

A NATIONAL ENERGY POLICY FOR CANADA

Jim Collinson¹

Executive Summary

Purpose: integration of energy, environment and economic factors into a national energy policy and strategy for Canada.

To justify developing a science based energy policy and strategy for Canada, taking into account Canada's energy, economic and environmental realities; including the diversity of Canada's energy opportunities and needs and the objectives to be achieved.

In addition, to outline a process to define that strategy including practical options for developing a vision for energy security, economic affordability and environmental sustainability.

Complexity of the current situation

- **Energy, environmental and economic factors** are interrelated and cannot be considered in isolation of each other;
- **CO2 emissions:** recent concerns about global warming and the degree it might be affected by human activities has raised questions about “greenhouse gases”, particularly CO2. This conventional wisdom imposes tremendous political pressure to do something immediately about CO2 emissions.
- **Energy** from traditional sources, world-wide, appears to be **peaking**, as evidenced by limits to reserves of oil, natural gas, and hydro potential. Although increases in reserves can be cited, these need to be seen in context.

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- Oil reserves deep under the sea represent considerably higher environmental and economic risk than land based ones;
- Natural gas reserve increases from shale fracturing processes indicates less long term potential than initially believed;
- Hydro potential lies in more remote locations with associated flooding and compensation impacts; and
- Coal reserves are considerable, but technology is a long way from solving the associated emissions problems.
- **Unsubstantiated common assumptions abound:** for example, clean electricity can be produced by solar and wind energy; nuclear energy is unsafe; hydro energy is clean as long as no flooding occurs and anyone affected is well compensated; electric cars are environmentally better than emissions from fossil fuel powered vehicles (true if electricity produced by coal fired generators vs high efficiency Diesel?); etc.
- **Mistaken perceptions,** for example, ignore reliability and variability of wind and solar power, and remember 50 year old nuclear technology vs current high safety standards with the latest technology for nuclear power, including using up much of the residual power stored in so-called “spent fuel rods”.
- **Political realities within Canada: The distribution of responsibilities** (Sections 91 and 92, Constitution Act, 1982) for resources, environment and economic initiatives amongst senior governments in Canada adds complexity to the policy/strategy role.
- **Energy projects of a magnitude to reduce current emissions will take 10 to 15 years to put in place after a decision to do so is taken.**
- **Global political realities** (both supplier and consuming nations) are complex, unstable and fraught with major stumbling blocks that increase risk for long term investments.

Proposal: Process for Policy and Strategy Development

Addressing this long term issue is complex: requiring scientific analysis along with social and political dialogue, nationally and regionally, with international world views taken into account. Open consultation and information sharing on options and consequences will foster movement towards new and creative solutions.

Political guidance must come from First Ministers: the integrated nature of this issue, involving energy, environment and economy, makes this one of Canada's most important single policy considerations. Canada's economic dependence on energy export underlines the urgency of developing an integrated and visionary policy/strategy. A "First Ministers' Council on Canada 2050" (FMCC 2050), with the chair rotating annually, is needed for at least a ten year period to provide the necessary political guidance and report to legislatures annually.

The research and information sharing role needs to be carried out by a relatively small secretariat in support of "The FMCC 2050", appointed by the FMCC. This would be the research, communication and integration arm. As the "honest broker" it would assess real options (and reserves), and implications for Canada's energy supply for domestic consumption and export. It would also identify priority research and technology questions (for example energy storage to better use wind and solar energy) to out Canada at the head of innovative longer term industrial applications. Public consultation could include various fora; over time in a coordinated and inclusive manner (possibly including one or more national conferences). The findings (a White Paper) would provide a scientific and policy context for discussion amongst all jurisdictions as energy decisions are made.

To ensure full scientific consideration of all factors, scientific and other necessary support could be provided to the secretariat through secondments and "executive interchanges" from Canada's senior governments, academic institutions, corporate and public interest groups. Those involved would return to their home organizations with a broader, encompassing perspective.

Consequences of Inaction

Shifts in longer term energy availability, and public conviction that a new approach is needed (usually focussed on specific "solutions" e.g. wind),

- Public pressure forces political leaders to take decisions out of context, with the result that Canada does not have national energy policy direction.
- An *ad hoc* series of initiatives add to the problem and confuse the issue of energy development and sustainability.

