

**AN ANALYSIS OF STRATEGIC OPPORTUNITIES AVAILABLE TO AN
ENVIRONMENTAL CONSULTING AND ENGINEERING FIRM**

by

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Abstract

Company Y is a full-service environmental and engineering consultancy cost leader with a client base in British Columbia and Alberta. The firm's services help both public and private sector clients meet their environmental obligations under federal, provincial and municipal government legislation, regulations and programs, as well as meet industry standards, regulations, and best practice.

Renewable energy, heat savings and energy efficiency initiatives that reduce greenhouse gas emissions and climate change impact are environmental sector growth areas. Despite being part of the heat and energy efficiency sector, Company Y's Renewable Energy division operates at a loss.

This paper presents a strategic analysis of the Renewable Energy division's primary service, geoexchange, and discusses the options available to Company Y's management team.

Keywords: Environmental Consulting and Engineering; Geoexchange; Heat and Energy Efficiency; Renewable Energy;

Dedication

To Kasey, my wonderful partner in life. To my family and friends who are always there when I need them.

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1: ENVIRONMENTAL CONSULTING AND ENGINEERING SERVICES AT COMPANY Y

1.1 Introduction

Company Y, founded in 1994 by its current CEO, is a full-service environmental consulting and engineering firm that sells its professional services on a project time and materials basis primarily to government, energy, and oil and gas clients across British Columbia (B.C.) and Alberta. The majority of Company Y's 150 employees are located at the firm's headquarters in Downtown Vancouver. Satellite offices exist in Burnaby, Victoria and Calgary, Alberta.

Company Y's core services are its assessment offerings in environmental impact, contaminated land, ecology, and socio-economics, which precede the firm's management of project-specific solutions that include remediation.

Historically, environmental consulting and engineering firms have grown by responding to new market challenges. Company Y has responded to these challenges by diversifying to remain competitive.

Renewable energy, heat savings and energy efficiency initiatives that reduce greenhouse gas (GHG) emissions and climate change impact are just some of the environmental sector's growth segments. Unfortunately, Company Y's Renewable Energy division operates at a loss. The firm's CEO concerned about the division's revenue, has questioned its future profitability in the renewable energy market.

This paper presents a strategic analysis of the Renewable Energy division's primary service, geexchange, and discusses the options available to Company Y's management team.

1.2 Company Y: Ownership and Structure

Company Y is a privately incorporated professional partnership with an ownership split 70:30 between its founder and current CEO, and its current VP of Development. A Board that is comprised of five external advisors, the current CEO, and the current VP of Development governs the firm.

The firm operates with a divisionalized structure along three lines of business that report directly into the CEO: 1) Corporate Services includes the support functions of Finance, HR, Marketing and Communications, and Development 2) Planning and Management includes Ecology and Environmental Management 3) Environmental Sciences and Engineering includes Geomatics, Infomatics, Engineering, Renewable Energy, Hydrogeology, Site Assessment and Risk Assessment.

In 2010, Company Y's CEO recognized that the firm was not meeting its revenue growth targets. Employee feedback identified deficiencies in process and systems across business intelligence, customer relationship management, communications, compensation and performance management, project, and program management. Declining financial growth coupled with employee feedback has led to serious questions about underperforming units such as the Renewable Energy division.

1.3 An Overview of Company Y's Services

Company Y's services help both public and private sector clients meet their environmental obligations under federal, provincial and municipal government legislation, regulations and programs, as well as meet industry standards, regulations and best practice.

To remain competitive in the environmental sector, Company Y has leveraged internal assets to create stand-alone divisions that service existing and new clients. However, the Renewable Energy division requires a significant investment to grow and diversify further into the geexchange value chain, the heat and energy efficiency, and the green building environmental sub-sector.

Company Y's current services and the client segments that use these services are summarised in Table 1 at the end of this section. This table was adapted from the Product Customer Matrix created by Boardman and Vining in 1996. However, this report with its limited scope only examines in detail the Renewable Energy division's geexchange service, and the firm's top five client industries (Sections 1.3 and 1.4).

1.3.1 Business Drivers

The client's environmental obligations and Company Y's service outputs summarized below provide additional insight into the firm's services.

- The geoexchange service helps clients meet the requirements of the Greenhouse Gas Reduction Targets Act administered by the Ministry of the Environment. The outputs available from this service are a feasibility report, a design report, and a test plan.
- The environmental impact assessment (EIA) service helps clients meet the requirements of the Canadian Environmental Assessment Act and Regulations administered by the Canadian Environmental Assessment Agency and the Environmental Assessment Office. The output from this service is an environmental impact assessment report.
- The contaminated land and remediation service helps clients meet the requirements of the Environmental Management Act administered by the Ministry of Environment and Environment Canada. The output from this service is a site investigation report and a remediation plan.
- The environmental, ecological and risk assessment service helps clients meet the requirements of the Canadian Environmental Protection Act (CEPA), 1999, administered by Environment Canada. The output from this service will feed into an environmental impact assessment report or a stand-alone ecological or risk assessment report.
- The carbon and sustainability service helps clients meet the: 1) Climate Action Plan administered by the BC Government, Ministry of the Environment, BC Hydro and independent verifiers; 2) Greenhouse Gas Reduction Targets Act (Bill 44 2007) administered by Environment Canada and the Ministry of the Environment; 3) Clean Energy Act, Bill 17 2010, administered by the Ministry of Energy, Mines and Petroleum Resources, and Environment Canada. The output from this service is an environmental carbon and sustainability report.

Several new opportunities exist for Company Y to help clients conform to the Greenhouse Gas Reduction Targets (Cap and Trade) Act administered by the Ministry of the Environment and the Emergency Program Act, and, the Oil and Gas Activities Act administered by the Ministry of Energy, Mines and Petroleum Resources.

1.3.2 Environmental Services

Long-term environmental impact assessment and First Nations related projects generate the highest profit margins for Company Y. A three-year standing offer from Public Works and Government Services Canada (PWGSC) provides the firm with longer-term, but lower margin revenue streams on contaminated site assessment, risk assessment and ecological projects.

Contaminated site and risk assessment projects are predominantly government contracts and generate lower margins for short-term projects compared to environmental assessment, risk management, and First Nations projects that are long-term.

Company Y believes its competitive advantage lies with the “great consultants that go the extra mile” to focus on client needs, a trait that differentiates the firm from its competitors whose primary focus is profit. Company Y believes that its growth is constrained by a combination of finances, finding the right people with the right skills to lead the firm into new sectors, and underperforming employees.

1.3.3 The Renewable Energy Division

Company Y’s Renewable Energy division is primarily engaged in the feasibility, design and testing of geexchange systems for buildings. The division competes in the heat and energy efficiency environmental sub-sector.

Geexchange is a relatively new, but commercialized heat and energy efficiency technology that enables owners to use the ground’s heating and cooling properties to heat and cool their property efficiently while reducing GHG emissions. The heat exchange between the property and the ground uses standard pump and compressor technology, in other words a geexchange system. Geexchange is an alternative to traditional oil, gas or coal fired heating, ventilating and air conditioning systems (HVAC). Natural Resources Canada (NRCan) and the US Environmental Protection Agency (EPA) consider geexchange systems to be the most energy efficient, environmentally friendly and cost-effective HVAC systems on the market today (Canadian GeoExchange Coalition, 2011).

Market demand for green construction has increased with changing standards, including the BC Building Codes, the BC Energy Efficiency Act, Leadership in Energy and Environmental Design (LEED) certification (administered by the Public Safety and Solicitor General (PSSG)), and the current standard activity (CSA) in energy C448.2-02 Design and Installation of Geexchange Systems for Residential and Other Small Buildings. LEED certification provides building owners, designers and operators with a framework for the assessment and implementation of green building design, construction, operations and maintenance (Green Building Certification Institute, 2011).

In response to this market demand, specialist firms such as heat pump manufacturers, have developed guidelines and proprietary software for their products to ensure that when a

geoexchange system is designed and installed it meets the manufacturer's heat pump specifications.

1.4 An Overview of Company Y's Customer Segments

Company Y's top twenty and top five clients generate 89% and 70% of the firm's total revenue, respectively. The firm's revenue streams fluctuate between a government and private split of 70:30 and 60:40.

1.4.1 Government

Since 1994, Company Y has served a growing client base that includes municipal, provincial and federal governments. The firm's top three clients who account for 46% of the firm's revenue are Environment Canada, PWGSC, and the Ministry of Transportation (MOT).

Environment Canada is a federal government body responsible for protecting the environment, conserving Canada's natural heritage, and providing meteorological information to the public. Environment Canada implements the Federal Government's environmental agenda through a series of programs and services that ensure the current and future health and safety of the environment, the population, and the planet. The agency enforces environmental and wildlife legislation across several domains that include the manufacture and use of toxic substances, import and export of hazardous wastes and materials, migratory birds, endangered species, the protection and conservation of domestic and international waters, and the conservation of renewable resources.

PWGSC is a common service agency for the Federal Government's departments, agencies and boards. PWGSC is Company Y's third top client, accounting for 19% of firm revenue.

MOT is a provincial government body with responsibility for the implementation of the government's transportation agenda, and is Company Y's top client, accounting for 21% of firm revenue.

In conclusion, Company Y has been successful at outbidding competitors to win government contracts for its environmental assessment and management, ecological assessment and management, contaminated site assessment and remediation, and risk management services.

1.4.2 Energy

The energy industry within British Columbia is dominated by BC Hydro, a government-owned corporation, BC's monopoly producer, transmitter and distributor of electrical power and Canada's third largest electric utility company. BC Hydro is Company Y's second top client, accounting for 20% of the firm's revenue.

BC Hydro has 94% population coverage in B.C., and 95% of BC's electric power is generated by an integrated hydroelectric system. Demand for electricity in B.C. is predicted to grow 25%-45% over the next 20 years and will be supported by a series of conservation, buying, and building. BC Hydro reports to the B.C. Ministry of Energy, Mines and Petroleum Resources, and energy policies are detailed in the 2007 BC Energy Plan and 2010 Clean Energy Act. The act has consolidated BC Hydro and the BC Transmission Corporation into a single entity responsible for planning and delivering B.C.'s clean energy while fostering job creation and reducing GHG (BC Hydro, 2011).

Renewable energy is energy generated from naturally replenishing resources such as sunlight, wind, rain, tides, and geothermal heat. Renewable energy is a stand-alone environmental sector that has spawned energy technologies that include solar, wind, biomass, hydroelectricity, geothermal, and biofuels. BC Hydro generates 54,000 gigawatt hours of electricity per annum, and the renewable energy projects assessed by BC Hydro had an annual energy production capacity of 18,000 gigawatt hours. Only biomass, geothermal, small hydro and tidal current are considered sufficient and commercially viable enough to contribute to BC Hydro's resource mix. Independent Power Producers (IPP) who are small-scale producers of renewable energy generate 11,400 gigawatt hours per year and include private companies, municipalities, First Nations, or individual customers working alone or in partnership. Company Y's Environmental Management division's clients are IPPs and account for 9% of the firm's revenue.

A 2007 BC Hydro Power Smart geoweb market assessment identified a potential 4,200 geoweb retrofits and 6,400 installations for new construction in B.C. which represents a significant value of potential greenlit project revenue (BC Hydro, 2007). This project also concluded that single-dwelling residential retrofit and single-dwelling new construction geoweb systems failed BC Hydro's total resource cost test parameters of conservation and demand management. Therefore, BC Hydro has chosen not to promote or incentivize single-dwelling residential geoweb systems.

The Canadian GeoExchange Coalition (CGC) and GeoExchange BC are industry associations that support and promote the advancement of geoechange in Canada and B.C. respectively. A BC Hydro project entitled BC Hydro Phase I Geoechange Energy Performance Evaluation is currently underway to evaluate and independently verify the claimed energy efficiencies set out by CGC in several of their publications. This project, co-sponsored by BC Hydro, Fortis Energy BC, the City of Vancouver, and Natural Resources Canada, project managed by GeoExchange BC, and executed by one of Company Y's competitors in the geoechange market, should provide future direction to the geoechange industry in Canada. Until the report's publication in May 2011, BC Hydro will provide only indirect sponsorship to geoechange projects for the Institutional, Commercial and Industrial (ICI) sector through its High Performance Building program.

Terasen Gas, now FortisBC, is a \$12 billion energy utility company that produces, transmits, and distributes electrical, natural gas and alternative energy solutions in B.C. The firm's natural gas and alternative energy lines of business serve 940,000 customers in 125 BC communities, while the electricity line of business serves 161,000 direct and indirect customers in the southern interior of B.C. The company is capable of planning, designing, and building a variety of energy and energy-efficient solutions that include geoechange. FortisBC engages Company Y's Renewable Energy division for some of the more complex geological aspects of its geoechange projects and accounts for 1% of Company Y's total client revenue.

In conclusion, the renewable energy and heat efficiency market landscape poses several challenges for Company Y's Renewable Energy division: 1) BC Hydro's decision not to incentivize single-dwelling retrofit and single-dwelling new construction geoechange projects means that buyer demand is likely to be low in two of the Renewable Energy division's geoechange market segments; 2) the BC Hydro Phase I Energy Performance Evaluation contract awarded to one of Company Y's competitors will provide this competitor with invaluable and unique geoechange portfolio experience; 3) two of Company Y's Renewable Energy division employees sit on the Board of Geoechange BC. This conflict of interest excluded the Renewable Energy division from BC Hydro Phase I's project selection phase; 4) the future direction of the geoechange market in Canada is uncertain until the publication of the Phase I project report findings in May 2011.

1.4.3 Oil and Gas

Canada has the second largest proven oil reserves in the world and produces 2.5 million barrels per day to make it the world's eighth largest producer of crude oil. The world's current oil supply of 86 million barrels per day slightly exceeds demand by 2 million barrels per day. Canada's oil production exceeds domestic requirements and much of Canada's oil sells on the world market, predominantly to the US. Crude oil and gas exports generate revenue of around \$70 billion per year. The industry employs around 300,000 people and contributes \$40 billion to Canada's gross domestic product (GDP) (Statistics Canada, 2007).

Oil and gas extraction is capital intensive and much of Canada's resources are non-conventional, for example the oil sands. Consequently, the oil and gas industry (upstream, mid-stream and downstream) has a significant environmental impact on water, land and air. Production and processing of oil, natural gas and coal, petroleum refining, and transportation by pipeline account for 20% of Canada's total GHG emissions (Statistics Canada, 2007). Energy efficient and pollution abatement technologies are an ongoing concern in the sector. Increased production levels drive up the operating costs associated with resource intensive processes and will eventually trigger an increase in demand for energy efficiency and pollution control solutions as firms respond to their environmental obligations. The industry also uses a significant amount of water in conventional drilling, oil sands surface mining, in-situ production, and upgrading, refining and petrochemical production. The upstream component of oil and gas accounts for 7% of total water allocation in Alberta. Although the industry now recycles 90% of its water, its environmental impact continues to be high.

The oil and gas sector generates 12% of Company Y's revenue and is a growth industry in B.C. and Alberta. This sector provides excellent opportunities for Company Y's environmental management, carbon and sustainability, site assessment, and renewable energy divisions to provide environmental impact assessment, contaminated land and remediation, carbon and climate change mitigation, and, heat and energy efficiency services respectively.

1.4.4 Mining

In 2006, the mining industry was worth \$35 billion with non-fuel minerals (including nickel, copper, iron ore, gold and potash) accounting for 91.6% and coal 8.4% of the total production value. The industry employs around 47,000 people contributing \$9 billion or 0.8% to Canada's GDP. The mining industry has implemented responsible mining best practice to mitigate or eliminate environmental impacts during exploration, planning, operations, restoration

and research. This sector provides several excellent opportunities for Company Y's environmental impact, contamination and remediation assessments, risk, ecological, and socio-economic assessments, and carbon and sustainability services.

1.4.5 Construction

In 2010, the construction industry in Canada was valued at \$73.9 billion, and although slightly higher than its 2009 value of \$69.2 billion, still declined from a 2008 peak value of \$75.5 billion (Statistics Canada, 2011). The non-residential sector, rather than the residential sector, will drive industry growth in 2010 and 2011 (Canadian Construction Industry, 2011). Residential sector construction has grown by 0.3% in 2010, with 0% growth in 2011. In 2010, non-residential, which includes institutional, government and commercial construction, grew by 1.0%-2.0% in 2010. Employment and investment levels have fallen steadily from 2008 peaks and growth will decline into 2012. Property developers are clients of the construction industry, clients of Company Y's Renewable Energy division, and a target of all Company Y divisions. This decline in the construction market has the potential to reduce demand for Company Y's geoexchange and other environmental consulting services.

In summary, Company Y's core competencies are in environmental assessment and management, ecological assessment and management, contaminated site assessment and remediation, and risk assessment and management. However, the firm has responded to new environmental challenges by diversifying to remain competitive. Although part of the heat and energy efficiency environmental growth sector, the Renewable Energy division operates at a loss. The division faces several challenges and opportunities as it competes in an unpredictable geoexchange market that is likely to remain so until the publication of the GeoExchange BC/BC Hydro Phase I Energy Performance Evaluation project results.

Table 1 Service – Customer Matrix for Company Y (Adapted from Boardman and Vining 1996)

Customer	Public						Private				
Service	Transport: Port/Air	Transport: Highway	Utility: Electric (Hydro)	Federal	Provincial	Municipalities	Mining	Property Developers	Oil & Gas	First Nations	*Utility /Eng
Environmental Assessment and Management	•	•	•	•	•	•	•	•		•	•
Socio-Economic Assessment	•	•	•				•			•	
Ecological Assessment (Terrestrial and aquatic vegetation and wildlife)	•	•	•	•	•		•	•		•	
Carbon and Sustainability Assessment			•	•		•		•			

Customer	Public						Private				
Service	Transport: Port/Air	Transport: Highway	Energy: Hydro	Federal	Provincial	Municipalities	Mining	Property Developers	Oil & Gas	First Nations	*Utility /Eng
Contaminated Land Site Assessment			•	•	•		•	•	•		
Remediation	•	•		•				•			
Risk Assessment & Management			•	•	•		•	•	•		
Hydrogeological Assessment			•	•	•		•	•	•		
Engineering			•	•	•		•	•	•		
Renewable Energy						•		•		•	•

*Private utility clients include First Nations, and other privately owned non-BC hydro energy projects including IPPs.

2: EXTERNAL (INDUSTRY) ANALYSIS

2.1 The Environmental Consulting Industry

The environmental consulting industry is comprised of organizations that provide expert advice, assistance and recommendations such as the adoption of an approach, process, or strategy on environmental issues such as contamination, toxic substances, and hazardous material (Statistics Canada, 2009). Such organizations include environmental and engineering consulting firms, government owned entities, private sector firms, associations, and non-governmental organizations (NGOs).

