An Innovative Approach to Market Characterization: Profiling of British Columbia's Upstream Oil and Gas Sector for the Province's Utility Using PESTLE and Porter Five Frameworks

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ABSTRACT

Fuelled by improvements in both the knowledge of unconventional natural gas resource potential and in the extraction technology, British Columbia's upstream oil and gas sector has experienced significant growth recently. Shale-gas resources have become a game changer necessitating a more strategic view of the market. Accompanying this growth is the recognition that implementing energy efficiency in the early phases of new construction is especially advantageous to both the electric utility and the end-user; however, market barriers continue to impede energy efficiency investments in the oil and gas sector itself.

To assist BC Hydro, the major utility in British Columbia serving the sector with its future energy efficiency programming for the sector while seeking input from the right stakeholders, ICF Marbek prepared a market profile of the driving forces influencing the growth and decision making in the sector. The study met its goals with the aid of an innovative methodology—the PESTLE and Porter Five frameworks.

The PESTLE (Political, Economic, Social, Technical, Legal, and Environment) analysis framework assists organizations in understanding the external environment in which they operate currently and will operate in the future; thereby informing the organization's strategic planning activities. The Porter Five model explores the operating environment in which a company can generate a competitive advantage by looking at (five) external forces that determine the intensity for competition and characterize the attractiveness and profitability of a sector.

The study identified factors influencing sector investments and, using the input of decision makers in the oil and gas industry, it was able to inform the importance of these factors. Using the PESTLE framework, the implications of these factors were analyzed and their impact rated against criteria of importance to BC Hydro's planning strategies. The forces driving competition and long term profitability are illustrated with the Porter Five framework, thus framing the attractiveness of the industry to increased investment. A marketing approach that tailors the utility energy efficiency program to the oil and gas sector can be refined, while ensuring that the message developed has relevant impacts to a growing industry whose performance is based on achieving timely and cost effective operations.

Introduction and Objective

The upstream oil and gas sector in British Columbia (BC) has experienced significant growth recently. The province has become an important contributor to Canada's natural gas supply. Improvements in both the knowledge of unconventional gas resource potential and in the extraction technology have played a major role in the growth of this sector and will contribute to the substantial growth expected in the near future.

In the nascent stages of growth there is an opportunity to implement energy conservation, especially in the early phases of new construction. Energy efficiency offers a strategic role in enhancing productivity and reducing greenhouse gases (GHGs).

The upstream oil and gas sector is also influenced by recent trends in the North American oil and gas market, international regulations and prices. To assist with future planning for this sector, implement energy conservation opportunities, and encourage energy conservation in new construction while still in the early growth phase, BC Hydro wants to understand the driving forces influencing the growth using existing BC Hydro market analysis methodologies and frameworks.

It is important to recognize the other market barriers to demand side management programs (DSM) apart from BC Hydro's conventional approach to DSM program design that address the 5 "A's" – Awareness, Accessibility, Affordability, Availability and Acceptability. Taking a structured approach by incorporating PESTLE and Porter's analysis will help BC Hydro to assess and weigh other external factors that should be considered and not typically part of DSM program design when engaging the market.

In this context, a profile of the upstream oil and gas sector was carried out to identify and characterize the main influencing factors for this sector. These factors are then utilized to probe the sector for a deeper understanding of the external environment and competitiveness in which participants in the industry operate. Although some factors may have changed since the study completion in 2011-12, the purpose of this paper is to demonstrate how the analysis was carried out and the relevance of the methodology and results to utilities and other planners.

Context and Setting

BC Hydro's Power Smart Partners Industrial Programs are designed to drive continuous energy improvement. As the shale-gas industry is relatively new to BC, promoting energy efficiency at the design stage will hopefully start companies down the path of strategic energy management approach, which is the overall objective of DSM: market transformation.

It is established that there are significant positive factors such as technological, regulatory and infrastructure that would justify the long term benefit of incorporating energy efficient design into the construction. An integrated energy management approach would ensure that the plant is designed and built with energy efficiency in mind, operated efficiently as designed, and will further out-perform through continuous improvement. In the promotion of the BC Hydro Power Smart Partners brand, BC Hydro has re-labeled the Plan-Do-Check-Act conventions to Plan-Discover-Upgrade-Support.

