Building New Energy Advantages for BC:  
Understanding and Benefitting from the Transformation of BC’s Energy Marketplaces  

A WHITE PAPER ON  
ENERGY POLICY IN BC  

October 2013
A White Paper on Energy Policy in BC

British Columbia is blessed with a remarkable array of energy resources that have served as a key growth engine for our economy and helped to generate much of the prosperity that the province has historically enjoyed. From vast hydro-electric resources to world-class natural gas plays, BC has successfully developed energy resources through effective policies that have supported strategic marketplace, infrastructure and human capital development. Given growing global and domestic demand for energy, the Business Council is convinced that with effective planning and strategic actions, BC’s energy resources can serve as a foundation for prosperity well into the future.

However, this future prosperity is by no means assured. Energy resources are developed in a dynamic and competitive marketplace within which complex technological, policy and political factors influence outcomes. There are currently a number of significant shifts under way in the energy landscape that have created uncertainty and a corresponding need for new policy responses. The impetus for this Energy White Paper is therefore the Business Council’s belief that BC’s energy policies need to keep pace with change – addressing both the challenges and the opportunities facing our energy sector.

Mindful of the changing marketplace context, over the past year the Business Council’s Energy Committee has discussed, debated, listened to experts and held an energy conference that was specifically designed to look at global, national and regional energy transformations and what all of this means for BC. The White Paper itself has been a collaborative undertaking between staff and Committee members, supported by a robust feedback process that sought and received valuable input from many members of the Council as well as selected outside experts.

What stands out in the analysis is a strong convergence of views: the unprecedented nature and speed of market shifts necessitates a policy response, so that the broad BC energy sector and indeed the province collectively are able to take advantage of new opportunities and address challenges that have emerged from recent marketplace developments. The shale gas revolution, growing global demand for various energy products, concerns over climate change (GHG emissions), and fundamental changes in the electricity marketplace all require that provincial decision-makers reflect and act in the face of the new realities reshaping the energy sector. While there is a general level of awareness of current energy marketplace developments, the knowledge tends to be somewhat superficial; the full effects are not yet embedded in policy structures, and existing regulatory and policy need to be adjusted to reflect the current situation.

In many respects there is reason for optimism that energy policies are changing for the better. Governments (at all levels) are dedicating resources and updating their policy responses to better manage and adapt to a fast-changing energy landscape – capturing new market opportunities and tackling challenges in the process. The Business Council’s Energy White Paper is designed to advance the energy dialogue in British Columbia, by providing both a solid base of factual information on the energy sector (Part I), and a focused assessment of challenges and a high level set of recommendations to move the province’s energy sector forward (Part 2).

Ultimately, the degree to which BC’s energy policy framework successfully identifies and charts a course to meet the evolving marketplace opportunities and challenges will be an important factor influencing the province’s future economic well-being.

Business Council Energy Committee
# Table of Contents

Executive Summary .................................................................................................................. i

PART 1: The Context ............................................................................................................... 1
Understanding Old and New Energy Realities ...................................................................... 1
Understanding Global Energy Supply and Demand ............................................................... 2
  Understanding Global Energy Demand .................................................................................. 2
  Understanding Global Energy Supply and Infrastructure .................................................... 4
  A Closer Look at Continental Energy Supply and Demand Dynamics ............................... 6
Developing Energy in BC: Overview ..................................................................................... 9
  History of Energy Development in BC ............................................................................... 9
  Electricity in BC ................................................................................................................. 10
  Oil and Gas in BC .............................................................................................................. 14
    Oil ...................................................................................................................................... 14
    Oil Refineries .................................................................................................................. 15
    Natural Gas ..................................................................................................................... 16
    Mid-stream Infrastructure and Energy Processing ......................................................... 18
    Downstream Natural Gas Use ......................................................................................... 19
  BC Energy Trade Summary ............................................................................................... 21
  Energy and Environment in BC ........................................................................................ 22

PART 2: The Building Blocks of Energy Prosperity for BC: Recommended Policy Directions and Actions ............................................................ 24
  Three Phases of Energy Policy Development in BC .......................................................... 24
    Phase 1 – Building the Legacy ......................................................................................... 24
    Phase 2 – The Regulatory and Natural Gas Foundation .................................................. 25
    Phase 3 – The Shale Gas Revolution, Climate Change and Electricity Market Shifts ....... 27
      Understanding the climate change dimension in BC ..................................................... 27
      Understanding the impacts of the shale gas revolution ................................................. 28
  The LNG imperative for BC and Western Canadian Natural Gas ........................................ 30
  BC’s LNG Strategy ............................................................................................................ 31
  Electricity market transformations ..................................................................................... 33
  The New Energy Reality for BC ....................................................................................... 34
Recommendations – Building BC’s New Energy Advantages

1. Update the Province’s Energy Policy Framework
2. Place a Renewed Focus on Energy Marketplace Competitiveness Challenges
3. Accelerate Natural Gas and LNG Development
4. Introduce a BC Non-Renewable Resource Fund (NRF), with Realistic Long Term Valuation Targets
5. Position BC as a Canadian and Global Leader of Responsible Energy Development
6. Establish a New Mandate for Energy Related Inter-Governmental Relations (IGR)
7. Moving the Western Market Access for Oil Sands Dialogue Forward
8. Continue to Build and Refine First Nations Energy Partnership Models
9. Reconciling Energy and Climate Change Objectives
10. Tackling the Challenges in Electricity Policy
11. Review BC’s Energy Rate Structure within a Re-constituted BC Utilities Commission
12. Build a Robust Skills and Infrastructure Agenda for the Energy Sector
13. Leveraging Downstream Energy Opportunities
Executive Summary

British Columbia has a vast and diverse set of energy resources. The development of these resources through effective policy regimes and sustained private and public investment has done much to generate a high quality of life for British Columbia. However, continued success in the future is by no means assured.

In a global context, the energy marketplace is vast and dynamic – creating tremendous wealth while requiring constant vigilance to ensure that resource potential is translated into real opportunities. Above all else, energy markets are in a constant state, and accelerating pace, of change – characterized by new supply options, rapidly shifting demand, technological changes, and external drivers such as climate change, many of which contribute to both uncertainty and opportunity.

In British Columbia, three specific factors are having a profound impact on BC’s energy pathway. These are:

1. the shale gas revolution – a technology driven ability to tap into vast shale gas (and in some jurisdictions, but not BC, oil) reserves that has transformed the continental, and increasingly the global, energy marketplace.
2. climate change – the complex, ongoing nexus between energy and environmental matters.
3. electricity marketplace transformation – the fundamental re-shaping of the electricity marketplace in our trade region.

In isolation and in combination, these developments underscore the need for energy policy reform designed to ensure British Columbia is able to maintain our energy advantages, adapt to new realities and capture opportunities emerging from global supply and demand shifts. In practice, over the past decade British Columbia has seen a relatively constant energy policy churn in a bid to keep up with the pace of change. In the most recent time period, the three developments noted above have resulted in a mostly incremental updating of the 2007 Energy Plan. While many of the incremental policy changes over the past five years are in the right direction, there is now a more urgent need to fully update and coordinate an Energy Plan framework for the province.

The “Building New Energy Advantages for BC” white paper concludes with a set of thirteen recommendations designed to refresh and modify the province’s energy policies in a coherent and coordinated fashion across a range of energy-related issues. The recommendations are made under the following topic headings:
1. Update the province’s energy policy framework
2. Place a renewed focus on energy marketplace competitiveness challenges
3. Accelerate natural gas and LNG development
4. Introduce a BC Non-renewable Resource Fund (NRF) with realistic long term valuation targets
5. Position BC as a Canadian and global leader in responsible energy development
6. Establish a new mandate for energy related Inter-Governmental Relations (IGR)
7. Move the western market oil access dialogue forward
8. Continue to build and refine First Nations energy partnership models
9. Reconcile and where necessary revise the province’s energy and climate change objectives
10. Tackle the challenges in electricity policy
11. Review BC’s energy rate structure within a re-constituted BC Utilities Commission
12. Build a robust skills and infrastructure agenda for the energy sector
13. Do more to leverage downstream energy opportunities

Overall, the Business Council’s white paper concludes that provincial policy-makers are beginning to take the right steps to move the energy policy framework forward. However, serious challenges remain – from taking account of strong competition in BC’s energy trading markets to managing domestic social license concerns, to ongoing cost of supply concerns – that will require determined policy leadership and improved collaboration.

While many other jurisdictions with vast energy resources have a more ingrained understanding, both economically and culturally, of energy issues, British Columbia needs to work on building a deeper public understanding of the role energy plays in the province’s current and future prosperity. As decision-makers in BC continue to work on updating energy policies, the most difficult task will likely be to reconcile the past energy policy framework with one that works in today’s dynamic energy marketplace.
Building New Energy Advantages for BC:  
Understanding and Benefitting from the Transformation  
of BC’s Energy Marketplaces

PART 1: The Context

Understanding Old and New Energy Realities

Energy is absolutely and irrevocably necessary for any society.\(^1\) It is the “oxygen” of both modern and emerging economies, and it is little exaggeration to say that we have built our civilization by harnessing energy.\(^2\) Without energy, in its various forms, we would not have the standard of living that advanced economies have grown accustomed to – the comforts of modern life like heat, light and power for our homes, transportation, food diversity, water and wastewater systems, technology and industries producing an astonishing variety of goods and services. In fact, as one prominent energy expert recently commented, “without oil there is virtually no mobility and without electricity – and primary energy inputs, which at the moment happen to be largely fossil fuels, globally, to generate that electricity – there would be no internet age.”\(^3\)

As a result of its unique place in society, energy and energy development issues are central to human existence. The search for, production of, trade in and use of energy products is a defining feature of all successful human civilizations. However, for the most part we tend to overlook energy’s crucial role in facilitating our everyday lives. From wood to charcoal to coal to conventional oil and gas and nuclear power, the world continues to consume ever-increasing amounts of energy as the human population fast approaches the 7.5 billion mark.\(^4\) As a result, and unlike in the past, the stakes are now much higher as concern increases over access to, type, and security of energy supplies for emerging energy-intensive economies across the developing world, which today are the main force behind ongoing urbanization and the remarkable expansion of the global middle class.

Both economically and environmentally, contemporary global economic interconnectedness and energy interdependence solidify a common set of opportunities and difficult choices for the future. Without question, energy-related matters will continue to feature prominently in the world’s public policy dialogue. For an energy-rich nation such as Canada, the future depends on how successfully we manage an increasingly complex set of energy-related issues. Within Canada, British Columbia will play host to many of these issues. Will the province’s energy development opportunities be responsibly realized or squandered? Can competing visions of the energy future be adequately reconciled to enable development and maintain social license? What, realistically, can be done by way of innovation in policy and practice by a relatively affluent but small, trade-dependent jurisdiction like BC.

In this paper, the Business Council seeks to provide some relevant historical context and an up to date fact base on current energy policy issues, along with a series of recommendations that highlight some of the policies that can help to drive a future of energy prosperity while, in modest ways, reconciling the complex and challenging policy objectives that inevitably arise in developing energy resources.

---

\(^1\) The Role of Energy in Economic Growth, David I Stern, October 2010.
\(^4\) United Nations, Department of Economic and Social Affairs, Population Division, Population Estimates and Projections Section.
Understanding Global Energy Supply and Demand

Despite the economic turmoil experienced by many developed countries in recent years, the fact is that almost all forecasts of world energy demand have continued to show steady growth in global consumption. This corresponds with an overall trend toward relatively strong economic growth in many emerging markets, at a time when growth has slowed across the so-called “advanced” economies. Global energy demand generally moves in lock-step with economic growth and human population growth, reflecting in part the inherent desire of people everywhere for a more comfortable standard of living as the process of economic development unfolds. It is this demand for energy that ultimately propels the search for new and more efficient exploitation of existing energy resources, and the corresponding effects on the pace of resource development, the costs of energy, the management and control of energy resources, and a host of related environmental, social license, and governance issues.

Understanding Global Energy Demand

Energy demand is largely driven by population growth and economic development. By 2025 the number of people on the planet is expected to reach 8.1 billion, before climbing to 9.6 billion by 2050, with almost all of the increase occurring in Asia and Africa. Population growth among the developed countries is expected to be sluggish, with outright declines in population in store for Japan and some European nations. However, as developing regions modernize and grow their economies, their use of energy will increase over time. According to the International Energy Agency’s “current policies” scenario, global primary energy demand is forecast to expand by 37.5% by 2035, and predictably most of this will be in developing countries. China and India will see the largest absolute increases in energy demand and consumption.

Fossil fuels will continue to dominate the global energy consumption picture, supplying between 63% and 80% of overall energy demand regardless of measures that may be taken to manage greenhouse gases. Even in a scenario where substantial action is taken to transform the energy sector, fossil fuels still play a very large role. Under a business as usual scenario for the future, coal, oil and natural gas dominate global energy demand in roughly the same proportions as in 2010, although shale gas will likely change the percentage of natural gas demand depending on the extent to which it can be recovered, economically. In a scenario where nations implement the GHG commitments they have already made and take some additional action to further stem emissions, there is a partial shift away...
from coal, roughly the same dependence on natural gas and oil, and increases in reliance on nuclear, hydro, bioenergy and other renewables. These estimates by the IEA were done before the most recent forecasts of world shale gas reserves were completed. With the ongoing expansion of shale gas resources, the demand for natural gas, particularly in Asia, is expected to grow rapidly, in part because many consuming nations are expected to be looking for lower carbon alternatives.

Demand for refined petroleum products is largely a result of an ever expanding global vehicle fleet, which is expected to reach 1.7 billion vehicles in 2035 (a doubling since 2005) and 2.5 billion by 2050.\(^7\) As a result, demand for oil changes very little, regardless of the future energy outlook. Transportation-related energy use is projected to account for almost all (97%) of the increase in world primary oil use through 2035.\(^8\) Despite growing demand in developing countries, OECD countries are still the biggest consumers of energy for transportation, accounting for almost 60% of current world demand. However, as non-OECD countries continue to develop and grow richer, their share of world transport-related energy demand will increase steadily, eventually surpassing that of the OECD countries.

