

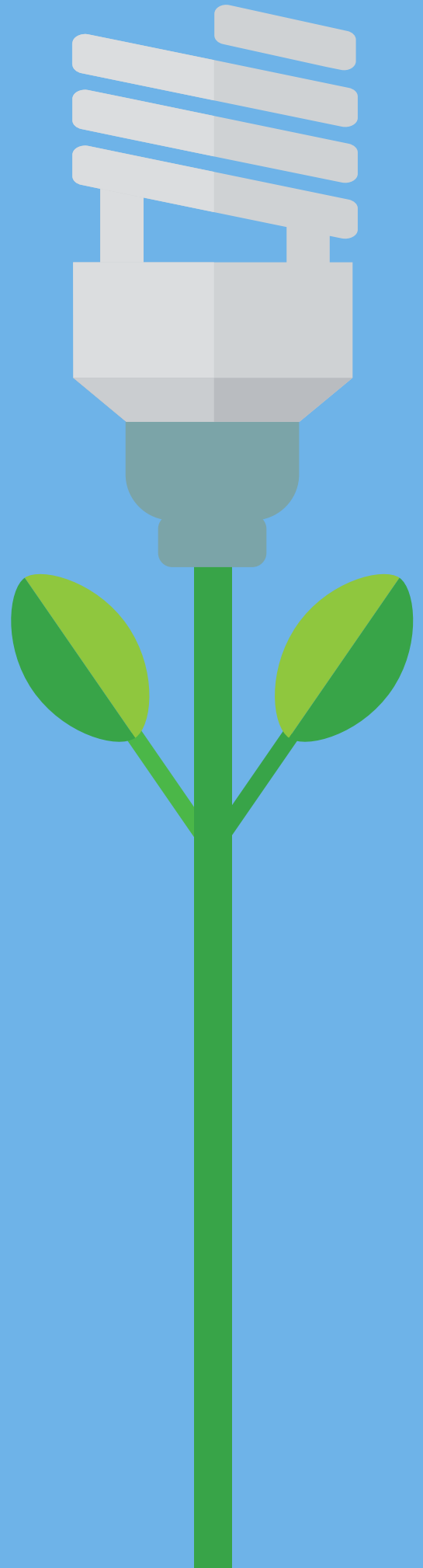


British Columbia Cleantech

2016 Status Report

March 2017

kpmg.ca



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Foreword

It's been six years since the previous BC Cleantech Report Card, and the numbers speak for themselves. By virtually every measure, BC's Cleantech sector shows dramatic growth: the number of Cleantech companies is up 35% to 273, the number of BC-based employees is up 20% to 8,560, average wages have increased by 24% to \$84,000 and the amount of equity raised is also up 25% to \$6 billion.

Over the past five years, BC has emerged as a globally recognized centre of Cleantech innovation. BC's Cleantech entrepreneurs have expanded the economy by launching dozens of new, high-growth companies. They've created thousands of new, high-paying technology jobs for British Columbians, and attracted billions of dollars of investment to BC to commercialize products and services for export around the world.

What is driving this growth? First, the market for Cleantech is enormous and demand is growing. At \$3 trillion per year, it's a big prize, the competition is fierce and BC companies are winning. Second, Cleantech has gone mainstream with truly superior solutions. They outperform incumbent technologies on multiple fronts by being less expensive, more efficient *and* a lot cleaner. Finally, BC's Cleantech sector is getting stronger. Management teams are more experienced, the talent pool is deeper, adoption is accelerating and investors are beating a path to BC.

Ultimately, Cleantech is about radically reinventing the future. It is the path to achieving greater prosperity, sustainability, *and* quality of life for British Columbia, Canada, and the world. This report describes a rapidly growing sector of entrepreneurs and innovators whose work is already shaping our future, and this is just the beginning.

Lastly, this report could not have been possible without the tremendous support and commitment from our collaborator, KPMG. KPMG has been a fixture in BC's Cleantech sector for many years and we are deeply grateful for their outstanding contribution, dedication and leadership.

Jonathan Rhone
Chair, BC Cleantech CEO Alliance
 March 2017

About the BC Cleantech CEO Alliance

The BC Cleantech CEO Alliance ("the Alliance") is a group of Cleantech CEOs and entrepreneurs committed to ensuring British Columbia is a global leader of Cleantech innovation, talent, and capital that develops breakthrough solutions for the world's most pressing challenges.

Executive summary

KPMG is pleased to work with the BC Cleantech CEO Alliance to present this *BC Cleantech 2016 Status Report*. The report shows the results of a survey of Cleantech companies in British Columbia that was conducted by KPMG in the fall of 2016. The Report also draws comparisons with results of a similar survey KPMG conducted in collaboration with the BC Cleantech CEO Alliance in 2011. The intent of the report is to provide a perspective on the size, health and impact of the Cleantech sector in the province.

New survey topics in 2016 include **business confidence** and **type and location of customers** for Cleantech products/services.

Participant profile

For the purposes of the survey, the Cleantech sector has been defined to include companies with the **primary purpose of developing new technologies** related to:

- clean energy production, transmission, storage or use;
- water treatment and management; and/or
- efficiency in energy or resource management and use.

In total, 273 Cleantech companies were identified for surveying in 2016, up from 202 surveyed in 2010.

There were 90 respondents, of which 60% were CEOs and another 15% were other C-level executives. Two-thirds of companies have been in business for 10 years or fewer.