- Decisions are made with incomplete, and at times, inaccurate information: for example, subsidized wind turbines generate electricity at a cost about triple that of conventional sources, operate only about 30% of the time, and improperly located, significantly interfere with bird staging and migrations, causing huge mortality rates: i.e. unreliable, uneconomic energy with potential serious environmental impacts.
- Pursuing the current disjointed initiatives lacking focus, direction or priority setting framework, impacts Canada's long term global competitiveness and future prosperity.
- The present course will result in "brownouts"; substantially increased costs, limits to growth if not actual reductions in living standards.

Canada Needs a National Policy and Strategy

- Canada must move toward a longer term view of energy for future environmental sustainability and economic viability.
- Solutions within an appropriate energy policy must be long term, integrated with economic and environmental priorities and have potential for sustainable growth will of necessity involve compromises amongst competing objectives. Included in this strategy must be priorities for research and technology to improve energy storage to take better advantage of variable supply from sources such as solar and wind.
- To effectively meet electrical needs in 2025, decisions must be made within the next two years!

A National Energy Policy for Canada

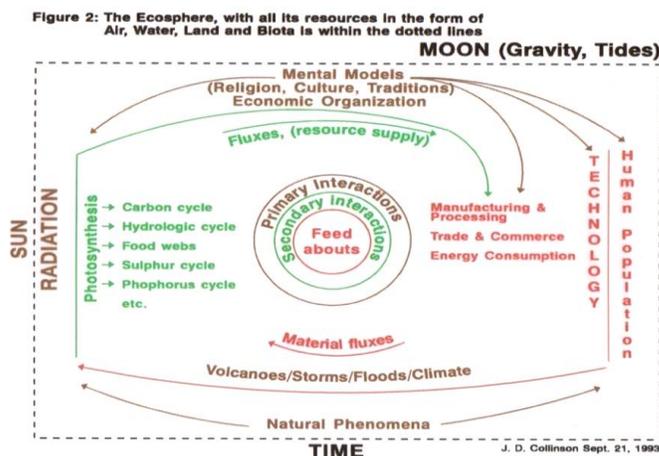
Jim Collinson

Purpose

To outline a process to define an energy policy for Canada that will take into account Canada's integrated system involving energy, economic and environmental realities; the diversity of Canada's energy opportunities and needs; the objectives to be achieved; and the options available for moving towards a vision for energy security, economic affordability and environmental sustainability.

Background

The notion of the earth being essentially a closed system, with radiant energy from the sun being the only net addition, is beginning to be more widely understood. Newton's Third Law of Motion "for every action there is an equal and opposite reaction" describes a physical and linear reaction, but there are also non-linear ones, e.g. chemical, enzyme, etc. which in turn generate many other non-linear effects from any one action. Modeling such complexity is a formidable challenge, as every set of solutions adds to the mix of variables.



This is the reality that has spawned much scientific effort towards understanding climate change. The complexity of global air circulation, with its interactions with

land and water ecological systems, combined with human activities, has led to concerns about the impact of these anthropogenic factors. Clearly, the climate of the world has been changing, but this has been the case forever. What is less certain is the degree to which human activities, particularly in the form of “greenhouse gases”, are impacting natural change. Some argue that it is significant (Gore, IPCC, etc.), some predict less impact, yet others argue that the science of modelling such complexity is not yet reliable enough to be the basis for long term decision-making. Even with this uncertainty, it is reasonable to at least identify selected steps to reduce obvious excessive emissions to improve atmospheric conditions. This needs to be done to assure adequate energy for the future while not disrupting economic, energy or environmental conditions to the point where human existence suffers more than if nothing were done. Human populations are beginning to level off or drop in many parts of the world; in part due to urbanization (large families are not an asset in cities), so the opportunity to find a balance amongst all three factors (economic, environmental and energy) seems possible.

The long periods of time it takes to develop alternate sources means that many significant decisions need to be made in the next decade, and cannot be left to “happen”: the results could be catastrophic.

Oil reserves are not as well known as many would like to suggest, because the reality is that new reserves may well imply greater costs and environmental and economic risk than before. The recent release of oil to the waters of the Gulf of Mexico from a rig explosion and pipe failure, and its associated long term environmental and economic costs, geographically attests to the implications and the linkages amongst the energy, economy and environment: the “three E’s”. It also, belatedly, raises the question of how realistic risk management needs to be.

