
WHITE PAPER FOR A GREEN ECONOMY THROUGH CLEAN TECHNOLOGIES

OCTOBER 2014

ēcotech
Québec



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PREFACE

According to numerous experts, the cleantech sector is a competitive, dynamic industry that generates many jobs worldwide. What is more, the fight against climate change is a major challenge that will further stimulate its growth. A recent report from the World Bank was the first to quantify the demand for this sector:

"In just the last decade, clean technology has emerged as a major global market. Over the next 10 years, an estimated \$6.4 trillion will be invested in developing countries. Of the total market in developing countries, some \$1.6 trillion will be accessible to SMEs, according to the report."¹

If it is estimated that \$6.4 trillion will be invested in developing countries, one can just imagine what the total amount will be when the demand from North America, Europe and Oceania is included as well!

The companies that make up this sector are therefore at the forefront of the shift towards a green economy. Québec has considerable assets that could help it establish a strong position in this booming market segment, but international competition is fierce. The province is also home to significant R&D activity and a pool of creative entrepreneurs.

However, the Québec cleantech sector is still an emerging industry and faces numerous challenges that hinder its development. Firstly, it is still composed primarily of small businesses and entrepreneurs who are often less experienced than many of their competitors, notably when it comes to raising funds in global markets for capital-intensive projects. Secondly, limited access to networks of buyers and investors, both inside and

outside Québec, is impeding the growth of an initial demand for the products, processes, technologies and services of Québec cleantech companies, seriously compromising the creation of world-class Québec companies.

Écotech Québec believes that implementing certain recommendations will help make Québec a **breeding ground for developing the cleantech sector** and, consequently, **drive the expansion of Québec companies and entrepreneurs into global markets.**

Finally, Écotech Québec plans to work with its partners and the various levels of government to help implement these recommendations to build the champions of tomorrow.

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Écotech Québec

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Écotech Québec

¹ World Bank (2014). *Building Competitive Green Industries: The Climate Change and Green Technology Opportunity for Developing Countries*, Washington, DC: info DEV Growing Innovation, World Bank Group. <http://www.infodev.org/infodev-files/green-industries.pdf>

SUMMARY

“Clear government commitment to green growth can promote private investment in green sectors. Uncertainty about the policy and regulatory frameworks that affect business opportunities and the risk-return profile of investment is a key barrier to private sector engagement in green infrastructure. Clearly linking economic growth and environmental policy aims and highlighting areas identified by government as priority sectors for green growth (...) can therefore help governments unlock public and private investment, both foreign and domestic.”

OECD (2013). *How to Unlock Private Investment in Support of Green Growth*, Remarks prepared for the OECD Green Growth and Sustainable Development Forum 2013, held December 5 and 6, in Paris.

The Québec cleantech sector has tremendous potential. The province has ample sources of renewable energy, an environmentally aware population and a business environment that, while not perfect, is favourable to research and innovation. Furthermore, the sector already boasts a dynamic entrepreneurial spirit, comparative advantages and promising businesses in niches such as biomass and waste management, energy efficiency, eco-mobility, the treatment of contaminated sites, and water treatment and purification.² Once properly activated, certain levers could help the cleantech sector reach its full potential and distinguish itself nationally and internationally.

With this in mind, the Écotech Québec Financing task force, co-chaired by Andrée-Lise Méthot (Cycle Capital) and Antoine Michaud (Tandem Expansion), asked Deloitte to conduct a study in order to better document these levers.³ The members of this task force include representatives from organizations like the TSX Venture Exchange, the Centre of Excellence in Energy Efficiency (C3E), CorpoSana Capital, Desjardins Venture Capital, the Fédération des Caisses Desjardins du Québec, Fondation CSN, Idénergie, Investissement Québec and Sustainable Development Technology Canada (SDTC).

In this study, Deloitte identified measures used to support the sector in a number of countries and consulted with various industry stakeholders (entrepreneurs, investors and experts) to determine and prioritize a series of levers and measures that could boost the Québec cleantech sector.

The study revealed that, unlike cleantech in other regions and countries, the Québec sector is still an emerging industry and faces numerous challenges that hinder its development. One way for the Québec business environment to become more conducive to the emergence and growth of innovative companies is to increase the local demand for this technology among public and para-public organizations and major private buyers. Also, Québec entrepreneurs could be better equipped to become world-class players. In fact, it is not enough for

² Écotech Québec (2012a). *The Québec Cleantech Industry: Study and Benchmarking*, Montréal: Écotech Québec, March 2012.

³ Écotech Québec (2014b). *Propulser le secteur des technologies propres : identification des leviers d'action prioritaires, study conducted by Deloitte on behalf of Écotech Québec*.

companies to have access to more diverse sources of financing and enhanced support at the commercialization and export stages; entrepreneurs must also be better prepared to show off their companies to local and foreign investors, more open to adopting an ambitious entrepreneurial culture and quicker to try new things with their business models and types of projects.

Furthermore, the cleantech sector's tremendous potential could be better leveraged if its participants did more networking, particularly with entrepreneurs and investors who have been successful in Québec and internationally. In fact, participating in organized networking opportunities could provide Québec companies with access to national and international networks of major private buyers, foreign financing to complement what is available in Québec, and valuable expertise from leaders already working in international markets.

In short, the Québec cleantech sector is operating in a business environment that still does not do enough to encourage the creation of veritable world-class companies. This business environment can, and therefore must, be improved.

Using the findings of the Deloitte study, Écotech Québec has formulated a series of more detailed recommendations. Écotech Québec believes that implementing certain recommendations will help make Québec a breeding ground for developing the cleantech sector and, consequently, drive the expansion of Québec companies and entrepreneurs into global markets.

Creating a more conducive business environment will, first of all, facilitate the emergence of high-quality companies and entrepreneurs. This business environment should take advantage of public procurement, recommend innovative fiscal measures, use and further promote the carbon market as a tool for economic development, and advocate for simplified, consistent government actions. Secondly, once properly established, this breeding ground for developing clean technology will provide entrepreneurs and companies with more favourable conditions for expanding into and exporting to global markets. To drive this expansion, there must be a greater emphasis on expertise and strategic networking and a well-balanced funding chain.

