

cleantech directions

2014

SURVEY AND THINK TANK

*reveal hurdles and
highlights in Canada's
cleantech industry*

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The Climate Change and Emissions Management Corporation (CCEMC) is pleased to support the Cleantech Canada 2014 Directions Survey and report.

We're proud to fund transformative ideas that are reducing GHG emissions both in Canada, and around the globe.

As this report shows, Canada is a great place for companies that are working to address some of the world's most daunting problems.

Based on the work of Céline Bak's team at Analytica Advisors, we know that cleantech is projected to overtake Canada's aerospace industry and grow from the \$11 billion industry it is today to a \$28 billion industry by 2022.

That's impressive, but perhaps it could be even larger.

Canada's cleantech industry is optimistic about the future. Many companies are geared toward commercialization and already generating revenue. A third are already exporting to markets around the world. Fully two-thirds anticipate growth next year.

Businesses are increasing their spending on cleantech, and there are opportunities across the spectrum with strong interest in energy-efficient solutions, waste management, recycling and clean and alternative energy.

To fully reach its potential, the small and medium companies that dominate the sector will need to leverage their networks, partners and associations, and work together to chart a course that addresses challenges related to policy, consumer uptake and investment. CCEMC is supporting efforts to accelerate commercialization of technologies that can reduce greenhouse gas emissions and assist Canada in achieving its reduction targets while growing a vibrant economy.

We know industry is up for the challenge. It's vitally important work that will help Canada and the world transition to a lower carbon future.

Kirk Andries
Managing Director
CCEMC



Front row—Left to right: Susan Sheehan, John Goetz, Yvonne Gruenthaler, Russel Matichuk, Apoorv Sinha
Back row—Left to right: Keith Gylander, Adrian Banica, Eric Schmadtke, Claudia Sammer, Kyle Greene, Julie Pithers, Jeffrey Sundquist, Kelly Kishiuchi, Kirk Andries, Gillian Andries.

This report shares insight from a Canadian business survey and a think tank of cleantech champions from industry, associations and government.

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Provider of gas diffusion technology.

Julie Pithers, DIRT, Calgary

DIRT (Doing it Right This Time) is focused on sustainable buildings.

Jeffrey Sundquist, Absolute Throughput, Edmonton

Developed a waterless hydrocarbon cleaning process.

Kelly Kishiuchi, Edmonton

Large utility company on the demand side.

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CCEMC is an independent organization that establishes or participates in clean technology funding initiatives; and sponsor of this report.

BY LISA WICHMANN—CLEANTECH CANADA

No doubt about it. The clean technology champions gathered in an Edmonton boardroom in June have their share of battle scars. Most have spent years in the trenches—chasing capital, pushing for policy change and searching out demand markets.

In a display of tenacity few other industries would inspire, here they were again; participating in a think tank to gauge cleantech barriers, opportunities and gaps. They came to dive into results from Cleantech Canada’s 2014 Directions Survey, which collected input from more than 650 organizations across Canada on the hurdles and highlights of cleantech expansion.

At the table were entrepreneurs and advocates of all stripes—large enterprise, government, legal, finance and associations. While many were a little exasperated with progress to date, the talk was backlit by optimism and undeniable urgency.

Much of that urgency stems from Alberta’s oil sands. From environmental groups to rock stars to

consumers, Canadians and the world are giving the oil sands close scrutiny.

The industry is tasked with proving it can operate sustainably; reduce emissions, use less water, safely transport its product across continents and oceans. Waiting in the wings, could clean technology finally get its cue?

“The oil and gas industry in Alberta has some tremendous pinch points and challenges around sustainability and I think everyone has recognized it now,” said Eric Schmadtke, vice-president of EnerTech Capital in Calgary, a venture capital investment company focused on energy technologies.

“Five years ago, people were saying ‘we don’t want to be on the bleeding edge of technology. We don’t want to take the risk’. And although the adoption cycle is still slow, I think at least the awareness and recognition that things need to change faster is there.”

Oil sands producers must compress greenhouse gas emissions, water use and energy consumption at a brisk pace over the next 10 years, he added, so cleantech companies should align their value proposition with that challenge.

Eighty percent of survey respondents agree Canada is a good business environment to start and expand a clean technology company.

Based among those who consider themselves a clean technology business (n=362)



- Strongly agree
- Agree
- Disagree
- Strongly disagree

HUGE POTENTIAL

The market will certainly be big enough. Canada’s oil sands are projected to be a \$364 billion opportunity for Canada’s provinces and industries by 2035, according to the Conference Board of Canada. The think tank participants speculated tier one and two suppliers to the oil sands will pull the rest of the supply chain along—creating unprecedented demand for cleantech.

But the prediction comes with a big ‘if’. Before it can take centre stage, the industry needs an intervention of sorts; or at least a recalibration. The group agreed

it's fragmented and lacks a unified voice. The cleantech survey also pointed to roadblocks such as a lack of political will and financing. Plus, cleantech companies are in a somewhat awkward dance with demand-side buyers.

"The gap that we're finding is when you talk to [major integrated] companies, and you look at their annual reports, all of the environmental sustainability messages in there are not translating down to the operational level; the procurement level," said Jeffrey Sundquist, vice-president of international and corporate development with Absolute Throughout Solutions Inc. in Edmonton.

"I can talk to a C-level executive in Calgary or London and they say 'this is awesome'. You talk to the facility manager whose scorecard is tied to keeping cash flow going and he says 'I like it, but I don't know it, and since I'm being scorecarded on [cost]...I'm not going to [buy]'. There needs to be a better way to 'operationalize' some of these cool ideas we've come up with."

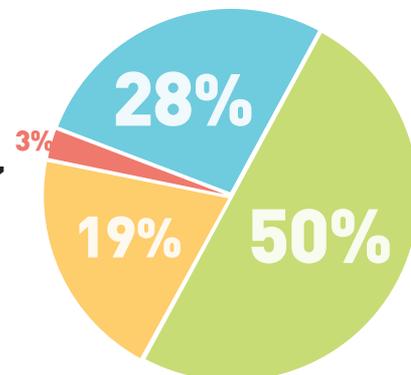
Sundquist's company has developed a hydrocarbon waterless cleaning process for refineries and upgraders. In about one month, the company saved its customers well over a million gallons of water.

Prior to that, Sundquist spent three years in London with the High Commission, representing Alberta in Europe. The role fueled his interest in bringing the province into cleantech's sphere.

"Reputation management for our province has always been a challenge and we've never been under a higher level of scrutiny," he said.

"The oil and gas industry in Alberta has some tremendous pinch points and challenges around sustainability and I think everyone has recognized it now." — Eric Schmadtke

Level of confidence in organizations' ability to find reliable clean technologies



Total Sample (n=653)

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

"Our energy sector is starting to redline on the whole investability test."

Much like public uproar over rainforest clearcutting in the 1980s and 1990s, he said society will tolerate the current environmental footprint of the oil sands for only so long, before pulling its tentative support.

"It's so important to Alberta and to Canada," Sundquist said. "If we don't get it right we'll be on the outside looking in. We'll continue to have difficulty with pipelines and finding new customers."