A profound change in attitude across governments, businesses and individuals worldwide, triggered by climate change, represents a tipping point for the environmental sector. Governments have responded by introducing new regulations, legislation, and GHG targets in an attempt to mitigate or eliminate climate change impacts. Such environmental business drivers have increased demand for products and services that offer prevention at the source rather than treatment at the end of the product or service lifecycle.

In an industry that serves a highly segmented environmental sector, climate change and sustainability issues have spawned a new set of environmental markets, which combined with existing segments, form the Green economy that includes:

- Land Management: urban forestry and parks; reforestation and afforestation and soil stabilization; habitat conservation and restoration: organic agriculture.
- Water Management: water purification; water reclamation, grey water and rainwater systems; low-water landscaping; stormwater management.
- Waste Management: Brownfield land remediation; Superfund cleanup; recycling; municipal solid waste salvage; sustainable packaging.
- Renewable Energy: includes solar, wind, geothermal, tidal, biofuels, and fuel cells for energy generation.
- Green Buildings: LEED construction of new buildings; residential and commercial assessment of existing buildings; Retrofit greening for energy and water efficiency; using green products and materials.

- Clean Transportation: car sharing and carpooling programs; alternative fuels; hybrid and electric vehicles.

To meet market demand, environmental consulting firms including Company Y have expanded by diversifying into new market segments, in particular targeting some or all of:

- Carbon and Climate Change Mitigation: environmental impacts associated with rising or falling sea levels, air temperatures, and water temperatures, declining or improving air quality, increasing or declining resource demand, population changes, and natural disaster management. All represent opportunities for environmental consulting firms who are able to offer predictive and preventative business services across a product or service lifecycle.
- Heat Savings and Energy Efficiency: energy efficiency initiatives that reduce GHG emissions and climate change impact.
- Renewable Energy Resources: the demand for skills associated with the production and distribution of energy from renewable energy sources that includes wind, photovoltaic solar, geothermal, biomass, hydro, ocean and tidal/wave.

2.1.1 Environmental Consulting Industry Characteristics

In Canada, a high number of small consulting firms earn 87.1% of industry revenue while the 20 largest firms capture 12.9%, a trend that has remained unchanged since 2006 (Statistics Canada, 2009). Small firms, by definition less than 100 employees, compete with several medium-sized firms (between 100 and 499 employees) and a few large (500 or more employees) firms in a monopolistically competitive market structure with low entry, and exit barriers, and where many incumbents compete on price and service. Although, there are opportunities to differentiate on service, incumbents compete primarily on price in the public sector, and price and service in the private sector.

In contrast, US industry data illustrates that firms of greater than 100 employees capture 65% of market revenue, and firms of between 20 and 100 employees capture 17% of market revenue (EBI Inc, 2010).

In Canada, environmental sector segments such as environmental impact, contaminated land, and ecological assessment are mature, while carbon and climate mitigation, energy efficiency and renewable energy resources are growth segments.

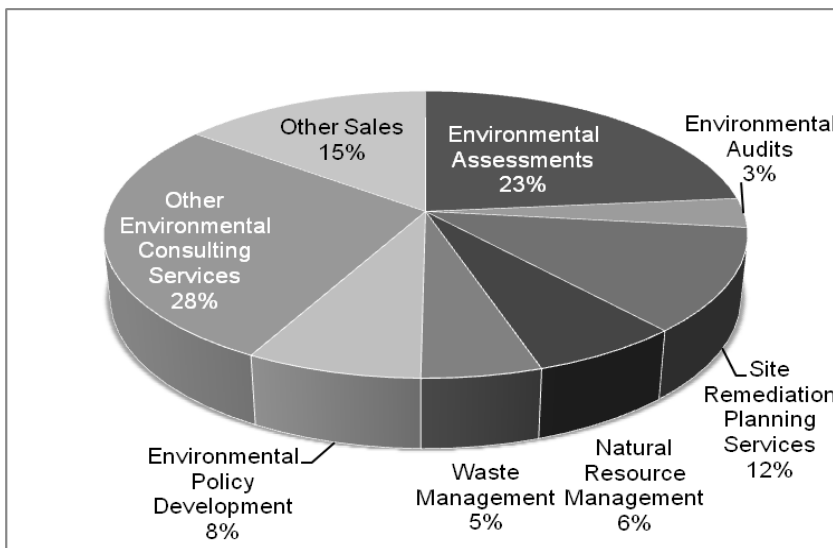
2.1.2 Size of the Environmental Consulting Industry

In 2008, the environmental consulting and other scientific and technical services industry generated revenue of \$4.2 billion, of which environmental consulting generated \$1.64 billion, an overall increase of 10.4% from 2007, and 32% of total revenue from all consulting services. Operating expenditures increased 8.4% from 2007. Profit margins on average were 18.6% for environmental consulting firms and 21.8% for management consulting firms (Statistics Canada, 2008).

Of the total \$13.1 billion of revenue from all consulting services (Management NAICS 54161, Environmental NAICS 54162 and other Technical and Scientific services NAICS 54169) management consulting accounted for \$8.9 billion. The consulting service split was 83%:17% private to public (Statistics Canada, 2008).

A sales breakdown by environmental consulting service illustrates how segmented Canada's environmental sector is (Figure 1).

Figure 1 Breakdown of Sales by Environmental Consulting Services in Canada (NAICS 54162)



Source: Statistics Canada 2009

2.2 A Competitive Analysis

A US based report ranks Company Y as one of the top 500 international environmental consulting and engineering firms, generating 2009 revenues of US\$17 million (EBI Inc., 2010). Company Y's Renewable Energy division provides a feasibility, design and testing service for District Heating, residential and commercial geexchange design and build projects. The division's target buyers are engineering firms, construction companies, property developers, residential, institutional, commercial and industrial property owners. The technical design team's expertise is in geexchange a relatively new, but commercialized heat and energy efficiency technology that enables owners to heat and cool their properties efficiently while reducing GHG emissions.

The division's competitive stance analysed below with Porter's Five Forces framework augmented with a sixth force of government and summarized in Figure 2 at the end of section 2.2 (Vining, Shapiro and Borges, 2005).

2.2.1 Rivalry among Existing Competitors

Industry incumbents compete primarily on price when bidding on public sector contracts that have standard price and technical components. However, on private sector contracts, incumbents compete on both price and technical expertise. Aided by marketing efforts, it is possible to increase a buyer's willingness to pay. Buyers perceive a difference in an incumbent's services, experience a difference in both technical expertise and in service quality, and are aware of their consultant's reputation. If an incumbent can increase a buyer's willingness to pay, the focus on price diminishes. Therefore, there is an opportunity to service a niche market with a private sector client who is focused less on price.

Incumbents who are vertically integrated and horizontally diversified are able to offer a wider range of products and services, some of which cross multiple industries that capture cost advantages through economies of scope. Company Y's Renewable Energy division has captured a small (5%-10%) portion of total fee revenue on geexchange design and build projects by being sub-contracted to the client's primary relationship holder who is either the property developer or the construction company. Company Y could capture a higher percentage of total project revenue with the appropriate internal resources. However, Company Y's internal resources are constrained on two levels; 1) despite a wide range of services including a sustainability and energy service, Company Y lacks the necessary CGC accreditation, and project experience to provide a full-service specialized geexchange service that includes the build phase or

installation; 2) Company Y lacks in-house LEED accredited resources to provide a full-service LEED green building design that would allow the firm to capture the feasibility, plan, design, build and test project phases on a green building project with heat and energy efficiency, including geexchange and solar components.

Incumbents such as Company Y have both cost advantages and disadvantages associated with proprietary resources. Proprietary information technology systems that support business operations are flexible enough to accommodate business enhancements, but at a high cost. Information technology resources such as geexchange design and built software could broaden the Renewable Energy division's geexchange services and increase productivity on geexchange projects.

Qualified, accredited, and experienced employees incur higher staff costs compared with unqualified, non-certified individuals, but are able to secure higher hourly billable rates and capture a higher proportion of the project value chain while increasing buyer confidence. Company Y's Renewable Energy division is disadvantaged on two levels: 1) constrained by human and IT resources, the Renewable Energy division is able to capture just a small proportion of the design and build project revenue; 2) resources charged out at below target chargeout and billable rates do not contribute to the firm's performance goals.

Firms such as BC Hydro and BC Fortis maintain duopoly control over BC's energy market and may decide to retain some or all phases of a geexchange project in house. Although unlikely, such a strategy would significantly reduce potential revenue opportunities available to the Renewable Energy division.

Overall, twenty-five installation companies capture 40 % of the residential market in Canada, but very few compete with each other because the majority of firms are located in different regional markets. The top ten installation companies in Canada are responsible for 25 % of all residential installations. These specialist geexchange firms have an advantage over Company Y because they are able to offer the full-service of feasibility, plan, design, build and test on geexchange projects while capitalizing on economies of scope and scale.

In conclusion, the Renewable Energy division is currently disadvantaged against its rivals; and, rivalry among incumbents is moderate to high.

2.2.2 Threat of New Entrants

The environmental consulting industry is unregulated and so it is possible for new entrants to make an easy entry and exit. However, the industry's clients are likely to be in a fully or partially regulated industry, and so new entrants are unlikely to become profitable. Industry clients prefer to use environmental consulting firms comprised of experienced, knowledgeable and accredited environmental professionals.

New entrants are typically unable to match incumbents on technical expertise, reputation and service quality, and so the threat of entry on low price triggers credible retaliation on the part of incumbents seeking to protect their market share. However, competing solely on low price is an unsustainable option that lowers profit margins for all competing firms.

A new entrant wishing to capitalize on industry trends with a fast entry and exit would require operating capital to enter this industry. Investment capital and annual operating costs associated with proprietary resources in the form of technical expertise are high. Exit costs increase with time as industry incumbents respond to changes in market demands to remain competitive.

A full-service geoexchange specialist or a full-service LEED green building design new entrant competing in the heat and energy efficiency sector would easily be able to displace incumbents such as Company Y's Renewable Energy division. Thus, while overall threat to industry incumbents is low, Company Y's division is open to displacement by these specialist firms.

In conclusion, the threat from new entrants is moderate.

2.2.3 Bargaining Power of Suppliers

Company Y's information systems comprise proprietary supplier software and a mix of third-party software and hardware. Relationship specific investments are present, incumbent asset specificity is high and switching costs are high. Third party IT supplier bargaining power is moderate. Therefore, IT supplier bargaining power is moderate to high.

Company Y's Corporate Services division comprises the support functions of Finance, IT, Human Resources, Facilities, Administration, Marketing and Communications, and Business Development. Primary functions reside within the Environmental and Engineering, and Planning and Management divisions. The bargaining power of Company Y's skilled resources fluctuates between high, moderate and low and in line with the external environment's demand for their

services, and each individual's level of skill, experience, qualification and professional certification. Therefore, their bargaining power also fluctuates between low and high.

In conclusion, supplier bargaining power is moderate to high.

2.2.4 Bargaining Power of Buyers

The buyers of Company Y's environmental services are either Government (Federal, Provincial or Municipal), state or government-owned organizations or private sector firms and categorized as:

1. A buyer who must comply with their environmental obligations under international, federal, provincial and municipal government legislation, regulations and programs as well as with industry standards, regulations and best practices.
2. A buyer who goes beyond the regulatory framework, is proactive, and incorporates social responsibility and sustainability into their business strategy.
3. A buyer who is voluntarily compliant with some or all environmental requirements under international, federal, provincial and municipal government legislation, regulations, and programs, as well as with industry standards, regulations and best practices.
4. A buyer with deep pockets who satisfies their environmental obligations will follow their own, and not the regulatory authority's timeline. Company Y primarily serves buyers in the first grouping.

Geoexchange systems have two main purposes: 1) to increase a property's energy efficiency 2) to reduce GHG emissions. The geoexchange market segments are: 1) a single-dwelling retrofit 2) a multiple-dwelling retrofit 3) a commercial, institutional, or industrial (ICI) retrofit 4) a single-dwelling new construction 5) a multiple-dwelling new construction 6) an ICI sector new construction 7) a Municipal District Heating Scheme 8) a stamp and review service. Typically, the Renewable Energy division's client will be the property owner or the property developer. With the introduction of green building codes retrofit, new construction and District Heating Schemes are required to comply with environmental, resource conservation and efficiency standards that cover land, air, water and energy across the plan, design, build and restoration phases of a geoexchange project. Therefore, because of compliance issues a buyer is more likely to purchase an energy efficiency solution. The likely buyer profile fits with some client's in Company Y's current client list.

The average single-dwelling residential geexchange system costs \$25,000 to design and install and represents a sizeable property investment for the average Canadian homeowner. Although some Canadian provinces offer financial assistance of up to 40% of cost, both B.C. and Alberta do not. BC Hydro has chosen not to promote or financially incentivize single-dwelling residential retrofit and new construction geexchange systems because they cause electricity brownouts in neighbouring properties and an increase in customer complaints. Therefore, geexchange technology fails BC Hydro's total resource cost test parameters of conservation and demand management. In conclusion, a lack of financial incentives and BC Hydro's technical concerns mean that the current buyer interest in geexchange is likely to be low, and incumbent opportunities to penetrate the single-dwelling residential retrofits and new construction market are currently limited.

CGC claims that geexchange systems reduce GHG emissions, and increase energy efficiency, are independently unverified. If the results from the BC Hydro Phase I Geoexchange Energy Performance for direct incentive programs for the ICI sector. In the interim, BC Hydro is indirectly supporting geexchange for the ICI sector's High Performance Building program.

The future growth of the geexchange sector across residential, ICI and district heating schemes is dependent on the results of the BC Hydro Phase I Evaluation study. Therefore, incumbent opportunities to penetrate this sector are currently moderate,

A buyer has instant access to energy efficiency products, services and prices through the internet, and a wider choice of incumbents leading the buyer to a lower priced product or service. Although Company Y's Renewable Energy division competes as a cost leader, it is underperforming which suggest that buyers select a service provider by a combination of price, service, and reputation.

Buyer switching costs become high once a buyer has signed a contract. Incumbents recognized that early exit loopholes within their services encouraged buyers to exit without paying. Company Y requires its client to pay a returnable deposit and fees in advance. An early exit from an existing incumbent-buyer contract incurs high buyer switching costs. However, a contract increases an incumbent's transaction costs.

In conclusion, the bargaining power of buyers is moderate to high.

2.2.5 Threat of Substitute Products/Services

Reputable firms that offer full-service specialized alternative energy efficiency technologies pose the greatest substitution threat to incumbents. However, a full-service environmental consulting firm like Company Y through its Renewable Energy, and Energy and Carbon Services divisions offers an impartial perspective on carbon management, sustainability and energy efficiency. The firm's value proposition is an attractive one for buyers who seek a recommendation for the best in situ solution.

In conclusion, the threat of substitution is moderate.

2.2.6 Complementors

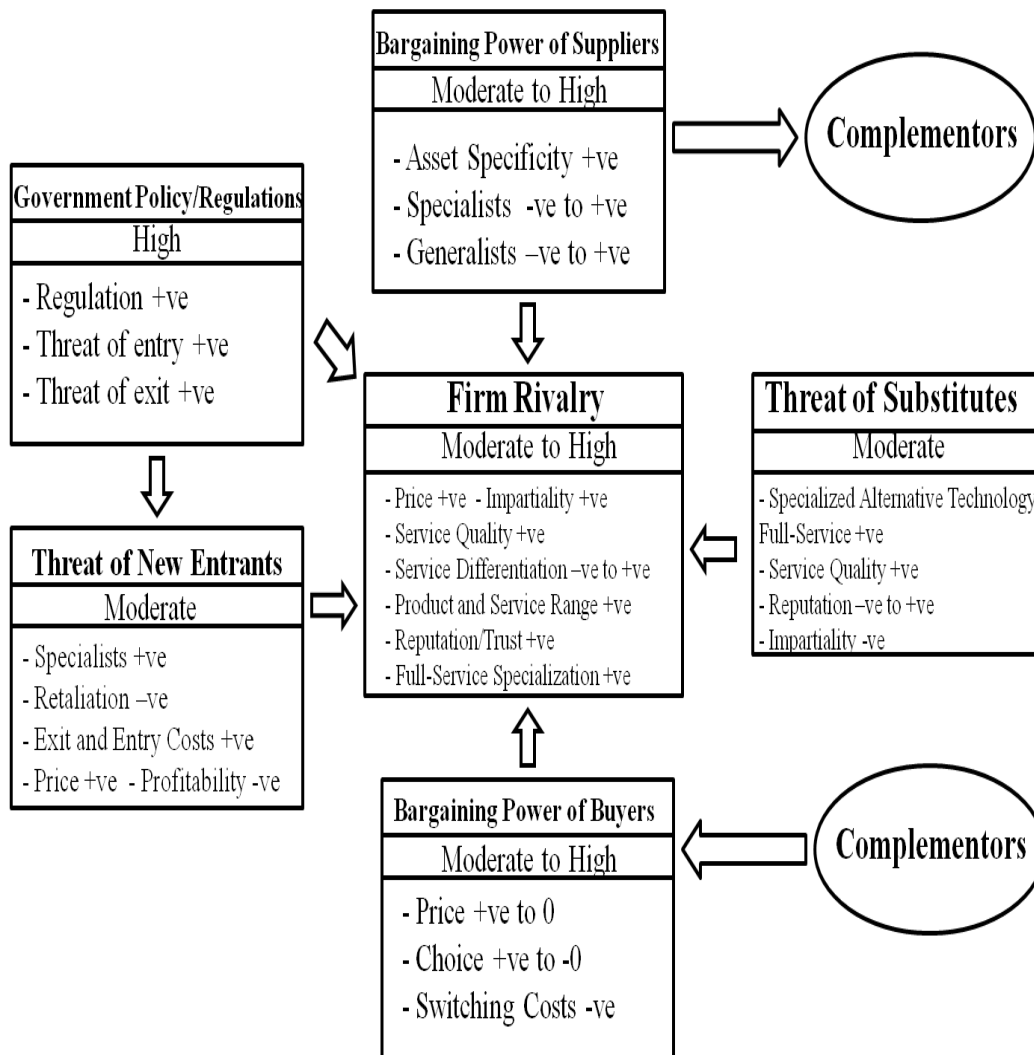
Company Y already offers a wide-range of complementary products and services that include sustainability, contaminated land and environmental impact assessment. A choice of complementary products and services may increase the demand for an incumbent's product or service, but does not significantly increase supplier power.

2.2.7 A Sixth Force of Government Policy and Regulation

The environmental consulting industry is unregulated, but exists to help an incumbent's buyers meet their environmental obligations under international, national, and local environmental policy, regulation and legislation, as well as professional codes of conduct and best practices.

In conclusion, the current regulatory and environmental management framework poses no barrier to entry or exit. However, government policy drives the industry and has a significant, but indirect impact demand for services.

