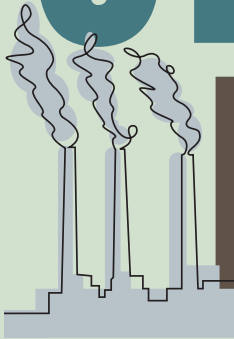
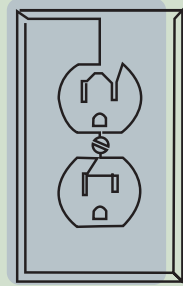


**FINAL REPORT  
OF THE  
WORKSHOP  
SERIES ON**

**ENERGY**

**SYSTEMS**



**LITERACY**

**IN CANADA**



**POLLUTION PROBE**  
CLEAN AIR. CLEAN WATER.

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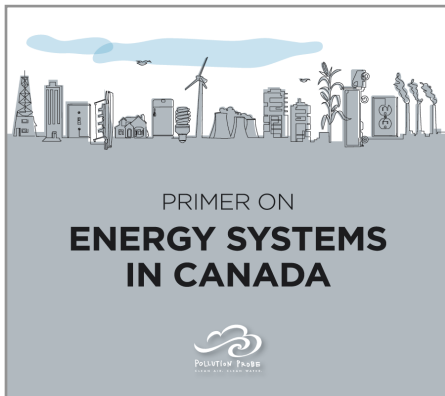
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# ENERGY SYSTEMS LITERACY IN CANADA WORKSHOP SERIES:

## *Final Roadmap Report*



**Energy systems literacy can be thought of as the essential platform for fluency and comprehension that allows individuals to consider energy issues with critical analysis, inference and synthesis; to articulate energy impacts and implications with accuracy and coherence; and to use and to manage information about energy as the basis for informed decisions and creative solutions development.**

**Energy systems literacy can help narrow the gaps that culturally and politically divide Canadians by revealing how energy connects us and reflects common values and aspirations.**

## Context

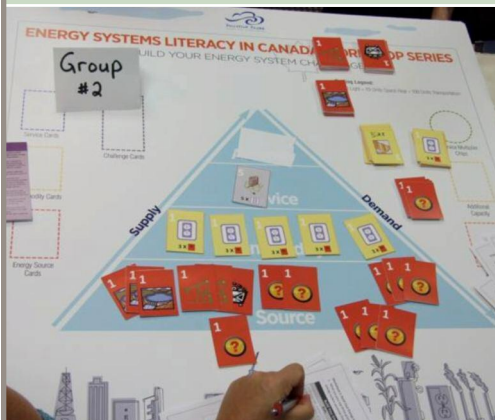
During the past three years, Pollution Probe has participated in multiple national dialogues aimed at producing a national energy strategy, including the Energy Framework Initiative, the Banff Dialogue, the Winnipeg Consensus and the Energy Policy Institute of Canada's consultations. A unifying theme throughout each of these dialogues was the need for a *higher degree of literacy among Canadians in the energy systems of which we are all a part.*

Inspired to tackle this issue directly, Pollution Probe produced the *Primer on Energy Systems in Canada*, which introduces readers to basic concepts, conventions and vocabulary that support education and discussion about energy from a *systems perspective*. Viewing energy issues through a systems lens allows us to recognize the interconnections that comprise the networks of technology and infrastructure that link energy end-users and energy sources, as well as the social, economic and environmental interrelationships that define the attributes of Canada's energy systems.

The Primer has become one of Pollution Probe's most popular educational resources, and many organizations have reached out with offers of collaboration and partnership to distribute its contents to new audiences. In response to the demand for further material and resources, Pollution Probe launched a cross-Canada series of workshops on energy literacy.



