

# 2017 **cleantech** directions

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## INSIDE

New research takes the pulse of  
Canada's cleantech sector

Expert roundtable looks at cleantech's  
best bets

Who is buying cleantech?

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# CANADA'S CLEANTECH SECTOR WILL WITHSTAND UNCERTAINTY IN 2017

*Not all clean technology is implemented for the greater good—some of it actually saves users a lot of money*

BY: MICHAEL OUELLETTE

Canada's cleantech sector is at a critical phase in its development. The start of 2016 saw an expanded global push for new technologies that mitigate the damage we do to our environment. Prime Minister Justin Trudeau's first budget was loaded with fiscal and policy support for Canada's cleantech sector, as well as some good old-fashioned cheerleading.

However, as the year wore on, the cleantech industry began experiencing headwinds as the U.S. election campaign illustrated the vast divide in attitudes towards clean technology and climate change. When it was all said and done, it was clear the world's most dominant economy would focus on extracting and burning fossil fuels, and shred any environmental regulations that get in the way.

With America about to get dirty again, Canada's cleantech sector is at an inflection point. Our largest and most accessible trading partner will be much less interested in adopting cleaner technologies, which means Canadian firms—always fighting to stay competitive—may also be less willing to make those investments.

But all is not lost—and our 2017 Cleantech Directions research report may help you find the way.

This report is based on a targeted survey of more than 400 of Canada's clean technology companies and their prospective customers, followed by a roundtable discussion with voices spanning all aspects of the clean technology ecosystem, including climate and business advocates, financial experts, technology incubators, crown corporations and industrial end users.

One of the most interesting findings is 66 per cent of businesses considering a clean technology purchase are doing so because the technology will save them money and improve efficiency—a buying intention that transcends regulatory changes.

Also of note is that waste management and energy efficiency are the two areas most companies expect to emphasize over the next two years.

When you combine these findings with the fact that almost 60 per cent of clean technology customers are either other businesses or the general public—as opposed

to various levels of government—the market for Canada's cleantech is far from drying up.

However, the target markets may be moving. The survey found 89 per cent of Canadian cleantech companies name the U.S. as their top export market. With U.S. demand for cleantech likely to slip over the next four years, other markets, including Europe, Mexico, Asia and even South America, are becoming stronger targets for Canadian clean technology exports.

As an uncertain 2017 begins, it's important to keep in mind that demand for clean technology still exists, and it looks as though Canada's cleantech sector is well positioned to take advantage.

Michael Ouellette  
Editor, Cleantech Canada

## CONTACT US

*Cleantech Canada delivers the latest news and insight on the global green economy for businesses and entrepreneurs. Visit us at [www.cleantechnology.ca](http://www.cleantechnology.ca), or E-mail the editor at [mouellette@canadianmanufacturing.com](mailto:mouellette@canadianmanufacturing.com)*

# ROUNDTABLE PARTICIPANTS

WELCOME TO CLEANTECH DIRECTIONS 2017



## PARTICIPANTS

**Jon Dogterom** | *Cleantech Venture Services, MaRS Discovery District*

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**Tom Corr** | *President and CEO, Ontario Centres of Excellence (OCE Inc.)*

**Michael Kousaie** | *Head of Business Development, Clean Tech, Toronto Stock Exchange and TSX Venture Exchange*

**Jack Simpson** | *Director of Generation and Capacity Planning, Toronto Hydro*

**Chris Evans** | *Senior Account Manager, Clean Technologies Advisor, Export Development Canada (EDC)*

**George Mahmoudides** | *Manager, Business Development & Knowledge Transfer, BioFuelNet Canada*

**Dennis Dussin** | *President, Alps Welding Ltd.*

**Jane Kearns** | *Senior Advisor, Cleantech, MaRS Discovery District*

**Susan Wood-Bohm** | *Executive Director, BIO GHG Management Program, Alberta Innovates*

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# LEVERAGING CANADA'S CLEANTECH MOMENTUM

BY: KIM LAUDRUM

Canadian exporters in the clean technology sector are poised to become stars, both at home and abroad. This is thanks in part to anticipated support from the federal Liberal government after years of neglect from the previous government, according to the sector's delegates at Cleantech Canada's 2017 roundtable. They gathered at the Toronto Stock Exchange in downtown Toronto on October 20.

