

## Écotech: Québec cleantech cluster association<sup>1</sup>



*Painting 1: Clean technologies (Painting by Ekaterina Turkina)*

On a sunny, but rather chilly morning in early March, Victoria Smaniotto, Director of Branding & Internationalization at Écotech, Québec's cleantech cluster, arrived at her office at 7 am to prepare for the meeting with the Écotech's team, which was scheduled to start at 9:30 am.

Victoria graduated from HEC Montréal in International Business and Marketing with a specialization in Corporate Social Responsibility. After living in Paris, Hong Kong and Chile, Victoria Smaniotto moved to Montréal and held various positions in the cleantech sector: from 2012 to 2014, as a business development analyst and marketing coordinator at Carnot Refrigeration, a Québec SME that develops HFC-free refrigeration systems; from 2014 to 2015, at Écotech Québec as Project manager and coordinator of two task forces; then in 2016, she held the one-year position of Head of Secretariat of the International Cleantech Network,

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<sup>1</sup> IGC research assistants: Meaghan Girard, Andriana Hnatykiw, Bazhena Ivanova; IGC linguistic editor: Meaghan Girard

before going back to Écotech Québec. Today, she coordinates two task forces, Internationalization & Branding and People, and assumes the role of VP Development & Partnerships within the new CanadaCleantech Alliance.



*Photo 1:* Victoria Smaniotto, Director of Branding & Internationalization, Écotech Québec

Victoria's task for today's meeting was to update the team on Écotech's potential as an organization and discuss the international exposure of its companies. She had received two excellent reports on these topics. Victoria was browsing through the reports as she needed some time to review them and to think about the major points before presenting them to the team.

First, she wanted to present the analysis of Écotech as an organization, which also included some important management recommendations for Écotech. This report was prepared by Marc-Antoine, HEC Master's student who was doing his supervised project (internship) at Écotech. His task was also to review the literature on cluster institutions and industrial cluster associations, analyze Écotech's potential as a cluster and develop recommendations for Écotech as a cluster association. The second report was on the internationalization of Écotech's companies, but it was well linked with the first report as it contained very useful information on the local social network infrastructure of Écotech.

### **Écotech Québec: Mission, Vision, Actions<sup>2</sup>**

The first organization of its kind in Canada, Écotech Québec is a cluster association that brings together decision-makers in the clean technology sector from across Québec, namely innovative companies, research and development centers and technology transfer centers, large enterprise users, the financial community, educational and training institutions, trade union confederations and industry associations, as well as key actors in other clusters specializing in clean technologies.

#### **Mission:**

In a sustainable development perspective, Écotech Québec mobilizes key players of the green economy to create the most favourable conditions for the development and growth of companies, and encourages end-users to increase the deployment of clean technologies.

#### **Vision:**

*A more competitive, greener and healthier Québec, with an emphasis on sustained growth of the cleantech sector.*

It is important to note that as part of the three-year planning process 2016-2018, the vision and mission are being updated to further reflect Écotech Québec's contribution to the evolution of the ecosystem of clean technologies of Québec.

#### **Actions:**

In order to quickly offer concrete benefits to its members, Écotech Québec develops tools and activities that respond to their needs. As the first organization of its type in Canada, Écotech Québec aims to build cohesion and synergy to help the cleantech industry develop to its full potential. In partnership with key players from Québec, Canada and the world, Écotech Québec contributes to the development of clean technologies from all of Québec's regions.

Écotech Québec is distinguished by its four levels of action that guide its activities in order to:

- Contribute to the creation of the most favourable conditions in Québec for:
  - Technological development
  - Financing clean technology projects and companies
  - Commercialization of innovations here and internationally
- Propel technology companies to reach their full potential by supporting them in the development of technological, commercial and financial partnerships

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<sup>2</sup> Écotech's Latest Annual Report

Its four main lines of action are:

1. Mesh
  - Referencing, linking, networking between companies, users, prescribers and partners
2. Presentation
  - Influence of public policy, regulation and taxation
  - Mobilization of public decision-makers
3. Influence
  - Discovery of innovations by users and prescribers from here and elsewhere
  - Increased visibility of entrepreneurs in appropriate forums
4. Business Intelligence
  - Dissemination of market information, assessment of trends, business environment and best practices

Detailed information on the actions and activities of Écotech is given in Appendix B.

Écotech Québec is the first cleantech cluster association in North America to receive a certification of Cluster Management Excellence.<sup>3</sup> It is a member of the CanadaCleantech Alliance and International Cleantech Network (ICN), an exclusive network of cleantech clusters in the world's leading cleantech regions that aims to generate new business opportunities, enhance competitive advantages and create value for companies, knowledge institutions and local authorities across cluster regions.<sup>4</sup>

### ***Historical background of Écotech***<sup>5</sup>

The creation of Écotech Québec is the result of sustained efforts and strategic reflection of several business leaders and organizations that saw the emergence of cleantech as a new industrial sector in which Québec could become a leader.

In 2008, three entrepreneurs from the cleantech sector (including one in private finance) started to put in place the Québec cleantech cluster. Andrée-Lise Méthot, Guy Drouin and Thierry Pagé were supported by political will in the Québec government and the city of Montréal. The three entrepreneurs and co-founders of Écotech Québec proposed a business case to the Communauté métropolitaine de Montréal (CMM), the Ministère du Développement

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<sup>3</sup> Cleantech is classified by sectors of activity in Québec: air, energy efficiency, green chemistry, renewable energy, residual waste, soil & groundwater, sustainable mobility and water.

<sup>4</sup> <http://internationalcleantechnetwork.com/members/ecotech-quebec/>

<sup>5</sup> information source: <http://www.ecotechquebec.com/en/about-us/history/>

économique, de l'Innovation et de l'Exportation (MDEIE), the Ministère des Affaires municipales, et des Régions et de l'Occupation des territoires (MAMROT), and the Agence de l'Efficacité Énergétique (AEE). They formed a committee with other players in the cleantech sector, volunteers who served as a temporary board to ensure the smooth running during the set up and beginning of Écotech Québec's activities. The creation of a provincial cleantech cluster was announced on March 17th, 2009. The secretariat of the newly constituted Cleantech Cluster further unified its operations when it moved into its offices in the Montréal World Trade Center on August 16, 2010.