Halifax workshop participants playing the Energy Systems Pyramid Game



**The Energy Systems Pyramid Game was developed to orient workshop participants to working with systems-based concepts. Faced with a series of abstract challenges, participants built energy systems that balanced supply and demand, while identifying the risks and opportunities of their unique solutions. This helped to foster systems-based dialogue, to identify critical elements of an energy system and their interdependencies, and to test the functionality of the concepts, conventions and vocabulary used in Pollution Probe's *Primer on Energy Systems in Canada*.**

## Workshop Series

This national initiative came to be known as the Energy Systems Literacy in Canada Workshop Series. It was designed to promote a new approach to engaging Canadians in a dialogue about energy – a dialogue that is firmly rooted in a “whole-systems” perspective that recognizes the interconnections between the energy sources that we draw on to deliver the energy services that we demand. Key experts, decision-makers and influencers from across the country were convened through the series of six regional workshops, held between February and September 2011. The series launched with two successful, plenary session-style workshops, held in Toronto and Vancouver. The remaining four workshops, which focused on stakeholder engagement and consultation, were held in Halifax, Montreal, Calgary and Ottawa.

## Goal

The goal of the workshop series was to identify the core elements of an energy systems approach for Canada and to identify and develop the strategies needed to educate, to inform and to engage key stakeholders to bring about a more sustainable energy future for Canada.

## Intended Outcomes

The intended outcomes of the workshop series were to:

1. Collaborate and build partnerships
2. Clarify the core elements of an energy system
3. Evaluate the *Primer on Energy Systems in Canada* as a tool to enhance energy systems literacy
4. Define further areas of investigation
5. Exchange knowledge

The key findings and opportunities identified during the workshop series are consolidated and reported in this document (see next section). Based on these findings, Pollution Probe proposes a long-term vision of energy systems literacy in Canada, as well as a shorter-term, five-year vision to drive the development and implementation of an actionable program to achieve measurable and meaningful improvements that is supported by funders and collaborating partners.

## LONG-TERM VISION

Canadians use their understanding of energy systems to create economic value, to contribute to sensible policy and to make informed choices.

## FIVE-YEAR VISION

A comprehensive, pan-Canadian program exists to elevate energy systems literacy levels among key audiences in Canada, targeting them with learning tools and engagement strategies developed according to their needs, and coherently executed through a collaboration of capacity organizations, with Pollution Probe as the administrative lead.

## Findings and Strategic Recommendations for Moving Forward

The findings and the associated recommendations that follow are based upon what we heard from workshop participants and are substantiated by the “As Said” reports that can be found on Pollution Probe’s website, [www.pollutionprobe.org/publications](http://www.pollutionprobe.org/publications). We listened to stakeholders for continuity and innovation throughout the workshops, and the recommendations reflect the emergent themes.

### A. RECOMMENDATIONS FOR ESTABLISHING AND MANAGING AN ENERGY SYSTEMS LITERACY PROGRAM

#### **Finding A1:**

*For any energy systems literacy initiative that is created, there should be a coordinated national approach underlying its structure. This would ensure appropriate oversight and strategic direction. Although a secretariat was not explicitly mentioned, this is believed to be the best approach for moving forward, based in best practice.*

#### **Recommendation A1. Create Secretariat:**

To establish a functional secretariat that will oversee all major decisions regarding the energy systems literacy initiative, establish appropriate terms of engagement and enable program partners to collaborate under a common vision.

#### **Finding A2:**

*There are currently many resources and tools in Canada and elsewhere that should not be duplicated in a national literacy initiative. Workshop participants felt that it was important to identify these resources and to use them appropriately, and thus avoid “reinventing the wheel”.*

#### **Recommendation A2. Identify Existing Resources:**

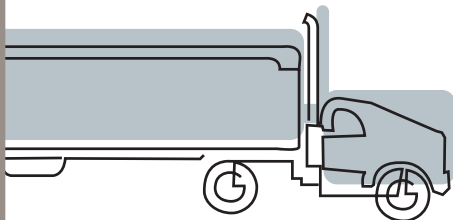
To create a database of pre-existing energy literacy resources that could be used and incorporated into the initiative. This step would ensure that there is no duplication of efforts and that it is a truly collaborative effort.