This white paper thus outlines how to achieve a green economy through clean technologies.

01 THE CLEANTECH INDUSTRY

Écotech Québec asked Deloitte to conduct a study⁴ to determine the most relevant and suitable levers for driving the expansion of the Québec cleantech sector. In this study, Deloitte identified measures used to support the sector in a number of countries and consulted with various industry stakeholders to determine and prioritize a series of levers and measures that could boost the Québec cleantech sector.

Activating certain levers is likely to have a positive effect on the supply and demand of Québec products and services, as well as on the sector's business maturity. Before going over the key findings, let us review some facts about the sector.

1.1 CURRENT SITUATION

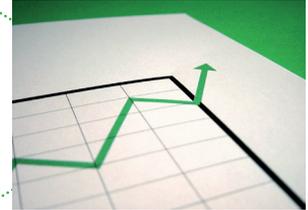
In Québec, the cleantech ecosystem encompasses over 1,000 organizations: about 500 innovative companies (94% of which are SMEs and 70% of which are active on international markets), nearly 200 research and development or technology transfer organizations, more than 30,000 jobs and total revenues of \$10.7 billion in 2011.⁵

In October 2012, Écotech Québec gave the Institut de recherche en économie contemporaine (IREC) a mandate to conduct an economic impact study using data gathered from a survey of companies developing cleantech solutions.⁶ Using the cross-sectoral model of the Institut de la Statistique du Québec (ISQ), this economic impact study was able to estimate the number of direct and indirect jobs as well as the Québec and federal tax and incidental tax revenues while factoring in the cross-sectoral effects.

Québec tax revenues derived from the activities of the companies surveyed totalled, for fiscal year 2011-2012, \$28.6 million, while Ottawa earned \$17.2 million in revenues from the same companies. Incidental tax revenues for both levels of government were \$48.4 million.



Renewable energy



Energy efficiency



Green chemistry



Sustainable mobility



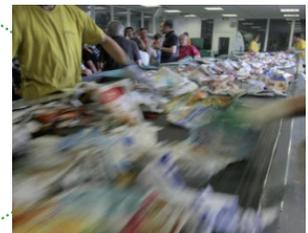
Soil & Groundwater



Water



Air



Residual waste

⁴ Écotech Québec (2014b). Op. cit.

⁵ Institut de la statistique du Québec (2013). *Enquête québécoise sur l'industrie de l'environnement 2011 – Rapport d'enquête, Québec: ISQ.*

⁶ Administered by IREC, the survey was sent to 242 Québec companies developing clean technology over the period October 16 to 30, 2012. It was completed by 53 companies, for a response rate of 21.9%. The data covered the fiscal year 2011-2012.

Although the economic benefits only represented 9.5% of sales, a large proportion of these benefits stemmed from the companies' spending on R&D and commercialization. Jobs associated with these activities make up 23.6% of the total number of jobs created by these companies. Direct tax revenues from these activities accounted for 18.6% of the total for the Québec government and 19.8% for the federal government. Finally, the incidental tax revenues generated by these two activities represented 16.7% of the total.

OVERALL ECONOMIC IMPACT OF R&D AND COMMERCIALIZATION

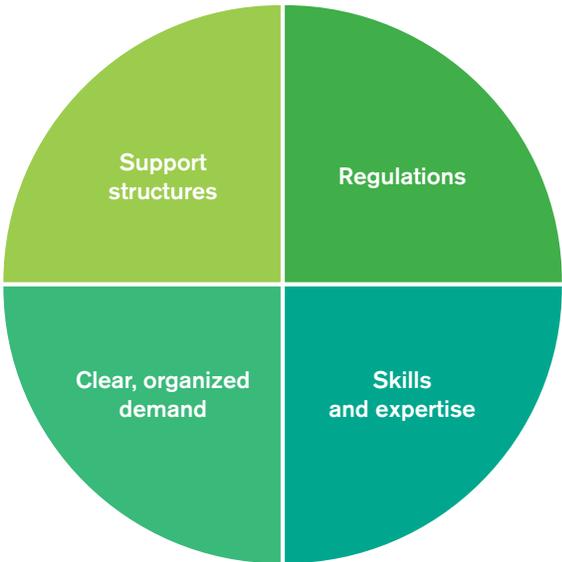
TOTAL EFFECTS			
	Industry total	R-D	Commercialization
	\$1,034.6 million	\$49.8 million	\$48 million
	Workforce		
Jobs (salaried and other)	4 912	590	568
	Government revenues (in thousands)		
Québec	28 583	2 715	2 615
Canada	17 172	1 733	1 669
Incidental tax revenues ⁷	48 426	4 122	3 972

These activities are labour-intensive, so they have a significant direct economic impact and are important to the economy. Activating certain levers could help boost the cleantech sector's economic impact even further.

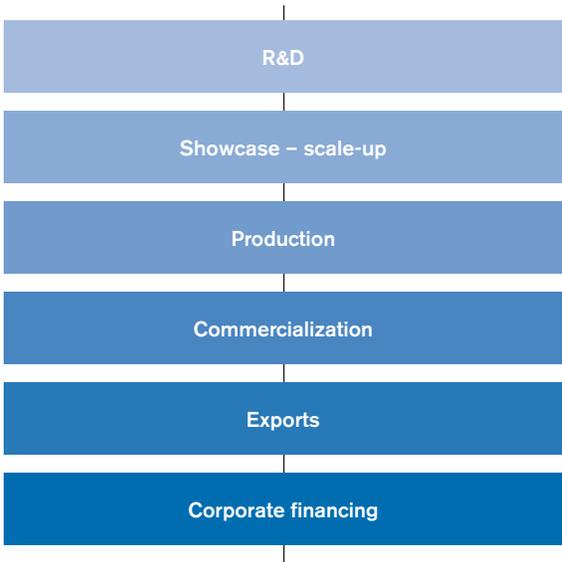
1.2 METHODOLOGY

This study identified and categorized a series of levers on the basis of whether they contributed to sector competitiveness or directly supported Québec companies.