### **Some important achievements<sup>6</sup>**

Écotech's team considers one of its major achievements has been helping many Québec SMEs in the cleantech sector to grow and cooperate with bigger industry players in other sectors that need clean solutions. For instance, Écotech matched a small innovative cleantech company called Carnot Refrigeration with a big Canadian company, Bell. Carnot Refrigeration developed green ventilation systems for Bell's data rooms, and this technology is now used throughout Canada. Carnot Refrigeration now has many customers and is growing very fast. Another example of a very productive partnership between a small innovative cleantech company and a large industry player facilitated by Écotech is cooperation between a firm specializing in garbage collection, Derichebourg Canada Environnement, and Montréal-based cleantech company Effenco that equips Derichebourg Canada Environnement's trucks with its innovative Stop-Start Active technology. Effenco's technology allows transportation companies to considerably reduce the fuel consumption of heavy vehicles. The Derichebourg Group, a major international player (now present in 14 countries), offers environmental services (recycling, recovery, collection of household waste, etc.).

Écotech also organizes many local and international events for Québec cleantech companies in order to help them find appropriate clients and markets for their innovative solutions. It also does a lot of advocacy work to help policymakers realize the importance of clean technologies and improve regulations in order to facilitate the growth of cleantech companies.

Since 2014, Écotech Québec has been certified for recognizing the quality of its management and activities on behalf of the European Cluster Excellence Initiative. It is the first clean technology cluster in North America to obtain this certification.

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<sup>6</sup> In 2015, Écotech Québec offset its GHG (greenhouse gasses) emissions by acquiring Educational Carbon Credit units on the Scol'ERE carbon exchange, a project in the Arden Forest. In addition to offsetting its GHG emissions by purchasing avoided equivalent CO<sub>2</sub>, Écotech Québec is contributing to the financing of an innovative project focusing on education and the action of Québec youth in the fight against climate change.

### **Distribution of Income**<sup>7</sup>

In 2015, Écotech Québec was able to count on the support of the private sector (membership fees and other donations) and the three levels of government (local, provincial and federal). The portion of private funding compares very favorably with that of the technological clusters internationally.

Public sector: 58%

Private sector: 42%

### **Écotech's team**<sup>8</sup>

**President and CEO:** Denis Leclerc. Since 2009, Denis Leclerc has been President and CEO of Écotech Québec, and representing the Québec cleantech cluster. He is also the Chairman of the International Cleantech Network, based in Copenhagen (Denmark), as well as the chairman of the CanadaCleantech Alliance. During his 20 years in the natural resources sector, Mr. Leclerc held several senior management positions, namely Vice-President of Sustainability and Environment for AbitibiBowater, a global forest products corporation.

Highly involved in the community, Mr. Leclerc also sits on the board of directors of Ecofuel, the Québec Cleantech Accelerator (that assists cleantech start-ups); on the Executive Committee of SWITCH, the Alliance for a Green Economy; on the Community Advisory Board of Aéroports de Montréal, and on the Québec Advisory Committee of the Minister of Sustainable Development, Environment and the Fight against Climate Change.<sup>9</sup>

**Vice-President, Operations and Partnerships:** Elise Laferrière. She has 15 years of experience in business development and operations management. Prior to joining Écotech Québec, she led the training, international trade and business intelligence teams of the Chamber of Commerce of Metropolitan Montréal. She has served as the World Bank Group's Private Sector Liaison Officer for Québec and as a member of the Board of Directors of Commerce International Québec. She has also been involved in business development at Raymond Chabot Grant Thornton, as Deputy General Manager of a small fair trade certified food products import and wholesale company, as a consultant to the Communications Branch of the former Canadian International Development Agency, as well as export assistant for FUNDECA, a federation of

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<sup>7</sup> Écotech, 2016, Annual Report

<sup>8</sup> For more information and details, please see <http://www.ecotechquebec.com/en/about-us/team/>

<sup>9</sup> <http://forum-americas.org/profile/denis-leclerc>

producers in Costa Rica. Elise holds a Bachelor in International Development Studies from the University of Toronto and an MBA from HEC Montréal.

Vice-President, Innovation and Commercialization: Normand Gadoury. In order to increase the adoption of clean technologies in Québec, Mr. Gadoury ensures in the deployment of INNO +, which brings innovation developers closer to potential users.

Director, Branding & Internationalization: Victoria Smaniotto, the main heroine of this case.

Coordinator: Anne Le Reste. She is responsible for administration, logistics of events, and web site management for Écotech Québec. During her 20 years in the municipal and associations fields, she accumulated a diversified experience in human resources management, communications and administration. Anne Le Reste has certificates in business management and applied communications.

One of the great organizational challenges faced by Écotech in 2016 was the change of Vice-President, as Marie-Pierre Ippersiel, the former VP left in November 2016 to seize a new opportunity as the CEO of PRIMA Québec. Écotech's team needed to rethink the entire structure of Écotech Québec: by the time Ms. Ippersiel left in November, there were three vacant full-time jobs at Écotech. Fortunately, Elise Laferrière, a very competent manager, became the new VP of Operations and Partnerships, and Normand Gadoury, a great professional in the field of innovation, accepted to become VP of Innovation and Commercialization.

Even though Écotech members feel like they have a very cooperative climate and very competent human resources, their organizational structure is still not finalized and they are still thinking about ways to improve it.

### **Task forces and resources of the organization**<sup>10</sup>

Task forces, composed of Écotech Québec members and other specialists in the field, are searching for solutions to the issues identified during the public consultations and are preparing concerted courses of action. These work groups aim to optimize interventions within the ecosystem to create the most favourable conditions for the development and commercialization of clean technologies.

There are 5 active task forces:

- Regulatory Framework & Taxation

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<sup>10</sup> Informaiton taken from <http://www.ecotechquebec.com/en/task-forces/>

- Financing
- Innovation & Commercialization
- Branding & Internationalization
- Skills & Expertise

### **1. Regulatory Framework & Taxation:**

A strong and adequate regulatory and taxation framework is required for the development of cleantech as it contributes to the creation of demand for clean technologies. Moreover, such a framework is recognized as a catalyst that prompts investment in cleantech innovation. It is vital to create an environment that encourages companies to innovate, invest and grow in Québec.

Mandate of the Regulatory Framework and Taxation Task Force:

- Educate political decision makers towards a more competitive and coherent regulatory and taxation framework. To do so, the working group will workshop “realistic and realizable” solutions, according to a phased timetable, in order to propose them to the different levels of government.

