

Capitalising on Green: *Fostering Canada's Cleantech Entrepreneurs*





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This report was prepared by 2006-2007 Action Canada fellows

Jane Ambachtsheer (jane_ambachtsheer@actioncanada.ca)

Caroline Charest (caroline_charest@actioncanada.ca)

Bart Kasowski (bart_kasowski@actioncanada.ca)

Jason Mitschele (jason_mitschele@actioncanada.ca)

and Rick Nielsen (rick_nielsen@actioncanada.ca)

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Project Synopsis

Canada today has the opportunity to “capitalise on green” through fostering the success of entrepreneurs who are developing clean technologies.

Commonly called “cleantech,” this field encompasses a diverse range of products, services and processes that are designed to provide superior performance at lower costs by more efficiently using natural resources. These technologies can be applied to water purification, agriculture, energy generation, manufacturing and other sectors.

Many jurisdictions, such as California, Germany and Denmark, have thriving cleantech industries, and a number of Canadian success stories exist. However, the opportunity for domestic economic growth and job stimulation is far greater than that which is currently being pursued.

The Capitalising on Green Taskforce interviewed 11 cleantech entrepreneurs across Canada about their entrepreneurial vision, the cleantech market and potential policy recommendations that could stimulate growth in this area.

A number of recommendations evolved as the result of this process, and these are the focus of this report. In order to promote Canadian cleantech entrepreneurship, we recommend that Canada's federal, provincial and municipal governments:

1. Develop a vision for cleantech in Canada
2. Remove barriers to foreign venture capital investment in Canada
3. Lead by example and procure green products
4. Streamline and centralize consumer incentives for consumers and corporations
5. Promote net metering, which allows customers to be credited for electricity they supply to the grid

The task force believes that implementing these recommendations will lead to increased entrepreneurial activity in Canada, increased economic activity and job creation, and a greater share of the international cleantech technology market captured by Canada.

The Definition of Cleantech

According to the Cleantech Venture Network, the term “clean technology” describes technologies developed by biological, computational and physical scientists and engineers that enable more efficient use of natural resources thereby greatly reducing the overall ecological impact, although this may be one of a technology’s benefits. Many of the technology-based opportunities described as cleantech may not have an explicit environmental “label” on their business plan. Furthermore, the impact of clean technologies on the economy is ubiquitous: there are large and highly disruptive market opportunities emerging in the multi-billion dollar agricultural, manufacturing and transportation sectors, as well as in the fundamental enabling areas of energy and water

Methodology

This taskforce conducted in-depth interviews with 11 cleantech entrepreneurs from across Canada about their entrepreneurial vision, how they established a successful enterprise and/or the types of obstacles they are facing, the cleantech market, and economic growth/policy recommendations that they believe would facilitate doing business in Canada. These responses were integrated into a list of policy recommendations that were then prioritized and ranked in terms of their relevance and importance by the entrepreneurs. The high priority policy recommendations were then researched and compiled and are discussed in this report.

A list of the entrepreneurs participating in this study are listed in Annex 1

Disclaimer: Although this report places significant emphasis on the input received from the entrepreneurs who were interviewed, the final text and recommendations represent the views of the task force team and do not necessarily represent the views of the participating entrepreneurs.

Opportunities

Cleantech is going to be a huge economic driver over the next 20 years. Countries have to evolve in order to stay competitive.

Tom Heintzman, Bullfrog Power

Demand for technologies that increase efficiency while minimizing environmental impacts has never been higher than today and it is becoming evident that this trend will continue well into the future. For example, the need to reduce greenhouse gas emissions has become a leading global concern and is driving political and economic choices around the world. Energy sufficiency also explains current and expected growth in cleantech demand.

Global Market Growth:

Investment in the cleantech sector has grown from a mere \$7 billion in 1995 to \$30 billion in 2004 and a record \$63 billion in 2006¹. It is projected that annual growth will be between 20-30% per year for the next decade.²

Significant political pressure is being felt around the globe for governments to intervene and entice industries and consumers to adopt cleaner technologies and processes. For instance, the Industry-Provincial Offset Group (IPOG)³, a Canadian group of "big GHG emitters"; provincial governments and NGOs, published a study in February 2007 that calls for Canada to develop a national plan to reduce GHG emissions based on market mechanisms. Similarly, in March 2007 a group of US businesses and investors called on the U.S. Government to establish a mandatory national policy on climate change, and to take action to stimulate deployment and update of new and existing technologies. This group included major corporations such as General Motors Corporation, Suncor Energy and American Airlines, along with investors representing \$4 trillion in assets.