According to the IEA, the demand for electricity from all sources of generation stood at 18,443 TWh in 2010. Demand is predicted to be between 50% higher (27,944 TWh) and 90% higher (34,889 TWh) by 2035, depending on whether there is a business as usual or a climate sensitive approach. In 2010, OECD countries represented 52% of demand and non-OECD countries 48%. In 2035 this flips, and non-OECD countries will represent about 65% of overall demand.

---

7 OECD's International Transport Forum.
Understanding Global Energy Supply and Infrastructure

As with any commodity market, demand growth, in the absence of suitable and cost-effective substitutes, has a strong pull effect on supply. Globally, they key incremental energy supplies are predicted to come from the sources depicted in Figure 5 below.

The tremendous increase in energy demand from emerging economies is also expected to exert a strong push effect on exploration and development for new energy supplies, and to spur the development of the pipes, lines and facilities needed to transform raw materials into useable joules. Getting that product to market will require global investment in supply infrastructure in the range of $38 trillion between 2012 and 2035, equal to 1.5% of global GDP over the same period; of this, a majority of the investment is expected to occur in non-OECD countries in Asia, Latin America and Africa.9

For oil, the world pumps an extraordinary amount out of the ground, amounting in 2011 to some 87.4 million barrels per day, with Canada producing 3.5m b/d (4% of total world supply).10 Canada currently holds the 3rd largest proven oil reserves in the world, and it is the 6th largest non-OPEC producer of oil.11 As for natural gas, Canada is the 3rd largest producer, in a world where this increasingly important fossil fuel already accounts for about a quarter of the global energy consumption.12 The world has vast natural gas reserves spread across over 100 countries.13 The IEA quotes estimates of 460 trillion cubic meters (tcm) of recoverable conventional gas reserves and 330 tcm of unconventional gas resources (2011). About 20% of the unconventional gas is located North America and another 28% in Asia-Pacific countries.

---

13 CIA World Fact Book for natural gas reserves by country.
In terms of natural gas production, Russia is currently the world leader at 657 billion cubic meters (bcm) in 2010, followed by the United States (604 bcm), Canada (160 bcm), Iran (143 bcm) and Qatar (121 bcm).\textsuperscript{14} Overall, non-OECD regions account for about 70% of natural gas production and will continue to maintain this position even with increasing unconventional supplies. By 2035, the IEA suggests that Russia and the US will remain the number 1 and 2 producers, with China ranking as number 3, followed by Qatar, Iran, Canada, Algeria and Indonesia.

International trade in natural gas, which has primarily been regionally based through pipeline infrastructure, appears set to expand in the form of liquefied natural gas (LNG) which can be transported by ship. If all LNG facilities currently in the planning and construction phases are completed, there could be about 480 bcm of LNG capacity per year within a decade.\textsuperscript{15}

Turning to coal, the International Energy Agency estimates that known world coal reserves are in the order of 728 billion tonnes (2010), with the United States holding the largest percentage of the total (31%) followed by China (25%), India (10%) and Russia (10%). Together, these four countries are responsible for 70% of global coal production. Of this, steam coal (i.e., coal used in electricity generation) accounts for 80%, with China dwarfing all other regions in this area. Coking coal used in steel manufacturing represents about 15% of global coal production.

Current production of all types of coal stands at 5,124 Mtce (2010), with about 85% being steam and lignite coal primarily used in power generation. The balance is coking coal, whose supply volume does not change much given that there are no/few substitutes.

\textsuperscript{14} Ibid.
\textsuperscript{15} IEA World Energy Outlook 2012.
Globally, electricity supply in 2010 was 21,408 TWh. Fossil fuel generation dominates the world electricity supply mix at 67%, with nuclear at 13% and renewables at 20% (16% is hydro). As the world’s fastest growing form of energy, the total projected increase in electricity supply to 2035 ranges from ~32,000 TWh to ~40,000 TWh; however, the types of supply and their place in the mix will depend, in part, on the policies adopted by governments with respect to energy development, climate change, and energy efficiency. In a business as usual world, the distribution of sources of power generation is unlikely to change much from what exists today. On the other hand, if the global community accepts and acts on the conclusions of the IEA in its 2012 Outlook and its 2013 Tracking Clean Energy Progress Report, which call for stronger policies to reduce the use of carbon-based energy, this could lead to a significant policy-driven shift away from fossil fuel electricity to equal parts nuclear, hydro and other renewables in the next 20-25 years.

A Closer Look at Continental Energy Supply and Demand Dynamics

To start, we need to understand the marketplace that BC’s energy products primarily trade in – which is basically a regional trade market in North America. At present, the vast majority of the province’s energy outputs do not have access to offshore markets. Apart from domestic demand (in the case of electricity and natural gas), British Columbia remains dependent on demand and supply factors in the United States and, to a lesser extent, elsewhere in Canada.

Over the next 35 years, current forecasts predict moderate growth in US energy demand/consumption, declining energy intensity across the economy, and increased domestic oil and natural gas production leading to reduced US reliance on imports of fossil fuels. Significant increases in domestic tight oil and shale gas production are well-documented and have already had a significant effect on price and supply/demand dynamics in the continental marketplace. Put simply, Canada will no longer have the same historic comparative advantage as an energy supplier in North America that we enjoyed in the past.

At the same time, energy intensity per capita is set to decline in the US and indeed in North America, meaning less energy will be used per dollar of real economic output. This trend is by now firmly established. It has many positives in terms of greater efficiency and a reduced environmental footprint, but for Canada, as a big energy supplier, it also has downsides due to slower growth in demand for some types of energy of which Canada is a big producer.

16 IEA World Energy Outlook 2012. NOTE: Supply and demand can differ substantially because total demand does not include own use in production, transmission and distribution losses.
In the case of US electricity generation, projections point to an aggregate rise in domestic production ranging from 23% to 28% by 2035. Renewables are expected to be a larger share of generation, up to 15%, while natural gas-fired power plants will account for about one-third of the new gross capacity built in America, much of which is replacing existing coal-fired generation.17

Comparatively, in its 2011 report Canada’s Energy Future: Energy Supply and Demand Projections to 2035, the National Energy Board confirms the emerging dominance of unconventional oil from oil sands, which by 2035 will constitute 86% of total Canadian oil production.18 The use of fracking for oil may also yield additional gains in future output. Similarly, in the case of natural gas, Canada will see an increasing share of shale gas in total production and reserves. New electricity generating capacity will also be added in Canada, and this extra capacity will involve more renewables, resulting in an overall decrease in carbon intensity in the Canadian electricity sector.

It is also worthwhile and important to note that Canada boasts a relatively “clean” power sector, with 61% of electricity coming from renewables or nuclear, a majority of which is generated using the nation’s vast endowment of water resources. We are the world’s second largest producer of hydroelectricity, after China. Comparatively, Canada ranks number 2, next to Norway, in terms of the overall “cleanliness” of power generation, despite the fact that China has more installed gigawatts.19 The United States, on the other hand, is only 10% “clean” in the power sector, which reflects its heavy reliance on thermal generation (although many US utilities are switching from coal to gas).

Demand drives supply, and as a result the NEB predicts modest growth in Canadian energy production in all energy sub-sectors. This is driven mainly by industrial development, which more than offsets declining domestic residential and commercial demand. In addition, despite declines in conventional production, as in many other jurisdictions, unconventional sources of oil (i.e., oil sands and shale oil) and natural gas will capture an increasing share of Canada’s energy portfolio. In electricity, most provinces will continue to add generating capacity, but the contribution from fossil sources (i.e., coal) will decline and large hydroelectric facilities are expected to gain more prominence (e.g., Lower Churchill – Muskrat Falls).

---

18 National Energy Board 2011.
19 US EIA 2012 Outlook.
The above summary of the current and future North American energy marketplace underscores an important challenge confronting Canada and British Columbia – the continental energy marketplace no longer provides the best potential economic returns for our suite of energy products. Over time, and in various forms, Canada and British Columbia must find ways to access faster growing and more profitable global markets for energy – primarily in Asia – as well as look at means to support greater domestic use of natural gas as well as manage the impacts this is expected to have on greenhouse gas emissions. We will return to this central theme later in the paper.

Source: Canada’s Energy Future: Energy Supply and Demand Projections to 2035.
Developing Energy in BC: Overview

On many levels, Canada and BC are the beneficiaries of a geological and geographic lottery which has endowed them with a number of comparative advantages in energy. British Columbia in particular boasts a remarkable diversity of both surface and subsurface energy options. This largesse, and its timely development in historical terms, has contributed to the province’s economic growth and well-being. But at times it has also made us complacent and may have led to insufficient attention being paid to wider developments in the energy sector in North America and globally.

British Columbia has relied on the historic development of its hydro and natural gas resources to build an economy that provides jobs, government revenues and access to relatively inexpensive energy to local consumers. Over time, the benefits of this energy abundance have been internalized into the economy. Generally, it is fair to say that many businesses and households in BC have taken relatively low cost energy and embedded the benefit into business models and household budgets. In some respects, there is now a sense of entitlement to energy dividends in the form of relatively low power rates and plentiful supply.

For a variety of reasons, there exists in BC a lack of recognition that energy resources and infrastructure require significant capital spending to maintain, improve and expand capacity of assets over time. In order to maintain and strengthen BC’s existing comparative advantage in energy, we need to invest in upgrading the system and develop new energy sources to help meet the needs of future generations.

This investment and renewal process takes significant coordination with the private sector, a more engaged dialogue with citizens and businesses, and a willingness to look at different approaches – and jurisdictional experiences – to ensure that the overall energy development pathway followed is understood and broadly supported. Being wedded to the past and to how things “have always been done” is not a productive strategy, and it runs the risk of foregoing development opportunities that are in the interests of British Columbians and Canadians.

The tension over resource control is a perennial issue that has been with the country since Confederation; locally, a similar tension has at times been apparent between regions in BC and with First Nations in relation to constitutional rights and title matters. Ultimately, as a province we do share the benefits stemming from our energy endowments. To enjoy these benefits on an ongoing basis, we need to invest in our energy resources and infrastructure. And we should stand ready to work collaboratively with other provinces and the federal government to develop energy resources to the advantage of not just BC, but Canada as a whole.

In the following section, we delve a bit more into the history of energy in BC to better understand the context for current energy challenges and opportunities.

History of Energy Development in BC

No jurisdiction is free of challenges in dealing with energy supply and demand. The issues that arise around energy development are not unique to Canada or BC. Around the world, governments struggle to identify and pursue energy development pathways that will maximize societal benefits and minimize risks. Even today, over 2 billion people around the world lack access to clean cooking fuels, the cause of much air pollution and related health problems.
BC’s social and economic development has rested on a rich foundation of primary natural resource extraction, processing and trade – this started with fur, shifted to fisheries, forestry and mining, and later diversified into energy. As a result, natural resources presently account for ~20% of all provincial government own-source revenues, with around four-fifths of this bounty derived from petroleum/natural gas/mining. Overall, primary and processed natural resource products comprise around 75% of BC’s international merchandise exports, with energy making up a bit less than one third of that.

Few jurisdictions have the diversified energy assets that British Columbia possesses. However, like any natural asset there has to be a plan and vision in place to convert the asset into tangible, economically valuable products and services that can support domestic and export market needs. Also necessary is a firm commitment to strong environmental protection and the prudent stewardship of our enviable natural resource wealth.

The development of BC’s hydroelectric energy (small and large, public and private projects) tends to elicit the strongest and deepest emotional response from citizens. Public attitudes in this area include pride in past accomplishments, an awareness of the beneficial legacy of the development of what we now refer to as heritage assets in the 1960s through the 1980s, as well as negative reactions in some quarters to proposals for new developments. In recent years, the debate about what BC should do with its abundant endowment of natural gas has been added to the mix. BC’s natural gas is a world-scale energy resource, the responsible development and use of which will be critical in the longer-term global transition from fossil fuels to lower-carbon energy alternatives.

**Electricity in BC**

Electricity is both ubiquitous and invisible in the lives of most people, at least in the developed countries. We expect reliable service at relatively low cost. BC has been developing and building out our power infrastructure since 1883. The first foray into electric street lighting in Victoria was a surprising source of consternation to many residents of the day. This was followed in 1895 by the formation of the Rossland Water and Light Company, which eventually became West Kootenay Power and Light Company Limited and was focused on meeting the needs of a booming mining industry in southeastern BC.

The first round of consolidation within the electricity sector occurred in 1945 with the formation of the BC Power Commission, which eventually became BC Hydro. It was in charge of the legendary province-building activities led by former Premier WAC Bennett, with the construction of facilities on the Peace and Columbia rivers during the 1960s. The last build-out of the Columbia River was the Revelstoke facility in 1984. Large facilities built before the formation of BC Hydro were completed for the most part by private sector mining companies.

---


21 The backbone includes (a) the 890 MW Kenney Dam and generating station built in the 1950s on the Nechako River, which was constructed to power the Alcan aluminium smelter in Kitimat, BC; and (b) Teck Cominco’s 1954 90 MW Waneta Dam and generating station on the mouth of the Pend d’Oreille River, which was added to in 1963 and 1966. In 2008, a further expansion was approved and the facility now has a capacity of 435 MW.
Currently, the main BC primary electricity players are two regulated utilities - BC Hydro and FortisBC. Other players include Columbia Power Corporation (a Crown corporation), Rio Tinto, Teck, independent power producers (IPPs), self-generators, small independently owned utilities (IOUs) and municipal utilities.\(^{22}\)

**Columbia River Treaty:**

BC Hydro manages its dams in the Columbia basin to provide downstream flood control and power generation benefits to the US ... in return, the United States delivers electricity power to the border (4,300 GW h per year of firm energy and about 1,300 MW of capacity), which Powerex then remarkets on behalf of the province (2010/11 revenues were $145 million).

