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Cleantech Report Card for British Columbia

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Foreword

The BC Cleantech CEO Alliance is very pleased to partner with KPMG LLP on the *Cleantech Report Card for British Columbia* as a means to better understand the benefits and impact of British Columbia's (BC) cleantech industry on our provincial economy.

As BC exits the recession, we have some remarkable opportunities to leverage the province's strengths to create a vibrant economic future for British Columbians. The cleantech industry can make a powerful contribution to this future by creating thousands of new jobs, attracting significant new investment and generating billions of dollars in export revenue.

Why cleantech? First, it is one of the world's fastest growing markets. Second, BC has a booming cleantech industry with globally competitive firms and an international reputation for excellence. Third, we can accelerate job creation and growth by making cleantech a priority for economic development.

Driven by global trends such as energy security, rising oil prices and climate change, the past decade has seen unprecedented growth in demand for cleantech and clean energy. According to the survey, in 2010 global investment in clean energy surged to a new record of \$243 billion¹, led by China, Germany, the US, Brazil, India and the rest of the EU-27. Today, annual investment in renewable energy represents nearly 50 percent² of all new power generation capacity.

It is no wonder, that multinational corporations such as GE, Daimler, Waste Management, Volvo, Cisco, Toshiba and Walmart, to name a few, are making sizeable investments in cleantech.

Fuelled by these global trends, BC's cleantech industry has grown to be one of the most vibrant cleantech clusters in North America with more than 200 "pure play" technology companies, employing over 8,000 people and generating \$2.5 billion in revenues annually, primarily from exports. Many of BC's cleantech companies are recognized international leaders, competing for and winning business around the world. It's also a very young, fast growing sector – over two-thirds of the companies did not exist ten years ago.

Despite the progress, BC is facing stiff competition from other jurisdictions which makes it a priority for BC to continue to build domestic cleantech industries as a means of attracting entrepreneurs, capital and jobs. The role of government in supporting and encouraging emerging cleantech clusters cannot be understated. Programs such as Scientific Research and Experimental Development (SR&ED) tax credits, Sustainable Development Technology Canada (SDTC), the federal Industrial Research Assistance Program (IRAP) and Innovative Clean Energy (ICE) Fund and the revenue neutral Carbon Tax have provided welcome support for the industry; however, there is more to be done to improve BC's competitiveness as a destination for cleantech businesses and capital.

The findings of this report demonstrate the value of making BC's cleantech industry an economic priority and building the sector into an engine of economic growth and prosperity for British Columbians. We're confident that with continued collaboration between industry and government, BC can secure its position as a global centre of cleantech innovation and leadership to the benefit of all British Columbians.

*Jonathan Rhone, CEO Nexterra Systems and
Chair of the BC Cleantech CEO Alliance
June 2011*

1 Bloomberg New Energy Finance, March 2011

2 International Energy Agency, Energy Information Administration (US Gov), and Bloomberg New Energy Finance, January 2011

About the BC Cleantech CEO Alliance

The BC Cleantech CEO Alliance is a group of industry leaders drawn from leading BC clean energy technology companies to accelerate the growth of the industry and further establish BC as a global leader in clean energy technologies.

- Ballard Power Systems
- Chrysalix Energy Venture Capital
- CIBC
- Corinex Communications
- Endurance Wind Power
- Harvest Power
- KPMG LLP
- Lignol Energy
- McCarthy Tetrault
- Nexterra Systems
- Offsetters
- Pulse Energy
- Enbala Power Networks
- Tantalus Systems
- Westport Innovations



Executive summary

Exports. Investments. Jobs. Sustainability.

While still nascent, BC's cleantech sector shows considerable prospects as an export-driven sector. In addition to making the world more sustainable for future generations, cleantech provides well-paying jobs and significant investment opportunities for British Columbians.

To benchmark the size and growth of the sector, and to understand its success factors and impinging hurdles, KPMG in Canada is pleased to partner with the BC Cleantech CEO Alliance to produce this *Cleantech Report Card for British Columbia*.