Members of this task force are:

<b>Co-présidents</b>	<b>Organisation</b>
Guy DROUIN	Biothermica Carbone inc.
Marie-Emmanuelle VAILLANCOURT	Davies
<b>Participants</b>	<b>Organisation</b>
Joël BÉLANGER	UMQ
Geneviève BRISSON	Gaz Métro
Philippe CHÉNARD	Fondaction
Christian CYR	CSN
Hélène GIGNAC	CTTEI
Claire HOLZER	Idénergie
Marie-Hélène LABRIE	Enerkem
Simon NAYLOR	Viridis Environnement
Anne-Marie SAULNIER	ECPAR
Jean SHOIRY	Recyclage Ecosolution
Noémie VALLET	CETEQ
<b>Coordonnatrice</b>	
Marie-Pierre IPPERSIEL	Écotech Québec

## **2. Financing:**

Securing adequate financing is one of the key conditions for the continued development of cleantech in Québec. This raises two questions that have a direct impact on the growth of the cleantech sector. Firstly, do all the components of the financial supply chain in Québec function adequately? And secondly, do the agents of the sector have an appropriate knowledge of the different types of financing and resources available? In response to these pressing questions, the working group will address what can be done to develop the weakest or missing links in the financial supply chain, and to educate the Québec cleantech industry on available resources.

## Mandate of the Financing Task Force:

- Ensure that the financial supply chain corresponds to the concrete needs of the agents of the ecosystem in order to allow the acceleration of the development of cleantech in Québec, and in the case of gaps, identify and propose concrete and realizable solutions to remedy those gaps.

## Members of this task force are:

Co-présidents	Organisation
Andrée-Lise MÉTHOT	Cycle Capital Management (CCM)
Antoine MICHAUD	Tandem Expansion
Participants	Organisation
Donald ANGERS	Centre d'excellence en efficacité énergétique (C3E)
Denis BASTIEN	Idénergie
Bruno CHAPUT	Directeur principal de comptes
Richard CLOUTIER	Ecofuel
Roland LÉGER	Desjardins Capital de risque
Sylvain MARTEL	Bourse de croissance TSX
Stéphan MORENCY	Fondation
Pascal-Hugo PLOURDE	Technologies du développement durable Canada (TDDC)
Colette ROY	Fonds de solidarité FTQ
Névine SALHANI	Investissement Québec
Jean SHOIRY	Recyclage EcoSolutions
Coordonnateurs	Organisation
Marie-Pierre IPPERSIEL	Écotech Québec

### 3. Innovation & Commercialization:

Innovation, one of the main drivers of economic development, is fundamental for companies to remain competitive locally and internationally. Innovation and its commercialization do not take place in a vacuum: they require external resources (researches, developers, etc.) in order to generate new products and services. In this context, a forum is needed for cleantech users to share their challenges with cleantech providers.

Mandate of the Innovation & Commercialization Task Force:

- To put in place tools to accelerate the development of relationships between users and providers in order to create a forum for exchange, development and adoption of innovation. In order to do so, the working group will develop a comprehensive knowledge base that addresses both the cleantech needs of users and the product innovations of producers. This platform will help accelerate the development and commercialization of cleantech in Québec.

Members of this task force are:

Co-présidents	Organisation
Marie-Christine FERLAND	Institut national d'optique

Participants	Organisation
Guy ADAM	Kosmos Innovations
Denis BASTIEN	Idénergie
Valérie BÉCAERT	CIRODD
Myriam BÉLISLE	Sherbrooke Innopole
Anis BEN AMOR	CRIBIQ
Simon BÉRUBÉ	Le Groupe Brio
Stéphane BRUNET	-
Laurent CÔTÉ	CRIQ
Georges DORVAL	AquaRehab
Jean-Jacques DRIEUX	Produits Magnus
Robert DUBÉ	RÉSEAU Environnement
Marisol LABRECQUE	Technologies Coldfixe
Jean LACROIX	AQME
Marie-Ève LACROIX	Ministère de l'Économie, de l'Innovation et de l'Exportation
Michel LAFOREST	SpiralTrans
Jean-François LAMY	Aquartis
Maroun MASSABKI	OPTECH
François ROBERGE	GCM
Alain WEBSTER	Université de Sherbrooke
Benoît SICOTTE	Bel
Jean-François VERMETTE	CTTÉI

Coordonnateurs	
Marina TYMOFIEVA	Écotech Québec
Denis LECLERC	Écotech Québec

#### **4. Branding & Internationalization:**

Québec companies seeking to commercialize innovative products, procedures or services face a sizeable challenge: they need to find buyers for their technologies here in Québec while investigating international trade options to compensate for Québec's small market size. However, Québec companies may lack information and resources to promote their products on the global market.

Mandate of the Branding & Internationalisation Task Force:

- Increase the notoriety of Québec expertise in order to generate even more business opportunities for the sector and accelerate the development and commercialization of cleantech.

- Participate in the creation of a tool set that adequately fulfills the needs of exporting companies.

In addition, the working group will seek to maximize the relationships between and with other cleantech organizations, such as international clusters, so that they can become gateways for our companies to bolster their success rate.

Members of this task force are:

<b>Co-présidents</b>	<b>Organisation</b>
Simon BÉRUBÉ	Le Groupe Brio
Diane LÉBOEUF	Technologies Écofixe – Idénergie
<b>Participants</b>	<b>Organisation</b>
Myriam BLAIS	Ministère de l'Économie, de l'Innovation et des Exportations
Mario GRENIER	Pyromaitre
Alida GUALTIERA	Davies
Jean LACROIX	AQME/RÉSEAU Environnement
Michel LAFOREST	Spiral Trans
Alexandra LAUZON	Export Québec
Maroun MASSABKI	OPTECH
Annie PARÉ	Enerkem
Simon PILLARELLA	Novothermic
Benoit SICOTTE	Bell Canada
Gilles TROTTIER	Idénergie
<b>Coordonnateurs</b>	<b>Organisation</b>
Victoria SMANIOTTO	Écotech Québec
Denis LECLERC	Écotech Québec

## **5. Skills & Expertise:**

For Québec to become a green economy, the skills are just as vital as the right tools and equipment. Québec has a critical mass of consulting engineers and a quality education system. However, Québec could be faced with a shortage in skilled labour in the near future. It is therefore essential to ensure that the training corresponds to the needs of the sector. In the context of a greener economy, new trades will occupy an important place, and this is why the main agents in the economy have to be made aware of this challenge.

### Mandate of the Skills & Expertise Task Force:

- To support cleantech entrepreneurs struggling with specific strategic issues and help them to surround themselves with relevant expertise in management. It will propose realistic and workable solutions in order to 1) Equip entrepreneurs and team with managerial skills, 2) Facilitate recruitment and ensure better coordination between labour and training supply and demand, and 3) Valorize cleantech entrepreneurs to develop the sector positioning and attractiveness.

