PEMBINA institute

January 22, 2013

*Executive Summary*

# Competing in Clean Energy: How Canada can capitalize on the global transition to clean energy

With more than 700 companies, the clean technology (cleantech) sector has emerged as a major driver of innovation and employment growth in Canada, investing almost $2 billion in research and development and seeing an 11 per cent increase in employment between 2008 and 2010.[1] Yet Canada currently captures just one per cent of the $1 trillion global clean technology industry. It is estimated that, as this industry grows to a projected $3 trillion by 2020, Canadian clean technology companies have the potential to increase their market share from today's $9 billion to $60 billion.[2]

Numerous studies and reports have explored the opportunity for Canada to compete in clean energy, but none have been based on the actual experiences — both positive and negative — of Canadian clean energy entrepreneurs. Drawing on published research and one-on-one interviews, Pembina's research explores how Canada is faring in the global clean energy race, identifies challenges faced by clean energy businesses, and suggests public policy options that would help create winning conditions for Canadian clean energy entrepreneurs. (For a list of our interviewees, see Table 1 below.)

## How is Canada faring in the global clean energy race?

While Canada is one of the top energy research and development (ER&D) funders in the world, this funding tends to be both short term and thinly distributed across multiple, uncoordinated programs.[3] Further, public ER&D funding in Canada is presently less than its peak in 1984 (measured as a percentage of GDP), and funding has been volatile, cycling through booms and busts.[4] ER&D funding is also concentrated in supply-side technologies, accounting for more than two-thirds of funding, which risks shortchanging the crucial demand side of the energy system.[5]

Despite ER&D investments, Canada places fifth in clean energy inventions, with its companies securing only two per cent of clean energy patents granted in the United States since 2002 (compared to Korea's five per cent, Germany's seven per cent, Japan's 26 per cent and the United States' 49 per cent).[6]

Several studies have ranked Canada's clean energy performance lower than that of other countries. A 2010 report by the National Roundtable on the Environment and the Economy (NRTEE) benchmarked Canada's performance relative to other G8 countries using a Low-

---

[1] Ian Philip, Jordan Isenberg, Jean-Frédéric Légaré-Tremblay and Remzi Cej, *Launching Cleantech: Ensuring Canada's place in the new global market*, (Action Canada, 2012), 9.

[2] Analytica Advisors, *Spotlight on Cleantech*, Issue No.3 (January 2012). http://www.analytica-advisors.com/sites/default/files/Spotlight%20on%20Cleantech%20No.3.pdf

[3] Tatiana Khanberg and Robert Joshi, *Smarter and Stronger – Taking charge of Canada's energy technology future* (The Mowat Centre, School of Public Policy and Governance, University of Toronto, 2012), 9. http://mowatcentre.ca/research-topic-mowat.php?mowatResearchID=67

[4] Ibid, 39.

[5] Ibid, 40

[6] Ibid, 9.

carbon Performance Index, and found that Canada placed sixth.[7] In the 2011 edition of its *Who's Winning the Clean Energy Race?* report, Pew Charitable Trusts ranked Canada's finance and investment in clean energy eleventh in the G-20,[8] a drop from eighth place in the 2009 edition.[9] These findings are consistent with the perspectives gathered from our interviewees, all of whom felt that there was tremendous opportunity for Canada both to compete globally in clean energy and to improve on our performance to date.

## What challenges do Canadian clean energy entrepreneurs and businesses face?

Our research identified two main challenges to clean energy entrepreneurship in Canada: the lack of stable, long-term government policy and difficulty accessing capital.

Prospective clean energy developers face a patchwork of policies and initiatives intended to support clean energy development across the country. In addition, conventional fossil fuel sources of energy (and associated technologies) benefit from more than a century of incumbency and competition that has driven their costs downward while being supported by infrastructure, market rules, and favorable tax treatment that predispose markets in their favour.[10] As a result, numerous interviewees suggested that the federal government has a necessary role to play in driving demand for clean energy through policy measures such as clean energy targets, green procurement policies and carbon pricing systems.

In an export-oriented economy like Canada's, significant growth in the clean technology sector will require looking to international markets. To date, the federal government has made some effort to support access to international markets for clean energy technology;[11] however, export market support for clean energy pales in comparison to the federal support being offered to diversify markets for oil and gas exports.[12]

Interviewees expressed a difficulty in accessing capital. One of the primary reasons for this is these types of technology companies fall into a "hole" between traditional asset classes. They

---

[7] National Roundtable on the Environment and the Economy, Measuring up: Benchmarking Canada's competitiveness in a low carbon world (2010), 15. http://nrtee-trnee.ca/wp-content/uploads/2011/08/benchmarking-eng.pdf

[8] The Pew Charitable Trusts, *Who's winning the clean energy race? 2011 edition,* (2012) 37. http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Report/FINAL_forweb_WhoIsWinningTheCleanEnergyRace-REPORT-2012.pdf

[9] The Pew Charitable Trusts, *Who's winning the clean energy race?* (2010) 25. http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Global_warming/G-20%20Report.pdf

[10] Jesse Jenkins and Sara Mansur, *Bridging the Clean Energy Valleys of Death: Helping American entrepreneurs meet the nation's energy innovation imperative* (The Breakthrough Institute, 2011), 9. http://thebreakthrough.org/blog/V alleys_of_Death.pdf

[11] For example, several clean energy research partnerships between Chinese and Canadian firms arose out of Prime Minister Harper's February 2012 trip to China - see Ari Altstedter, "Green dreams for Canada and China in clean energy deals," *Capital News Online,* March 2, 2012. http://www.capitalnews.ca/index.php/news/canadian-and-chinese-firms-partner-for-clean-energy