Participant Profile – Technology and Innovation Required

The survey covered those **Pure Play Cleantech Firms** involved solely in the **research, development or deployment of technological innovations** in the following areas:

- Energy generation
- Energy transmission and storage
- Energy use in transportation
- Energy efficiency
- Resource management

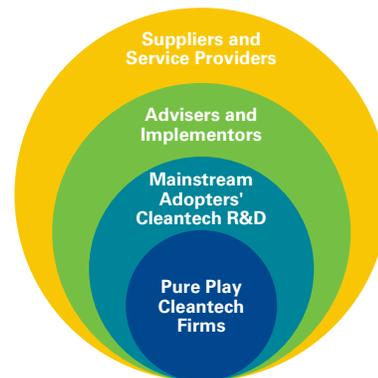
While the BC cleantech sector is weighted heavily towards energy technologies, several firms are also creating products and services that better manage resources, including land, goods, air and water. Firms that primarily generate power for sale using traditional methods, without deploying new technologies or innovation, were excluded from the survey.

The strength of the BC sector comes from the confluence of several historic assets. BC companies have a long history in power management, including power conditioning and battery storage, while the province's diverse geography and historic forestry industry support a range of alternative generation technologies such as wind, solar, biomass and tidal energy. Building from BC's base as a regional financial centre, green financing and carbon financing companies are also emerging.

Highlights

- 202 cleantech organizations were identified as operating in BC.
- 68 percent of the organizations who responded to the survey were formed in the last 10 years.
- Total revenues by all firms in the BC cleantech industry are forecast to increase by 57 percent from \$1.6 billion in 2008 to \$2.5 billion in 2011.

The Report focuses on "Pure Play" cleantech companies only, which are the core of the clean technology industry. Many more jobs are created throughout the cleantech value chain by services, suppliers, customers and early adopters.



- Total employees for 2010 are estimated to be 7,200 with an average salary of \$72,000. The total number of employees is forecast to grow to 8,400 in 2011, an increase of 31% over 2009.
- Estimated annual payroll for 2010 is \$520 million, with the federal government receiving \$78 million and the province receiving \$28 million in income tax from those employees.
- Total equity raised by all firms in the BC cleantech industry is estimated to be \$843 million over the last 24 months and \$4.8 billion since inception.
- The cleantech industry has benefited from valuable support through Scientific Research and Experimental Development (SR&ED) programs, Sustainable Development Technology Canada (SDTC), the federal Industrial Research Assistance Program (IRAP) and Innovative Clean Energy (ICE) Fund support.
- To support further development, there is a desire for governments of all levels to support new technology development through enhanced Research and Development grant funding, early adoption incentives, and funding of demonstration projects.

In summary, while still young, the BC cleantech sector shows tremendous opportunity for growth. It's a sector worth encouraging and promoting globally. It creates high-paying jobs and investment opportunities for British Columbians', it's export-oriented, and it's helping to improve the sustainability of the planet.

*Lorne Burns, Greater Vancouver Area
Sustainability Practice Leader, KPMG LLP
June 2011*

Operations, locations, and age of firms

Focused on Energy

With 63 percent of respondents identifying development of energy related technologies as best describing their operations, energy is clearly the dominant activity for BC cleantech companies.

- **Energy generation** is the predominant activity for 33 percent of survey respondents. (Energy generation technologies excludes companies with energy generation as their primary activity.)
- **Energy transmission and storage** and **Energy use in stationary applications** was reported by 17 percent and 8 percent of survey respondents.
- **Resource management, including recycling/waste management** was reported by 12 percent.
- 8 percent of firms reported operating in **Water resource management**.

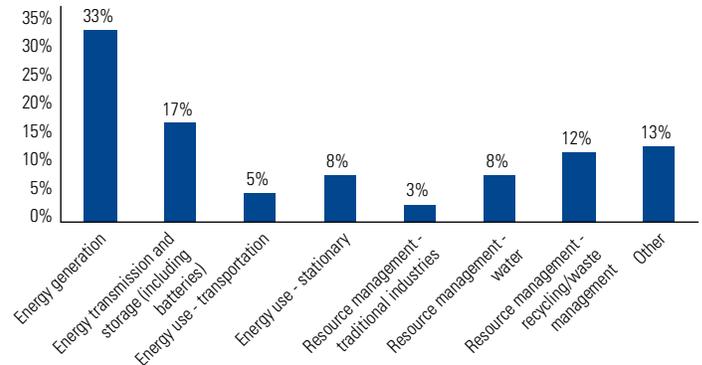
Clustered and Cross the Province

The respondents indicated that they have cleantech operations active in every economic region in BC. At the same time, the importance of having a strong cluster appears to be demonstrated as 85 percent of the primary operations are located in the Lower Mainland, where there is a higher concentration of talent and supporting services. In many instances, the operations in the Lower Mainland and City of Vancouver reflect the location of head offices (or regional offices for international firms), while actual project operations may take place elsewhere in the province.