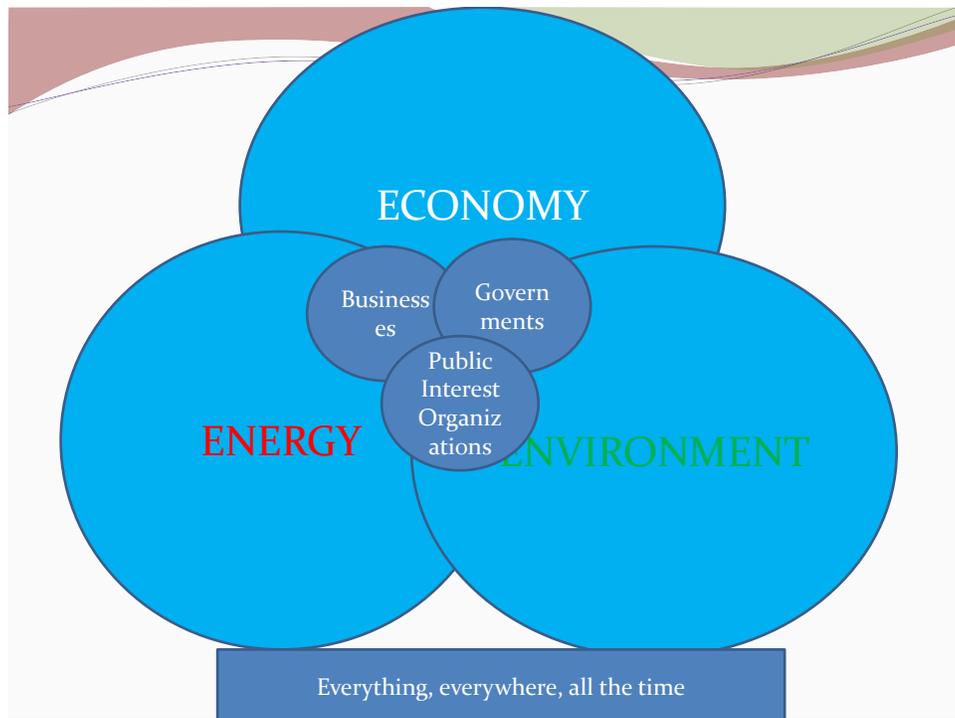
Coal reserves abound, but the reality of “clean coal” to date exists largely in the minds of the coal companies, and solutions to this environmental hazard are not expected in the medium term. Wind and solar energy in most places are unreliable and expensive, and take up considerable resources both in the construction, location and operation. They will be important players, but cannot replace large reliable sources society relies upon until better ways are developed to store and release energy produced from sources having variable supply characteristics.

Hydro power is clearly economical and effective, and many more potential sites exist. These, however, need to be examined in the context of what is gained vs what is lost, and against other options.

This leaves nuclear energy. There is limited public awareness of nuclear energy. What knowledge does exist is largely negative, and is based in large measure on everything from Hiroshima to Chernobyl. In fact, nuclear power could be much more reliable and safer than “new oil”, for example. The positive aspects of the nuclear option have been missed due to an outdated conventional wisdom that it is inherently unsafe.

Other energy sources and products include, *inter alia*, biomass, hydrogen, geothermal, etc. All can play key roles, but by their very nature, in more selective and special applications.

The integrated nature of energy, economy and environment, and the constantly changing overall world ecological system, combined with the strong interests of government, private sector and public interests, requires an integrated approach to long term direction.



Choices exist, and all have both positive and negative implications. These will vary across the country, but decisions need to be made soon because the long time period from a decision to an operating project is well beyond the political time frame implied by a 4-5 year election period. In the past, however, there have been political leaders who have been far sighted enough to stand up for the longer term needs of the country.

The difficult political obstacle today is the criticism generated by a conventional wisdom (almost of a religious-like fervour) based on emotional publicity emanating from special interest/activist groups with no apparent interest in objectivity. Early on, these groups came into existence as a growth out of conservation movements, and provided a much needed “other view” from powerful industry voices. They have since expanded to the point where membership is large but not as closely associated to the science as originally, so may press single purpose issues without the benefit of direct analysis. Such people play a helpful role by ensuring both specific and emotional questions are identified, but often ignore the reality that decisions and tradeoffs are necessary to avoid complete collapse of an integrated environmental, energy and economic system. The wrong long term energy policy, including no energy policy, could lead to this kind of chaos.

Problem

The approach to science generally is to try to break matters down to their smallest particle so as to understand them. Global complexity, however, implies that everything is related all the time, so what is needed is an approach that will assess all the pieces as they function together, ever changing over time. It also implies that one needs to recognize that every “solution” immediately becomes another variable in the overall equation.