Report highlights

- BC's Cleantech sector is estimated to employ approximately **13,900 people** in 2016, with **8,560 (65%) employees based in BC**.
- One-third of respondents expect a **substantial increase in employees** by mid-2017.
- Average annual salary for BC Cleantech employees is **\$84,000**.
- **Power & Utilities and Transportation** are two main customers for Cleantech (34% of respondents and 29%, respectively).
- In the next 3–5 years, Cleantech companies expect to see **increased revenue growth outside of BC**.
- Half of respondents indicate that current **SR&ED tax credits and IRAP funding** are the two government programs that are most beneficial to the Cleantech sector.
- **Two-thirds** of respondents identified the support of demonstration and commercialization projects through loan guarantees or grants as a key factor to accelerate the industry in BC, while a further third are interested in higher SR&ED tax credits for Cleantech research and development.
- **56%** of respondents file SR&ED claims.
- **79%** of respondents own at least one patent.
- **68%** of respondents expect substantial improvement in their business with a further **28%** anticipating moderate improvement.
- **80%** of the respondents expect either substantially higher or moderate capital investment in their company.

Cleantech companies avail themselves of the government programs, funding, and tax credits available to them to help them innovate and get their products to market. Given that Cleantech in BC is a largely export-driven sector, continuing to foster the conditions that allow exports to thrive remains important.

The data indicates that markets served by the Cleantech sector are many and are geographically widespread. **The growth in revenue from exports outside of BC is a positive indicator for Cleantech companies.** Furthermore, the diversity of markets should help bolster the sector against economic downturn in any one of those markets, or any one of those regions.

The Cleantech sector continues to both experience and drive growth in our province, as well as providing **an attractive investment opportunity** for British Columbians. The jobs it offers are desirable ones – average salaries are high and the technologies these jobs produce contribute to a cleaner and more sustainable world.

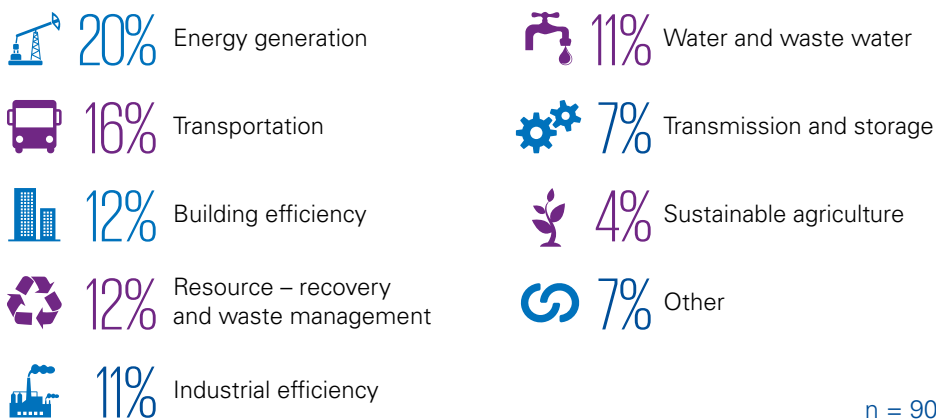
Companies in the sector are young, with one-third in business for fewer than five years. Dedicated support of Cleantech will not only help them grow and generate significant business for our province for years to come, but it will also contribute to keeping BC forward looking and relevant to the rest of the world.

Lorne Burns
Greater Vancouver Area
Partner, KPMG LLP
February 2017



Profile of the Cleantech sector

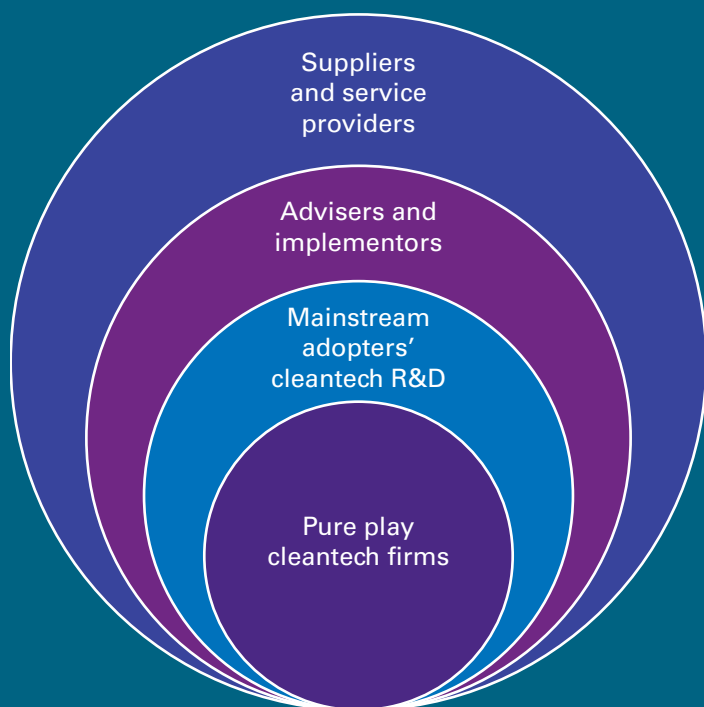
For the purposes of both the 2011 and 2016 surveys, the Cleantech sector has been defined to include companies with the primary purpose of developing new technologies related to **clean energy production, transmission, storage, or use; water treatment and management; and/or efficiency in energy or resource management and use.** The following graph illustrates how respondents in the 2016 survey categorize their companies:



Business focus of Cleantech companies

Excluded from this definition are early mainstream adopters of Cleantech technologies; businesses that generate power for sale; and those that manufacture, service, implement, integrate, or consult solely with respect to technologies or systems developed by other companies.

