The world's largest vertical axis wind turbine at Cap Chat, Quebec. Wind is becoming a more significant part of Quebec's energy supply. Shutterstock photo

A New National Prize: Making Clean Energy the Next Oil Sands

Clare Demerse and Dan Woynillowicz

It took a critical mass of innovation, commercial viability and political will to make Alberta's oil sands the focus of Ottawa's energy policy. The same factors are converging now to make clean energy the next energy industry Cinderella story. Canadians have said they want cleaner energy, and they've said they'll pay for it, which should make the political argument clear. The rest is about vision.

When oil patch veterans tell the story of how Canada's oil sands grew up, their history usually highlights the ingenuity and investment of pioneering companies like Esso, Suncor and Syncrude. Little wonder, then, that most Canadians aren't aware of the significant role that the federal government played in building this industry.

In the mid-1990s, government and industry experts saw that a confluence of forces—growing global oil demand,

increasing oil prices, and technology breakthroughs—could unleash oil sands development. The industry was on the cusp of growth, but its success was far from a sure thing.

In response, the Alberta Chamber of Resources convened a National Oil Sands Task Force—a collective of industry and government representatives—to align private and public sector efforts to turn this opportunity into reality. In the task force's view, the oil sands were the new "national prize," and their development represented a "new energy vision" for Canada. The task force presented a framework for oil sands growth based on a "collaborative alliance" of government and the private sector.

Ottawa responded. From support for research and development to direct investment, to various direct and indirect subsidies, federal support became a key ingredient of the industry's success.

Why recount this history in an article about the future of clean energy in Canada? Because the clean energy sector now finds itself in a remarkably similar situation to that of the oil sands 25 years ago. The forces at play today include technology and cost breakthroughs that make clean energy increasingly competitive, as well as a rapidly growing domestic and global market for clean energy solutions fuelled by governments' and citizens' desire to reduce carbon pollution.

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According to *Bloomberg* New Energy Finance, investors poured $207 billion into clean energy deployment around the world in 2013. In Canada, investment hit $6.5 billion—ranking us 7th among G20 countries for clean energy investment. And because clean energy technology costs are dropping, dollar for dollar, this investment is building more clean energy capacity than ever. For example, *Bloomberg* has tracked a more than 75 percent drop in solar module prices since 2008. It's little wonder that 2013 marked the first time solar power received more investment than any other renewable energy technology.

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For example, a recent study produced by global consultants McKinsey & Company for Natural Resources Canada found that Canada has an opportunity to enhance our competitiveness in next-generation automotive technology and advanced trains and jets. They also found that we could take the lead in emerging markets with solar photovoltaics, bioenergy, unconventional hydro and energy efficiency.

Increasingly, Canadians understand the benefits—environmental and economic—of competing in clean energy. A recent Environics Institute survey found that 70 per cent of Canadians believe it is possible for their province to shift most of its energy requirements from fossil fuels to clean, renewable forms of energy. Equally importantly, according to an Université de Montréal poll conducted for Canada 2020, they'd even be willing to pay more for it.

Thanks to a recent United Nations-backed report, we now have a clear picture of what Canada's low-carbon future could look like. It turns out that clean energy needs to play a starring role.

A heavyweight team of experts—headed by economist Jeffrey Sachs—produced the July 2014 *Pathways to Deep Decarbonization* analysis. Research teams from 15 countries were asked to come up with scenarios that chop much of the carbon pollution from their respective economies by 2050, in line with the scale of cuts required to live up to the goal that virtually all countries—including ours—have adopted, which is to keep global warming to 2°C or less.

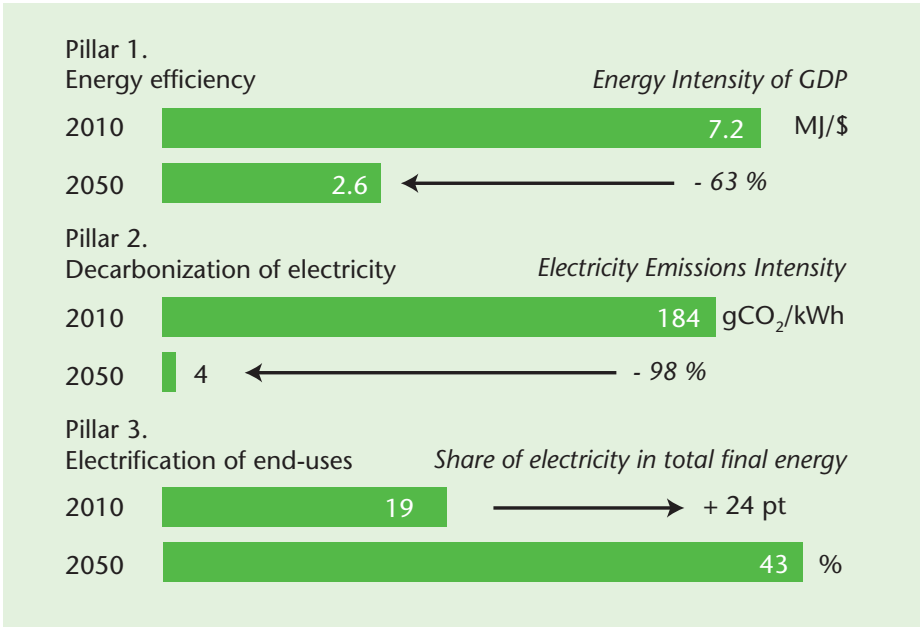
It turns out that the recipe for a low-carbon future is surprisingly simple. All of the project's 15 participating countries—a list that includes China, the US, the UK, India, Brazil, and Mexico—took the same three steps:

1. Cut energy waste as much as possible.
2. Clean up the electricity supply, which means relying far more on solar, wind, and hydro and a lot less on coal and natural gas.
3. Replace fossil fuels with clean electricity. Rather than filling up with oil, we would drive electric cars. Electric heat pumps, not natural gas, would keep us warm in winter.

As the report points out, "decarbonizing electricity production is essential, since it is a precondition to reducing emissions throughout the rest of the economy through electrification." This is illustrated in figure 1.

The Canadian team had to find a pathway that cuts our 2010 carbon pollution total by nearly 90 percent by 2050. And they succeeded, presenting a scenario that whittles down emissions from electricity, transportation and buildings to less than 6 per cent of the 2010 level by 2050 while our GDP grows by more than 200 percent.

FIGURE 1: The three steps to deep decarbonization in Canada



Source: Sustainable Development Solutions Network & the Institute for Sustainable Development and International Relations. (2014). *Pathways to Deep Decarbonization, Interim 2014 Report.*

Canada already sources most of its electricity from low-carbon hydropower, but the analysis still anticipates massive growth in wind and solar. According to *Pathways*, in 2050 wind and solar will provide 27 per cent of Canada's electricity generation—a huge step up from the two percent they provide today.

What will it take for clean energy generation to grow quickly in Canada?

First, like any other sector, clean energy will only grow if there is increasing demand for the product it produces.

That demand largely depends on provincial choices—provincial governments have jurisdiction over electricity generation in Canada—but (as noted above) it can also come from markets outside Canada. The United States is our natural market for exports of clean electricity, but Canadian companies can (and do) also supply clean power expertise, technologies and services to the growing global market.

If more Canadians start driving electric vehicles instead of gasoline-powered cars, demand for clean electricity will grow. The Canadian Electricity Association points to the rate of electric vehicle adoption as one of the "key variables" influencing the future size of the electricity system in Canada.

Matching clean power to consumer demand in real time requires a modern, smart grid, and most of Canada's jurisdictions have some upgrading to do to get there.

Clean power can be produced almost anywhere, from a rooftop equipped with solar panels to a fast-running river, sometimes in very small amounts. That's a sharp contrast to the electricity sector's traditional model, which relied on huge plants running around the clock. Matching clean power to consumer demand in real time requires a modern, smart grid, and most of Canada's jurisdictions have some upgrading to do to get there.

Then there's power storage. Unlike coal or nuclear, many clean energy sources provide power on a variable basis: the wind isn't always blowing and the sun isn't always shining. Technologies that store power can cover the gaps, allowing wind, solar and others to move from a niche role to become major power players.

Clean electricity experts will also tell you that the sector struggles with finding financing. The capital required to build new facilities is significant, and it can be hard to come by when investors aren't yet familiar with the sector.

Although many clean energy technologies are already mature, new research and development can cut costs even further and improve efficiency.

Finally, stronger climate policy—including a price on carbon—would be great news for a sector that offers an indispensable low-carbon solution.

Just as it did with the oil sands sector two decades ago, Ottawa can play an important role today in creating the conditions for clean energy's growth and success.