Yet, even without that welcome support, Canadian cleantech firms have already established themselves.

"Our cleantech companies punch above their weight internationally. They are heavy exporters to developing markets, not just the U.S.," said Jane Kearns, senior advisor, cleantech, with MaRS Discovery District, a business incubator in Toronto.

Kearns expressed optimism about the innovative start-up cleantech companies she has seen mature. "They are now viable companies offering a lot of jobs and economic opportunities to the country. Canada could become an energy superpower. It's just not necessarily oil and gas."

Driving the market for cleantech

products and services is the Paris accord on climate change, which in April was signed by 170 countries that agreed to set targets for reducing carbon emissions every five years and reach carbon neutrality by 2050. Canada plans to reduce its greenhouse gas emissions by 40 per cent by 2030.

"This is a huge opportunity for our companies to sell internationally," Kearns said.

Chris Evans, who is a senior account manager and clean technologies advisor for Export Development Canada (EDC), pointed out that there are comparative advantages for innovation in certain areas of the country. EDC assists companies who have already commercialized their product or service to reach markets outside of Canada.

"In Ontario we see a comparative advantage in innovation in water, energy production and even biopolymers. Companies in these sub-sectors are exporting now. They are Canadian cleantech companies that are stars," Evans said.

Boosting the success of these companies is improved access to funding for research and development, points out Susan Wood-Bohm, executive director, BIO



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GHG Management Program: with Alberta Innovates.

Over the past year, the federal government “has improved the cache of the research and development aspect of innovation. This leads to an improvement in the adoption of ideas that research and innovation are good things with good positive contributions to the country. I think we’ve needed that piece for some time,” Wood-Bohm said.

(Following the roundtable discussion, on November 1, Federal Finance Minister Bill Morneau announced plans to inject \$21.9 billion into cleantech and other green projects over the next 11 years.)

Research and innovation is important. But there comes a time when industry has to commercialize its innovations and bring them to market.

With that in mind, clean

technology is a point of focus at Ontario Centres of Excellence (OCE), which uses funding from the Ontario government to leverage greater investments from the academic and private sectors to bring innovation to market. Tom Corr, OCE’s president and CEO, said the organization spends 20 to 30 per cent of its \$200 million annual budget on clean technology innovation, be it energy or environment related.



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*- Jane Kearns*

*MaRS Discovery District*





*We are now moving beyond, 'how do we deploy?' Now we're talking about 'how do we implement?' A year ago there was still a lot of resistance.*

*- Dennis Dussin  
Alps Welding*

"Because of the cap-and-trade programs coming in Ontario, and the need for emitters to adopt the technology that is going to help them meet their goals for 2020 and 2030, there is a lot of money going through OCE that came from the government," Corr said.

"I think it's an exciting time to be in that space. At least on the GHG reduction side," Corr added.

Generally, the companies that receive funding and support from OCE take longer to get to market than, say, someone developing an app for smartphones and tablets.

"These firms require a lot more capital," Corr points out.

"But there is certainly more going on now in this area than ever before. We are finding—with partners such as SDTC and in Alberta and with NSERC funding—that we can leverage with our funds in Ontario in the cleantech sector. Things are looking good, but I don't think there is any shortcut," Corr said. "It takes the time it takes."

As a supplier to the oil and gas and cleantech industries, Dennis Dussin says there is still a long

way to go. "Cleantech is still in its infancy. But I do think there has been a change in mindset." Dussin is president of Alps Welding Ltd., a Vaughan, Ont.-based metal fabricator, which makes piping systems, stacks and heat exchangers.