This report focuses solely on the companies generating new intellectual property, business models, or service offerings – called “pure play Cleantech” in the diagram – and does not include the much larger set of companies that implement these products and services in their own operations.





Innovation indicators

Cleantech is innovative by nature and government impetus is needed to help companies get new ideas off the ground. Federal and provincial government backing **feeds the success of Cleantech companies** that, in turn, comprise a major engine for BC's economy, including exports and employment.

Two main indicators of innovation shine through in the survey results:

- Companies' uptake of SR&ED credits available; and
- The number of Cleantech companies that hold patents.

Scientific research and experimental development (SR&ED)

The research and development phases of a company's business are capital intensive. To help mitigate the costs, technology companies need to take advantage of any supportive programs available to them. Cleantech companies' interest in programs that help them in these early phases has been consistently high, and the 2016 survey results show that **three-quarters of Cleantech companies file claims for SR&ED** credits.

Federal support through the Industrial Research Assistance Program (IRAP) is also popular, with half of companies surveyed subscribing to the program.

Patents

Patents are considered concrete indicators of technological innovation by Cleantech companies. Of companies that participated in the survey, **four-fifths own one or more patents**.

Further information arising from the survey illustrates that the majority of companies have received both SR&ED credits and patents:

- **58% received both SR&ED credits and patents**
- 9% received SR&ED credits only
- 14% hold patents only

At the time of the 2016 survey, only 12% of respondents had not claimed SR&ED credits nor filed patents.

An energetic sector

Energy propels the Cleantech sector

One-fifth of survey respondents are in the business of developing technologies and solutions to enhance or create new sources of energy generation. Taken together with those focussed on energy transmission or energy storage, the number jumps to nearly one-third. This is consistent with findings in the 2011 survey and reiterates the significance of this group to the Cleantech sector as a whole.

- 20% of respondents work in **energy generation**.
- The second largest group is in **transportation technologies and solutions**, at 16%.
- **Resource recovery**, including waste management, is represented by 12%, equal to 2011 survey results.
- **Water and waste water is the focus of 11%**, up a little from 8% in 2011.
- The smallest category, 4% of survey participants, is **sustainable agriculture**.

Dynamic and emerging industry

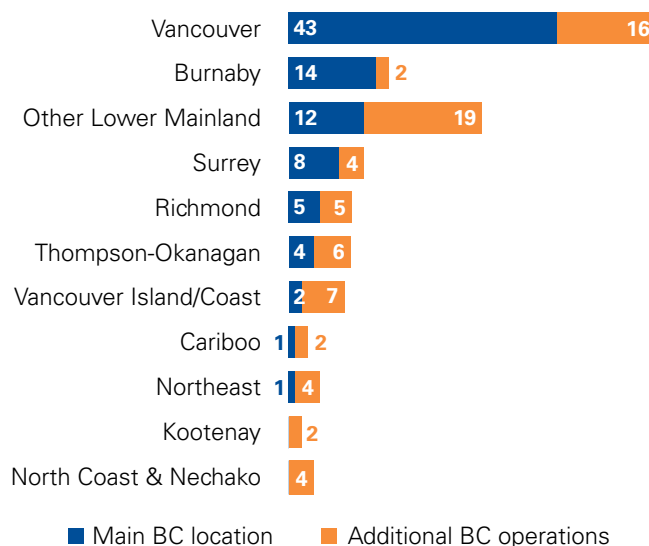
Two-thirds of companies surveyed have been in business for 10 years or fewer. A substantial number of the companies surveyed were not yet in existence or fledgling and not identified when the survey was last completed in 2011. The other side of the coin is that a handful of the 2011 participants no longer exist, either because they have been acquired or are no longer in business. This overall youthfulness of the sector is consistent with the results of the 2011 survey, and while this indicates strong growth

potential, the high degree of turnover reflects the risk in any emerging technology sector.

A tight interdependent ecosystem

Almost half of the companies have their main operations in Vancouver. Expanding outward a little, 91% are located in the Greater Vancouver Area. Just **over 50% of companies have operations in multiple locations** across the province, making Cleantech a significant sector for employment opportunities throughout BC.

Number of BC operations by location



n = 90

Employment generated by Cleantech

Desirable jobs

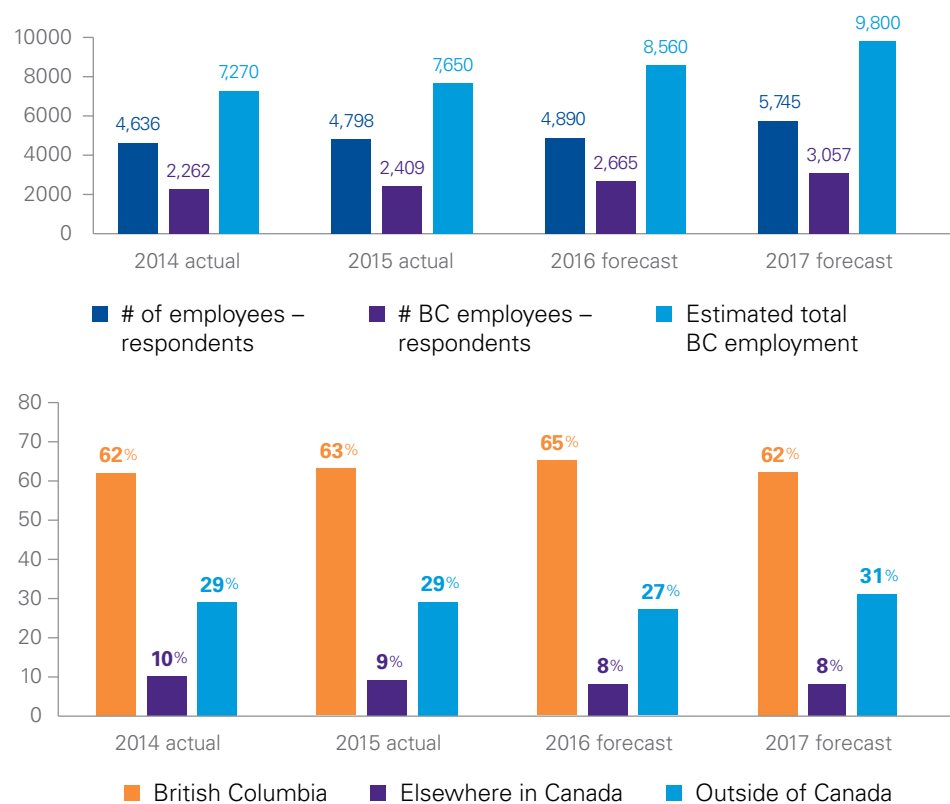
The sector employs a lot of highly trained workers, such as engineers, designers, and sales and marketing professionals, resulting in a correspondingly high average salary. **The average annual salary in 2015 was \$84,000** whereas in 2009 it was \$68,000.