**BC Hydro Supply Mix**

- Majority from Peace and Columbia River facilities with >50% from 4 plants: Mica, Revelstoke, GM Shrum and Peace Canyon.
- Thermal: Burrard (950 MW), Fort Nelson (73 MW) and Prince Rupert (46 MW). BC Hydro also operates some small diesel generating plants to serve non-integrated areas.
- IPPs contribute ~10,827 GWh or 20% of total BC Hydro supply (2012)
  - Thermal, 21%: Island Generation, Campbell River, 275 MW; and McMahon Cogeneration, Taylor, 105 MW;
  - Run-of-river generation, 25%;
  - Storage, 30%;
  - Biomass/biogas/MSW/waste heat plants, 19% (including the 68MW Williams Lake Power Plant that burns ~600,000 tons of sawdust and bark annually as well as the cogeneration boiler at the Howe Sound Pulp and Paper);
  - Other, 5% (including wind being biogas, municipal solid and combined heat and power, which are largely niche markets in urban center like Vancouver and Victoria).

**BC Hydro**

- ~57,000 GWh of total load requirements in 2012.
- 12,000 MW of installed capacity (2012) from 31 hydroelectric facilities and three thermal plants and purchases from IPPs.
- Serves about 1.9M customers and meets about 86% of the total provincial demand.
- 93% clean or renewable.

**Fortis**

- ~3,200 GWh/year.
- Serves about ~160,000 customers in Okanagan and Kootenay regions.

---

\(^{22}\) Corix Multi Utility Services Inc., Hemlock Valley Electrical Services Limited, Silversmith Power and Light Corporation, Yukon Electrical Company Limited.
Unlike water or gas, electricity cannot be stored (although water in reservoirs is a proxy for storage), nor can it be routed in a specific direction; instead, it follows a path of least resistance. Electricity must be generated as it is needed, and supply must be kept in balance with demand. This means generation and transmission operations have to be monitored and controlled in real time, 24 hours a day, to ensure a consistent and sufficient flow. In North America, this requires the cooperation and coordination of hundreds of electricity industry participants in eight interconnected alternating current transmission systems across the continent.

Interconnection with and between electricity grids is fundamental to reliability. It ensures that the bulk power system as a whole is able to supply the aggregate electrical demand and energy requirements of customers at all times, taking into account scheduled and unscheduled outages of system elements. Interconnection also ensures the system is able to withstand sudden disturbances such as electric short-circuits or the unanticipated loss of system elements

Non-BC Hydro Supply and Suppliers

- Fortis has four plants on the Kootenay River (Corra Lin, 49 MW; Upper and Lower Bonnington, 66 MW each; and South Slocan 54 MW).
- Columbia Power Corporation, a Crown corporation formed in 1994 owns 3 facilities: Arrow Lakes (185 MW), Brilliant Expansion (120 MW) and a joint venture with Fortis which is currently undertaking the Waneta Expansion.
- Municipal utilities: Nelson Hydro, City of New Westminster, City of Grand Forks, City of Kelowna, City of Penticton, Summerland Power and Hemlock Valley all of whom purchase power from either BC Hydro or Fortis for redistribution and may or may not own small local generation facilities.
as a result of various contingencies. Integration and interconnectedness is also fundamental to trade in electricity.

BC’s interconnection with western North America was initiated with the 1961 Columbia River Treaty and is now part of what is called the Western Interconnection system. It is the largest alternating current (AC) electric grid, geographically, in North America, and has the most diverse set of participants. Members include Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 Western US states. A bi-national organization, the Western Electricity Coordinating Council (WECC), is the administrative body that manages reliability coordination, standards development, compliance and enforcement, planning, technical studies, load and resource assessments, and training. Interconnection has enabled BC to be part of a system that is inherently more reliable than if we were isolated within our borders. It also enables BC to take advantage of electricity imports and exports with entities throughout western North America.

The overall stability of the entire Western Interconnection system depends on all of the participants connected to it. This interconnectedness also provides opportunities for reserve-sharing and trade within the region, and enables the integration of a diversity of generation types. Trade is not only possible but necessary, as well as economically beneficial to the participants.

As a tool of economic development, BC’s dam building phase paved the way for a significant expansion of the forest industry over the next four decades and also helped to ensure that a sizable number of mines were able to develop in the province thanks to electricity availability and competitive pricing. By the late 1990s this supply abundance eventually narrowed amid a growing population and economy which led to increased electricity demand from commercial, residential and industrial users. By 2001, in an average water year, British Columbia had actually become a net-importer of electricity.24

This important turn of events was followed in the early 2000s with further changes in the electricity sector. Developments

---

in the Western Interconnection trade region resulted in significant shifts in supply and demand dynamics. These changes are explored in greater detail in subsequent sections of this paper, but in general, the attempt to build BC into a renewable energy powerhouse for Western North America ran headlong into the reality of the biggest economic slump since the Great Depression, the 2008 financial crisis, and contemporaneous changes in the cost of various electricity supply alternatives.

Oil and Gas in BC

Oil

British Columbia does not have a large endowment of crude oil compared to Alberta and Newfoundland, and presently accounts for approximately 8% of Canada’s annual production. Despite some emerging opportunities, the production of oil in BC has fallen steadily, from 25 million barrels per year in 1969 to 8 million barrels per year in 2010. Estimated reserves from various basins and drill testing programs show BC’s remaining reserves of crude oil at 114.3 MMbbl to the end of 2011. Much of this is challenging to find and extract.

Although there has long been a moratorium on offshore oil development (since 1972), mainly along the North Coast (i.e., Haida Gwaii), the potential reserves in that region are estimated to be in the order of 4% of Canada’s total oil reserves at 1,560 million m³ (9.8 billion barrels).²⁵

²⁵ Geological Survey of Canada.
Oil Refineries

Since the 1970s Canada’s petroleum refining industry has shrunk. From a high of 40 refining facilities four decades ago, only 19 are operating today, with two of these in British Columbia. One is located in Burnaby, the other in Prince George. If a new refinery of significant size were to be constructed in the province, the capital cost would be in excess of $10 billion.

Delivering refined petroleum products involves a complex web of pipelines, ships, railways, and trucks. Ultimately for Canadian and BC consumers, the product generally ends up at a local gas station, of which there are about 13,000 across the country, providing employment for 80,000 people.

The Kinder Morgan pipeline that runs from Edmonton to Vancouver is a key transport route for Western Canadian oil, both to BC and to export markets. BC is also home to the Spectra and PNG natural gas large diameter pipelines from Northeast BC north to the Yukon and south to Vancouver and Vancouver Island, and Prince Rupert, respectively. Together with the Fortis system in southeastern BC, these pipelines help to connect supply to customers and also provide many associated economic benefits.

The ports are a key part of the energy supply puzzle, serving as major and vital pieces of the infrastructure that links the province to trade opportunities around the world. Port Metro Vancouver, the Port of Prince Rupert and the Port of Kitimat are the main exit points for commodities shipped on tankers and container ships. Of these, only Port Metro Vancouver handles oil and related products. In 2011 it shipped 6,670,782 metric tonnes of petroleum products (e.g., crude petroleum, gasoline, diesel and fuel oils, aviation and jet fuel, kerosene, distillate, and coke), which represents about 8% of total tonnage exported out of Vancouver.

The 159-litre barrel, used as a standard measure for crude oil since the 1850s, was the size of barrel adopted in the 15th century by the kings of England and Norway as the standard container for herring.

Sources: Evolution of Canada’s oil and gas industry, Canadian Centre for Energy Information, 2005.

Conventional Crude and equivalents
Production: 35,555 barrels per day (bbl/d).
Consumption: 183,198 barrels of petroleum products per day (2010 data), almost exclusively transportation related with about 10% used in industrial processes. To meet this consumption level we import 80%.
Reserves Potential: 187.3 MMbbl.
Source: Ministry of Natural Gas

Refining in BC

The Burnaby Oil Refinery owned by Chevron Canada is the largest plant in the province and has been operating since 1935. It refines 50,000 to 55,000 bbl/day of motor gasoline, diesel and jet fuels, asphalts, heating fuels, heavy fuel oils, butanes and propane. Crude oil is shipped to the facility via the Kinder Morgan pipeline which covers the distance between Edmonton and Burnaby. Plant outputs/products are used domestically as well as exported.

The Prince George Oil Refinery, owned by Husky Energy, was built in 1967 and has been operating since 1976. It produces about 12,000 bbl/day of grades ranging from unleaded gasoline, seasonal diesel fuels, propane and butane, and heavy fuel oil.
Natural Gas

While BC accounts for only about 5-10% of Canada’s conventional natural gas production at 39.6 bcm/year, it is currently the 2nd biggest natural gas producing province. At the end of 2011, BC’s remaining reserves of conventional natural gas were 980 bcm (raw) and 810 bcm (marketable). Yet, relatively speaking this is miniscule when viewed in a global context, as Canada holds less than 1% of global conventional and unconventional natural gas reserves.

However, with advances in horizontal drilling and hydraulic fracturing techniques, some estimates suggest there are over 39,648 bcm of gas in place in BC, located in unconventional shale, coal/methane reserves and in yet-to-be-found large gas-bearing shales in the Horn River Basin, Cordova Embayment, the Liard Basin and the Montney play areas.

If one assumes that 20% of the gas in place is recoverable, BC would add another 280 tcf (~8,000 bcm) to our recoverable natural gas supply. If the provincial government’s present base case of five new LNG facilities is achieved, BC would increase annual production by 113 bcm/year. Combined with the existing ~40 bcm, we would be able to meet current and new LNG needs for at least 50 years.

To put this further into context, the IEA notes that at the end of 2011 global LNG capacity was 373 bcm. It suggests that this might grow to 575 bcm by 2035. If BC is able to construct five LNG facilities, the province would become a major player with about 20% of the world-wide market share, up from 0% today. Under this scenario, BC would also supplant Alberta as Canada’s leading natural gas producer.

The Western Canada Sedimentary Basin is the main land area where oil and gas exploration and development has occurred. It includes parts of all four western provinces, the Northwest Territories and the Yukon. Since the 1920s, seismic surveys have been used to gain a picture of what might be contained within oil and gas-bearing rock structures, but the only way to really find out is by drilling a well. The first gas well drilled in BC was in 1956 at Clark Lake. In 1957, the Spectra system (formerly Westcoast Energy Inc.) began delivering natural gas from northeastern British Columbia to the lower mainland and US markets in the Pacific Northwest.

---

26 Canadian Association of Petroleum Producers, 2012 Statistics.
27 How many trillion cubic feet in 1 billion cubic metre? The answer is 0.0353146665722. Therefore, 39.6 bcm is 1.4 tcf; 980 bcm is 34.6 tcf; 810 bcm is 28.6 tcf; 39,648 bcm is 1,400 tcf; 113 bcm/year is 4 tcf/year.
28 IEA World Energy Outlook, 2012. Technically recoverable unconventional natural gas resources in the world is estimated to be 790 tcm.
29 The amount of gas in a reservoir at any time, calculated at standard conditions. This includes recoverable and nonrecoverable gas.
Since the 1950s, about 23,000 wells have been drilled in BC, with more than 80% of activity occurring since 1993/94 when mandatory energy removal certificates were abandoned as a form of supply management.\textsuperscript{30} While activity has slowed recently in an environment of low North American natural gas prices, steady advances in drilling techniques have enabled producers to start exploring vast tracts of previously inaccessible gas-bearing shales in the Horn River Basin, Cordova Embayment, Liard Basin and the Montney play. Drilling may well increase in the future as BC looks for new natural gas markets and development opportunities.

The province has also benefited from the sizable Crown revenues generated from natural gas exploration, development and production/exports. Annual revenue from the disposition of natural gas rights and royalties and fees collected has exceeded $1 billion annually since 2000. In 2008/2009 this peaked at $3 billion.\textsuperscript{31} Between 1993 and 2012, bonus bids amounted to about $10 billion and have contributed 89% of all provincial revenue from petroleum titles tenure sales since 1978.

Government in BC supported the steady development of natural gas starting in the 1990s through the adoption of new regulatory structures and the implementation of a fiscal regime designed to incent development of higher (initial) cost reserves. New institutional bodies like the Oil and Gas Commission (OGC) were established to provide more certainty around processes and facilitate access by industry to significant sources of capital to explore and expand. At the same time the BC government took steps to manage the environmental impacts of natural gas development.

\textbf{Natural Gas in BC}

- \textit{Production (gross)}: 4.0 bcf/d.
- \textit{Production (marketed)}: 3.5 bcf/d.
- \textit{Consumption}: 245.1 billion cubic feet of natural gas per year (2010 data) in the following proportions:
  - Industrial 44%;
  - Transportation 6%;
  - Residential 30%;
  - Commercial/Institutional 19%.
- \textit{BC exports 85% of our natural gas.}
- \textit{Ultimate potential}: 1400 TCF.

\textsuperscript{30} Ministry of Energy and Mines backgrounder 2012.
\textsuperscript{31} Responsible Natural Gas Development in British Columbia, May 2013, Ministry of Energy and Mines.
Mid-stream Infrastructure and Energy Processing

BC’s abundant supply of energy sources has necessitated the building and maintenance of a sizable corresponding pipeline and processing infrastructure to transform and move products to market. The cost of transportation alone represents some 2/3 of the final price per unit of natural gas. The construction and evolution of the provincial gas pipeline system, including connections with Alberta and the United States, has been critical in shaping North American natural gas markets. Siting pipelines is one of the most difficult aspects of producing and getting natural gas to consumers, both domestic and foreign. Siting processing facilities faces the same challenges as any large industrial facility. As gas production expands into more remote areas, there may be additional issues associated with developing the facilities needed to move BC produced natural gas to end use markets.