"A year ago our customers were asking, 'if' they had to anything [to reduce carbon emissions]. Now we are hearing them ask, 'How are we going to do it? Where are we going to get the funding? What technology are we going to use? Which companies are going to benefit from it? Which technologies are







*We are at a record year in 2016 for capital raised for cleantech companies. Best we've ever seen.*

*- Michael Koussaie  
Toronto Stock Exchange*

we going to get commercialized?” said Dussin.

“We are now moving beyond, ‘how do we deploy?’ Now we’re talking about, ‘how do we implement?’ A year ago there was still a lot of resistance.”

The change in mindset can be attributed to the change in government and its willingness to open the coffers. But in a sector so dependent on funding, where is the private capital in cleantech?

“We are at a record year in 2016 for capital raised for cleantech companies. Best we’ve ever seen,” noted Michael Koussaie, head of business development, technology at the Toronto Stock Exchange and TSX Venture Exchange.

“Almost \$3 billion has been raised by our cleantech companies. However, it’s skewed very much to two camps—either they are really big power producers who have no risks at all in terms of commercializing, or they are high-growth micro-cap companies that don’t need lots of money to get there,” Koussaie said.

Examples of the big power producers listed on the Toronto Stock

Exchange include Algonquin Power & Utilities Corp. in Oakville, Ont. and Northland Power, with headquarters in Toronto.

“Our TSX Venture Exchange is for companies that are in early- or pre-revenue stages,” said Koussaie. “That exchange, as it relates to cleantech, is resonating today only with those companies that are low-capital intensity.”

## BIOMATERIALS AND BIOFUELS

George Mahmoudides has been tracking biofuel investment since 2014 when, he says, there was about \$16 billion raised in Canada and the U.S. “We’re down to \$3.9 billion in the last year,” he said. Mahmoudides is manager, Business Development & Knowledge Transfer at BioFuelNet Canada, a non-for-profit corporation that connects academic researchers, industry partners and government representatives to accelerate the development of sustainable advanced biofuels. He points out the difficulty cleantech companies in this area face is mainly due to their dependence on established

value chains.

“In isolation many of these companies have gone to the dogs,” he said. The problem is that most of them have raised money “not through equity but through debt,” with high interest rates. Unfortunately, “one in four companies in the biofuel bioproducts space goes bankrupt within the first six months, for a variety of reasons,” said Mahmoudides.

However, he is quick to point out some prominent success stories in Canada.

“BioAmber is selling succinic acid. Enerkem now is selling multiple products. Ensyn is selling heating oil but they’ve moved into sub-fields,” he said. These other products make it possible for them to subsidize the cost of biofuel.

“It’s the sophistication of the market that has been one of the stumbling blocks for the bio economy in relation to the cleantech aspect,” Mahmoudides said.

Where are the opportunities for cleantech companies?

“Uses for carbon. The best approach for reducing carbon emissions is to come up with ideas