The desire for energy sufficiency and autonomy also explains why some jurisdictions are choosing to invest in cleantech. With uncertain foreign oil supplies and volatile prices, it has become increasingly strategic for countries to develop their own energy sources and reduce their needs through greater energy efficiency.

Furthermore, it is expected that the carbon market will become a significant part of cleantech financing and demand stimulation. "Financial carbon funds", which finance projects to reduce carbon emissions around the globe in exchange for permits, have reached a capitalisation of \$11.2 billion U.S. in December 2006, compared with \$241 million U.S. in 2000. The carbon market is expected to grow at a rate of 200 % per year⁴

(Footnotes)

¹ Environmental Entrepreneurs and Cleantech Venture Network LLC

² Green Dreams. The Economist: November 18th-24th 2006. Page 71.

³ Amongst the participants of study : AgCert, Alcan, Alberta-Pacific Forest Industry, Canadian Electricity Association, Canadian Cement Association, Canadian Gas Association, International Emissions trading Association, Baseline Emission Management, B.-C. Hydro, Bennett Jones LLP, Biothermica Énergie, Toronto Stock Exchange, Bourse du climat de Montréal, Chicago Climate Exchange, Bruce Power, Climate Central Exchange, CO2e, EnCana, EPCOR, Nexen, Ontario Power Generation, Shell Canada, SNC-Lavalin Environnement, Spectra Energy, Suncor, the Delphi Group, Trans Canada, TransAlta, Alberta Government, Manitoba Government (osv.), ICF International and others. Two thirds of the participants voted in favour of the recommendations of the study. Moreover, in a parallel process, the main emitters of the thermal production field, endorsed the conclusions of the study: Atco, Epcor, TransAlta, Sask Power, Nova Scotia Power and New Brunswick Power.

⁴ Ministère du Développement Économique, de l'Innovation et de l'Exportation, Québec.

Growing Export Markets Rather Than Import Markets:

Countries that invest in clean technologies today will have a tremendous opportunity to benefit. Demand for their products is already growing, which in turn translates into significant inflows of capital and stimulates job creation. On the other hand, countries without a strong clean technology manufacturing base will either have to double their efforts to develop one or import technologies from other countries. Denmark and Germany are two examples that illustrate the benefits of acting early to seize a technology leadership position. Over the past decades, Denmark has invested heavily in wind power technology and Germany has specialized in solar technologies. Today, many of these wind and solar technologies are imported from Denmark and Germany into Canada

"The potential is huge. When possible, we use Canadian suppliers. But for photovoltaic, we can't use Canadian firms because there is no proven expertise at the scale we are contemplating so we are using German companies. They are very enthusiastic, and helping us to understand which sites are good candidates for the technology."

Alex Winch, Mondial Energy

For an energy-rich country such as Canada, choosing to adopt clean technologies does not necessarily imply a reduction in the production of energy from traditional sources. With electricity demand growing in the United States at an average annual rate of 1.5% through 2030⁵, energy produced by new sources or saved following the implementation of more efficient processes in Canada would be available for export. Alternatively, this new or freed-up energy could also be used locally for industrial development purposes, thus creating value and jobs for Canadians.

Clean technologies can also create new markets. For instance, Nanox Inc. developed a "green catalyst" that is less expensive to produce than traditional catalysts because it replaces precious metals such as platinum with common metal compounds. The objective was to develop a catalyst that can be available in markets where it is currently non-existent because of the price. Nanox now seeks to implement these cheaper catalysts in generators, as well as eventually export them in developing countries.

Creating Employment:

Fostering the growth of the clean technology industry will have a positive impact on employment. A recent study found that the renewable energy sector generates more jobs per megawatt of power installed, per unit of energy produced, and per dollar of investment, than the fossil-fuel-based energy sector. Even when the most pessimistic job creation scenario for renewable energy is compared to that of the most optimistic scenario for conventional energy sources, job creation in renewable energy sector will outperform conventional energy by sector 1.9 times.⁶ Developing Canada's clean technology industry would not only create jobs in the manufacturing, but also the research and development field. These are usually high paying jobs, with important economic spin-offs to various industries.

(Footnotes)

⁵ Energy Information Administration. Annual Energy Outlook 2007

⁶ Daniel M. Kammen, Kamal Kapadia and Matthias Fripp (2004) *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* RAEI Report, University of California, Berkeley

Attracting Cleantech Firms and Investors to Canada:

The creation of clean technology clusters across the country would attract multinationals seeking to establish activities within these clusters, as well as encourage local entrepreneurs to launch clean technology businesses. In this way, clean technology clusters would have an economic multiplier effect.