[12] For example, see: Nathan Vanderklippe, *Canada goes on offensive in pipeline PR* war (Globe and Mail, October 10, 2011). http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/canada-goes-on-offensive-in-pipeline-pr-war/article557163/
Jason Fekete, *Oil sales, human rights (and pandas) on Stephen Harper's China agenda* (Postmedia News, February 7, 2012). http://news.nationalpost.com/2012/02/07/oil-sales-human-rights-on-stephen-harpers-agenda-in-china/
Chris Sorenson, *Enbridge has a best friend in Ottawa* (Macleans, July 4, 2012), http://www2.macleans.ca/2012/07/04/power-corp/

have a venture capital risk profile, but require infrastructure-type capital (i.e. debt financing) — that is, they are both high risk and have high capital needs. Compounding the challenge of accessing capital is the decline in venture capital investment, particularly from large institutional investors. With this in mind, many highlighted Sustainable Development Technology Canada's (SDTC) Tech Fund and NextGen Biofuels Fund as bright lights on the investment landscape. Our interviewees noted that these funds fill critical gaps in the innovation cycle that risk leaving cleantech startups crippled.

## What public policy options could be applied to these challenges?

Our research uncovered three main opportunities for the federal government to better support clean energy entrepreneurship in Canada:

1. **Develop a set of specific federal financial tools to encourage clean energy entrepreneurship.** As with other sectors of the Canadian economy, targeted and customized support will help enable the clean energy sector to fulfill its potential. A toolbox of financial instruments is needed to support clean energy technologies and ensure that those with market potential successfully cross both "valleys of death" (technological and commercial) that researchers have identified. For example, there is growing support for green bonds, broadly defined as "fixed-income securities that raise capital for a project with specific environmental benefits."[13] There is also a need to continue to provide support to approaches that are already proving successful. SDTC has played a critical role in supporting clean energy technologies. We suggest the federal government begin recapitalizing SDTC at a rate of $100 million per year for the next five years, beginning in Budget 2013.
2. **Engage in the development of a national energy strategy.** A Canadian energy strategy would provide long-term guidance to federal, provincial and municipal policymakers, as well as the private sector. While provincial governments are pursuing such a strategy through the Council of the Federation, the federal government to date has been less active. A national energy strategy could be complemented by long-term ER&D targets and effective funding for "...priorities set by long-term policy and organized in a diversified portfolio that cuts across the energy system and stages of investment."[14] Many of our interviewees suggested that Canada's abundance of resource wealth should be leveraged to support a transition to clean energy.
3. **Send the right price signals.** As with the recommendation above, provincial governments also have an important role to play here. However, the federal government can help send the right price signals for clean energy entrepreneurship by accelerating efforts to phase out the remaining fossil fuel subsidies. In addition, the majority of our interviewees identified a federal approach to carbon pricing as a critical step in encouraging the domestic transition to clean energy technologies and services. That domestic transition would then help establish the conditions for Canadian entrepreneurs and businesses to compete successfully abroad.

---

[13] Tatiana Khanberg and Robert Joshi, *Smarter and Stronger – Taking charge of Canada's energy technology future* (The Mowat Centre, School of Public Policy and Governance, University of Toronto, 2012), 10. http://mowatcentre.ca/research-topic-mowat.php?mowatResearchID=67

[14] Sustainable Prosperity, *Green Bonds – Policy Brief* (2012), 2. http://www.sustainableprosperity.ca/article2810

## Table 1: Interviewees

| Name | Position | Company |
|---|---|---|
| Dan Balaban | Founder and CEO | Greengate Power Corporation |
| Frances Bowen | Chair in Innovation Studies | Queen Mary University of London & University of Calgary |
| Mike Brown | Co-founder and Chairman of the Board | Chrysalix Energy Ventures |
| Karen Clarke-Whistler | Chief Environment Officer | TD Bank Group |
| John Coyne | VP, General Counsel & Corporate Secretary | Unilever Canada |
| David Demers | CEO | Westport Innovations |
| Dawn Farrell | CEO | TransAlta |
| Jeremy Hall | Professor, Beedie School of Economics; Fellow of The Centre of Innovation Studies (THECIS) | Simon Fraser University |
| Andrew Heintzman | Co-founder, President and CEO;<br>Chair of Premier's Climate Change Advisory Panel for the Province of Ontario | Investeco Capital Corp. |
| Tom Heintzman | Co-founder and President | Bullfrog Power |
| Guy Holborn | Associate Professor, Business, Economics and Public Policy; Director, Ivey Energy Policy and Management Centre; and Suncor Chair in Energy Policy | University of Western Ontario |
| Ross Hornby and Kim Warburton | VP, Government Relations and Policy; VP, Communications | GE Canada |
| Jatin Nathwani | Professor and Ontario Research Chair in Public Policy and Sustainable Energy Management, Faculty of Engineering and the Faculty of Environment; Executive Director WISE | University of Waterloo |
| Nick Parker | Executive Chairman | Cleantech Group |
| Tom Rand | Managing Partner, MaRS Cleantech Fund | MaRS Discovery District |
| John Ruffolo | CEO | OMERS Ventures |
| Bill Smith | Senior VP, Energy Sector | Siemens Canada |
| Mike Scott | President and CEO | Nexterra |
| Bill Tharp | CEO | Climate Change Infrastructure |
| Mossadiq Umedaly | Executive Chairman;<br>Venture Partner | Enecsys Limited;<br>Wellington Partners |
| Dianne Zimmerman | Manager, Strategic Relations | Suncor Energy |