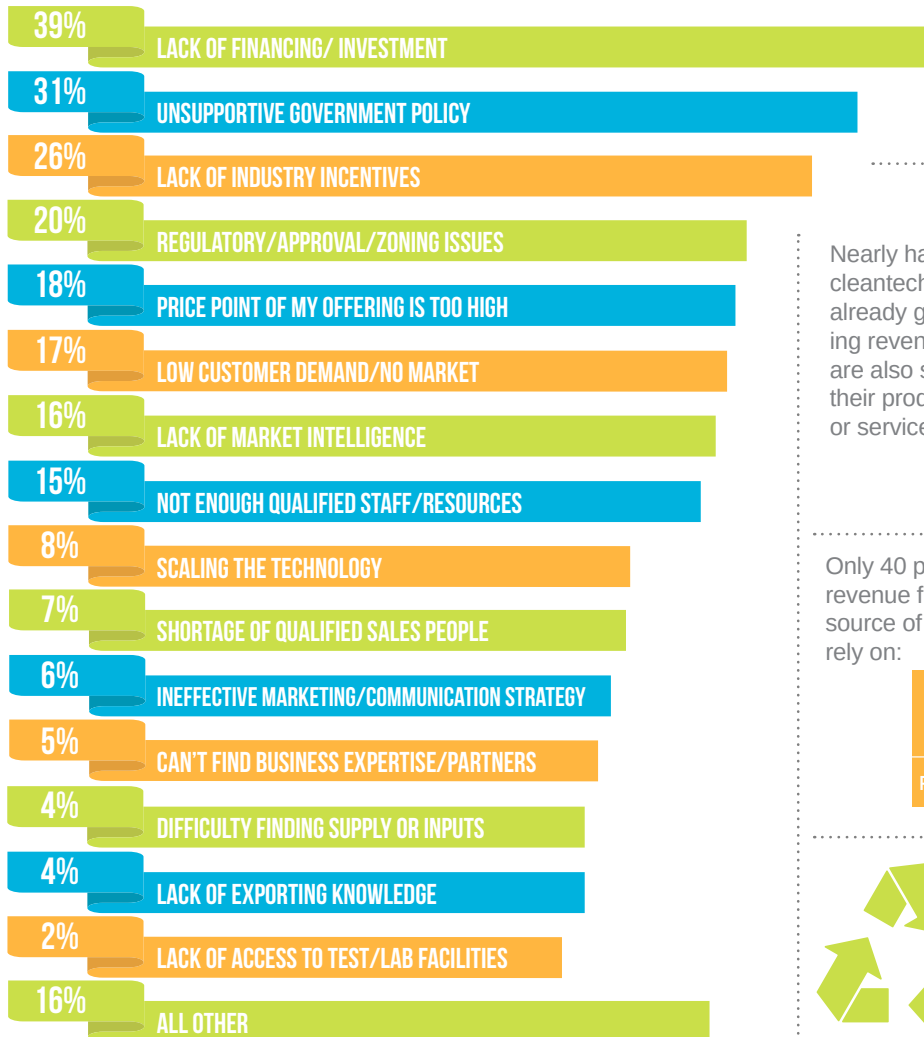
*It’s the sophistication of the market that has been one of the stumbling blocks for the bio economy in relation to the cleantech aspect.*

*- George Mahmoudides  
BioFuelNet Canada*

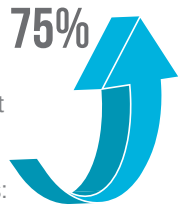
# THE CLEANTECH LANDSCAPE

## CLEANTECH 2017 SURVEY

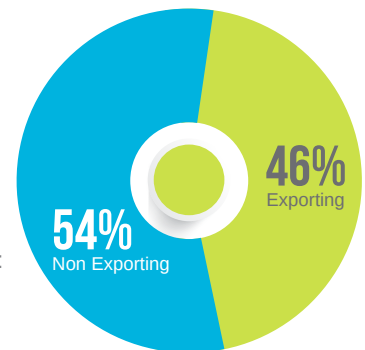
The survey asked approximately 250 cleantech companies to identify the top three barriers to expanding their business:



Despite the challenges, 75 per cent of cleantech firms are confident they will experience growth over the next two years:



Nearly half of the cleantech firms already generating revenue are also selling their products or services abroad:



Only 40 per cent of cleantech companies said revenue from sales was their most important source of financing. The majority of businesses rely on:

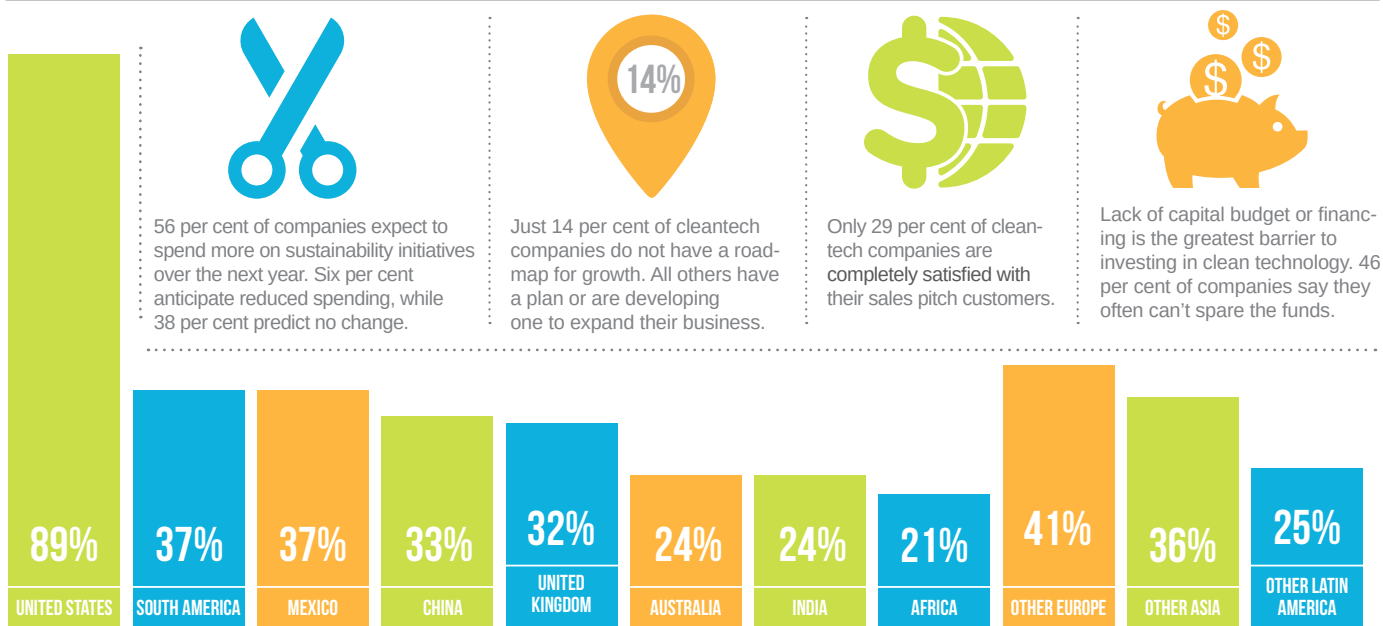


Two-thirds of respondents said their company has implemented a waste management or recycling initiative within the past two years:

The survey asked if companies were concerned about safeguarding intellectual property when exploring new markets, suppliers or customers:

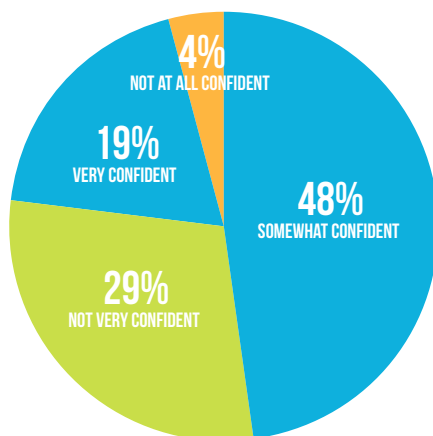




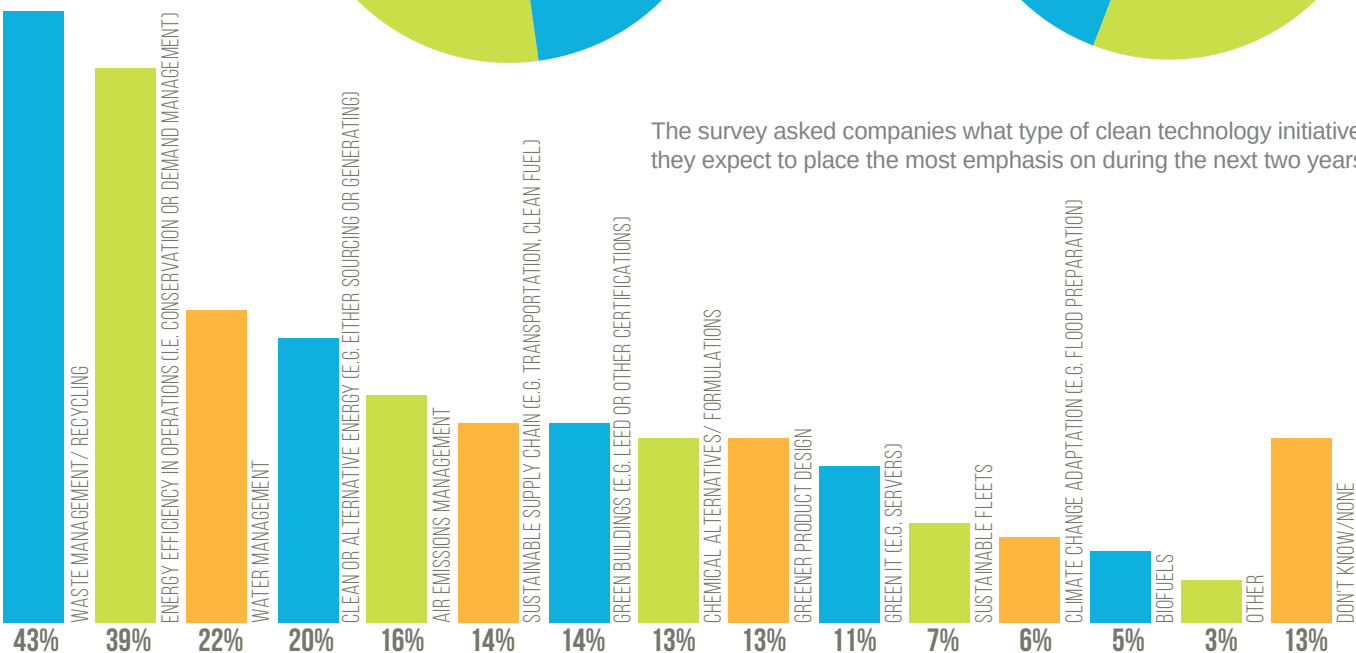
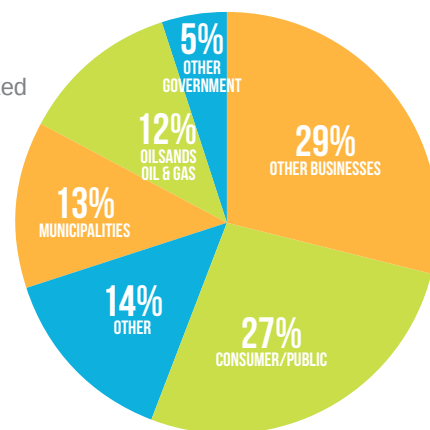


## The U.S. is far and away the most popular export market

The survey asked cleantech end-users if they felt confident their organization knows where to find reliable clean technologies:



The survey asked cleantech firms who their main customers are:





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for commercializing it,” said Sarah Petrean, senior policy advisor, Clean Energy Canada.

One example of this is Dr. Jennifer Holmgren, CEO of LanzaTech, Mahmoudides points out. She gets special mention for developing the technology that uses gas fermentation to convert wastes or low-value resources into a diverse spectrum of low carbon fuels and chemicals. LanzaTech’s technology for producing fuel ethanol from steel mill off-gases is ready for commercial deployment today. Richard Branson and Warren Buffet, among others, support her work, Mahmoudides commented.

The best opportunities for technology deployment aren’t necessarily going to happen within a cleantech silo, said Jon Dogterom, a colleague of Kearns who leads the Cleantech Venture Services at MaRS. “They are going to happen with convergence of technologies.

“Look at what’s happening in solar now. In Africa the rate of rural electrification is incredible. In Kenya, a company called M-KOPA—one of the founders is a Canadian—has gone after that market,” Dogterom said. The company was successful, not because there were advancements or improvements in solar power. They were successful because they introduced an easy payment system via mobile phone.

“It was thin-tech meets cleantech and together it works,” Dogterom



said. “It’s actually convergence with other sectors that is going to lead to the big breakthroughs.”