Providing appealing jobs that contribute to cleaner ways of doing business both here and around the world contributes to BC's ability to attract and retain workers. **In fact, in 2016, BC Cleantech companies employed an estimated 13,900 people, with 8,560 of them employed right here in the province.**

Growing employment rates

The Cleantech sector's **employment growth rate remains high**, and is higher than it was five years ago.

Employment



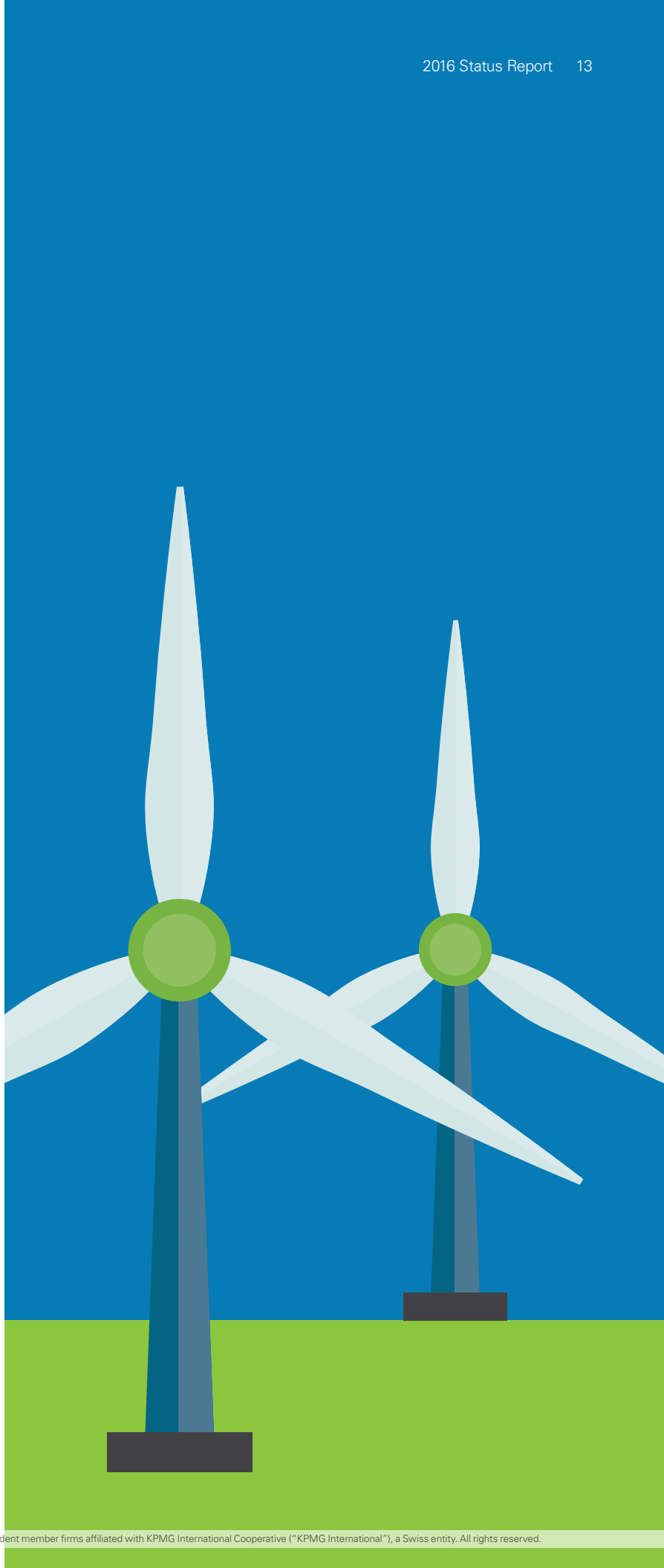
From 2014 to 2016, total employment by Cleantech respondents increased by 9% in total and by 18% in BC.

A future-oriented sector

BC's Cleantech sector is young, innovative, and growing. It offers desirable, well paid jobs for British Columbians. The very products and services it produces contribute to a cleaner, more sustainable world – something of increasing appeal and importance to employees and employers alike. **Satisfying and rewarding jobs attract professional-level employees** to our province, who in turn produce the innovative Cleantech products and services that **attract investors to our region**. It's clear that Cleantech offers BC the opportunity to stay relevant on the economic stage.

