KPMG
cutting through complexity

Cleantech's going mainstream: exploring new opportunities

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KPMG invests in the industry through thought leadership, share forums and white papers on trends, opportunities and challenges affecting the Canadian Power & Utilities sector.

In this issue we focus on the impact cleantech innovation is having on Canada's power sector in terms of reducing the cost of solar and wind, lowering power demand through energy efficiency, and bringing energy storage to the grid. We also explore the state of cleantech innovation, investment and government support in Canada.

Issue 1: A New Era for Clean Energy in Canada

Project finance market trends and the prospects of new power generation developments in British Columbia and the rest of Canada.

Issue 2: Wind Energy in Canada: Realizing the Opportunity

Wind financing activities and the next wave of wind opportunities in the province of Québec.

Issue 3: Alberta's future energy mix: exploring the potential for renewables

Opportunities and challenges facing the power and utilities sector in Alberta and the role of renewable energy in meeting Alberta's growing electricity demand.

Summary findings

Cleantech is impacting Canada's power sector

Cleantech innovation is having a major impact on Canada's power sector and is moving to mainstream applications. Innovations improving the cost and performance profile is evident in the wind and solar sector. For solar, technology innovation has contributed to turnkey solar photovoltaic (PV) project prices falling to $3.4 per watt in 2012, a 73% decrease on the average price of similar systems in 2005.[1] At this price, solar is nearing grid parity in regions of Canada with strong solar resources.

Cleantech innovation in energy efficiency and smart grid is also impacting Canada's power sector by reducing the need for new capacity. For example, British Columbia estimates it will be able to displace 66% of anticipated power demand increases through energy efficiency and conservation measures.[2]

Cleantech is being incorporated into global supply chains

Clean technology and services are also being implemented across the supply chains of multiple industries outside of electricity. For example, Canada's rapidly growing oil and gas sector is increasingly deploying new wastewater treatment technology in order to meet strict water recycling requirements. Some of Canada's largest industrial manufacturing companies are also implementing energy efficiency measures to reduce electricity costs. Even in the IT sector, cleantech solutions are increasingly being used to reduce data storage centres' power requirements.

Canada leads the way in cleantech innovation

Canada is a hotbed of cleantech innovation by any measure. Private investment in Canadian cleantech companies totalled $1.5 billion between the beginning of 2010 and June 2013, representing 4% of global private investment in cleantech companies during the same period.[3] This is a significant volume given that Canada only accounts for 2% of global GDP.

Canada's edge in cleantech innovation is also evidenced by the high level of patent applications sought by its companies. Some 106 patents were issued to Canadian cleantech companies in 2012, while 135 patent applications were filed.[4] The innovation pipeline is clearly robust.

Strategic investors are replacing venture capital funds as the most active cleantech investors

Venture capital funds are now less active in pursuing large capital-intensive cleantech investment opportunities. This is reflected in the fact that only $76 million was invested on average per quarter in Canadian cleantech companies in 2011 and 2012, a 25% decrease on the $101 million quarterly average investment volume in 2010.[5]

Encouragingly, strategic investors are replacing venture capital funds to an extent, with investors such as General Electric, Cisco and Cenovus Energy all investing in Canadian cleantech companies in the past 18 months.

[1] CanSIA / IEA estimates (2013)
[2] British Columbia Clean Energy Act (2010): www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_10022_01
[3] Clean Energy Pipeline (London, UK, 2014)
[4] MaRS Discovery District (Toronto, ON, 2013)
[5] Clean Energy Pipeline (London, UK, 2014

Cleantech innovation is critical for a sustainable power sector

It is hard to identify an area of Canada's power sector that has not been impacted by the wave of cleantech innovation in the past decade. Technology advancements in solar photovoltaic (PV) and onshore wind in the past five years have significantly reduced their levelized cost of energy (LCOE) to the point at which they are approaching grid parity in various markets; the increasing deployment of smart meters and smart grid software is enabling time-of-use pricing; and advancements in energy storage technology are addressing the most important drawback of renewable energy, intermittency. At the same time, increased deployment of energy efficiency technology in homes and industry is reducing the power capacity requirements in certain provinces. Some of Canada's largest industrial manufacturing companies are also incorporating energy efficiency technology into their processes to reduce costs.

But cleantech does not just apply to power. Canadian oil and gas companies are increasingly deploying innovative industrial wastewater treatment technologies to cost-effectively meet strict waste water recycling and reuse requirements

//Canada's ability to compete globally in the cleantech sector will not exclusively come from investments in domestic manufacturing capabilities. It will thrive if we can demonstrate our ability to quickly and effectively commercialize home-grown innovative technologies that are supported by adequate federal and provincial policies as well as private capital.//

Georges Arabache
Vice President
KPMG

Technology innovation improves competitiveness of renewable energy

Cleantech innovation is greatly impacting Canada's renewable energy sector by improving the cost competitiveness of solar PV. Technology enhancements in power conversion, manufacturing processes and sun tracking, combined with a significant ramp up in manufacturing capacity in Asia, have led to a significant reduction in costs. According to data compiled by the International Energy

Agency (IEA) and the Canadian Solar Industries Association (CanSIA), the average turnkey price of a grid-connected solar PV project over 10 kW was $3.4 per watt in 2012, a 73% decrease on the price of a similar system in 2005 (Figure 1: Solar module and turnkey system costs in Canada).

"Solar costs have come down quite dramatically," confirmed John Gorman, President of CanSIA. "Technological advances have complemented this, which is unique to solar. Solar is the only energy source that is going through a predictable and dramatic cost reduction while at the same time going through significant advancements in terms of efficiency and new technologies. For example, the Fraunhofer Institute recently benchmarked a new Sanyo microchip solar product that demonstrated 44.6% efficiency, which is unprecedented. There are also a lot of solar nanotechnology advancements and innovations in semiconductors that convert solar directly into AC, which removes the need for an inverter. These technologies are not yet mainstream, but are a sign of things to come."