There are a number of regulated gas distribution utilities in BC that provide service to households as well as commercial and industrial users. These include: Spectra, Big White Gas Utility, Cal-Gas Inc., Corix Multi Utility Services Inc., Mt. Hayes Storage Limited Partnership, Pacific Northern Gas (N.E.) Ltd, Pacific

BC also has a large number of exploration and development companies that take the upfront risk to find, extract and process natural gas which can then be marketed domestically or exported. Canada is home to 35% of the world’s publicly traded oil and gas production companies. Most of these are junior- and mid-sized producers. We are more familiar with the larger companies like Encana, Suncor, Imperial Oil and Shell, but the industry is also populated with hundreds of smaller firms.

In volume terms, the production and export of natural gas in BC is modest (40 bcm), equal to about 5% of US demand (680 bcm 2010). Only 16% of BC gas production goes to serve domestic demand, with 41% exported to the US and the remainder shipped to the rest of Canada. Looking ahead, BC will face new challenges as US domestic production increases thanks to its own shale gas revolution; expanding US output is likely to displace BC as a key supplier of natural gas to parts of the North American market. Developing new export markets is therefore critical to continued natural gas production in BC.

Thus, an important initiative for BC is to develop the capacity to produce and export liquefied natural gas (LNG) to foreign markets. At the moment three LNG proposals are under active review in the province, with many (9) more in the pre-feasibility stage. There will be significant ripple effects from building out the LNG sector, including growth in the demand for BC-based engineering, scientific, technical and professional services, and new opportunities for economic development in First Nations communities. The Port of Kitimat is in the process of upgrading its facilities to be an export point for liquefied natural gas. Kitimat, along with Prince Rupert, look well placed to become an important trading hub for BC’s emerging LNG industry.

**Downstream Natural Gas Use**

As noted, BC consumers use only about 16% of the natural gas produced here. The transportation sector is one area where an opportunity exists to support innovation, high tech R&D, and policies aimed at stimulating local demand for natural gas via fuel-switching. In addition, there is scope to use more natural gas in the residential sector – heating and use of high efficiency furnaces – in community build outs in non-integrated areas to replace diesel, and for electricity generation in general. Natural gas is widely viewed as a global transition fuel on the way to a lower-carbon economy, and yet BC, despite having huge supplies, has evolved a policy and regulatory framework that is not aligned with – and, indeed, actively discourages – the domestic use of natural gas.

Transportation accounts for 36-38% percent of all greenhouse gas emissions in BC and is also a source of more localized air pollution. Globally, transportation is the main driver of increases in oil demand, currently accounting for 40% of world-wide refined petroleum products consumption. At the same time, the diffuse and distributed nature of the transportation fleet makes emissions and pollution management in transportation more challenging than it is in the case of stationary point-sources of GHG and other air emissions. However, we believe the transformation of the transportation sector can be supported by greater use of alternative fuels, in particular natural gas.

Natural gas consumed in transportation in BC contributes to a reduced GHG emissions profile for the transportation sector. On a life-cycle basis, natural gas produces between 6% and 11% less greenhouse emissions than gasoline.

---

gas emissions than gasoline and approximately 25% lower tailpipe emissions than diesel.\textsuperscript{33} Natural gas used in transportation also emits considerably fewer air pollutants than diesel, which requires after-treatment and capture of carbon monoxide, nitrogen oxides and particulate matter (among others) to meet Transport Canada/US EPA 2010 emissions standards. For example, a heavy duty Class 8 natural gas truck reduces NOx by about 30% and PM by about 60%, relative to a similar truck using diesel.

The Gateway Strategy adopted by the BC and federal governments has reinforced Greater Vancouver’s role as Canada’s West Coast commercial transportation hub. Truck transportation (including crossings at the four land borders with the United States) has grown appreciably over time.\textsuperscript{34} As a result, this sector will continue to pose a challenge for the province’s GHG reduction targets and can also give rise to concerns over local air quality. Shifting even a relatively small share of the Lower Mainland’s truck fleet to natural gas would promote the Pacific Gateway as a “clean” energy hub, and the economies of scale gained from this growth could make it feasible for fuel providers to construct public Liquid Natural Gas and Compressed Natural Gas (CNG) refilling stations.

Natural gas fuelled vehicles in the off-road and marine segments represent another promising area for BC and indeed Canada as a whole. In the near term (within 3-5 years), the technology will be available for such high horsepower applications as mine haul trucks, locomotives and marine engines. These engines consume large quantities of fuel every day, and the cost and emissions savings of switching to natural gas could be substantial, even over short payback periods. Given BC’s resource intensive economy, natural gas would also appear to be an attractive choice for applications such as short sea shipping (for tug boats and ferries), mining, forestry and oil and gas operations, and rail yard and longer-haul rail operations.

Both the IEA and US Energy Information Agency are forecasting a favorable price differential between diesel and natural gas in North America over the long term. BC’s abundant domestic natural gas supply offers both greater fuel security and significant cost savings, should we choose to encourage greater use of the commodity in the transportation sector. As well, the National Energy Board, in its recent approvals of LNG export licenses, finds that exports will not compromise domestic uses of natural gas for the foreseeable future; this is an important reassurance for industrial, commercial and residential consumers within the domestic market.

As for the use of natural gas in electricity generation, BC currently has ~1,500 MW of natural gas generation capacity spread out over five facilities, with the biggest being Burrard Thermal at 950 MW.\textsuperscript{35} While natural gas is seen in many jurisdictions as a logical and rational choice for new supply and to replace coal-fired generation, the BC government has established policies and regulatory constraints that stand in the way of expanding its use in the electricity sector.

The province’s extensive hydroelectric system has ensured that BC can claim 93% clean generation, compared to 61% for Canada and only 10% in the US. However, with the exception of Site C, there are very few opportunities for additional large-scale hydroelectric development in the province. While generation using water may not be entirely GHG-free, “the important role of hydroelectric reservoirs in the global GHG dynamic is unquestionable.”\textsuperscript{36} Generation by water will remain the bedrock of BC’s

\textsuperscript{34} StatsCan Trucking Summary Statistics by Province and Territory.  
\textsuperscript{35} Burrard Thermal has the potential of generating 7,050 GWh per year. However, because of restrictions in the Clean Energy Act sections 3(5), 6(2)(d) and 13, its current firm energy contribution is zero GWh. It can be used in emergencies or by regulation but otherwise it does not contribute to meeting the electricity needs of British Columbians. Source: Draft IRP Chapter 2, Load and Resource Gap.  
power supply, apart from the nascent LNG sector (see below). The question for British Columbia, in relation to natural gas, is whether to simply export the commodity (which often will be used to displace coal and oil in other markets), or to also explore ways to use it domestically to meet our own energy needs and enhance the province’s prosperity.

### Coal in BC

BC has vast reserves of coal, with recoverable reserves estimated to be in the order of 25 billion tonnes in the province.

Coal exports represent 44% of total production in Canada with metallurgical coal representing 85% of all Canadian coal exports. BC coal exports account for 89% of Canada’s exports of the commodity, with 98% of both production and exports being metallurgical coal used in the production of steel. The industry in BC represents $3.2 million in GDP and a reported $5.9 in expenditures, direct and indirect. BC is the third largest exporter of metallurgical coal in the world.

Most of the coal exported from British Columbia comes from the Kootenay and Peace River coalfields. In recent years, coal has ranked as BC’s largest single export product. In 2011, $7.1 billion worth of coal was shipped from BC, amounting to 22% of all provincial international merchandise exports.

Over one billion tonnes of coal have been mined in British Columbia in the period 1836 to 2011.

<table>
<thead>
<tr>
<th>Clean Coal Production (million tonnes)</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metallurgical</td>
<td>23</td>
<td>24.3</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Thermal</td>
<td>1.2</td>
<td>1.1</td>
<td>1.2</td>
<td>.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24.2</strong></td>
<td><strong>25.4</strong></td>
<td><strong>27.2</strong></td>
<td><strong>27.5</strong></td>
</tr>
</tbody>
</table>

BC has no coal based electricity generation. At present Canada generates only 13% of total electricity supply from coal with Alberta and Ontario dominating at over 78% of the total almost equally divided between the two provinces.


### BC Energy Trade Summary

For a small jurisdiction like BC, trade is a key ingredient in a healthy economy. It makes no economic sense to cut ourselves off from the rest of the world. As in other sectors that produce tradable goods and services, the province can reap substantial benefits by connecting to regional and global energy markets. Much of British Columbia’s wealth – historically, today and assuredly in the future – comes from trade, including in energy and other products that are energy-intensive. Energy exports are a vital contributor to the health of the Canadian and BC economies, representing 6.9% (2010) of Canada’s GDP and 5.4% (2011) of BC’s GDP as well as 31% of the province’s international merchandise exports.

---

37 The Canada-US Trade and Energy Relationship, David McLaughlin and Bob Page, Institute for Public Policy.
There have been declining prices in North America for natural gas and in some locations for electricity. This has affected the total quantum of energy trade revenues realized by BC. However, the sector as a whole still represents a substantial part of the province’s export base (as is also true for Canada). In the BC context, natural gas largely holds the key to future export growth.

Historically and for economic reasons, trade in electricity and natural gas usually occurs most easily and efficiently between closely linked and related regions, both geographically and economically. This has certainly been true for BC, which has developed a logical and mutually beneficial set of energy trade relations with the rest of Canada and a significant commercial energy relationship with the United States. However, despite Canada’s status as America’s largest trading partner and the principal destination for much of the oil and gas produced in Canada since the 1970s, the US is in the early stages of a multi-year resurgence of domestic energy production – both oil and natural gas. This trend is now well-established, with significant price and supply implications for energy producing jurisdictions in Canada and elsewhere. As a result, access to more lucrative offshore energy markets will be critical to sustaining and expanding oil and gas production and exports in Western Canada. This topic is explored in more detail below.

**Energy and Environment in BC**

Energy is the nexus point for many fundamental discussions about trade-offs between the environment and economic development and growth. Modern societies need and use energy often unconsciously; as consumers, we expect cost-effective and reliable energy to be available on demand, at anytime and anywhere for anything we may be doing. As a result, the energy and environmental policy dialogues are inextricably linked. Today, one cannot occur without the other.

39 Export Development Canada, *Gearing up for Growth, Spring 2013*.
In the past, the range of impacts considered in project development was narrower than it is today. In fact, many of the processes we use to evaluate developments have existed for less than 20 years and in some cases are only now becoming mature. For example, when BC Hydro’s first facilities were constructed, there was no environmental assessment process and the main values considered were flood control and power generation. Values like fisheries, wildlife, landscapes, recreation and water quality were given limited or no attention. The vastness of our landscape made it seem like there was limitless available space within which to explore and develop BC’s resources. Much has changed since that phase of the province’s economic development. In many ways BC is now a leader in dealing with complex energy and environmental challenges – addressing risks of negative impacts from development appropriately, and balancing social/economic and environmental interests.

In BC, as elsewhere, the most significant environmental issues relating to energy use and production are:

- Climate change – how to rationalize the province’s policy framework to ensure we do our part but don’t disadvantage BC industries in the global economic arena in the process?
- Spill response – how do we effectively manage the risk of potential spills of fossil fuels?
- Water – how do we leverage our abundant supply while protecting both the quantity and quality of drinking and other water?
- Land use and protected areas – how do we find the right balance between acknowledging the good work that’s been done in protecting almost 16% of BC’s land base (and the demand for more areas to be set aside) with the need to accommodate both economic development and a growing population?
- Air Quality – how do we maintain good air quality while advancing new industrial development opportunities?

These are posed as questions in this paper rather than explored in depth as each subject area could have its own extensive paper written about them. Some of the possible answers to the policy response on the topic of climate change, in particular, are addressed in the recommendations section.

*****
PART 2: The Building Blocks of Energy Prosperity for BC: Recommended Policy Directions and Actions

The first part of this paper provided the background and fact base for energy development in BC. In Part II we consider the policy directions and actions required to advance energy prosperity in British Columbia. This section includes some historical context and a more detailed analysis of a number of contemporary factors that are driving change: (1) the shale gas revolution, (2) climate change, and (3) fundamental shifts in the electricity marketplace.

Three Phases of Energy Policy Development in BC

As described in the introduction, energy is deeply embedded in our industrial and technology-driven economies. In order to develop energy resources, there is a constantly evolving policy and political conversation about societal needs that plays out in legislative deliberations, laws, regulatory measures, strategies, and funding priorities, all of which ultimately leads to the framework for the exploration, extraction, transformation and use of energy in its various forms. In BC, this complex policy arena has the added feature that most energy resources have an underlying title with the Crown – the provincial government – which largely sets the table for reconciling competing values and interests, and also determines how any resource rents associated with energy products are managed and distributed.

Overall, British Columbia has benefitted greatly from the economic framework governing resource development. Given BC’s extensive and diverse energy assets, we should continue to do so well into the future. But continued energy prosperity is by no means assured. The province’s energy assets require a relatively complex set of enabling public policies and market-driven imperatives to translate potential into reality. Historically, BC has been quite successful in getting the public policy framework right to support energy development in a manner that has enhanced prosperity and fostered downstream economic diversification. However, today the province faces dynamic period for energy policy. There is a pressing need to update policies to deal with a shifting commercial and technological landscape that is overlain with fundamental policy trade-offs that are evident on a global scale.

Phase 1 – Building the Legacy

To understand this policy landscape, a broad understanding of the history of policies to encourage energy development in BC is helpful. At a high level, three phases can be identified. In the first phase, energy policies in the post-war period (1950s-1970s) were underpinned by a visionary and largely successful desire to rapidly build and diversify the economy, using the province’s abundant hydro resources to encourage investment in emerging downstream industries in the forestry and mining sectors. In addition to the hydro legacy, this period also saw the foundations of pipeline development laid in the oil and gas sector. While this phase was by no means uncontroversial, in retrospect most of
the energy development that happened did so with relatively broad public support and, in most instances, considerable economic foresight.