Challenges

While the benefits of developing a cleantech industry are obvious, there are many challenges that could keep Canada from pursuing this opportunity.

Canada is a Resource-Rich Nation:

Canada is an energy-rich nation with vast reserves of oil and gas, as well as considerable capacity for hydroelectric power generation. Given the nation's ability to access these traditional energy sources for its own use and for export, Canada's leadership may be inclined to pursue these traditional energy sources and not pursue the long-term opportunity that is presented by the cleantech energy industry. Like any new sector, cleantech energy is dependent on the creation of new technologies and applications that require long development times and the use of considerable resources. This long-term commitment would have an especially high opportunity cost for Canada since the country could more easily make economic gains by aggressively developing current energy sources, from the tar sands of Alberta to the rivers of Northern Quebec. This access to cheaper energy from traditional sources also allows for greater development of energy-intensive industrial activities in Canada, as well as potential energy sales to other nations. Despite the long-term economic and environmental advantages of cleantech energy, Canada has attractive reasons for not making the investment required to develop this new sector and instead focus on accelerating the development of current forms of fossil fuel and hydroelectric power generation.

Foreign Technology Leadership:

Many foreign countries have been focusing for years on developing alternative power sources and have established technological leadership positions. While Canada has the potential to develop its own world-class technologies, the country's inexperience in this sector could be viewed as a significant challenge to the creation of successful firms that benefit the Canadian economy. While the long-term benefits of technology leadership are indisputable, it may be argued that Canada is already too far behind the curve and at this point would be best served by adopting technologies created elsewhere rather than devoting resources to risky research and development on long lead-time projects.

Lack of Adequate Venture Capital Financing:

Like many emerging industries, the embryonic cleantech energy sector requires strong and sustainable sources of financing. Unfortunately, the financing of Canadian start-ups is relatively thin when compared with several other developed Western countries, particularly our American neighbours. In 2005, the estimated total of all venture capital investments in Canada was \$1.8 billion versus \$35.3 billion (in Canadian dollars) in the U.S.⁷ Canadian venture capital investment per capita was 53% less than the American equivalent. Furthermore, Canada's venture capital financing is overly focused on early stage investments with approximately 50% of investment dollars going to seed and early stage firms. American venture capitalists place less than 20% of dollars on early stage firms with more than 80% of dollars invested in later stage firms to fund their maturation.⁸ Taken together, these two disparities between the Canadian and U.S. environments indicate that Canada's entrepreneurial firms are at a disadvantage in terms of venture capital access, particularly in the prototyping and commercialization stages when firms must take their technologies from the lab to the real world. While the federal government has instituted several programs to assist cleantech firms with technology development, these firms nevertheless face a difficult environment in terms of venture capital financing that can be crucial to achieving success. This situation is exacerbated by certain Canadian tax laws that discourage foreign venture capital investment and place Canadian firms at a competitive disadvantage compared to firms located in other countries.

Environmental Fatalism:

Another challenge that threatens the development of a cleantech energy industry in Canada is the fact that the population may adopt an "it's too late" attitude with regards to improving environmental conditions. Many experts in the environmental field have commented on the danger of pessimistic thinking that results in decisions that simply maintain the status quo in terms of energy use or environmental policy. Given that the development of cleantech energy will require significant investment, this negative attitude concerning the value of creating new technologies could be a sizeable hurdle for entrepreneurs seeking to develop this industry.

(Footnotes)

⁷ "Growing the Businesses of Tomorrow: Challenges and Prospects of Early-Stage Venture Capital Investment in Canada," Macdonald & Associates Limited, March 2005.

⁸ *Ibid.*

Recommendation #1:

Develop a Vision for Cleantech in Canada

"Government needs to lead by clearly indicating where they want to position Canada in terms of bio-fuels and indeed, energy as a whole. They need to take a stand and make the statement that Canadian production of bio-fuels will be competitive in the world market."

Doug Hooper, Canadian Bioenergy Corporation

In our discussions with cleantech entrepreneurs from across the country, they overwhelmingly felt that all three levels of government had not clearly stated that cleantech is vital to Canada's economic future. The entrepreneurs believe this is essential to promote the development of the industry within Canada and to facilitate effective long-term decision making for companies and investors.