In the "Plan" stage, BC Hydro has an Industrial Energy Manager Initiative that co-funds a dedicated person to spearhead efficiency efforts into the customers' long-term business vision. Funding and resources are offered for benchmarking the site's energy management practices and for developing a Sustainable Energy Management Plan (SEMP). Understanding that energy management may be a new role, Energy Managers entering the program also have access to expert Energy Management Coaching to allow them to quickly get up to speed in their new roles.

In the next stage, "Discover," technical solutions are offered to identify and study energy savings potential and opportunities. Co-funding is provided for energy audits, assessments and feasibility studies for retro-fit of existing facilities as well as greenfield and expanding plants.

To build the business case for efficiency upgrades in the "Upgrade" stage, project incentives are offered to help justify the capital upgrade. The Transmission Service tiered rate structure also provides a "rate based" justification to conserve.

As continued "Support", to raise awareness and recognition of energy efficiency and cost savings projects, BC Hydro has an Employee Awareness program with major workshop and event funding for sites participating in the Strategic Energy Management Program with their Industrial Energy Manager.

From the Power Smart Partners Industrial Programs Plan-Discover-Upgrade-Support framework, the offers are customized to a particular sector. In this manner, the programs can be targeted to the needs of a particular sector, such as upstream oil and gas.

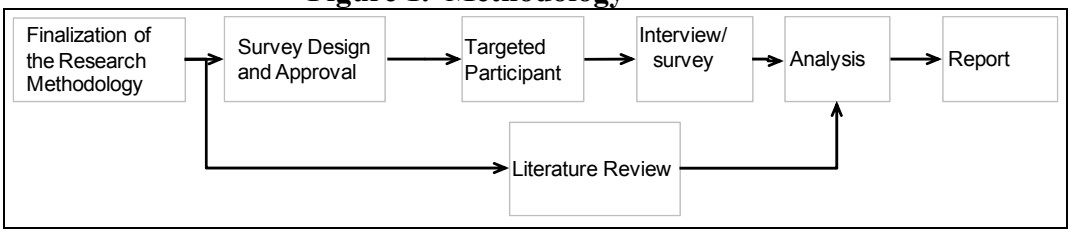
As previously discussed, the province's oil and gas sector is a new and fast growing market for BC Hydro and generic program offerings to encourage energy efficiency may not be sufficient. There are multiple external drivers or motivations for investment in the upstream oil and gas industry in BC. Capital projects are driven by tight schedules that require decisions on power infrastructure – gas or electric drivers – when it comes to primary equipment selection. While a broad target may be set to electrify due to cost, rate, reliability or GHG reduction benefits, the power utility needs to address the market with message that there is a major difference between "electrification" and "efficient electrification" based on life-cycle costing versus lowest first-cost in decision-making. If the decision is made to purchase standard efficiency gear, the opportunity is good as lost, as retrofitting will not be considered until near end-of-life decades down the road.

A targeted approach to each sector provides the ability to improve program uptake and demand side reduction. PESTLE and Porter Five are tools that were used in this study to uncover motivations for investment and drivers for efficiency that may not have been understood before.

Methodology

Using the approach outlined in Figure 1, the study focused on the sub-sectors of the upstream oil and gas sector relevant to BC: conventional and unconventional natural gas production; natural gas processing; natural gas pipelines, liquefied natural gas (LNG), crude oil production and crude oil pipelines.

Figure 1. Methodology



An extensive literature review was carried out to develop a profile of the upstream oil and gas sector in BC and to provide the bases for an in-depth and targeted survey questionnaire. It also sets the basis for the analysis using the PESTLE and Porter Five framework described below.

The targeted participants for interviews or surveys were selected from BC Hydro customers, experts in the industry, consultants and government officials and associations

affiliated with the sector. The survey was designed around a process of answering a key set of questions summarized in Table 1, and the survey process and questions were subjected to review by sector experts. The questions informed the factors of the analysis framework.

Table 1. Key Survey Questions

Key elements : Questions to be addressed	Targeted Participant
What electrification issues impact current operating costs and activity in BC?	Upstream oil and gas producers only
What factors influence corporate decisions to invest in energy efficiency for BC operations?	Upstream oil and gas producers only
What strategies have been used to diversify or manage electricity supply in BC?	Upstream oil and gas producers only
What knowledge-based programs and/or practices does your organization utilize?	Upstream oil and gas producers only
What factors influence investment decisions to grow upstream oil and gas activity in BC?	Upstream oil and gas producers, Government /utility representatives, Oil and gas association representatives, Service sector/industry experts

A target for number of interviews and surveys was established based on the population size of full list of participants and group they fit in, as shown in Table 1. Table 2 outlines the targeted and achieved sample size for the market assessment data collection activity.