**Phase 2 – The Regulatory and Natural Gas Foundation**

As the province moved beyond the dam-building phase in the electricity sector and proceeded to develop the broader natural resource sector, in the 1980s and 1990s energy policies shifted to a second phase. In this era, energy policies were less focused on government-led interventions, and took more account of global energy policy trends toward greater market competition combined with regulatory oversight. This period saw moves to open up the natural gas distribution sector and to put in place new institutional constructs to grow the emerging upstream natural gas sector.\(^47\)

The results of this second phase were somewhat mixed. On the natural gas side, the establishment of the Oil and Gas Commission (OGC) received largely favorable reviews from industry and has been praised by most stakeholders for effective implementation of the provincial framework (under both NDP and BC Liberal governments) to develop the upstream gas sector.

In the mid-stream, during this period BC Gas was privatized and natural gas distribution shifted to a competitive marketplace with regulatory (BC Utilities Commission) oversight. Overall and certainly compared to other jurisdictions, the BC Gas privatization went relatively smoothly. While escalating natural gas prices led to some inevitable complaints, the BCUC established itself as a regulator able to assess supply and demand issues and to ensure that infrastructure was developed in a suitable manner to allow for competition upstream and fairly priced access to product downstream. Given the importance of the BCUC, a more detailed description is provided below.

The BCUC performs the functions of a classic energy regulatory agency. Quoting from the agency’s mandate:

> “The Commission is responsible for ensuring that customers receive safe, reliable and non-discriminatory energy services at fair rates from the utilities it regulates, that shareholders of these utilities are afforded a reasonable opportunity to earn a fair return on their invested capital, and that the competitive interests of B.C. businesses are not frustrated.”

At times the BCUC served its purpose with fact-driven, stakeholder engagement processes designed to reach decisions on a variety of energy development and rate-related matters. Although this was not always a quiet period for energy policy, compared to some other jurisdictions efforts to de-regulate the energy sector in BC proceeded in a context of relative stability.

While electricity market disruptions were largely avoided in BC during this time, de-regulation and utility reform proved to be a complex challenge. During the 1990s, important policy debates regarding market reform – systems (transmission) access and Independent Power Producers (IPPs, primarily smaller scale renewables and merchant natural gas generation) – gained attention.\(^48\) Government attempts to put in place frameworks to evaluate and encourage new electricity generation suffered from a combination of

---

\(^47\) The National Energy Board was constituted in 1959; the BC Utilities Commission began its duties in 1980, after the province released its first official Energy policy – An Energy Secure British Columbia.

\(^48\) Two comprehensive reviews occurred in the 1990s – the BCUC undertook an Electricity Market Structure Review in 1994/95, and in 1997 a BC Task Force on Electricity Reform also looked at market reform. Neither review led to substantive changes during the 1990s, although incremental shifts and an IPP policy did emerge.
regulatory uncertainty and repeated government interventions in regulatory processes to clarify broader policy intent. The electricity sector struggled as the government took increasingly prescriptive steps to ensure that the BC Utilities Commission model effectively regulated the overlay of both provincial policies and emerging marketplace imperatives. Most challenging for the BCUC, as for other similar Commissions elsewhere, was the interpretation of government policies on the supply of new electricity generation, and how to monetize and evaluate the array of broad social and environmental objectives that entered into energy policy and associated regulatory decisions.

Competing interests from emerging IPP development, including natural gas and renewables, and the ongoing desire among existing customers to maintain low electricity rates, led to inevitable policy conflict. By the late 1990s, the government of the day decided that more specific direction was required around generation options, and it effectively precluded the BCUC from assessing and rendering determinations on supply options. While a detailed review of this period is beyond the scope of this paper, the next government-imposed initiative to develop natural gas-fired electricity generation on Vancouver Island met with limited success and was plagued by poor timing – ending with only one generation facility being built in Campbell River, and a costly court case that stemmed from a government decision to renege on a contract for the Duke Point natural gas facility.49

More impressively, over the 1980s and 1990s BC Hydro was successful in two important areas: electricity conservation and, through the trading arm Powerex, maximizing the benefits of the BC Hydro system with its ability to sell power into the Western trade region at high price points and store energy at low prices behind the utility’s dams. BC’s dams are globally recognized as one of the most efficient storage systems in the world, and over much of this period the province benefitted from electricity market de-regulation and systems integration in the WECC.50 On the conservation side, the Power Smart and Resource Smart programs provided significant demand side management savings, with clear net benefits relative to cost in many programs in terms of efficiency and demand deferral.51

While policy mistakes were made, each of these first two phases of energy policy development in BC saw significant successes in enabling energy-related economic activity both upstream and downstream, and in generating significant resource rents for the Crown. However, as the 20th century drew to a close, a new set of challenges came into view. It is to these challenges, and the third phase of energy policies, that we now turn.

49 Rising gas prices, and projections of ongoing natural gas price increases, brought some of the project economics into question. At this time, shale gas was not a significant factor in supply analysis. The cancellation of the Duke Point facility came after significant public debate and after key milestones had been passed by the company. The subsequent cost to ratepayers was $120 million. The Vancouver Island cogeneration facility in Campbell River became operational in 2002. Successive governments have struggled to determine the most efficient and effective means to add supply as the electricity demands of the province finally approached system limits (from a planning perspective) and outgrew the overcapacity supplied by the large dam building phase.

50 It is worth noting that electricity end users throughout the WECC also benefitted from BC Hydro.

51 A detailed analysis of these programs, launched in 1989, is beyond the scope of this paper. However, many of these programs have been reviewed by the BCUC in some depth, supporting the initiatives. The extent to which further conservation measures can deliver results will be determined in the coming years, as some two-thirds of future demand is to be met through conservation.
Phase 3 – The Shale Gas Revolution, Climate Change and Electricity Market Shifts

Over the most recent decade, BC has worked to establish an effective policy framework to deal with the opportunities and challenges of new local, regional and global energy supply and demand dynamics.

During this period, three fairly comprehensive policy programs were launched to guide provincial energy policies – the 2002 Energy Plan, the 2007 Energy Plan, and the 2010 Clean Energy Act/2011 Jobs Plan. All three plans attempted to reconcile and address significant shifts in both policy objectives and the energy marketplace.

The focus of the BC Liberal government’s 2002 energy plan was to put in place a clear framework to accelerate the development of the natural gas sector, and to enable the emergence of a more robust IPP industry to meet the growing need for BC Hydro to plan for new power acquisitions and possible future export opportunities for renewable energy. While the 2002 plan met with some success, emerging policy issues, including the (at the time) increased potential for renewable energy exports, necessitated further change. The 2007 Energy Plan sought to put BC at the forefront of the global effort to address climate change and build out a vision for clean energy development, inclusive of a belief that natural gas exports were part of a continental approach to move toward a lower carbon North American economy. In the section below, the impacts of the 2007 Energy Plan and of the government’s policies with respect to climate change are outlined in greater detail.

Understanding the climate change dimension in BC

It is widely recognized and scientifically validated that climate change is a global, multi-generational challenge for policy makers and society that has significant linkages to energy. As such, climate change policies had, and will continue to have, an important impact on energy policy in BC.

As a relatively small, open trading province with a diverse mix of energy resources and environmental values, climate change poses a particularly complex set of challenges for BC policy makers. Within this context, reconciling sometimes competing economic and environmental imperatives without a coherent guiding GHG framework in the broad external (regional, national and global) marketplace is, to put it bluntly, a nearly impossible task. However, policy makers nonetheless must strive to address scientific and public concerns around climate change, and understandably seek to ensure that BC does its part to contribute to global efforts to tackle GHG emissions.

Despite the difficulty of acting, in part unilaterally, to try and reconcile energy and climate change policy objectives, BC did seek to chart an innovative path forward as a ‘clean energy superpower’, with a dual focus on developing renewable electricity sources and ‘clean’ natural gas. The 2007 Energy Plan: A Vision for Clean Energy Leadership embodied a dual approach to energy development opportunities. In addition to IPP and natural gas development initiatives, the government announced a first for North America – a comprehensive, revenue-neutral carbon tax that applies to most types of fossil fuel consumed by both businesses and consumers.
From an energy development perspective, both the 2007 Energy Plan and the BC carbon tax were predicated on realizing the benefits expected to come from being a first-mover jurisdiction in carbon pricing. It was assumed that other governments in Canada and the US would, fairly quickly, adopt their own carbon pricing regimes, and that BC’s policies in this area would be integrated with those of other jurisdictions through the Western Climate Initiative (WCI). The 2007 BC Energy Plan framework was also designed to capture future marketplace (WECC) trade benefits that were anticipated to arise owing to the rapid development of RPS (clean renewable electricity content standards) for utilities in the large California market and elsewhere.

Unfortunately, the vision underlying BC’s 2007 Energy Plan was fundamentally compromised by a series of subsequent events and marketplace developments, including: (1) the 2008-09 economic downturn and the weak recovery that followed, which severely dampened US market potential for renewables; (2) the explosion of US shale gas production, which contributed to structurally lower North American prices for this important energy commodity and encouraged many utilities to build natural gas-fired generation instead of more costly renewables; and (3) stalled progress on climate change initiatives to price carbon in Canada and the United States. Taken together, these developments undermined core assumptions underpinning BC’s 2007 Energy Plan, and in recent years they have put pressure on the province to reassess aspects of its energy policy framework. Undoubtedly the most significant new development affecting the broad energy sector is what is now commonly called the ‘shale gas revolution’.

Understanding the impacts of the shale gas revolution

The impact of the shale gas revolution on BC has been far-reaching, and for energy policy, remarkably swift. As Figure 21 below shows, the natural gas sector in North America changed profoundly beginning in 2007, as a significant price spike that ran through 2008 crashed going into 2009, with a much lower price environment now embedded in marketplace expectations due to the astonishing surge in the supply of shale gas at prices well below those prevailing in the 2003-2008 era.
**Figure 21**
Global Natural Gas Prices, Key Areas

![Graph showing global natural gas prices](image)

Source: US Federal Reserve, World Bank, CGA.

**Figure 22**
Price Projections, Various Scenarios, Lower 48 States, US Natural Gas, 1990-2035
(2009 dollars per thousand cubic feet)

![Graph showing price projections](image)

Source: US Department of Energy.
At present, US natural gas prices in the lower 48 states are projected to remain below (or just over) $6/mmBtu until at least 2025, under almost all conceivable supply/demand/scenarios. Figure 22 on the previous page depicts the price projections from the US Department of Energy.

The major supply and demand changes linked to rapid continental shale gas development have had negative consequences for the profitability and overall economic health of the upstream natural gas industry in BC and elsewhere. From a BC government perspective, the shale gas revolution has also had a deleterious impact on budget revenues. As Figure 23 below highlights, natural gas royalties accruing to the provincial government have slumped from a high of about $2 billion in 2005/06 to $400 million (or less) from 2009/10 onward.

Figure 23
BC government natural gas royalties 2000-2015 ($ millions)


The LNG imperative for BC and Western Canadian Natural Gas

Fortunately, natural gas produced in BC (and in Western Canada more generally) now has a potential new marketplace. As shown in Figure 21 on the previous page, there is currently a very significant price spread for natural gas around the world. This price spread presents an opportunity to establish natural gas trade relations outside of BC’s traditional continental/regional pipeline paradigm, by exporting natural gas via the liquefaction and transportation of the commodity in the form of LNG. In a global context, the natural gas marketplace is moving to a hybrid model as the traditional, regional based natural gas supply system is supplemented by a rapidly expanding LNG global trade model that allows North American suppliers to sell into offshore markets at prices well above those prevailing closer to home.

mmBtu is the industry standard measure for natural gas – million British Thermal Units of energy (1 BTU heats/cools 1 pound of water by 1 degree Fahrenheit).
LNG supply and demand dynamics are now playing out in what has become a global race to bring (regional) natural gas price spreads into a more stable equilibrium – one that integrates different regional markets by enabling the wide (and increasing) variety of global new shale gas supply options into markets that can sustain the higher costs associated with the production and transportation of LNG from areas with shale gas abundance and, generally, lower-cost upstream producers.  

**BC’s LNG Strategy**

In February 2012 the BC government released its LNG strategy as a follow-up component to the earlier September 2011 BC Jobs Plan. The strategy articulates a clear commitment to do what’s necessary to make this potentially new sector competitive in a global context, and sets an ambitious target to have at least three LNG facilities operating in the province by 2020. The assumption is that these facilities would sell BC gas into Asian markets with an appetite to enter into long-term supply arrangements for Canadian-produced LNG.

By any measure, the capital deployment and potential lift to the BC economy from an expanding LNG sector would be unprecedented. There is the potential for perhaps $50 billion in new capital investment over a period of 5-7 years. Over the longer-term, the LNG sector could generate up to 1.2 million person years of employment in the province (100,000 jobs). The incremental economic impact from development of the LNG sector could yield a six-fold increase in annual BC government natural gas royalties and produce a cumulative gain of as much as $1 trillion on the province’s GDP over the next 30 years.

Given the stakes at play and the depressed outlook for continental natural gas prices, the Business Council believes the provincial government’s focus on LNG, and its desire to link BC gas with offshore energy consumers, is fully merited. However, behind the promising headlines and the broad support for LNG are some very real challenges and a long list of global competitors intent on serving the same markets.

---

56 For a thorough review of supply and demand dynamics, see the US Energy Information Agency’s reports: [http://www.eia.gov/naturalgas/](http://www.eia.gov/naturalgas/).
58 See [http://www.roboc.com/Resources/Reports.htm](http://www.roboc.com/Resources/Reports.htm).
59 These estimates were based on reviews undertaken by Ernst and Young and Grant Thornton for the Ministry of Energy, Mines and Natural Gas in February of 2013. Note that the Business Council has not verified or attempted to replicate the findings of these reports.
60 There are approximately 30 jurisdictions looking at LNG export opportunities.
Shale gas is not unique to BC and North America – it’s a global resource available in many countries. The reality is that a number of other jurisdictions are looking to develop their own LNG sectors – and many are already present in the Asian marketplace. In short, timing issues are critical as BC continues to work to capitalize on the LNG opportunity. So too is the need to ensure that the regulatory and fiscal frameworks governing LNG in British Columbia are competitive on a global basis. Figures 24 and 25 shed light on the overall competitive environment by looking at current supply and demand from a price and cost of supply perspective.