Industry overall

The total number of employees in 2015 for all firms in the BC Cleantech industry is estimated to be 13,900, with 7,650 located in BC. Based on an average salary of \$84,000, this translates into an estimated annual payroll of \$640 million.

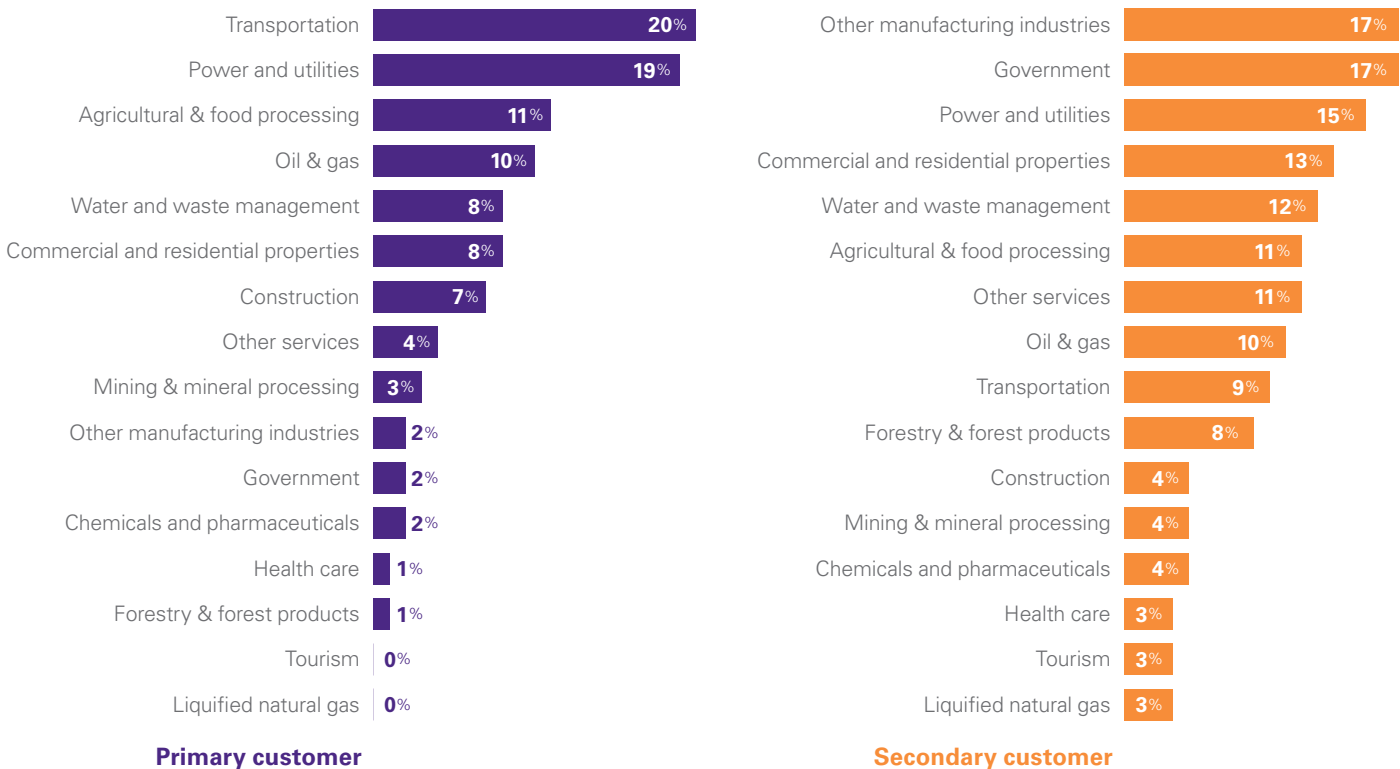


Customers and revenue

Strong, diversified demand for BC Cleantech

The connection between the Cleantech sector and other industries is strong, with a wide range of industry sectors identified as the primary and secondary customers.

Customers

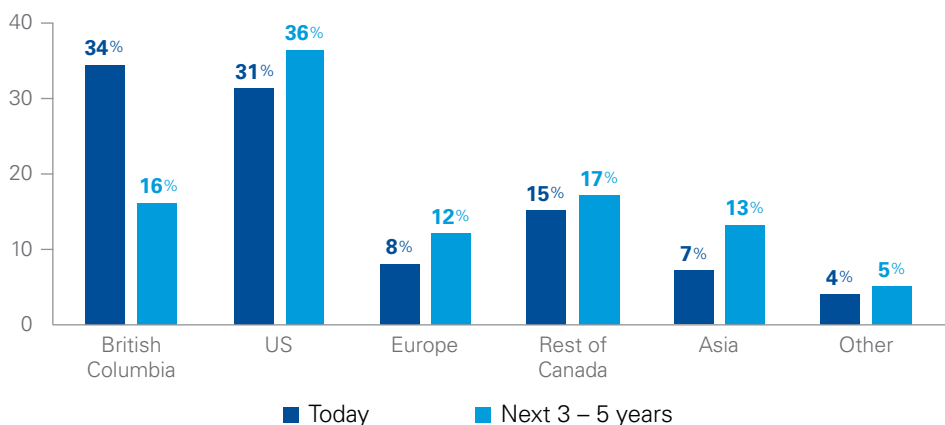


n = 89

To help to demonstrate links between the Cleantech sector and traditional sectors, companies were asked to indicate the primary vertical industry or group of industries into which their company sells its products and/or services. Approximately 20% and 19% of respondents indicate a primary customer base within the **Transportation** and **Power and Utilities** markets, respectively.