We recommend that Canada's federal, provincial and municipal governments:

Issue an unequivocal statement supporting the development and growth of the clean technology industry in Canada. This statement should specify that:

- The achievement of this growth requires active support of Canada's cleantech entrepreneurs
- Canada will capture a portion of the new economic growth generated by international demand for greenhouse gas reduction technologies
- Building demand for cleantech within Canada is essential to facilitate financing and to support the export of these technologies

Recommendation #2:**Remove Barriers to Foreign Venture Capital Investment in Canada**

"We need to reform tax law in Canada to stop discouraging foreign venture capital investors, especially from the United States. This is the single most important thing that needs to be done to improve entrepreneurship in Canada. Get rid of the venture capital barriers and allow American investors to invest here without penalty."

Len April, Sunarc of Canada Inc.

The long-term success of Canada's cleantech energy sector, like all entrepreneur-driven Canadian industries, depends upon the establishment of solid and dependable sources of financing, notably from venture capital providers. Unfortunately, the venture capital sector in Canada today is immature and inadequate, due in large part to Canadian tax laws that discourage foreign investments. Under the current rules, foreign investors who would like to support entrepreneurial firms in Canada are subject to a form of double-taxation as well as bureaucratic hurdles that don't exist when they invest elsewhere. These rules result in the chronic under-funding of emerging Canadian firms and considerable economic loss for the country as these small firms are forced to wind down operations or sell too early to larger competitors. Ironically, these sub-optimal results further discourage investors from putting their money into the financing of Canadian start-ups, creating a vicious circle of underperformance.

There are a number of important changes that need to be made in order to level the playing field and eliminate this major competitive disadvantage for Canadian entrepreneurs who need foreign investors to finance their projects.

WE RECOMMEND THAT CANADA'S GOVERNMENT:**Eliminate the 116 Clearance Certificate Documentation Requirements:**

When investing in a privately-held Canadian company, foreign venture capital firms are required under Canadian tax law to provide extensive and personally signed documentation from all the individual equity holders participating in the investment upon the sale of their position. This expensive and time-consuming requirement was initially intended to help enforce the payment of taxes to Canada, but today these taxes have largely been eliminated through tax treaties with other countries. Since venture capital firms usually consist of partnerships with hundreds of investors, the legal fees and paperwork required to satisfy these requirements is an enormous burden that can cost hundreds of thousands of dollars. Furthermore, all these investors are required to obtain Canadian taxpayer ID numbers and file Canadian tax returns even though in virtually every instance no tax is due. Again, such requirements do not exist in the U.S. and most other developed Western countries and this puts Canada at a huge disadvantage. The result is that foreign investors avoid making Canadian investments, harming the health of emerging Canadian companies who need this important source of financing. We recommend eliminating the 116 Clearance Certificate requirements in order to encourage foreign investment in entrepreneurial Canadian firms.

Eliminate Withholding Tax:

Currently, a foreign venture capital investor with an equity position in a privately-held Canadian firm is subject to a 25% withholding tax on any gain resulting from the sale of this ownership stake until the 116 Clearance Certificate is issued. This process commonly involves delays of 4-8 months. No such withholding exists in the U.S. so Canadian investors are able to invest in the U.S. without being subject to this type of withholding (resulting in significant expenses and delays) but foreign investors who want to invest here are penalized. While mechanisms for providing relief are available to foreign firms, the procedures involved can be complicated, expensive and time-consuming. As a result, many decide simply to avoid investing in Canadian firms as a matter of course. We recommend eliminating the 25% withholding tax on gains made by investors who wish to participate in entrepreneurial Canadian firms.

Allow Tax-Free Rollovers:

One of the most common exit strategies for venture capital firms is a rollover of stock following the acquisition of a portfolio company by a larger firm. Under current Canadian tax law, investors are immediately subject to tax if the shares in a Canadian firm are transformed into shares in a foreign firm during a rollover but there is no tax if the acquiring firm is Canadian. This is a strong disincentive for a foreign venture capitalist that might otherwise invest in a Canadian firm but doesn't want to be penalized by laws that could encourage some shareholders to accept a lower price from a Canadian buyer because of tax considerations. We recommend that Canada adopt the same tax rules for cross-border rollover transactions as those that apply when the acquiring firm is Canadian.