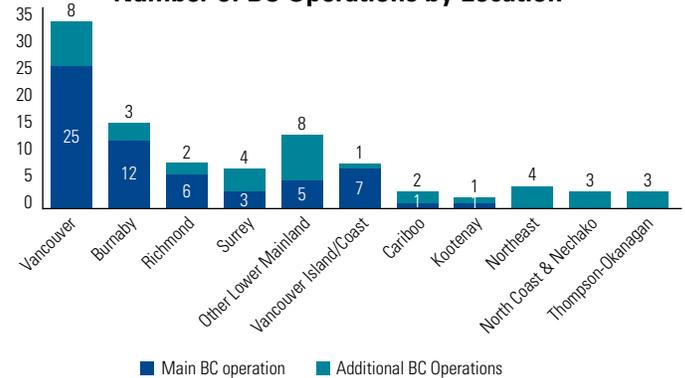
Young and Dynamic

The age of firms reflects the dynamic nature of the cleantech industry. Approximately 68 percent of the respondents have been in business for 10 years or less: 31 percent less than five years, 37 percent between six and 10 years. Only 32 percent of firms have been in business for 11 years or more.

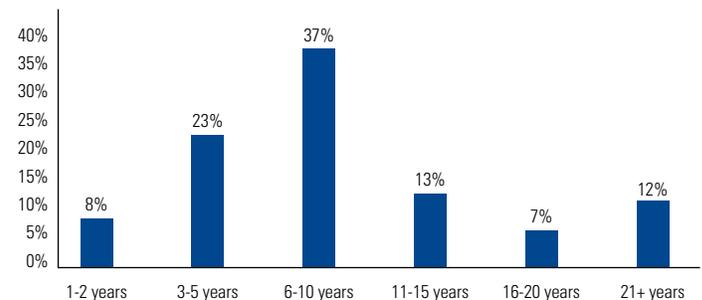
Identified Sectors



Number of BC Operations by Location



Corporate Age



Technology

Driven by Innovation

For the purposes of this Report Card, the cleantech industry has been defined to include firms active in the development of new technologies. Firms that only generate power for sale, or that only manufacture, service, implement, integrate, or consult in respect of technologies or systems developed by other firms, were excluded from the industry definition. Based on this definition, technology development activities represent the core of the cleantech industry. Given this definition, it is appropriate that all responding firms engage in demonstrable technology activities, as evidenced by the holding of patents and/or the claiming of tax credits for SR&ED activities. Indeed, 64 percent of responding firms hold one or more patents and claim SR&ED credits. In addition, 20 percent of firms report that they claim SR&ED credits (but presently hold no patents), 13 percent of firms report that they hold patents (but claim no SR&ED credits). Only 3 percent of firms report having neither.

Supported through Collaboration

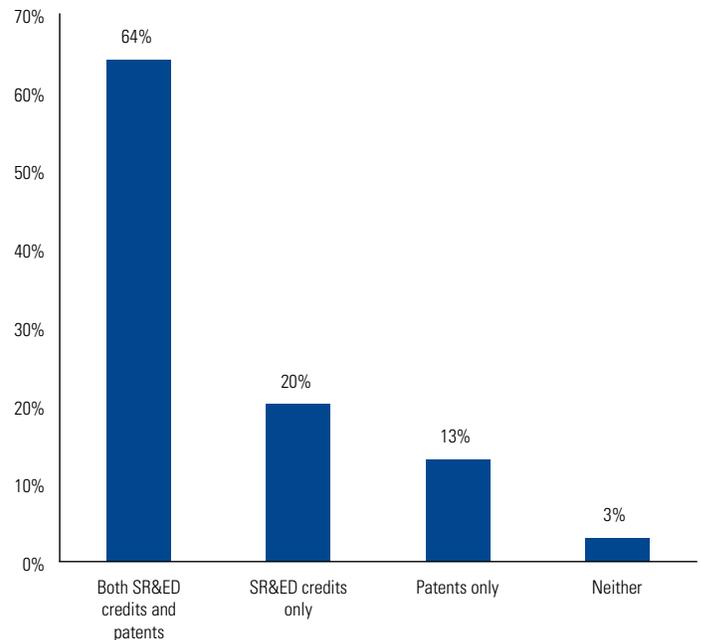
In order to develop, commercialize, market and sell their technologies, BC's cleantech firms have established collaborations, partnerships and alliances with a wide range of domestic and multinational companies including the following sample of organizations identified by respondents:

