September 2019

Energy Efficiency
Alberta's Emerging Energy Source

Monica Curtis

Across North America, energy efficiency programs have been helping industry, businesses, institutions and households optimize energy use, delivering value to facility owners and managers, service providers, utilities, governments and communities through reduced emissions, lower costs for consumers and utilities, as well as increased economic activity.

> Efficiency – the measurable ability to avoid wasting materials, energy, effort, money and time in doing something or producing a desired result.
>
> Energy Efficiency – the use of energy in an optimum manner that achieves the same service that would have been achieved using a common, less efficient manner.

In October 2016, Alberta joined the ranks. A robust consultation process engaged hundreds of Albertans[1], including individuals, Indigenous communities, educators and students, utilities, businesses and municipal and industrial stakeholders. The outcome? The creation of Energy Efficiency Alberta, a not-for-profit provincial agency with a mandate to build awareness about energy use and its impacts; deliver programs and services that support development of energy efficiency and microgeneration; and promote, and foster further development of, the energy efficiency and renewable energy services industry.

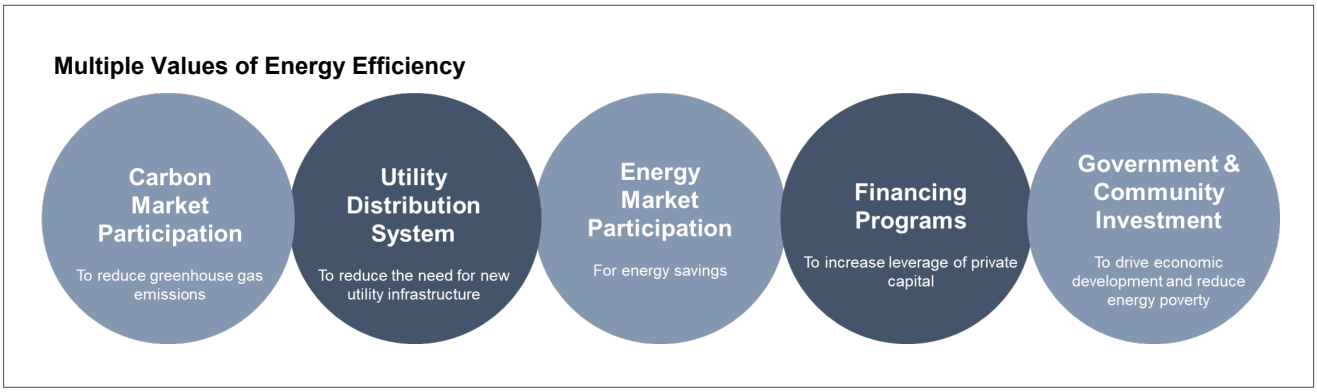
The pace in early days was frantic, as the agency was literally built while delivering programs and services to Albertans. A six-member Board of Directors, with support from a small group of Government of Alberta staff, contracted program design services and hired Monica Curtis as CEO. Programs launched in April 2017 with only two employees and four program implementation contractors. Within months, there were more than 50 staff and 100 contracted program delivery personnel who brought expertise from across Canada and the U.S. In the background, an industry-leading demand side management information and reporting system was built, ensuring energy savings and emission reductions driven by the agency's programs are real, measurable and verifiable.

[1] Alberta Energy Efficiency Advisory Panel. Getting it Right: A More Energy Efficient Alberta. October 2016

By year two, the agency had a dedicated team working to reduce Alberta's energy waste through education and awareness, technical training and certification; energy use, feasibility and design studies and re-commissioning; financial incentives on equipment and projects; and dedicated financing products to support investment in energy efficiency, renewable energy and clean technology.

What is the value of energy efficiency?

Energy efficiency provides multiple, proven values as indicated in the diagram below.



Reducing greenhouse gas emissions.

Alberta is already capitalizing on the carbon emission reduction value of energy efficiency. To date, Energy Efficiency Alberta's programming has avoided 5.7 million tonnes of greenhouse gas emissions[i] while also saving Albertans over $690 million over the life of the products purchased. This means Albertans are saving $84 for every tonne of carbon dioxide equivalent (CO_2e) reduced.

Reducing the need for new utility infrastructure.

The agency's program results validate that energy efficiency is the lowest cost energy resource available in Alberta at 2.7 cents per kWh of saved energy. Experience in multiple jurisdictions also demonstrates that locational energy efficiency and distributed generation can provide lower cost alternatives to distribution and transmission system expansion.

Market mechanism - Energy efficiency programs are currently the most common mechanism to pay project proponents for the services they provide to utility and carbon markets. The financial incentive delivered through the program is structured to reflect the value of the savings delivered to the utility system and the value of the carbon emission reductions.

Cost-effectiveness - Industry-standard economic tests are used to verify programs are designed to generate more value than they cost to deliver. Independent third-party verification of program results ensures that the value those financial incentives are paying project proponents for is real.

Increasing leverage of private capital.

Financial incentives not only pay project proponents for the value they deliver, they also provide leverage for private capital. During the first two years of operations Energy Efficiency Alberta's $101 million in incentive payments to 216,000 projects across Alberta, stimulated nearly $375 million in private-sector investment in those projects.