Table 2. Sample Size for Study

	Target	Completed	% of target
Interview	15	12	80%
online survey	19	10	53%
Total	34	22	65%

Time constraints and unavailability of senior decision makers to participate in the study constrained the efforts to achieve full participation of the target. However, the survey sample included experts and representatives in industry with a broad experience to provide the perspective of more than one target participant. As the outcome of this study is intended to be indicative (qualitative) of the market forces, the sample size is determined to be sufficient to provide this indicative analysis.

Analysis Frameworks

The PESTLE analysis framework is a tool that assists an organization in understanding the external environment in which they operate currently and will operate in the future, thereby informing its strategic planning activities. Based on the literature review and the environment for this study, the PESTLE (Political, Economic, Social, Technical, Legal and Environment) factors were grouped as follows:

- Technological drivers
- Political, Legal and Environmental drivers
- Economic and Social drivers

- Organizations and Programs influencing sector (additional)

The PESTLE analysis was further refined using three main elements (**Renewal Associates 2003**):

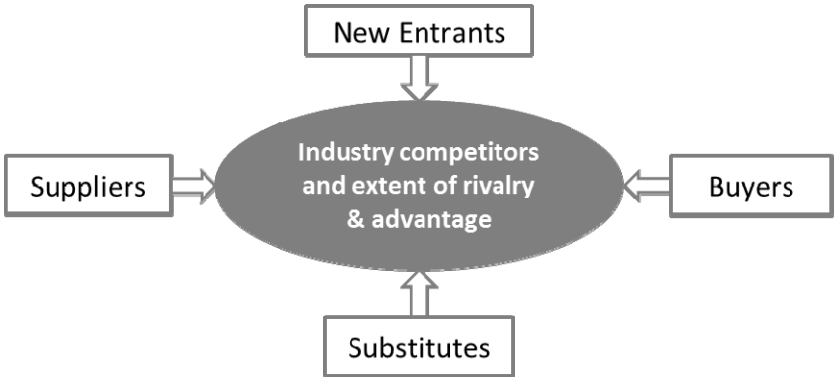
- List: an external list of factors
- Identify: the implications of the external factors and
- Decide: the importance of the implications of the external factors

The list of factors and identification of impacts are informed by the literature review and consultation as defined above. The factors for each driver are grouped based on drivers influencing growth, drivers for investment in energy efficiency, supply strategies and electrification issues. Deciding the importance of these external factors is carried out by rating the survey/interview responses while considering the results of the literature review.

Each factor is rated by the following; the impact in its timespan (short, medium and long timeframes), impact by type (positive or negative impact on growth), change in impact over time (increasing or decreasing significance,) and finally, the relative importance of external factors. This final metric is envisioned to be analyzed within the framework of BC Hydro's planning and marketing strategies for the sector.

The Porter Five Framework, developed by Michael Porter (Harvard Business School), explores the environment in which a company operates to generate a competitive advantage. The analysis looks at five key external forces acting on a company or industry as shown in in the Figure 2 below; threat of new entrants, rivalry among existing organizations; the threat of substitute products; determinants of supplier power; and determinants of buyer power.

Figure 2. Porter Five Analysis Framework (RapidBI 2011)



These forces determine the intensity of competition and thus the attractiveness and profitability of a sector. The model can be used to analyze the driving forces within an industry and its output sets the basis for decision making on how to influence or exploit industry characteristics.

As in the PESTLE framework, the factors for the Porter Five framework are informed by literature review and consultation with experts. The impacts of external factors were determined by rating the survey/interview responses in the context of knowledge from the literature review.

The overall impact of the factor is presented qualitatively, in the context of profitability and attractiveness of the industry to increased investment.

Analysis and Findings

The results of the interviews and surveys are presented within each framework by each of the sub-categories defined in the methodology for the PESTLE and Porter Five frameworks.

