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THE REAL COST OF ENERGY

Canada's way of life – among the highest standards of living on earth – would not be possible without access to plentiful and reliable sources of energy. Energy drives the economy and supports quality of life.

Lately, much attention has been paid to the real cost of energy. Unfortunately, the real price paid for gas or electricity is significantly greater than what is paid at the pump or on utility bills. In fact, market prices don't reflect the hundreds of billions of dollars in hidden costs of energy production. But this and future generations will still pay.

"What economists call externalities have not been included in how our economy works," says Greg Kiessling, chairman and co-founder of Bullfrog Power. "It's obvious now that if it's profitable to sell products that depend on it being free or cheap to pollute, then we will end up with a damaged planet full of pollution and waste."

Calculating the true cost of energy is complex, but possible. "The first step is you have to look at the full life cycle of an energy supply mix," says Deb Doncaster, executive director of the Community Power Fund. "A lot of what supplies energy in terms of coal plants, gas plants, nuclear power plants and hydro power was built 30 or 40 years ago. We have to take into consideration that the cost of capital and the cost of labour were much less expensive back then than they are today."

Costs come in many forms. Fossil fuels are linked to air pollution and can cause damage to human health and to



the climate. Nuclear power carries a legacy of radioactive waste. Large hydroelectric dams alter the flow of rivers and contribute to declines in salmon and other migratory fish species.

These social and environmental outcomes also carry a cost. The bill comes in the form of shorter life spans, increased medical and food costs, higher insurance rates, higher military expenditures and expensive environmental cleanups.

“The challenge we face is to get these externalities into the economic system and to have them priced properly so that our economy functions well in the next hundred years,” adds Kiessling. “Consumers are becoming more aware of the fact that externalities are not priced into their energy costs. And some are voluntarily saying they want them priced in. They don’t want to be buying energy that doesn’t have externalities factored in. They want to be paying the real cost of energy. They want to buy energy that comes from renewable sources, even though it costs more. It’s achievable. It’s real. And it’s something we can switch to over time.”

THE SOCIAL COST OF ENERGY

A more holistic accounting of the total costs of energy consumption that includes both the private and external costs is known as the social cost of energy use. Some argue that bringing this full cost of energy under control means fixing how we make energy, not how we sell it.

“We’re at this interesting crossroads with renewable energy because not only is it cleaner, it is easier to deploy and it’s actually now less expensive than a lot of the traditional forms of generation,” says Doncaster. “And provinces are heading towards a more transparent process. In Ontario, this is what we’re moving towards – clear and transparent pricing in the electricity sector through feed-in-tariffs for our renewable energy contracts.”

Renewable energy becomes more competitively priced when traditional energy sources’ hidden costs are factored in, allowing a mix of renewable sources – wind, fuel cell, solar, geothermal, biomass and others – to play a role in meeting future demand.

“Real prices need to be calculated so that the marketplace can respond,” says Kiessling. “This could come from taxes on the pollution and waste from energy sources. These taxes could be revenue neutral, but need to be large enough to cause different decision making. In a 20- to 30-year frame, we can completely fix this problem. It is possible for us to switch to a very low-pollution environment.”

SOCIAL LICENCE AT RISK



The change in attitude towards energy pricing – and therefore energy investment – hinges on recognition that energy, care for the environment and the economy are inextricably intertwined.

Some observers believe this is already occurring at the grassroots level. More Canadians are arguing that Canada's energy sector is environmentally insensitive. "Local opposition is becoming more pronounced for energy projects," says Toby Heaps, president and co-founder of Corporate Knights, a media, research and financial-products company. "And this will slow things down. Some Canadians are beginning to feel a sense of injustice."

Tom Rand, managing partner of the MaRS Cleantech Fund, adds that the social licence to extract and sell fossil fuels is under threat everywhere. "It's particularly under threat in Alberta, because there we're seeing some of the highest carbon-intensive energy on the planet. There will be continued pressure to take the social licence away from open-ended development. This poses a great risk for investors in the traditional energy sector."