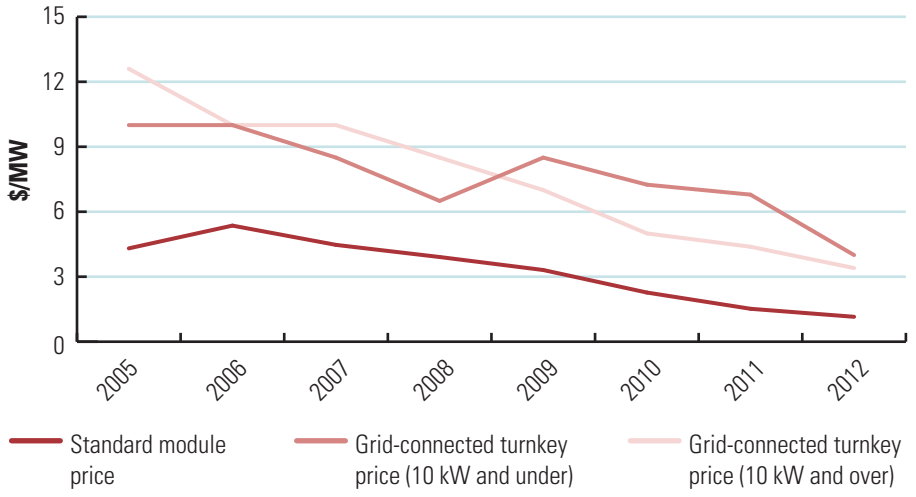
The significant decrease in costs has resulted in solar PV nearing grid parity in areas of Canada with a strong solar resource. Canada's best solar resource is in Alberta, which possesses a solar resource that is 25% better than Ontario's and 30% stronger than Germany's, according to CanSIA.

"We will be at grid parity soon in Alberta," confirmed Gorman. "When you start to look at avoided transmission and distribution costs, fuel price hedging, emissions reduction and some time of day usage, and add this to the retail price, you will see that solar is more than competitive than many other energy sources."

Innovation in energy storage technology is also improving the viability of renewable energy. The main obstacle to renewable energy becoming a significant proportion of the energy mix is its intermittency. Without grid-scale storage capabilities, planners are reluctant to allow too much renewable energy to connect to the grid due to capacity constraints and the need to ensure that peak demand can always be met.

Many Canadian provinces are exploring energy storage options. In September 2013, BC Hydro completed installation of a 1 MW battery bank in Yoho National Park, BC, that will store clean energy produced by BC Hydro for seven hours. It is the first project of its kind in Canada and is designed to serve as a template for how solar PV and onshore wind capacity can be integrated into the grid. Ontario is also looking to add energy storage to its grid. In early 2013, Ontario's Independent Electricity System Operator (IESO) announced it would contract 10 MW of storage services, comprising a combination of flywheel energy storage, battery storage and process storage technology.

Figure 1: Solar module and turnkey system costs in Canada



Source: CanSIA / IEA estimates (2013)

Energy efficiency impacts demand for new capacity

Advancements in energy efficiency technology are also impacting Canada's power market. Implementing energy efficiency technologies in homes, manufacturing and industry can significantly reduce energy demand, and hence the need for new power capacity. For example, British Columbia's 2010 Clean Energy Act mandates utilities to offer demand-side management (DSM) programs to their customers. It is anticipated that 66% of BC's increase in power demand can be displaced by energy efficiency and conservation programs.[6] BC's

[6] British Columbia Clean Energy Act (2010): www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_10022_01

push for energy efficiency is already bearing fruit. In 2011, DSM saved 671 million kWh of electricity, equivalent to the annual energy consumption of 66,000 homes, according to statistics compiled by the BC government.[7]

Increasing innovation and deployment of smart grid technology is also affecting Canada's power sector. Smart grid technologies enable time-of-use pricing, which encourages energy users to alter their consumption patterns away from peak times. Better monitoring and automation at the grid level also allows utilities to operate networks more efficiently. Smart home-related technology can also increase the viability of residential renewable energy installations.

Ontario is furthest ahead in smart grid deployment, having completed the $1 billion roll-out of 4.7 billion smart meters to almost every homeowner and small business. It is the first jurisdiction in North America to have completed such an initiative. Smart grid deployment is a key pillar in Ontario's long-term target to reduce peak electricity demand by 7,100 MW and achieve overall energy savings of 28 TWh by the end of 2030.[8]

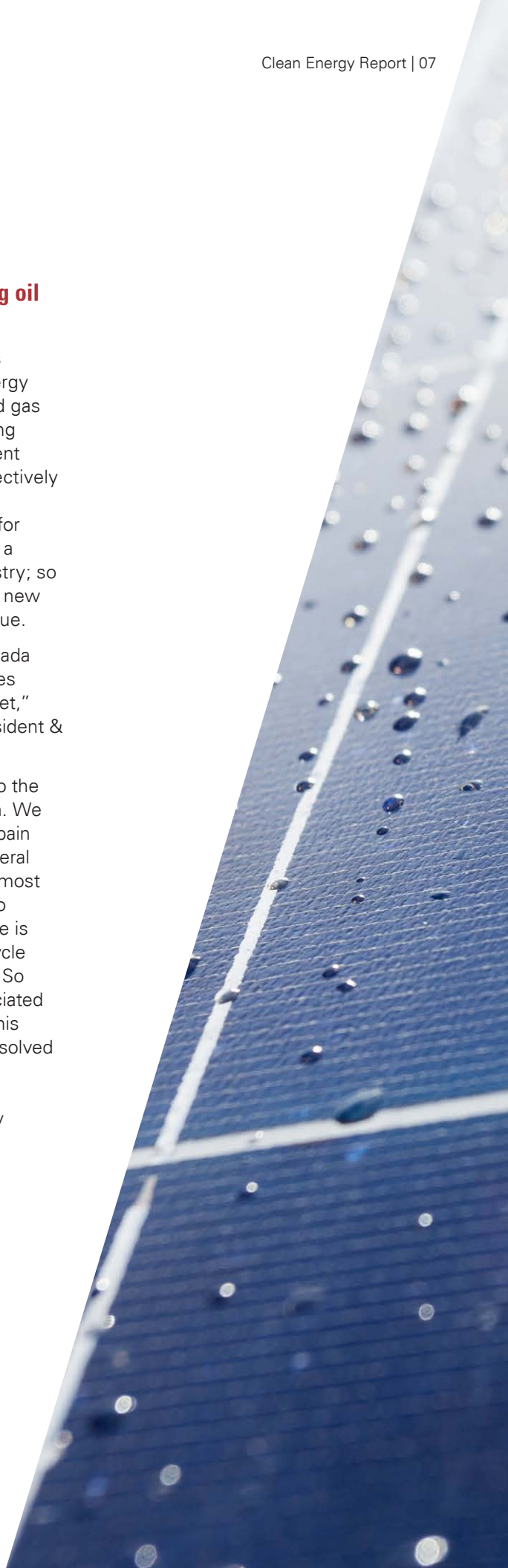
British Columbia has also initiated its 'Smart Metering Program', which aims to deploy a variety of smart grid technologies including smart meters, a meter communications network and in-home power consumption feedback tools. It also foresees improving the grid to make it better able to accommodate renewable energy capacity. Some 1.8 million smart meters had been installed as of July 2013 under this program, representing 96% of BC Hydro's customers.