#### **Finding A3:**

*Workshop participants felt that there needed to be a “strategic” approach toward a national energy systems literacy initiative. This was to coordinate efforts between the different collaborators and to ensure that program elements were delivered in a cohesive manner, reinforcing fundamental concepts.*

#### **Recommendation A3. Develop Planning Document:**

To create a five-year strategic planning document that will identify goals and objectives, program elements, target audiences, timeframes, deliverables, key performance indicators, collaborating organizations and accountability for the projects executed through the secretariat.



**Finding A4:**

*It was identified that any national program should be communicated throughout Canada using an effective brand. This marketing effort should reflect a proper assessment of audience and market needs and enable strong national partnerships.*

**Recommendation A4.  
Develop Marketing and Communications Strategy:**

To develop a robust marketing and communications strategy that clearly communicates the program and brands it accordingly, that is informed by a stakeholder and market needs assessment and that fosters and facilitates organizational partnerships across Canada.

**Finding A5:**

*There was consensus among the workshop participants that the program should be monitored to assess its effectiveness, in terms of both the delivery of program elements and in quantifying improvements in energy systems literacy levels among target audiences. Key performance indicators would be established for assessing effectiveness and to ensure continuous improvement.*

**Recommendation A5.  
Develop Key Performance Indicators:**

To develop systems of performance measurement and accountability in conjunction with planning efforts. For example:

- Quantity and quality of audiences targeted and successfully engaged.
- Baseline literacy levels established in target audiences, and demonstrated improvement against those levels.
- Quantity and quality of collaborating partners.
- Educational tools and materials development – popularity of use.
- Pre- and post-survey at literacy point sources to determine the effectiveness of the materials.
- Quantity of online “hits” by audience and demography.
- Strategic use of existing resources.
- Profile of initiative in media and among decision-makers in government and industry.
- Impact on national energy policy development.





## B. RECOMMENDATIONS FOR PROGRAM ELEMENTS (YEARS 1 TO 3)

### **Finding B1:**

Workshop participants articulated the need to accurately define the target audiences and the literacy objectives for each audience, particularly with regard to future iterations of the Primer and related program elements. Defining target stakeholder groups, prioritizing them and understanding their needs will be critical to successful program design and implementation. This finding links closely to the marketing and communications strategy (identified in Recommendation A4).

### **Recommendation B1. Define Target Audiences:**

To prioritize, define and conduct a needs assessment of key audiences to be engaged. The needs assessment will identify educational resources and tools that have already been or should be developed. The following audiences and stakeholder groups have been consistently identified throughout the workshop series:

- Change Agents, Thought Leaders
- Media
- Politicians and Senior Government Officials:
  - Municipalities, city planners/designers
  - Provincial energy policy-makers, system planners
  - Federal government, standards developers
- Industry:
  - Investors, project financiers, venture capitalists
  - Producers
  - Developers
  - Industrial users
- Academic Curricula (initiatives tailored to age group):
  - Elementary
  - High school
  - Colleges/universities
- Voters/Electorate/Energy End-users

### **Finding B2:**

Many workshop participants spoke to the need for further engagement of stakeholders in regions of Canada to which Pollution Probe has not yet taken its energy systems literacy workshop. This was considered important with regard to identifying audiences, literacy needs and partnerships that would underpin a program of truly national scope and scale.

### **Recommendation B2. Extend Workshop Series:**

To conduct 15 to 20 additional Canadian workshops to engage audiences in all regions of Canada, to gather further intelligence on the core elements of an energy system, to support a more detailed and regionally complete needs assessment and to build a truly pan-Canadian network of supporters and collaborators for the energy systems literacy initiative.

### **Finding B3:**

Workshop participants felt that the Primer on Energy Systems in Canada and future educational resources that are yet to be developed should be more broadly distributed and strategically tailored to audiences in different sectors of society.

### **Recommendation B3. Disseminate Targeted Educational Resources:**

To disseminate the *Primer on Energy Systems in Canada* and any additional print or online resources to identified target audiences.