### Members of this task force are:

<b>Co-présidents</b>	<b>Organisation</b>
Bryan WALLIS	Inocucor
Dominique DODIER	EnviroCompétences
<b>Participants</b>	<b>Organisation</b>
Denis BASTIEN	Idénergie
Myriam BÉLISLE	Sherbrooke Innopole
Christian CYR	CSN
Robert Dubé	TREBORA Conseil
Luc GUAY	Ministère de l'Économie, de l'Innovation et des Exportations
Hélène FILION	ÉTS - Centech
Daniel MATHIEU	Communauté métropolitaine de Montréal
Simon McDOUGALL	Ecofuel
<b>Coordonnatrice</b>	<b>Organisation</b>
Victoria SMANIOTTO	Écotech Québec

### **Future Plans**<sup>11</sup>

To enhance Québec's position in a global green economy, Écotech's five strategic priorities are:

1. Help develop a favourable business environment
2. Accelerate innovation and commercialization
3. Help make the funding chain become stable and competitive
4. Promote Québec's clean technologies locally, regionally and abroad
5. Increase the skills and expertise of entrepreneurs

To accelerate the success of existing Québec cleantech companies and develop new ones, Écotech Québec plans to concentrate its efforts in the following areas:

- Business, regulatory and political conditions
- Intensified commercialization of innovations
- Targeted networking with commercial partners
- Increased presence of businesses in international markets

### **Who can join Écotech Québec?**

- Large end-user companies and organizations
- Innovative companies that possess or develop clean technologies
- R&D centres, training and professional development organizations and institutions
- Industrial associations and groups from the clean technology and environmental sectors
- Risk capital firms and financial institutions
- Labour unions
- Clean technology influencers, like engineering firms

Appendix B gives detailed information on the benefits of joining Écotech Québec.

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<sup>11</sup> Information taken from Écotech's annual report and website: <http://www.ecotechquebec.com>

## **Members and Membership Fees**

Employee Number	Membership Fee
Less than 25 employees	\$250
25 to 100 employees	\$500
101 to 500 employees	\$750
More than 500 employees	\$1000

Appendix A provides the membership list. Écotech’s members—companies and organizations—come from the following sectors: air, green chemistry, water, eco-mobility, energy efficiency, renewable energy, waste, soil and groundwater, enabling technologies. For more information on each sector, please explore: <http://www.ecotechquebec.com/en/clean-technologies/sectors/>.

Écotech also created an elaborate interactive map of all the cluster stakeholders.

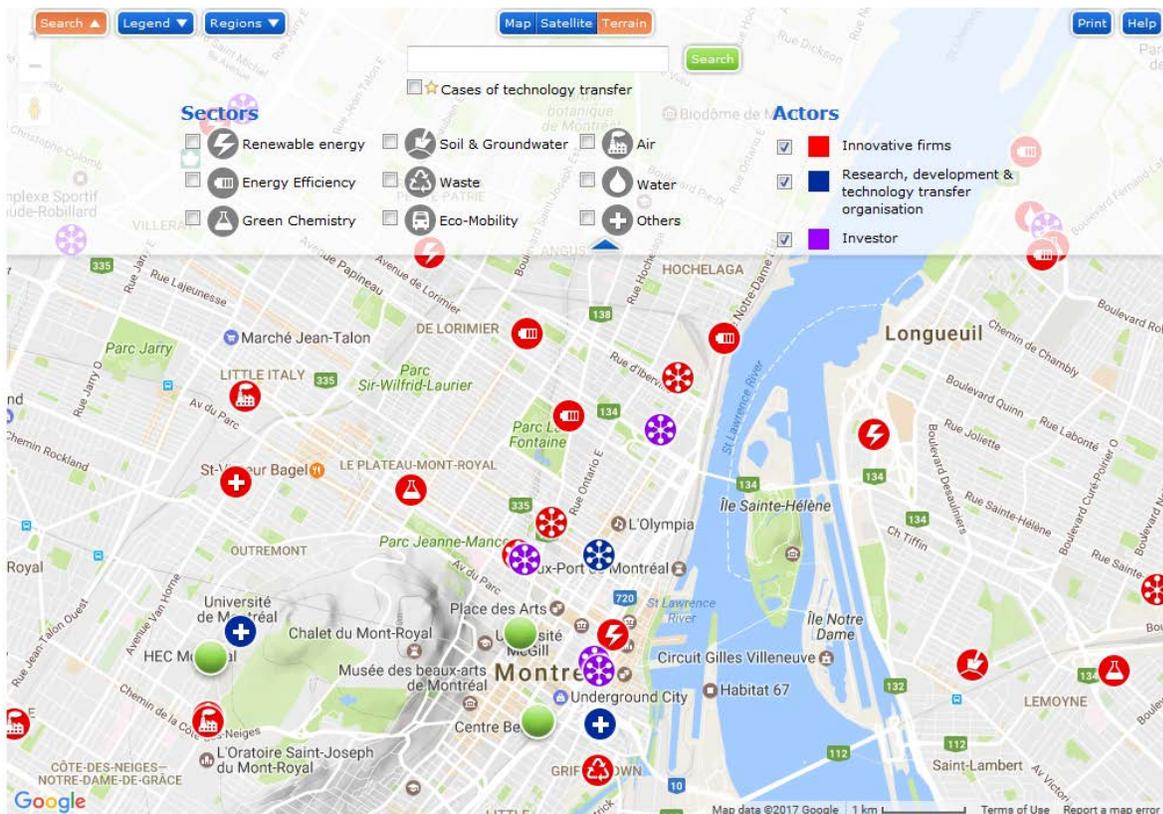


Diagram 1: interactive map of stakeholders

To explore the interactive map in detail, please visit the following web page (click on the icon at the left side of the page): <http://www.ecotechquebec.com/en/members/why-join-us/>

### **Écotech's broader network**

#### **Partners:**

Écotech Québec has a variety of public and private partners and collaborators, including 8 Prestige Partners that fund Écotech Québec, thus ensuring a broad level of industry participation and continued cluster support.

#### **PRESTIGE PARTNERS**

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Bell



Davies



Fondation



Gaz Métro



Cycle Capital



Desjardins



FPInnovations



Invest Quebec

## PUBLIC PARTNERS

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Communauté métropolitaine de Montréal (CMM)



Ministère de l'Économie, de la Science et de l'Innovation (MESI)

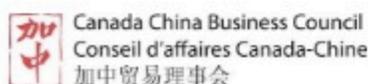
Secrétariat à la région métropolitaine (MAMOT)



Développement économique Canada (DEC)

## COLLABORATORS

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### International Partners:

As members of Écotech Québec, companies and organizations have an exclusive access to services of the top 12 cleantech clusters. The Cleantech Network International (ICN), created in 2009, brings together clusters in Asia, Europe and the United States. The aim is to generate new business opportunities, improve competitive advantage and create value for the member companies in all regions.