Companies were also asked to identify two secondary markets (either current or target). While Power and Utilities stands out again, chosen by 15% of respondents, the secondary markets have a very different distribution. Other Manufacturing and Government lead the way, with 17% each. However, there is a more even and diverse distribution across the broad set of industries than there is for primary customers.

Revenue by geographic market



The many different markets served by the Cleantech sector suggest that the sector should be well protected against the ebb and flow of market conditions in any one industry or any one region of the world.

Innovating locally, exporting globally

The reach of the industry is significant, as BC's Cleantech companies sell a significant amount of their products and services to customers outside of BC. Survey **results show by far the largest export market to be the United States**, and this is expected to remain the case for the next three to five years.

Comparing exports with domestic sales, survey results show:

- 34% of revenues come from BC;
- 15% are from the rest of Canada;
- 31% are generated by exports to the US
- 19%, or nearly one-fifth, of export revenue comes from Europe, Asia, and other countries.

Combined sales to Europe, Asia and other countries is expected to grow to one-third of total revenue by 2021.

Rising revenues

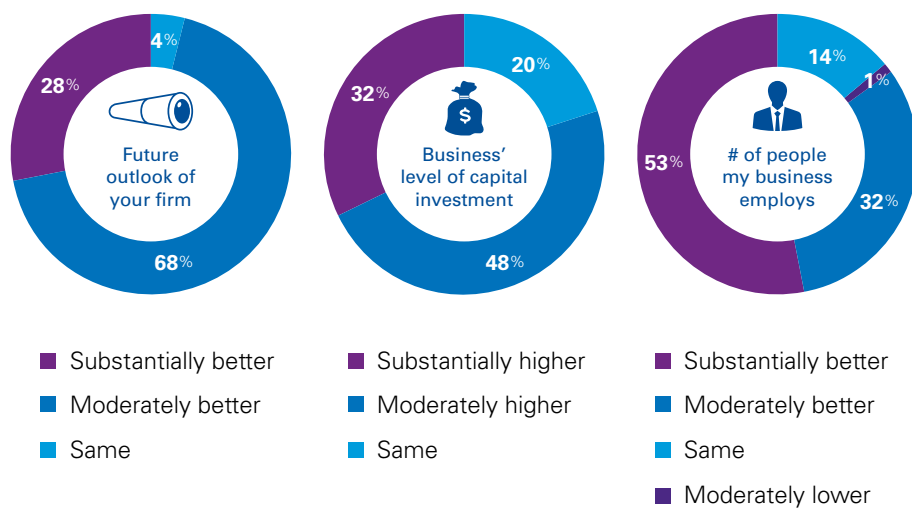
Total estimated revenues for the industry is forecasted to reach 1.8 billion in 2016, which would be a 20% increase over the 2014 figure. **Average revenue per company is anticipated to increase** to about \$6.6 million in 2016. While respondents appear very optimistic for 2017, the substantive increase is largely attributable to large number of respondents who are currently not generating revenue and are anticipating doing so in 2017. A similar optimism was expressed by the respondents to the 2011 survey.

Total revenues all respondents		Industry overall	
2014 Actual	\$456 m	2014 Actual	\$1.5 b
2015 Actual	\$518 m	2015 Actual	\$1.7 b
2016 Forecast	\$543 m	2016 Forecast	\$1.8 b
2017 Forecast	\$882 m	2017 Forecast	\$2.9 b

Business confidence

Cleantech companies were asked whether they thought that in one year's time their overall business situation would be better, worse, or stay the same; whether or not the level of capital investment would increase; and how the number of people they employed would change. Respondents express an **overall optimism about growth**, with 80% anticipate a moderate or substantial increase in capital investment. When it comes to employment, 85% expect their companies to hire in the next 12 months.

Business confidence



n = 81



Equity

Equity raised

Equity is crucial for technology companies engaged in developing innovative technologies. **Cleantech companies rely on equity to fund the multiple stages of their business:** research and development, commercialization, business development and sales activities.

Measuring equity raised since inception is one indicator of how well the R&D and commercialization phases of the business, in particular, have been funded. Total equity raised since inception by companies that responded to the survey is \$4.3 billion.

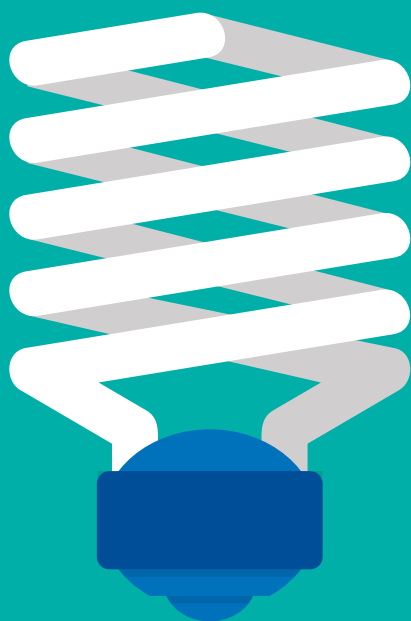
Total equity raised – all respondents

Since inception	\$4,314 m
Last 24 months	\$550 m
Next 24 months	\$702 m

Survey participants were asked to forecast how much they expect to raise in the 24 months following the survey. On average, respondents forecast raising \$9.6 million per entity.

Total equity raised – industry overall

Since inception	\$6.0 b
Last 24 months	\$1.14 b



Shifting sources of equity

Just as the destinations for BC's Cleantech products are diverse and dynamic, so are the domestic and international sources of equity that help fund them.