Efficiency financing is an emerging mechanism for monetizing the value of energy efficiency, renewable energy and clean technology. Cost-effective energy efficiency projects create utility bill and operating cost savings. Loan repayment

can be purposefully structured, so the repayment schedule matches the savings. This in turn, reduces the risk to the lender. Reducing risk reduces borrowing costs.

Driving economic development and reducing energy poverty.

There is an ever-growing list of societal benefits that come from investment in energy efficiency. Leading this list are economic development and local jobs, as well as increased business competitiveness and investor confidence.

Energy efficiency, renewable energy and clean technology investments are made in facilities and buildings in the local community. Financial incentives drive demand for these projects, and the jobs that do the work. It also reduces utility and operating costs, improving the productivity of local business and industry, and savings money for participating consumers and nonprofits.

Consumers demand and expect sustainability. So do investors. Environment, sustainability and governance (ESG) are becoming standard criteria for assessing investment options. A consistent investment in energy efficiency and clean technology innovation and adoption, increases competitiveness of businesses and industry.

Energy efficiency investment in affordable housing, limited income households, rural communities, nonprofit organizations and small business are used to address social issues such as poverty. And there is growing evidence that energy efficiency technologies can deliver health benefits from improved indoor air quality to the use of tunable high-efficiency lighting in treating diseases from sleep apnea to dementia.

How has Energy Efficiency Alberta's programming delivered that value for Alberta?

Energy Efficiency Alberta has invested about $218 million, with projects completed in every part in the province. For every dollar invested, Alberta is getting more than three back. That is $692 million in energy savings over the lifetime of the more than 15.5 million products.

Alberta is also seeing $850 million in economic growth with about 4,200 job-years[2] created. Businesses benefit from the market demand and related activity giving them a boost. Albertans are embracing the opportunities that come from energy efficiency.

[2] A job-year of employment is defined as full-time employment for one person for one year.

What is the opportunity for the future?

It's clear the impact of greater energy efficiency, even at this early stage, is being realized across Alberta. The impressive results – in the numbers and in the actions and experiences of program participants and service providers – demonstrate that demand for energy-efficient and microgeneration technology is growing.

And this is only the beginning.

In 2018, Energy Efficiency Alberta commissioned a technical study, *Alberta's Energy Efficiency Potential 2019-2038,*[3] to assess the potential for energy efficiency over the next 20 years. The study revealed that a sustained investment in cost-effective energy efficiency and small-scale renewable energy can deliver $1 billion per year in gross energy savings, 900 MW of peak electricity demand savings in 2038, and a 4.4 metric tonne reduction in CO_2e annually, saving Albertans $125 for every tonne reduced. Additionally, it shows Alberta's energy efficiency industry can meet about seven per cent of Alberta's electricity needs in the next 10 years.

These results are consistent with long-standing experience in the utility industry across North America, and clearly demonstrate the benefits and cost-savings to Albertans through to 2038 and beyond.

What comes next?

Consumers, prosumers[4], businesses and industry are demanding choice, and those choices include energy efficiency. Whether it's the 150,000 households that participated in the agency's initial residential programs; or the 3,000 oil and gas sites that signed up for the methane emission reduction program, energy efficiency programs have proven to be popular and well received.

Across Alberta, industry and community partnerships are emerging to drive adoption of high-efficient technologies and operating practices in the province. Each one of those projects happened because a person chose to invest. It is something consumers think about when they walk through a home improvement store. It is something businesses of all sizes look to when thinking about how they can tighten up costs. It is something that governments showcase when they profile their climate change mitigation and economic diversification efforts.

Technology and innovation have created solutions. Energy efficiency programs are generating demand for those solutions, broadening the market, and growing the industry.

[i] Figures are calculated since the inception of Energy Efficiency Alberta in April 2017 to March 31, 2019. Performance results are for energy savings and GHG reductions, calculated over the lifetime of the products purchased. Energy savings and greenhouse gas reduction figures have been reviewed and verified by a third party except for in-progress industrial and commercial custom projects.

[3] Navigant Consulting, Understanding Alberta's Energy Efficiency Potential 2019-2038, October 2018

[4] Prosumer – an energy consumer that also produces energy. Examples are an industrial site using combined heat and power system or a business with a rooftop solar installation.

About the Author

Monica Curtis has worked in energy efficiency for over 25 years, starting her career with Edmonton Power (currently EPCOR) and SaskPower. She served as the Executive Vice President Strategic Development and Energy Finance Solutions with a leader in efficiency programs based in Madison, Wisconsin where she oversaw the delivery of energy efficiency and efficiency finance programs and residential building science training for electric and natural gas utilities and governments.

Monica holds a Master of Business Administration from Athabasca University and a Bachelor of Human Ecology from the University of Manitoba. She is a member of the Executive Committee of the Municipal Climate Change Action Centre and the Steering Committee of the Energy Futures Lab. She also volunteers with Higher Landing, supporting former oil and gas professionals successfully transitioning to new career opportunities. Monica was recognized as a Compelling Calgarian by the Calgary Herald in 2019.