- Austria – Green Tech Cluster

- Denmark – CLEAN
- France – TENERDIS renewable energy cluster
- Germany – Renewable Energy Hamburg
- Italy – Lombardy Energy Cluster
- Norway – Oslo renewable energy and environment cluster
- Netherlands – Clean Tech Delta
- South Africa – Western Cape Province Greentech
- United States, Northern Carolina – Research Triangle Cleantech Cluster
- Sweden – Sustainable Business Hub
- Belgium, Walloon Region – Cluster TWEED

**Other International Partners:**

- Brazil – Ministerio do Medio ambiente
- United-States, Massachusetts – ACTION New England
- China – Yixing Industry Park for Environment Science and Technology
- China – Qingdao City Construction Investment Group
- Bayern, Germany – Umweltcluster Bayern

**Marc-Antoine’s overview of the literature on cluster associations and the importance of the institutional environment in industrial clusters**

A cluster’s institutional environment is key to not only to cluster growth, but at a more fundamental level, to cluster existence—indeed, both firms and institutions comprise the “basic units of a cluster” (Menzel and Forhnal, 2007) and it would be impossible for a cluster to move past the birth or emergence phase without benefiting from an institutional environment and a particular cluster association that would perform a leading role in providing a platform for companies’ interactions and in mediating their relationship with different levels of the government (Sölvell, 2008). Additionally, Carpinetti and Lima (2013) describe these institutions (“Institutions for collaboration,” or IFCs) as entities that—though they do not participate directly in the supply chain—are fundamental to cluster activities by managing interactions within the cluster, such as coordinating joint actions, fostering the diffusion of knowledge inside the cluster, providing a cognitive framework to cross the “knowledge filter,” (Audretsch and Lehmann, 2006) and at times mediating conflicts of interests between cluster associates. Indeed, though external economies naturally emerge from agglomerations, cluster members benefit a lot from local supporting institutions whose missions are geared toward satisfying the needs of cluster stakeholders. Steiner (2006) also refers to institutions as “social technologies,” insofar as they are regarded by the relevant stakeholders as standard and representing the

proper way to get things done. He adds that institutions provide not so much “constraints on behaviour,” but rather offer support when human cooperation is needed.

Although cluster institutions can take many forms (private organizations, public agencies, cluster associations, regional development agencies, R&D centres, etc.), cluster associations are the most important institutions, according to researchers, because they are in the centre of the cluster’s network and connect all the important stakeholders inside the cluster. Moreover, they help to connect the focal cluster with other clusters through their linkages with other cluster associations.

There is an argument in the literature that external economies such as labour market pooling, shared inputs and specialized suppliers emerge almost holistically from the simple fact of agglomeration and regular market processes. Therefore, “colocation occurs naturally and without coordination through independent decisions of firms operating in their own interests.” (Wolman and Hincapie, 2015, 140). As a result, the benefits that may be derived from agglomerations do not necessarily require much intervention. However, even scholars adhering to this point of view argue that institutions can play an important role on these fronts. They can lobby government for better infrastructure on behalf of cluster members, work with universities and trade schools to cultivate the necessary workforce, etc. (Wolman and Hincapie, 2015).

Other researchers argue that these measures, however, are very rudimentary and by focusing on these types of interventions, institutions do not fulfill their potential. There is a prominent group of researchers including Porter (1998, 2001), who claim that cluster associations—together with associate firms—should leverage their position to upgrade the cluster and business environment in general, in order to produce knowledge and technological spillovers. More specifically, in terms of roles and functions, Porter (1998) says institutions such as cluster associations must go beyond their traditional roles of focusing on seeking government subsidies and special favours (which ultimately distorts competition), lobbying the government, compiling statistics and hosting social functions. Indeed, by limiting themselves to these functions, Porter claims that institutions are missing out on opportunities:

*Associations should provide a forum for the exchange of ideas and a focal point for collective action in overcoming obstacles to productivity and growth. Associations can take the lead in such activities as establishing university-based testing facilities and training or research programs; collecting cluster-related information; offering forums on common managerial problems; investigating solutions to environmental issues; organizing trade fairs and delegations; and managing purchasing consortia (Porter, 1998, 88-89).*

More recent research also follows the lines of Porter and argues that modern-day cluster associations should go beyond the functions of earlier-type cluster associations and should become very flexible and at the same time rigorous to excel in multiple tasks. But what specifically does this entail? The literature consulted pointed to two main focus areas in which cluster associations can get involved: develop different creative and effective approaches to foster the so called cluster-effect, or effect of agglomeration economy, and also (since innovation is critical for the modern-day economy) provide appropriate infrastructure for social networking and knowledge spillovers inside the cluster.

Cluster institutions can create greater impact by focusing on fostering knowledge and technological spillovers, where they can serve an important coordinating and trust-generating function. As we know, ours is increasingly a knowledge-based or learning economy, characterized by the hyper-mobility of information and knowledge (Steiner, 2006); as such, competitive advantage lies not so much in margins and economies of scale, but rather in the cultivation and exploitation of unique competencies and resources; and in this context, the role of formal organizations and local institutions is to help coordinate activities and manage cluster transactions (Asheim and Coenen, 2006).

That said, how do institutions such as cluster associations concretely promote cluster growth and health? At a fundamental level, institutions help shape an institutional perspective that underlies the cluster and create factors that influence economic behaviour, such as factors that lead to cooperation. Indeed, fundamentally, institutions influence the very core of human behaviour by providing the cognitive framework by which to interpret and even give meaning to knowledge, as well as by providing the intellectual habits and routines for transforming this information into useful knowledge (Hodgeson, in Steiner, 2006).

Institutions also seem to be able to have a greater impact in “social-network” type clusters, where there is a lot of cooperation between co-located companies, as opposed to pure “agglomeration” type models, where companies physically co-locate, but do not engage in intense communication and joint projects. In the latter, benefits generally hinge on the resulting externalities such as pools of specialized labour, increased input sharing and supplier specialization, and does not necessarily require a great deal of cooperation or conscious efforts to share knowledge (Wolman and Hincapie, 2015; Steiner, 2006). Though there are some technological and knowledge spillover effects, this appears to remain in the back stage. In other words, this form of agglomeration emerges and is maintained more holistically, somewhat in keeping with the “invisible hand” principle (i.e. less calculation, cost-benefit analysis) (Ragman and Verbeke, 2003).