CATEGORY 1. CONTRIBUTIONS TO SECTOR COMPETITIVENESS



CATEGORY 2. SUPPORT FOR CLEANTECH COMPANY PERFORMANCE



⁷ Includes the QPP, HSF, CSST, OPIP and employment insurance.

Introducing some of these levers and creating appropriate measures for activating them could help create a business environment conducive to the development of the cleantech sector. Such an environment could attract investment and foster the emergence of world-class Québec companies.

Therefore, a two-step process was conducted: one, define the levers, and two, prioritize the measures needed to activate (or implement) them, based on the following information:

- a benchmarking and analysis of practices used in six countries⁸
- the perspective of international and Québec cleantech clusters
 - a survey of cluster members of the International Cleantech Network⁹
 - a working meeting with Écotech Québec
- the perspective of Québec cleantech companies
 - a survey, discussion groups, telephone interviews
- the perspective of Québec investors in the cleantech sector
 - a survey, discussion groups, working meetings

Finally, representatives from the Québec Ministère des Finances et de l'Économie (MFE)¹⁰ were also consulted as part of the process.

1.3 A GROWING SECTOR WITH TREMENDOUS POTENTIAL

The Québec cleantech sector is composed primarily of small businesses. Some focus on research, development and demonstration, while others are at the stage of commercializing their technologies, processes, products and services. The Deloitte study noted that entrepreneurs in this sector, compared to their international competitors, could benefit from having more experience, particularly when it comes to management and seeking financing.

As a result, it remains difficult for Québec companies to finance products, technology and processes requiring capital-intensive investment, from the design stage to commercialization. In addition, the general public and major private buyers (governments and businesses) remain relatively unaware of the range of available cleantech products and their potential environmental and economic benefits. This situation hinders the emergence of a clear, organized local demand that would enable Québec companies to develop the recognition and expertise needed to reach a critical mass and commercialize their products on a larger scale, here and internationally.

Activating certain levers could foster the creation of a business environment conducive to developing world-class companies. For example, introducing environmental regulations with stronger incentives could help spur demand for cleantech products and services. Similarly, creating specific support structures could directly improve the performance of companies at various stages of development.

However, the selection of levers that could drive the expansion of the cleantech sector and the method of activating them depend on the context in which they are implemented. Consequently, an exercise was conducted to prioritize the levers and measures that could boost the cleantech sector, using a methodology that reflects the Québec context.

1.4 STAKEHOLDER PERSPECTIVES ON LEVERS

The process that Deloitte used to prioritize the levers and activation measures involved gathering various viewpoints on the state of the cleantech sector and the best ways to ensure its growth and competitiveness. These complementary findings were obtained using a variety of information gathering methods.

THE PERSPECTIVE OF INTERNATIONAL PRACTICES

The first perspective came from a benchmarking and analysis of practices used in the United States, France, Germany, Finland, Denmark and Israel, countries with well-established cleantech sectors. According to this exercise, the levers most commonly used for cleantech development are support structures (incubators, clusters and international alliances to support local companies) and R&D support (investment in research centres, the creation of platforms to support innovation).

Other popular lines of action are to create a clear, organized demand locally (notably through public procurement and the use of incentives) and support for exports, particularly in countries where the small local market compels companies to engage in international trade, as is the case in Québec.

THE PERSPECTIVE OF CLEANTECH CLUSTERS

Consultations with international and Québec cleantech clusters highlighted the importance of two things: creating an ecosystem to build business competitiveness and generating "local champions." With regard to the former, clusters underscored the need to work on developing a clear, organized demand and implementing regulations favourable to the sector's development.

As for levers to foster the development of high-quality companies, many clusters mentioned that it was difficult for entrepreneurs to obtain adequate financing for their projects, particularly from the private sector. In Québec, it would appear that scaling up and showcases are levers to be activated in the short term, along with commercialization.

⁸ Germany, Denmark, the United States, Finland, France and Israel.

⁹ A Germany (Renewable Energy Hamburg), Austria (Eco World Styria), South Korea (Incheon TechnoPark), Denmark (Copenhagen Cleantech Cluster), the United States (Colorado Clean Energy Cluster, Research Triangle Cleantech Cluster), France (Tenerdis), Italy (Lombardy Energy Cluster).

¹⁰ Now known as the Ministère de l'Économie, de l'Innovation et des Exportations (MEIE).

THE PERSPECTIVE OF QUÉBEC COMPANIES

Québec cleantech companies stressed the need to stimulate a clear, organized demand in a small market like Québec. To this end, activities to raise awareness among potential users of this technology and the government, as well as changes to tender processes, could be beneficial.

According to the companies consulted, strengthening and simplifying regulations could also help stimulate the sector, as could streamlining sometimes cumbersome administrative procedures. In addition, it would be a good idea to better coordinate the many existing support structures so they can respond more effectively to the needs of entrepreneurs. Corporate financing should also be improved, notably by creating opportunities for Québec entrepreneurs to meet with foreign investors.

Finally, Québec companies noted the importance of supporting commercialization and exports,¹¹ notably by helping business partners from here connect with those from abroad and by developing business intelligence in certain countries; both actions would enhance the Québec cleantech sector's reputation on international markets.

THE PERSPECTIVE OF QUÉBEC INVESTORS

The Québec investors consulted primarily emphasized the importance of enhancing the skills and expertise of entrepreneurs and their management teams. In other words, skills and expertise are key to the success of Québec companies. In fact, it is crucial that Québec cleantech entrepreneurs have access to relevant expertise in management, presenting projects and raising capital. The creation of networks to connect entrepreneurs with experienced business leaders and the development of a better understanding of target markets could accelerate the business maturity of entrepreneurs.

Investors also underscored the need to stimulate a clear, organized demand for cleantech products in the Québec market, as well as the importance of attracting more financing and providing better support for the demonstration (showcases), commercialization and export stages of development, a step that is practically obligatory for Québec companies who must reach a sufficient critical mass in order to survive and develop in what is a largely globalized market.