PESTLE framework:

- Technology drivers
- Political, legal and environmental drivers
- Economic and social drivers
- Organization and program effects

Porter Five Framework:

- Threat of new entrants
- Rivalry among existing organizations
- Threat of substitute products
- Determinants of buyer power

There are several factors that influence the drivers, and each can be cross-cutting and fit into more than one aspect of the PESTLE or Porter Five sub-categories above. This increases the impact of the factor. The factors for the PESTLE analysis, defined in the methodology above, are placed into only one sub-category for which it has the greatest impact. The factor can also have a secondary effect on the other sub-categories. This cross-cutting secondary effect is accounted for in evaluating the overall potential impact of the factor in

Table 4.

PESTLE Analysis

For each question, the respondent was given a choice of the following:

- 1 = Very insignificant /would not invest due to this criterion
- 2 = Somewhat insignificant/discourages investment
- 3 = Somewhat significant / does not discourage investment
- 4 = Very significant /encourages investment

The responses shown are given a score using the following methodology:

$$Score = \frac{\sum_1^4 Respondents_{n=1} * n}{Total\ respondents}$$

The maximum score in almost all cases is 4 (if all respondents rated impact as 4) and the minimum is 1 (if all respondents rated impact as 1). Some respondents chose not to answer some questions because they did not have knowledge of that specific factor. Those non-responses are not included, and the final score is based on the number of respondents for that specific question.

The implications of these factors are rated relative to the criteria in Table 3 which includes the literature review of the market and the responses of those surveyed.

Table 3. PESTLE Criteria

Criteria	Impact	Notes
Time Frame	short: 0 - 5 yrs medium: 5 - 10 yrs long: >10 years	The time frame is relative to the growth and investment impacts for the oil and gas producers
Impact Effect	Positive + Negative - Unknown/neutral	Impacts relative to growth and investment: - positive encourages growth & investment - negative discourages growth & investment - neutral has no impact
Impact	Increasing > Unchanged = Decreasing < Unknown	Impact on investment (e.g. increasing implies that the impact of this factor is increasing over time)
Overall Potential Impact	H – High M – Medium L – Low	Overall impact of the factor based on the above criteria i.e. the respondent's rating of the impact (score), the timeframe, whether it has a positive or negative impact, whether the impact effect is increasing or decreasing, and whether the factor impacts more than one category (e.g. technology and economics).

PESTLE Findings

The overall PESTLE Framework, including organization and program impacts, is presented in

Table 4. The factors are presented in order of overall potential impact for each category. The PESTLE framework allows BC Hydro to confirm or modify the current hypothesis on the sector's market drivers by rating the relative importance of each of the factors in BC Hydro's overall plan and strategy for the sector.

Table 4. PESTLE Framework

Technology Drivers		**Score**	**Time Frame**	**Impact Type**	**Impact**	**Potential Impact**
Drivers influencing growth	Advancement in production techniques	3.9	Medium	Positive	>	H
	Access to supporting infrastructure	3.1	Long	Positive	>	M-H
Electricity supply strategy	Diversify supply using natural gas	2.7	Medium	Positive	>	H
	Intervention with regulator for preferred rates	1.8	Medium	Neutral	=	L
	Diversify supply using solar PV	1.4	Medium	Neutral	=	L
	Diversify supply using other fuel	1.4	Short	Neutral	=	L
	Diversify supply using wind power	1.3	Medium	Neutral	=	L
Drivers for investment in EE	Existing / anticipated prov./nat. GHG regulations	3.1	Short	Negative	>	H
	Availability of government or utility incentives	3.0	Medium	Positive	=	M-H
	Corporate Social Responsibility	3.1	Medium	Positive	>	M
	Corporate operating cost reduction targets	3.0	Medium	Positive	=	M
	Corporate GHG reduction targets	2.4	Medium	Positive	>	L-M
	Current electricity rate structure	2.9	Short	Neutral	=	L
Political, Legal and Environmental Drivers		**Score**	**Time Frame**	**Impact Type**	**Impact**	**Potential Impact**
Drivers influencing growth	Ability to utilize renewable power resources in BC	3.2	Short	Positive	>	M-H
	Regulatory conditions affecting self-generation of power	2.6	Medium	Negative	>	M
	Existing environmental regulations and concern over changes to regulations	2.4	Medium	Negative	=	M
	Other regulatory requirements	2.8	Long	Neutral	=	L
	Provincial regulatory environment including water and air emission regulations, protected areas	2.5	Long	Neutral	=	L
	First nations land ownership claims	2.5	Long	Neutral	=	L
Economic and Social Drivers		**Score**	**Time Frame**	**Impact Type**	**Impact**	**Potential Impact**
Drivers influencing growth	Market trade routes & proximity to transport infrastructure	3.4	Long	Positive	>	H
	Cost of capital	3.1	Short	Positive	<	M
	Availability of skilled labour	2.8	Short	Neutral	=	L-M
	Need for local investment in communities	3.0	Medium	Neutral	=	L
	Public perception with respect to oil and gas exploration and environmental consequences	2.7	Medium	Neutral	=	L
Impact of electrification issues	Planned rate increases - future activity	3.3	Medium	Negative	>	H
	Delayed electrical service connection - future activity	3.2	Medium	Negative	>	M-H
	Planned rate increases - current operations	3.1	Short	Neutral	=	L
	Power outages-current operations	2.9	Short	Neutral	=	L
	Power outages - future activity	2.7	Medium	Negative	=	L
	Delayed electrical service connection - current operations	2.7	Short	Neutral	=	L
Organization and Program Drivers		**Score**	**Time Frame**	**Impact Type**	**Impact**	**Potential Impact**
Drivers influencing growth	Provincial government incentives for Oil & Gas	4.0	Medium	Positive	=	M-H
	Federal government incentives	3.5	Medium	Positive	=	M