- Archer Daniels Midland
- Air Liquide
- BAE Systems
- BASF
- BP
- Cisco
- Cummins
- Daimler
- Dow
- Exxon Mobil
- Fortis BC
- GDF Suez
- General Electric
- Motorola
- Shell
- Suncor
- Tyco
- Volvo
- Walmart
- Weichai Power
- Waste Management

For the purposes of the survey, "cleantech" was defined to include firms active in the development of new technologies in the following areas:

- Energy generation
- Energy transmission and storage (including batteries)
- Energy use – transportation
- Energy use – stationary
- Resource management in traditional industries
- Resource management – water
- Resource management – recycling/waste management

Technology Activities



Revenue and exports

Growing and Emerging

BC cleantech firms demonstrated strong growth with average sales increasing 48 percent from \$8 million in 2008 to 11.8 million for 2010. Total industry revenues are forecast to reach \$2.5 billion in 2011.

Survey respondents are optimistic about their prospects for 2011, with a number of respondents expecting their first commercial sales, and firms already at the commercial operating stage expecting to see large increases in sales. The number of respondents not reporting sales declined from 36 percent in 2008 to 13 percent in 2011.

Focus on Exports

Exports accounted for 78 percent of cleantech revenues in both 2009 and 2010. Not surprisingly, the US represents the largest market for BC cleantech products and services. However, the magnitude of the US market is perhaps surprising, accounting for a 2010 forecast of 60 percent of revenues, up from 34 percent in 2008. Exports to Europe declined from 27 percent in 2008 to 11 percent in 2010. Revenue from BC and the rest of Canada accounted for 13 percent and 9 percent of sales in 2010. Exports to Asia only account for 5 percent of 2010 sales – a figure that may be expected to grow in the future as Asia, most importantly China, increasingly focuses on addressing environmental issues. Sales to the rest of the world (Latin America, Australia, and/or Africa) account for 3 percent of sales among the responding firms.

Exports and Domestic as a Percentage of Revenues

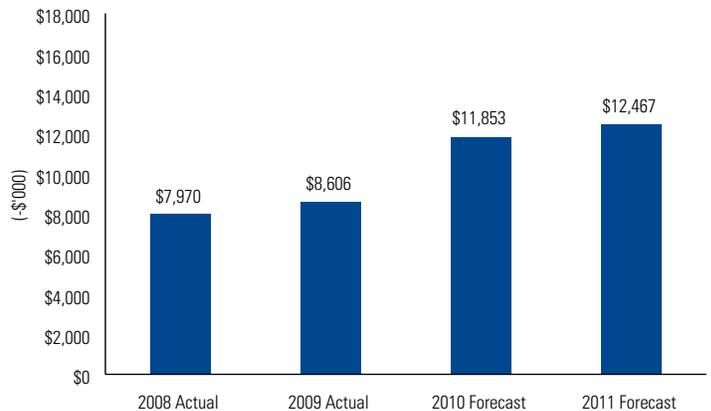
	2008 Actual (%)	2009 Actual (%)	2010 Forecast (%)
British Columbia	23	15	13
US	34	48	60
Europe	27	23	11
Rest of Canada	8	7	9
Asia	4	5	5
Other	4	3	3

Size of the BC cleantech industry

Based on the survey data received from respondent firms, total revenues by all firms in the BC cleantech industry are estimated to be:

2008 actual	2009 actual	2010 forecast	2011 forecast
\$1.6 billion	\$1.7 billion	\$2.4 Billion	2.5 Billion

Average Revenues



Employment

Cleantech is Generating Jobs, Good Jobs

Total employment for 2011 is forecast to reach approximately 8,400 employees, an increase of 1,900 since 2009. Not surprisingly, employment dipped in 2009 as the industry was not immune to the economic decline. However, employment prospects recovered briskly with an estimated increase of 800 employees to a total forecasted number of 7,200 employees in 2010 and with a further 1,100 jobs expected to be added in 2011.

Employment in the BC cleantech industry is heavily oriented towards engineering, design, sales, marketing and other professional occupations, resulting in highly desirable and well-paid jobs for British Columbians.

In addition to growing employment, average salaries at BC cleantech firms have also increased. Among responding firms, average pay increased from \$60,000 in 2008 to \$68,000 in 2009. Average salaries are expected to climb further to \$72,000 in 2010 and \$77,000 in 2011.