Figure 2 Porter's Five Forces Framework Augmented with a Sixth Force of Government



Adapted from Porter 1979, and, Vining, Shapiro and Borges 2005

2.3 Key Success Factors

Porter's Five Forces analysis identified the environmental consulting industry's key success factors (Table 2). A rank of high means that a firm outperforms the industry average and poses a threat to its competitors, a rank of medium means there is some competitive advantage and threat to competitors, a rank of low indicates that there is no competitive advantage, and the threat to competitors is low or negligible.

The Renewable Energy division's main competitors in the geoexchange market are:

- Competitor A: a small B.C.-based company of between 10 and 20 mechanical and electrical engineers with an award-winning record in LEED commercial and residential building design, and a strong client-list that includes multi-national corporations, small and medium sized firms.
- Competitor B: a small B.C. based company of 50 to 100 employees that provides customized energy solutions for commercial and residential properties. The firm has 65 years of experience, is a full-service CGC certified geexchange provider, and an IPP.
- Competitor C: a small B.C. based company of less than 100 employees with 30 years experience in the design, installation and servicing of HVAC systems. This CGC certified firm with 20 years of commercial and residential geexchange experience has a strong presence in B.C., Alberta and Washington State.
- Competitor D: founded in 1954, is a 5,000 to 10,000 employee, publicly traded architectural and planning consulting firm headquartered in Edmonton, Alberta with an extensive North American presence. The firm has diversified into the environmental sector to provide environmental and waste management services. The firm has extensive LEED experience across all building sectors, including geexchange, and secured the contract for BC Hydro's Phase I Geexchange Energy Performance Evaluation project.

Table 2 Key Success Factors (Source: Author 2011)

Key Success Factor	Category of Threat	RE Div. Company	Competitor A	Competitor B	Competitor C	Competitor D
Price	Rival, New Entrants & Buyers	High	Low-Medium	Medium	Medium	Low-Medium
Reputation/Trust/Quality	Rival and Substitutes	Low-Medium	High	Medium	Medium-High	High
Product and Service Range	Rival	Medium-High	Low-Medium	Low-Medium	Low-Medium	Medium-High
Service Differentiation	Rival and Substitutes	Low-Medium	Medium	Low-Medium	Low-Medium	Medium-High
Full-Service Building Specialization (Green/LEED)	Rival	Low	High	Medium-High	High	Medium-High
Full-Service Geoexchange Specialization	Rival, New Entrants and Substitutes	Low-Medium	High	High	High	Medium-High
Impartiality	Rivals and Substitutes	High	Medium	Low	Low-Medium	Medium-High
Partnerships with Complementors	Rivals	Low-Medium	Low-Medium	Low-Medium	Low-Medium	Medium
Costs: Specialists	Supplier	Medium	High	Medium	Medium	High
Costs: Generalists	Supplier	Medium	Low	Low	Low	Medium

2.4 Industry Attractiveness

Industry profitability levels tend to be firm specific, but profit margins on average are 18.6% for environmental consulting firms (Statistics Canada, 2008). Table 3 below summarizes the industry's degree of competitiveness and attractiveness.

Table 3 A Summary of Industry Competitiveness and Attractiveness using Porter's Five Forces

Porter's Five Forces	Degree of Threat
Intensity of Competition	Moderate to High
Threat of Substitutes	Moderate
Threat of New Entrants	Moderate
Bargaining Power of Suppliers	Low to Moderate to High
Bargaining Power of Buyers	Moderate to High
Government Policy/Regulations	High
Other Aspects	Ability to Alter Status Quo:
Government Regulation	Government environmental policy and regulation increases or decreases the demand for the incumbent's services.
Technology Changes	New environmental technologies have the potential to change an industry segment's supply and demand curve.
Overall Industry Competitiveness	Moderate to High
Overall Industry Attractiveness	Moderate

Source: Author 2011

In conclusion, the environmental industry continues to be a moderately attractive one. Firms like Competitor D, with a combination of specialists and generalists, a high market penetration rate, a strong technical reputation, and a range of products and services derived from the firm's core competencies claim a modest 6.19% profit margin on revenues of \$1.513 billion, one that is lower than the industry average of 18.6%, and Company Y's 6.49%. Although the industry average is associated with small firms of less than 100 who generate higher profit margins, these figures illustrate the competitive nature of the environmental consulting industry, as well as some of the financial performance challenges such as operating costs and revenue faced by medium and large firms.

2.5 Strategic Issues within the Industry – PEST

Historically, government policy, environmental legislation, and regulations have driven the demand for environmental consulting services as firms comply with regulatory requirements to avoid financial penalties and damage to their reputation. Increasingly, buyers of environmental consulting services do so because of economic, social, and environmental benefits, collectively known as sustainability, and are thus engaged in voluntary, rather than mandatory compliance. In summary, the drivers of growth in the environmental market are:

- Environmental policy, regulations, and legislation that includes direct government spending on the environment, environmental regulation and legislation, and economic incentives.
- Financial and economic factors that influence operational practices, improve efficiency, and reduce emissions and energy costs.
- Customer demand for environmental goods, services and eco-friendly practices.
- Evolving environmental management practices, product lifecycle assessments and business policies.

Changes in government regulations and a desire for sustainability in both the public and private sectors have increased demand for green environmental products and services.

The demand for sustainability shapes the future of the environmental industry's market to create opportunities for firms that are able to meet buyer demand in new market segments.

2.5.1 Political

The environmental consulting industry is unregulated, but the industries the sector serves tend to be highly regulated. A government's environmental agenda influences environmental policy, regulation, and legislation, as well as industry regulations and best practice therefore, influencing the environmental sector at a global, federal, provincial and municipal level.

60%-70% of Company Y's revenue comes from government contracts, which makes the firm particularly vulnerable to the current economic climate of government deficits, budget cuts, recession and recovery. Despite the 2008 recession, and an unpredictable economic landscape, Canadian government environmental expenditure has grown at a higher annual rate than total expenditures (Table 4). In previous business cycles during the recession and recovery stages, environmental expenditure has decreased. The government's willingness to increase expenditure, despite such economic uncertainty, is further proof that the environmental sector has reached its tipping point (Section 2.1).

Table 4 Canadian Government Revenues, Expenditures and Environmental Expenditures 2005-2009

	(in \$ Millions)					Annual Growth 2005-2009
	2005	2006	2007	2008	2009	
Total Revenue						
(Federal, Provincial, Territorial, Local)	499,676	533,031	561,238	600,575	585,799	4.1%
Growth		6.7%	5.3%	7.0%	-2.5%	
Total Expenditures						
(Federal, Provincial, Territorial, Local)	487,365	516,669	545,533	580,922	594,594	5.1%
Growth		6.0%	5.6%	6.5%	2.4%	
Environmental Expenditures						
(Federal, Provincial, Territorial, Local)	11,903	13,158	14,420	15,516	16,933	9.2%
Growth		10.5%	9.6%	7.6%	9.1%	

Source: ECO Canada 2010

2.5.2 Economic Factors

The Canadian environmental sector employs 3.2% of total workers, a level that is greater than the Pharmaceutical or Aerospace sectors. Government and industry policy together with macro-economic factors determine the environmental cost of compliance. Climate change in particular has had a profound influence on government policy and for the next five years government and private sector spending will continue to drive the environmental or green economy more than any other factor. The environmental sector's emerging and growth sub-sectors are reflected in employment trends that show an increased demand for workers in carbon and climate change mitigation, heat savings and energy efficiency (Table 5).

Table 5 Future Growth Expectations for Worker Demand in Each Environmental Sub-Sector

Emerging & Very High Growth	Emerging & High Growth	Stable Growth	Flat Growth	Declining Growth
<ul style="list-style-type: none"> • Carbon & Climate Change Mitigation 	<ul style="list-style-type: none"> • Environmental remediation 	<ul style="list-style-type: none"> • Protection of ambient air quality 	<ul style="list-style-type: none"> • Water quality protection 	<ul style="list-style-type: none"> • Agriculture including organic farming
<ul style="list-style-type: none"> • Heat Savings & Energy Efficiency 	<ul style="list-style-type: none"> • Eco-innovation & environmental R&D 	<ul style="list-style-type: none"> • Water systems design for water supply 	<ul style="list-style-type: none"> • Operation of water & wastewater facilities 	<ul style="list-style-type: none"> • Sustainable forestry
<ul style="list-style-type: none"> • Renewable Energy Resources 	<ul style="list-style-type: none"> • Environmental health and safety 	<ul style="list-style-type: none"> • Waste management 	<ul style="list-style-type: none"> • Noise & vibration abatement. 	<ul style="list-style-type: none"> • Conservation of wildlife & fisheries
<ul style="list-style-type: none"> • Alternative Fuels & Alternative Fuel Vehicle 	<ul style="list-style-type: none"> • Protection of biodiversity & protection of landscape. 	<ul style="list-style-type: none"> • Environmental education • Environmental Policy & legislation 		<ul style="list-style-type: none"> • Minerals Management
		<ul style="list-style-type: none"> • Environmental communications & environmental public awareness. 		

Source: ECO Canada 2010

2.5.3 Socio/Demographic Factors

Climate change has heightened the public's awareness of environmental issues and has driven the increased demand for environmental goods and services.

2.5.4 Technological Factors

Disruptive and emergent technologies such as wind power, solar power, tidal power and geoechange have displaced old and environmentally damaging technologies such as oil and coal.

In conclusion, PEST factors have a significant influence on the environmental consulting industry.

2.6 Market Trends and Opportunities: Growth Sectors

The environmental market is highly segmented by service type and client industry. North American market data indicates that assessment and audit have generated the highest year on year revenue since 1995. The expectation is that the global environmental goods and services market will grow at between 4.7% and 7.7% per year (ECO Canada, 2010). The sector's growth areas are in carbon and climate change mitigation, heat savings and energy efficiency, and, renewable energy resources.

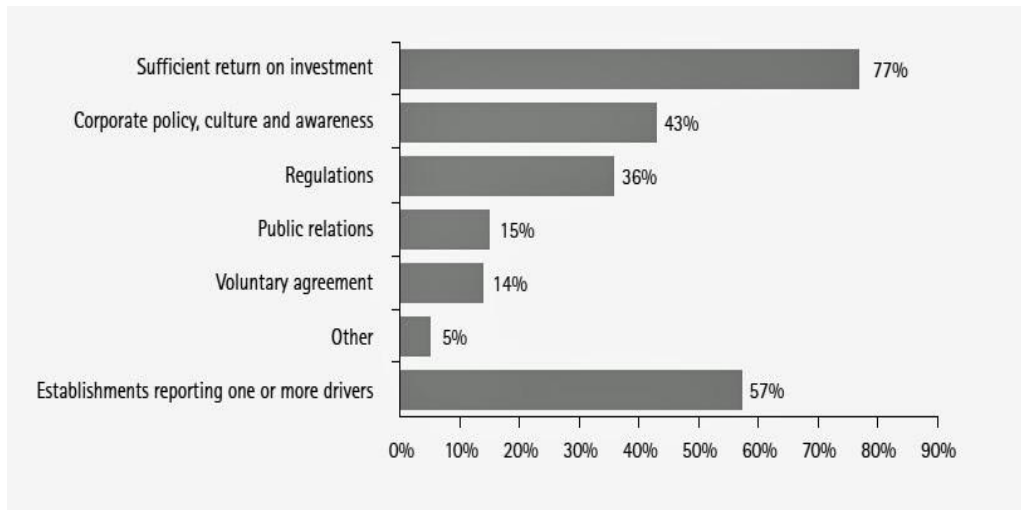
2.6.1 Carbon and Climate Change Mitigation

Services that assess environmental impacts associated with air, water or land resources impacted by climate change all represent opportunities for environmental consulting firms that are able to offer predictive and preventative business services across a product or service lifecycle. Company Y's services offerings in this sector are currently limited.

2.6.2 Heat Savings and Energy Efficiency

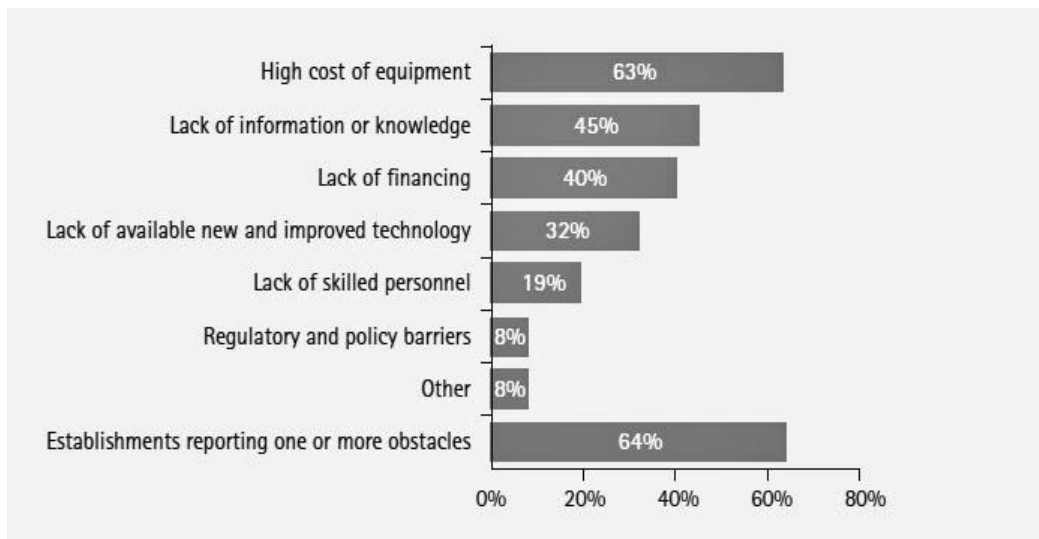
The demand for heat savings and energy efficiency products and services continues to increase. Firms that are willing to diversifying will capture a higher market share of this growing environmental sub-sector. Environmentally aware buyers still seek a "sufficient return on their investment" (Figure 3). However, despite an increased demand, some barriers to market penetration continue to exist among those buyers reporting obstacles as cost and lack of knowledge (Figure 4). In conclusion, pricing is important, but as buyer demand increases, the average price of the technology should decrease.

Figure 3 Why did your firm invest in Energy Efficient Technology?



Source: ECO Canada 2010

Figure 4 Reported Obstacles to adopting Energy Efficient Technologies



Source: ECO Canada 2010

2.6.2.1 The Geexchange Market in British Columbia

The Canadian GeoExchange Coalition’s comparisons of traditional property heating and cooling systems show expected geexchange GHG reductions (Table 6).

Table 6 GHG Savings Potential in British Columbia

Market penetration*	2%	4%	8%	16%
Electric baseboard				
GHG savings (tons CO ₂ eq.)	4 383	8 765	17 531	35 062
Natural gas				
GHG savings (tons CO ₂ eq.)	54 376	108 752	217 504	435 008
Oil				
GHG savings (tons CO ₂ eq.)	3 202	6 404	12 807	25 614
Total				
GHG savings (tons CO ₂ eq.)	61 961	123 921	247 842	495 684
Equivalent number of cars	18 441	36 881	73 763	147 525

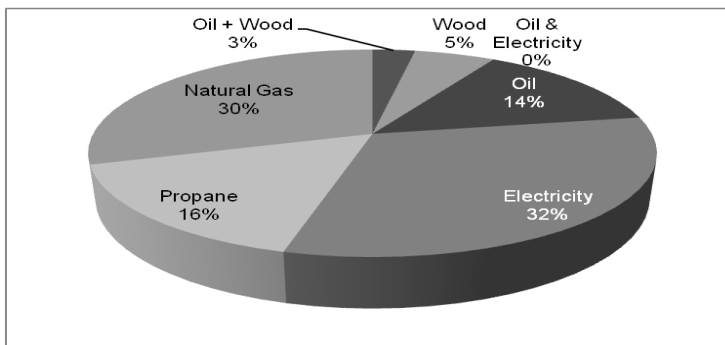
*There are 970 000 single detached houses in British Columbia (OEE 2006b)

Source: Canadian GeoExchange Coalition 2010

The average B.C. single-dwelling residential owner will pay \$22,689 for a closed horizontal geoechange system (51.54% of systems sold) which is \$1,300 less than the Canadian average; and, \$27,889 for a closed vertical system (31.06% of systems sold) which is \$114 less than the Canadian average of \$28,003. Of the other system types sold, 2.39% of systems are pond or lake loop, and 15.02% are open loop.

Unfortunately, financial incentives for residential geoechange systems are not available in B.C. or Alberta, unlike the rest of Canada where the average government funded incentive is \$9,000-\$10,000. With an estimated 970,000 single detached homes in B.C. the single-dwelling retrofit market has the potential to generate an estimated \$22 billion with 100% penetration. The lack of financial incentives coupled with mixed messages from the geoechange industry has resulted in B.C. buyers opting for alternative technologies or the status quo. However, despite buyer uncertainty, there is still some residential demand for geoechange system retrofits that replace inefficient and GHG emitting technologies (Figure 5).

Figure 5 System Retrofits – Fuel Replaced (British Columbia)



Source: Canadian GeoExchange Coalition 2010

Market competition and labour costs account for some of the price differentials across Canada. Within B.C., the top heat pump brand has a 43.57% market share and the top three installers capture around a 29.35% market share (Table 7). With the exception of specialist firms such as Competitor C, the primary consultant or developer will sub-contract the installation of the geoechange system, which is the Renewable Energy division’s current strategy.

Table 7 Market Share by Brand in British Columbia and Installers Market Share in British Columbia

Market Share by Brand British Columbia		Installers' Market Share British Columbia	
Position / Rank	Market Share	Position / Rank	Market Share
1	43,57%	1	10,92%
2	12,28%	2	9,90%
3	11,11%	3	8,53%
4	9,06%	4	5,46%
5	5,85%	5	4,44%
6	3,51%	6	3,75%
7	2,92%	7	3,75%
8	2,34%	8	3,41%
9	2,05%	9	3,41%
10	1,75%	10	3,41%
11	1,46%	11	3,07%
12	1,17%	12	3,07%
13	0,88%	13	2,73%
14	0,58%	14	2,73%
15	0,58%	15	2,39%

Source: Canadian GeoExchange Coalition 2010

In B.C., installers have an average of 7.5 years in the geoechange business, 82.5% of installations are for new residences compared to 17.5% for existing residences. In Saskatchewan 54.1% of geoechange installations were retrofit and 45.9% for new residences; in Ontario 66.8% were system retrofits compared to 33.2% for new residences. An Ontario installation firm has been in the business the longest with 11 years experience (Table 8). Being a slightly more mature market with a higher proportion of residential heating system technologies like oil and coal, the retrofit market demand was significantly stronger than the demand for new installations moving west to east across Canada.