Maintain Canadian-Controlled Status for Venture Capital-Backed Firms:

Canadian firms are given considerable tax benefits, from R&D credits to capital gain exemptions, but these are often dependent on the maintenance of "Canadian-controlled" status. Significant investment by a foreign venture capital provider can result in the loss of this status. As a result, emerging Canadian firms often face a Catch-22 situation: accept the valuable financing and lose the valuable benefits or keep the valuable benefits and lose the valuable financing. To avoid this undesirable scenario, we recommend redefining the manner of interpreting "Canadian-controlled" and focusing on the location of a firm's business activities, its employee levels and/or other benefits it provides to the Canadian economy.

Recommendation #3: Lead by Example and Procure Green Products

The biggest challenge companies face is going from research into production and distribution. Government can help companies make this transition successfully by being a market force through procurement.

Tom Rand, Canadian Hydrogen Energy Company

With a reported \$13 billion spent on goods and services in 2004⁹, the federal government is a significant purchaser in Canada. Provincial and municipal governments are also major purchasers in their respective jurisdictions. Together, this means that the Canada's governments at all levels play an important role in terms of procuring goods and services that have the appropriate environmental credentials, and in showing other consumers the benefits of purchasing the product.

Governments in Canada have already put in place some policies and mechanisms to increase the sustainability dimension of government procurement. For example, in April 2006, the Federal Government (Department of Public Works and Government Service) introduced a Policy on Green Procurement. Likewise, a number of provinces and municipalities have made headway in this realm. For example, the City of Calgary purchases wind power for light rail transit (making Calgary's C-Train the first wind-powered public transit system in North America), and provinces such as Quebec, British Columbia and Manitoba have green procurement policies.

However, the clear message from entrepreneurs is that existing efforts are falling short – particularly as they relate to the purchasing of clean technologies. Through the introduction of sustainability criteria into public procurement decisions, governments in Canada can stimulate the development and use, both nationally and internationally, of more environmentally-friendly technologies.

WE RECOMMEND THAT CANADA'S GOVERNMENT:

1. Establish a sustainable procurement strategy for Canada, which includes lifecycle analysis.

Canada would benefit from a clear strategy for sustainable public procurement. Such a strategy could be developed by all levels of government and their agencies, and could address responsibilities, resources and monitoring and evaluation procedures. Its key goal would be to develop standards and create momentum towards best-practices in green procurement.

(Footnotes)

⁹ Commissioner of the Environment and Sustainable Development. 2004. Report of the Commissioner of the Environment and Sustainable Development.

Life cycle assessment seeks to determine the environmental impact of a product or service throughout all stages of its life (raw material processing, manufacturing, transportation, use and ultimate disposal), and must be central to Canada's vision for green procurement. This analysis is useful to policy makers because it allows for products and services to be compared in terms of their total environmental impact and allows for products and services to be selected based on environmental performance. Although a number of provinces currently have policies on green procurement, very few of these reference lifecycle analysis at this time.

This has significant ramifications for clean technologies, as it can transform industry's perception of eco-innovation from a costly hindrance towards a business opportunity.

"The biggest impediment we face is the lack of market acceptance that you can sell renewable energy into the market to beat the price of fossil fuels. We're up against fundamental market ignorance."

Alex Winch, Mondial Energy

2. The immediate strategy for green procurement should focus on climate change, water and waste

The opportunities for green procurement are vast. To achieve optimal impact in the shortest amount of time, the public sector should focus enhanced procurement efforts on three key environmental areas: carbon, water and waste. These are high impact areas for Canada's future and are also central to the cleantech. Thus, the strategy will support the development of new technologies and stimulate market response and economic growth.

Examples of procurement opportunities on three focus issues

Area of Spend	Opportunity	Issue Addressed
Energy	Specify minimum targets for the use of clean technologies within key industrial sectors including energy generation	Climate change
Construction	Achieve water savings through implementation of water conservation and efficiency measures ¹⁰	Water
Construction	Ensure onsite recycling of aggregates for construction projects ¹¹	Waste

(Footnotes)

¹⁰ Woking Borough Council implemented cistern dams, tap regulators, flow controls, waterless urinals, water recycling and leak detection in its own buildings, leading to a reduction in its water consumption by 43.3% between 1991–2000 and a financial saving of 11.3%. From *Procuring the Future: Sustainable Procurement National Action Plan: Recommendations from the Sustainable Procurement Task Force*, June 2006.

¹¹ *Ibid.* Bexley Council did this for the A221 Danson Road. Benefits included a financial saving of 30%, reduced traffic congestion, saving of 3300 tonnes of virgin aggregates, recovery of 1500m³ potential materials to landfill, and reduction of over 200 lorry movements. .