Employment by the BC cleantech industry

The total number of employees for 2010 by all firms in the BC cleantech industry is estimated to be 7,200. Based on an average salary of \$72,000, this translates into an estimated annual payroll of \$520 million in 2010, with the Federal government receiving \$78 million and the Province receiving \$28 million in income tax from those employees.

Employees by Location

	2008 Actual (%)	2009 Actual (%)	2010 Forecast (%)	2011 Forecast (%)
British Columbia	79%	72%	74%	73%
Elsewhere in Canada	2%	2%	2%	2%
Outside of Canada	19%	26%	24%	25%
Number of employees – respondents	2,488	2,360	2,752	3,196
BC employees – respondents	1,969	1,709	2,034	2,337
Estimated total BC industry employment	7,650	6,400	7,200	8,400

Average Annual Salary

	2008 Actual	2009 Actual	2010 Forecast	2011 Forecast
Average annual salary	\$60,000	\$68,000	\$72,000	\$77,000
Estimated total BC industry payroll (-\$,000)	\$460	\$435	\$520	\$650

Equity

As with all entrepreneurial technology sectors, equity capital represents the lifeblood of cleantech sector firms as they work toward the commercialization of new technologies. The ability to raise new capital for these firms is critical to their ability to pursue research and development, commercialization, business development and sales activities.

Among responding firms, capital raised in the last 24 months averaged \$4.2 million per firm, and total capital raised since inception averaged \$35.4 million per firm.

For the cleantech sector, equity raised since inception represents one of the measures of total funds raised towards technology development and commercialization. On this measure, the mix of firms that responded to this survey conformed to pre-defined expectations as to the nature of the industry:

- 79 percent of respondents represented small businesses, having raised less than \$20 million in equity in their lifetime.
- 17 percent of respondents represented medium-sized businesses, having raised between \$20 million and \$150 million in equity since inception.
- 4 percent of respondents represented larger sized businesses, having raised more than \$150 million in equity since inception.

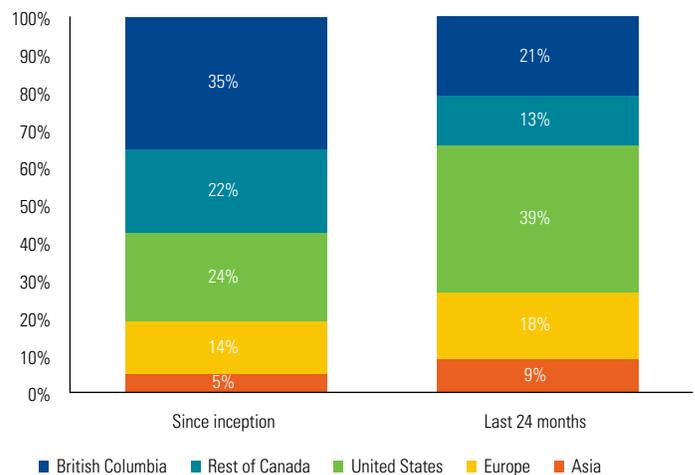
Equity Raised in a Challenging Market

In spite of the recent economic challenges, the cleantech industry is still estimated to have raised in excess of \$840 million over the past 24 months. The sources of equity for the BC cleantech industry have changed over time. BC and Canadian sources historically contributed 57 percent of the lifetime equity raised by BC cleantech firms, while US sources generated 24 percent, Europe 14 percent and Asia the balance. However, over the last 24 months the share of equity coming from sources in the US has increased to 39 percent, Europe to 18 percent, and Asia to 9 percent. Accordingly, equity from BC or other Canadian sources declined to 34 percent of total equity raised over the past 24 months.

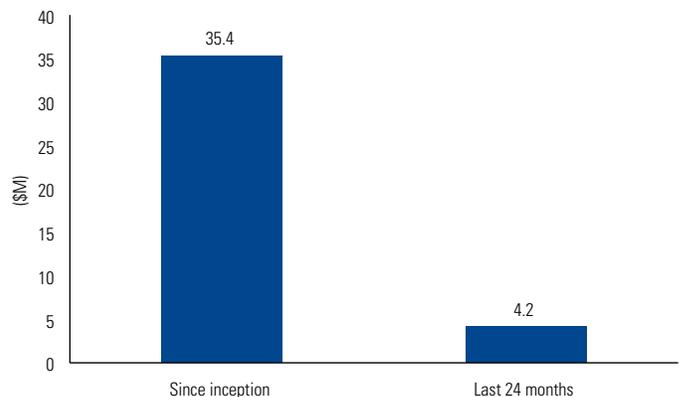
Investment in the BC cleantech industry

Based on the survey data received from responding firms, we conservatively estimate that total equity raised by all firms in the BC cleantech industry is estimated to be in the range of \$840 million over the last 24 months and in the range of \$4.8 billion since inception.