### GOVERNMENT NON-PROCUREMENT

There are opportunities in greenhouse gas reduction, given the carbon tax in many of the provinces and cap-and-trade elsewhere. “That is going to drive a lot of the adoption,” said OCE’s Corr. “Whether that technology is made in Canada or elsewhere, it’s going

to get purchased, I can guarantee that.”

OCE, among other programs and industry initiatives, provides funding up to \$5 million to an emitter to help them justify deploying technology to reduce their greenhouse gas output. “There is no requirement that the technology must come from Ontario or from Canada,” said Corr.

“It’s anathema to us because we are always about economic development,” the OCE president



*Nothing drives demand for clean solutions like high electricity prices. High innovation happens when things start costing too much.*

*- Sarah Petrean  
Clean Energy Canada*



*It's actually convergence with other sectors that is going to lead to the big breakthroughs.*

*- Jon Dogterom  
MaRS Discovery District*

admitted, “but the province has made it very clear that economic development is number two to reducing greenhouse gases. The government would prefer that the technology be made somewhere in Canada, but there are no extra points if you do.”

OCE also funds Ontario-based research at an academic institution or small or medium-sized business that can be deployed at a later stage, Corr said.

“In other words, the technology won’t be available to meet 2020 targets. There is \$20 million there that can go out at \$1 million a pop to help companies do that. That’s intended to fund the research and product development. Hitting the emission reduction targets is the number one goal of the program. Economic development is number two,” Corr reiterated.

In any case, EDC’s Chris Evans warned such a “Buy Canadian” clean technology policy could be seen as protectionist—possibly triggering trade disputes, as happened with the Feed-in-Tariff program.

Evans adds that the Ontario

Trade Commissioner Service and the various trade offices are trying to help companies develop the connections they need to be successful. “Many of these companies are exporting to just one or two countries. They can do more. The diversification of exporting to 20 countries minimizes risk and increases regular cash flow.”

## MANUFACTURING DEMAND

Funding and its supporting policy is important, but for these companies to thrive the question remains: how do we create demand for these clean technologies?

“Putting a price on carbon changes things,” said Petreva. “You have to put a price on not going clean. Now that there is going to be a cost, that will change things. It will change what the consumer wants. Nothing drives demand for clean solutions like high electricity prices. High innovation happens when things start costing too much.”

“The key point is that the customer matters,” noted Jack Simpson, director of generation

and capacity planning, at Toronto Hydro. “It can’t be just green. It has to be economic. The product itself has to be better, faster, and more efficient. If we aren’t answering that then it’s going to fail.”

To reach full throttle, the cleantech industry needs urgent action, says Wood-Bohm. “The urgency is based on an incredibly short time frame to impact. I think we have to be really focused on those technologies that get us to our endpoint before we get to that 2030 cutoff, which would spell serious trouble from climate change.” 🐼

*\*Addendum: The 2017 Roundtable on Cleantech Directions was held October 20. On Nov. 8, 2016, Donald Trump was elected president of the United States, putting into question what impact his position on climate change and support for the fossil-fuel industry might mean for environmental and trade policies in Canada.*

## KIM LAUDRUM

*is a Toronto-based business writer and contributing editor to Cleantech Canada.*



*It can't be just green. It has to be economic. The product itself has to be better, faster, and more efficient. If we aren't answering that then it's going to fail.*