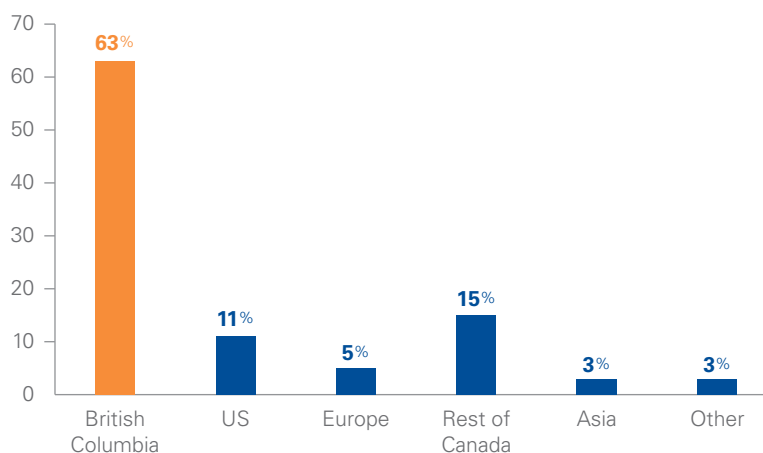
The **majority of equity raised is from British Columbia**, at 63%. Second and third to BC are the rest of Canada combined and the United States, respectively.

Figures from the 2016 survey have demonstrated a notable shift from figures reported in 2011. From 2009 to 2011, the US represented as much as 39% of equity sources compared with 11% now. Europe contributed 18% and has dropped to 5%. Asia contributed 9% compared with the current 3%, and equity sources from BC and elsewhere in Canada totalled 34%.

However, while a great majority of capital investment in the Cleantech sector comes from BC and other parts of Canada, **the combined investment from Europe, Asia and other locations remains significant**, at 19% – nearly one-fifth.

Given the major political leadership changes in Canada, the UK, Europe, and the USA in 2015 and 2016, and the consequent re-establishing of business priorities, it appears that it would serve the BC Cleantech sector well to continue to foster a diverse set of equity sources.

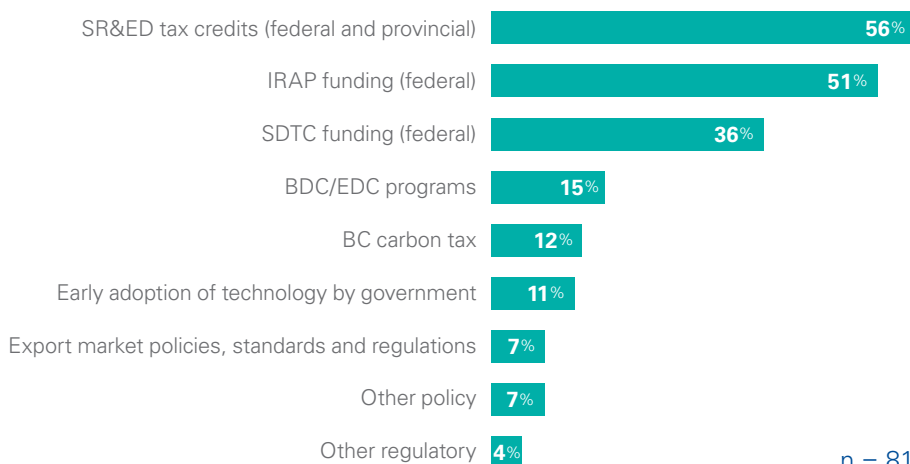
Equity by location



Current government programs

Government initiatives aimed at supporting Cleantech companies currently range from grants and tax credits, to regulations and policies – such as export policies – and early adoption of new technology by the government.

Programs and incentives currently used



n = 81

Consistent with 2011 survey responses, the 2016 results indicate a **high uptake of the wide range of federal and provincial government programs** that support Cleantech companies. In particular, when we asked companies which support programs are most beneficial to the sector, half of respondents indicate these two;

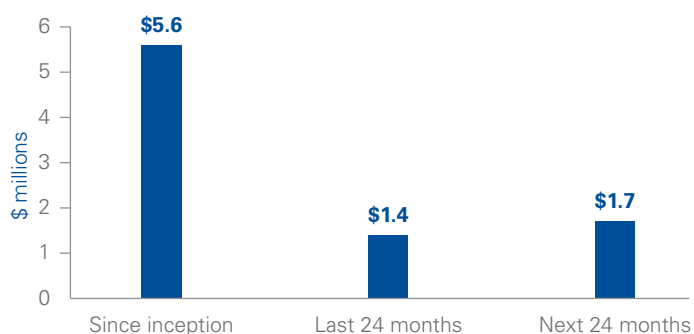
- Scientific Research and Experimental Development (SR&ED) tax credits.
- Industrial Research Assistance Program (IRAP) funding.

Grants

Grant funding, like equity, plays an important role in helping to finance the development and commercialization of new technologies produced by the Cleantech industry. As in aerospace, telecommunications and other major technology sectors, grants serve an especially important role in supporting the early stages of breakthrough innovation.

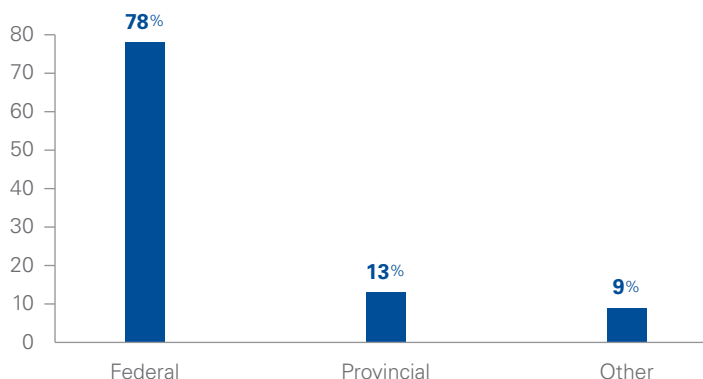
Currently, companies have indicated that 78% of grant funding comes from federal sources, 13% from provincial sources, and 9% from international sources.