Cleantech is also benefitting oil and gas industries

The reach of cleantech extends well beyond the renewable energy sector. Indeed, Canada's oil and gas industry is increasingly deploying innovative waste water treatment technology in order to cost-effectively meet strict water recycling and reuse requirements. The need for huge volumes of fresh water is a growing challenge for the industry; so many companies are looking at new technologies to address the issue.

"The oil and gas industry in Canada is huge and has lots of challenges that cleantech solutions can meet," explained Jonathan Rhone, President & CEO of Axine Water.

"They are increasingly looking to the technology sector for innovation. We have solutions to many of their pain points and are working with several oil sands operators. One of the most common ways to extract oil is to pump steam underground. There is a regulatory requirement to recycle 90% of this steam and reuse it. So there are significant costs associated with treating and then reusing this water. It is very hard to treat dissolved contaminants. By deploying our technology in a steam-assisted gravity drainage oil sands facility we can reduce the cost of oil production by $1-$2 per barrel."



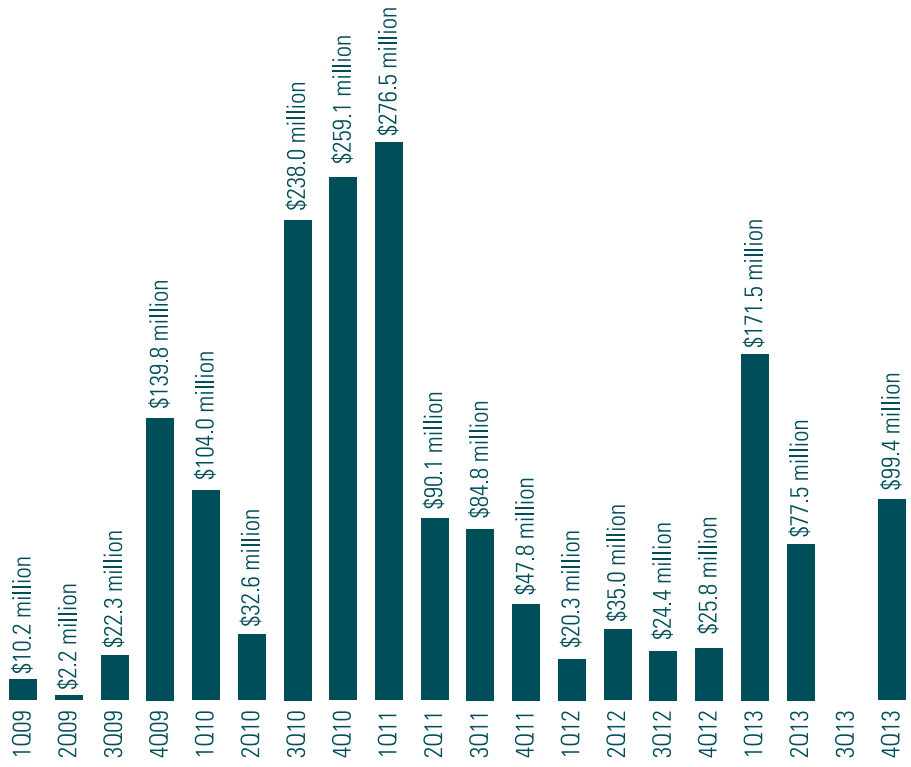
[7] British Columbia Government statistics: www.empr.gov.bc.ca/EEC/Strategy/DSM/Pages/default.aspx
[8] Ontario Power Authority: www.powerauthority.on.ca/cfund

//$348 million was invested in Canadian cleantech companies in 2013, more than three times the $106 million invested in 2012.//

Clean Energy Pipeline (London, UK, 2014)

Canada punches above its weight in cleantech innovation

Figure 2: Canadian venture capital and private equity investment in cleantech (excluding buyouts)



Source: Clean Energy Pipeline venture capital and private equity deal database

Canada is a hotbed for cleantech innovation as indicated by the level of private sector investment in Canadian cleantech companies. Since the beginning of 2010, some $1.6 billion has been invested in private Canadian cleantech companies, representing 4% of total private investment in the global cleantech sector, according to deals tracked by Clean Energy Pipeline.[9] This is a significant sum given that Canada accounts for just 2% of global GDP.

Investment was particularly robust in 2013 – some $348 million was invested in Canadian cleantech companies in 2013, more than three times the $106 million invested in 2012.[10] (Figure 2: Canadian venture capital and private equity investment in cleantech.) "There has been more activity recently," confirmed Wally Hunter, Managing Director, EnerTech Capital. "The volume of transactions in this space is higher than it has been for a long time."

The largest sectors for investment are biomass, accounting for 21% of total investment, solar (17%) and biofuels (16%). Solar dominated in terms of the number of deals, accounting for 17% of the number of investments, followed by energy efficiency (16%) and wind (15%).[11] (Figure 3: Cleantech investment

[9, 10, 11] Clean Energy Pipeline (London, UK, 2014)

in Canada by sector by deal value and Figure 4: Cleantech investment in Canada by sector by number of deals.) Figure 5, on page 10 lists the most notable venture capital and private equity investments in Canadian cleantech companies.

Investment is expected to shift away from capital-intensive sectors such as solar and wind to sectors that will require less capital such as energy efficiency, energy storage and wastewater treatment.

"The most attractive area for us at the moment is efficiency," explained Tony Van Bommel, Senior Managing Partner at BDC Venture Capital. "The net result is that you drive down the cost of creating energy assets or running existing assets. This is beneficial for the customer and has huge upside for the people that create these solutions as they have universal appeal to customers around the world. Other interesting areas for us include building materials and lighting. The third area is natural resources, which includes companies that have developed technologies to clean industrial wastewater."

The high level of cleantech innovation in Canada is also evidenced by the considerable volume of cleantech patents granted. Some 106 patents were issued to Canadian cleantech companies in 2012, while 135 patent applications were made, according to data compiled by MaRS Discovery District.[12] The majority of patents (67) were granted to companies developing clean technology that can be applied to the energy generation sector. Some 13 patents were issued to energy storage companies, while seven were issued to water technology companies. (Figure 6: Cleantech patent grants and applications in Canada.)