He painted an onerous scenario no one in the room disputed. But he and the others also acknowledged

the firm footholds achieved by Canada's cleantech sector. In fact, the survey found 80 percent of the 362 cleantech companies surveyed believe Canada is a good place to start and expand a clean technology business, despite the host of challenges they face.

An additional 291 companies on the 'demand' side were also surveyed, gauging their tolerance



Canada's energy sector is the main customer base for 10 percent of cleantech companies surveyed.

PHOTO: Thinkstock

for risk, plans to purchase clean technologies, and their top sustainability priorities.

The biggest driver of clean technology procurement was identified as cost savings or efficiencies (cited by 55 percent), followed by corporate social responsibility programs (33 percent). In terms of barriers to investment, the survey found lack of capital budget was cited by most respondents (50

percent), followed by low rate of return (36 percent).

The cleantech companies in the room—and the single voice from a large enterprise on the demand side—brought those numbers to life; clearly outlining cleantech's bottlenecks and bright spots.

FINANCING—AKA: THE VALLEY OF DEATH

ABOUT THE SURVEY

The Cleantech Canada Directions Survey was conducted in April and May, 2014. It polled executives at 653 companies to take a snapshot of Canadian industry's involvement and investment in clean technology.

The survey was sponsored by the Climate Change and Emissions Management Corporation (CCEMC) and conducted by Toronto-based Northstar Research Partners.

More than half the companies surveyed identify themselves as a clean technology company; meaning they're primarily focused on products, services or processes to address climate, waste or resource challenges.

The remainder of respondents (291) represent demand-side organizations.

"I've been bashing my head against that problem for the last 14 years," quipped Adrian Banica, CEO and founder of Synodon Inc., when asked about the availability of financing for cleantech companies. "I spent the last 14 years raising about \$20 million."

Synodon is a gas leak detection and remote sensing company, providing technology for markets such as pipelines. The company is about four years into commercialization and went public around the same time, when it needed \$5 million to kick-start the next phase of development.

"We found it impossible to actually raise it in the private capital side of things here in Alberta, so we had to go public. It was a great decision, but the conversation is very different—the trigger points, the attention span, the due diligence they do."

That's one of the main takeaways for Banica—how the financing quest differs from the research stage to piloting, to commercialization and going public. At

each stage, Banica was required to supply different information and data.

But he doesn't really believe the capital isn't there; it's just hard to get. Often, there's no proven return-on-investment for many new clean technologies. "We all wish we could snap our fingers and have the cash [and] go ahead with our fun project. But reality isn't that way...But I found any company that really chased capital always found it."

Others in the room agreed; citing success stories and cases of cleantech companies not only commercializing, but expanding far beyond Canadian borders. To get there though, they had to walk through the "valley of death"—a phrase bandied around throughout the discussion.

And really, that's the crux of the conversation. What is the valley of death and how do cleantech companies — and proponents within large companies — get through it? How can it be turned into a more fertile and viable landscape?

"The issue in the cleantech space is the valley of death is bigger than [it is] for the IT space and for other innovators, partly because to go from bench scale to production, it's a much bigger cost—a much more risky undertaking," said Russel Matichuk, chairman and president of the Alberta Clean Technology Industry Alliance (ACTia) in Edmonton.

ACTia is an industry association focused on fostering research, innovation and adoption of clean technologies.

Through his efforts on that front, Matichuk has noticed the demand side needs a little push.

"The challenge in these big companies is that nobody gets fired for doing something that has worked or is working," Matichuk said. "And adopting innovation is doing something different. Your job is on the line. So how do you fix that problem? Well, there's one way to fix it and that's by policy. Public policy infuses pain into the equation and that pain inspires people to think differently."

He referred to the \$15-per-tonne carbon levy charged to Alberta emitters as an example of pain that motivates changes to procurement practices. But cleantech companies have to do their part too. Matichuk has noticed many entrepreneurs really know their technologies. The business case? Often less so.

"We have to educate innovators because [they]

The survey asked cleantech companies if they export. One-third said, "Yes."

Total Sample (n=362)

33% YES

67% NO

“It's highly competitive, they're each trying to out-do each other and are happier to jump on new innovations than, typically, large Canadian companies.”

— Julie Pithers



come up with some great ideas but they're often not that well-versed on larger economics. And so they go out there and try to sell something and they do the math and say 'I can sell this to you...You're spending \$5 million a year on this problem and [my solution] will save you \$1 million a year,' he said.

"But what they fail to realize is all of the costs and

risks associated with that change. They have no idea what they are. Frankly, it might cost [the buyer] \$20 million to make that change to give them a \$1 million benefit."

DEALING WITH RISK

That strikes a chord with Kelly Kishiuchi, senior project engineer with a large utility company in Edmonton. It's part of an infrastructure company serving markets such as pipelines and power plants. Throughout her career, Kishiuchi has worked in cleantech innovation, but also as a buyer with large enterprises on the demand side.

"If I'm an X-billion dollar company and [the clean technology] saves me a million dollars, is that material? Material when we know that when we make a change, it's not just that one little area, it's across the organization?" she asked.

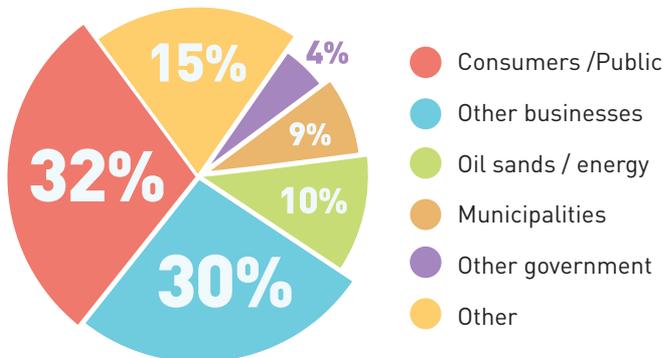
"I'm always on the lookout for new technologies. It's not a difficult thing for us to find...There are a lot of fabulous technologies we could apply across our international platform of companies. But the problem is we want to see it demonstrated. I'm not going to risk the capital, even if it's a small amount, such as \$100,000. I'm not going to risk that unless I've seen it elsewhere."

Kishiuchi won't consider technologies in the research phase, or even demonstration. Money has been lost on such gambles, she said, citing a past example. "I can think of a new technology that was looked at. There were many people looking at that one technology that required various feedstocks.

"It looked very promising but that feedstock was for a number of different technology companies who were trying to access it... We made an investment and the company disappeared. All of a sudden, no one is answering the phone. And I've seen that many times."

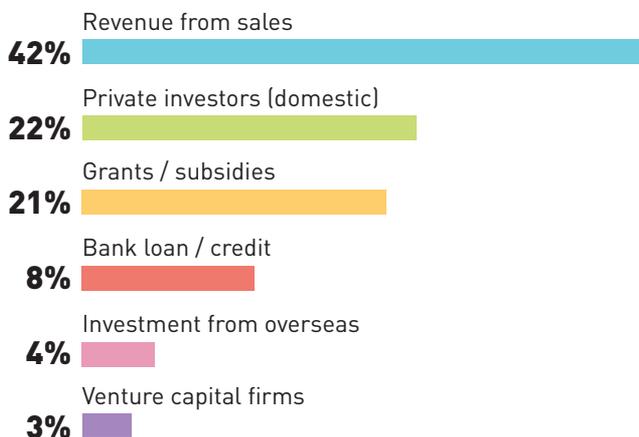
Cleantech companies' main customer base

Total Sample (n=246)



Most important funding sources for cleantech companies

Based on those who consider themselves to be a clean technology business (n=362)



NEED FOR CERTAINTY

Buyers who have experienced such scenarios have developed a keen appetite for certainty. If they're going to procure alternative technologies, they want assurance the company will be around for years to come, for continuity of supply, but also for service and warranties, Kishiuchi added.

