GETTING IT RIGHT: A MORE ENERGY EFFICIENT ALBERTA

Final Report of the Alberta Energy Efficiency Advisory Panel

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LETTER TO THE MINISTER

On behalf of the Energy Efficiency Advisory Panel, I wish to place on record our sincere thanks to the many hundreds of individuals and organizations that contributed to this report. Although responsibility for the analysis and the recommendations in this report belong solely with the Panel we could not have produced the report without the enthusiasm, expertise and dedication of individual Albertans, representatives of stakeholder groups and technical experts here in Alberta, across North America and as far as the United Kingdom.

The Panel was impressed by the very high quality of written submissions from individual Albertans and experts, the insights we obtained from the research we commissioned, and the knowledge we were able to obtain from case studies that were presented to us by international leaders in energy efficiency. All of these inputs to the work of the Panel are referenced in this report and they will remain accessible to the public on the project website.

We must also acknowledge the superb job done by the Climate Change Secretariat within your department who worked with great dedication throughout the engagement to support the Panel. Every request was met with speed, professionalism and integrity, on many occasions in the personal and family time of individuals concerned. Alberta is fortunate to have such dedicated and expert staff available to support the significant transitions that are underway in the provincial economy and in the rest of Canada. This is very important work and it is good to know that public servants in Alberta can help set a clear lead for the country in our commitment to delivering a lower carbon future for Canada.

As you know, our Panel comprised independent and knowledgeable individuals who worked transparently and within the terms of an agreed code of conduct that ensured no private external influence on our deliberations or our recommendations. I believe you can be proud of their deep commitment to Alberta and to the prospect of the province becoming an international leader on questions of energy efficiency and small-scale renewable energy in the future. Our recommendations are offered independently, unanimously and in good faith to your government, and through you, in due course to the Energy Efficiency Alberta agency. But we have been clear throughout that it will be up to your office to interpret our report and our recommendations, and that the agency must determine exactly which programs are launched and when.

There is no doubt, given the evidence presented to our Panel that Albertans who have studied the issues and who have become acquainted with the opportunities recognize that significant benefits can be generated for the province with effective, performance-based and accountable programming in energy efficiency, and in the design and development of smaller-scale renewable energy systems. These benefits are economic, social and environmental in nature, and most importantly, they all represent **excellent value for money** for Albertans.

We believe our recommendations will help set Energy Efficiency Alberta up for success. Based on expert advice we have received and analyzed, we have recommended four best practice programs for launch in early 2017 that will be relatively quick to establish, are low risk and accessible to all. But these are only the first steps of programming, which in due course, must be built on a much wider portfolio of targeted programs for energy efficiency and community energy systems based on detailed analysis and market testing, and in some cases, public policy changes. Whatever programming is designed and implemented over time, the success of Energy Efficiency Alberta and achieving maximum returns on investment will be very dependent on the promise of secure multi-year funding and the early establishment of a highly trusted brand.

It has been an enormous pleasure for me to serve as Chair of the Alberta Energy Efficiency Advisory Panel.

David Wheeler

A REDUCED CARBON FOOTPRINT: "DEFINITELY A SELLING FEATURE."

When Angela Cruickshank and family found their 1915 character home in Medicine Hat in 2001, its hardwood floors, high ceilings, moldings and trim captured their hearts. Its poor energy efficiency, confirmed in an energy audit, did not. So they sealed the house with new windows and doors; upgraded all the insulation; and installed LED lighting, programmable thermostats, low-flow faucets, and new appliances.

"Probably the most expensive thing we did was install solar panels on our garage roof," Angela says. "However we bought and installed the panels for one-half the regular price because, at the time, we could take advantage of both city and provincial funding programs."

She notes their electricity bills have been as low as $20 (mostly for the fixed costs of generation and distribution.) The Cruickshank family sold their character home this year and are upgrading another one. "The upgrades we had made were definitely a selling feature. The new owners told us so."

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EXECUTIVE SUMMARY

Through the Climate Leadership Plan, the Government of Alberta is taking steps to address the challenge of climate change. *Getting it Right: A More Energy Efficient Alberta* deals with one aspect of the government's plan: the creation of Energy Efficiency Alberta, a not-for-profit Crown Agency that will support energy efficiency programs and services for homes and businesses.

To help launch Energy Efficiency Alberta, the government struck the Energy Efficiency Advisory Panel. The Panel was asked to advise on:

- A long-term vision for the goals and outcomes for Energy Efficiency Alberta;
- First-stage energy efficiency and community energy system programs; and
- Initial education and outreach initiatives.

The Energy Efficiency Advisory Panel engaged with a wide cross-section of Albertans, including individuals, Indigenous communities, educators, students, co-operatives, and municipal and industry stakeholders, to determine the types of energy savings and community energy programs that Energy Efficiency Alberta can deliver in the short term. Hundreds participated in the engagement processes, both in person and online, and expressed a keen interest in participating in the transition to greater energy efficiency and cleaner energy in Alberta. The Panel also commissioned research, reviewed case studies, and consulted with experts from around the province and throughout North America. The following recommendations emerged from these activities:

1. VISION AND OUTCOMES

1.1 Recommended Vision: Energy Efficiency Alberta is a catalyst for saving money, creating jobs and reducing emissions – all at the same time.