While a detailed analysis of all the factors unfolding in the LNG sector is well beyond the scope of this paper, the case for moving quickly to establish this new sector is convincing. Based on feedback from LNG proponents and LNG buyers, and our own analysis of the marketplace, it is clear that realizing the LNG opportunity requires that the province move without delay to convert the current interest from LNG proponents to reality. At present, there are no less than 12 proposed LNG projects of varying sizes in BC, of which approximately half are likely to be progressing towards final investment decisions over the next 6-24 months.

The argument for pursuing this window of opportunity is based on a marketplace need to align current export market issues – demand forecasts, security of LNG supply and LNG infrastructure needs - with long-term LNG supply sources, including both new contracts and contract renewals. Overall, there is sufficient evidence in the marketplace to suggest that, if the current LNG contract window closes before BC is able to secure final investment decisions, there would be potentially lengthy delays before BC and Western Canadian natural gas would have another LNG export opportunity.

---

61 Note that the Business Council and CAPP have a working group with LNG producers to discuss areas of interest within the policy framework being developed for the sector. More detailed analysis and recommendations may come forward at a later date.

62 This estimate was compiled from discussions with LNG proponents and government officials.
Note that this is not to say that there will no future growth opportunities in the North American marketplace in the medium-to long-term, but BC natural gas will face stiff competition for the foreseeable future in North America.

In terms of the specific policy initiatives in this phase of energy development to enable the development of the LNG sector, the government has made several important updates to the Clean Energy Act regulatory framework. This includes modifying the definition of ‘clean’ in terms of electricity inputs for LNG, and updating key regulatory structures in the Oil and Gas Commission. These updates, and the next steps required, are discussed in the final section of the paper.

**Electricity market transformations**

While not having the same profile as climate change and shale gas, the transformation of the electricity market across the WECC region has in some ways been equally profound, with significant implications for energy policy in British Columbia.

Over roughly the same period as noted in the preceding section on natural gas, the electricity supply and demand equation in the WECC trade region has been altered fundamentally due to a series of factors: (1) the 2008-09 North American economic downturn and weak post-recession recovery, (2) sizable renewable energy subsidies coming forward from the Obama administration and some US states, and (3) most recently, the growing attraction of low cost natural gas fired electricity as a source of energy supply. The impact of these developments on power contracts and the benchmark mid-C price has been substantial and, as with natural gas, this lower-priced electricity environment is projected to persist for some time, even if more provinces/states eventually take steps to price carbon emissions.63

These electricity marketplace shifts have important implications for British Columbia. BC Hydro, through its latest Integrated Resources Plan (IRP), is no longer predicting significant new electricity supply needs beyond Site C and conservation targets, with the notable exception of additional LNG load, for a decade.64 The clean electricity export opportunity to the US has evaporated for the foreseeable future due to expanding shale gas supply, low natural gas prices, and US renewable energy subsidies.

In addition, the province’s existing electricity system assets need attention and investment in order to ensure reliability and availability. This re-investment includes existing IPP infrastructure, which does not cease to exist at the end of a 20 to 40 year energy purchase agreement, but has the potential for long-term and cost effective contributions to the entirety of BC electricity infrastructure for 50 to 100 years. These facilities are equivalent to BC Hydro’s “resource smart” investments that take advantage of infrastructure that already exists. Moreover, as outlined above, ongoing cost pressures at BC Hydro have to be addressed. This will require new and innovative policies to mitigate ratepayer impacts while continuing to build for the future.

BC’s past investment in electricity infrastructure in the 1950s through the early 1980s has paid dividends through relatively low rates relative to most other provinces and states. This has provided an economic advantage that has been used to attract energy-intensive industries and to support primary resource extraction activities, which by their very nature use large quantities of energy. However, during some

---

63 Mid-C refers to the price for electricity at the mid-Columbia delivery point. The IRP provides a relatively robust discussion of various factors involved in price projections for electricity. It is noteworthy that, given a relatively low predicted GHG pricing scenario for natural gas fired electricity in the US, other estimates predict mid-C prices in the $30-$40 MWh range for the coming decade under normal to above normal water conditions.

periods in the 1990s and early 2000s, there was very little capital committed to maintaining an aging infrastructure portfolio; and more recently, other factors have contributed to the specter of significant rate increases to cover current and future costs. Meanwhile, much of the public in BC has an expectation that low power rates will continue indefinitely. However, along with the refurbishment of existing assets that is now required, some new capacity will be needed to meet the specific needs of LNG development along with the modest growth in demand beyond the current decade. Even in this relatively slow growth environment, the capital requirements to maintain and add to the system will be substantial given the size, age and technical complexity of electricity generation. According to BC Hydro’s most recent service plan, sustaining (versus growth) capital expenditures will increase 60% over the next 4 years, to $1.64B per annum, while growth capital will remain flat for a total of $2.45 billion (excluding Site C) by 2016.

While updates to the government’s Clean Energy strategy occurred in 2010, and further actions were taken pursuant to the 2011 BC Hydro Review that dampened future rate increases to some degree, the reality is that BC Hydro has a relatively constrained set of tools to avoid future rate increases. The costs stemming from necessary, and in some instances overdue, infrastructure upgrades and system improvements are combining with higher costs of both new supply contracts and conservation options to drive up overall power costs in British Columbia. At the same time, there are fewer opportunities to generate profits for BC ratepayers through traditional electricity trade within the WECC region – although Powerex has continued to find significant marketplace opportunities to maximize BC’s storage capabilities and downstream benefits in a profitable manner.

As the discussion of electricity rates and heritage legacy benefits continues, the Business Council notes that the province’s current Industrial Rate Review provides a useful and more detailed perspective on the issues that are relevant for business in British Columbia – critical and complex issues such as retail access policies will require attention to ensure market forces are utilized by BC Hydro to keep our industries competitive in a rising electricity cost environment.65

The task of keeping electricity rates competitive, while upgrading infrastructure and growing/diversifying BC’s economy, will be a daunting one in the years ahead.

**The New Energy Reality for BC**

The changing energy landscape discussed above speaks to a new energy reality for BC. As part of an increasingly global energy marketplace, BC cannot afford to build walls around the province, and we need to move beyond the expectation that our energy resources bring with them automatic and enduring entitlements. Fortunately, much good work has already been undertaken by the provincial government – many of the trends and marketplace shifts examined in this paper are well understood by key decision-makers, and energy policies are being updated in this dynamic period.

The attention being given to energy matters is fully merited – the energy sector is in transition. The Business Council believes the time is right to put in place (further) updated policies to advance the province’s energy opportunities and address emerging challenges. To this end, the following section outlines a series of recommendations to help build a stronger policy foundation for energy development in British Columbia.

*****

65 [Http://www.empr.gov.bc.ca/EPD/Pages/IndustrialElectricityPolicyReview.aspx](http://www.empr.gov.bc.ca/EPD/Pages/IndustrialElectricityPolicyReview.aspx)
Recommendations – Building BC’s New Energy Advantages

Fortunately, BC has already developed many of the building blocks to deliver energy prosperity. In the following section, we briefly outline a series of high-level policy recommendation areas supported by more detailed policy actions. These are intended to position the province for continued energy prosperity and to move through the challenges detailed in this paper. The key areas covered are:

- Improving the province’s overall energy policy framework;
- Accelerating natural gas and LNG development;
- Ensuring that BC is a leader in responsible energy development;
- Moving the Western market access for oil sands debate forward;
- Continuing to improve First Nations’ involvement in energy development;
- Reconciling energy and climate change objectives;
- Addressing the challenges in electricity policy;
- Building the human resource and infrastructure required to enable development;
- Leveraging downstream energy opportunities.

1. Update the Province’s Energy Policy Framework

Given the changed energy landscape, the Business Council believes there is more work to be done to reconcile market shifts and incremental, new policy directions within a well-articulated provincial energy plan. The province’s energy strategy would benefit from a comprehensive update to address some of these recent trends and challenges, and to send clear signals to both markets and citizens on the future direction of energy policy and energy development in the province.

To this end the Business Council recommends:

Recommendation 1: Within 6-12 months, complete a comprehensive review and update of BC’s energy policy framework.

Recommendation 1a: In key policy areas with immediate needs (e.g., LNG, the BC Hydro Integrated Resource Planning process), complete the required review work in 3-6 months for incorporation into a more comprehensive, well-articulated energy policy framework.

Recommendation 1b: The provincial government’s Core Review process should be utilized to ensure an orderly and comprehensive review of relevant agencies and mandates to fit within a revitalized energy policy framework.

2. Place a Renewed Focus on Energy Marketplace Competitiveness Challenges

The Business Council has growing concerns with respect to BC’s competitiveness as a supplier of energy products, particularly for export purposes. While the province has competitive structures for upstream energy development and still benefits from the legacy of dams and other hydro-electric capacity, the recent erosion of tax competitiveness with the return to the PST, the $30/ton carbon tax, and recent

---

66 Note that more detailed discussions and recommendations on aspects of energy development in BC are covered in the Business Council’s 2009 and 2010 Outlook 2020 reports.

67 The Business Council notes that while this work can be part of the Core Review process, there will be certain policy areas requiring more immediate review and updating.
corporate tax increases have, taken together, diminished the attractiveness of investing and doing business in BC, especially for capital-intensive industries and some manufacturing sub-sectors. This is compounded by the complex regulatory and operating environment facing energy producers and infrastructure providers in the province.

BC’s energy resources are world-class from an inventory perspective, and the province has a strong set of primary development and service sector firms, but the resources are hardly unique globally and particularly not within the current (and future) continental marketplace. Our energy advantages, then, focus on the benefits of having excellent enabling infrastructure, such as pipelines and processing, along with the human capital available to mobilize new growth opportunities. But this requires an overlay of cost competitiveness and effective public policies to ensure that development moves forward in a timely manner.

Determining exactly what the right policy mix is to meet competitiveness tests (which includes the quality of the environment and consequences of development) while continuing to ensure the Crown receives an appropriate return for a public resource, is an ongoing issue for policy makers. At certain points in the province’s development, governments have made important enabling policy decisions that spurred downstream development. It was these developments, rather than the energy resources in and of themselves, that subsequently generated economic prosperity. In order to facilitate the next phase of energy related economic growth in BC, a renewed focus on defining and acting to strengthen energy sector competitiveness will be required.

This work should not be restricted to questions of fiscal/tax competitiveness. A broad definition of competitiveness is needed to ground the development of policies that successfully address issues such as carbon management and First Nations, right through to infrastructure and human capital needs. All of these factors combine to influence overall competitiveness and create social license for the energy sector. To ensure that ongoing BC energy sector competitiveness tests are met, the Business Council recommends the following:

Recommendation 2: Ensure that BC’s energy sector competitiveness is assessed regularly across a comprehensive set of key indicators – and use this analysis as an input into a renewed energy policy framework, looking at a full range of costs and benefits.

Recommendation 2a: Ensure that the review of BC Hydro’s IRP and the still emerging LNG policy framework are underpinned by clear, well-articulated competitiveness analyses including some measure of environmental quality.

Recommendation 2b: As part of the government’s Core Review process, ensure that regulatory efficiency and alternative delivery and financing models are fully explored with a competitiveness lens on energy sector development.

3. Accelerate Natural Gas and LNG Development

The LNG opportunity for BC is generational in nature, historically unique and well-timed in the face of continental natural gas supply and demand trends. Currently, the provincial government’s natural gas and LNG sector plans are largely directional in nature. These plans have provided a framework to allow public servants and industry to develop this emerging sector in a coordinated fashion as projects
progress. However, there are some critical policy components that would benefit from greater transparency and a clear(er) set of guiding principles.

In particular, issues around the fiscal framework(s), First Nations, GHG management, infrastructure, power supply, labour (skills) requirements and the overall regulatory overlay are all areas where we believe an accelerated, principled approach would benefit the sector and serve the broader public interest. Recently, the Business Council has worked with the Canadian Association of Petroleum Producers (CAPP), key LNG proponents and government officials to explore issues of common interest. To further this effort, the Business Council recommends that the province take the following steps:

Recommendation 3: Complete and release a ‘Guiding Principles for LNG Development’ document developed collaboratively by key stakeholders.

Recommendation 3a: Support the creation of a Ministry of Natural Gas Development, appropriately resourced, to engage with proponents and the entire supply chain. We also support the establishment of a robust cabinet and Deputy Minister committee system to work with the LNG Secretariat in the Ministry.

Recommendation 3b: Ensure there is comprehensive coordination between electricity demands through the entire natural gas value chain on the part of BC Hydro and provincial officials responsible for policy oversight.

4. Introduce a BC Non-Renewable Resource Fund (NRF), with Realistic Long Term Valuation Targets

The development of non-renewable resources can generate significant societal wealth. However, energy development can also give rise to long-term, structural challenges for economies that end up using/dissipating resource rents in an unwise or unsustainable manner. Of particular concern is the practice among some energy-rich jurisdictions of utilizing non-renewable resource revenues to fund public sector operating costs and income transfer programs, and/or to maintain taxes at artificially low levels by drawing excessively on the revenue streams associated with the exploitation of non-renewable resources. If energy resources are imprudently managed and not used to support long-term wealth creation and economic sustainability, this may lead to painful adjustments when the resource wealth runs out or is significantly diminished. In this regard, we believe that society can benefit over the long-term if some of the economic rents accruing from the production and sale of non-renewable resources is set aside to help finance improvements in human capital, infrastructure development, and investments in science, research and innovation.