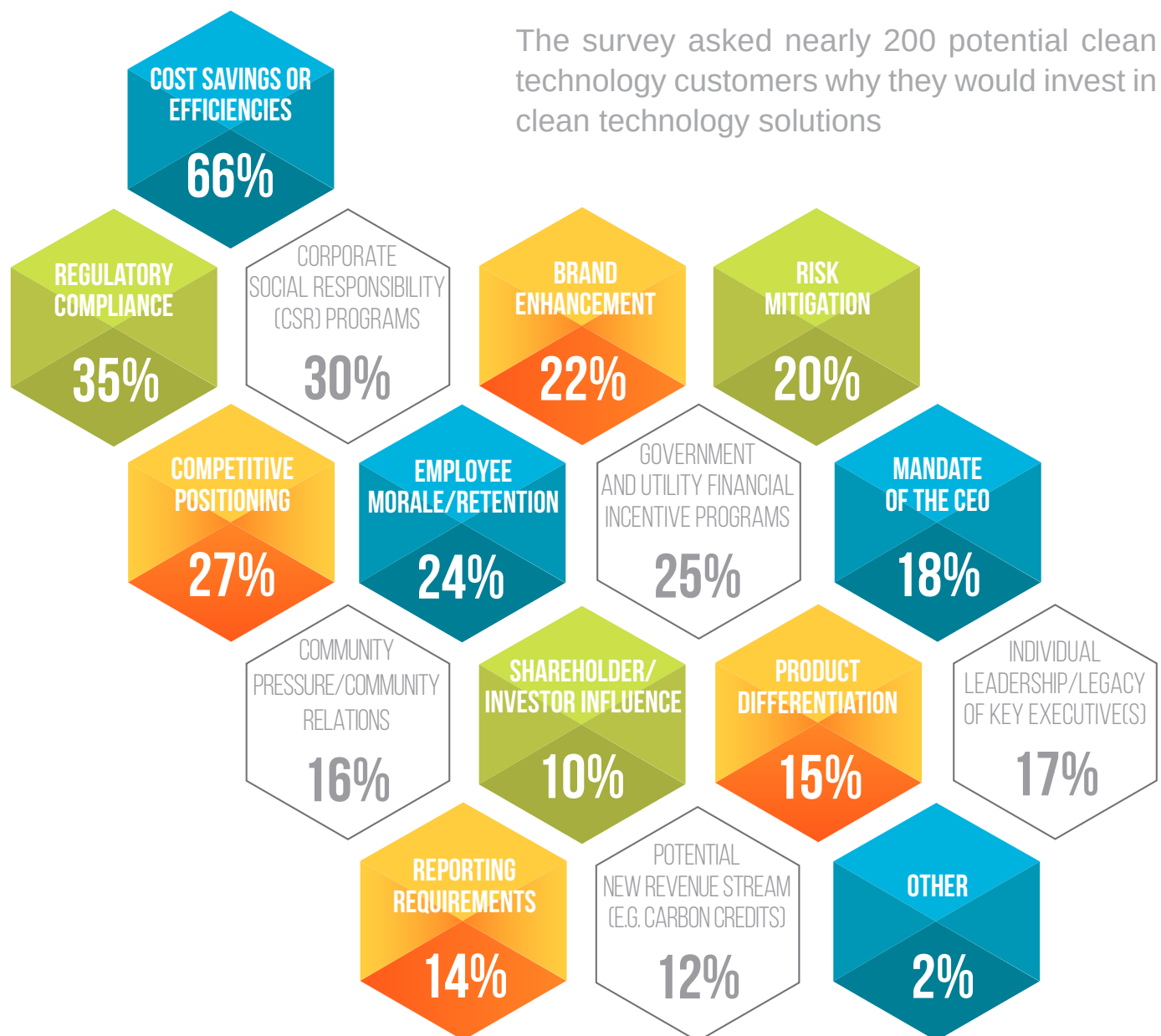
*- Jack Simpson  
Toronto Hydro*



# WHAT CUSTOMERS ARE LOOKING FOR

CLEANTECH 2017 SURVEY

The survey asked nearly 200 potential clean technology customers why they would invest in clean technology solutions



A photograph of a man and a woman in a factory or industrial setting. Both are wearing blue hard hats. The woman, on the left, is wearing a white lab coat over a patterned shirt and is holding a black clipboard. The man, on the right, is wearing a light blue button-down shirt and a dark purple tie, and is holding a large sheet of paper with a technical drawing. They are both smiling at the camera. The background shows industrial equipment, pipes, and a high ceiling with structural beams.

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