Table 8 Residential Installations in New and Existing Buildings and Years in Business for Heat Pump Contractors in British Columbia

Table 2
Residential Installations in New and Existing Buildings
(Average for 260 Contractors Since in Business)

	Existing	New	Total
BC	17,5%	82,5%	100,0%
AB	13,8%	86,2%	100,0%
SK	54,1%	45,9%	100,0%
MB	43,5%	56,5%	100,0%
ON	66,8%	33,2%	100,0%
QC	30,7%	69,3%	100,0%
NB	50,4%	49,6%	100,0%
NS	31,5%	68,5%	100,0%
PE	43,1%	56,9%	100,0%
NF	70,0%	30,0%	100,0%
CANADA	51,1%	48,9%	100,0%

Table 3
Years in Business - Canadian Geothermal Heat Pump Contractors
(n=260)

	Years in Business	Standard Deviation	Years Min	Years Max
BC	7,5	6,0	1	28
AB	7,9	5,5	2	18
SK	5,7	4,2	1	16
MB	8,8	6,2	1	25
ON	11,0	9,4	1	30
QC	8,4	7,8	1	28
NB	9,6	11,1	1	30
NS	10,1	8,4	3	28
PE	10,7	15,1	1	28
NF	n.a.	n.a.	n.a.	n.a.
CANADA	9,5	8,4	1	30

Source: Canadian GeoExchange Coalition 2010

2.6.3 Renewable Energy

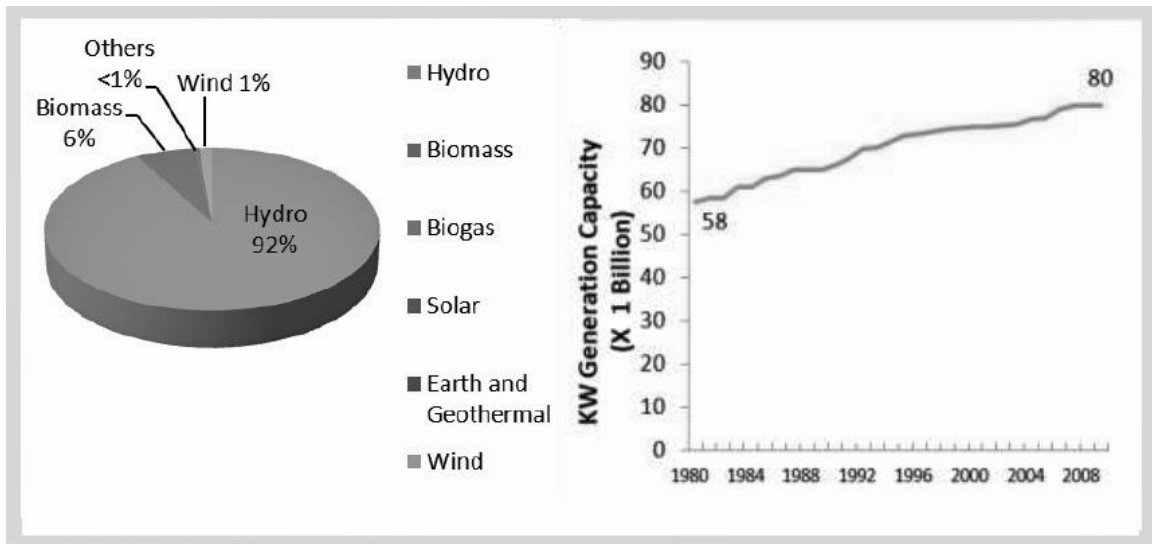
Renewable energy is energy generated from naturally replenishing resources such as sunlight, wind, rain, tides, and geothermal heat. Renewable energy is an environmental sub-sector and part of an industry that has spawned new technologies that include solar, wind, biomass, hydroelectricity, geothermal, and biofuels.

92% of Canada's renewable energy generation capacity is hydropower generation (Figure 6). At 6%, biomass is the second largest component. Renewable energy production sources have grown steadily since the 1980s at an average annual growth rate of 1.1% (Table 9).

2.6.3.1 The Renewable Energy Market in British Columbia

The increased demand for renewable energy is a result of the government's environmental agenda and changes in industry best practice. The proliferation of IPPs to satisfy the demand for renewable energy power has provided environmental consulting and engineering firms with opportunities to diversify their services to meet market demands and remain competitive. Company Y has been successful in meeting such demands through its wind power environmental impact assessment service.

Figure 6 Generation Capacity of Renewable Energy Sources in Canada



Source: ECO Canada 2010

Table 9 KW Capacity by Renewable Energy Source in Canada

KW Capacity (X 1,000)	1980	1990	2000	2009	1990-2000 Avg. Annual Growth	2000-2009 Avg. Annual Growth
High Growth						
Solar (on-grid)	405	417	2,121	43,150	20%	40%
Wind	-	20	124,107	1,045,567	164%	27%
Geothermal	387	492	9,754	30,266	39%	13%
Low Growth						
Hydro	55,498,324	62,326,768	69,683,968	73,286,368	1.2%	0.6%
Biomass	1,988,041	3,759,097	4,681,993	4,828,093	2.5%	0.3%
Municipal Solid Waste	21,100	22,300	22,300	22,300	0.0%	0.0%
Tidal	-	20,000	20,000	20,000	0.0%	0.0%
Total	57,507,465	66,128,165	74,408,261	78,156,761	1.3%	0.5%

Source: ECO Canada 2010

2.7 Trends and Opportunities: The Canadian Market

The environmental good and services market in Canada is segmented and is dominated by a high number of small to medium sized firms (SMEs) of less than 100 employees, several medium (100-499), and a few large (500+) firms.

Company Y would like to expand its operations nationally. This section examines the current national markets and provides an overview of potential opportunities.

2.7.1 Size of the Environmental Goods and Services Market in British Columbia

In 2004, the environmental goods and services market in British Columbia was valued at \$2,300 million with 1,352 environmental firms. Sales of environmental services were \$1,314 million (Statistics Canada, 2008). Environmental issues important to B.C. include fresh water, climate change, and contaminants, ecosystems, and species conservation.

2.7.2 Characteristics of the Environmental Sector in Western Canada

Approximately 2,900 environmental sector firms exist in Western Canada employing 56,000 people (Western Economic Diversification Canada, 2010).

Western Canada includes the provinces of Alberta, British Columbia, Manitoba and Saskatchewan. Each province has its own unique set of environmental sector characteristics:

- Alberta: Canada's third largest environmental market behind Ontario, and Quebec, has an industry that supports the province's energy resources and manufacturing sectors.
- British Columbia: Canada's fourth largest environmental market, has established itself with transportation fuel cell technology, water and wastewater management, and LEED compliant buildings.
- Manitoba: Canada's fifth largest market is focused on research and development in geothermal, biofuels, transportation refueling systems, and wind energy.

- Saskatchewan: Canada's fifth largest market is primarily focused on providing impact, audit, and regulatory studies with particular focus on clients in the energy, agriculture and mining sectors.

In conclusion, there are several opportunities for Company Y to penetrate existing markets across Western Canada with the firm's existing services in EIA and ESA, particularly in Alberta and Saskatchewan.

2.7.3 The Size of the Environmental Goods and Services Market in Canada

In 2008, the sale of environmental products manufactured in Canada generated \$2.3 billion in revenue, \$966 million involved machinery, equipment and product sales associated with renewable energy production. Environmentally related services generated the remaining \$1.8 billion or 44% of total environmental goods and services revenue of \$4.1 billion. Environmental consulting services generated 78% of service sector revenue or \$1.4 billion. Site remediation and emergency environmental services generated 22% or \$360 million of environmental service revenue (Statistics Canada, 2009).

In terms of provincial breakdown, the most recent and available data from 2004 showed that Ontario generated 43% of total environmental goods and service revenue, with B.C. on 13% and Alberta on 15%.

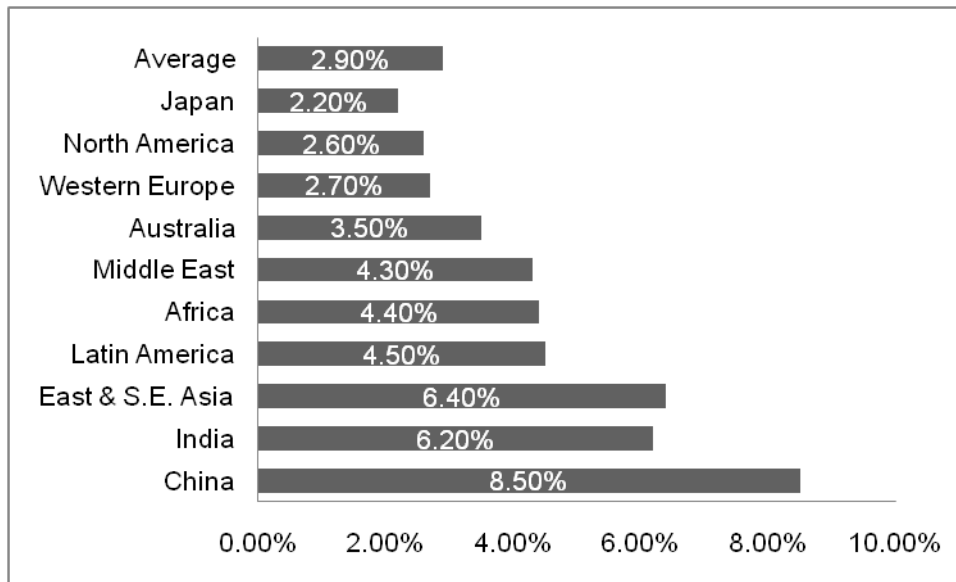
In 2010, the environmental goods and services market was valued at \$29 billion and employed 166,000 people (Industry Canada, 2010).

2.8 Trends and Opportunities: The Global Market

Company Y would like to expand its operations internationally. This section examines the current global market and provides an overview of potential opportunities.

Canada represents 1.7% of the global market for environmental goods and services and from the years 2000 to 2010, the Canadian market value grew at an average 7%-9% per annum (Figure 7). Canadian exports to the United States were valued at \$770 million, \$20 million to Mexico and \$210 million to other international markets.

Figure 7 Growth of Global Environmental Markets 2000-2010



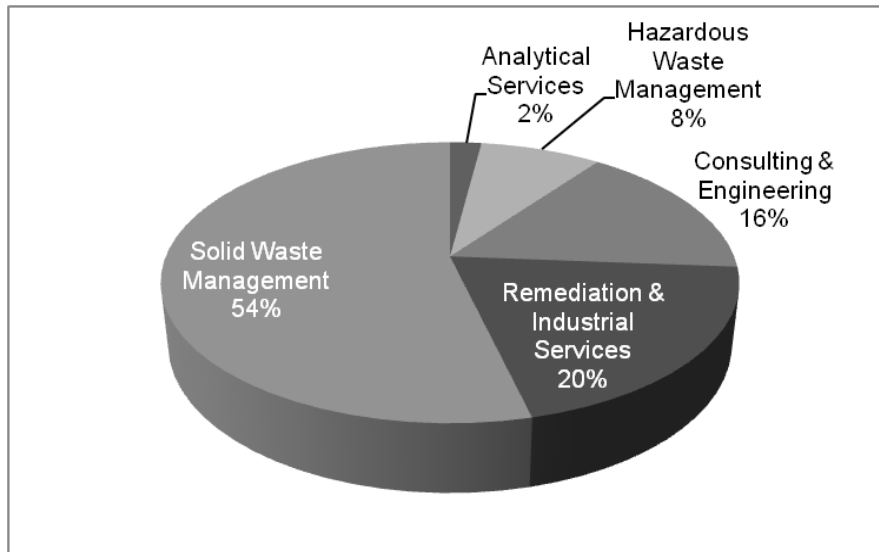
Source: Statistics Canada 2004

The global environmental services market encompasses a broad range of organizations that engage in the management of the environment and include waste management firms, consulting and engineering firms, analytical services firms, remediation, and industrial service firms.

The global market comprises North America (Canada, United States and Mexico); South America (Argentina, Brazil, Chile, Columbia and Venezuela); Western Europe (Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden and the United Kingdom); Eastern Europe (The Czech Republic, Hungary, Poland, Romania, Russia and the Ukraine); Asia Pacific (Australia, China, India, Japan, Singapore, South Korea, and Taiwan).

In 2009, the global environmental services market was valued at \$228.5 billion, and by 2014, its predicted value is \$276.4 billion (DataMonitor, 2010). Consulting and engineering firms generate \$36.56 billion or 16% of market revenue. By 2014, the value of consulting and engineering services will rise to \$44.224 billion assuming that the consulting and engineering firm's market share remains constant (Figure 8).

Figure 8 Global Environmental Services Market Breakdown 2009



Source: DataMonitor 2010

In conclusion, the national and global markets are highly competitive and although one of the top 500 international environmental consulting and engineering firms with 2009 revenues of \$17 million, Company Y need to either create new demand in an uncontested market space or capture an existing incumbent's market to increase its national and global rank.

2.9 Potential New Markets for Company Y

Company Y's current priority is the viability of its Renewable Energy division's geexchange services and the division's market opportunities in B.C. (Section 2.6.2.1), Alberta, and Canada. This section examines immediate opportunities in Alberta and Canada that are currently available to Company Y.

2.9.1 Geexchange in Alberta

The Alberta geexchange market offers some opportunities for Company Y. The expected GHG reductions in Alberta property heating, and cooling systems using replacement residential geexchange systems is significant (Table 10).

Table 10 GHG Savings Potential in Alberta

Market penetration*	2%	4%	8%	16%
Electric baseboard				
GHG savings (tons CO ₂ eq.)	11 763	23 526	47 052	94 105
Natural gas				
GHG savings (tons CO ₂ eq.)	(43 276)	(86 553)	(173 105)	(346 210)
Oil				
GHG savings (tons CO ₂ eq.)	38	76	152	304
Total				
GHG savings (tons CO ₂ eq.)	(31 475)	(62 950)	(125 900)	(251 801)
Equivalent number of cars	-	-	-	-

*There are 856 000 single detached houses in Alberta (OEE 2006b)

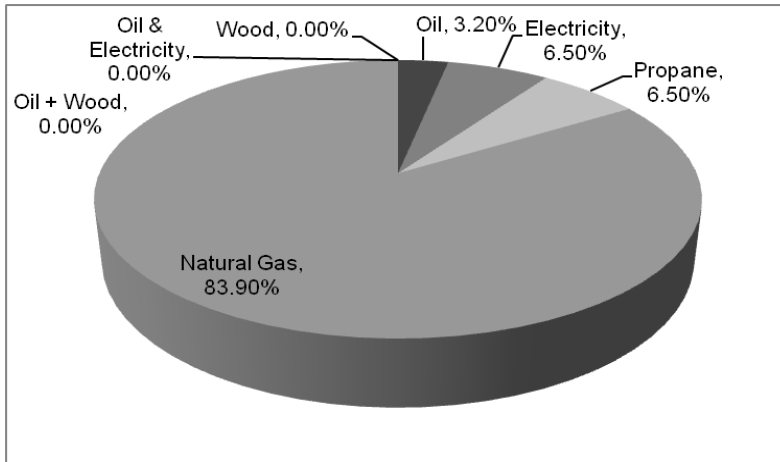
Source: Canadian GeoExchange Coalition 2010

The average Alberta single-dwelling residential owner will pay \$22,111 for a closed horizontal geexchange system (18.6% of systems sold) which is \$2,000 less than the Canadian average; and, \$30,399 for a closed vertical system (72.09% of systems sold) compared to the Canadian average of \$28,003. Lower drilling costs reflect regional geology and a competitive drilling market explain the lower cost of horizontal systems. However, a higher willingness to pay for a closed vertical system is reflected in its higher price. Of the other system types sold 2.33% are pond or lake loop, and 6.98% are open loop. In the retrofit market 83.9% of the installations replaced natural gas, 6.5% electricity, 6.5% Propane, and 2.3% heating oil (Figure 9). These values reflect the high penetration rate of natural gas in Alberta's residential heating market.

Unfortunately, financial incentives for residential geexchange systems are not available in Alberta or B.C., unlike in the rest of Canada where the average government funded incentive is \$9,000-\$10,000.

With an estimated 856,000 single detached homes in Alberta, and assuming 100% penetration, the retrofit market has the potential to generate an estimated \$18.76 billion for closed vertical systems and \$18.9 billion for closed horizontal systems.

Figure 9 System Retrofits – Fuel Replaced (Alberta)



Source: Canadian GeoExchange Coalition 2010

Within Alberta the top heat pump brand had a 27.42% share of the market, and the top three brands a 72.58% market share. The B.C. and Alberta pump markets are similar, with the three top pump brands dominating the market. Although one pump brand dominated the B.C. market with a 43.57% share, there was a higher penetration rate by firms ranked 11 to 15 compared to a penetration rate of 0% for firms ranked 11 to 15 in Alberta (Table 11).

In Alberta, the top three geothermal system installers captured 55.82% of the market and the top installer captured 27.91% of the market (Table 11). In B.C. the top three installers captured 29.35%.

Table 11 Market Share by Brand in Alberta and Installers Market Share in Alberta

Market Share by Brand Alberta		Installers' Market Share Alberta	
Position / Rank	Market Share	Position / Rank	Market Share
1	27,42%	1	27,91%
2	27,42%	2	16,28%
3	17,74%	3	11,63%
4	9,68%	4	9,30%
5	4,84%	5	6,98%
6	4,84%	6	6,98%
7	3,23%	7	4,65%
8	1,61%	8	4,65%
9	1,61%	9	2,33%
10	1,61%	10	2,33%
11	0,00%	11	2,33%
12	0,00%	12	2,33%
13	0,00%	13	2,33%
14	0,00%	14	0,00%
15	0,00%	15	0,00%

Source: Canadian GeoExchange Coalition 2010

2.9.2 Geoexchange in Canada

There are an estimated 7,181,000 single detached homes in Canada (Canadian GeoExchange Coalition 2010). The single-dwelling retrofit market with an average system install of \$25,000 and 100% market penetration has the potential to generate an estimated \$179.5 billion (Table 12).

Table 12 Estimated Potential Market Value of Residential Retrofit Geoexchange Systems in Canada*

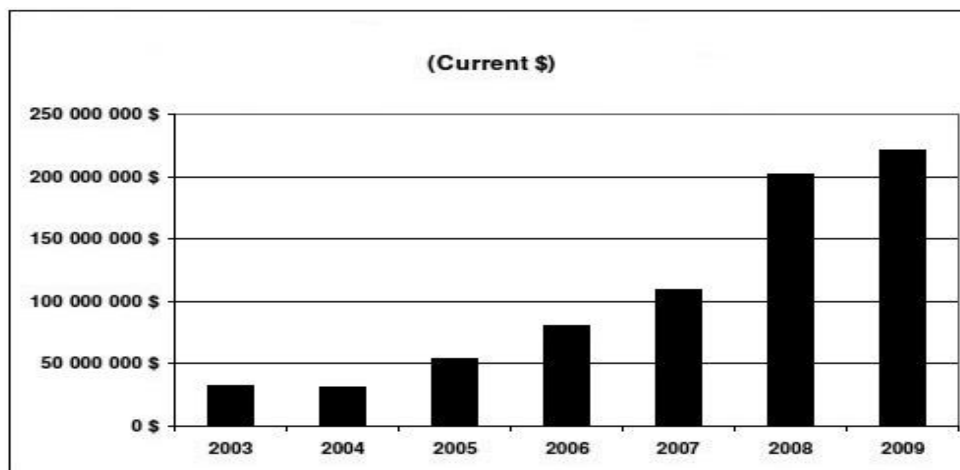
Province	Total	**Open	Closed	Closed	**Pond/Lake
B.C.	\$13.7 billion	\$3.6 billion	\$11.3 billion	\$8.4 billion	\$579.6 million
Alberta	\$39.67 billion	\$1.5 billion	\$18.9 billion	\$18.76	\$498 million
Canada	\$179.5 billion	\$10.95 billion	\$94 billion	\$61.2 billion	\$9.2 billion

Source: Author 2011

*Assumes 100% market penetration and **Average installation cost of \$25,000.