In our view, careful assessment of energy resource inventories, the market conditions for energy products, and the use of non-renewable resource revenues is a sensible strategy for any energy-rich jurisdiction. Within this construct, a well-established principle is to ensure that a portion of non-renewable resource revenues is earmarked to benefit future generations. Globally, there is a wide range of options for doing so. Some jurisdictions (Norway, Middle East, Russia) have channeled large portions of the earnings from their vast energy wealth into Sovereign Wealth Funds (SWFs). Other jurisdictions, such as Alberta and many OPEC countries, have dedicated varying portions of their non-

---

68 The Business Council supported the provincial government’s commitment to establish and resource such a new Ministry as part of their 2013 election campaign platform. A new dedicated Ministry of Natural Gas is now in place.

69 The IMF has produced the following report on this topic: http://www.imf.org/external/pubs/nft/op/205/.

renewable energy revenues to pay for a range of public programs (health care and education), income transfer programs, and public sector employment and pay levels that are comparatively high, in part due to competitive labour market pressures in these jurisdictions.71

In the case of BC, there has been no overarching attempt to establish a Natural Resource Fund (NRF), although Fair Share programs and a variety of Resource Trust models have been implemented at times in the recent past.72 In the 2013 Throne Speech, the government announced a commitment to establish a ‘Prosperity Fund’ to take a portion of the potential tax revenues from a future LNG industry for savings and debt reduction purposes. In previous budget consultation submissions, the Business Council has offered support for the idea of an NRF. However, we recommend broadening out the LNG-driven framework initiated for the proposed Prosperity Fund. A more expansive NRF model is desirable, one that is not limited to energy. It should start with a comprehensive review and discussion of the appropriate mix of future non-renewable resource rents for budget expenditures and for deployment to an arms-length non-renewable resource endowment fund.73 To this end, the Business Council recommends the following:

Recommendation 4: Undertake a financial options review of current and future non-renewable resource revenues, including the existing vehicles for providing long term funding in resource dependent regions (Trusts/Fairshare programs), with the intent to establish a modest non-renewable resource endowment fund by 2016.

Recommendation 4a: Ensure a robust competitiveness test overlays fund design and that an external, arms-length oversight and management body forms a core component of the governance structure.

Recommendation 4b: Consideration should be given to looking specifically at dedicating a small portion of a BC NRF to support energy system transitions – funding for improved energy intensity, efficiency and transportation programs that are incremental to general revenue programs and that create new, long term intergenerational energy assets in a manner that does not distort market activity.74

5. **Position BC as a Canadian and Global Leader of Responsible Energy Development**

Much of BC’s energy resource development takes place well outside of urban settings where the vast majority of residents live. This creates challenges in terms of building a solid public understanding of BC’s energy economy, notably in urban areas. As our energy economy transitions and looks at new opportunities for future development, it will be important to improve the level of literacy regarding all aspects of energy use and development. This means literacy regarding current and future domestic energy production, but also consumption patterns and new market realities that impact the economy.

Too often we take for granted the many benefits of energy resources, both from a consumption perspective and in terms of the economic wealth generated by energy development and trade. There is a tendency to focus on concerns that can arise around energy production and use, leading to missed opportunities to look for solutions that make use of the province’s energy resources for current and

---

71 In Alberta’s case, public sector wages have become significantly higher than in other provinces.
73 It is noteworthy that BC has been able to develop a diverse set of renewable resource development (hydro, forestry, wind) energy resources along with having a vast inventory of natural gas. Note that this proposed fund is also consistent with the International Energy Agency’s policy assumption for OECD countries under the 450 scenario (World Energy Outlook 2020, Annex B).
74 Note that the Business Council will be producing a more comprehensive piece on the Prosperity Fund in the Fall of 2013.
future needs. This includes conversations about climate change and the eventual transition to a lower (global) carbon energy economy, as well as the fundamental marketplace challenges and opportunities outlined in this paper and elsewhere.

Recommendation 5: In partnership with industry, resource communities, the federal government and other key institutions, the provincial government and industry should develop and disseminate more comprehensive public information on BC’s energy consumption and production, energy transitions and energy future.

Recommendation 5a: Utilize innovative online and social media communication channels to build energy literacy and improve public engagement.

Recommendation 5b: Include, as part of the above initiative, an assessment of new programs to assist in creating stronger connectivity between individual action and energy outcomes in BC, building on BC Hydro’s successful PowerSmart programs.

6. Establish a New Mandate for Energy Related Inter-Governmental Relations (IGR)

At times BC has had a reputation as the outlier province in Confederation. West of the Rockies and on the country’s ‘left coast’, BC has evolved a somewhat unique and complex political culture that is often misunderstood as simply a culture of protest. Occasionally resource development has been a source of conflict between Victoria and Ottawa. However, in recent times this has changed. BC has hosted major international events such as Expo 86 and the 2010 Winter Olympics that galvanized a different approach to intergovernmental relations (IGR). Intergovernmental agreements, such as the New West Partnership, the Trade, Investment and Labour Mobility Agreement (TILMA), the Pacific Coast Collaborative and other IGR arrangements have been led in significant part by BC. These actions have received broad support for taking a different approach to IGR leadership and have served BC well – a significant amount of federal funding and shared development of the Pacific Gateway and other BC priorities has resulted.

In general, BC has benefitted when the province’s IGR focus has been to proactively work with other governments on the basis of constructive engagement versus public dispute making. To be clear, some degree of intergovernmental tension is inevitable, and conflict may be inevitable in some circumstances – but standing up for BC’s interests need not imply a confrontational approach. If entrenched, IGR confrontation can be hard to move away from and leverage points can become complex quickly. A hostile situation on the energy IGR front will ultimately produce sub-optimal outcomes for BC, the West and the country. While we are clearly not at that point today, the recent positive engagement between the Premiers of British Columbia and Alberta will need to be backstopped by constructive dialogue that produces positive results within the context of a ‘re-set’ previously outlined on key energy files.75

This recommended position on IGR does not imply that BC should be a passive recipient of the country’s energy products and policies. It would be a mistake to view BC’s role as a ‘taker’ of the country’s energy products, without a more coordinated and cogent framework to deal with the province’s specific and often diverse interests. The Business Council is convinced that this can be done in a more collaborative and mutually beneficial manner.

75 As noted in a June meeting between the Premiers, “the two Premiers agreed on the need for responsible energy development in both provinces.”
BC has an important role to play in the federation as the Pacific Gateway for Canada, with our strategically located ports being vital to the country as global trade patterns continue to shift towards the Asia-Pacific. The energy dialogue today requires new thinking, innovative approaches and a shared desire for better outcomes across a full range of policy objectives – economic and environmental. To this end, the Business Council recommends the following:

Recommendation 6: Building on the current suite of policies, BC and Alberta should re-invigorate a more collaborative IGR mandate for energy development based on constructive, principled engagement.

Recommendation 6a: Engagement should include, but not be limited to, the development of policies for working via the New West Partnership and the Council of the Federation on both overarching and specific energy and climate change strategies that benefit BC, all Western provinces and Canada.76

Recommendation 6b: Given the significance of IGR to current energy matters, the Premier should maintain leadership of the IGR file in government.

7. Moving the Western Market Access for Oil Sands Dialogue Forward

The traditional energy development pathways for oil products have been altered due to concerns about climate change and other environmental impacts, primarily terrestrial and marine oil spill concerns.77 While scientific and values debates of this nature are complex and involve policy perspectives that are often difficult to reconcile, it is worth recalling that BC has been safely shipping oil off our coast since the 1930s, has over 40,000 kms of pipelines, is home to two oil refineries in Burnaby and Prince George, and has over 370 locally-based firms providing services to the oil sands sector.

Due to the heightened attention being given to oil sand exports and pipeline development, it is clear that new initiatives need to be pursued in order to bridge the divide and establish a firmer basis for advancing oil sands export development in a responsible manner.

No one should be under any illusions as to the task at hand – it is going to take perseverance and a willingness to find innovative policy solutions that will not satisfy all stakeholders, but can break through a division that’s currently unsustainable. The Business Council believes this complex file requires a more comprehensive ‘rethinking’ of key component pieces in order to work toward a clearer understanding of the relative strengths and weaknesses (and therefore of potential improvements) of pipeline proposals and the policy context within which they can be developed. This thinking can be shaped around the ‘five conditions’ established by Premier Clark in 2012, as a means of defining BC’s specific position on new oil pipeline developments to the west coast and determining what role governments and industry will play in achieving those conditions.

76 While the Business Council notes that this work will likely include looking at the idea of a Canadian Energy Strategy, important bilateral and Western provincial issues on specific topics should be the initial focus. Note that we deal with oil sands market access in a separate recommendation below.

77 Not since the province’s Clayoquot Sound conflicts and the associated confrontation in BC’s forestry sector two decades ago has resource development provoked such a highly polarized debate in the province. As a proxy for climate change concerns, and to an extent concerns over marine/terrestrial spills, oil pipeline development in BC has become a very fractious subject.
From a national economic perspective there is little debate that Canada would gain greatly from an increase in access to Asia for oil products and other energy commodities. Despite this reality, there is a gap in understanding precisely how BC currently benefits from oil sands development and how this can be improved moving forward.

While political leaders have generally resisted the temptation to engage in ‘grand’ planning schemes for both historical and practical reasons, it is clear that market access for Canadian oil is currently caught in a conflict that necessitates a more comprehensive and collaborative approach involving First Nations, industry, governments and other stakeholders.

Recommendation 7: Governments (at all levels) should commit to a more collaborative, comprehensive dialogue focused on moving the market access discussions for western Canadian oil products forward across the range of issues – economic, social and environmental – at play.

Recommendation 7a: The federal government and the Western Premiers should advance a coordinated, federal-provincial program for market access within six months, taking into account Premier Clark’s five conditions. BC should continue to take a leadership role in this initiative, with the governments of Alberta and Canada entering into more detailed discussions of the five conditions in the context of existing risks and opportunities associated with the transportation of oil and the operation of oil-related infrastructure in and around BC.

Recommendation 7b: Based on the need for a more comprehensive plan on the Western access issue, the discussions on market access should also include a detailed review of the proposal for a west coast oil refinery. This should include an examination of market interest/criteria and the financial viability of the proposal, based on a risk-sensitive market analysis.

8. Continue to Build and Refine First Nations Energy Partnership Models

While the headlines tend to amplify the concerns that some First Nations have with respect to certain energy projects in BC, the reality is the majority of energy projects are moving forward with the active support and growing participation of BC’s 200+ First Nations. Elsewhere, the Business Council has supported and summarized the growing array of economic reconciliation agreements now being used by the provincial government and the significant increase in development agreements between the private sector and BC First Nations.  

The path ahead for energy prosperity in BC undoubtedly requires a deepening of economic relationships between government, industry and First Nations. The unique nature of ‘rights and title’ issues in BC necessitates a concerted effort to build on the initial foundation of First Nations energy-related partnerships. More specifically, the Business Council would like to see greater engagement and focus from all levels of government to build and entrench these new economic relationships into the fabric of the province in a manner that creates competitive advantages versus disadvantages. Excellent work has been done on this front already – including new revenue-sharing programs, business development and capacity funding – but more needs to be accomplished.

---

Meaningful involvement of First Nations in resource development can produce ‘win-win’ outcomes for both First Nations and all citizens of BC. This is a complex and sensitive area of both law and relationship development, and the search for progress will not always be straightforward. To this end the Business Council recommends:

**Recommendation 8:** Government (all levels) and industries and companies working directly with First Nations partners need to accelerate economic engagement, strengthen and reinforce relevant internal staff resources, and find new ways to highlight the successes of economic engagement with BC First Nations.

**Recommendation 8a:** The BC government should assess the utility of establishing annual consultation feedback sessions with First Nations directly involved with energy development, energy developers and key government staff, to review, sectorally, strategies to improve outcomes for all. An annual ‘provincial energy forum’ of directly engaged First Nations and companies could also be considered as part of this process. This should also include a dialogue about the role of distributed generation and small scale renewables.

### 9. Reconciling Energy and Climate Change Objectives

British Columbia has been a leader in the development of renewable energy (primarily hydro), and was the first jurisdiction in North America to implement a comprehensive carbon pricing framework. While the Business Council has expressed concerns with aspects of the province’s carbon tax initiative, the overall objective to be a pacesetter in these areas is generally consistent with BC’s economic and environmental values. But new strategies are now required to address the fundamental challenges that have arisen due to emerging energy development opportunities, the changing North American energy and climate policy context, and the consequences of BC having moved well in advance of other provinces/states to price GHG emissions. The nascent LNG sector requires a forward-looking carbon management framework that provides the right policy support to meet the commitment to build the world’s cleanest LNG facilities here in BC.

Recently, the Business Council completed a detailed review of carbon pricing in our submission to last year’s Ministry of Finance carbon tax review. While we support the principle of carbon pricing and see some advantages from BC’s leadership on this file, the Business Council remains concerned that the carbon tax is putting the province’s trade-exposed and energy-intensive industries at a competitive disadvantage, particularly in the North American context. This is because other governments in the US and Canada have declined to follow BC’s lead and to date have failed to institute a broad carbon pricing policy. Without careful, ongoing analysis of how the carbon tax ‘fits’ with other initiatives, we see a risk that the tax will create economic distortions that hurt BC’s economy for limited or no net environmental gain. The Business Council notes that the government’s carbon tax review resulted in no meaningful changes to the structure or level of the tax, although there is now a commitment to freeze the rate for five years, which we see as a positive step.

---

79 The recent announcements on climate change from the Obama administration suggest that direct pricing signals, such as carbon taxes, will not be implemented in the US in the foreseeable future. Regulatory levers and a more direct focus on coal-fired electricity appear to be the administration’s priorities. BC and Canada will need to ensure that the implications of this approach are well understood.