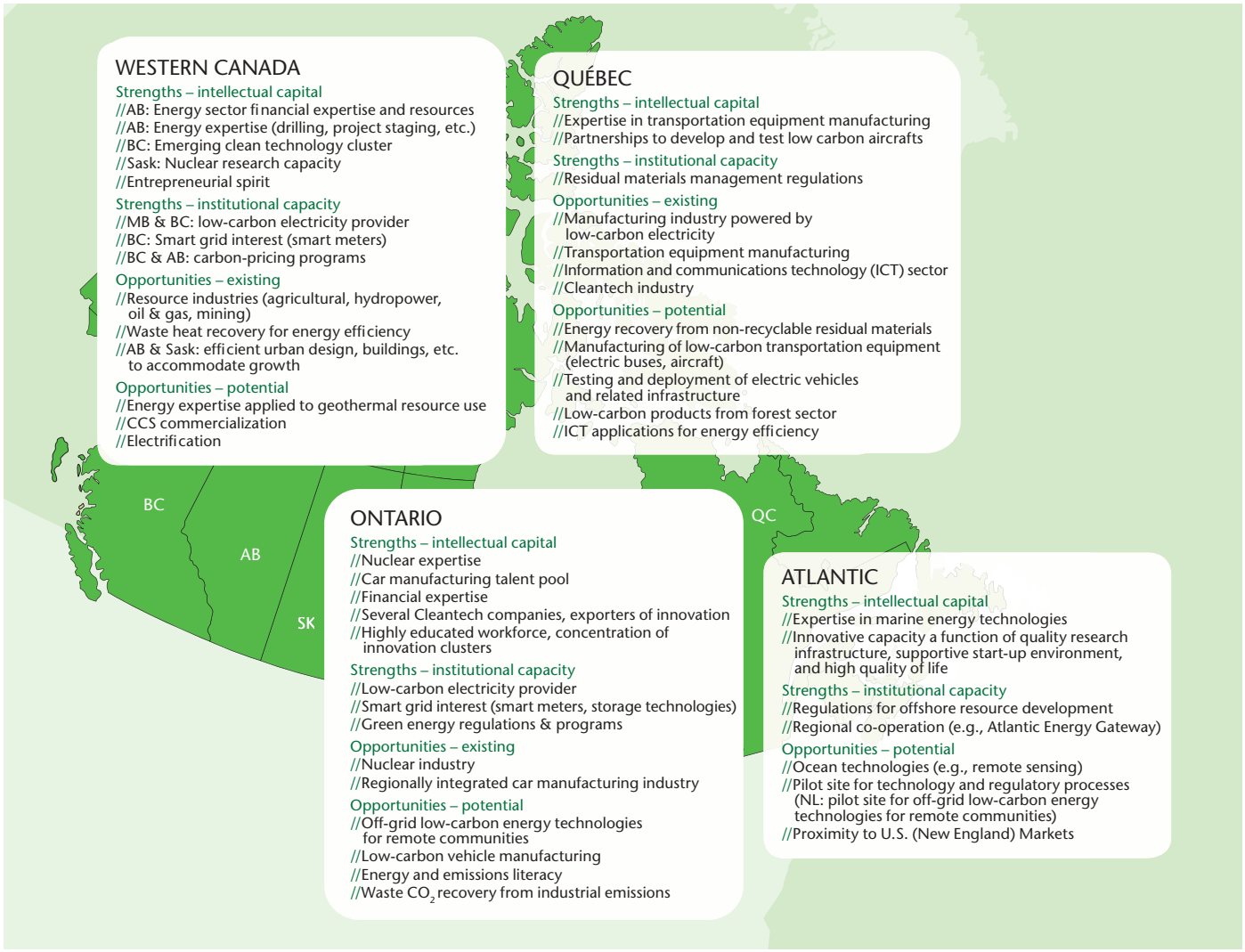
The first step is the least expensive, but perhaps the most essential: making clean energy a priority.

Right now, a casual observer of the government's approach could be forgiven for thinking Canada's energy edge starts and stops in Fort McMurray's oil sands. Clean energy could use even a fraction of the political attention that our government has paid to pipelines proposals for oil sands development. For example:

- Five years ago, the US launched an annual international Clean Energy Ministerial, but Canada's Natural Resources Minister has missed the last two annual meetings in favour of pitching the Keystone XL pipeline proposal. We're hoping that changes in time for the 2015 meeting.
- Canada is not a member of the International Renewable Energy Agency (IRENA). The United States, China and Australia are among the agency's 132 current members; it would be great to see Canada make it 133.

Once enough federal politicians and officials became familiar with the clean energy sector's potential, their appetite for further policy support will only grow. But meanwhile, it

FIGURE 2: Low-carbon strengths and opportunities across Canada



Source: National Round Table on the Environment and the Economy. (2012). Framing the Future: Embracing the Low-Carbon Economy.

looks like we're headed towards a surplus in the 2015 federal budget, and the time is right to invest a portion of that surplus to bolster Canada's clean energy competitiveness. Here are two simple ideas that would make a big difference for clean energy:

Level the tax playing field for power storage and solar technologies. To its credit, the federal government has been systematically adding clean technologies to Capital Cost Allowance class 43.1 and 43.2, allowing companies to write off clean-tech assets more quickly and thus save on their tax bills. This year, solar technologies and power storage assets need that boost. In addition, a Residential Solar Energy Tax Credit—along the lines of the government's extremely successful Home Renovation Tax Credit—would help support Canadians interested in installing rooftop solar systems in their homes.

Give consumers an incentive to buy electric vehicles. Ottawa often likes to say that it's "harmonized" with Washington on climate and energy policy. That's absolutely true when it comes to fuel efficiency standards for vehicles: our regulations are essentially identical to the rules enacted south of the border. But Washington has been offering consumer electric vehicle rebates for several years now without an Ottawa equivalent.

In the 1990s, federal support and engagement in the oil sands was justified on the basis that they represented a "national prize." The reality is that the economic benefits of oil sands development overwhelmingly accrue to Alberta—to the tune of 94 percent, according to the Canadian Energy Research Institute. In contrast, as the National Roundtable on Environment and the Economy found (figure 2), the opportunities in low-carbon goods and services are far more diverse, with strengths to build on in all regions of the country.

The oil sands' history shows the power of governments working with industry to build a "national prize." It's time for a compelling new energy vision to motivate governments again, this time with a new national prize in mind: a prosperous and competitive clean energy economy. P

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