Average grant funding



Federal funding has consistently been by far the largest source of grant funding for the Cleantech sector. The proportion of grants coming from federal sources has grown since 2011, and currently makes up three-quarters of all grant funding.

Sources of grant funding



The survey also gauged the amount of grant funding received, and the anticipated amount of funding that would be received in the two years following the survey. The total value of grant funding of responding companies since their inception averaged \$5.6 million, and a further \$1.7 million in grants is expected in the two years following the survey.

Total grant funding all companies

Since inception	\$368 m
Last 24 months	\$89 m
Next 24 months	\$107 m

Future government Cleantech programs

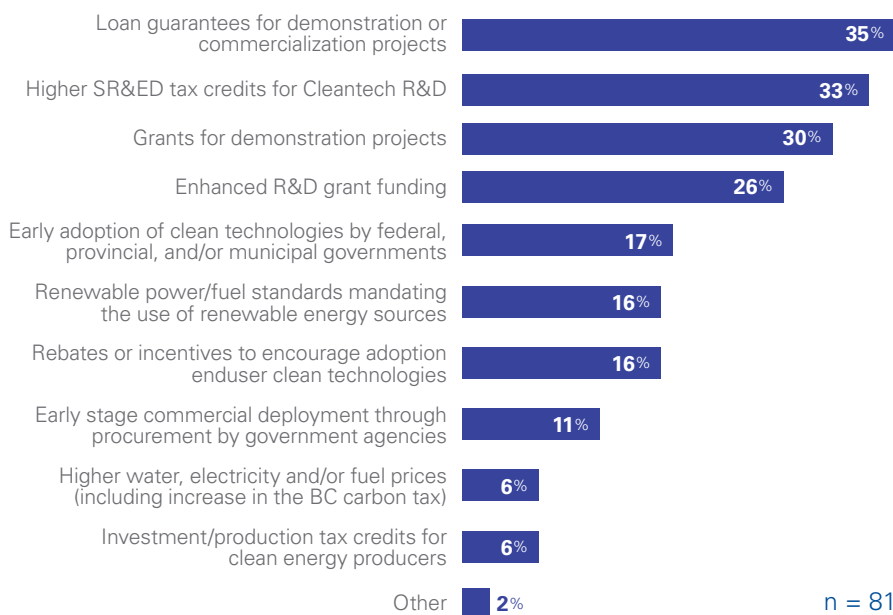
Looking ahead

There is an appetite for new governmental programs for BC Cleantech companies that are emerging from the research and development phase and are ready to commercialize their innovations and begin scaling up operations, revenue and growth.

Loan guarantees and grants for demonstration projects both figure in the top three categories of government programs that are of interest to Cleantech companies, just as they were in 2011.

The survey provided ten ideas, represented by the categories in the accompanying chart, for ways in which government could enhance its support of the Cleantech sector. Respondents were asked to indicate the two that would most benefit their company.

Ideas for future government programs



Total % age exceeds 100% due to respondents being invited to choose two categories.

While every category registered interest from respondents, these three are the most popular with one-third of respondents:

- **Loan guarantees** for demonstration or commercialization projects.
- Higher **SR&ED tax credits** for Cleantech R&D.
- **Grants** for demonstration projects.

Apart from categories related to direct financial support, adoption of clean technologies also received a lot of interest. Nearly one-third of respondents indicate these among their top two choices:

- **Early adoption of clean technologies** by government (municipal, provincial, or federal); or
- **Early-stage commercial deployment of clean technologies** through procurement by government.

Also on the topic of adoption, the following ideas garnered considerable support:

- **Initiatives to mandate the use of renewable energy** sources; and
- **Rebates/incentives to encourage adoption** of end-user clean technologies.

The responses are consistent with those arising from the 2011 survey.



About KPMG's Cleantech survey

Goal of the 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 update our understanding of this vital industry, **KPMG in Canada teamed with the BC Cleantech CEO Alliance** for the second time, to develop this *BC Cleantech 2016 Status Report*.

The objectives of the report are to **benchmark the size and growth of the industry**, assess change since 2011, and **provide valuable insights** for evaluating, advocating, and monitoring the growth and development of the industry in BC.

Additionally, this report serves to **identify actions and economic impetus** that could further industry growth.

Survey methodology

This status report has been developed based on an **online survey** sent to all Cleantech firms in the province – 273 firms in total. The survey was conducted in August and September of 2016. A total of 90 companies responded with 80 of those respondents completing the entire survey.

The data presented is based solely on responses to the survey and have not otherwise been verified by KPMG. Total industry estimates were extrapolated from the survey data.

For the purposes of this study, the definition of the Cleantech industry included **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 with respect to 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 operations. This process resulted in the identification of 273 active Cleantech firms operating in BC.

Note: % ages presented in this report may not add up to 100% due to rounding and the opportunity to choose more than one answer to some questions.





Acknowledgements

KPMG would like to acknowledge and thank the BC Cleantech CEO Alliance for their support and, in particular, the efforts of **Jonathan Rhone**. We are also very grateful for the support of **Marty Reed**, **Michiah Prull** and **Emma Gaiger** of **Evok Innovations**, whose contributions were invaluable.

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