Percentage Equity by Location



Average Equity Raised Per Firm



Grant funding

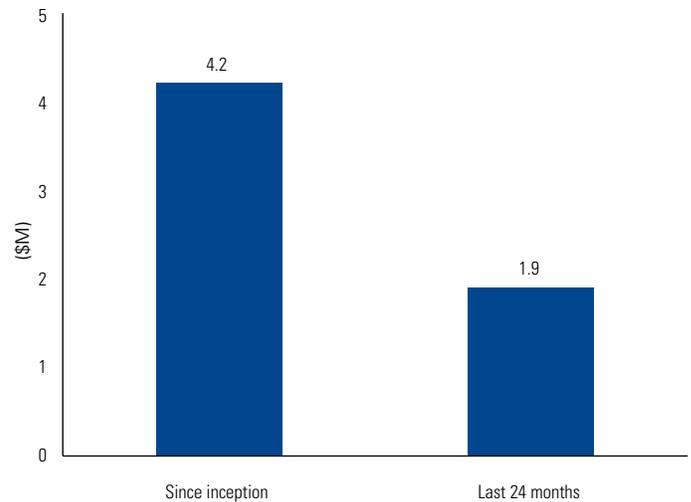
In addition to equity, grant funding also plays an important role in helping to finance the development and commercialization of new technologies in the cleantech industry. Grant funding sources include:

- Programs broadly focused on R&D, most notably federal and provincial tax credits for SR&ED and IRAP.
- Programs specifically targeting the development of new technologies in the cleantech industry, including the federal SDTC program and the BC ICE Fund.

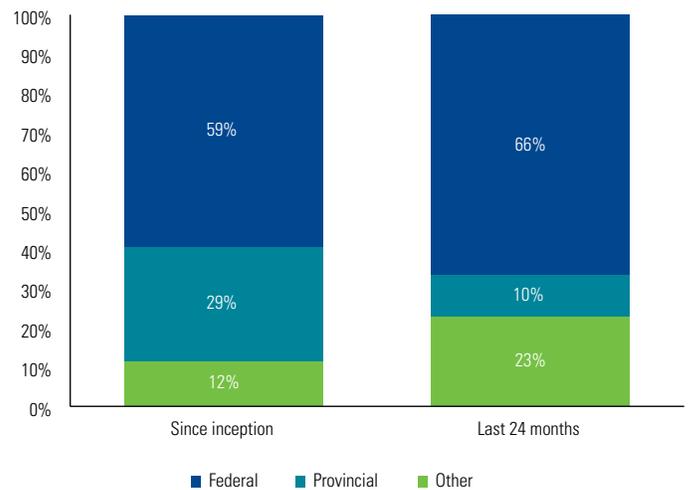
Among responding firms, grant funding received in the last 24 months averages \$1.9 million per firm, and total grant funding received since inception averages \$4.2 million per firm. It is notable that 45 percent of lifetime grant funding has been received by responding firms in the last 24 months, whereas for equity raised (refer to previous page), only 18 percent of lifetime equity has been raised in the last two years. This relationship reflects both the focus of new funding sources for the development of technologies in the cleantech realm in recent years, and the importance of grant funding sources for the development of new technologies in periods when equity capital is scarce.

The federal government has always represented an important source of grant funding for BC cleantech firms, and that role significantly continues to grow. Since inception, 59 percent of grant funding received by responding firms has come from federal sources, and this has grown to 66 percent over the last two years – likely due to the ramp-up of SDTC funding. In contrast the provincial share of grant funding has shrunk in recent years, with provincial sources accounting for just 10 percent of grant funding over the last two years as compared to 29 percent since inception. Other grant funds, primarily from international sources, have increased in recent years, having provided 12 percent of lifetime grant funding as compared to 23 percent of funding over the last two years.

Average Grant Funding Per Firm



Sources of Grant Funding



Current government support

Government support is vital to the development of emerging industries – especially in a field that has the potential to become an engine of economic growth, investment, exports and job creation.