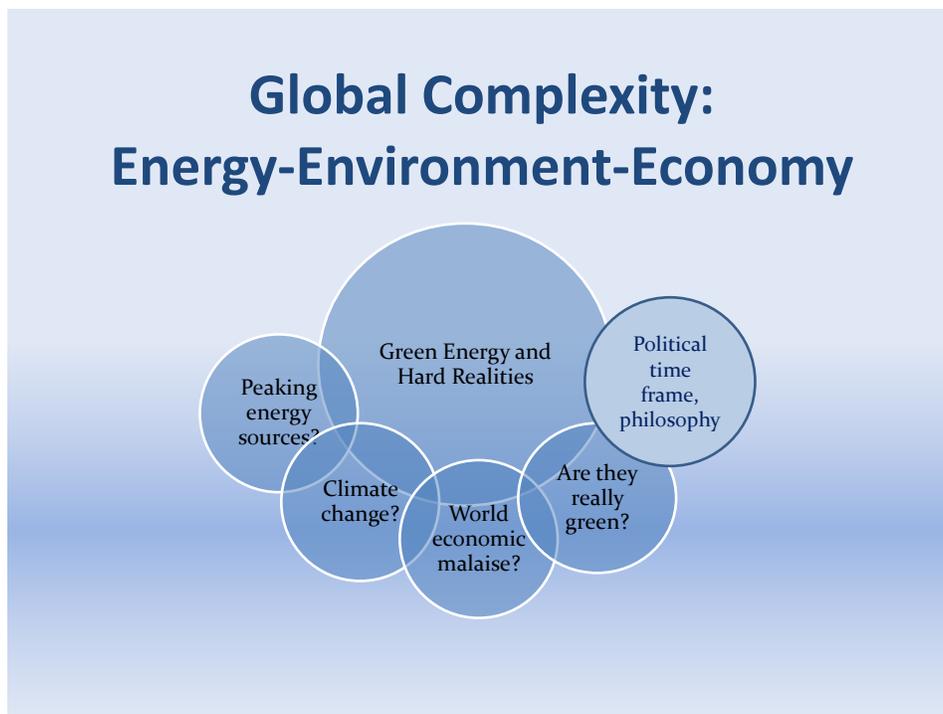
Most organizations have some vested interest and perspective in energy policy. Sometimes they may agree on objectives, but generally they (including activists) tend to jump to currently popular “solutions” without considering options and alternatives.

It is probably not all that difficult to find common ground on the objectives for energy policy. The difficulty arises on the means to achieve them. Each group

will have its particular point of view regarding energy options that are “best”. However, they may not objectively take into account other alternatives that might better serve.

Nor are some of them likely to be prepared to admit that compromise and “second best” might be the most appropriate solution in certain circumstances. For example, wind power will not work in all cases for all needs; nuclear is inappropriate for small demand areas or projects; hydro may be inappropriate for areas far from where it is produced; coal may be the best option in select cases; etc.

The continuing global economic uncertainties will dampen demand for energy for the short term, perhaps giving a breathing space for long term decisions to be made that will address the energy problem beyond the short life between elections. It is important to note that the time for large projects to come on line after a decision to proceed, is in excess of ten years.



Given the nature of Canada’s Constitution, the political will to take a fresh look at energy policy must come from First Ministers. Within that framework, what is needed is some organization dedicated to be an “honest broker” on the issue, and give each option consideration by assessing the pros and cons as they relate to the different regions of Canada, as well as their impact globally.

A Proposal to Develop an Energy Policy for Canada

Addressing this long term issue is complex: requiring a strong analytical capacity combined with an integrated political dialogue at the most senior level. The process for policy development must provide for open information and consultation on options and consequences, while respecting principles of flexibility, economic viability, environmental sustainability and inclusion.

The political guidance must come from First Ministers: the integrated nature of this issue, involving energy, environment and economy makes this the most important single policy consideration since the early days of Confederation. Leadership and direction for a National Energy/Environment/Economic Policy must come from a First Ministers' Council on Canada 2050 (FMCC). The Council should respect constitutional responsibilities set out in the Constitution Act 1982 (Sections 91 and 92) by annually rotating the role of chair amongst members². The necessary political guidance will be needed for at least ten years³.