With the “social network model,” which naturally shares all the benefits of the first model, but for which the knowledge spillovers take centre stage, institutional coordination on behalf of cluster association is critical: trust and social embeddedness become much more of an issue,

and the guiding hand of institutions and associations play a much larger role (Steiner, 2006; Wolman and Hincapie, 2015; Carpinetti and Lima, 2013). This is an important distinction as the processes that give rise to spillovers can be better explained through this social network model (Wolman and Hincapie, 2015).

Specifically, in the social network model, institutions can act as brokers as well as provide the cognitive framework to interpret information and knowledge. Indeed, Audretsch and Lehmann (2006), on the other hand, zoom into these institutional processes to explain how the “mechanics” involved with knowledge commercialization in particular. We know that local proximities give access to knowledge, and knowledge spillovers in particular, which in turn creates competitive advantage for that cluster. However, the authors explain the difference between information and knowledge, and tacit knowledge in particular. Whereas information is “context free” and therefore easily codified and therefore widely accessible, particularly due to globalization and the Internet, knowledge is more tacit and more closely tied to a particular context, and therefore much more difficult to codify. Herein lies the importance of proximity with respect to knowledge: stakeholders in a given cluster or agglomeration are likely to have developed similar context-specific competencies, and it is these same competencies that allows them to not only understand the knowledge, but be able to apply and/or commercialize it within their specific context. Essentially, the shared competencies and context is what enables stakeholders—local entrepreneurs<sup>12</sup>—to permeate the “knowledge filter” and commercialize the new knowledge, which in turn generates knowledge spillovers for the entire cluster. In other words, local entrepreneurs act as conduits for this knowledge spillover. They are the missing links between investments in new knowledge and economic growth.

In other words, institutions can also help in improving the environment to assist entrepreneurs to also bridge this knowledge gap themselves, and more significant, to be able to take the interpreted knowledge and commercialize it. However, all of these benefits may be qualified as “soft,” and many authors in the consulted literature seem to agree are difficult to measure (Sölvell, 2008; Carpinetti and Lima, 2013).

Even though Écotech Québec is a young, innovative and fast growing cluster, its member companies face important challenges, such as a rather rigid environmental legislation in Québec that is still not very supportive of radical cleantech innovations; a difficult regulatory environment with a lot of administrative documentation, fees, fines, permits, high taxes, etc.; the rather small size of domestic market; and difficulties with obtaining capital. These difficulties force many innovative cleantech companies to internationalize upon inception rather than to explore domestic market. Therefore, the presence and help of Écotech as a cluster association is critical for the initiation, survival, and growth of Québec companies both

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<sup>12</sup> The authors specify that “footloose” MNEs cannot play this role.

in terms of growth in domestic market and in terms of obtaining success in the international markets.

### **Social network model of Écotech cluster**

After reading Marc-Antoine's overview of the literature, Victoria switched to the section on social network analysis from the second report, which was a summary of the thesis written by Christophe Marriage-Beaulieu in 2016. Christophe is now an economist working for Innovation, Science and Economic Development for the Government of Canada. Christophe wrote his thesis on the Écotech cluster. The figure below gives a social network diagram of Écotech cluster based on the interviews conducted by Christophe with the major cluster actors. The linkages are modelled on the basis of existing interactions: joint projects, joint ventures, partnerships. The size of the nodes is proportional to the number of links maintained.

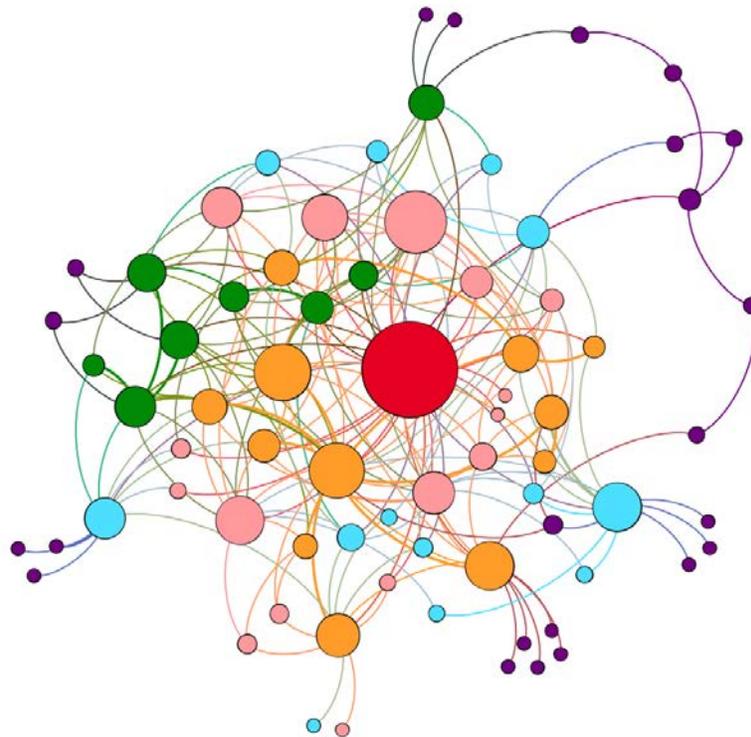


Diagram 2: social network model of Écotech cluster

- The cluster association, Écotech, is red
- Different groupings and other associations are pink (e.g. CRIBIQ, le Consortium de recherche et innovations en bioprocédés industriels au Québec)

- Academic organizations are green
- Government agencies are orange
- Companies are in light blue
- Organizations outside the country are purple

The report based on Christophe's thesis also contained useful interviews with Écotech companies. The companies reported that the actors in the institutional infrastructure of Québec's cleantech cluster played an important role in the development of the clean technology sector in Québec. Moreover, collaboration, joint projects and social networking were critical for the development of new clean technologies.

One of the interviewees even commented:

"There is a lot of work in coalition with other [actors] in the market because we are building not just new technology, but a new economic sector."

In the report, some company representatives mentioned the fact that the creation of a cluster association had led to greater cohesion among companies located in the cluster and an increase in collective action. Moreover, by exploring the social network graph, Victoria noted that the organizations of the institutional infrastructure (Écotech, other associations [e.g. industry associations], and governmental organizations) form very dense relationships. Indeed, these actors form a relatively dense network around which companies gravitate. The arrangement of the network illustrates the fact that organizations of institutional infrastructure collaborate rather than work in silo.

At the same time, some company representatives argued that more direct interaction between the cluster association and companies is necessary as sometimes Écotech as a cluster association is more involved in interactions with government agencies. Even though the reasons for this are obvious, some company representatives felt that more collective action in terms of generating common ideas and setting common goals is necessary. Indeed, Victoria noted that on the diagram somehow companies are at the periphery rather than in the core of the cluster communication and collaboration network.