Her insight was a cue for cleantech companies to do a better job communicating their business plans, finances and prospects. But it also spoke to a clear gap in the industry—a safe place to test cleantech, added EnerTech's Schmadtke.

"We need a riskless sandbox," he said. "We've got a great need for technology. Everybody is saying we need to reduce the amount of resources we deploy and use. There's great technology, but there's still that divide...We need to have this riskless sandbox where you can play around with technologies and actually pilot them and test them and deploy them more rapidly."

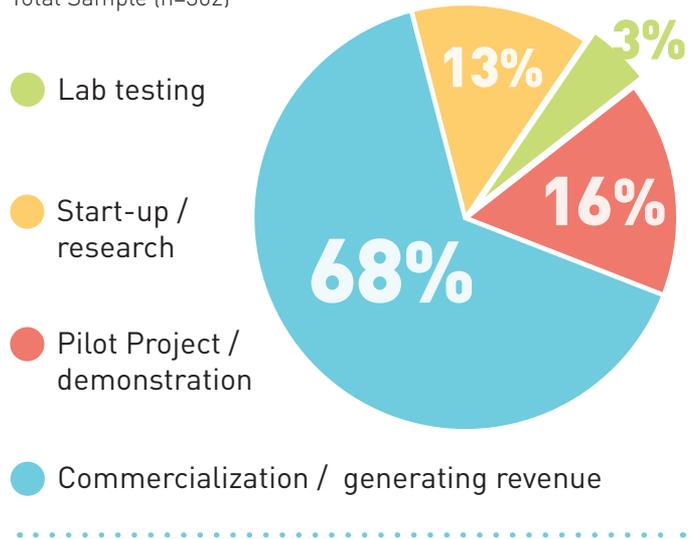
Such an idea would also remediate the tendency of large enterprises to invest where it's easiest, added Kirk Andries, managing director of the Climate Change and Emissions Management Corp. (CCEMC), an Alberta-based funding organization focused on reducing greenhouse gas emissions and adapting to climate change.

"There are technologies you can buy, off the shelf right now, bolt-on, but many big companies are not doing that yet," Andries said. "The capital goes to where it gets the best treatment...If you have a dollar and you can invest it in increasing

"We all wish we could snap our fingers and have the cash [and] go ahead with our fun project. But reality isn't that way...But I found any company that really chased capital always found it." —Adrian Banica

Cleantech companies were asked about their stage of development.

Total Sample (n=362)



production versus an efficiency, you typically go to where you get the greatest return on investment. Usually, that's production."

Yet, energy efficiency provides one of the easiest returns on investment, Andries said, adding the decision to invest in clean technologies to make equipment and operations less energy intensive should be "intuitive."

From his perspective with an energy financing firm, Schmadtke agreed. "What we're not understanding as a country is that there is a war

around the world for energy. And the countries that are going to be the most energy efficient will win. So you're seeing that in Europe...and China has totally got it and they're pushing hard. But we just don't get it. We've got a surplus, right? There's so much energy here, it's not even funny."



“We made an investment and the company disappeared. All of a sudden, no one is answering the phone. And I’ve seen that many times.”

— Kelly Kishiuchi

TECHNOLOGIES IN DEMAND

Though the bias toward productivity is well-entrenched, there are signs the industry is “getting it” in terms of energy efficiency. The research found waste management and recycling was the top sustainability priority for buyers over the past two years (cited by 57 percent). Energy efficiency was second (40 per cent).

Looking ahead two years though, energy efficiency jumps to top spot (45 percent), and

Survey respondents pegged their top barriers to investing in clean technology solutions.

Total Sample (n=653)



waste management and recycling drops to second (37 percent). Clean and renewable energy will also be more important, with 30 percent planning investment over the next two years, compared to 24 percent over the past two years.

Regardless of where the money is invested, the group agreed procurement managers and the executive suite will put proposals through a rigorous process—looking for assurance of a robust return.

Even then, getting in the door of a national or global company might not mean hefty contracts, according to Kyle Greene, chief technology officer with Seair Diffusion Systems Inc., a Spruce Grove, Alta.-based supplier of gas diffusion technology.

“Even if you get adoption in one of these very large companies, you get adopted in [only] one area,” Greene said. “It doesn’t necessarily mean [the technology] will be adopted across the company. So you have a challenge. In the very large companies, one part of the company very likely doesn’t know what the other part of the company is doing.”

Getting the first order or contract involves a lot of due diligence, said Greene—far more than cleantech companies might expect. Financing is his top hurdle to growth, but the second is buyers’ aversion to the unknown.

“There’s a de-risking scenario that you have to go through. You have to pass the technology risk and the corporate risk. The technology risk can be mitigated through various methods. You can do it through universities, third-party verifications...field trials, pilots, etcetera. But the corporate risk—that becomes a huge challenge.”

Seair had to modify its business model, to go in with larger partners to reduce the risk factor for

buyers such as energy and oil sands companies, and municipalities.

“You get the question: Are you going to be around in two years? Are you going to be around in five years? This [technology] has a life span of 25 years ... Are you going to be around in 25 years to work with it?”

Even one of the youngest people in the room—Apoorv Sinha, a cleantech entrepreneur and president of Carbon Upcycling Technologies—had gained astute insight from his short foray into the ‘valley of death’. He’s honed a keen sense of what potential buyers want.

Respondents identified their motivations to invest in clean technology.

Total Sample (n=653)



Carbon Upcycling, based in Calgary, is an early-stage cleantech company aiming to capture carbon,

DEMAND DRIVERS (653 RESPONSES)

The survey asked all respondents (**cleantech companies and non-cleantech**) to identify sustainability priorities for the next two years.

The results show operational **energy efficiency** is the top priority (45 percent), followed by waste management/ recycling (37 percent) and clean or alternative energy (30 percent). Water management was identified by 24 percent, while air emissions management came in at 18 percent.

Just over 50 percent of all respondents said their **company’s spending on clean technology** or sustainability initiatives increased over the past 12 months; and 60 percent anticipate an increase in spending over the next 12 months.

Why are companies investing in clean technology and sustainability? **Cost savings or efficiencies** is the top driver (55 percent). Corporate social responsibility (CSR) was identified by 33 percent, followed by competitive positioning (31 percent), regulatory compliance (27 percent) and employee morale/ retention (26 percent).

Companies would likely invest more if they could surmount common barriers, such as a **lack of capital budget** or financing (50 percent), low rate of return on investment (36 percent), unacceptable payback periods (27 percent), and lack of executive priority (22 percent).

Can companies find clean technologies and solutions? Seventy-eight percent said they’re confident in their organization’s ability to find reliable clean technologies.



Availability of feedstock was cited by the group as a major risk to buyers investing in alternative technology. PHOTO: Thinkstock

combine it with graphite and turn it into graphene, a durable substance suitable for a range of products, from electronics to medical devices.