### **Finding B4:**

Workshop participants felt that the Primer on Energy Systems in Canada was a progressive and well-rounded document that generally succeeded in creating a basic language for energy systems in Canada; however, many stakeholders also felt that additional resources and supplements were needed to help further explain key concepts that are specifically relevant to different stakeholder groups.

### **Recommendation B4. Enrich and Develop More Educational Resources:**

To complement and supplement the educational value of the *Primer on Energy Systems in Canada* with additional content that details specific technologies and systems, such as district energy systems, and to enrich the sections that explain the social, economic and environmental factors governing Canada's energy systems, including system attribute comparison tables, energy systems governance structures, life cycle assessment, domestic and international examples of best practice, consumer-oriented energy stories, geo-referenced layered resource maps and aboriginal issues and priorities.





### **Finding B5:**

All stakeholders agreed that online, interactive, informative and engaging digital resources should be created to enhance energy systems literacy and to enhance access to information by different audiences. They believed that this is the way forward, as most people access information via online digital resources in which they can self-navigate the available content.

### **Recommendation B5.**

#### **Create Digital Tools:**

To develop online digital learning tools to help increase energy systems literacy in Canada. The following are examples of identified needs:

- **Online Digital Primer:** To develop an online, interactive and self-navigable version of the *Primer on Energy Systems in Canada*, permitting the user to explore the energy system in Canada at his or her own pace and discretion.
- **Online Energy Systems Game:** To create a game that teaches young adults and energy stakeholders alike about how energy systems evolve, the interconnections and interdependencies that govern system behaviour, and the economic, regional, social and environmental system attributes that result.
- **Video:** To create a documentary-style video explaining what an energy system is, how it relates to and interacts with end-users and the major issues that bear upon the systems in Canada. The objective of the video would be to elevate each audience's appreciation of the nature of Canada's energy systems – their social, economic and technological dimensions – thus improving the quality of public engagement and individual decision-making.
- **GIS-based Online Resource Maps:** To generate comprehensive maps of all kinds that can be layered with different data points (e.g., maps of developed and undeveloped energy resources in Canada). Such maps would require national and regional data. An energy flow diagram with updated and interactive data has also been suggested as a useful tool for relaying quantitative information about resource and commodity flows through Canada's energy systems.
- **Consumer-focused Energy Tracking Tool:** This would be an online tool through which energy consumers could track their energy use, as well as associated costs and impacts, which is intended to facilitate better decision-making (i.e., energy conservation, efficiency and policy engagement based on desired energy system attributes).
- **Online Community of Practice:** To develop an open-source information clearing house for practitioners of energy systems education. This would facilitate continuous updating of content, identification of further areas of investigation and the fostering of a cross-Canada community of collaboration.

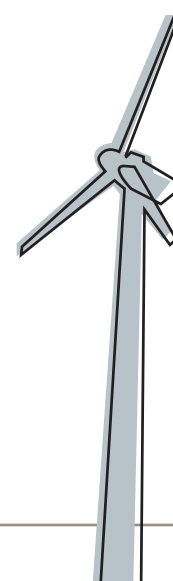
### **Finding B6:**

It was felt that youth need to be engaged and educated on energy systems now, as they will be the future change agents and decision-makers. A national competition that would engage post-secondary students in a cross-disciplinary, problem-solving energy system challenge was an innovative suggestion from multiple workshop participants.

### **Recommendation B6.**

#### **Develop Canada-wide Energy Literacy Competition:**

To develop a Canada-wide competition that would involve industry, designers, planners, policy-makers and university students (e.g., political science, engineers and sustainability practitioners) to form regional teams that would define a Canadian energy system problem and create a real-world, pragmatic “systems-based” solution, identifying economic, social and environmental attributes, as well as policy options to enable its implementation. The solutions could form the bases of further educational materials.