Among BC cleantech firms, federal and provincial SR&ED tax credits and federal IRAP funding are the clear leaders as the most important programs currently supporting the development of the cleantech industry. These two programs received the highest number of mentions among respondents, both in respect of providing assistance to responding firms specifically, and for supporting the development of the industry in general. SR&ED credits received 56 percent of total mentions for programs that support responding firms, and 70 percent of total mentions for programs that support the industry in general. Meanwhile, IRAP received 48 percent of total mentions for programs supporting respondent firms, and 30 percent of total mentions for programs supporting the cleantech industry in general.

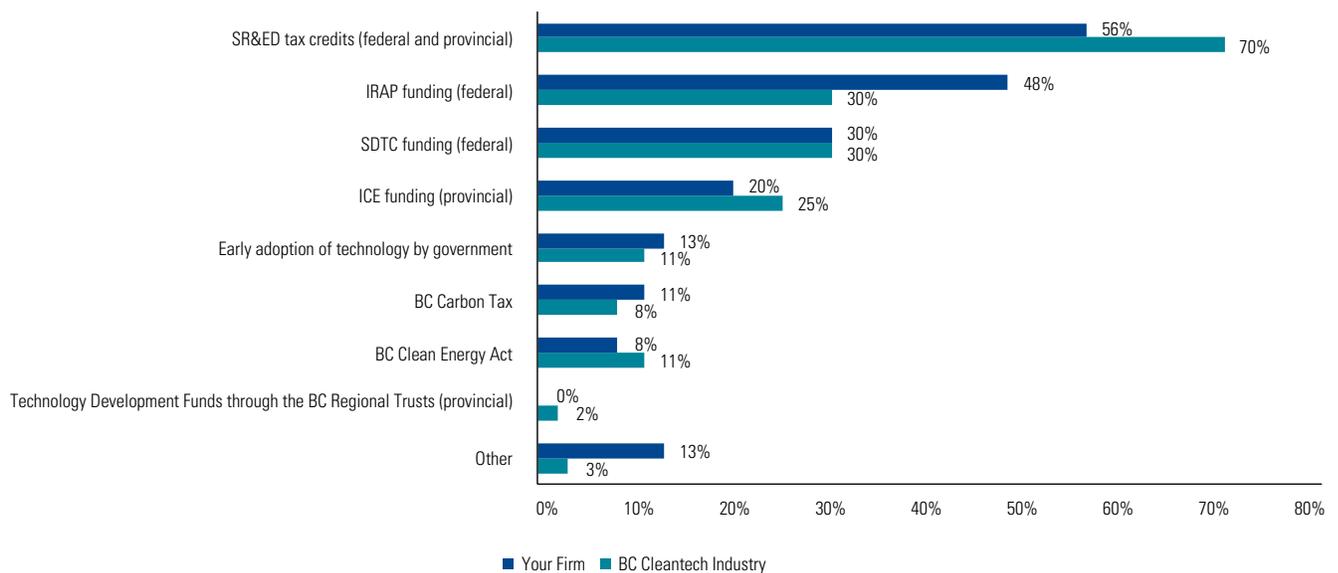
After SR&ED and IRAP, federal SDTC funding and BC ICE Fund represent the other major sources of support for both individual cleantech firms and the industry as a whole. For programs supporting specific respondent firms, SDTC

received 30 percent of total mentions, while ICE Fund garnered 20 percent of all mentions in support of respondents’ firms. However, the SDTC is viewed as being more valuable for the BC cleantech industry as a whole, receiving 30 percent of total mentions in this category, as compared to 25 percent of mentions for ICE Fund.

Other industry support mechanisms fall well behind these four main programs in the opinion of survey respondents. Among early adoption of technology by government, the BC Carbon Tax, the BC Clean Energy Act, BC’s Regional Trust Technology Development Funds, and other support mechanisms, no single program or initiative received more than 13 percent of total mentions, either for their ability to assist specific firms or the industry in general.

However, respondents were not allowed to mention more than two support initiatives in this question. Therefore, these results do not necessarily imply that provincial initiatives such as BC’s Clean Energy Act and Carbon Tax are not supporting the development of the cleantech firms and industry – only that these initiatives are not seen to be as important support mechanisms as the direct funding programs of SR&ED, IRAP, SDTC and ICE Fund.

Importance of Existing Government Support for the Industry



Future industry support

When asked about initiatives that would support the growth of the BC cleantech industry, survey respondents had a lot to say, with suggested initiatives covering all aspects of the technology development process – from promoting R&D, to technology demonstration, to commercialization and roll-out.