//In the next decade, we expect cleantech investment to shift away from capital-intensive sectors such as solar and wind to less capital-intensive sectors such as energy efficiency, energy storage and wastewater treatment.//

Craig Walters
Partner
KPMG

Figure 3: Cleantech investment in Canada by sector by deal value (2010 to date)

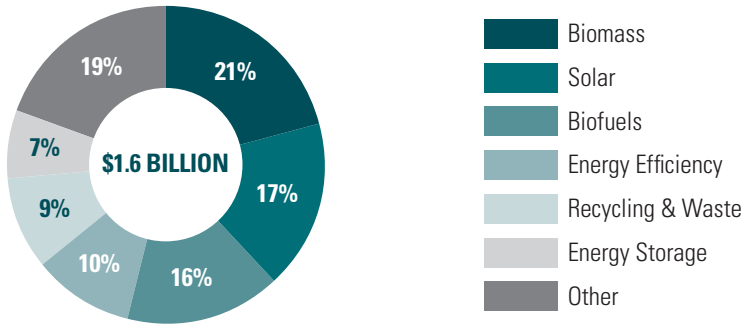
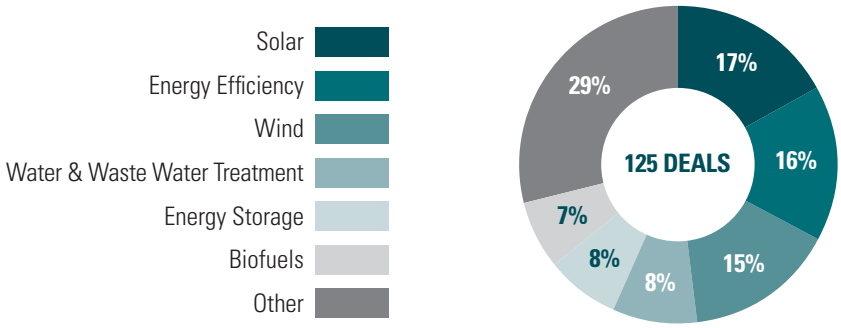


Figure 4: Cleantech investment in Canada by sector by number of deals (2010 to date)



Note: Investment includes venture capital and private equity development capital transactions but excludes buyouts

Source: Clean Energy Pipeline venture capital and private equity deal database

[12] MaRS Discovery District (Toronto, ON, 2013)

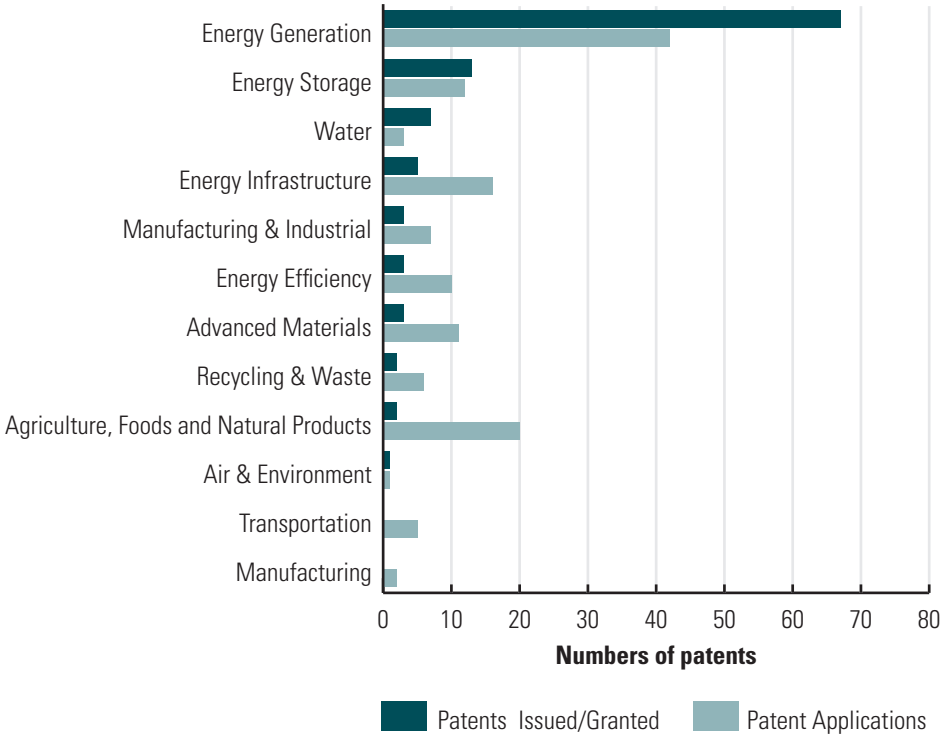
Figure 5: Notable venture capital and private equity investments in Canadian cleantech companies (2013)

Company	Location	Funds raised	Investor(s)	Sector
New Fuel Systems Inc	Vancouver, BC	$100 million	Lambert Private Equity LLC	Plastic-to-fuel recycling
Enerkem Technologies Inc	Montréal, QC	$49 million	Investissement Québec, Waste Management of CanadaRho Ventures, Braemar Energy Ventures, The Westly Group, Cycle Capital, Fonds de solidarité FTQ and Fondaction	Waste-to-biofuels, waste-to-chemicals
Anaergia Inc	Burlington, ON	$46 million	Macquarie Capital, Tandem Expansion Fund, Export Development Canada, Global H2O Investments	Waste-to-energy
Enerkem Technologies Inc	Montréal, QC	$38 million	Waste Management of Canada Corp (subsidiary of Waste Management Inc), EB Investments	Waste-to-biofuels, waste-to-chemicals
Distech Controls Inc	Brossard, QC	$37 million	Samsung Ventures, Caisse de dépôt et placement du Québec (CDPQ), Export Development Canada (EDC), EnerTech Capital, Fonds de solidarité FTQ, W2 Investments	Energy management
LY'ON Superchargers Inc	Pointe Claire, QC	$20 million	Undisclosed	Energy storage
Ostara Nutrient Recovery Technologies Inc	Vancouver, BC	$13 million	Wheatsheaf Investments, VantagePoint Capital Partners, Frog Capital, Ostara Board Chairman Fredric Corrigan	Waste water treatment
Alter NRG Corp	Calgary, AB	$11 million	Undisclosed	Waste-to-energy
Temporal Power Ltd	Mississauga, ON	$10 million	Enbridge Emerging Technology, Northwater Intellectual Property Fund	Energy storage
Enbala Power Networks	Toronto, ON	$7 million	Chrysalix, EnerTech Capital, Export Development Canada, XPV Capital	Smart grid

Source: Clean Energy Pipeline venture capital and private equity deal database

Many innovative Canadian cleantech companies have developed into world leaders. For example, Concord, ON-based RuggedCom, a developer of communications network technology that is deployed extensively in the smart grid sector, grew revenues to $94 million in FY 2011 and employees to 360. In early 2012, the company, which was founded in 2001, was acquired by Siemens for $382 million. Another example is Burnaby, BC-based Ballard Power Systems, a global leader in proton exchange membrane fuel cell technology, which generated $43.7 million from fuel cell sales around the world in FY 2012.

Figure 6: Cleantech patent grants and applications in Canada (2012)



Source: MaRS Discovery District (Toronto, ON, 2013)

//106 patents were issued to Canadian cleantech companies in 2012, while 135 patent applications were made.//

MaRS Discovery District (Toronto, ON, 2013)

Who is investing in Canadian cleantech?