Technological drivers. The strongest driver relevant to corporate decisions to invest in energy efficiency are the existing GHG regulations in BC (carbon tax), the availability of incentives, and the influence of corporate social responsibility. Also important is the current electricity rate structure that can encourage investment in energy efficiency and corporate cost reduction targets. Corporate GHG reduction targets had less of impact, but were still considered important by the respondents.

The organizations interviewed about electrification issues and diversification of electricity supply indicated that utilizing natural gas to diversify the electricity supply is very important especially for remote sites. Less important is intervention with the regulator to obtain more preferable rates to grid connected power and diversification of electricity supply using renewables.

The advancement in production techniques is the most significant technological driver influencing investment growth. This driver has economic implications as well, since the technology breakthrough in horizontal drilling, fracking and related innovation has driven down the costs of exploration and extraction. Another driver is the access to supporting grid and transport infrastructure. The effect of grid connection on the annual operating costs, although technically oriented, has more of an economic impact and is therefore included in the economic and social drivers.

Political, legal and environmental drivers. For the political, legal and/or environmental drivers influencing growth, the most important one as rated by respondents is the ability to utilize the province's renewable power sources. Organizations are keen to use electricity from the grid, as it is renewable and as a result of carbon tax, is lower cost to use. Grid electricity is reliable (assuming that there is adequate capacity) and clean (deemed as zero GHGs in BC) with an opportunity to claim carbon offsets from avoided fossil fuel combustion. It also offers lower maintenance (cost and performance) relative to gas-fired generators.

Equally important drivers are other regulatory requirements, particularly in reducing efforts associated with regulatory duplication, complexity of compliance with regulations, and related cost implications. Many organizations appreciate the streamlining of regulatory compliance offered by the BC Oil and Gas Commission, compared to other jurisdictions in Canada.

First Nations land ownership claims have a diverging effect on the investment strategies of organizations. The organizations that have spent time developing relationships with First Nation's communities benefit from their support and involvement in the upstream oil and gas projects. However, when First Nation's relationships are poorly handled, existing and future investments may be jeopardized.

Regulations pertaining to labour, water and air emissions will always exist and are the same as in other jurisdictions, therefore are included in the cost of operating in BC. These drivers have a neutral effect on growth in this sector.

Related issues that have a somewhat discouraging effect on investment are regulatory conditions affecting self-generation of power (carbon tax) and existing concerns over changes to these climate-change regulations in BC. For some organizations, the importance of self-generation of power is minimal while a number of others would like to increase this share. The sector has access to 'free fuel' in the form of natural gas but the imposition of carbon tax on self-generation using natural gas is a deterrent. Concern over changes to the carbon tax regime in BC

places an economic damper on the upstream oil and gas organizations considering self-generation.

Economic and social drivers. There were more social and economic drivers influencing the sector than other drivers, due to the nature of the market and link to profitability.

Regarding electrification issues, planned rate increases and delayed future electrical service connections have a significant impact on current investment strategies and decisions on whether to invest in electrical or natural gas fired equipment for remote sites. Power outages and delays in electrical connections are somewhat important as the sector grows and a greater demand is placed on the system.