3. Develop a greater level of sophistication when dealing with procurement of new technologies.

Canadian entrepreneurs in the cleantech field are today frustrated at the lack of consistency between jurisdictions. For example, the installation of an energy saving device was delayed in one municipality because city officials demanded that a vast range of permits be filed, mainly because they weren't sure which ones were applicable. In another region, *no* permit was required at all in order to install the same technology. The lesson is that prudent, measured regulation is required to fast-track the broad use of clean technologies within public spending.

Further education and support for procurement officers across Canada could help reduce red tape in this field. This could be facilitated through the development of toolkit and professional staff to support green procurement best practices at all levels of government and to align government procurement policies with the best practices developed through the prior recommendations.

The success of a Canadian vision for green procurement would also be aided by the development of more robust procurement information management systems. For example, the federal green procurement policy seeks to achieve the integration of environmental performance into procurement related decision making through the provision of a spreadsheet tool to inform procurement decision-making¹². However, the environmental attributes used in the model are very broad, with little guidance on how to score each metric. Further, the policy lacks performance indicators thereby making it impossible to evaluate the effectiveness of this policy or the decision making tools associated with it.

Recommendation #4:

Streamline and Centralize Incentives for Consumers

"The current programs in Canada are complex: You need special and expensive permits and machines. It needs to be simple"

Tony Verrelli, Cleanfield Energy

The entrepreneurs overwhelmingly believe that the government can create policies that allow the cleantech market to further develop in Canada. This market stimulation can take the form of consumer and corporate incentives to invest in clean technologies. This is vital because the creation of exportable Made-in-Canada technologies depends on having a strong local market that allows entrepreneurs to successfully get off the ground.

(Footnotes)

¹²Users of the tool assign scores to each commodity based on several environmental performance indicators (such as greenhouse gas emissions and air contaminants, energy and water efficiency, ozone depleting substances and waste) and operational requirements (such as the volume and frequency of purchase, cost related to the environmental impacts, usability and effectiveness of alternatives). A rating is assigned to each category, and commodities with the lowest scores are the ones with the smallest impacts and are therefore preferable for purchase.

Incentives for Consumers

Consumers form a significant portion of the market; offering incentives to encourage greener purchases will be beneficial to the cleantech sector. Although Canada currently offers a series of consumer incentives in the form of rebates like the Energy Star Program, which offers rebates on a host of products ranging from consumer electronics to new homes, they fall short of creating a solid market for green products. Based on feedback from the entrepreneurs, we recommend that Canada adopt more comprehensive incentive programs like the ones offered in the several US states and various European countries.

Make Clean Technologies GST Exempt

In order to maximize the impact of any sector stimulation policy, the incentive must be fast acting and reach its intended target. The objective of such a policy would be to increase household purchase, and business investment, in clean technologies. Through this policy, consumers would be eligible for a sales tax exemption when clean technologies are purchased. New Jersey offers a full exemption from the state's 7% sales tax for all solar and wind energy equipment for all taxpayers. The implementing statute directed the New Jersey Division of Energy Planning and Conservation in the Department of Energy to establish technical standards for qualifying solar energy systems.¹³ A similar policy can be introduced in Canada if the federal government were to exempt all solar and wind products from the GST. If the provinces were to follow suit, it could mean a savings for the consumer of up to 14% on these products.

Level the playing field for Canadian entrepreneurs by introducing cleantech incentive schemes that are available in other jurisdictions

A prime example of how a market for clean technology can be developed through the use of consumer incentives can be seen in the case of Cleanfield Energy, a Canadian manufacture of wind turbines. Cleanfield energy exports 96% of its wind technology to the United States because the market is more developed largely through the use of rebates. Tony Verrelli also stated that one of the largest impediments to building the wind industry in Canada is "competition from the US regarding government incentives."

(Footnotes)

¹³ http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=NJ01F&state=NJ&CurrentPageID=1

New York State offers a rebate for half the cost of wind powered turbines for commercial consumers and the state of New Jersey now rebates 60% of the costs.¹⁴ Also, New Jersey offers attractive consumer incentives to residential and business customers to help reduce the cost of installing a renewable energy generation system by defraying the costs of installation, equipment, and interconnection, which are paid incrementally based on the size of the system.¹⁵ Furthermore, in California, consumers receive subsidies of 42 cents per kilowatt of solar energy produced¹⁶ and 11 cents per kilowatt of wind power produced.¹⁷ Finally, clean technologies are also exempt from paying state sales tax in many jurisdictions.¹⁸

Promote and Streamline Existing Consumer Incentives

In Canada, several incentives exist to utilize cleaner and more efficient technologies; however, these incentives vary significantly throughout the country. As a result, the existing incentives are relatively unknown within the general population and are therefore underutilized. Centralizing consumer incentive information should be a priority in order to stimulate demand for these products. To achieve this, a website could be developed that lists the incentives and eligible products by region and jurisdiction. Furthermore, the surveyed entrepreneurs explained that the incentive programs that are available are difficult and cumbersome for the average consumer to access. Finally, in order to further encourage consumers to invest in clean technologies, the government should offer low-interest loans to consumers and businesses to make the purchase of these technologies more affordable.