“It’s much tougher to get \$100,000 than it is to get \$10 million,” Sinha said, reflecting on the all-too-common financing drought. “That blows my mind in a way...We’re fighting for dimes here and you have to be very competitive in the Canadian market.”

He’s learned the key to attracting investment is the pitch. Because the technology is higher risk, it has to make a significant impact. “It can’t be incremental, because there’s a cost [to buyers] of changing. So it has to be enough of a change that those guys say, ‘OK. It’s worth the pain of changing our habits,’” Sinha said.

Carbon Upcycling was named a grand challenge winner at the Zero2014 conference in Edmonton in April. The award—from the Climate Change and Emissions Management Corp. (CCEMC)—provides \$500,000 to the company, to aid in its development.

For that, Sinha sees Alberta as a great place to get

seed money and show proof of concept. Now he’d like to see the market mature enough to become a viable place to sell clean technology.

GROWING PAINS

The group agreed getting to the revenue phase is perhaps the biggest hurdle for cleantech companies, and the challenge often requires them to look beyond their home markets for partners and capital.

“Companies that need under one or two million seem to be able to raise that money in Canada. But if they’re looking for sums over that amount they really need to go abroad,” said Yvonne Gruenthaler, trade commissioner with Foreign Affairs and International Trade in Calgary.

Gruenthaler is the sustainable technologies lead for the Prairie provinces. Her role is to help Canadian companies grow through exports. She’s seen companies fail—only about 10 percent make it—but has also watched start-ups expand overseas, with the right strategy.

The trade commission has set up Canadian Technology Accelerator (CTA) hubs in the US, to help companies tap into customers and expertise outside the country—a service Canadian companies can apply for.

“The consulate or the embassy has entered into an agreement with a local incubator or accelerator and has literally purchased space for Canadian companies to come in,” Gruenthaler said. “It gets the company three months of time in an accelerator with access



“If you have to report something, that means you have to measure it. Once you start measuring it, you realize, ‘Oh, my gosh’, and you start setting standards.”

—Susan Sheehan



It can't be incremental, because there's a cost [to buyers] of changing. So it has to be enough of a change that those guys say, 'OK. It's worth the pain of changing our habits.'”

—Apoorv Sinha

to the entire mentor network...as well as the advice and support of the trade commissioner down there... We've also cultivated a network of angel investors and venture capital investors around the world.”

That kind of support seems to be creating traction for Canadian cleantech companies in the US market. The research found one-third of the cleantech companies surveyed are exporting, with the US being their largest market (79 percent), followed by Europe (32 percent). Forecasts predict an even bigger surge.

According to Analytica Advisors' annual Canadian Clean Technology Industry Report, the industry is growing faster than any other major sector of the economy. The cleantech sector grew by nine percent in 2012, the report found, far outpacing the mining, oil and gas sector's growth of 0.3 percent. Canadian exports of clean technologies grew to a record \$5.8 billion in 2012.

That's a strong signal of growth to come. In the course of her work though, Gruenthaler has noticed Canadian companies could expand faster if they increased scale. “That's precisely one of the issues we have in this country. Our SMEs do not merge. They do not become middle-sized companies. The proportion of companies that actually grow up to become billion-dollar companies is miniscule. We need to encourage our companies to look at growth through merging.”

THE EXIT PLAN

As to why cleantech companies don't merge, the think tank participants had experiences to share on that front.

One of the major litmus tests of start-up success is the ability to be “flipped,” said Claudia Sammer, Co-CEO of Transformana, focused on high-tech growth in Alberta.

“They [investors] always ask ‘what is your exit plan? Is it built to flip?’ We need to instill as a group here that companies should be built to grow and stay in our community. We need a whole new way of thinking about investments,” Sammer said.

Not only is the business community too focused on the short-term exit, new companies are often acquired by foreign investors who relocate operations and brainpower outside the country.

“A couple of years ago we looked at the companies that exited here [in software and hardware] between 1999 and 2012 and found \$6.7 billion of exits. People were dancing. But we as Albertans should be super sad because most of those companies went away. It's not like Silicon Valley where Google and eBay and Amazon are still running those companies. They left us. How are we going to diversify if they leave us?”

Part of the problem is the lack of financing for cleantech companies entering pre-commercialization, added Sundquist. Many organizations offer seed funding for research, but sooner or later, companies outgrow it.

“They get to a maturity level where they've got proof of concept, and they say, ‘thank you very much. I'm out of here because the well has run dry on this funding model. I'm going to commercialize it, but I'm going to do it elsewhere. I'm going to go where there are tax incentives, where I can get a tax honeymoon for 20 years and build my business there’,” said Sundquist.

MERGER SHY

Even so, cleantech companies at least, expect to grow in 2015, with two-thirds of respondents anticipating their business will expand. Twenty-five percent expect to stay the same, and only three percent predicted a decline.

Top barriers to expanding business in the clean technology market

Based on those who consider themselves to be a clean technology business (n=362)



Judging from the experiences of cleantech executives in the room, that expansion likely won't come from mergers. "The entrepreneurs that actually bring these companies to the market are not seasoned entrepreneurs. They're just first-timers and they have an ego. I mean, we all do. I had conversations about merging with companies and it's untenable. I mean, it doesn't work," said Synodon's Banica.

In other words, fostering a cleantech company from a kernel of an idea through the painful process of research, testing, and commercialization is a labour of love, and it's not easy to cede control to new partners. Plus, many of these companies underestimate—or don't know—their own value.

"If you tuck in too early with one of these larger players and you don't have that value, they're going to take advantage of you," added Sundquist. "It's that gap between the value creation and being taken advantage of that a lot of companies are struggling with."

Matichuk, who deals with cleantech companies all the time in his role as ACTia president, is familiar with the dilemma. Though it can involve risk, mergers and acquisitions are sometimes well worth it.