Pond/lake requires planning permission for non-lake/pond owners. Direct installations in Canada are valued at \$4.15 billion. In 2009, Canadian sales of residential geoexchange systems had reached \$220 million with accelerated growth between 2007 and 2008 that leveled off in 2009 (Figure 10). GHG savings are also understood to be significant (Table 13).

Figure 10 Total Sales – Residential Geothermal Heat Pump Systems in Canada



Source: Canadian GeoExchange Coalition 2010

Table 13 GHG Savings Potential across Canada

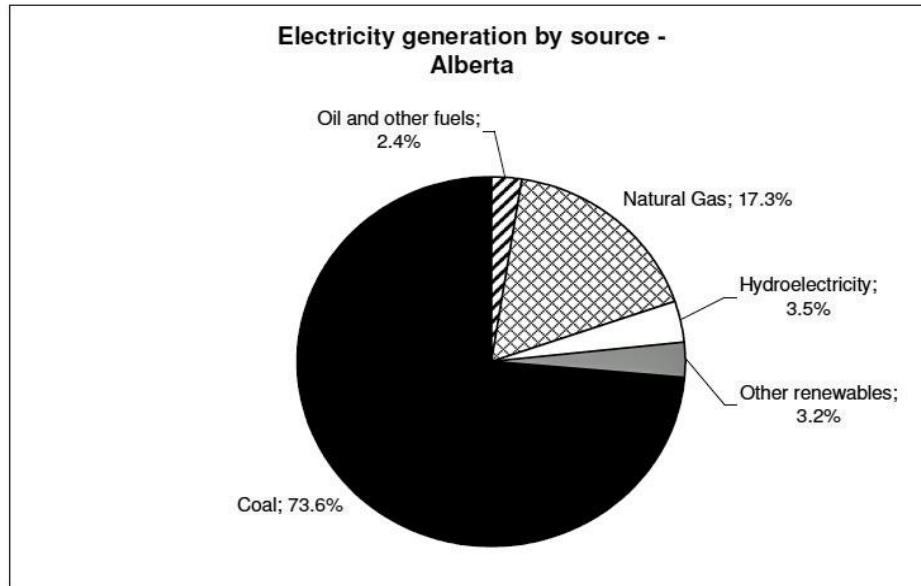
Province/Territory	GHG emissions (Mt eq. CO₂)	GHG emissions per capita (tons / inhab.)	GHG share from residential sector (%)	Total GHG contribution over Canada's emissions (%)
<i>Canada</i>	747	22.7	5.9	100
<i>Alberta</i>	245.7	70.7	3.7	33.2
<i>British Columbia</i>	63.1	14.4	7.0	8.5
<i>Prince Edward Island</i>	2.1	15.1	15.3	0.3
<i>Manitoba</i>	21.3	18	5.2	2.9
<i>New Brunswick</i>	18.7	24.9	3.9	2.5
<i>Nova Scotia</i>	20.6	22.1	5.8	2.8
<i>Ontario</i>	197.4	15.4	10.2	26.7
<i>Québec</i>	85.7	11.1	5.7	11.6
<i>Saskatchewan</i>	72	72.2	2.2	9.7
<i>Newfoundland/Labrador</i>	10.5	20.8	4.7	1.4
<i>Territories</i>	2.2	21.4	6.2	0.3

Source: Canadian GeoExchange Coalition 2010

2.9.3 Renewable Energy in Alberta

Alberta's electricity power generation, transmission, and retail distribution is municipality and privately owned. Therefore, the potential for greater IPP involvement exists when compared to a B.C. energy market monopolized by BC Hydro. In Alberta, coal is the top source of electrical power generation (Figure 11). The increased demand for renewable energy is a result of the government's environmental agenda and changes in industry best practice. The proliferation of IPPs to satisfy the demand for renewable energy power has provided environmental consulting and engineering firms with opportunities to diversify their services to meet market demands and remain competitive. Company Y has been successful in meeting such demands through its wind power environmental impact assessment service in B.C. and should be able to transfer that experience to the energy market in Alberta.

Figure 11 Electricity Generation by Source in Alberta



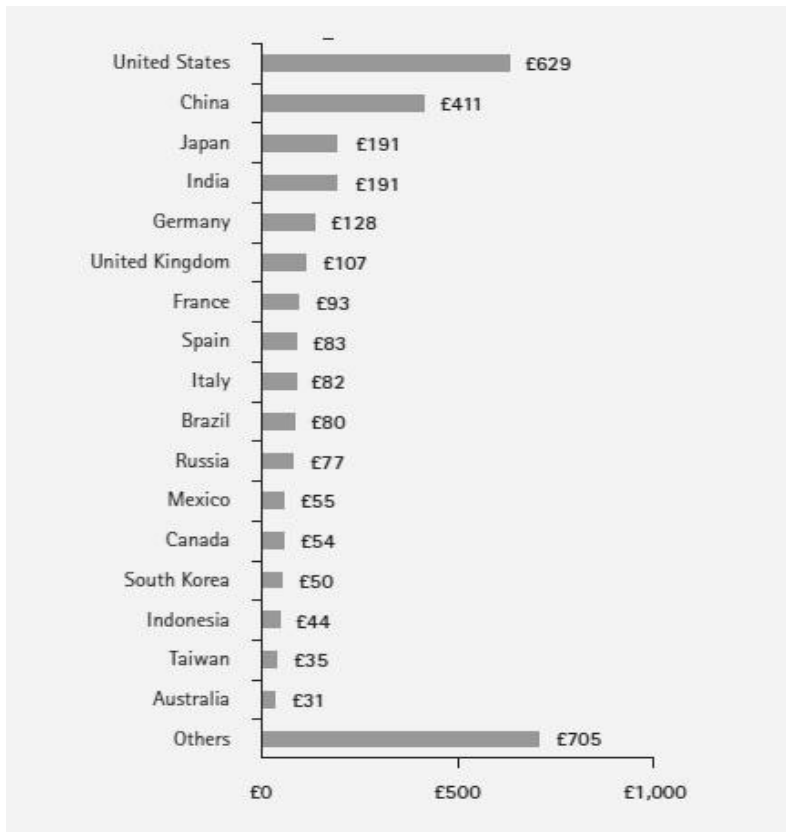
Source: Canadian GeoExchange Coalition 2010

2.9.4 The Carbon Offset Market

The Carbon Capture and Storage market potential is particularly high in the Canadian provinces of Alberta (70.7 tons/inhabitant) and Saskatchewan (72.2 tons/inhabitant) where GHG emissions per capita are significantly higher than the Canadian average of 22.7 tons per inhabitant. The introduction of the Carbon Capture and Storage Amendment Act 2010 provides a strong market opportunity for environmental consulting and engineering firms like Company Y.

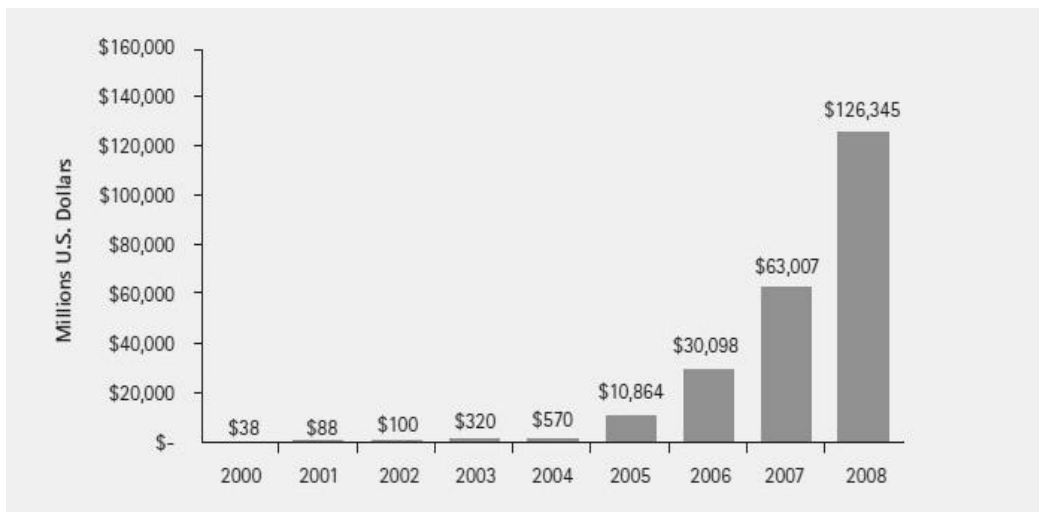
In 2009, the global low carbon environmental goods and services sub-sector (LCEGS) was valued at \$4.5 billion across national markets. The global carbon offset market with an annual growth rate of 176% was valued at \$128 billion in 2008 (Figures 12 and 13). Both markets offer opportunities for Company Y's carbon and energy efficiency service.

Figure 12 National Markets for LCEGS Sector



Source: ECO Canada 2010

Figure 13 Growth in the Global Carbon Offset Market



Source: ECO Canada 2010

In summary, a profound change in attitude across governments, businesses and individuals worldwide, triggered by climate change, represents a tipping point for an environmental sector with mature and growth market segments. The environmental industry is a moderately attractive one in which environmental consulting firms diversify to meet environmental market demands.

The demand for energy and heat efficiency, and climate change services is at a global, national and provincial level. In Canada, the single-dwelling residential retrofit market for geexchange systems is valued at \$179.5 billion with a 100% penetration rate, and the market is moderately competitive. In Alberta, the top three geexchange system installers captured 55.82% of the market and the top installer captured 27.91% of the market. In B.C. the top three installers captured 29.35% of the market. Unfortunately, financial incentives for residential geexchange systems are not available in Alberta or B.C., unlike in the rest of Canada where the average government funded incentive is \$9,000-\$10,000. The absence of residential incentives in some provinces is expected to slow buyer demand.

In 2008, the environmental consulting and other scientific and technical services industry generated revenue of \$4.2 billion, of which environmental consulting generated \$1.64 billion, an overall increase of 10.4% from 2007, and 32% of total revenue from all consulting services. In 2009, the global environmental services market was valued at \$228.5 billion, and by 2014, its predicted value is \$276.4 billion (DataMonitor, 2010).

In 2009, the global low carbon environmental goods and services sub-sector (LCEGS) was valued at \$4.5 billion across national markets. The global carbon offset market with an annual growth rate of 176% and valued at \$128 billion in 2008 offers opportunities for firms like Company Y willing to compete in this environmental sub-sector.

Company Y's existing client base in the resource heavy, carbon polluting industries like mining, and oil and gas present the firm with opportunities to offer niche services that will capture 100% of the value chain. Such a service would start with an environmental audit, site assessment, or feasibility study.

3: INTERNAL ANALYSIS

This section examines the Renewable Energy division's geexchange service and Company Y's resources, strategies and financial performance in further detail.

3.1 Where Company Y's Geexchange Service Adds Value

3.1.1 Geexchange Technology

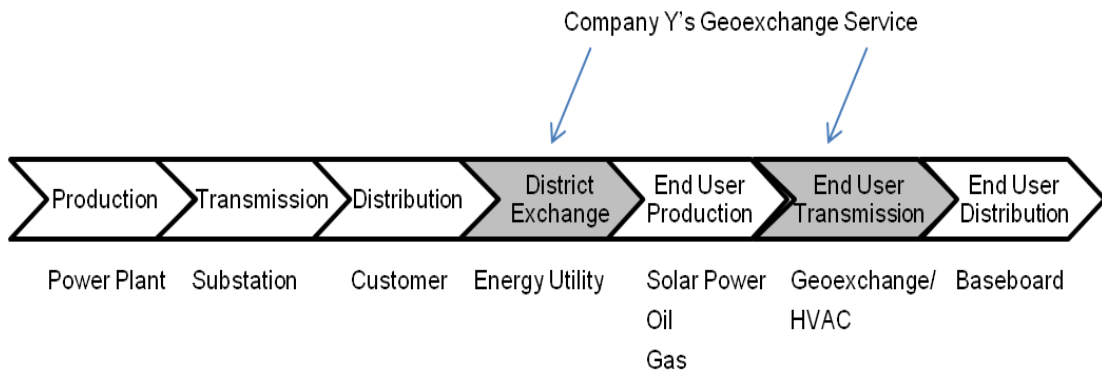
Geexchange is a relatively new, commercialized heat and energy efficiency technology that enables owners to use the ground's heating and cooling properties to heat and cool their property efficiently while reducing GHG emissions. Geexchange is also known as earth-coupled, earth energy, water-source heat pumps or ground source heat pumps. A system is comprised of three components: 1) a horizontal or vertical loop buried in the ground or in a nearby lake or pond that circulates a refrigerant to exchange heat with the ground or water; 2) a heat pump of three mechanical devices a compressor, a condenser and an evaporator, that moves hot or cold fluid between the building and the earth via the loop. The heat pump easily integrates with the building's existing distribution system; 3) the building's distribution system distributes hot or cold air through the building. Geexchange can also heat a property's water in isolation or in combination with other heating and cooling sources like solar.

According to the average geexchange company, high-efficiency geexchange systems are 48% more efficient than the most efficient gas furnaces and 75% more efficient than oil furnaces. They also outperform gas technology by 36% in the heating mode, and 43% in the cooling mode. Geexchange systems lower electricity demand, for example, replacing every district school conventional HVAC system over the next 10 years would produce an estimated \$11 billion in energy savings (Earthlinked, 2011). Geexchange also reduces GHG emissions with 650,000 installations being equivalent to removing 640,000 cars off the road and reducing reliance on 14 million barrels of crude oil per year. System maintenance costs are lower even in sub-arctic and arctic regions. Geexchange systems are aesthetically superior, and less prone to vandalism with no requirements for roof or landscape chillers, air handlers and other equipment.

3.1.2 The Renewable Energy Division's Georexchange Service

Company Y's Renewable Energy division is involved in the feasibility, design, and testing phases of residential and commercial retrofit georexchange projects. Company Y's client is the property owner in single-dwelling residential projects; in District Heating Schemes the project's developer; and, in new residential and commercial construction Company Y's client is the residential property owner, or the commercial property developer. However, the division's georexchange service covers only a small portion of the energy supply chain (Figure 15).

Figure 15 Company Y's Georexchange Service in the Energy Supply Chain



Source: Author 2011

The property developer's primary client is usually a full-service building design firm or the georexchange system installer. Either type of firm has the internal expertise in the form of CGC or LEED accredited resources that allow each firm to capture a larger percentage of total project fees (Figure 16).

Figure 16 A Design and Build Project Roadmap



Source: Author 2011

The Renewable Energy division also provides a review and stamp service that fulfils a municipality requirement for retrofit projects.

The fee structure for the Renewable Energy division's geoexchange services is:

1. District Heating Schemes generate a fee that is 5%-10% of the construction fee.
2. New construction either single or multiple dwelling residential or commercial generates a fee that is 5%-10% of the construction fee.
3. System retrofits on single or multiple dwelling residential or commercial properties generates a fee of \$2,000 for 15 hours work over 2-3 days.
4. A stamp and review service to fulfil a municipality requirement for retrofit projects generates a flat fee of \$2,000.

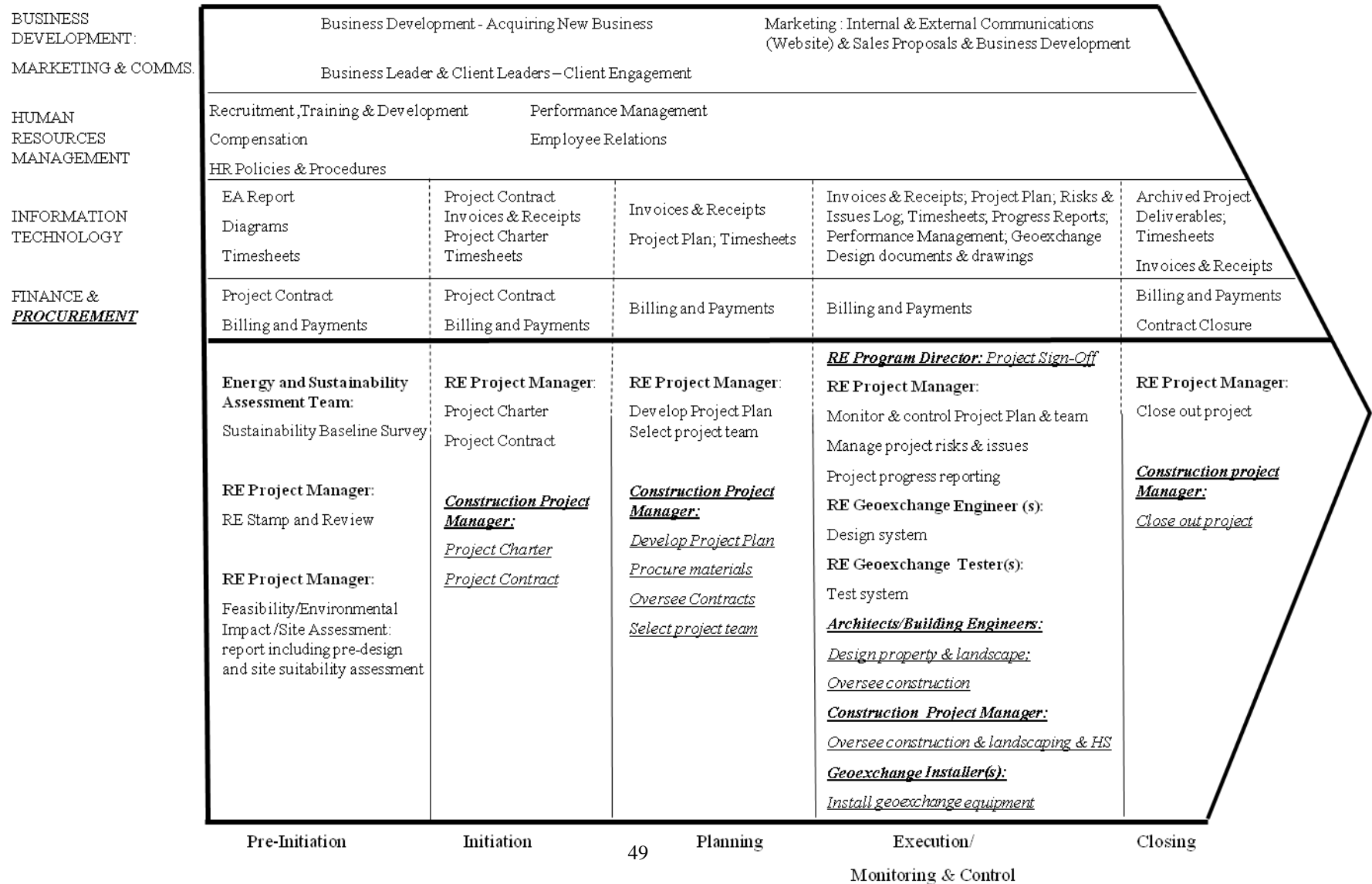
The Renewable Energy division averages just five geoexchange projects per year. Despite competing as a loss leader, the geoexchange service's growth rate is low with just one additional project every two years since 2002.