Recommendation #5: Promote Net Metering

Electrical meters measure the amount of energy used by the consumer but they can also measure the amount of energy produced by the consumer and returned to the grid. This is the concept of net metering. Effectively the electrical meter turns backwards when customers with generating facilities produce more energy than they are using or need.

Net metering is a cost effective, simple method to encourage direct customer investment in renewable energy technologies and it is relatively easy to administer. It can facilitate the offsetting of energy consumption with consumer energy generation. This can be done over one or more billing cycles and not just instantaneously.

Proponents of renewable energy industries believe that the economic disincentive associated with the capital cost of generation equipment is offset by effectively increasing the value electricity generated by renewable energy technologies. Net metering does not generally require the use of public funds.

(Footnotes)

¹⁴http://www.njcep.com/html/2_incent.html

¹⁵<http://www.njcep.com/>

¹⁶ <http://www.gosolarcalifornia.ca.gov/>

¹⁷ <http://www.consumerenergycenter.org/erprebate/program.html>

¹⁸ Bird, L. et al., Policies and market factors driving wind power development in the United States. *Energy Policy* 33 (2005): 1397-1407

A single meter is utilized and there is no need for ongoing supervision or administrative or regulatory interaction once the program is established. Net metering is simple in that customers can make renewable energy technology choices that only affect their electrical meters.

Typically Net metering customer generation installations receive the retail price for their generation contribution as opposed to a reduced or wholesale rate for electricity which lowers the economic threshold of the customer generation installation since the avoided cost is greater than the cost of energy from the utility. (Over the lifetime of the customer-generator's net metering facilities, the difference between what the customer-generator would have paid the energy supplier without the generation equipment and what is paid with the equipment, is the avoided cost.)

Typically under a net metering arrangement the customer generated excess electricity is purchased (referred to as buy-back) under three possible rates: above retail, retail and below retail. Arrangements with respect to financial compensation for the customer-generator vary with jurisdiction and the utility or energy supplier but usually will be received after a set number of billing periods.

Some utilities will argue that the rate that they pay for the surplus power should be less than retail since there is a cost to transmission and distribution of the electricity and as well, costs associated with administration, troubleshooting, generation efficiency and system revenue loss. Utilities should benefit however since the reliability of the network is improved when customers supply their own electricity, particularly during peak periods. Also, given the significant projected growth in energy demand it is reasonable to expect that less grid capacity will be needed with the advent of more customer-generators. (Globally, the total energy system is expected to grow 3 times its current size in this century)

WE RECOMMEND THAT CANADA'S GOVERNMENT:

Promote and facilitate customer-generator awareness of net metering financial viability. (A net metering project is financially viable if the avoided cost is greater than the total equipment acquisition repayments, since the customer-generator's expenses on the project are less than what the customer-generator would have had to pay the energy supplier.)

Promote and facilitate a simple "no fee" net metering application and permitting process. (Complicated or convoluted application and/or permitting processes discourage potential customer-generators from participating in net metering.)

Promote and facilitate uniform connection standards and rules for net metering installations. (Currently in Canada net metering customer-generators are usually restricted to set amounts of capacity ie: B.C. has a limit of 50 kilowatts or less; Nova Scotia has a limit of 100 kilowatts or less; while Ontario has a limit of 500 kilowatts or less. In some jurisdictions net metering customer-generators have a limit placed on their electrical credits whereby any surplus credits are not paid for. Electricity credits earned by net metering customer-generators have time limits set on them (usually one year); if they are not used in that time, in some jurisdictions, they are lost. At the end of the year, British Columbia Hydro credits the client's account for surplus electricity or pays out the client at a rate of 5.4 cents per kilowatt-hour. Surplus credits earned from the Ontario Hydro Authority are lost.)