The research and information sharing role needs to be carried out by a relatively small group named "The Canada 2050 Group"⁴, appointed by the FMCC. They would be the "honest broker" to assess real options (and reserves) and their implications for energy within Canada, both for domestic consumption and export, in a context of environmental and economic responsibility. They then would provide this information to the public through various fora; perhaps including one or more national conferences⁵. The findings will provide a scientific and policy context for discussion amongst all jurisdictions as policy is developed and energy decisions are made.

This "honest broker" entity would be mandated to conduct an analysis of Canada-wide energy needs, options and variability in options, along with export potentials. It needs access to all information available to governments, provincial and federal on these matters, and that of private sector businesses where commercial

² The nature of this structure respects the jurisdiction of provincial governments over natural resources within their boundaries: a critical factor in the case of energy, economic and environmental matters.

³ The 1960's Resource Ministers' Council was an effective model for national (vs federal-provincial) discourse.

⁴ The Economic Council of Canada, in its early days, played a very effective research and communications role. This role is now needed on the much broader topic integrating economic, energy and environmental factors.

⁵ e.g. the 1961 Resources for Tomorrow Conference, and the 1966 Pollution and Our Environment Conference were exceptional initiatives that updated both the scope of the scientific community as well as the public on these matters

confidentiality is not impacted (although access to much of this might be negotiated with appropriate confidentiality conditions).

Responsibilities would include:

1. Design a work program to objectively assess (using energy, environment and economic criteria), future energy needs related to existing and potential sources (and reserves) over time periods of 5, 10, 15, 20, 25 and 40 years. This is essential base information to understand the magnitude of the problems and potential, combined with the long time frame between a decision being made and energy being produced. Most of the data for this already exists, but needs to be verified, integrated and compiled in a consistent format.
2. Identify long term research and technology priorities, including storage (battery, hydrogen production, etc.) and allocation incentives (e.g. pricing, timing, carbon tax/price “carrots”, etc.) that would widen the range of realistic options over the longer term, and offer ways to put Canada in the forefront on industrial application of new storage and energy allocation systems.
3. Initiate information sharing processes with interested organizations and the general public, so that research findings and potential future directions are openly available. This process could give consideration to a national conference on the subject, with objective background papers on all reasonable topics prepared in advance, and open media coverage of the event for the benefit of all Canadians.⁶
4. Produce a White Paper on Energy Policy and Strategy for Canada, to serve as a research baseline for decision-making by all parties involved in the energy field. This provides each party with a basis from which to devise an effective energy strategy for their particular case, along with a context within which to work together with others where appropriate.

⁶ Such as conference could be along the lines of the 1961 “Resources for Tomorrow Conference”, and the 1966 “Pollution and Our Environment Conference”. These were both hosted by the then “Resource Ministers Council”, a national organization consisting of Resource Ministers from all Provinces and the Government of Canada, with the chair rotating amongst the group on an annual basis.

The secretariat (Canada 2050 Group) referred to above should be augmented by scientific support through secondments and “executive interchanges” from governments, academic institutions and the corporate and special interest sectors to ensure full consideration of all factors. Those involved would be able to return to their home base with broader perspectives and understanding.

Other options exist for addressing this topic, but each has their limitations.

1. **A Royal Commission** could take on the role of research and consultation, but unless it was uniquely structured to have the support of all senior governments, it would lack the access needed to do a comprehensive job.
2. **The Federal Government** could attempt to do this on its own, but one only need remember what happened at Kyoto, where Canada, at the last minute and without any consultation with the provinces, proposed and agreed to a limit on greenhouse gas emissions that was known at the time to be unattainable, yet made good short term political capital for the Prime Minister of the day.
3. **The senior governments could do it through an intergovernmental committee** but this is the model that got the UN into so much trouble, with participants (admittedly not all, but many) carrying with them political positions that set science aside. Credibility could be difficult.

The support of federal and provincial governments is essential, but so is the need for an “honest broker” to manage and direct the process. This secretariat has to be staffed with qualified people selected from governments, industry, public interest groups and the academic community based on their analytical and communicating skills and their reputation for scientific integrity.

Canada must move towards a longer term view of energy needs and options within the context of Canada’s future environment and economic viability. Continuing disjointed initiatives are heading Canada into a long term position of lower living standards and compromised global competitiveness.