1.5 FROM LEVERS TO RECOMMENDATIONS

Taking into account the levers identified during the consultation process and the situation in Québec, Écotech Québec is proposing a series of recommendations that, if implemented, would benefit the cleantech sector.

Sections 2 and 3 thus set forth two categories of recommendations. The first category calls on the various levels of government to implement the recommendations to help make Québec a breeding ground for developing the cleantech sector. The second category calls on stakeholders in the ecosystem, as well as entrepreneurs, to better support the effort to expand into global markets.

¹¹ The term commercialize refers to the activity of defining a product, targeting potential markets and then accessing commercial distribution channels. The term export refers to the activity of commercializing a product, process, expertise or service outside of one's home country.

02

MAKING QUÉBEC A BREEDING GROUND FOR DEVELOPING THE CLEANTECH SECTOR

A favourable business environment can facilitate the emergence of high-quality companies and entrepreneurs. Écotech Québec has identified several activities associated with this objective: strengthen and improve policies and regulations, use innovative tax tools more effectively and stimulate public procurement. Once activated, these various levers can effect change quickly because they will improve the conditions needed to develop the cleantech sector.

Écotech Québec therefore proposes a first category of recommendations that call on governments to make Québec a breeding ground for the emergence of world-class entrepreneurs.

2.1 PUBLIC PROCUREMENT: AN ESSENTIAL TOOL FOR STIMULATING DEMAND

Leveraging public procurement is a measure that would generally stimulate demand in the cleantech sector, in addition to lending Québec companies credibility by providing them with opportunities to put their innovations to the test, enabling them to reach a critical mass and enhancing their capacity for international expansion.

Québec public procurement spending totalled as much as \$28.7 billion in 2009. The Québec government, its public and para-public organizations and municipalities are therefore major buyers who can support cleantech companies by serving as demonstration sites and adopting better procurement practices, from both an economic and environmental point of view.¹²

To further increase the role of public organizations as testing grounds and technology showcases, Écotech Québec believes that adding a new criterion to the objectives set forth in the Government Sustainable Development Strategy 2015-2020 could be a very effective first step if there is real political will.

Such a move would provide strong support for the subsequent large-scale commercialization of many of these technologies¹³ and offer great economic and environmental potential. Initiatives like Québec City's technology showcase program¹⁴ and Montreal's¹⁵ smart city project are some examples of how cities can become laboratories to test innovative solutions for municipal challenges.

Beyond providing a testing ground, the government could lead by example, which could translate into more investment dedicated to clean technology. For example, the Finnish government has adopted a new rule whereby government purchasers must consider cleantech in their calls for tender.¹⁶ The goal is to reduce the public sector's use of materials and energy throughout the life cycle of products and services, with a particular focus on waste management, transportation, energy production and energy efficiency. This measure aims to use 1% of the government's total procurement budget to support Finnish SMEs. The Finnish approach goes even further by having value propositions include life cycle cost calculations.

Québec employs the "1%" approach in its policy of integrating art into the architecture and environment of government and public buildings and sites. The aim of this policy is to support the creation of works of visual art and craft across the province. All construction projects worth over \$150,000 financed by government departments and organizations, or by individuals or other organizations receiving government subsidies for capital projects, must set aside 1% of their budgets for the purchase of artworks. This practice could act as a template for the creation of a similar government initiative to promote made-in-Québec green innovations, while also helping to reduce the ecological footprint and improve the efficiency of public and para-public organizations.

Furthermore, Écotech Québec believes that including performance goals in calls for tender, along with criteria like the total cost of ownership, could lead to the selection of clean technologies, thus appreciably stimulating demand. Creating green procurement practices through calls for tender would also help the government lead by example.

Performance contracts use a contractual agreement to oblige service suppliers to guarantee a target in terms of environmental impact or energy consumption, for example. Écotech Québec strongly supports the development of such performance standards¹⁷ rather than specifications based on the use of specific technologies, processes or materials or the rule of the lowest bidder.

Under the Regulation respecting construction contracts of public bodies, a technology or product is selected primarily according to the energy savings it procures, rather than simply the cost of acquisition. This practice could be extended to public contracts involving any products or services that consume energy and all renovation or construction projects; this would enable public procurement to encourage the development, adoption and commercialization of clean technologies.

¹² Écotech Québec (2014a). *Vers un rôle accru des organismes publics pour accélérer la commercialisation des innovations vertes du Québec*. [Towards an Increased Role for Government Agencies to Accelerate the Commercialization of Green Innovations from Québec], Écotech Québec.

¹³ Ibid.

¹⁴ https://www.ville.quebec.qc.ca/gens_affaires/strategie_dev_economique/programme_vitrine_technologique.aspx

¹⁵ http://ville.montreal.qc.ca/pls/portal/docs/page/prt_vdm_fr/media/documents/ville_intelligente_en_2014.pdf

¹⁶ https://ec.europa.eu/environment/eciap/about-eco-innovation/good-practices/finland/20131113-finland-focuses-on-future-prosperity-through-cleantech-growth_en

¹⁷ Écotech Québec (2014a). Op. cit.

An analysis of the total cost of ownership is an assessment that considers total economic costs over the life cycle of a project (operation, maintenance, follow-up and disposal) when analyzing the solutions submitted in response to a call for tender. The Québec government has recognized the importance of developing a Québec database of life cycle inventories (LCI) that can be used to document the environmental footprint of goods and services. It has therefore given CIRAIG (International Reference Centre for the Life Cycle of Products, Processes and Services) the necessary resources to develop such a database, adapted to the Québec context.¹⁸ Following the example of Finland, it would be pertinent to harness the data from life cycle inventories, which make up a body of information that can be used to assess the environmental impact of a good or service.

Under the *Regulation respecting service contracts of public bodies*,¹⁹ preferential treatment (by a margin of no more than 10%) can be given to bidders who are environmentally friendly or who offer a specific level of quality by applying an ISO standard or specification associated with sustainable development and the environment, for example. Such requirements must be specified in the tender documents. However, this practice is not common. In addition, the criteria used to assess a supplier's level of eco-responsibility could be based on indicators like the total cost of ownership (TCO), the life cycle cost (LCC) or environmental certifications, as well as the socio-economic impact (tax revenues, direct and indirect jobs, etc.).