Venture capital and private equity funds have become less active in large capital-intensive cleantech investments in Canada since the beginning of 2011. The decrease is primarily a result of large US venture capital funds winding down investments in capital-intensive cleantech companies. The most recent example of this is US venture capital firm SAIL Capital Partners, which dropped plans to raise a Canadian cleantech venture fund in September 2013.

"There are relatively fewer funds targeting this sector than there were five years ago," confirmed Tony Van Bommel. "The large US firms that placed big bets on Canadian cleantech infrastructure have struggled to raise new cleantech funds. I think this was a natural development though. There needs to be a washout of funds so that the good opportunities are properly priced and are not lost in the melee of multiple opportunities. So there is a good opportunity going forward."

//Strategic investors have definitely become more active in cleantech.//

Tony Van Bommel
Senior Managing Partner
BDC Venture Capital

Although US venture capital firms have retreated from Canada, there remains a strong network of Canadian-based dedicated cleantech venture capital firms that are still very active. (See Figure 7: Active cleantech venture capital funds in Canada).

The flight of venture capital has partly been plugged by growing interest from strategic investors. "Strategic investors have definitely become more active in cleantech," explained Tony Van Bommel. "There are some large macro trends facing the world from an environmental, carbon and energy standpoint that are not going away. A lot of strategic investors are very well positioned to take advantage and can take a longer term view. They realize there is a long play and many have been savvy and have set up corporate venture capital funds to target cleantech investments."

There is also anecdotal evidence that family offices[13] are increasing their exposure to cleantech. "Interest from family offices is definitely growing in this sector and they are starting to invest more directly in addition to investing in funds," explained Wally Hunter. "They now want access to direct deal flow in the energy technology space. A lot of family offices have made a lot of money from oil and gas so have a deep understanding of energy assets. They see cleantech as a natural extension for them."

[13] Family offices are private companies that manage investments and trusts for a single family or a number of families.

Figure 7: Active cleantech venture capital funds in Canada

Investor	Canadian offices	Cleantech portfolio	Fund size and status
BDC Venture Capital	Montréal, QC	Axine Water Technologies, Cooledge Lighting, D-Wave Systems, General Fusion, Nexterra Systems, ProSep, REGEN Energy, Solantro Semiconductor, SWITCH Materials, Teradici, Vizimax	In June 2013, BDC Venture Capital announced plans to invest $100 million in energy and cleantech opportunities from its current fund.
Enertech Capital	Toronto, ON	Altela, Atraverda, CalStar Products, Clean Air Power, Distech Controls, ENBALA, FilterBoxx, IOSIL Energy, N-Dimension, The NanoSteel Company, OwnEnergy, PCN Technology, Serious Energy, Space Time Insight, Tangent Energy	In September 2013, EnerTech Capital closed its fourth fund, EnerTech Capital Partners IV LP, on $120 million.
Yaletown Venture Partners	Vancouver, BC; Calgary, AB	Columbia Green, Cooledge Lighting, Endurance, EnerG2, nFluids, Redlen Technologies, Solegear, Vizimax	In September 2008, Yaletown announced a $65 million initial closing of its Yaletown Ventures II fund. The fund had a target size of $100 million.
MaRS Cleantech Fund	Toronto, ON	Circuit Meter, GreenMantra, Hydrostor, Polar Sapphire, Smart Energy Instruments, Woodland Biofuels	In March 2012, MaRS held the first close of its $30 million MaRS Cleantech Fund. The fund has since reached its funding target.
Chrysalix Energy Venture Capital	Vancouver, BC; Calgary, AB	Agilyx, Akermin, Axine, Brammo, Bridgelux, Cyrium, ENBALA, GaN Systems, General Fusion, GlassPoint, H2 Scan, Hydro Point, Light Based Technologies, Lilliputian, Liquid Light, MineSense, Nanosteel, Primus Power, Purfresh, ReliOn	In 2008, Chrysalix closed its third fund, Chrysalix Energy III, on $123 million. The firm is currently raising its fourth fund.
Pangaea Ventures	Vancouver, BC	Boulder Ionics, Cnano Technology, Cyrium Technologies, Envia Systems, Kovio, Masterson Industries, NewLeaf Symbiotics, Rayne Water, RSI, Semprus BioSciences, SWITCH Materials, TIVRA, Vestaron	In May 2012, Pangaea Ventures held the first closing of its third fund, Pangaea Ventures Fund III, on $50 million. The fund is targeting a $100 million final close.
Cycle Capital Management	Montréal, QC	American Aerogel, Energate, Enerkem Technologies, LED Roadway Lighting, Utilicase	In August 2012, it was reported that Cycle Capital Management was set to close its third fund on $100 million.
Ventures West Capital	Vancouver, BC	BPL Global, Silicor Materials, SWITCH Materials	Undisclosed

Source: Clean Energy Pipeline venture capital and private equity deal database

//We have a goal of doubling Canada's share of the global market to 2% by 2020, when the global market is expected to be $3 trillion.//

Vicky Sharpe
President & CEO
Sustainable Development Technology Canada

Canada's economy benefits from cleantech

Cleantech is significantly impacting Canada's economy in terms of jobs, exports and growth. As of 2011, Canadian cleantech employment totalled 52,600, representing compound annual growth of 17% between 2009 and 2011, according to Analytica Advisors.[14]

"In 2011, about 50,000 jobs were ascribed to the cleantech sector," confirmed Vicky Sharpe, President & CEO of Sustainable Development Technology Canada (SDTC). "This is equivalent to about $10 billion in revenues, which is about 1% of the global market. We have a goal of doubling Canada's share of the global market to 2% by 2020, when the global market is expected to be $3 trillion. This translates to $60 billion in revenues and about 130,000 jobs, assuming a global market of $3 trillion."

Cleantech is a particularly important industry to Canada because it typically exports more than traditional industries. Indeed, exports currently account for 50% of revenues generated by the 245 companies SDTC has invested in. This is significantly more than the 10% export revenue share of the average Canadian small and medium enterprise.

[14] Analytica Advisors: www.analytica-advisors.com

An ecosystem of government support

The wealth of cleantech innovation in Canada is partly a result of the high level of government support on offer. The Canadian government has sponsored numerous initiatives, ranging from grants to technology companies spinning out of universities, grants for clean technology demonstration projects and funding to promote exports of cleantech equipment. Some of the major government cleantech initiatives are outlined below:

Industrial Research Assistance Program (IRAP): IRAP, an initiative run by National Research Council Canada, provides advisory services and funding to early-stage technology companies in Canada.