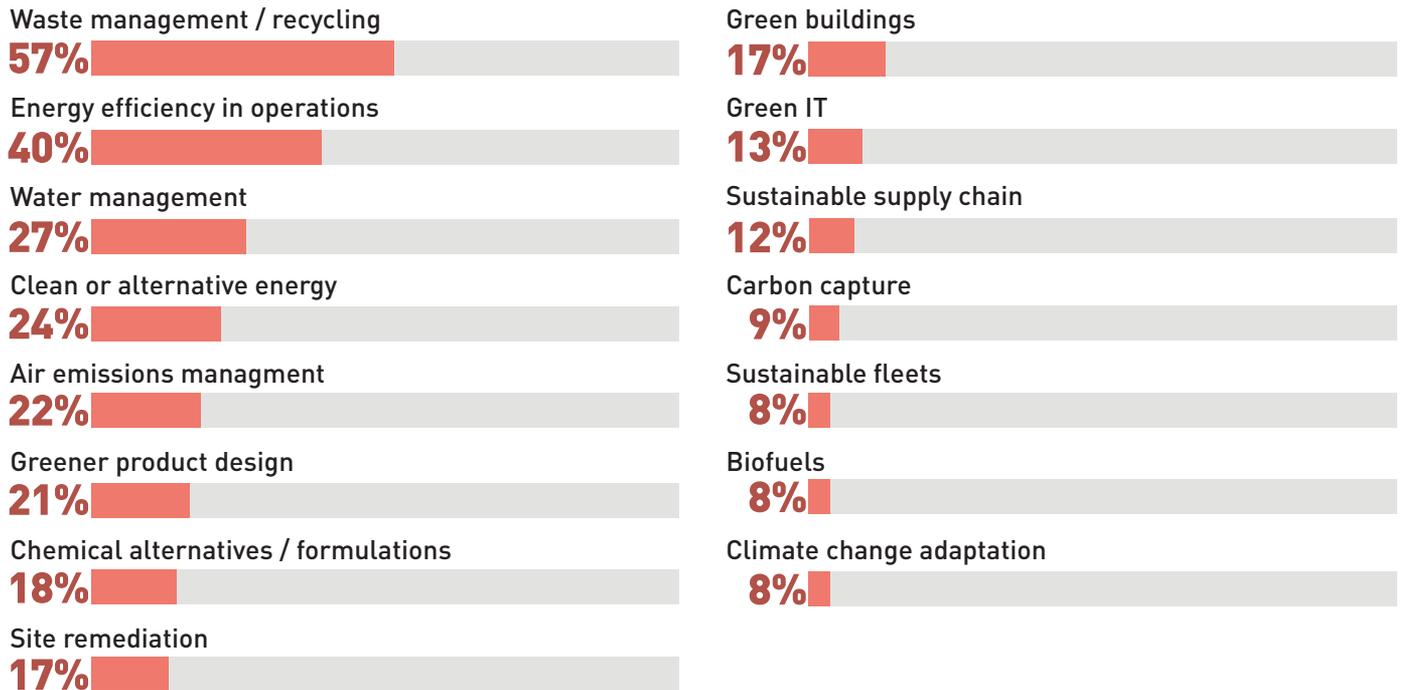
"The innovators are always in love with their technology and their company and then they don't recognize that sometimes it's not just about great innovation, it's about confidence—business confidence. And sometimes you're far better off to own 20 percent of something that's successful than 100 percent of something that never gets off the rails."

For instance, cleantech entrepreneurs could license their technology to a larger company already established in key supply chains, such as the oil sands. Collecting a five percent royalty could be a sizable revenue contribution, Matichuk added.

As a cleantech investor, Schmadtke agrees. "If you look at the vendors that are supplying the industry,

Areas respondents have invested in over the past two years

Total Sample (n=653)



increasingly, their customers are asking them to bring more value to the table. So they're scanning the environment to say, 'if I can partner with this technology...I can tuck it in and bring this to the table'."

CHANNEL PARTNERS

Another important avenue for cleantech companies is distributors. Channel partnerships have worked

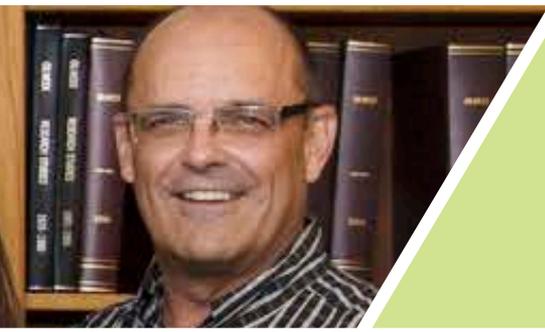
well for companies such as Synodon. Banica concedes you lose a little control, but it can be rewarding from a sales perspective.

"The only reason why 80 percent of our revenue is from Texas is because we have a channel partner [there]. And it's much easier. You still have to sell yourself first for a while and that still can kill you. But once you're selling enough mass to convince a channel partner to become a distribution channel,



The issue in the cleantech space is the valley of death is bigger than [it is] for the IT space and for other innovators, partly because to go from bench scale to production, it's a much bigger cost—a much more risky undertaking.

— Russel Matichuk



“It’s a real challenge, but there’s lots of opportunity that comes with it for our cleantech industry. In terms of the collective community, everyone needs to work together to pursue solutions. Everyone has a role to play.”
—Kirk Andries

then it certainly can work.”

Another cleantech stakeholder at the table agreed. Julie Pithers works in business and community development with Calgary-based DIRTT Environmental Solutions, which stands for ‘Doing It Right This Time’.

DIRTT is focused on modernizing buildings, and making them more sustainable. One of the toughest challenges for cleantech companies is the ‘pitch’ or getting potential customers to understand a novel technology. So DIRTT uses a visual approach.

“It’s a video game experience and we’re melding

it with engineering, manufacturing and design,” Pithers said. “You design, let’s say, this conference room and as soon as you draw it it becomes 3D. You can fly through here and make design decisions that are automatically updated in your price.”

The final design generates a bar code that goes directly to the factory and tells the machines where to cut and drill, she explained. Onsite, there’s no material waste, fewer [skilled people] and the carbon footprint is much lower than with traditional builds. Eighty-five percent of DIRTT work is exported, and the US is key.

CLEANTECH COMPANY SNAPSHOT (362 RESPONSES)

Of 653 responses to the research survey, more than half identified themselves as a “cleantech company.” The majority (53 percent) have been in business for 15 years or less. They survey also found the following:

- Sixty-eight percent are at the **commercialization stage**; 16 percent are at the pilot phase. Thirteen percent are in start-up/research and three percent are at lab testing.
- Of those at commercialization (246 respondents), their biggest market is consumers and the public (32 percent), followed by other businesses (30 percent), oil sands and energy (10 percent), municipalities (nine percent), other government (four percent).
- Thirty-three percent are **exporters**.
- The majority have an optimistic outlook, with 66 percent **anticipating growth** in the next year.

- Lack of financing was identified as the top impediment to growth (44 percent), followed by **unsupportive government policy** and incentives (42 percent).
- The most helpful source of support for cleantech companies is business partners (39 percent), followed by industry associations (32 percent).
- When asked if Canada is a **good business environment** to start and expand a clean technology company, 80 percent agreed.
- Revenue from sales was identified as the most important source of funding (42 percent), followed by private investors (22 percent), grants and subsidies (21 percent), bank loans (eight percent), investment from overseas (four percent) and venture capital (three percent).

“We’re not a direct sell. We chose distribution partners all over North America who already have a foothold in the commercial office industry,” Pithers said. “They already have great clients who are looking at things like this, and they’re all looking for markets to grow into.”

Pithers has found US companies are not only hungry for innovation, they’re also more willing to try non-traditional products and ideas. “It’s highly competitive, they’re

each trying to out-do each other and are happier to jump on new innovations than, typically, large Canadian companies.”

In terms of commercializing struggles, Pithers sees a need for investors who know the industry. So called ‘smart angels’ understand the specific market, have the right contacts, and know how to open doors.

On that note, a major takeaway from the think tank was the need for a more connected industry. Or in the words of Keith Gylander, “In general, we are all a bunch of cowboys.”

Gylander is business development leader with TRTech, an Edmonton-based organization focused on commercializing new technologies. “There’s so little interaction and so little cross-pollination of our ideas and our experiences...That’s one thing that as a province, we need to change.”

Gylander has worked with companies on both the demand and supply side, and sees a lack of community in the innovation market. “Silicon Valley created something because of the synergy of all these like minds wanting to work together,” he said, referring

“I don’t know one place where I can send a client and say, ‘Here’s what you can become a member of or become a part of that’s really going to help you along’. I have to send them to a bunch of different places and a bunch of different people.”