It is now essential that public buyers be better informed about existing clean technologies. In fact, the lack of information and opportunities for discussion between potential users of green innovations and those who develop them is one of the main challenges facing the development of the cleantech sector.

With this in mind, Écotech Québec has created INNO+™, a marketplace that connects potential public users with suppliers (notably technology SMEs). Its aim is twofold: increase the productivity and competitiveness of businesses in a range of industries and promote the commercialization of made-in-Québec innovations. However, public buyers are too often unaware that innovative local products exist to meet their environmental, energy and economic challenges.

By familiarizing public purchasers with the innovative clean technologies being developed in Québec, the INNO+™ public procurement networking workshops could eliminate the information deficit of public buyers and make them aware of existing cleantech products. Another idea would be to require that government subsidies granted under projects such as the Plan Nord and the Maritime Strategy be subject to a sustainability criterion; in other words, organizations seeking funding would have to demonstrate that they looked for ways to reduce their carbon and ecological footprint by seeking sustainable solutions among the supply of made-in-Québec clean technologies. This is an excellent example of public procurement having a tangible impact.

Recommendations for using public procurement to stimulate demand for clean technologies:

- **Encourage public organizations to serve as testing grounds and technology showcases for made-in-Québec green innovations, which will then provide strong support for the large-scale commercialization of many of these technologies**
- **Draft a policy to promote clean technologies to increase investment from public and para-public organizations**
- **Encourage government departments and organizations to use performance-based calls for tender that include specific criteria like the total cost of ownership, thereby focussing on the end rather than the means**
- **Ensure that calls for tender issued by public and para-public organizations employ green procurement practices by offering an additional bonus during the bid analysis and giving the preferential margin to bidders who consider the three pillars of sustainable development**
- **Organize networking workshops with public and para-public organizations to acquaint them with the wide range of Québec-made cleantech solutions**

2.2 INNOVATIVE TAX TOOLS FOR ADEQUATE FINANCING

To consolidate the supply of and local demand for clean technologies, companies in this sector require better financial support for their projects during the various stages of their development. Écotech Québec believes that a better use of tax tools could be very effective.

Fiscal incentives for R&D, such as tax credits, are becoming increasingly common and generous in OECD countries.²⁰ Such measures are more effective than other types of fiscal incentives at increasing private R&D efforts and improving the innovation capacity of companies. Since such companies are more likely to launch an innovative product on the local and international markets, it would be logical to reinstate the R&D tax credit rate of 17.5% (salary of research staff), a percentage that was cut by 20% in the last budget in May 2014, notably for SMEs whose projects are associated with the fight against climate change. To be competitive, companies must improve both their innovative products and their services.

Furthermore, since the cleantech sector is still relatively young and focussed on innovation, many companies are now in the product commercialization phase. One of the primary challenges facing innovative companies is how to bring the products and processes they have developed to market given the financial resources required at this crucial stage. Increased support for

¹⁸ <http://www.ciraig.org/fr/bd-icv.php>

¹⁹ Government of Québec. 2014. Regulation respecting service contracts of public bodies, R.R.Q. c. C-65.1, r 4, sec. 50. Online. http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/C_65_1/C65_1R4_A.HTM

²⁰ OECD (2013). *Maximising the benefits of R&D tax incentives for innovation*, Directorate for Science, Technology and Industry, Paris: OECD, October 2013.

innovation commercialization would translate into job creation, business growth, increased exports for the companies involved and enhanced global recognition of our companies' strengths.

Écotech Québec believes it is critical to have a framework to encourage the deployment of green innovations in Québec. Therefore, it recommends that the existing R&D tax credit be extended to include the commercialization phase (salaries) for already qualified companies.

Instituted for a trial period of three years, such a measure would support companies in their marketing efforts and apply to the salaries of employees working to commercialize clean technologies and thus build sales and technical expertise to accelerate the marketing of green innovations. The measure would affect SMEs with fewer than 250 employees that have a solid commercialization plan in place and are developing or commercializing clean technologies that have been the subject of a request for intellectual property protection. At the end of this trial period, an evaluation would be conducted to judge the spin-offs and the implementation of such a measure. The estimated cost would be the equivalent of approximately 1% of the R&D credits granted each year, or less than \$8 million²¹ annually.

Recommendations for obtaining adequate financing to support the creation of wealth:

- **Roll back the R&D tax credit (salary of research staff) to the rate it offered prior to the 2014-2015 budget, for SMEs whose projects are associated with GHG reduction**
- **Extend the R&D tax credit (salary portion) for SMEs so it includes activities to commercialize clean technologies**

2.3 THE CARBON MARKET: A TOOL FOR ECONOMIC DEVELOPMENT

Écotech Québec supports Québec's decision to develop the carbon market by adopting the Cap and Trade System for Greenhouse Gas Emission Allowances in partnership with California. Ideally, of course, this market should expand to other North American jurisdictions as well.

The cap and trade system is Québec's primary instrument for reducing its GHG emissions, particularly in the industrial and energy sectors. It should be an opportunity to accelerate the rollout of made-in-Québec clean technologies. This rollout could take place in manufacturing, in sectors that will be indirectly affected by higher fuel prices, such as transportation and energy-intensive industries, and in sectors eligible for offset credits. It will also encourage the development of new clean technologies that could help reduce GHG. Increasingly, revenues from government auctions of emission allowances under the cap and trade system that are paid into the Green Fund should be earmarked for this purpose.

For example, the TechnoClimat program would benefit from taking a broader approach. To date, eligibility for this program has been restricted to new technologies that help reduce GHG emissions solely in Québec. This has meant that all technologies involving the production of green electricity (solar photovoltaics, wind energy, geothermal energy, etc.) and innovative energy efficiency technologies²² that do not replace the use of fossil fuels have not been eligible for the program because, even though they would be considered GHG-reduction technologies in many places around the world, in Québec, these technologies would produce electricity to replace hydroelectricity, which emits very few GHG. However, all the kilowatts saved and all the new kilowatts produced can, in fact, replace thermal energy produced by our neighbours, which is a significant contribution to GHG reduction. In addition, support for these technologies would enable Québec to export the expertise developed here and thus take full advantage of the opportunities offered by the booming international renewable energy market.