Sustainable Development Technology Canada (SDTC): SDTC is a non-profit foundation that, through its two funds (SD Tech Fund and the NextGen Biofuels Fund), provides non-dilutive financing to demonstration-scale cleantech projects in the fields of climate change, clean air, water quality and soil.

SDTC has invested in demonstration projects of 245 Canadian cleantech companies since its inception in 2001. Some 53 of these companies have attracted $2.5 billion in private sector investment in the past decade. In 2012 alone, private sector investment into companies SDTC has invested in reached $387 million.

Tom Rand, Managing Partner at the MaRS Cleantech Fund, underlined the importance SDTC has played in the development of Canada's cleantech sector. "SDTC is one of the strongest partners in this space," he said. "Without SDTC there probably wouldn't be a cleantech sector in Canada. Some companies we have invested in which are now on the verge of global markets would not exist if it wasn't for SDTC. So it is really important that these public-private partnerships continue to exist in Canada."

Scientific Research & Experimental Development (SR&ED) Tax Incentive Program: The SR&ED program is a federal tax incentive program that encourages Canadian businesses of all sizes across all sectors to undertake research and development (R&D) through providing companies with a cash refund and/or tax credit of up to 35% on R&D expenditure. This initiative is not specific to cleantech, although it is highly beneficial to this sector due to the significant volume of investment allocated to R&D compared with other sectors.

"The tax structure for R&D here in Canada has created some pretty attractive terms for cleantech companies based here," confirmed Wally Hunter. "The R&D tax credit system basically gives you a cash credit back for technology R&D done by Canadian companies. This certainly helps spur innovation. It can cover up to 50% of the engineering dollars you spend. It is important for companies to remain Canadian-controlled as you are ineligible for it if you are not."

Export Development Canada (EDC): EDC has identified cleantech as one of its top three priority sectors. Within cleantech, EDC offers programs in equity, banking and insurance. As part of its equity program, EDC invests in cleantech companies alongside institutional investors or venture capital arms of strategic investors. However, it is its debt program that EDC believes will be most beneficial for Canadian cleantech companies.

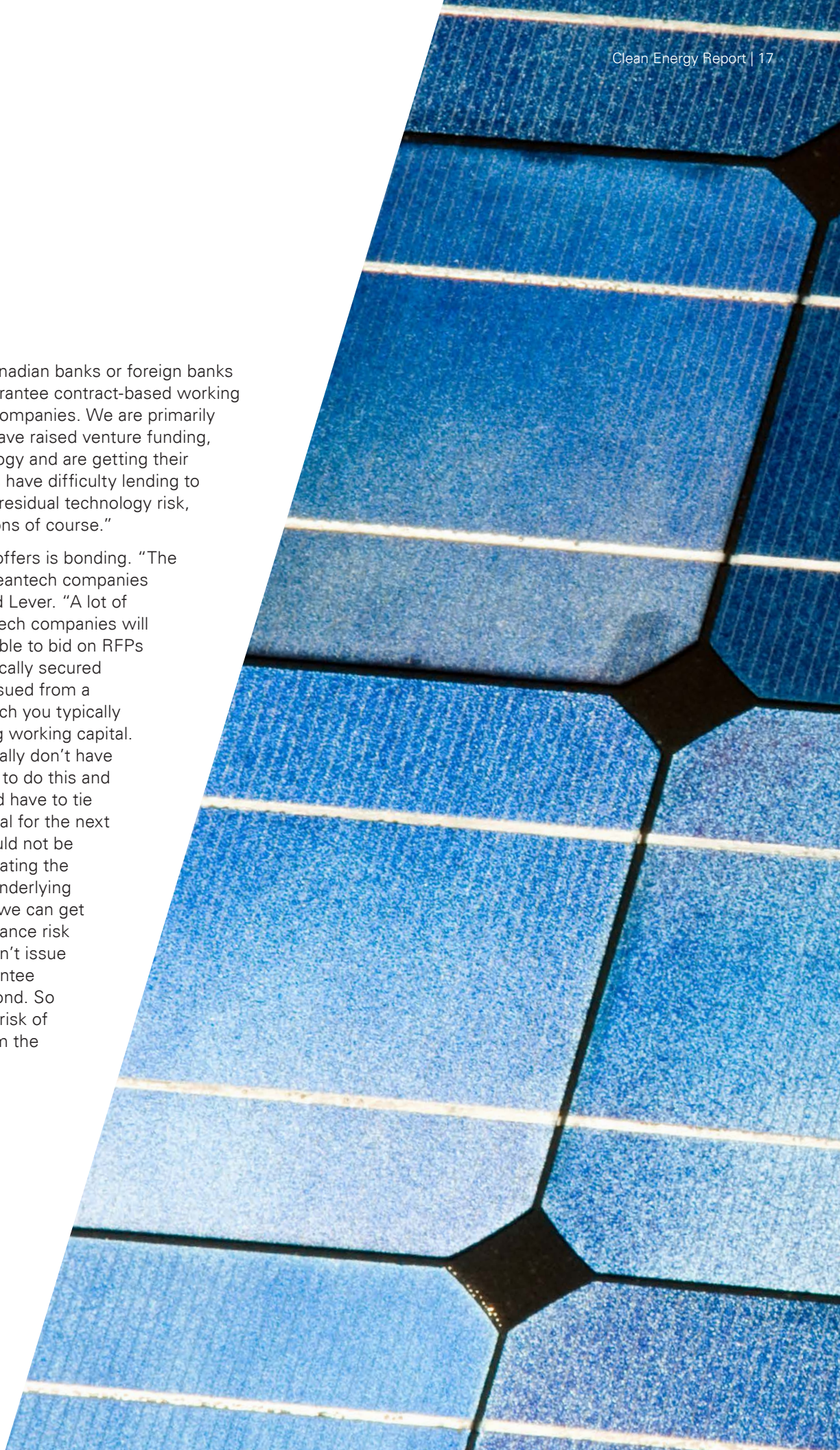
"The barrier a lot of Canadian cleantech companies face is not on the equity investment side, but access to working capital," explained Rod Lever, Cleantech Lead, Infrastructure and Environment at EDC. "In this

KPMG's Green Tax Index

Are you interested in learning more about how Canada and other countries are driving environmental change through tax measures? In August 2013 KPMG published its 'Green Tax Index' to increase awareness of the complex, fragmented and rapidly evolving green tax landscape worldwide. It aims to encourage companies to explore the opportunities of green tax incentives, and to reduce exposure to green tax penalties. Canada was ranked 11th alongside Spain in the overall index, but joint sixth alongside the Netherlands in the green tax incentives ranking. Canada was ranked second to South Korea in terms of encouraging green innovation through tax measures.

regard, we partner with Canadian banks or foreign banks domiciled in Canada to guarantee contract-based working capital loans to cleantech companies. We are primarily targeting companies that have raised venture funding, have de-risked the technology and are getting their first contracts. Many banks have difficulty lending to companies with perceived residual technology risk, although there are exceptions of course."