## Thoughts from Guest Speakers on the Importance of Energy Literacy

### **Ralph Torrie,**

*Managing Director at Trottier Energy Futures Project*

Torrie spoke about the assumptions that analysts and decision-makers relied on to forecast, incorrectly, future demand for energy commodities prior to the energy shocks of the 1970s. Looking forward, to tackle complex issues, such as greenhouse gas emissions and climate change, Torrie believes that new frameworks are needed to help us to understand and to characterize the underlying drivers of demand for energy services, and to identify the opportunities to decouple these demands from the provision of amenities. Torrie said that Pollution Probe's *Primer on Energy Systems in Canada* is a big step forward in defining that framework, since it regards demand for energy services and amenities as critical parts of the energy system. Torrie further added that a common language around energy systems is needed to enable collaboration on developing more sustainable energy strategies.

### **Dr. David B. Layzell,**

*Executive Director of the Institute for Sustainable Energy, Environment and Economy (ISEEE) at the University of Calgary*

Layzell introduced the concept of an Energy System "Chain", in which the links that form the connections between energy sources and end-user were identified and characterized. He articulated some of the main attributes of Canada's energy system by quantifying energy commodity flows through it, as well as the portion put to useful work and the portion lost as waste heat. Some of the key aspects of

energy flow in Canada include large exports to the US, a high quotient of fossil fuels and a number of inefficiencies embedded in the system. This energy system, nonetheless, has facilitated a high quality of life for many Canadians. Layzell presented the challenges and opportunities inherent in transforming our energy system. The main challenges include: addressing greenhouse gas emissions and climate change, the US demand for "secure" supplies of energy, the relatively low price of energy and high costs associated with securing sources in politically unstable regions. Layzell believes that we must elevate the quality of the debate that divides energy and environmental advocates, and that this is critical to strategically position Canada for the next energy system transformation. To achieve this sophisticated level of dialogue, Layzell believes that we need to improve our energy systems literacy.

### **Daniel Gagnier,**

*Chair of the International Institute for Sustainable Development*

Gagnier reflected upon the current geopolitical situation, including such topics as the global economic crisis, China's ownership of the majority of US debt, global clean-tech investments and intractable climate change issues. He also highlighted the difficult role that energy plays in Canada due to our standard of living, our harsh climate, the long distances that we need to travel and our energy assets and system attributes, which are regionally differentiated. This served to highlight the complexities of Canada's involvement in a globalized energy market, and the challenge that this will pose in Canada's

decision-making with regard to forward-looking energy policy and strategy. Gagnier stressed the extremely important role that Canada's energy systems will play in our future, and how Canada could deploy these resources to become a major international player. As such, a national energy strategy will need to be developed sooner or later. Gagnier believes that energy systems literacy is a priority element in this strategy, giving Canadians the tools that they need to make better choices and to enable productive participation in energy policy development that benefits all Canadians.

### **Peter Watson,**

*Deputy Minister, Alberta Energy*

Watson spoke about the dichotomy of multiple stakeholder perspectives when looking at contentious energy issues in Canada. Using the oil sands and nuclear energy as case examples, Watson demonstrated the "tunnel vision" that different stakeholders can use to frame their arguments and decision-making. Watson supports energy systems literacy as a foundational element that can help bring about a more balanced discussion between different stakeholder groups. He also believes that energy systems literacy will equip all Canadians with the information that they will need to enhance their decision-making capacities.