Québec must also find ways to maximize the economic benefits (or minimize the economic impact) of the cap and trade system, notably by developing more offset credit protocols. Since the current potential for offset credits in Québec is limited and the increase in energy prices will probably not be enough to significantly modify consumer behaviour, Québec and its companies may have to purchase emission rights in California in order to meet their commitments, leading to a flight of capital. It is therefore essential to support efforts to bundle projects together to combine their offset credits; it is also important to propose more activities that are eligible for carbon credits. Current Québec protocols cover manure storage facilities (agriculture), landfill sites (waste management) and the ozone-depleting substances (ODS) present in insulating foam. Other protocols should be published soon, including one on methane from coal mines and the addition of refrigerants to the ODS protocol.

Finally, a clear signal must be sent with regard to the possible extension of the legal framework beyond the year 2020 to facilitate the financing of current GHG reduction projects that require more than five years to repay their principal.

Recommendations for taking full advantage of the carbon market as a tool for economic development:

- **Encourage various industrial sectors to adopt more green innovations to reduce GHG as part of the cap and trade system and extend its legal framework beyond the year 2020 to facilitate the financing of current GHG reduction projects**
- **Accelerate the development of new offset credit protocols so more emission rights may be purchased in Québec**
- **Leverage the Green Fund to better support government programs designed to support the development of clean technologies associated with climate change**

²¹ Institut de recherche en économie contemporaine (2013). *Analyse d'impact d'un crédit d'impôt à la commercialisation des technologies propres* [Impact assessment of a cleantech commercialization tax credit], study conducted on behalf of Écotech Québec, July 2013.

²² Hydro-Québec currently has the mandate to support purely electric innovative energy efficiency technologies through its IDEAS and AVENUES programs. Since the mandate of the Bureau de l'efficacité énergétique (Energy Efficiency Bureau) is limited by its existing master plan, this plan will be revised in the next few years.

2.4 SIMPLIFIED, CONSISTENT GOVERNMENT ACTIONS

Implementing consistent policies as well as strengthening and complying with existing regulations and standards will stimulate the local supply of and demand for clean technologies. Well-designed policies and regulations can also generate major economic benefits for Québec. For example, the German government's ambitious objectives to reduce CO₂ emissions and improve energy efficiency by the year 2050 have strengthened the demand for clean technologies so much that Germany is now a global leader in the field.²³ In Québec, waste management regulations have encouraged companies working in this sector to develop new technologies and processes.

Écotech Québec notes that simplifying regulations and administrative procedures—even the pre-approvals needed to obtain performance-based certificates of authorization—could accelerate the development, adoption and commercialization of clean technology. It therefore salutes the Québec government's objective, set forth in the 2014-2015 budget, to cut the cost of administrative procedures imposed on SMEs by 20% by the end of 2015 and create a standing oversight committee to implement the recommendations of the report issued by the task force on regulatory and administrative streamlining.²⁴

These policies and regulations have specific time-frames for implementation that must be respected and that can affect the investment decisions of companies. Écotech Québec believes that environmental regulations and policies should incorporate more economic development and workforce training objectives.

Furthermore, Écotech Québec is of the opinion that the process of issuing environmental approvals from the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) must be simplified and made more efficient. One way to do this would be to create online "smart" forms more relevant to the various types of projects, along with better help tools for applicants. Like Ontario, Québec could also set up a simplified authorization process for environmentally friendly projects. In effect, applications submitted by companies to various government organizations and programs must be fast-tracked when the projects of the companies in question are consistent with the priorities of the government or the Climate Change Action Plan.

Écotech Québec also notes significant regional disparities in the way such authorizations are issued, the complexity of the process and the delays encountered. This situation not only hinders the development of clean technologies, it also impedes the development of various regions. Harmonizing audits, notably by organizing sessions to coordinate the efforts of the MDDELCC and the departments in charge of financial assistance to projects, would help accelerate decision making.

In addition, now that more government departments and public participants are focussed on the green economy, there is a definite need to ensure greater consistency among policies, programs and measures. In this regard, Écotech Québec salutes

the mandate of the Minister for Small and Medium Enterprises, Regulatory Streamlining and Regional Economic Development, which is to reduce paperwork and regulations. Red tape is a barrier to start-ups. Furthermore, it would also be a good idea if the Secretariat of the Ministerial Committee on the Economy, Job Creation and Sustainable Development could put together a "response team" with the following objectives: 1) make policy implementation more predictable to validate the business decisions of entrepreneurs; 2) implement a mechanism for coordinating and resolving issues associated with ministerial decisions; and 3) ensure regular reporting on the results achieved due to increased support for the green economy (GHG avoided, jobs created, etc.).

Recommendations for simplifying and ensuring greater consistency in government actions to accelerate the transition to a green economy:

- **Accelerate and simplify the issuance of government authorizations, particularly certificates of authorization for projects that incorporate new technologies with a positive environmental impact**
- **Set up a response team for the Ministerial Committee on the Economy, Job Creation and Sustainable Development dedicated to removing barriers and quickly settling any disagreements associated with the demonstration and use of clean technologies**

²³ Écotech Québec (2014b). Op. Cit.

²⁴ Ministère des Finances du Québec (2014). "Budget 2014-2015: Initiatives to Support SMEs and Private Investment!" Press Release 3, Québec, Thursday, June 4, 2014.

03 DRIVING THE EXPANSION OF CLEANTECH COMPANIES

In a context more conducive to the creation of cleantech companies, entrepreneurs will have a more favourable business environment for developing and commercializing their green innovations. However, given the small size of the local market, the development of the cleantech sector also requires the emergence of world-class Québec entrepreneurs capable of competing with experienced international rivals.

Therefore, the second category of recommendations involves entrepreneurs and ecosystem stakeholders who are able to better support their efforts to expand into global markets.