—John Goetz

to California’s IT hotbed as an example of the potential.

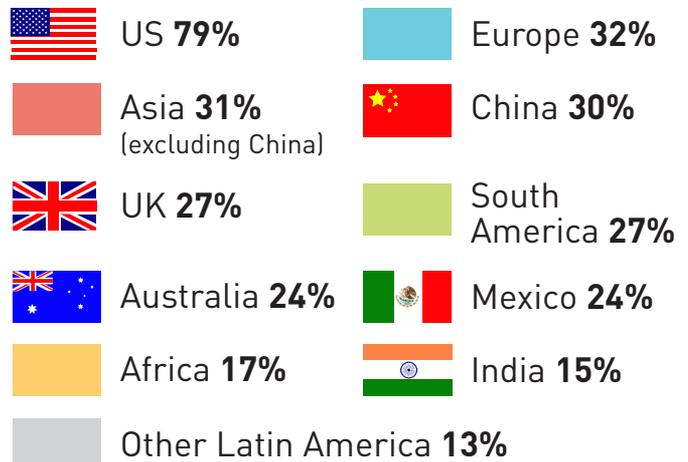
John Goetz agreed, pointing to the disconnect between start-ups, and also the countless associations trying to serve the market. “What I think is lacking is a central focal point for the cleantech industry,” said Goetz, national lead for the cleantech and climate change group with international law firm, Dentons Canada LLP in Calgary.

“I don’t know one place where I can send a client and say, ‘Here’s what you can become a member of or become a part of that’s really going to help you along’. I have to send them to a bunch of different places and a bunch of different people.”

Goetz suggested consolidating the most effective

Where do Canadian cleantech companies export?

(119 responses)



associations or accelerators, to create a powerful, unified organization similar to what the energy industry has in CAPP (Canadian Association of Petroleum Producers).

“If we could champion that and make that happen, we’d have really accomplished something,” Goetz said. “If we could roll them into one, even if they maintained their independent status, we’d still have one focal point...Look at how effective CAPP is.”

The gap that we’re finding is when you talk to [major integrated] companies, and you look at their annual reports, all of the environmental sustainability messages in there are not translating down to the operational level; the procurement level.

—Jeffrey Sundquist

using proprietary matching algorithms to take complex data...and create matches,” Sheehan said. “Once you become a member... it automatically tells you what you match to. And whenever there’s a new match, you get notified.”

She emphasized Canada is a small market compared to behemoths such as China, so businesses will likely need to find their first customers outside the country. With its multiculturalism and global connections, foreign investors are eyeing Canada as their

entrance to bigger markets.

“Trade commissions in Europe and in South America and Latin America are looking at Canada as a place to do business, to get planted here, form relationships and then go to Asia,” Sheehan said, adding cleantech companies shouldn’t focus solely on the US.

“The Asian market is just so obscenely huge and moving so quickly that we don’t even have a pulse compared to what’s going on there. And even the American market is irrelevant compared to [the benefit] if a company gets a little foothold in Asia—it’s just a game changer.”

On the local front, Matchuk and ACTia are working in the same vein, largely through events. For years, cleantech companies have tried to sell directly to large enterprises such as Suncor and Syncrude. But the more tangible opportunities lie farther down the supply chain, so he’d like to see more cleantech showcases at energy and oil sands-related events.

“The guy from Suncor is not likely going to go into the innovation pavilion, take a few notes and say, ‘I’ve

MATCH-MAKING

That’s right in the wheelhouse of Susan Sheehan.

She was an early player in the cleantech industry and has watched it fire and sputter over the years. “What I observed then and continue to observe for the last two decades is that it’s always about characterizing your sandbox. But the connectivity between that sandbox and this one isn’t happening.”

Sheehan recently launched a new online platform for the industry called getcleantech. “It’s basically a dating site for cleantech. So we’re working towards knitting all of the different communities, innovators, experts, government agencies, trade commissioners together in a sort of LinkedIn plus eHarmony solution.”

The idea is to connect cleantech companies with potential partners so if one has 75 percent of an environmental problem solved, they can find a company to supply the last piece of the puzzle; either around the corner, or across the world.

“So we’re creating that community online. We’re

got to go buy some of this'. But the guy that's already selling to Suncor, he wants to make more money from that channel so we've got to find a way to get that mixing going on and do it a lot more intelligently," Matichuk said. "That's where the magic happens."

BETTER ENFORCEMENT

With the industry charging ahead on the connections front, the group called for more support from the provincial and federal governments; both on policy but also on enforcement of existing environmental regulations that would spur demand for clean technologies.

"From my perspective...there is a pretty lax attitude here," Banica reflected, drawing on his experience in Canada compared to the US. "There are regulations and the regulators expect the companies to just follow them. And they'll follow them to a certain spirit, but there's a lot of interpretation there which leaves a lot to be desired."

Dentons' Goetz agreed. "It's not [big energy companies] that are breaching regulations, it's their suppliers who are smaller and who are prepared to take more risk. And then [energy companies] aren't aware of it or they're not wanting to be aware."

That said, the group agreed it's not regulations that will create critical mass in cleantech; it's economics. "Every single one of our customers

in the United States have bought because they actually made an internal decision that this is good for their business, as opposed to being driven by regulations," Banica noted.

PRESSURE TO REPORT

But there's another driver coming down the tracks—at an alarming speed, added getcleantech's Sheehan. More and more, companies are being required to report their carbon emissions as a liability on the balance sheet.

"If you have to report something, that means you have to measure it. Once you start measuring it, you realize, 'Oh, my gosh', and you start setting standards. We're not going to get anywhere trying to influence social policy and political winds. Where things are happening is at the corporate level where organizations are being either required to report through regulations, or through industry-imposed standards."

Sheehan called Canada a laggard on that front, an opinion the research supports. The survey found only one-third of all companies (cleantech and non-cleantech) engage in public reporting of corporate social responsibility programs and progress. Of those who don't report, 50 percent plan to start within the next five years.

"In Europe and the UK, for example, in order to trade on the stock exchange there, you now have

“They [investors] always ask ‘what is your exit plan? Is it built to flip?’ We need to instill as a group here that companies should be built to grow and stay in our community. We need a whole new way of thinking about investments.”

—Claudia Sammer





The think tank included cleantech entrepreneurs and representatives from financing, government, legal services, procurement and associations.

to report carbon,” she said. “In some jurisdictions it’s integrated reporting...meaning non-financial and financial at the same time; non-financial being water, carbon, waste, social policies, board diversity, employee diversity, safety.”

In the near future, companies that aren’t reporting stand to be excluded from stock exchanges, and to run afoul of investor and consumer expectations, she said. Others in the room agreed it will break through the tendency of business to avoid making change in favour of ‘business as usual’. Part of the problem is lack of clear direction, added Sundquist.

“Industry needs certainty in policy. That’s why carbon capture and storage has not taken off here or anywhere, frankly...because the supply chain hasn’t been given the signal that there will be economies of scale to keep it affordable.”