## Conclusion

Victoria Smaniotto put aside Marc-Antoine's report that provided a great overview of Écotech as an organization, as well as offered a concise literature report on the role of cluster associations and concluded with some strategic and management recommendations for Écotech. Victoria realized that the report helped her to develop some ideas on how Écotech can further enhance its leading role as Québec cleantech cluster association. She liked all Marc-

Antoine's recommendations, but she also developed a couple extra ideas. Victoria also found the second report based on Christophe's thesis very useful. She felt very content and knew she had some important information and ideas to deliver to her team in the framework of the upcoming meeting.

**Task:**

1. Analyze Écotech's potential and capacity as an organization. Reflect on its role in the cleantech cluster.
2. Propose a strategic plan for Écotech that would allow it to enhance its contribution to the cluster and ensure that other cluster stakeholders are working toward common goals.

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### **Appendix A: Detailed Examples of activities**

#### **Participation in Public Consultations:**

Écotech Québec, a key player in the positioning of Québec's clean technologies sector, is frequently asked to participate in public consultations prior to the development of several public policies. Speaking on issues directly related to the ecosystem and the business conditions of the sector, Écotech Québec presents some capacity-building proposals.

For example, Écotech Québec participated in the development of the Government Sustainable Development Strategy, where the government wanted to provide greater incentives for clean technologies. As part of its brief to the government, Écotech Québec proposed elements that would help to support the government in the implementation of its strategy. Not only can the clean technology sector contribute to the achievement of government objectives but also the strategy itself can have a real impact on the growth and competitiveness of this sector. In

October, the new strategy was unveiled and thanks to Écotech, included several measures to increase the use of clean technologies.

As another example, last March, Écotech Québec was invited to present its proposals to the Advisory Committee on regulatory and administrative relief led by the Minister for Small and Medium Enterprises, Regulatory Relief and Regional Economic Development. The mandate of this committee is to advise the government on the measures to be taken to alleviate the regulatory and administrative burden on businesses, to identify problems and needs, and to suggest priority regulatory and administrative areas.

Écotech Québec was also invited by the Committee on Transportation and the Environment to submit its recommendations on the green paper entitled Modernizing the Environmental Approval Scheme of the Environment Quality Act. The objective is to provide Québec with a clear, predictable and effective environmental regime. Écotech Québec participated in the special consultations and presented recommendations to the Committee on how to increase the contribution of innovative companies to help Québec meet the emissions reduction target by 2030.

Finally, Écotech Québec made recommendations to the Québec Taxation Review Committee. Volume 1 on the current Québec's tax reform recommends, among other things, the introduction of fiscal measures to support the commercialization of research and development for SMEs. This was one of the flagship measures introduced by Écotech Québec.

#### A Sustained Commitment:

Écotech Québec, through its President and Chief Executive Officer, is a member of the Climate Change Advisory Committee of the Minister of Sustainable Development, Environment and Climate Change, whose mandate is to advise the government on the guidelines and the most promising actions in the fight against climate change.

In addition, as a founding member of the Alliance for a Green Economy (SWITCH), Écotech Québec continues contributing to making the shift to a green economy. Écotech and SWITCH actively participated in the organization of the Canadian Round Table on the Green Economy. The event brought together nearly 200 decision makers from Canada's economic, associative, financial and environmental communities, who discussed the key elements to accelerate the shift to green economy.

Finally, the Vice-President of Écotech Québec was invited to sit on the independent commission mandated by the Council of the Communauté métropolitaine de Montréal for public consultations on the draft of the Metropolitan Management Plan 2015-2020.

#### Business activities:

Écotech Québec organizes events, called Rendez-Vous, to showcase the potential of new markets. For instance, knowing that the City of Hong Kong, an excellent gateway to penetrate the Asian market, has to invest several billion dollars in the green economy (waste treatment, green building, energy efficiency, water treatment), Écotech Québec jumped on the opportunity when Hong Kong stakeholders were passing through Montréal. Last June, a Rendez-Vous was organized for Québec and Hong Kong company representatives in collaboration with the Hong Kong Canada Trade Association (ACHKC). The objective was to explore business opportunities and meet partners to help companies start or accelerate their efforts in this region of the world. The speakers shared the secrets to entering the Hong Kong market and exchanged with participants during the mesh activity.

In anticipation of a mission led by Prime Minister Philippe Couillard to Mexico and a second mission to Colombia led by the Minister of Economy, Innovation and Exports, Jacques Daoust, Écotech Québec organized the Rendez-Vous for participants from Québec, Mexico City, and Bogota. The meeting, organized in collaboration with Export Québec, provided an opportunity to better identify priorities and opportunities for Québec's cleantech companies in Mexico City and Bogota. Successful advice to support the process abroad was presented by Export Development Canada (EDC).

#### International Mesh:

Écotech Québec collaborates intensely with the International Cleantech Network (ICN), an exclusive network that brings together clusters of clean technologies located in Asia, Africa, Europe and North America with headquarters in Copenhagen. This international collaboration aims to generate new business opportunities and improve the competitive advantage of each by creating synergies between companies, research centers and local authorities in each of the regions concerned. As mentioned above, the President and Chief Executive Officer of Écotech Québec, Denis Leclerc, is the Chairman of the Board of Directors of the ICN, which helps Écotech Québec to be at the centre of different international activities.

Building on the initiative of Écotech Québec, members of the ICN held their annual meetings in Montréal in March. The objective of the meeting was to define the CCM's action plan, which also includes strategic vision and the exchange of good practices for cluster management. As part of the 20th edition of the Salon d'Americana, Écotech Québec also organized a technical briefing for members of the ICN with representatives of the Communauté métropolitaine de Montréal and the Government of Québec to give them an overview of the context and business opportunities in Québec. Écotech Québec has helped develop the ICN Passport, which provides cluster members with international membership (access to all the cleantech clusters-members of ICN), including the provision of temporary office space and the linking of relevant organizations to each region. Finally, an agreement with the grouping of megacities, the C40, was announced at the COP21 now offering privileged access to companies wishing to propose their innovations to large metropolises.

### A Remarkable Presence at COP21:

The Conference on Climate in Paris (December 2 to 9, 2015) was the perfect opportunity for Écotech Québec to actively promote Québec's innovations, particularly at the Solutions Gallery, with a view to reducing the impact of professional activities on climate. The presence of political and economic players from around the world has given Écotech Québec the opportunity to forge links with high-level stakeholders, including Morocco, Denmark, Brazil, Israel and the United Arab Emirates.