Current Unsustainable Situation

- Absence of energy policy results in:
 - *ad hoc* initiatives on the part of industries, individual provinces and municipalities and individuals will add to the chaos and inefficiencies
 - Large investments which take several to many years to come to fruition will not occur, and investment money will go elsewhere
 - Lack of cooperation at all levels stalls possibility for effective returns and appropriate matching of supply to demand

Political Reality - Energy

The short time period between elections in Canada (about 4 years), makes it difficult to expect political parties to take long term decisions without strong public opinion on their side. Currently, the conventional wisdom on energy matters seems to land on selected individual projects, without any comprehensive and analytical context. The result is a series of apparently *ad hoc* projects that seem to address items of public interest, but in fact are very short term in nature and often counter to longer term needs.

The subsidy on purchase of electric cars in Ontario is a good example of this, as is the rush to construct wind farms in Manitoba and Ontario and solar units in Ontario, even though these are notoriously expensive and unreliable, needing offset power sources to compensate for down periods. In the case of Manitoba, cheap electric power exists in the north, but the government seems determined to increase costs to consumers to appear to be “green”, even though hydro power everywhere else is considered green (even by proposing to construct a transmission line 50% longer than necessary to give the appearance of protecting an area of boreal forest and potential World Heritage Site considerable larger than is actually needed)! Ontario is being faced with a serious future electrical power

shortage, yet provides incentives to consume more electricity by subsidizing the purchase of electric cars!

Quebec and Newfoundland and Labrador have disagreed for decades over a lopsided deal strongly favouring Quebec on power transmission, with the consequence that development of clean power from the lower Churchill has been deferred for a long time, and it is likely that more costly (overall) transmission lines will need to be put in place elsewhere, just because of the apparent greed and pride of Quebec and its Hydro monopoly that is run, as is the case with Manitoba, as a direct policy instrument of the government.

British Columbia has now decided to proceed with another major dam on the Peace: a project that will be years in construction. Alberta will need to consider new ways to generate hydrogen production for the oil sands to counter international opinion that using natural gas simply adds unnecessarily too much CO₂ to the atmosphere. The international reaction is so strong that it is clear something has to be done to improve international relations generally and export markets specifically. Perhaps, as suggested by Cosmos Voutsinos⁷, power from existing wind farms could produce the hydrogen while winds are strong enough to produce power, rather than frustrate electricity delivery and management with variable power availability. CO₂ from natural gas used for hydrogen for the oil sands could be significantly reduced.

Saskatchewan will need to consider alternative sources to their old coal fired generators. Premier Wall backed down from an earlier thought that nuclear power made sense there, but all other viable options result in greenhouse gas emissions, unless a deal is made to import hydro power from Manitoba. It may be time to rethink that idea. New Brunswick is facing electrical power difficulties, and Nova Scotia in recent years has experienced many outages due to storms.

Transportation:

The above doesn't address the transportation sector, which has its own particular needs and associated implications, including, *inter alia*, emissions, economy,

⁷ "Roadmap for a Comprehensive Energy Policy", The McIntyre Collegium, Lethbridge, AB, 2010

volumes and cradle to grave factoring of all environmental impacts. A country as large as Canada carries a huge energy need simply to work.

Primary energy processing and their subsequent impacts on transportation (e.g. shipping crude oil to the Gulf of Mexico refineries (themselves subject to hurricanes) require an industrial policy that facilitates certain value-added activities locate closer to “home” to reduce emissions, not as an impediment to trade.

Conclusion:

All regions of Canada are in need of long term approaches to meeting their energy needs within a context that takes economic and environmental realities into account. Although the UN has not handled the global review very well, it is at least trying to grapple with the very complex subject. Canada cannot continue with *ad hoc* reactions to individual situations, or copying a US approach that is in turn not well developed.

The long term nature of appropriate action requires a strategic national approach, within which each jurisdiction can find means to address its needs for the long term. Massive duplication at provincial and national levels, including in the corporate sector, is expensive and has not served Canada well.

Businesses need to take energy into account, especially those who use huge amounts of power, and/or contribute significantly to “greenhouse gas” emissions. They need to get out in front of the subject, not simply react to “events” as they occur. The recent Gulf of Mexico oil rig/pipe burst fiasco is clear evidence of that.

A national energy review as a basis for policy and strategies is critical at this stage. The impacts of well-intended but wrong decisions are expensive, and do little to have real impact on energy supply and environmental quality. In a country as large and diverse as Canada, with many jurisdictions and large corporate interests, a new comprehensive approach to energy policy is needed, led by a new structural entity playing the role of “honest broker”.

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