For the social and economic drivers influencing growth, market trade and proximity to transport is important in terms of encouraging investment, since it is tied to having a trade route to markets. Diversification of trade routes and expansion of infrastructure provides export options to markets with more attractive prices, such as Asia.

Low interest rates and a high Canadian dollar have made technology purchases cheaper. The remote location of the natural gas resources have implications on a company's cost to attract and relocate labour to these regions, and to invest and share in infrastructure development for the benefit of local communities.

Organization and programs. A very important factor influencing growth (though outside of the PESTLE context) is the availability of provincial incentives for the sector that improve the economics of investments. The BC Oil and Gas commission has eased the process of regulatory compliance. Federal programs and incentives can encourage investment but were less important for some respondents.

There is a general awareness and use of knowledge based practices from associations such as CAPP. Utility programs such as Power Smart are important but are not taken full advantage of.

Porter Five Analysis

The Porter Five framework is presented and evaluated using the five external forces that determine competition and long-term industry profitability.

Threat of new entrants. New entrants to the oil and gas sector raise the level of competition within the sector and can reduce its attractiveness. New entrants to BC's upstream oil and gas sector can face the following barriers:

- High fixed costs – capital or investment costs, access to grid
- Scarcity of resources – advancement in production, land availability, access to grid
- Government restrictions or legislation
- Economies of product differences – type of well products
- Switching costs or sunk costs – capital costs of new development
- Access to distribution – access to market trade routes
- Absolute cost advantages – access to grid, cost of power, cost of labour
- Learning curve advantages – advancement in production techniques

Rivalry among existing organizations. The intensity of rivalry in the upstream oil and gas sector will be affected by:

- Competition structure – access to trade routes, support infrastructure, land and skilled labour
- Industry cost structure – high fixed cost and cost of capital
- Strategic objectives – maturity of industry, room for growth, innovation in production techniques
- Barriers to exit (i.e. cost associated with leaving the sector) – high capital costs

Threat of substitute products. Substitute products reduce the overall attractiveness of the industry and profitability, since the price of the product is limited by the market. The threat of substitute products depends on:

- Buyer propensity to substitute – new markets for same product and public perception
- Relative price performance of substitutes – gas as a substitute for power generation
- Buyer switching costs – access to product from new transport infrastructure

Determinants of supplier power. The cost of products can significantly impact the profitability of operating businesses. Depending on the supply chain, suppliers can leverage their bargaining power over a company. As suppliers to the upstream oil and gas sector were not interviewed, this aspect was studied from the following perspective:

- Cost of inputs relative to selling price of the product – affected by cost of capital and availability of incentives, global supply agreements and negotiating power.

Determinants of buyer power. Buyer power is the power of those who create the demand for the product. This is affected by the following aspects:

- Number of buyers and location – transport (buyers of gas) and grid access (buyers of electricity)
- Buyer volume – trade routes
- Whether the product is extremely important or not, and if the buyer can do without it for a period of time – demand over the winter seasons
- Customers are price sensitive – affected by trade routes and proximity to markets
- Buyer switching costs relative to organization switching costs – affected by investment cost of extraction and market trade routes
- Availability of existing substitute products – substitution of natural gas for power generation
- Buyer price sensitivity – affected by market trade routes

The five forces affecting the upstream oil and gas sector's competitiveness and attractiveness based on the above factors are presented in Table 5. The overall potential impact of each of these factors is evaluated on the scores of the responses described above and qualitatively rated using the following criteria:

- H – High (>3.0)
- M – Medium (between 2.7-3.0)
- L – Low (<2.7)

The overall impact determined from the above criteria is based on the score of the responses. It is then applied to all the Porter Five forces for which the factor is applicable. For example, market trade routes and proximity to transport infrastructure has a high impact (since the score is >3) and has an impact on all of the Porter Five forces. Thus all the five forces are given a rating of High (H). The forces which are not impacted by the factors are left blank.

Porter Five Forces Findings

The table below presents the findings of the Porter Five Analysis.