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ANNEX 1: LIST OF INTERVIEWED ENTREPRENEURS

Alex Winch

Mondial Energy Inc., Toronto, Ontario

André Van Neste, Charles Bérubé et Houshang D. Alamdari,

Nanox Inc., Quebec, Quebec

Clayton Bear,

New Energy Corporation Inc., Calgary, Alberta

Doug Hooper

Canadian Bioenergy Corporation, Vancouver, British Columbia

Ghyslain Théberge

CO₂ Solution, Sainte-Foy, Quebec

Jonathan Ritchey

EXRO Technologies Inc., Calgary, Alberta

Len April,

Sunarc of Canada Inc., Laval, Quebec

Leo Hakka,

Cansolv Technologies Inc., Montreal, Quebec

Tom Heinzman,

Bullfrog Power, Toronto Ontario

Tom Rand

Canadian Hydrogen Energy Company, Bowmanville, Ontario

Tony Verrelli,

Cleanfield Energy, Hamilton, Ontario

ANNEX 2: ENTREPRENEUR SURVEY

Revolutionizing Cleantech in Canada

Part 1: Entrepreneurial Vision

- 1) What is your main business idea?
- 2) What is the current state of your business?
- 3) What drove you to start your business?
- 4) What are your top three objectives?

Part 2: Establishing a Successful Enterprise

- 5) What are the three most important key success factors for your business?
- 6) What are the three most important challenges or impediments to success?
- 7) What are the three most important things that could be done (by you) to improve your chances of success?
- 8) What are three things government could do to improve your chances of success? Who in government specifically?
- 9) What are three things business could do to improve your chances of success? Who in business specifically?
- 10) What are three things business could do to improve your chances of success? Who in business specifically?
- 11) Is there anyone else who could improve your chances of success? What could they do?
- 12) Did you have trouble raising capital for your business?

Part 3:

Markets and Economic Growth

13) What is your current market and how do you see it evolving?

14) Are there other markets that you're envisioning for the future? New markets or export opportunities? How do you see them evolving? Will you develop additional products or services?

15) How will your project affect Canada's economy? Will it contribute to Canada's economic growth? How?

Part 4:

Policy Recommendations

16) Given everything we've discussed today, what are the key policy recommendations which would better enable the success of your business?

17) What are the policy instruments or initiatives which could better support or enable cleantech entrepreneurs in Canada more broadly?

18) Are there specific initiatives, networks, policy makers or other entrepreneurs that you feel we should talk to or research as we undertake this project?

19) Would you be willing to review our final recommendations and allow us cite passages from this interview (provided you have final approval of the quotations)?

Part 5:

Other

20) Is there anything we haven't covered that you'd like to discuss?

ANNEX 3: RANKING RESULTS FROM ENTREPRENEURS

Statement	Median	Average	Standard Deviation	Responses
Tier One - Develop a vision for Canada	1	1.2	0.4	11
Tier Two - Address structural framework and high level policy issues				
Rethink subsidies to the oil and gas sector	1	1.6	0.8	11
Review the price of electricity	2	2.4	0.5	11
Develop consumer incentives to use clean technologies	1	1.5	0.7	11
Promote a country-wide system of net metering	2	2.1	0.6	10
Tier Three - Take action: Develop portfolio of cleantech policies and programs addressing a variety of stakeholder groups				
Government				
a. Develop the international market (EDC)	2	2.2	0.9	11
b. Be an early adopter (procurement)	1	1.3	0.5	11
Public				
a. Educate the public about cleantech	2	2.1	0.7	11
b. Educate the public about climate change	2	2.3	0.5	11
c. Put in place specific consumer incentives	1	1.4	0.5	11
Corporations				
a. Get corporations to play a mentoring role to cleantech companies	2	2.2	0.8	11
b. Encourage corporations to be early adopters of clean technologies	1	1.2	0.5	11
Investors				
a. Remove barriers to venture capitalists making investments in Canada	2	2.0	0.9	11
b. Encourage Canadian institutional investors to invest in cleantech	1	1.8	0.9	11
c. Foster early-stage angel investor capital in Canada	2	1.9	0.8	11
d. BDC/Invest Quebec	3	2.3	0.9	10
Entrepreneurs				
a. Launch 'federal cleantech centre	2	2.0	0.9	11
b. Make the grant system for cleantech entrepreneurs more accessible at pre-commercial stages	2	1.7	0.8	11
c. R&D tax credit	2	1.8	0.6	10
d. SDTC – review accessibility of funding	2	2.2	0.8	9
e. IP (who's responsible for funding, optimise process from universities to commercialization)	2	2.4	0.5	9