The division's projects are split 20:40:40 across residential, institutional, and commercial clients respectively. Since 2002, the project scope has increased and the division is involved in feasibility, design and test phases on larger projects that include District Heating Schemes.

This project has identified eight buyer segments (section 2.2.4), yet Company Y's fee structure only comprises four segments. The division has failed to adequately segment its market and identify niche opportunities.

In Figure 17 below, *in bold and italic*, are the areas where value added services are currently not provided by Company Y. The division could capture value across other project phases with access to additional internal resources.

Figure 17 Value Chain Analysis – The Renewable Energy Division's Geoexchange Service



Source: Adapted from Bus 607 class notes and Porter HBR, 2001

3.2 Company Y's Resources

3.2.1 Human Resources

The firm operates with a divisionalized structure along three lines of business that report directly into the CEO: 1) Corporate Services includes the support functions of Finance, HR, Marketing and Communications, and Development 2) Planning and Management comprises Ecology and Environmental Management 3) Environmental Sciences and Engineering comprises Geomatics, Infomatics, Engineering, Renewable Energy, Hydrogeology, Site Assessment, and Risk Assessment.

The firm has four office committees that support Health and Safety, the Environment, Social activities, and Project Management. Six centres of excellence (COE) in Engineering, Earth Sciences, Hydrogeology, Toxicology, Ecology and Planning also exist.

Company Y's divisionalized organization supports a general management function comprised of business and client leaders from each line of business with responsibility for resource management and executing business strategy that supports decentralized, informal decision-making, more customer focus and understanding, and, resource coordination and integration. However, if this general management team is weak, it can also create a series of siloed teams whose focus is one output, one industry and one client. The CEO conveyed that the firm's project management function is weak and that on occasions client leaders have been unwilling to share their clients. These observations coupled with the current organizational structure, suggests siloed resources. Although divisionalized organizations are adaptable, they are prone to task duplication, resource inefficiencies, and fail to capture economies of scale and scope.

A detailed analysis of the organization's structure is outside the scope of this project. However, the firm should consider whether restructuring the organization as a hybrid matrix-network would increase project and resource efficiency, time efficiency and adaptability. Any restructuring would only be successful if aligned with the organization's business strategies, and, the appropriate supporting systems, people and culture were in place.

3.2.1.1 Corporate Services

Corporate Services is comprised of four support functions: 1) Finance is responsible for financial reporting, invoicing and billing; 2) the human resources and corporate services function

is sub-divided into three divisions with: a) Human resources responsible for recruitment, training and development, compensation, performance management, employee relations, internal communications and human resources policies; b) Facilities and IT are responsible for the management of Company Y facilities and IT across Company Y's four offices; c) Administration is responsible for general administration across the organization; 3) Marketing and Communications is responsible for internal and external marketing and communications, business development, and sales proposals; 4) the Development division is responsible for acquiring new business for the company.

3.2.1.2 The Environmental Sciences and Engineering Divisions

The Environmental Sciences and Engineering (ES&E) line of business comprises eight divisions. Geomatics and Infomatics are responsible for computer-aided design (CAD) and geographical information systems (GIS). Engineering, Hydrogeology, Site Assessments 1, 2 and 3, and Risk Assessment are responsible for contaminated land, site remediation and risk assessment projects. The Environmental Sciences and Engineering line of business is supported by client designated leaders and technical experts.

The Renewable Energy division is responsible for the feasibility, design and testing of geexchange systems in design and build projects. The division is also involved in the feasibility, design and testing of projects with a solar power component.

3.2.1.3 The Planning and Management Divisions

The Planning and Management (P&M) line of business comprises five divisions. Ecology 1 and 2, and Environmental Management 1, 2 and 3 are responsible for assessment in environmental impact, ecology and socio-economics; and, First Nations strategy. The ES&E line of business is supported by client designated leaders and technical experts.

The planning and management divisions engage in eight primary services:

1. Environmental impact assessment (EIA) that includes wind energy projects, airport building construction, water treatment plants, mining, and transportation infrastructure
2. Strategic management advice on First Nations issues
3. Ecological assessment contributions to EIA projects; and, stand-alone ecological assessment and management projects

4. Socio-economic assessment contributions to EIA; and, stand-alone socio-economic assessment and management projects
5. Aquatic sciences assessment contributions to EIA projects; and, stand-alone aquatic assessment and management projects
6. First Nations consultation and training
7. Public consultation supporting EIA and stand-alone consultation projects
8. Energy and carbon management.

The environmental science and engineering divisions engage in six primary services:

1. Contaminated land - phase 1/2/3 environmental site assessment (ESA) and detailed site investigation
2. Engineering and contaminated land remediation
3. Human health and ecological risk assessments
4. Hydrogeology assessments and modeling
5. Renewable energy, geoexchange, and solar hot water
6. Geomatics, AutoCAD, and Geographical Information Systems (GIS).

Two secondary services include:

7. Phase I ESAs, Due Diligence, Litigation Support
8. CSAP reviews.

3.2.2 Financial Resources

Company Y is a privately owned company and beyond general revenue performance data, financial statement data was unavailable.

3.2.3 Physical Assets

Company Y rents office space in Vancouver, Burnaby, Victoria and Alberta. Company Y owns its office equipment, and information technology hardware and software resources partially outsourced to a Third Party provider support the firm's primary and secondary functions.

3.2.4 Technological Assets

Company Y does not own any technological assets.

3.2.5 Strategic Assets

Strategic assets are resources and capabilities that not only create a competitive advantage, are also unique, sustainable and transferable across the firm, in other markets or in other countries (replicable). A sustainable competitive advantage results from unique firm specific resources and capabilities applied to well-defined activities in ways that are difficult to imitate and immune to appropriation by others (Boardman, Shapiro, and Vining, 2004).

Company Y's competitive advantage is price, a competitive advantage that is easy to imitate and therefore, unsustainable. Company Y's consultants that "go the extra mile to meet client needs without charge" are Company Y's strategic assets. Although, Company Y's competitive advantage is unsustainable, its consultants are unique, transferable across the firm, other markets and countries, but they are only strategic assets if they can also help the firm to leverage its competitive advantage to grow. Company Y could gain a strategic competitive advantage by using strategic assets to create differentiated products and services that are not price sensitive. Company Y can only increase its profit margin by increasing client willingness to pay and decreasing operating costs.

3.3 Company Y's Current Strategies

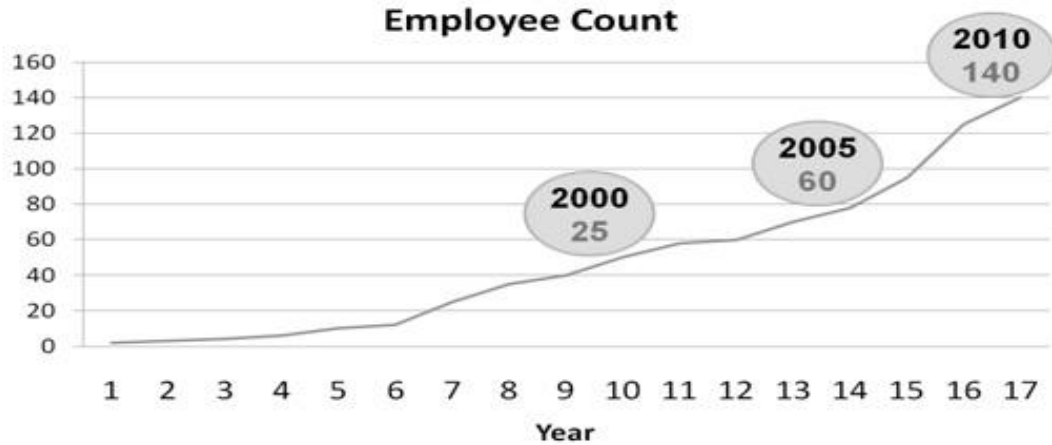
3.3.1 Current Corporate Strategy

Company Y has grown its employee numbers at an average annual rate of 46% over the past 10 years to reach and then surpass a target employee headcount of 140 (Figure 18). Such a people-focused strategy risks incurring high overhead costs. With a current average billable rate of 70% per employee, 18 unbillable staff, and for the past three years, a failure to meet the firm's strategic goal of a 13% profit margin, this strategy may be unsustainable.

Company Y's services in B.C. and Alberta help both public and private sector clients meet their environmental obligations under federal, provincial and municipal government legislation, regulations and programs, as well as meet industry standards, regulations and best practice. Each line of business offers a broad range of vertically integrated services and positions itself as a cost leader. The company has grown organically through a combination of service

development and market penetration, but has also diversified into new environmental sectors that include heat savings and energy efficiency with its geexchange, and energy and carbon services.

Figure 18 Company Y's Headcount Growth



Source: Company Y 2011

3.3.2 Services and Customers (Positioning Strategy)

Company Y is a service-oriented firm that sells a few services to many different customer segments. As markets mature, a new service will cycle through diversification, market development, and market penetration. Company Y's geexchange service was originally a diversified offering that has now cycled through to market penetration (Figure 19).

Figure 19 Company Y's Positioning Strategy

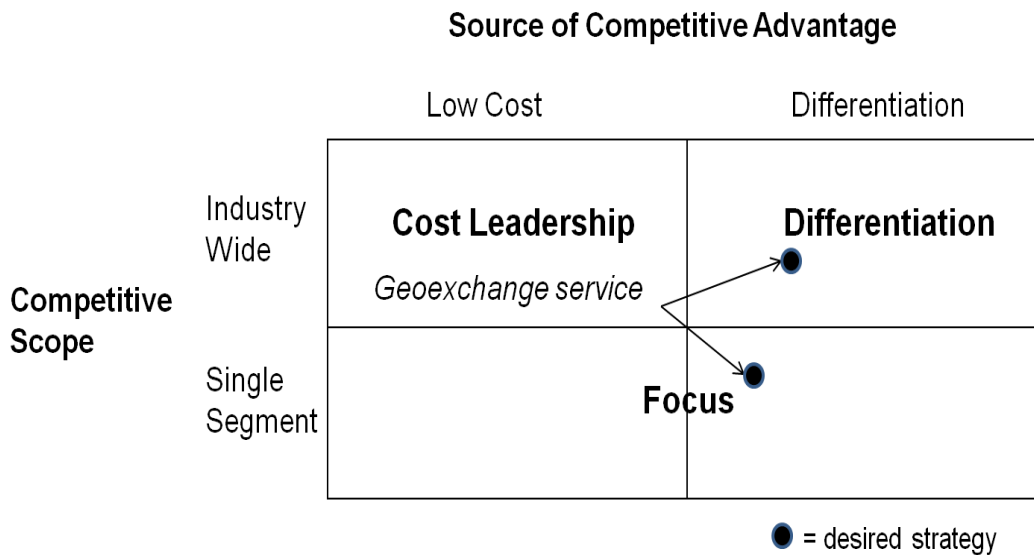
		Service/Product	
		Existing	New
Market	Existing	Market penetration <i>EIA; ESA & Remediation</i> <i>Geexchange service</i>	Service/Product Development
	New	Market Development	Diversification

Source: Porter, M.E., *Competitive Strategy*, The Free Press, 1980.

3.3.3 Competitive Strategy

Industry incumbents are involved in competitive bidding with public sector contracts usually awarded to the lowest priced bidder.. However, within the private sector, the bidder with solid technical experience and a fair price wins the contract. Incumbents can compete by differentiating their service. Company Y’s georexchange service competes as a cost leader although ideally the division should adopt a differentiation or focus strategy to increase the division’s revenue (Figure 20).

Figure 20 Company Y’s Competitive Strategy



Source: Porter, M.E., *Competitive Strategy*, The Free Press, 1980.

3.3.4 Functional Strategy

Company Y is the primary contractor on the majority of its projects. However, on georexchange projects, Company Y’s Renewable Energy division is a sub-contractor to the primary contractor, a role that captures only a small percentage of total available project revenue. Typically, the georexchange system installer is a sub-contractor of the Renewable Energy division or the primary contractor. Ideally, if Company Y had sufficient internal resources it would consistently be the primary contractor and the project manager on both large-scale and small-scale projects, a role that would allow the firm to capture a higher percentage of total project revenue.

3.3.5 Strategic Fit

Although Company Y's current corporate strategy, positioning, competitive stance and functional strategies reinforce one another through alignment, there are opportunities for the firm and the Renewable Energy division to increase revenues by changing their business strategies. Instead of competing as a cost leader, the division should compete with a differentiated focus strategy to drive up its revenues.

3.3.6 Corporate Social Responsibility

The goal of any company is to create shareholder value in a socially responsible manner. Being socially responsible means that an individual or firm while maximizing economic profit within the rules of the game, and without deception or fraud does not contribute to a socially inefficient outcome in which social cost is not equal to social benefit (Friedman, 1970). Firms that earn economic profits consistently over time have a sustainable (economic, social and environment) competitive advantage.

Firms that introduce corporate social responsibility (CSR) into their business model are proactive about their responsibilities to non-shareholder stakeholders that include the environment, suppliers, employees and community. Sustainable management considers its impact on the environment and on society in general, while maintaining financial profitability (Nguyen and Slater, 2010). Sustainability is one of Company Y's core values, and the firm has made a commitment to report, using the G3 Guidelines of the Global Initiative (GRI), on an annual basis the firm's performance in each of the areas of economics, environment, employee commuting, consumables, electronic waste disposal, solid waste management, labour and community.

Introducing CSR into a firm's business model has the potential to increase revenue using a favourable CSR reputation to attract clients, and increase profits through process improvements that decrease a firm's costs. However, a firm that introduces CSR also increases its transaction costs and risks creating a backroom and front room that needs to be controlled. Indeed, Company Y already has one: Gender Distribution. Although 51% of employees are female, only 17.7% are in the management group, a level significantly below that required to substantiate Company Y's CSR statement that its gender distribution is balanced.

3.4 An Analysis of Financial Performance

3.4.1 The Renewable Energy Division's Geoexchange Service

The Renewable Energy division's financial performance in 2010 illustrates that three employees failed to meet their billable target rates. Two employees, Director 1, and Senior - employee 2 were below their target billable rates of 60% and 70% respectively, and each incurred an operating loss. Mid-employee 3 was below his/her target billable rate of 70%, but incurred an operating profit. Mid-employee 1 was above his/her target billable rate of 70%, but incurred an operating loss. Despite the division's underperformance, its operating profit was \$132,500 (Table 14).

*Table 14 The Renewable Energy Division's Financial Performance 2010**

Employee Position	Total Revenue/Year (\$)	Total Operating Cost/Year includes training (\$)	Gross Operating Profit (Loss) (\$)	Target Chargeout Rate/Hr (\$) versus est. Actual Average Chargeout Rate/Hour (\$)	Billable Project Hrs/Yr (1950 hrs/year)
Director 1	96k	104k	(8k)	140-190 vs 106	46.38% (60% target)
Mid Employee 1	73k	74k	(1k)	115 vs 49	77% (70% target)
Mid Employee 2	128.5k	67k	61.5k	100 vs 83	79.6% (70% target)
Mid Employee 3	92k	78k	14k	95 vs 71	66.7% (70% target)
Junior Employee 1	104k	53k	51k	90 vs 68	79% (70% target)
Senior Employee 1	115k	92k	23k	135 vs 82	72.4% (70% target)
Senior Employee 2	65k	73k	(8k)	120 vs 83	40% (70% target)
Totals	673.5k	541k	132.5k		

*Source: Author 2011 using data sourced from Company Y 201. *Shaded areas illustrate underperformance.*

In 2010, employee chargeout rates across the division were between \$66/hr and \$17/hr below target chargeout rates. Although the division competes as a cost leader, and chargeout rates are deliberately low, by adopting such a strategy the division risks incurring future operating losses.

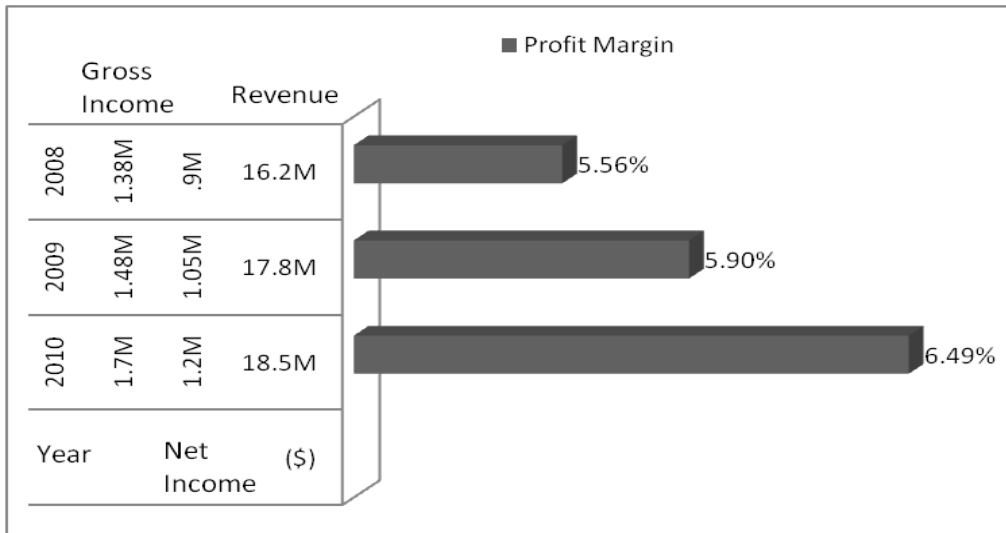
Although the division compete as a cost leader, low chargeout rates coupled with below target billable rates, signify a low demand for the Renewable Energy division’s services. The division’s market penetration rate is low.

This low demand is also apparent in 2011 year to date March 2011 performance data. The Renewable Energy division’s revenue from all project types is \$71,400, labour costs are \$52,000, and total operating costs extrapolated from 2010 are \$129,519. Therefore, other operating costs are \$77,519. In conclusion, the Renewable Energy division’s March 2011 year to date operating loss is \$58,119.