Another vital service EDC offers is bonding. "The other great need a lot of cleantech companies have is bonding," explained Lever. "A lot of infrastructure-heavy cleantech companies will need to post bonds to be able to bid on RFPs and tenders. A bond is typically secured through a letter of credit issued from a financial institution, for which you typically need to post corresponding working capital. Cleantech companies typically don't have big enough balance sheets to do this and even if they did, they would have to tie up all of their working capital for the next two or three years and would not be able to grow. Through validating the performance risk and the underlying cash flows of the contract we can get comfortable in the performance risk of good companies. We don't issue bonds ourselves, but guarantee the party that issues the bond. So we effectively transfer the risk of the Canadian company from the issuer to us."



How we can help

KPMG has built one of Canada's largest Power & Utilities practices comprised of professionals who have relevant industry backgrounds and devote their talent and tactical skills to helping clients grow, enhance shareholder value and succeed in the marketplace.

KPMG's Power and Utilities team serve organizations involved in all aspects of the Power & Utilities sector, from generation and transmission through to distribution and retail. Our multi-disciplined professionals understand the sector's unique and ever-changing issues that affect the entire industry, and regional regulatory complexities. We offer customized, industry-focused Audit, Tax, and Advisory services. Our industry-trained and highly qualified professionals focus on company specific needs and draw on international resources when required.

KPMG offers a broad range of services that include:

- Uncovering ways to help reduce the tax burden
- Advising on external risks by implement solid internal controls and examining business continuity strategies
- Providing thorough due diligence with input from our global network of professionals
- Accessing capital to help make improvements to the aging infrastructure
- Identifying and implementing cost optimization approaches
- Implementation and conversion to International Financial Reporting Standards (IFRS).

Appendix

Notable renewable energy asset/project debt finance deals in Canada (2013)

Note: This table only includes deals over C$100 million for which the volume of debt financing is disclosed

South Kent Wind Farm (270MW) Ontario			March 2013
Owners	Pattern Energy Group LP / Samsung Renewable Energy Inc.	**Debt providers**	Nord LB / Union Bank / Natixis / Societe Generale / Manulife Financial Corp. / Bank of Tokyo-Mitsubishi UFJ / Mizuho Corporate Bank Ltd. / Royal Bank of Scotland Group plc / KeyBank / Bayern LB / CIBC World Markets Inc. / Credit Agricole Corporate and Investment Bank / Siemens Bank GmbH / BMO Financial Group / Royal Bank of Canada
Financing volume	C$700 million	**Financing type**	Construction & term loan
Tenure (years)	Construction + 7 years	**Rate (%)**	N/D

Grand Renewable Solar Energy Park (100MW) Ontario			October 2013
Owners	Connor, Clark & Lunn Infrastructure Ltd. / Samsung Renewable Energy Inc..	**Debt providers**	Nord LB / Natixis / Rabobank / Bank of Tokyo-Mitsubishi UFJ / KeyBank / Canadian Imperial Bank of Commerce / National Bank of Canada / Caisse centrale Desjardins / Royal Bank of Canada
Financing volume	C$525 million	**Financing type**	Construction & term loan
Tenure (years)	N/D	**Rate (%)**	N/D

Comber Wind Farm (166MW) Ontario			February 2013
Owners	Brookfield Renewable Energy Partners LP	**Debt providers**	Scotia Capital Inc.
Financing volume	C$450 million	**Financing type**	Bond refinancing
Tenure (years)	17.75 years	**Rate (%)**	5.13%

Borealis Solar Portfolio (108MW) Ontario — Advised by KPMG			December 2013
Owners	Metropolitan Life Insurance Company / Fiera Axium Infrastructure Inc.	**Debt providers**	Sun Life Assurance Company of Canada / National Bank Financial Inc.
Financing volume	C$390 million	**Financing type**	Construction and term loan
Tenure (years)	Construction + 19 years	**Rate (%)**	N/D

Continued >

Vents du Kempt Wind Farm (101MW) Québec			June 2013
Owners	Eolectric Inc. / Fiera Axium Infrastructure Inc.	**Debt providers**	Manulife Financial Corp. / Caisse de dépôt et placement du Québec / KfW IPEX Bank
Financing volume	C$300 million	**Financing type**	Construction and term loan
Tenure (years)	N/D	**Rate (%)**	N/D

Walpole, Belmont & Amherstburg Solar Plants (50MW) Ontario			August 2013
Owners	Alterra Power Corp. / GE Energy Financial Services	**Debt providers**	Manulife Financial Corp. / Sun Life Assurance Company of Canada / Canada Life Assurance Company / Caisse de dépôt et placement du Québec / Great-West Life Assurance Company
Financing volume	C$200 million	**Financing type**	Acquisition finance
Tenure (years)	N/D	**Rate (%)**	N/D

Fort St. James Biomass Plant (33MW) British Columbia			November 2013
Owners	Dalkia plc / Fengate Capital Management	**Debt providers**	Natixis / Rabobank / Bank of Tokyo-Mitsubishi UFJ / Canadian Imperial Bank of Commerce / National Bank of Canada
Financing volume	C$175 million	**Financing type**	Construction and term loan
Tenure (years)	N/D	**Rate (%)**	N/D

FieStar Solar Portfolio (42MW) Ontario			June 2013
Owners	Starwood Energy Group Global LLC / Fiera Axium Infrastructure Inc.	**Debt providers**	Nord LB / Natixis / Bank of Tokyo-Mitsubishi UFJ
Financing volume	C$175 million	**Financing type**	Construction and term loan
Tenure (years)	N/D	**Rate (%)**	N/D

Seigneurie de Beaupre phase II Wind Farm (68MW) Québec			October 2013
Owners	Gaz Metro LP / Valener Inc.	**Debt providers**	Sun Life Assurance Company of Canada / Industrial Alliance Insurance and Financial Services Inc. / KfW IPEX Bank
Financing volume	C$166 million	**Financing type**	Construction term loan, bridge financing, letter of credit facility
Tenure (years)	Construction + 19.5 years	**Rate (%)**	N/D

Continued >

Gosfield Wind Farm (50.6MW) Ontario			March 2013
Owners	Brookfield Renewable Energy Partners LP	**Debt providers**	Bank of Tokyo-Mitsubishi UFJ / Siemens Financial Services Ltd. / Laurentian Bank of Canada
Financing volume	C$130 million	**Financing type**	Construction and term loan
Tenure (years)	N/D	**Rate (%)**	N/D