DIVERSIFICATION IS KEY

Critical to Canada's commitment to reducing greenhouse gases is a growing cleantech sector. With a vast and exceptionally diversified mix of renewable energy sources, Canada's clean-energy potential includes hydro, solar, wind, biomass and tidal power. Underpenetration of renewable energy resources, such as wind and solar, represents a significant opportunity for investment in technologies that will drive the market.

"Over the next ten years there will be a potential for Canada to make a change in our exports of renewable energy," says Heaps. "In a 20-year period there is a potential for our clean-electricity exports to supersede our oil exports. From an investment perspective, if you're taking a longer-term view, it doesn't mean that every renewable energy stock is going to be a good bet. But the ones that have good management and have good valuations are definitely operating in a demand-and-supply policy context that augers quite well."

Rand says Canadian cleantech companies in particular are drawing investor attention. "Our market is global. There is a very strong portfolio of cleantech companies in Canada, largely because we have good, targeted support structures for early-stage cleantech. And Canada has some of the best support structures in the world."

Céline Bak, president and CEO of Analytica Advisors, a consulting firm in the cleantech sector, adds that over the last four years, the rate of R&D investment in Canada's cleantech industry has been growing. "Cumulatively, it has attained close to \$4 billion. That's a very significant investment in terms of private-sector research and development in Canada. For example, that's more than the pharmaceutical [manufacturing] industry."



However, Canada's cleantech sector is new, and still must find its footing. There will be market barriers and it will have to fight for market share against established producers.

"Canadian cleantech companies are still small," says Bak. "Many are not yet of a scale that would be interesting or attractive to institutional investors." But established industries such as oil and gas, forestry, mining and agriculture are investing in cleantech nonetheless, she says, and many Canadian cleantech companies are competing successfully in Europe and around the world in spite of their small size.

One big boost for the industry is Canada's emerging infrastructure for renewable energy, says Heaps. "We have hydro potential we're not tapping yet. We have wind potential we're not tapping yet. We have the ideal geography for pump storage. We have an emerging provincial regulatory environment, especially when you take a close look at British Columbia, Ontario, Nova Scotia, Newfoundland and definitely Quebec. Things are being set up to make it much easier to build renewable energy generation."

The potential certainly appears to exist for a big payoff. Rand says the global clean-energy technology sector will grow to between \$2 trillion and \$3 trillion by 2020. "If we grab just 2% of that market, we will have a clean energy economy that is larger than our automotive sector."

If political leaders would simply put a price on carbon, he adds, renewable energy would already be competing toe-to-toe with fossil fuels. "But the fossil fuel sector has been allowed to hide externalities and not pay for them. With billions of dollars a year globally in direct subsidies, the playing field is not yet balanced. But on an even playing field, where we counted these externalities, hydrocarbons would not be able to compete today."

AFFORDABLE SOLAR ENERGY: NOW AVAILABLE

Mention solar energy and many people raise standard arguments, especially that it's too expensive and efficiencies aren't high enough. Nic Morgan, vice-president of business development and co-founder of Toronto startup Morgan Solar, argues that these objections were valid up until five years ago.

Since then, he says, the market has completely shifted. "Solar can now compete on its own level footing with other energy sources. Natural gas is still cheap, and hydro is still cheaper most of the time. But when you look at the demand for energy during the day and throughout the year, as the price goes up, solar production tends to match that demand. And solar panels are generating power when the price of electricity is the highest."

One reason for the turnaround is innovation in the technologies. Morgan Solar's Sun Simba, for example, is a new solar panel design using an optical concentration system that concentrates sunlight energy from a large area into a tiny solar cell.

"The other thing that is starting to happen now is the banking and finance industries are starting to take solar more seriously," he says. "We're seeing that solar contracts are solid, and they're with reputable utilities and with government. They're guaranteed. Bankers and other financing groups are starting to see the opportunity and move into the marketplace." ■