3.4.2 Company Y’s Financial Performance

Company Y is a people- focused and values-based firm of 150 employees. The firm has failed to meet its strategic goal of 13% annual profit margin for the past three years (Figure 21).

Figure 21 Company Y’s Revenue versus Profit Margin 2008-2010



Source: Author 2011 using data sourced from Company Y

In 2010, the P&M line of business's gross margin was 27.42% with 39 staff and an average billable rate of 72%. The ES&E line of business gross margin was 12.5% with 75 staff and an average billable rate of 69%. Corporate services accounted for 18 unbillable staff (Table 15).

If productivity is fees per of staff, within the ES&E line of business the average 2010 productivity level was \$128,000. Within the P&M line of business, the average 2010 productivity level was \$158,974. The average rate across both lines of business for all staff was \$162,280 in 2010 with 114 staff, and \$185,417 in 2009 with 96 staff. These results indicate that the addition of staff to the firm's P&M and ES&E lines of business decreased the firm's average productivity levels between 2009 and 2010 (Table 15).

Table 15 Company Y's P&M, ES&E, and Renewable Energy Division Performance 2010

Line of Business/Division	Gross Margin	# Staff	Average Billable Rate (Target is	Average Productivity = Fees/# Staff
P&M	27.42%	39	72%	\$158,974
ES&E	12.5%	75	69%	\$128,000
Renewable Energy	19.67%	7	65.9%	\$96, 214

Source: Author 2011 using data sourced from Company Y

The P&M line of business outperforms the ES&E line of business, and the Renewable Energy division across all financial performance measures while exceeding the firm's targets. Although the Renewable Energy division's gross margin of 19.67% is higher than the other ES&E divisions combined, the average billable rate and productivity are lower than either P&M or ES&E.

In summary, the Renewable Energy division competes in the heat savings and energy efficiency sector, which is a growth environmental sub-sector. Despite this, the division's 2010 performance raises several concerns. Although the division recorded a gross margin of 19.67%,

it failed to meet performance targets in billable rates. The firm also underperformed against the P&M and ES&E lines of business on productivity per employee.

The Renewable Energy division competes as a cost leader, but a low buyer demand indicates that the division is now at risk of continuing to incur additional operating losses. Year to date figures for March 2011 indicate that the Renewable Energy division's operating loss is \$58,119.

Although Company Y's current corporate strategy, positioning, competitive stance and functional strategies reinforce one another through alignment, there are opportunities for the firm and the Renewable Energy division to increase revenues by changing the firm's strategies.

Instead of competing as a cost leader, the firm and the division should consider competing with a differentiated focus strategy to drive up firm revenue. However, Company Y can only increase its profit margin by increasing client willingness to pay and decreasing operating costs.

4: COMPANY Y: AN ASSESSMENT OF THE PRESENT SITUATION

The environmental consulting industry is moderately attractive, competitive and highly dependent on federal, provincial and municipal government policy, regulation, legislation and programs to drive it. Client industry standards, regulations and best practice also influence the sector. A series of government and industry level initiatives currently drive demand for green environmental goods and services, the sector's strongest economic growth area.

Company Y is a full-service environmental and engineering consultancy cost leader with a client base in British Columbia and Alberta. Renewable energy, heat savings and energy efficiency initiatives that reduce GHG emissions and climate change impact are industry growth areas. Despite this, Company Y's Renewable Energy division operates at a loss. The firm's CEO, concerned about the division's revenue, has questioned its future profitability in the renewable energy market.

The Renewable Energy division offers a geoexchange service of feasibility, design and testing that captures only 5%-10% of project revenue. The division is not only constrained by internal resources, it competes in an environmental growth sector against experienced, full-service and specialized incumbents. The Renewable Energy division's geoexchange service has diversified Company Y away from its core competencies in EIA and ESA. To build the service to a level that captures a significant proportion of geoexchange project revenue would require a significant investment.

In 2010, the Canadian GeoExchange Coalition valued geoexchange residential retrofit sales in Canada at \$220 million, and with a potential single-dwelling residential retrofit market of \$179.5 billion (based on 100% market penetration); geoexchange is an attractive and lucrative market.

However, the average residential geoexchange system retrofit costs \$25,000 and with future electrical rate increases planned, particularly in B.C, residential property owners are reluctant to invest in a geoexchange system if higher electrical rates negate potential operating cost savings. In B.C. and Alberta, no residential financial assistance is available. BC Hydro has chosen not to promote or incentivize single or multiple-dwelling residential retrofit and new

residential construction projects because the technology fails BC Hydro's total resource cost test parameters of conservation and demand management. In contrast, financial incentives are available under the ecoEnergy Retrofit Homes program managed by Natural Resources Canada. Residential owners in Ontario, Quebec, Saskatchewan and Manitoba receive up to 40% of geexchange costs.

Although the residential Canadian geexchange market has grown 40% annually in 2004 and 2005, 60% in 2006, 2007 and 2008, and 65% in 2009, a rise that correlates with increased fossil fuel costs, conflicting reports about the energy efficiency, GHG benefits, and potential environmental impacts of geexchange systems have contributed to buyer uncertainty (Canadian GeoExchange Coalition, 2010).

Currently underway is a project cosponsored by BC Hydro, Fortis Energy BC, the City of Vancouver and Natural Resources Canada that evaluates the claimed energy efficiencies, and GHG reductions set out by the Canadian GeoExchange Coalition in several of their publications. Project manager GeoExchange BC's conclusions should provide future direction to the geexchange industry in Canada. Until the report's publication in May 2011, BC Hydro provide sole indirect sponsorship to geexchange projects for the Institutional, Commercial and Industrial (ICI) sector through their High Performance Building program; and, Natural Resources Canada support residential geexchange through their ecoEnergy program. In conclusion, without BC Hydro's support the residential single-dwelling retrofit and new construction market in B.C. is unlikely to grow. Therefore, the future direction of the geexchange market in Canada is uncertain until the publication of the Phase I project report findings.

Environmental Consulting and Engineering firms who maintain an impartial stance are highly regarded in the industry. However, two senior employees of Company Y's Renewable Energy division sit on GeoExchange BC's Board of Directors. Company Y excluded from the project selection phase of the BC Hydro Phase I Energy Performance Evaluation project because of this conflict of interest, lost an opportunity to one of its primary competitors, to gain invaluable geexchange project experience. In addition, new or existing clients seeking impartial environmental advice may believe their quality of service compromised and question Company Y's integrity. Integrity and accountability are Company Y's core values, and so this conflict of interest may continue to lead to both internal and external repercussions for Company Y.

Maintaining the status quo of the Renewable Energy division's geexchange service is likely to lead to continued losses for the division in 2011 while the conflict of interest described earlier could, over the long-term, harm Company Y's brand and damage other revenue streams.

Figure 22 illustrates Company Y's dilemma. The division's geoexchange service occupies the low market growth and relative low market share or the 'dog' quadrant of the Boston Consulting Group's (BCG) growth share matrix. Although the heat savings and energy efficiency market is a growth one, with an uncertain geoexchange market, and buyer reluctance, the growth rate is likely to decline over the next three years within the residential sector, with only some growth expected in the ICI sector. These external factors combined are likely to lower this environmental sector's growth rate and may push the sector into decline.

Company Y's geoexchange service has diversified the firm to compete in an environmental sub-sector that is beyond the firm's core competencies and positions Company Y's renewable energy division as a cost leader in a highly competitive market space occupied by experienced incumbents.

Although the Renewable Energy division competes as a cost leader, a low buyer demand for its services, and a low productivity rate per employee, illustrates that the division faces significant challenges. Year to date figures for March 2011 show that the Renewable Energy division's revenue is \$71,400, labour costs are \$52,000 and other operating costs are \$77,519, which means that the Renewable Energy division's current 2011 year to date operating loss is \$58,119.

Company Y's current corporate strategy, positioning, competitive stance and functional strategies reinforce one another through alignment, but there are opportunities for the firm and the Renewable Energy division to increase revenues by changing strategy. Instead of competing as a cost leader, the division should consider competing with a differentiated focus strategy to drive up firm revenue. However, Company Y can only increase its profit margin by increasing client willingness to pay and decreasing operating costs.

In conclusion, Company Y should change its corporate and business level strategies if it wishes to improve performance and remain profitable. Maintaining the status quo will ensure that profit margins continue to be significantly below target, and that the Renewable Energy division will continue to underperform, and operate at a loss.

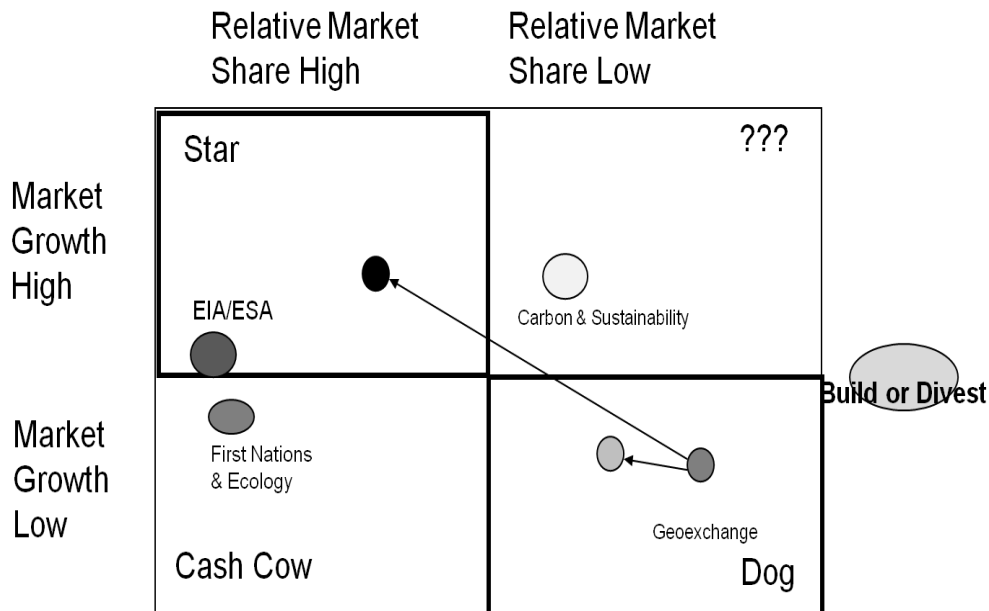
Moving ahead, Company Y should respond to the demands of the environmental sector's growth areas of carbon and climate change mitigation, heat and energy efficiency, green buildings, and, renewable energy resource management. The firm should position itself to serve niche market growth areas derived from the firm's core and complementary services in remediation, EIA and ESA. Company Y should target potential buyers that fall under specific

market segments (2.2.4). Such buyers are likely to operate in heavily regulated industry sectors like oil and gas, or wish to improve their CSR. Diversifying into a strongly competitive geoexchange market has proven to be a significant challenge, and the division currently operates at a loss.

Company Y’s competitors pose a significant threat to the firm not only in the heat and energy efficiency sector, but also in the firm’s core offerings of EIA, ESA and remediation. It is critical that Company Y positions itself with the right corporate and business level strategies to remain competitive and to ensure that the firm’s services are in the ‘Star’ and ‘??’ quadrants (Figure 22).

Therefore, as a starting point, Company Y should decide whether to: 1) divest or invest in the Renewable Energy’s geoexchange service 2) release underperforming employees from the Renewable Energy division 3) conduct a review of each division’s financial performance to identify and analyze areas of underperformance. Divesting or downsizing just one division will not resolve Company Y’s other performance and profitability issues over the long-term. In conclusion, the firm needs to plan and execute a strategy for change that will improve the firm’s performance, profitability and secure a sustainable competitive advantage for each service.

Figure 22 Company Y’s Future Direction – Boston Consulting Group Growth Share Matrix, 1970



Adapted from Boston Consulting Group Growth Share Matrix, 1970

● = current position ● = desired position
 ○ = expected position

5: STRATEGIC OPPORTUNITIES AVAILABLE TO COMPANY Y

Canadian-owned environmental consulting and engineering firms like Company Y compete as cost leaders in a monopolistically competitive market strongly influenced by government policy, economic factors and industry best practice. Larger, multi-national firms and smaller niche players all vie for a share of the environmental sector's growth areas collectively known as the green economy. This trend leaves Company Y with several revenue growth challenges and some difficult strategic choices to make.

Competing solely on low price is an unsustainable option that lowers profit margins for all firms. To remain competitive, Company Y needs to be more aggressive in setting and achieving its corporate strategic goal and business objectives. Although competing on service differentiation is not an option on public sector bids, the firm could adopt a differentiated focus strategy on private sector bids.

Company Y's Renewable Energy division's geexchange service has diversified the firm away from its core competencies. This growth strategy has failed to meet target expectations for a Renewable Energy division that competes as a cost leader in a heat and energy efficiency environmental sub-sector growth market against experienced incumbents. The division currently operates at a loss.

Maintaining the status quo puts the firm at risk of becoming unprofitable, unresponsive, inefficient, inflexible, and unsustainable.

Therefore, section 5.1 presents several strategic alternatives to the status quo.

5.1 Strategic Alternatives

5.1.1 Strategy #1: Maintain the Status Quo

In 2010, the Renewable Energy division failed to meet target expectations on billable rate and employee productivity despite a gross margin of 19.7%. The division's 2011 year to date revenue is \$71,400, operating costs are \$129, 519 and so the division is operating at a loss of \$58,119.

Additionally, Company Y's Renewable Energy director and a senior employee were in a conflict of interest position that restricted the firm's participation in BC Hydro's Phase I geoechange project. Therefore, new or existing clients seeking impartial environmental advice may believe their quality of service compromised, and question Company Y's integrity. This conflict of interest could have wider and longer-term implications for Company Y.

Maintaining the status quo will ensure that the division continues to underperform.

5.1.2 Strategy #2: Expand the Renewable Energy Division's Capabilities Accompanied by an Expansion into Niche Markets

Company Y lacks the necessary CGC accreditation, and project experience to provide a full-service specialized geoechange service that enables the firm to capture the build project phase or installation. The addition of a CGC accredited employee and attaining CGC firm certification would increase the division's likelihood of capturing revenue on this phase of the project.

Company Y also lacks in-house LEED accredited resources to provide a LEED green building design service that would allow the firm to capture the feasibility, plan, design, build and test project phases on a green building project with heat and energy efficiency, including geoechange and solar components. The recruitment of experienced LEED-accredited resources would increase the division's likelihood of being awarded a green building project that has a wider scope, including single-dwelling, and multiple-dwelling residential, ICI and District Heating Schemes.

Competing as a cost leader has proven to be an unsuccessful strategy for the Renewable Energy division. The division should consider competing with a differentiated focus strategy to drive up revenue in niche markets. However, Company Y can only increase its profit margin by increasing client willingness to pay and decreasing operating costs.

5.1.3 Strategy #3: Cease the Renewable Energy Division's Geoechange Service

Since 2002, the division on average added just one project every one or two years, and in 2010, completed work on five geoechange projects. The division also underperformed on billable rates and productivity, and is currently operating at a loss of \$58, 119.

Ceasing the division's geoechange service would free-up internal resources for re-allocation to other divisions or when re-allocation is not possible or is unproductive would reduce the firm's headcount and annual labour costs.

5.1.4 Strategy # 4: Downsize the Renewable Energy Division and Company Y's Unbillable Resources

In 2010, three out of seven Renewable Energy division employees failed to meet their billable rate performance targets. The division was also the least productive across the ES&E divisions combined, and the P&M line of business. Although the division competes as a cost leader, low chargeout rates coupled with below target billable rates, signify a low demand for the Renewable Energy division's services. The division's cost leadership stance has failed to penetrate the market.

Corporate Services consists of 18 unbillable employees and the firm should consider reducing the number of unbillable employees, and underperforming employees across other divisions to minimize the firm's annual labour costs.

5.1.5 Strategy # 5: Expand the Georexchange Service by Acquisition or Partnership

Company Y could expand its Renewable Energy division through partnerships with firms that capture just the build phase of a georexchange project, such as the georexchange installer, or a full-service georexchange firm or firms that capture a relatively high share of the green building market, such as LEED architects and planners.

Company Y could expand by acquiring a CGC-certified company that has a solid client base and is experienced across the full georexchange value chain. An acquisition would also increase Company Y's market share and client base, and offer a window of opportunity into other industry sectors that wish to increase their environmental compliance.

Alternatively, Company Y could acquire a small, reputable firm of LEED accredited architects and planners. Such an acquisition would add a LEED green building design service to Company Y's portfolio and instantly increase the firm's market share and client base.

5.2 Possible Future Scenarios

5.2.1 Worst-Case Scenario

The worst-case scenario for Company Y is a heating and energy efficiency sector that prefers no environmental consultant involvement across any of the bid, feasibility, plan, design, build, test and monitor phases of georexchange retrofit and new construction projects.

This scenario is most likely to happen with a buyer who has no environmental obligations associated with a project or would prefer to use a non-environmental consulting firm. Typically, the project type would be a single-dwelling retrofit or new construction with a full-service geexchange specialist firm as the sole service provider. On larger projects such as a multiple-dwelling or ICI retrofit or new construction or District Heating, the full-service building design firm is the primary service provider, and geexchange is just one component in a green building project.

5.2.2 Best-Case Scenario

The best-case scenario for Company Y is a heating and energy efficiency sector that prefers the environmental consultants to be the primary supplier on bid, feasibility, plan, design, build, test, and monitor phases of geexchange retrofit and new construction projects.

On single-dwelling retrofit and new construction projects, the environmental consultant would also be the project manager and responsible for all project phases. The project manager sub-contracts some or all of the project phases to a full-service geexchange specialist.

This scenario is most likely to happen with a) a buyer who must comply with their environmental obligations, or b) who wishes to go beyond the regulatory framework, or c) is voluntarily compliant, or d) with deep pockets.

On multiple-dwelling and ICI retrofit or new construction or District Heating Scheme projects the environmental consultant, as the project manager, would sub-contract some or all of the project work to a full-service building design firm.

5.2.3 Most Likely Scenario

The most-likely case scenario for Company Y is a heating and energy efficiency sector that prefers the environmental consultants to be the primary supplier on two or three components of the bid, feasibility, plan, design, build, test, and monitor phases of small retrofit and new construction projects. These phases are most likely to be feasibility and testing. On larger projects such as a multiple-dwelling or ICI retrofit or new construction or District Heating, the environmental consultants may be involved in the feasibility and testing phases, but the majority of the project work is split between the full-service building design firm and the geexchange installer, especially on green building projects.

5.3 Evaluation Criteria Based on Company Y's Critical Success Factors

Company Y's weighted goals were derived from company documents, and conversations held with the firm's CEO, and used to evaluate the strategic alternatives identified in section 5.1 (Table 16).