3.1 EXPERTISE: THE KEY TO BUSINESS SUCCESS

Québec is home to a pool of dynamic, creative entrepreneurs working in the cleantech sector. Many have the potential to expand their companies into global markets and thus become world-class players. For this to happen, it is essential to promote a more ambitious entrepreneurial culture so entrepreneurs will be better equipped. In this regard, Écotech Québec salutes the Innov8-Agir initiative of the Caisse de dépôt et placement du Québec, which aims to stimulate entrepreneurial culture in Québec, starting with the education of our young people. Entrepreneurs would also benefit from working with an experienced team, especially when it comes to management, project presentation, raising capital and market development.

Innovative companies in Québec have access to a number of support structures (local development centres, incubators, research and technology transfer centres, etc.). Écotech Québec believes that it is time to network these structures to promote more dialogue among researchers, entrepreneurs and investors as well as encourage the addition of high value-added services (e.g., mentoring, intellectual property, commercialization strategy).

For this reason, Écotech Québec supports the rollout of a new accelerator dedicated to the cleantech sector. The objectives of this accelerator, launched by the private sector, are in line with the mission of Écotech Québec: 1) strengthen the cleantech

ecosystem; 2) increase investment opportunities; and 3) develop local entrepreneurship. It will provide opportunities for Québec entrepreneurs to connect and network with experienced entrepreneurs already working in international markets.

In addition to launching this accelerator, it is crucial to recommend measures that will enhance entrepreneurs' awareness of the importance of working with experts who can support their efforts. Furthermore, it is essential that business leaders be better informed and supported so they can acquire a clear understanding of existing financing opportunities and be in a position to present their projects in a more organized, compelling way.

To complement the training of Québec entrepreneurs and their management teams, workshops, organized specifically to address the requirements of the cleantech sector or adapted for this purpose, could quickly acquaint them with the global issues they must face in order to successfully carry out their business projects. These workshops would also give entrepreneurs a chance to work with "star players" who could give them relevant business information. Potential topics could include, for example, intellectual property strategies, international development, new business models, investor relations or even best business practices.

Recommendations for further developing the expertise of entrepreneurs and their management teams:

- Support the [rollout of an accelerator to facilitate financing opportunities and provide mentoring to cleantech entrepreneurs](#)
- Strengthen the [expertise of entrepreneurs by facilitating the creation of specific workshops or adapting existing workshops associated with the realities of the cleantech sector](#)

3.2 INCREASED STRATEGIC NETWORKING

Écotech Québec believes that the development of the Québec cleantech sector not only depends on the presence of high-quality entrepreneurs and innovative companies with critical mass, it also requires a better understanding of markets and direct access to major networks of buyers and investors. Écotech Québec believes that, without this access, Québec could miss an opportunity to reach its full potential in a sector capable of generating both wealth and high-quality jobs.

Around the globe, a key characteristic of the cleantech sector is the existence of strategic partnerships—including networks of investors. These partnerships often act as powerful levers that help drive innovative companies into commercialization networks. Unfortunately, few Québec companies are currently part of such partnerships.

However, Québec is home to numerous world-class companies and entrepreneurs working outside the cleantech sector. They are major private buyers and many of them have been members of global networks in their respective industries for a number of years. These experienced companies and entrepreneurs could be called upon to help launch new champions from the cleantech sector.

Worldwide, the cleantech sector also includes seasoned entrepreneurs and investors whose expertise could be of great interest to Québec entrepreneurs. Facilitating connections with them could therefore potentially be extremely beneficial.

Creating a network of buyers (public and private) would give local companies more opportunities to demonstrate and implement their technologies on the local market. This would enable them to improve their proposal as part of their export efforts and develop a solid sales pitch that would then make it easier to sell their products or services in the global marketplace. This network would benefit many innovative companies, stimulate a very promising sector and contribute to achieving environmental and economic objectives. To this end, Écotech Québec will continue its association with MEQ (Québec Manufacturers and Exporters) and work on developing other such partnerships.

These arrangements could take several forms. Écotech Québec believes that if very promising Québec companies put experienced entrepreneurs with extensive connections on their boards of directors or advisory committees, they could accelerate their access to global markets. Major Québec companies could also develop closer business ties with stakeholders from the cleantech sector by inviting them into their global business networks, as the Caisse de dépôt et placement has done, acting as a bridge to foreign markets.

Recommendations for further developing the strategic networking efforts of cleantech entrepreneurs:

- **Help export companies work more closely with cleantech companies to thereby facilitate connections between world-class "star players" and entrepreneurs with strong potential**

3.3 A MORE DIVERSE FUNDING CHAIN

Québec would benefit greatly from an influx of foreign investors to complement and diversify the types of financing available in the province. Overall, the funding chain for Québec cleantech companies seems relatively balanced, thanks in part to tools recently implemented by the Québec government (programs, the Anges Québec capital fund, Cycle-C3E Seed Fund, etc.).²⁵

However, what the funding chain needs now are tools and modes of financing better suited to capital-intensive projects, like factory construction, and more appropriate financing vehicles. Funds of a sufficient size (over \$100 million) could support the growth of cleantech companies during the period known as the "valley of death." In this regard, the "fund-to-fund" approach is beginning to yield results and attract foreign co-investors.

Écotech Québec is planning to update its study on the Québec funding chain. It then wants to better publicize the types of financing available in Québec so entrepreneurs are fully aware of all the possibilities.

Recommendations for providing modes of financing better suited to the projects of cleantech entrepreneurs:

- **Ensure a diverse funding chain, notably for more capital-intensive projects that could require special financing**
- **Help generate interest from foreign investment funds likely to invest in Québec cleantech companies**

²⁵ Écotech Québec (2012). *The Quebec Cleantech Industry: A Review of the Funding Chain*, Montreal: Écotech Québec, November 2012.

04 CONCLUSION

The Québec cleantech sector holds tremendous potential. The province is already home to a pool of entrepreneurs and companies that excel in several very promising segments of the cleantech sector.

