from many comments regarding its capacity to interact, beyond the federal government, with other governmental levels and entities.

Responses to the straw dog seem to support predominantly either a not-for-profit independent or a university-based organisation with contradictory arguments as to which of these organisations would be best placed to interact will all stakeholders – particularly the provinces – as well as leverage other funding coming from research councils, governments, etc.

4.1. Basic structure

Based on the comments, it is clear that the EMI structure should:

- Be multisite, to facilitate interactions amongst stakeholders and modelers;
- Have a diverse staff able to handle:
    - Technical issues linked to database, data and code management;
    - Operations supporting activities, training, demands from stakeholders;
    - Liaison/communication with stakeholders and the ecosystem;
- Interface with partners, including academics, consultants and various agencies;
- Serve the needs of the policy makers.

4.2. Organisation

While the National Forum is not the best place to discuss small details about the EMI, we believe that providing some basic organisation details is essential to help visualise the structure.

- Board of Directors (including regional partners)
- Executive Committee (formed by regional directors) and Executive Director or Chief Executive Director (depending on the nature of the organisation)
- Three to five regional offices
- Supporting councils:
    - Advisory council composed of stakeholders in general;
    - Scientific council composed of predominantly of modellers, from academia, private and public sectors.

4.3. Staffing

The staffing is composed to ensure that the mandate can be fulfilled. We estimate that meeting the minimum expectation requires a staff of about 15 people, for an annual budget of around 2 M$.

While management, operation and liaison people should be stationed in the EMI regional offices, some of the technical staff could be working in various groups across the country for maintaining models and data sets.

Of course, as the EMI attracts funding from other levels of government, it is expected that the offices will grow.

4.3.1. Management (3 people)

- Executive director or Chief Executive Director (see *Type of organisation* for details);
- Regional directors (either an academic or one of the staffs as part their overall tasks);
- Two support staff for
    - Finances;
    - Human resources.

4.3.2. Technical staff (7 people)

- Maintain the modelling inventory (including models, modellers and users);
- Assemble, maintain data sets; develop interface for data; establish reference data sets;
- Maintain models (mostly update data); develop documentation;
- Work with researchers for various developments.

4.3.3. Operations (2 people)

- Organise workshops, forum, meetings;
- Organise training both for modelers and policy makers;
- Correspond with stakeholders, respond to demands.

4.3.4. Liaison (3 people)

- Develop intellectual property (IP) rules to facilitate use of data and models;
- Coordinate with the ecosystem – CCEI, CICC, etc.;
- Liaise with policy makers and other stakeholders, including provinces and territories, First Nations, municipalities, etc.;
- Lead strategic development, co-identification of data, models to be supported, etc.;
- Leverage funding from other sources

4.4. Type of organisation

⚠ *While most comments seemed to consider that both a not-for-profit and a university-based organisation could respond to the need of most policy makers regulators and industries, questions were raised as to which of these two types of organisation could best include private and agency-based modellers and, as important, work with provinces. Since it was not possible to extract a dominant position from the various comments, we frame here two propositions that adopt the same overall multisite structure.*

4.4.1. Not-for-profit

A not-for-profit organisation would sit outside university and government. Its governance would be independent, with an unpaid board composed of stakeholders, including policy makers at various levels, industry and regulators.

Its daily activities would be led by a permanent CEO located in one of the regional offices.

This not-for-profit could support some staff in various modeling groups. While it would be able to work with government, agencies and private sector, it would not be able to directly access some of the federal and provincial research funding.

4.4.2. University-based

In a university-based organisation, each regional office would be led by a Regional Scientific Director, a local Faculty. On rotating basis (every 2 to 3 years), one of these would be identified as the Leading Scientific Director.

This structure would include a board, composed of university representatives as well as various stakeholders.

The daily activities would be led by a permanent executive director located in one of the regional offices.

As an academic structure, through its scientific directors, the EMI would be able to directly access research funding as well as work with government, agencies and private sectors.