The President of Écotech Québec hosted a press conference during which the Prime Minister of Québec, Philippe Couillard, announced a package of measures totaling \$25.5 million to support actions to combat climate change. In addition, he acted as moderator of the panel on "Integrating climate issues into public policy," which included the Minister of Sustainable Development, the Environment and the Fight Against Climate Change, David Heurtel.

### Missions in Japan and China:

In an effort to propel Québec companies internationally, Écotech Québec has been involved in two trade missions organized by the Board of Trade of Metropolitan Montréal and the World Trade Center. During the mission to Japan in February, participants had the opportunity to participate in the Kansai-Canada Greentech Forum in Osaka to present and showcase their expertise to potential partners. The mission then traveled to Tokyo to participate in the World Smart Energy Week, a world-renowned fair. The second mission, led by the Mayor of Montréal, Denis Coderre, took place in China in November. Écotech Québec offered companies a special clean technology program that included a day at Eco Expo Asia (Asia's largest trade fair for environmental technologies and green buildings), which led to personalized and organized meetings by the Consulate of Canada. In addition, thanks to its partnership with the China Yixing Industrial Park for Environmental Science and Technology, Écotech Québec has offered companies the opportunity to meet potential partners. Dagua Technologies seized this opportunity to find a great business partner. For more information on this innovative Québec company, please go here: <http://www.dagua.com/>.

### INNO+:

INNO + is another important initiative designed and created by Écotech Québec. It is a simple and effective formula for the emergence of more business opportunities between Québec's technology-based SMEs and potential users of innovative solutions. As part of this initiative, in partnership with the Québec Association for Energy Management (AQME), the Québec Council for Environmental Technology Enterprises (CETEQ) and Réseau Environnement, Écotech Québec organized a series of workshops. The objective of these workshops is to present the

solutions of innovative SMEs to an audience composed mainly of representatives of the municipal sector. Écotech Québec was selected as part of the PRAM-Est program of the City of Montréal, funded by the Ministry of Municipal Affairs and Land Occupancy. Three INNO + workshops were organized on the topics of soil decontamination, energy efficiency and process optimization. These workshops were conducted in partnership with local chambers of commerce, industry associations and local development centers. Nearly 200 participants attended the workshops. In addition, a microsite has been developed to allow those who have not been able to attend the workshops to have access to the innovations that were presented.

#### Collaboration with different industry players:

Écotech Québec successfully collaborated with the MISA Group (Mining Expertise Network) in order to better inform the mining industry about innovative solutions contributing to its vitality and sustainability. Solutions were presented in relation to the various challenges and challenges in the mining environment.

#### Knowledge and Networking:

Écotech's ConneXion activities provide targeted information and training, as well as opportunities for networking for Québec companies. The activities focus on such topics as market identification and prioritization, uses and benefits of liquefied natural gas, investor presentations, lobbyists registry, tax credits, commercial and technological positioning, etc. In total, more than 800 participants participated in various Écotech Québec networking events.

#### Supporting Start-up Development:

With the objective of increasing the presence of start-up companies, Écotech Québec continues its collaboration with the Ecofuel accelerator. In addition to receiving a free annual membership, Québec start-ups are invited, through ConneXion, to make a presentation on their technology and discuss the next steps in their business plan. In addition, through its communication tools, Écotech Québec promotes calls for applications from the accelerator and also disseminates the “wins” of Ecofuel's companies.

#### From School Benches:

The Écotech Challenge is a competition in which teams of university students offer solutions to a real strategic challenge of a real clean technology company. In March, Idénergie sought student assistance to prioritize opportunities for the commercialization phase of its small river hydro turbine. The winning team presented a very comprehensive action plan addressing both the marketing challenge of reaching the target clientele and penetrating new markets. The second place winner presented a detailed marketing plan that includes a very elaborate web campaign. Other clean technology companies attended the team presentations and met with potential trainees. The Écotech Challenge with Idénergie's participation resulted in the offer of three summer internships and one permanent position within the company.

A second edition of the Challenge took place in November with the Brio Group, which asked students to help them position themselves with a strong brand image in order to develop a relationship with their customers and potential partners. The winning team presented an array of innovative ideas and the second-place team offered the Brio Group a marketing plan in four areas: developing a sense of ownership through the creation of tools, developing partnerships with specific companies, rethinking traditional sites and promoting on-screen activities. Idénergie also attended the presentations and offered two winter internships and two summer internships. Québec also recruited two trainees.

#### Green Innovation:

In order to increase the growth of green innovations in Québec and its partners, Écotech Québec implements a strategy targeting social media. Thus, Écotech Québec offers, twice a week, Ecominute, the green innovation of the day. A total of 98 blogs have been published and disseminated on a range of social media. More than 6,500 people follow Ecominute on Twitter, LinkedIn and Facebook. These blogs are also a source of information for traditional media. Web traffic continued to grow strongly this year, particularly in terms of number of users and number of visits. Indeed, in 2015, more than 50,000 different visitors visited the website, an increase of 64% compared to 2014. In addition, Denis Leclerc participates as a columnist on the Silver Channel, where he introduces and popularizes Québec innovations in clean technologies.

#### Green and Clean Creativity:

A flagship event for creativity and innovation, C2MTL brings together important players active on a global scale. The event aims to stimulate visionary managers by offering an environment that encourages collaboration and the emergence of new approaches. The activity presented by Écotech Québec, inspired by the INNO + workshops, allowed four companies to present their solution to a wide and varied audience. In addition, a workshop was organized to stimulate creativity in order to find ways to increase the socio-economic acceptability of projects related to wind and energy recovery.

### **Appendix B: Benefits of Écotech Québec Membership**

- Obtain a direct access to a unique ecosystem (ordering parties, financiers, researchers, cleantech developers)
- Generate business opportunities with players of this ecosystem during networking activities
- Increase the company's visibility on the web with the company's own marketing fact sheet on Écotech's website
- Identify business opportunities more rapidly during meetings with international buyers reserved exclusively for Écotech members
- Obtain privileged information on the most recent national and international clean technology trends and developments

- Contribute to ongoing industry representation within public institutions
- Participate in Écotech's different task forces on topics such as taxation, financing, branding, innovation & commercialization, internationalization, and human resources; also participate in the realization of projects that will benefit the cleantech ecosystem
- Attend workshops offered by renowned experts
- Save 25% of the cost of activities such as the Annual Cleantech Forum or the Summit on Parliament Hill
- Obtain rebates on registration fees for events on the national and international scene
- Contribute to develop Écotech Québec's position parliamentary committee
- Propose a candidate for Écotech Québec's board of governors