Table 5. Porter Five Analysis

Factor	PORTER Five forces					Score	Overall Potential Impact
	Threat of New Entrants	Rivalry Among Firms	Threat of Substitute Products	Determinants of			
				Supplier Power	Buyer Power		
Market trade routes & proximity to transport infrastructure	H	H	H	H	H	3.4	H
Provincial government incentives for Oil and Gas	H	-	-	H	-	4.0	H
Advancement in production techniques	H	H	-	-	-	3.9	H
Federal government incentives	H	-	-	H	-	3.5	H
Ability to utilize renewable power resources in BC	H	-	-	-	H	3.2	H
Access to supporting infrastructure	H	H	-	-	-	3.1	H
Cost of capital	H	H	-	H	-	3.1	H
Need for local investment in communities	M	-	-	-	M	3.0	M
Availability of skilled labour	M	M	-	-	M	2.8	M
Other regulatory requirements	M	-	-	-	-	2.8	M
Public perception with respect to oil and gas exploration and environmental consequences	-	-	M	-	M	2.7	M
Regulatory conditions affecting self-generation of power	L	-	-	-	-	2.6	L
First nations land ownership claims	L	L	-	L	-	2.5	L
Provincial regulatory environment including water and air emission regulations, protected areas	L	-	-	-	-	2.5	L
Existing environmental regulations and concern over changes to regulations	L	-	-	-	-	2.4	L

The overall impact of market routes and transport infrastructure for upstream oil and gas products and services affects the sector significantly. The further the customer is located from the resources, the more likely they are to use a substitute product if available at a lower cost. The ability to transport to markets with a high demand and high value, such as Asian markets, will impact the sector's ability to invest and grow in BC.

Advancement in production techniques has improved the overall attractiveness of the upstream oil and gas sector in BC. Investment hurdles have also been lowered through the availability of incentives, recent access to low-cost capital and the high-value Canadian dollar.

Organizations with resources near existing electrical grid infrastructure would have an advantage over those in remote areas, thereby incurring lower costs associated with self-generation (higher equipment costs and implied carbon taxes) and grid access (infrastructure costs to remote sites and delays in accessing power).

The sector faces competition in securing skilled labour due to demand form other regions, such as Alberta as well as the remote location of the oil and gas resources in BC. Organizations that continue to specialize in this sector with innovative equipment and a skilled labour force will be beneficiaries of change.

Successful working relationships with First Nations can facilitate company operations and have an important impact on the bottom line of a business. Conversely, unsuccessful handling of first Nation's claims can severely hinder operations and investments. Public perception has an effect on the way companies operate and compete in the public sphere.

At the time of this study, regulatory conditions in BC were not deemed a limitation to the ability of an organization to compete in the upstream oil and gas section because they affect all organizations.

Conclusion

The PESTLE and Porter Five frameworks can be used to assess demand side management (DSM) marketing approaches in growing and dynamic markets, such as the natural gas sector in BC. As sub-sectors within the industrial sector are not homogenous and follow different economic cycles, it is very important for BC Hydro to understand who, where and when to engage in the sector with insight as to what is important to the target audience. The results of the methodology were used to confirm BC Hydro's hypothesis assumed for the sector drivers and assist with the marketing approach for future energy efficiency programming.

The approach using the PESTLE and Porter Five frameworks offered sector insight from the stakeholder's perspective that encompasses more than the conventional barriers to energy efficiency. Using the study output, a marketing approach that tailors the Power Smart Program for the oil and gas sector programs can be refined and used to ensure that the message developed has relevant impacts to a growing industry whose performance is based on achieving timely and cost effective operations. The conclusions are consistent with BC Hydro's understanding from industry's engagement at various touch points within the utility. The external surveys validate the hypotheses using a structured approach using PESTLE and Porter's approach.

BC Hydro has focused on the attributes with the highest scores and impacts identified in this PESTLE and Porter Five study. The marketing approach and messaging is being developed by BC Hydro, to start, for customers and service providers such as consultants and vendors is to go beyond the electrical interconnection and electrification and deeper into energy efficiency.

In BC Hydro's Plan-Discover-Upgrade-Support components, programs offered in the Plan stage are Power Smart Partners New Plant Design focus on compression load, variable speed drives, variable volume pocket compressors and efficient motors. For existing plants, the Discover stage offers custom energy studies and audits in gas compression and process optimization. The Upgrade stage picks up savings with prescriptive offerings through the Self-Serve Incentive Program (SIP) for eligible lighting and compressed air systems in addition to the

custom incentive offer. The Support stage provides recognition and training which will hopefully lead to adoption of Power Smart's Strategic Energy Management Program (SEMP) and EnMS (energy management systems).

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