Among 18 main support initiatives identified in the survey, four areas were identified more frequently than any others:

- Two leading initiatives were identified to help promote R&D – enhanced R&D grant funding and higher SR&ED tax credits for cleantech R&D in particular. These potential initiatives were identified as being beneficial for both individual cleantech firms, and for the industry in general.
- Two leading initiatives were identified to assist in getting new technologies into the field in a demonstration setting – early adoption of clean technologies by government and grants for demonstration projects. These potential initiatives were identified as being equally beneficial both for specific cleantech firms and for the BC cleantech industry in general.

In addition to these four strongly endorsed support initiatives, end-user rebates or incentives to encourage adoption of clean technologies and renewable power or fuel standards were the other initiatives seen as having the best potential to help stimulate the BC cleantech industry as a whole.



Possible Future Government Initiatives
Perceived as Benefit to:

	Your Firm (%)	BC Cleantech Industry (%)
<i>Promoting R&D</i>		
Enhanced R&D grant funding	49	34
Higher SR&ED tax credits for cleantech R&D	44	41
Establishment of provincial research centres and/or technology incubators	8	15
Promoting R&D – Other	5	2
<i>Technology Demonstration</i>		
Grants for demonstration projects	41	41
Early adoption of clean technologies by federal, provincial, and/or municipal governments	36	43
Incentives for venture capital investment	20	20
Forty-three provincial loan guarantees for demonstration projects	13	11
Development zones that offer specific tax breaks for business operating in the zone	7	5
Technology demonstration – Other	2	2
<i>Technology commercialization and roll-out</i>		
Early stage commercial deployment through procurement by government agencies	28	20
Green bonds/provincial loan guarantees for commercialization projects	23	21
Rebates or incentives to encourage adoption and end-user clean technologies	20	25
Renewable power/fuel standards mandating the use of renewable energy sources	15	21
Feed-in power tariffs	13	20
Higher water, electricity and/or fuel prices (including increase in the BC Carbon Tax)	10	7
Investment/production tax credits for clean energy producers	8	15
Technology/commercialization and roll-out – Other	2	0

KPMG's clean technology survey

The cleantech industry is one of the fastest growing industries in BC, with the province being home to one of the largest industry clusters in Canada and North America. To develop a better understanding of this vital industry, KPMG in Canada partnered with the BC Cleantech CEO Alliance to develop this inaugural *Cleantech Report Card for British Columbia*.

The objectives for the *Cleantech Report Card for British Columbia* are to benchmark the size and growth of the industry, and to provide valuable insights for evaluating, advocating, and monitoring the growth and development of the industry in BC. Additionally, this Report Card serves to identify actions and support required in order to accelerate industry growth.

For the purposes of this Report Card, the cleantech industry has been defined to include firms with the primary purpose of developing new technologies related to clean energy production, transmission, storage, or use, and/or efficiency in energy or resource management and use. Early mainstream adopters or firms that generate power for sale, or that manufacture, service, implement, integrate, or consult solely in respect of technologies or systems developed by other firms are excluded from this definition.

Cleantech firms were identified through the review and integration of several relevant sectoral lists of firms. This industry identification process included reviewing the websites and placing telephone calls to many firms in order to verify their relevance to the cleantech sector and their ongoing business operation. This process resulted in the identification of 202 active cleantech firms operating in BC.

This Report Card has been developed based on a customized electronic survey sent to all cleantech firms in the province. The survey was conducted between July and December of 2010 and again in March 2011. Responses were received from 60 firms, representing 30 percent of the 202 identified cleantech firms operating in the province. The mix of firms that responded conformed to expectations as to the nature of the industry based on equity raised:

- 79 percent of respondents represented small businesses, having raised less than \$20 million in equity in their lifetime.
- 17 percent of respondents represented medium-sized businesses, having raised between \$20 million and \$150 million in equity since inception.
- 4 percent of respondents represented larger sized businesses, having raised more than \$150 million in equity since inception.

These results suggest that the responding firms are reasonably representative of the industry as a whole. As with any web-based survey, it is not possible to verify the randomness of the sample.

Percentages may not add up to 100 percent due to rounding.



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KPMG in Canada is committed to our clients. We have made considerable investments in regards to personnel, research, and hard-won experience. Through these investments, we strive to be the best in everything we do, turning our experience and industry knowledge into real value for our clients. This is the KPMG Way.

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