81 To the extent that BC’s carbon tax leads to the out-migration of industrial activity to other jurisdictions, or a displacement in the domestic market of BC-produced goods by imports, the net impact on global GHG emissions is likely to be negative.
Ultimately policy makers need to reconcile the pathways for future energy development with the associated carbon emissions in order to have a more coherent framework for meeting policy objectives. As it currently stands, BC’s energy use and energy development strategy (natural gas/LNG in particular) and its carbon management plan (GHG emissions to be 33% below 2007 levels by 2020) are incompatible. The Business Council recommends the following:

**Recommendation 9:** Government should undertake a legislative (select standing) committee review of BC’s carbon management framework specifically as it relates to the current legislated GHG reduction targets. This work should include an updated assessment of energy opportunities, a review of the GHG reduction goals set by other provinces and states, and a consideration of mechanisms to recognize and manage significant increases in carbon output due to future energy development. The outcome of the review should be incorporated into an updated provincial energy plan, to be completed within 12 months, and it should establish a framework to support carbon pricing for the coming decade.

**Recommendation 9a:** Adopt a comprehensive approach to carbon management from LNG; build the approach into the overall energy plan. In our view, it makes sense to treat exported LNG, and the associated upstream activity, as a relatively clean energy resource on a global basis – particularly if GHG lifecycle analyses show a net global GHG benefit from LNG displacing coal-fired electricity generation. In this regard, it is important to recognize that many other jurisdictions view natural gas as a highly desirable and relatively clean energy source that will play a critical role in the long-term transition to a low-carbon economy.

**Recommendation 9b:** Pursue negotiations with the federal government to ensure that the sectoral GHG regulatory model being implemented federally allows for equivalency arrangements that recognize and respect BC’s carbon tax regime.

**10. Tackling the Challenges in Electricity Policy**

All major utilities must undertake detailed planning processes to ensure market supply and demand dynamics are well understood, and that the significant lead times required for large-scale capital expenditure are managed in a cost-effective manner. For the province’s electricity needs, the IRP serves as a foundation for building these long term plans. Unsurprisingly, in a world of varying commodity prices, shifting policy priorities and continued requirements for substantial capital expenditures in the electricity sector, IRPs can quickly become complicated, with legitimate questions around valuation, objectives, timing and public attitudes.

In these transitional environments, the IRP becomes a critical mechanism to rigorously examine options and reconcile potentially conflicting policy priorities. While the IRP process was put on hold to allow for the May 2013 election and discussions with LNG proponents on electricity supply needs, the recently

---

82 The provincial government’s most recent progress report highlights progress in this area, but the report does not account for natural gas development trajectories in a substantive manner.

83 While the Business Council is concerned that an excessive number of energy reviews could lead to investment uncertainty, we see an overriding need to reconcile incompatible policy objectives in the energy-environment policy framework. To ensure that development certainty is provided in the short-term, the Business Council recommends clearly defined Terms of Reference for reviews that provide investment certainty and spell out the need to facilitate energy development and energy transitions versus deciding which projects government will support.
submitted (to government) plan highlights a situation where future load growth will be met primarily through conservation and Site C.84

As government considers the IRP, and BC Hydro undertakes further consultations on the content, it may also make sense to incorporate the findings of the Industrial Rate Review and the government-wide Core Review process in a more explicit manner.85

These initiatives, which for sequencing and practical reasons currently fall outside of the IRP, will potentially have an effect on evolving electricity policies and rates.

Additionally, BC’s electricity policy framework would benefit from a more public examination of the marketplace implications of the shale gas revolution and the related LNG export opportunity. Currently, the IRP has a relatively low base-case estimate for future power demand linked to LNG, along with scenarios that do include higher LNG related electricity requirements and related consequences for, among other things, the future of the clean energy sector. To this end, the Business Council recommends the following:

Recommendation 10: For the 2013 IRP, as government considers the plan submitted by BC Hydro, ensure a clearly and explicitly detailed plan exists for LNG development. Complete the review within 3-6 months, for inclusion in an updated provincial energy plan.

Recommendation 10a: Ensure that within this review, the role of distributed economic activity (enabling other economic activities such as mining; eliminating diesel generation, particularly for rural communities and First Nations) is assessed and factored into the analysis.

Recommendation 10b: In areas where there may be perceptions of conflicted interests by BC Hydro in terms of electricity generation options, such as cost of supply analysis, make sure that effective third party oversight is provided. This can include but not necessarily be limited to the BCUC.

Recommendation 10c: As an ancillary review, and consistent with the government’s Core Review process, the province should work with the private sector and BC’s utilities to look at mechanisms to bring private sector capital to help finance new electricity infrastructure requirements. This should include, but not be limited to, P3s and partnerships such as the Highway 37 transmission line.

11. Review BC’s Energy Rate Structure within a Re-constituted BC Utilities Commission

BC consumers and industrial users have struggled at times to understand and influence the potentially significant rate increases that will be required to continue operating BC’s electricity system and to meet future needs. The provincial government’s 2011 review of BC Hydro highlighted several areas of cost concern and led to some measurable improvements; however, longer-term solutions regarding BC Hydro’s rates were not addressed in a comprehensive fashion in that review.86

While the government attempted to ensure that key provincial policy objectives did not get caught up in BCUC processes by enacting special directives and legislative changes, we believe it is critical to have

84 Http://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp.html
85 Http://www.empr.gov.bc.ca/EPD/Pages/IndustrialElectricityPolicyReview.aspx
86 Http://www.newsroom.gov.bc.ca/downloads/bchydroreview.pdf. Note that the majority of the recommendations have been implemented by BC Hydro, however there are several outstanding recommendations that fall into government’s purview to implement.
an independent lens on all rate-related issues. To this end, the Business Council recommends the following:

Recommendation 11: The government should reconstitute the BCUC as a public interest regulatory body with a clear, refreshed mandate to evaluate and report on the rate implications of energy supply options as well as the monetary impacts of energy policy choices – including climate change objectives established by the government.

Recommendation 11a: As an output of the current industrial rate review, clear direction should be given to allow for industrial rates to be reviewed in the context of overall provincial economic objectives. This should include a holistic competiveness assessment that encompasses taxation, carbon pricing and pertinent market changes, such as those occurring in the forest sector.

Recommendation 11b: To ensure that BCUC makes timely decisions and operates in alignment with government policy, the government and the BCUC should streamline processes, review and update governance structures, address staff capacity challenges and ensure that the agency’s operations deliver process and outcome certainty.

12. Build a Robust Skills and Infrastructure Agenda for the Energy Sector

Maintaining a healthy energy sector depends in part on ensuring that the enabling infrastructure exists and that there is adequate access to the right kinds of labour with the right skill sets. As the energy export profile for BC continues to grow and shifts to new opportunities, the infrastructure required also has to keep pace. While recent gateway initiatives have poured significant resources into the transportation network, more will need to be done. This is particularly true in communities and regions looking at rapid growth scenarios – the Northeast and in the Prince Rupert/Kitimat areas. Similarly, there is a major challenge around the skills agenda as the population ages and competition for skilled labour grows. Regionally, the potential for skill shortages in the energy sector is greatest outside of the Lower Mainland. Additionally, in some areas BC population outmigration, particularly to Alberta, has already curtailed the labour supply.

There are also concerns over “skills mismatches”. In a world of rapid technological change and the skill-intensification of many jobs, the gap between worker skills and what employers are looking for to fill job openings may be widening. In the BC context, geographical or regional labour mismatches are already an issue and will remain so going forward. Job opportunities may be found in regions with an inadequate supply of local qualified workers, while some under-employed or unemployed workers in urban settings may be unwilling or unable to move to where the jobs exist.

Managing and addressing infrastructure needs and potential skill shortages will require multifaceted approaches and involve both government and industry at all levels. Both of these areas merit detailed

---

87 The Business Council notes that rate reviews, and utilities in general, do not operate effectively if policy mandates are unclear or are in conflict. In order to have a well functioning BCUC, government policies need to be clearly detailed and prioritized to allow for effective comparative analysis.

policy work and institutional reform, some of which is already well advanced within government and key industries.89

Recommendation 12: The human resource dimension of energy sector development requires specific, cross-sectoral and cross-corporate integration. BC’s Jobs Plan has provided an initial foundation, but more specific, multi-party coordination will be necessary in the years ahead. Dedicated resources already in place should be expanded within government and coordinated across high-growth sectors/regions and large projects in a systematic manner that builds on existing work and moves in tandem with investment decisions.

Recommendation 12a: A comprehensive approach to enabling infrastructure requires advance planning and coordination across transportation and ancillary services (community and project) needs. Inventory work should advance to more detailed infrastructure development plans on both a regional and project/sector-specific basis. Detailed infrastructure plans should be developed as an output from an updated energy plan (see Recommendation 1). In areas with multiple projects, coordinating across projects will be increasingly important, taking higher level analysis and building implementation plans that deliver workforce and infrastructure certainty.

13. Leveraging Downstream Energy Opportunities

(a) Natural Gas

Downstream natural gas development has received little attention or encouragement to date in BC. In fact, in some cases the province has created strong disincentives to the domestic use of natural gas. The focus of policy-makers and industry stakeholders has been mainly directed to upstream resource activities and commodity exports. It is time to look more closely at downstream economic development opportunities flowing from BC’s primary energy assets.

In particular, the Clean Energy Act constrained fossil fuel development with (a) the progressive and increasing GHG reduction targets and (b) measures to foster fuel “switching from one kind of energy or use to another that decreases [GHG] emissions.” What this means, in particular for domestic use in the building sector (a significant energy user), is that many new developments (e.g., residential condominiums) are installing electric baseboard heating, existing owners are discouraged from turning to natural gas for heating, and utilities are unable to tap demand side management funds to stimulate the adoption of high efficiency natural gas furnaces (95%+ efficiency is the provincial standard).

Furthermore, transportation, chemical processing, oil refining and a diverse range of other possible LNG-related downstream production activities are areas where it is possible to advance value-added economic development by using BC’s domestic natural gas. In particular, at 36% to 38% of provincial emissions, the transportation sector offers a significant opportunity to use natural gas to displace higher carbon content fossil fuels. Although government policies should enable the market to decide on specific technology solutions, the transportation sector is integral to economic activity, and encouraging a build-out of natural gas distribution and fuelling infrastructure would support the growth of a relatively new industry (natural gas for transportation), while also spurring the creation of more high-paying technology, engineering and automotive jobs (as well as repair and maintenance specialists).

89 The BC Jobs Plan and subsequent work on the LNG sector have produced a series of foundational reports. Recently, BC Natural Gas Workforce Strategy Committee released a comprehensive report on the significant workforce needs that may be required for the development of the sector: http://www.rtocb.com/Assets/RTO+Assets/About+RTO/BC+NG+Strategy+2013JUL.pdf.
Some US analyses suggest that the employment impact is about 11 jobs for a light CNG station and 165 jobs per heavy duty LNG station. \(^{90}\) Partnerships between companies and government will be important to success in this area. \(^{91}\)

(b) Electricity

In terms of electricity generation, natural gas is a global transition fuel on the way to a lower carbon future. Yet in BC today natural gas has a limited role as a potential electricity generating option. While there are currently five natural gas fired facilities in BC, the one facility that has historically made a meaningful contribution to generation – Burrard Thermal – has been constrained by policy, and new projects face serious constraints under the Clean Energy Act. At the same time, British Columbians are concerned about rising electricity costs stemming from the investments required to renew the existing hydroelectric infrastructure and the additional capacity that, over time, will be necessary to meet the needs of a growing population and economy. Juxtaposed to this is the fact that most British Columbians also envision a future where renewable electricity retains a very prominent role.

While the Business Council generally believes that market forces should determine the best options in electricity generation, there will be an ongoing need to ensure a balanced approach to non-renewable and renewable electricity generation in the absence of full carbon pricing across North America. This includes ensuring that other policy objectives are appropriately reviewed across supply options. While it is difficult to accurately monetize and analyze all policy objectives, the current reality is that natural gas generation, strategically deployed, is likely a sound choice for some industrial self-generation configurations (LNG in particular), as well as for strategic new stand-alone facilities in locations around BC. Natural gas generation can eliminate the use of diesel generation, be used to meet localized peak demands, harness the benefits of distributed generation, provide ‘firming’ capabilities for intermittent, remote renewables, reduce the need for transmission infrastructure investments, and provide a buffer against more expensive generating facilities over the medium term.

In combination with cost effective renewable energy sources perhaps deployed as part of a strategy on distributed generation/community energy development, natural gas electricity generation in the downstream environment will play an important, growing role in BC. Additionally, there are many smaller-scale industrial examples where natural gas generation might be possible for some customers, including greenhouses that can make CO2 so there are times during the year where there is more heat produced than can be used in the greenhouse and could be turned to electricity production.

**Recommendation 13:** Government should review the policy framework for natural gas generation, with a view to selectively fostering the strategic use of natural gas in electricity generation where full risk, cost and benefit analysis of generation options indicates a fit for natural gas generation.
Recommendation 13a: Spur transportation end-use natural gas demand by building out infrastructure (e.g., small scale LNG) and in fleet procurement decisions to encourage greater use of domestic gas resources, support and showcase BC clean technology (e.g., section 18, *Clean Energy Act*), and demonstrate a commitment to the environment and climate change management.  

Recommendation 13b: BC should make adjustments to tax policy that level the regulatory playing field for natural gas as a transportation fuel.

Recommendation 13c: As the LNG sector advances, the province should assess the merits of a technology fund specific for LNG use in the domestic downstream marketplace, bearing in mind the need to avoid marketplace distortions among energy choices.

Recommendation 13d: Review the Clean Energy Act, Part 5, and remove natural gas demand side management barriers (as noted above) and look at creating policies to foster the extension of natural gas to communities not currently served.

Recommendation 13e: Review how a more distributed system can both manage reliability risks as well as provide opportunities for development of small scale renewables and micro-grids.

*****

---

92 Note that this should be done in tandem with the ongoing build-out of infrastructure required for electrical cars.