White River - Gitchi Animki Hydro Plant (19MW) Ontario			August 2013
Owners	Regional Power / Pic Mobert First Nation	**Debt providers**	Manulife Financial Corp.
Financing volume	C$126 million	**Financing type**	Construction and term loan
Tenure (years)	N/D	**Rate (%)**	N/D

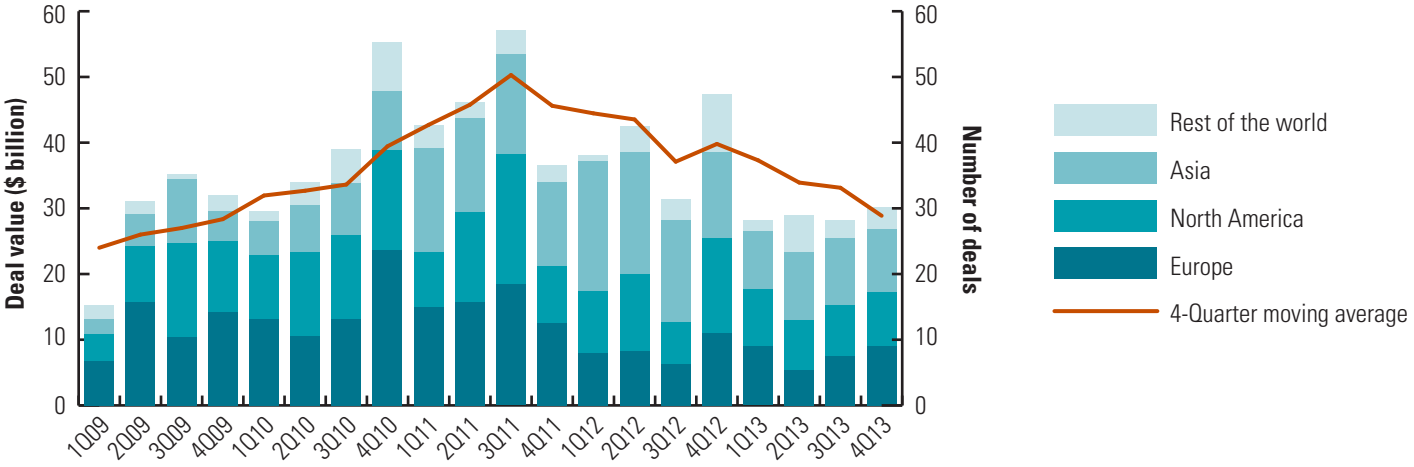
Glen Dhu Wind Farm (62.1MW) Nova Scotia			July 2013
Owners	Glen Dhu Wind Energy LP	**Debt providers**	Stonebridge Financial Corp.
Financing volume	C$115 million	**Financing type**	Refinancing
Tenure (years)	17.5 years	**Rate (%)**	5.33%

Solar Portfolio (30MW) Ontario			October 2013
Owners	Canadian Solar Inc.	**Debt providers**	Deutsche Bank AG
Financing volume	C$104 million	**Financing type**	Construction loan
Tenure (years)	1 year	**Rate (%)**	N/D

Mackenzie Biomass Plant (36MW) British Columbia			November 2013
Owners	Conifex Timber Inc.	**Debt providers**	Canadian Imperial Bank of Commerce / Integrated Private Debt Corp. / Business Development Bank of Canada / Export Development Canada (EDC)
Financing volume	C$103 million	**Financing type**	Construction and term loan
Tenure (years)	6 years	**Rate (%)**	N/D

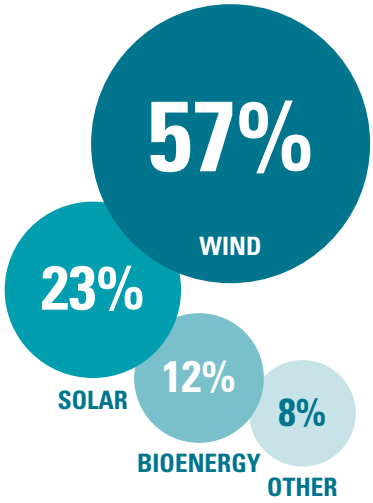
Source: Clean Energy Pipeline asset/project finance deal database

Global project finance by region

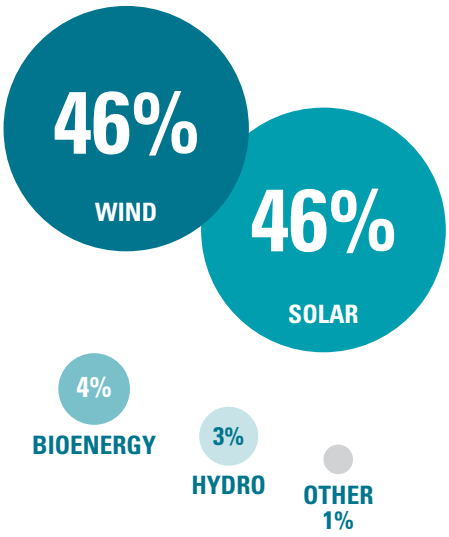


Source: Clean Energy Pipeline asset/project finance deal database

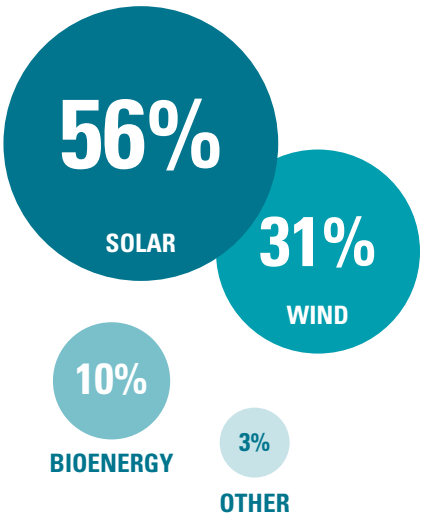
Europe: project finance volume by sector as a % of total debt raised - 2013



North America: project finance volume by sector as a % of total debt raised - 2013



China: project finance volume by sector as a % of total debt raised - 2013



Source: Clean Energy Pipeline asset/project finance deal database

About the research

This report provides insight into financing, investment and development trends in Canada's clean energy sector. The research for this report was provided by Clean Energy Pipeline, a specialist provider of research, data and news on the clean energy sector.

Both articles in this report include comments from interviews conducted with the following individuals:

- Jonathan Rhone, President & CEO, **Axine Water Technologies Inc**
- Tony Van Bommel, Senior Managing Partner, **BDC Venture Capital**
- John Gorman, President, **Canadian Solar Industries Association**
- Wally Hunter, Managing Director, **EnerTech Capital**
- Rod Lever, Cleantech Lead, Infrastructure and Environment, **Export Development Canada**
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