Taking that one step further, Goetz said current-day business planning needs to be reinvented. “To

say you’re going to continue doing the wrong thing because [change would] make you uncompetitive... it’s archaic thinking,” he said. “As opposed to taking a more enlightened view on it and saying, ‘We’re going to do the right thing because it’s going to make us more competitive’.”

The group also acknowledged governments are hesitant. One participant called the carbon regulation arena “political suicide.” Another said we’re too fixated on following the US, instead of clearing our own policy path.

“We can be an energy super power if we do it properly,” Sundquist said. “We just need the guts to do it. And I think that’s what’s missing is we don’t have the fortitude, or we think there are these bogeymen... That if we implement [policy], then suddenly all of the commercial and economic air is going to leave the province or leave the country,” he said.



“Companies that need under one or two million seem to be able to raise that money in Canada. But if they’re looking for sums over that amount they really need to go abroad.”

—Yvonne Gruenthaler

“We’ve got a very interesting window in time where if we’ve got the guts to do it, now could be a time where we push and hold other jurisdictions to account to the same standard.”

The overall conclusion was Canada has what it takes to be a major world player in the cleantech market—research, accelerators, funding organizations and in the oil sands, a burgeoning demand market.

“I think we have a great environment and the brainpower to actually make these companies very successful, if we can connect that with looking outwards for markets,” Banica said. “If we can keep those companies here and have them exporting, that’s the win.”

The CCEMC’s Andries called for leadership, both from industry and the cleantech community, and said all stakeholders need to take a more complete view of Canada’s environmental problems, and how the country can move to a lower carbon economy.

“We’re going to increase our production in the oil sands from 1.7 million barrels a day to five. All else remaining equal, greenhouse gas emissions will increase and the markets are paying attention to this,” he said. “It’s a real challenge, but there’s lots

“You get the question, ‘Are you going to be around in two years? Are you going to be around in five years? This [technology] has a life span of 25 years ... Are you going to be around in 25 years to work with it?’”

—Kyle Greene

of opportunity that comes with it for our cleantech industry. In terms of the collective community, everyone needs to work together to pursue solutions. Everyone has a role to play.”

With that kind of resolve and determination, the think tank participants and the ecosystems they serve are poised to finally bring about change—giving clean technology the push it needs to be a powerhouse

industry in Canada and around the world.

THINK TANK WISH LIST

- ✓ Better enforcement of environmental regulations;
- ✓ A unified cleantech association, on par with the energy sector’s CAPP;
- ✓ Mandated public reporting of carbon emissions and sustainability progress;
- ✓ More funding for companies past the research stage;
- ✓ Less focus on the ‘exit strategy’;
- ✓ A way to translate CEO enthusiasm for cleantech down to procurement;
- ✓ A risk-free sandbox where buyers can test alternatives;
- ✓ Legal, financial and other service sectors involved with de-risking;
- ✓ Coaching for cleantech entrepreneurs on the business case/ models;
- ✓ More stringent carbon taxes and policy.

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Cleantech Canada thanks the CCEMC for making this report possible. The following organizations contributed supporting expertise or input: Alberta Clean Technology Industry Alliance (ACTia); Student Energy; getcleantech.

SURVEY RESPONDENT PROFILE

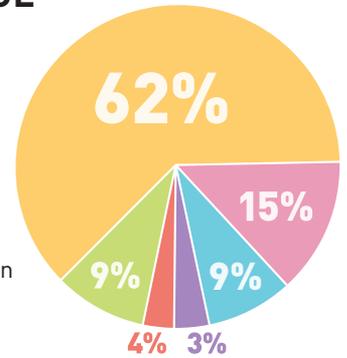
ROLE (all respondents = 653)



COMPANY REVENUE (cleantech companies = 362)

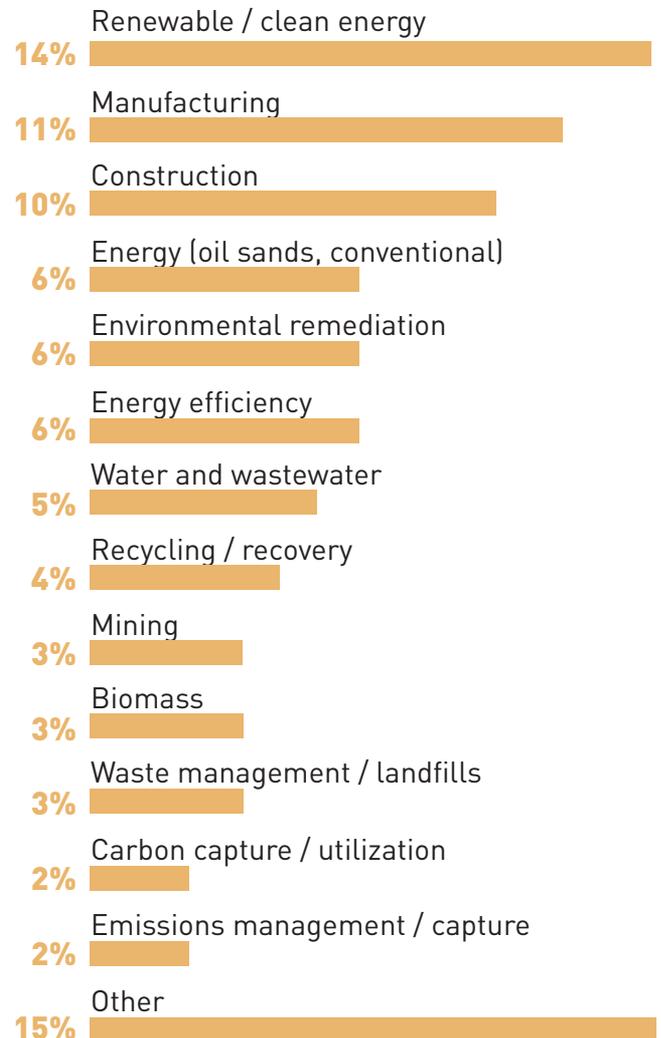
(cleantech companies = 362)

- Less than \$10 million
- \$10 million to \$25 million
- \$26 million to \$50 million
- \$51 million to \$100 million
- Over \$100 million
- Dont know



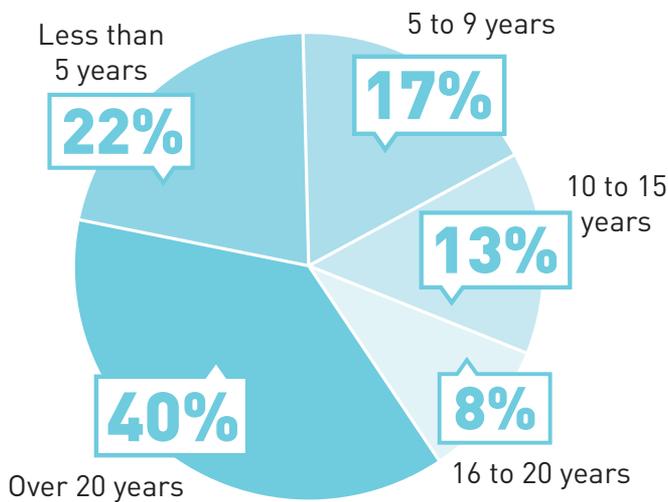
PRIMARY INDUSTRY (cleantech respondents = 362)

(cleantech respondents = 362)