Creating a more conducive business environment will, first of all, facilitate the emergence of high-quality companies and entrepreneurs. This business environment should take advantage of public procurement, recommend innovative fiscal measures, use and further promote the carbon market as a tool for economic development, and advocate for simplified, consistent government actions. Secondly, once properly established, this breeding ground for developing clean technology will provide entrepreneurs and companies with more favourable conditions for expanding into and exporting to global markets. To drive this expansion, there must be a greater emphasis on expertise and strategic networking and a well-balanced funding chain.

This will help the cleantech sector attract foreign investment and create high-quality jobs and economic benefits worthy of this dynamic international growth industry.

Écotech Québec believes that implementing certain recommendations will help make Québec a breeding ground for developing the cleantech sector and, consequently, drive the expansion of Québec companies and entrepreneurs into global markets.

These recommendations were prioritized by looking at the current socio-economic context, the relative speed with which they could be implemented, and their positive impact on the sector's development. Although all of the recommendations (listed in the tables below) are essential, five recommendations have been categorized as "top priority" (***).

Finally, as these recommendations could involve a number of different associations, organizations or even government departments, Écotech Québec has decided it will meet with these participants to put together an action plan. This plan will be used to identify the most suitable and promising organizations for implementing these recommendations, in co-operation with Écotech Québec.

MAKING QUÉBEC A BREEDING GROUND FOR DEVELOPING THE CLEANTECH SECTOR

USING PUBLIC PROCUREMENT TO STIMULATE DEMAND FOR CLEAN TECHNOLOGIES

	Encourage public organizations to serve as testing grounds and technology showcases for made-in-Québec green innovations, which will then provide strong support for the large-scale commercialization of many of these technologies	★ ★ ★
	Draft a policy to promote clean technologies to increase investment from public and para-public organizations	★
	Encourage government departments and organizations to use performance-based calls for tender that include specific criteria like the total cost of ownership, thereby focussing on the end rather than the means	★ ★
	Ensure that calls for tender issued by public and para-public organizations employ green procurement practices by offering an additional bonus during the bid analysis and giving the preferential margin to bidders who consider the three pillars of sustainable development	★ ★
	Organize networking workshops with public and para-public organizations to acquaint them with the wide range of Québec-made cleantech solutions	★ ★

FINANCING THAT USES INNOVATIVE FISCAL MEASURES

	Roll back the R&D tax credit (salary of research staff) to the rate it offered prior to the 2014-2015 budget, for SMEs whose projects are associated with GHG reduction	★ ★
	Extend the R&D tax credit (salary portion) for SMEs so it includes activities to commercialize clean technologies	★ ★ ★

THE CARBON MARKET AS A TOOL FOR ECONOMIC DEVELOPMENT

	Encourage various industrial sectors to adopt more green innovations to reduce GHG as part of the cap and trade system and extend its legal framework beyond the year 2020 to facilitate the financing of current GHG reduction projects	★ ★
	Accelerate the development of new offset credit protocols so more emission rights may be purchased in Québec	★ ★
	Leverage the Green Fund to better support government programs designed to support the development of clean technologies associated with climate change	★ ★ ★

SIMPLIFIED, CONSISTENT GOVERNMENT ACTIONS

	Accelerate and simplify the issuance of government authorizations, particularly certificates of authorization for projects that incorporate new technologies with a positive environmental impact	★ ★ ★
	Set up a response team for the Ministerial Committee on the Economy, Job Creation and Sustainable Development dedicated to removing barriers and quickly settling any disagreements associated with the demonstration and use of clean technologies	★

DRIVING THE EXPANSION OF CLEANTECH COMPANIES

DEVELOPING EXPERTISE

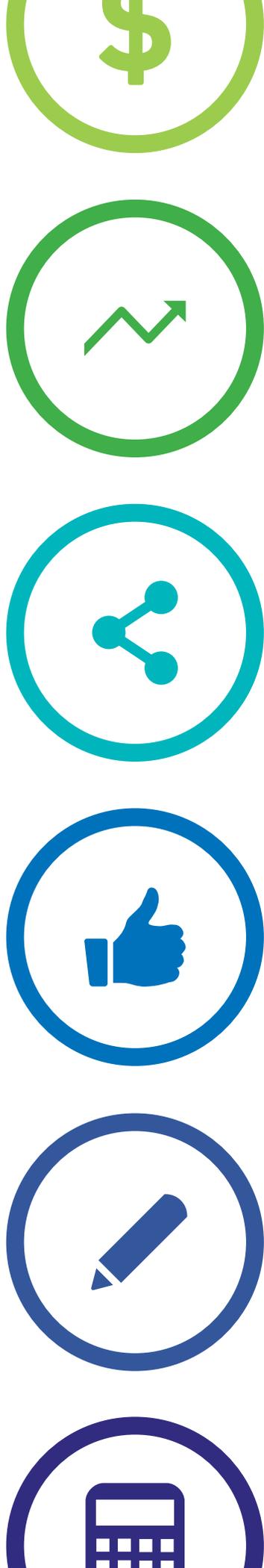
	Support the rollout of an accelerator to facilitate financing opportunities and provide mentoring to cleantech entrepreneurs	★ ★ ★
	Strengthen the expertise of entrepreneurs by facilitating the creation of specific workshops or adapting existing workshops associated with the realities of the cleantech sector	★

INCREASED STRATEGIC NETWORKING

	Help export companies work more closely with cleantech companies to thereby facilitate connections between world-class "star players" and entrepreneurs with strong potential	★ ★
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A MORE DIVERSE FUNDING CHAIN

	Ensure a diverse funding chain, notably for more capital-intensive projects that could require special financing	★
	Help generate interest from foreign investment funds likely to invest in Québec cleantech companies	★ ★



The first organization of its kind in Canada, Écotech Québec brings together the decision makers in the cleantech industry from all across Québec, such as innovative companies, R&D and technology transfer centers, large end-user companies, financial circles, educational and training institutions, labour unions and sectorial industrial associations. Écotech Québec accelerates the development, financing, adoption, commercialization and exportation of Québec cleantech.

Écotech Québec helps position Québec as a center of excellence for cleantech in North America. It is a key player in the development of this industry, which is recognized as an engine of wealth creation and prosperity. It helps make Québec more competitive, greener and healthier.

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