## Key Participating Energy Stakeholder Organizations Engaged

Alberta Energy	Canadian Renewal Fuels Association	Heritage Gas	Ontario Ministry of Energy
Alberta Energy Resources Conservation Board	Canfor Pulp	Hoggan and Associates	Ontario Ministry of the Environment
AltaGas	Canadian Association of Petroleum Producers	Hydro Ottawa	Ontario Power Authority
Association of International Automobile Manufacturers of Canada	Carleton University	Hydro Québec	Ontario Power Generation
Azure Dynamics	Genovus Energy	IBM	Ottawa Centre for Regional Innovation
BC Automobile Association	Clayton Developments	Imperial Oil	QUEST Canada
BC Bioenergy Network	Clean Energy BC	Industry Canada	RBC
BC Hydro	Climate Change Central	International Institute for Sustainable Development	Real Property Association of Canada
BC Ministry of Energy and Mines	Climate Change Nova Scotia	J.R. Century Petroleum Consultants	Renewable Energy Solutions
BC Ministry of Transportation & Infrastructure	ConocoPhillips Canada	Kenneth Ogilvie Consulting	SEEDS Foundation
Boldon Group Inc.	Consumers Council of Canada	L'Association de l'industrie électrique du Québec	Senate of Canada
Bullfrog Power	Dalhousie University	Lignol Innovations	Shell Canada
Calgary tour de nuit Society	David Suzuki Foundation	M.K. Jaccard and Associates	Stantec
Canada Science and Technology Museums	Department of Energy, Government of Alberta	MacLeod Dixon, LLP	Summerhill Group
Canada West Foundation	Devon Canada	Manning Centre for Building Democracy	Suncor Energy
Canadian Association of Petroleum Producers	DW Environmental	Mitchell & Associates Consulting	Sustainable Development Technology Canada
Canadian Bioenergy	Earncliffe Strategy Group	National Energy Board	Sustainable Prosperity
Canadian Council of Chief Executives	Ecology Action Centre	National Research Council	TELUS World of Science
Canadian Defence and Foreign Affairs Institute	Efficiency Nova Scotia	Natural Resources Canada	The Capital Hill Group
Canadian District Energy Association	Enbridge Gas Distribution	Newalta Corporation	The Delphi Group
Canadian Electricity Association	Energy and Materials Research Group, Simon Fraser University	Nova Scotia Climate Change Directorate	The Pembina Institute
Canadian Energy Pipeline Association	Energy Council of Canada	Nova Scotia Community College	Tides Canada Energy Initiative
Canadian Energy-from-Waste Coalition	Energy Futures Network	Nova Scotia Department of Energy	Torrie Smith Associates
Canadian Gas Association	Environment Canada	Nova Scotia Department of the Environment	Toyota Canada
Canadian Hydrogen and Fuel Cell Association	Equilibrium Communities Initiative Natural Resources Canada	Nova Scotia Power (an Emera company)	Transport Canada
Canadian Hydropower Association	FortisBC	Offsets	Union Gas
Canadian Nuclear Association	FPIInnovations	On Target	Université Laval
Canadian Oil Sands	Gaz Métro	Ontario Centres of Excellence	University of British Columbia
	Golder Associates	Ontario Energy Association	University of Calgary
	Green Power Labs	Ontario Independent Electricity System Operator	University of Montreal
	Hatch		University of Ottawa
	HEC Montréal		University of Toronto
	Hemmera Energy		whatIf? Technologies

# QUICK INFO

207

Number of individual experts and key energy stakeholders participating in the workshops.

## STAKEHOLDER FEEDBACK

*“Great session - very happy to both sponsor and participate. Look forward to more....”*

Number of organizations participating in the workshops.

124

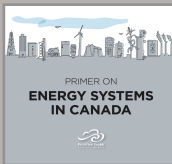
*“Well worth attending! Really enjoyed, good interaction, much more engaging than I anticipated. Glad to have participated, thank you!”*

85%

OVERALL WORKSHOP SATISFACTION SCORE

*“Very worthwhile initiative and workshop opportunity, very much appreciated.”*

Number of hard copies distributed to date of the *Primer on Energy Systems in Canada*.



1,257

*“Good pre-read and preparation for the event. Right mix of skills and experience given the caliber of the group. An interactive program is critical.”*

978

Number of digital downloads to date of the *Primer on Energy Systems in Canada*.

**Advisory Council:** Paul Cheliak (Canadian Gas Association) • Mike Cleland (Canada West Foundation) • Pierre Guimond (Canadian Electricity Association) • Fiona Jones (Suncor Energy) • Hon. Senator McCoy • Jon Mitchell (Cenovus) • Sandra Odendahl (RBC) • Mary Ellen Richardson (Canadian District Energy Association) • Ed Seaward (Union Gas)

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