5.3.1 Current Mission, Vision and Values

Company Y's mission is to create opportunities for clients, and its employees. Company Y's vision is to be the employer of choice for employees of choice.

'The Company Y Way' is the company's mantra, a "secret sauce" and an extended version of the firm's value statement. The company believes that working the 'Company Y Way' of people-based, business-focused, values-driven and performance excellence gives them a competitive advantage. Their way is the "secret sauce" of who the organization is, and employees must embrace and live by it.

5.3.2 Critical Success Factors

Company Y's critical success factors or goals are:

- Client Relations: Proactively working together and striving to understand different perspectives by being respectful of the firm's clients and employees.
- Leadership: Clear and accountable, acknowledging the trust that clients and employee teams have to deliver the right solutions.
- Expertise: Demonstrating expertise through technical excellence and continuous improvement; being innovative.
- People: Allocating resources in a timely manner ensuring the right people are in the right roles at the right time.
- Profitability: Delivering on client commitments and ensuring sustainable financial health.

Table 16 Company Y's Weighted Goals

Goal	Short Term	Long Term	Average Weight
Client Relations	20%	25%	22.5%
Leadership	20%	25%	22.5%
Expertise	20%	20%	20%
People	25%	10%	17.5%
Profitability	15%	20%	17.5%

Adapted from Company Y 2011

Company Y's values where appropriate, applied to the strategic alternatives and scenario analysis (Sections 5.4, 5.5. and 5.6) include:

- **Respect:** Working together and understanding different perspectives and needs – across clients, partners and employees.
- **Integrity:** Always deliver on Company Y commitments.
- **Accountability:** Company Y holds itself accountable, and acknowledges the trust that clients and its employees have placed in the firm to deliver the right solutions.
- **Sustainability:** Strive for solutions that address client needs, business objectives and principles of sustainability (economic, social and environment).
- **Innovation:** Identifying better ways to do things and strive for continual improvement.
- **Responsiveness:** Opportunity focused quick to react, and eager to support Company Y's teams and their clients.
- **Adaptability:** Responding to changing economic and regulatory conditions that impact Company Y's clients and industry.

Company Y also believes that its growth is constrained by a combination of finances, finding the right people with the right skills to lead the firm into new sectors, and underperforming employees.

5.4 Analysis of Strategic Alternatives

5.4.1 Analysis of Strategy #1: Maintain the Status Quo

In 2010, despite a gross margin of 19.7%, the division underperformed on target billable rates with three employees below their target rates; and, the division's productivity level was less than the firm's P&M line of business, and other ES&E divisions combined.

The Renewable Energy division's year to date 2011 operating loss is \$58,119. Although the division competes as a cost leader, a low buyer demand indicates that the division is now at risk of continuing to incur additional operating losses through 2011. Such operating losses will influence Company Y's ability to meet its strategic goal of a 13% profit margin.

Company Y has a reputation for giving impartial advice. Although the Renewable Energy division's conflict of interest does not violate any of the firm's core values, it could have wider and longer-term implications for Company Y. Despite the firm's promise to be accountable for delivering the rights solutions, new or existing clients seeking impartial environmental advice may believe their quality of service compromised, and given the division's degree of focus on geoexchange, question the firm's integrity.

In conclusion, maintaining the status quo is not a viable short or long-term strategy for the Renewable Energy division.

5.4.2 Analysis of Strategy #2: Expand the Renewable Energy Division's Capabilities Accompanied by an Expansion into Niche Markets

Assuming that sufficient internal capabilities now exist, Company Y would be able to offer full-service geoexchange and/or LEED green building design service where geoexchange would be just one of several heat and energy efficiency options.

The division's expanded services would exist as a stand-alone offering, or be vertically integrated with Company Y's contaminated land site assessment, remediation, or energy and carbon services, on new construction or existing property projects.

This resource expansion accompanied by a departure from a cost leadership to a differentiated focus strategy would increase the division's revenue, but may increase operating costs in the short-term with the absence of scale economies.

An expanded Renewable Energy division would be capable of competing against experienced incumbents in the green building sector. However, a slow economic recovery, near

zero growth in the construction industry, and an uncertain geoexchange market means that external factors will influence the Renewable Energy division's ability to increase its revenue through 2011 and 2012.

Adopting an expansion and a differentiated focus strategy would improve the division's likelihood of contributing to Company Y's expertise and profitability goals. However, the division still needs to adapt to an uncertain market while offering innovative niche solutions.

5.4.3 Analysis of Strategy #3: Cease the Renewable Energy Division's Geoexchange Service

In 2010, the Renewable Energy division underperformed on its billable rate and productivity targets. Year to date operating losses are currently at \$58,119.

In Canada, the single-dwelling residential geoexchange is a growth market that is valued at \$179.5 billion, but accounts for only 20% of the division's current revenue. Residential buyer reliance on government financial incentives for retrofit geoexchange, such as those provided through the ecoEnergy program, offer a short-term window of opportunity for the Renewable Energy division, but only in markets outside of B.C. and Alberta.

Although the ICI sector in B.C. supported by key energy and government stakeholders through BC Hydro's High Performance Building program accounts for 80% of the Renewable Energy division's current project load, until the publication of the BC Hydro – GeoExchange BC Phase I report in May 2011, the future of the Canadian geoexchange market remains uncertain.

In addition, a slow economic recovery, near zero growth in the construction industry, and an uncertain geoexchange market means that external factors will influence the Renewable Energy's ability to increase its revenue through 2011.

Therefore, ceasing the division's geoexchange service would free-up internal resources for re-allocation to other divisions or when re-allocation is not possible or is unprofitable would reduce the firm's headcount and annual labour costs by approximately \$270,400. Such a strategy would contribute to Company Y's profitability goal.

5.4.4 Analysis of Strategy # 4: Downsize the Renewable Energy Division and Company Y's Unbillable Resources

The Renewable Energy division, if downsized to two or three employees, would provide Company Y with a small presence in the heat and energy efficiency market. A downsized, re-positioned division would provide Company Y with a small, but profitable and important

presence in the heat and energy efficiency market. Reducing the headcount of underperforming employees where re-allocation was not possible or productive would reduce the firm's annual labour costs by approximately \$120,000. A re-brand combined with a niche marketing strategy would increase the division's market penetration rate, and increase revenue and operating profit.

The division still has to compete against experienced and reputable incumbents with limited internal resources, and within an uncertain geoexchange market. Therefore, retained employees must have the appropriate skills to work on both geoexchange projects and other services provided by Company Y to ensure they are sufficiently experienced to contribute to the firm's performance objectives.

Adopting a downsizing strategy would require strong leadership skills to either relocate or let go underperforming employees. Such tactics are necessary to improve the division's performance, and to increase the division's profit margin, and its growth rate. A downsizing strategy is likely to be an unwelcome challenge for many employees, but a strong strategy executed well will improve employee performance in those able to adapt to internal change.

Additionally, downsizing the number of unbillable resources in Corporate Services and other divisional underperforming employees would significantly reduce Company Y's annual labour costs.

5.4.5 Analysis of Strategy # 5: Expand by Acquisition or Partnership

Current partnerships are limited to geoexchange installers and developers, but do not include architects or planners. Complementary partnerships would increase the Renewable Energy division's market exposure, and lead to a higher volume of project work. Historically, pre-partnership expectations prove elusive and the partnership fails. Company Y must be prudent and select the right partner to ensure that pre-partner expectations were compatible and realistic. The partnership must be profitable and productive for both parties.

The acquisition of a CGC-certified company would increase Company Y's market share and client base instantly, and offer a window of opportunity into other industry sectors that wish to increase their environmental compliance.

Alternatively, the acquisition of a small, reputable firm of LEED accredited architects and planners would add a LEED green building design service to Company Y's portfolio and increase the firm's market share and client base instantly. A LEED green building design service

would stand-alone, or vertically integrate with the firm's contaminated land site assessment, remediation, or energy and carbon services.

Historically unless well managed, acquisitions rarely meet pre-acquisition expectations, and although the acquiring firm instantly increases its market share, profitability may decrease because resource duplication causes operating costs to increase, and productivity levels to decrease over the short-term.

After the division has acquired a LEED building design service, it would still compete against experienced and reputable incumbents. However, with suitably qualified internal resources, and an expanded client base, the division would be in a significantly stronger position to penetrate the green building sector, and move away from its over-reliance on geoexchange.

The green building sector is an environmental growth sub-sector in which construction industry standards adapt to climate change and natural disasters. A slow economic recovery coupled with near zero growth in the construction industry, means that external factors will influence the division's ability to increase its revenue through 2011 and 2012.

However, adopting an acquisition strategy would increase the division's expertise, while providing employees with an opportunity to increase their green building experience. It also shows that Company Y is adaptable to changing economic and regulatory conditions.

5.5 Company Y's Goals and Valuation

In Table 17 below, Company Y's goals assessed against the strategic alternatives identifies the likelihood of Company Y achieving its goals in the short-term and long-term.

Table 17 Company Y's Goal Predictions

Goal	Strategic Alternative				
	Status Quo (ST/LT)	Expand Capability & Niche Market (ST/LT)	Cease (ST/LT)	Downsize (ST/LT)	Expand by Partnership or Acquisition (ST/LT)
Client Relations	Medium/ Low	Medium/Medium- High	Low/Low	Low- Medium/ Medium- High	Medium/ Medium- High
Leadership	Medium/ Low	Medium/ Medium-High	Low/Low	Medium/ Medium- High	Medium/ Medium- High
Expertise	Medium/Low	Medium- High/Medium- High	Low/Low	Medium- High/Medium	High/ Medium- High
People	Medium/Medium	Medium- High/Medium	Low/ Medium	Low- Medium/ Medium	Medium/ Medium- High
Profitability	Low/Low	Low- Medium/Medium- High	Medium- High/Medium	Medium- High/ Medium	Medium /Medium- High

Based upon Boardman, Shapiro and Vining 2004

Key: Valuation: High = 3; Med/High = 2.5; Med =2; Med/Low = 1.5; Low = 1.

Short-Term = ST, Long-Term = LT.

In Table 18 below, Company Y’s strategic alternatives in section 5.1 evaluated against Company Y’s weighted goals, identifies Company Y’s best strategic alternative over the short-term and long-term.

Table 18 Company Y’s Valuation Predictions

	Strategic Alternative				
Goal	Status Quo (ST/LT)	Expand Capability & Niche Market (ST/LT)	Cease (ST/LT)	Downsize (ST/LT)	Expand by Partnership or Acquisition (ST/LT)
Client Relations	40% 25%	40% 62.5%	20% 25%	30% 62.5%	40% 62.5%
Leadership	40% 25%	40% 62.5%	20% 25%	40% 62.5%	40% 62.5%
Expertise	40% 20%	50% 50%	20% 20%	50% 40%	60% 50%
People	50% 20%	62.5% 20%	25% 20%	37.5% 20%	50% 25%
Profitability	15% 20%	22.5% 50%	37.5% 40%	37.5% 40%	30% 50%
Average	37% ST 22% LT 29.5%	43% ST 49% LT 46.0%	24.5% ST 26% LT 25.25%	39% ST 45% LT 42.0%	44 ST 50% LT 47.0%

Based upon Boardman, Shapiro and Vining 2004

Key: Valuation: High = 3; Med/High = 2.5; Med =2; Med/Low = 1.5; Low = 1. Short-Term = ST, Long-Term = LT.

Three roughly-equal strategic options emerge from the above weighted averages: a) expand the division by partnership or acquisition. b) expand the division's capability by recruiting external resources. c) downsize the division (Table 18).

A divisional growth strategy would first require a clear set of performance objectives, aligned with the firm's corporate strategy. Successful execution of the business level strategy would require strong leadership and management oversight.

Company Y must ensure that such a growth strategy is possible given the potential range of both internal and external conflicts of interest across the firm's services and client base.

5.6 Scenario Analysis for Company Y's Strategy Selection

5.6.1 Best-Case Scenario Analysis

The best-case scenario for Company Y is a heating and energy efficiency sector that prefers the environmental consultants to be the primary supplier on bid, feasibility, plan, design, build, test, and monitor phases of geexchange retrofit and new construction projects.

On single-dwelling retrofit and new construction projects, the environmental consultant would also be the project manager and responsible for all project phases. The project manager sub-contracts some or all of the project phases to a full-service geexchange specialist.

Under this best-case scenario, expanding the division through acquisition would instantly increase the firm's client base, operating costs and revenue. The acquisition of another firm, for example of architects, would see Company Y inherit large and small projects, and increase the scope of the firm's services to include LEED green building design.

This strategy would also increase the firm's exposure to new clients while capturing a higher percentage of project revenue.

On multiple-dwelling and ICI retrofit or new construction or District Heating Scheme projects the environmental consultant would sub-contract some or all of the project work to a full-service building design firm. However, now that the division has expanded by acquisition it is able to capture the feasibility, plan, design, build and test project phases on a green building project with heat and energy efficiency, including geexchange components.

5.6.2 Worst-Case Scenario Analysis

The worst-case scenario for Company Y is a heating and energy efficiency sector that prefers no environmental consultant involvement across any of the bid, feasibility, plan, design, build, test and monitor phases of geexchange retrofit and new construction projects.

Under this worst-case scenario, an expansion of the division's services by acquiring another firm would benefit Company Y only if the acquired firm maintained its original and separate identity, but was still able to integrate with Company Y's existing services.

5.6.3 Most Likely Scenario

The most-likely case scenario for Company Y is a heating and energy efficiency sector that prefers the environmental consultants to be the primary supplier on two or three components of the bid, feasibility, plan, design, build, test, and monitor phases of small retrofit and new construction projects. These phases are most likely to be feasibility, design and testing.

On larger projects such as a multiple-dwelling or ICI retrofit or new construction or District Heating, the environmental consultants may be involved in the feasibility and testing phases, but the majority of the project work is split between the full-service building design firm and the geexchange installer, especially on green building projects.

Expanding the division through acquisition of a firm of LEED accredited architects and planners would instantly increase Company Y's market presence, client base, operating costs and revenue. A LEED green building design service would stand-alone, or vertically integrate with the firm's contaminated land site assessment, remediation, or energy and carbon services. Company Y's newly integrated services would prove attractive to a heating and energy efficiency sector or green building design sector that prefers the involvement of environmental consultants across all phases of small and large geexchange or green building projects, or buyers who prefer some involvement at the feasibility and testing phases.

In conclusion, the best alternative strategy over the short and long-term is expansion by acquisition. Expansion by partnership will not provide Company Y with sufficient revenue growth opportunities.

6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Company Y's Renewable Energy division's geexchange service has diversified the firm away from its core competencies in EIA and ESA to compete as a cost leader in a moderately competitive market space occupied by experienced incumbents. The division's cost leadership stance has failed to penetrate its target market.

The division also faces several external challenges: 1) an uncertain geexchange market until the publication of BC Hydro- GeoExchange BC's Phase I Evaluation project report in May 2011; 2) the residential retrofit and single-dwelling new construction market in B.C. is unlikely to grow without BC Hydro's support; 3) a lack of financial incentives reduces buyer demand in the single-dwelling residential B.C. and Alberta geexchange market; 4) near zero growth in the construction industry; 5) an economy that is slow to recover from the 2008 recession.

The best alternative strategy over the short and long term is to expand the Renewable Energy division by acquisition. This would instantly increase the division's market presence, client base, operating costs and revenue. However, expansion by recruitment of better qualified external resources and downsizing of underperforming employees were close second and third alternatives, which suggests that only a combination of alternative strategies executed in sequence will allow Company Y to grow this division while meeting the firm's current business goals.

Company Y's financial performance over 2008, 2009 and 2010 falls short of the firm's strategic goal and demonstrates that the current corporate level strategy is not producing the desired results.

The firm needs to change its corporate and business level strategies if it is to remain profitable. Maintaining the status quo will ensure that profit margins remain significantly below target; and, the Renewable Energy division continues to underperform, and operate at a loss.

In conclusion, the firm needs to plan and execute a strategy for change that will improve the firm's performance, profitability and secure a sustainable competitive advantage for each service.

6.2 Suggested Implementation Plan

1. Review Company Y's Current Financial Position: A full financial and employee review will identify sources of underperformance across all of Company Y's divisions.
2. Select the Change Management Team: The CEO should select a small management team to develop and execute the firm's new strategies.
3. Strategize: Company Y should create a new vision, a new corporate strategy, and a new brand for the company. If the firm is to remain competitive in the environmental market it must develop a clear set of business level strategies and performance objectives aligned with the new corporate strategy,
4. Create a Sense of Urgency: The CEO should secure key stakeholder buy to ensure the successful implementation.
5. Execute new corporate and business level strategies: Company Y must execute its change strategy in a manner that aligns with the firm's business values.
6. Monitor each division's performance: Company Y's corporate and business level strategies will contain performance measurements that must be monitored, controlled and amended if necessary.
7. Downsize or upsize resources: Company Y must downsize or upsize in response to internal firm and external conditions.

6.3 Recommendations

6.3.1 Underperforming Employees in Company Y's Renewable Energy Division

Company Y should re-assign the Renewable Energy division's underperforming employees to other divisions where they needed. If this is unlikely to be productive, let go underperforming employees. This would reduce the firm's operating costs while the firm competed in its chosen markets.

6.3.2 Unbillable Employees in Corporate Services

Company Y should let go unbillable employees in Corporate Services, and only maintain a skeleton service. This would reduce the firm's operating costs.

6.3.3 Conflicts of Interest

Company Y should resolve any conflicts of interest that constrain the firm's ability to remain competitive in external markets.

6.3.4 Downsize, Expand and Re-Brand the Renewable Energy Division

The renewable energy division's capabilities should be expanded and re-branded and would involve a combination of events: 1) an immediate shift from a cost leadership to a differentiated focus strategy; 2) a weekly performance check to assess the impact of the new strategy; 3) an immediate headcount reduction of underperforming employees if performance objectives are not met; 4) if external market conditions are favourable then seek to acquire a firm of LEED accredited architects and planners who bring market share, expertise and clients to complement Company Y's existing services portfolio; 5) re-brand the division; 6) if external market conditions continue to be unfavourable then downsize the division further.

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Interviews

January 22nd 2011 An introduction to Company Y’s VP of Development was facilitated by Dr Mark Frein via e-mail.

February 2nd 2011 In person client meeting with Company Y’s CEO, and Company Y’s Director of IT and Financial Controller.

February 9th 2011 Telephone meeting with Company Y’s Director of IT and Financial Controller to discuss the firm’s organizational structure.

February 14th 2011 An in person client meeting with Company Y’s CEO to discuss the firm’s strategy, organizational structure and financial performance.

February 15th 2011 Telephone meeting with Company Y’s Director of Renewable Energy division, to discuss the firm’s Renewable Energy service.

February 16th 2011 Telephone meeting with a Project Manager/Energy Carbon Services Manager in Company Y’s Environmental Management team to discuss the firm’s carbon and energy projects/carbon and sustainability service.

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