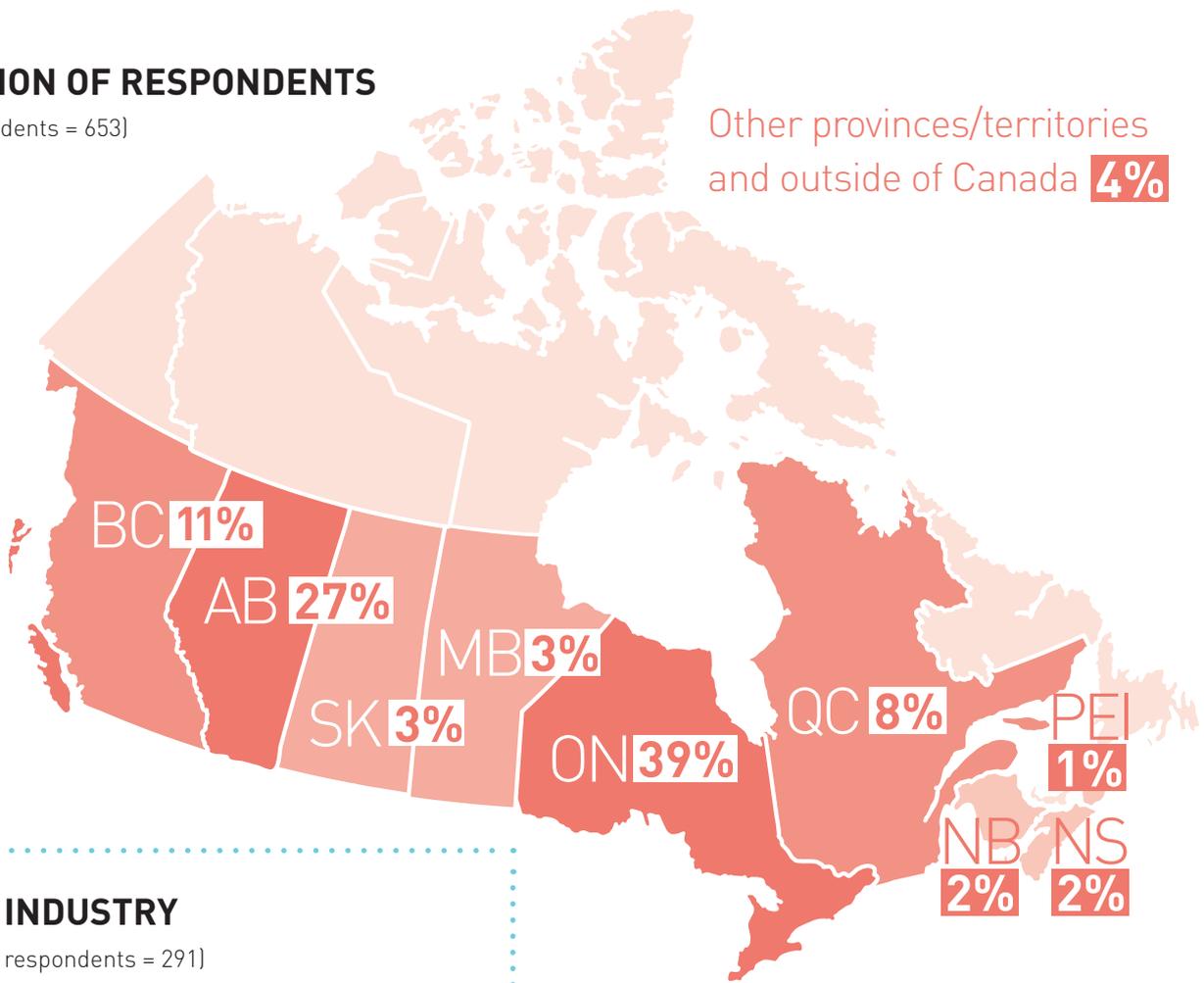
YEARS IN BUSINESS (cleantech companies = 362)

(cleantech companies = 362)



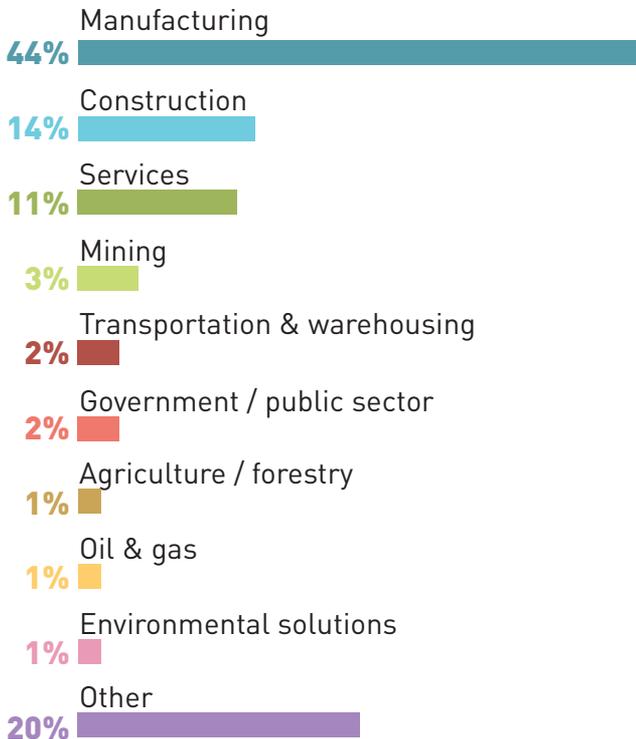
LOCATION OF RESPONDENTS

(all respondents = 653)



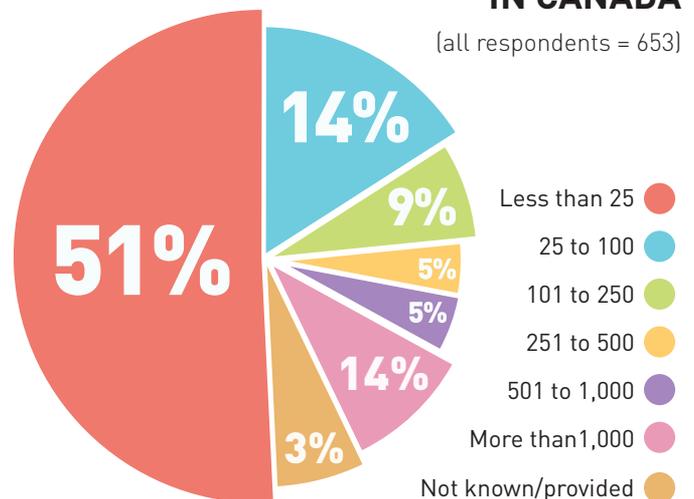
PRIMARY INDUSTRY

(non-cleantech respondents = 291)



NUMBER OF PEOPLE EMPLOYED IN CANADA

(all respondents = 653)



REDUCING GHG EMISSIONS. FUNDING A WAY FORWARD.



Alberta's CCEMC is here to assist Canada in achieving its greenhouse gas (GHG) reduction targets by supporting clean technologies. To date, the CCEMC has invested well over \$200 million in projects that will reduce an estimated 10.2 megatonnes of GHG emissions by 2020.

Twice a year, the CCEMC invites two funding submissions for projects that will help Alberta – and the world – address climate change.

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