By 2025, Energy Efficiency Alberta will play an ongoing, central role in achieving the following outcomes:

- Alberta will be a leader in the development and delivery of programs related to energy efficiency and community energy systems.
- Albertans will embrace energy efficiency and readily access new energy-saving technologies, whether at home, school or work.
- Energy solutions will be more affordable, clean and diverse; communities will be more self-reliant, and new jobs will be created.
- Alberta will be home to a flourishing energy efficiency services industry.

- Energy Efficiency Alberta's programs, information and incentives will be an important driver in ongoing market transformation.

The Panel also recognized that reaching all Albertans in a meaningful and effective way, as well as cultivating their interest and enthusiasm, will require the development of a wide portfolio of programs.

1.2 The Panel recommends Energy Efficiency Alberta build a diversified portfolio of programs that evolves in a timely fashion.

The Panel heard that different programs can be delivered most effectively by seeking out appropriate and diverse sources of collaboration. Thus:

1.3 The Panel recommends Energy Efficiency Alberta work with a variety of actors that are well-suited to be involved in the outreach and delivery of specific programs.

2. AGENCY OVERSIGHT

A robust oversight process is required to assess Energy Efficiency Alberta's performance against targets and to help design and optimize its activities.

2.1 The Panel recommends the Government of Alberta consider the following when designing Energy Efficiency Alberta's oversight:

- Set clear reporting, approval and evaluation procedures.
- Hire third-party evaluators to assess program impacts/performance and include stakeholders in the process.
- Clearly delineate the role of government (powers and limitations).
- Support the development of strong marketing and independent branding of the agency, in addition to marketing of programs.
- Ensure transparency of information and data with links to accountability and reporting mechanisms.

2.2 To measure success, the Panel recommends Energy Efficiency Alberta track outcomes against set performance targets and indicators for both individual programs and the agency's entire portfolio. The Panel also recommends Energy Efficiency Alberta set up a formal, rigorous process to assess and report on all performance targets and indicators.

3. FUNDING

To build lasting market transformation, Energy Efficiency Alberta needs assurance of long-term funding.

3.1 The Panel recommends the Government of Alberta make a commitment to provide ongoing funding that always ensures a minimum of a rolling five-year budget (similar to that of the Climate Leadership Plan). This is a minimum time horizon to enable effective planning cycles.

3.2 The Panel recommends the Government of Alberta establish a formal interdepartmental oversight committee to ensure the effective and complementary use of all funds contributing to energy efficiency and community renewable energy in the province (i.e., funds allocated to Energy Efficiency Alberta as well as other non-agency programs).

4. EDUCATION AND OUTREACH

Education and outreach initiatives must apply at multiple levels – from high-level knowledge about efficiency and renewable energy to specific program-level understanding to formal education.

4.1 The Panel recommends Energy Efficiency Alberta develop and deliver general outreach and information programs to create Agency awareness, promote efficiency program uptake and change consumer behaviours.

4.2 The Panel recommends Energy Efficiency Alberta benchmark its budgeting for education and outreach to that of other jurisdictions.

4.3 The Panel recommends an education advisory group be established with a broad representation of stakeholders including a significant number of student leaders.

4.4 The Panel recommends Energy Efficiency Alberta undertake capacity building activities that support a wide range of Albertans to successfully participate in the development, delivery and uptake of energy efficiency and community energy systems. It is also recommended this capacity building be undertaken in a way that leverages existing programs, industry groups, professional associations, post-secondary institutions and unions.

4.5 The Panel recommends Energy Efficiency Alberta identify a clear strategy for assuring itself that communities and community-based groups can develop or have access to appropriate expertise to participate fully in Energy Efficiency Alberta programming. This includes ensuring that resources are provided for such expertise, either directly or from other agencies.

4.6 The Panel recommends Energy Efficiency Alberta develop ongoing relationships with a wide range of groups to advance energy efficiency and community energy systems so that the agency can assure programs are relevant, effective and accessible. It is recommended these relationships build on the preliminary engagement work already completed by the Panel.

4.7 The Panel recommends Energy Efficiency Alberta form a collaborative relationship with municipalities to build on existing municipal initiatives, to leverage existing capacity and funds, and to coordinate the sharing of resources and data where possible.

4.8 The Panel recommends Energy Efficiency Alberta play a supporting role in the advancement of government and non-government policies and practices that support the uptake of energy efficiency and community energy systems in the province.

5. INITIAL PROGRAMMING

In keeping with the advice received from the public, stakeholders and experts, the Panel recommends the first four programs be easy to implement, be low risk, and have immediate, measurable gains to generate public interest and uptake. The recommended programs are:

5.1 Direct Install (DI) Program

In a Direct Install program, low-cost energy efficiency products are installed in homes at no cost to consumers. Installation is conducted by qualified agents who schedule home visits. Both single-family homes and multi-family dwellings are eligible for the program, as are all income levels. Examples[1] of direct install products include LED lighting, LED night lights, smart power bars, and low-flow showerheads and aerators.

5.2 Consumer Products Program

The Consumer Products program offers incentives (point-of-sale, online or mail-in) for purchase of energy efficient appliances and electronics that are independently certified to save energy without sacrificing features or functionality. It is recommended that incentives include appliances only at the top tier of energy efficiency to maximize effectiveness. Examples of eligible consumer products include: appliances and electronics, insulation and draft-proofing products, water heaters and products included in the Direct Install program.

1. These are examples only. Actual products available through the Direct Install program or any other identified program may vary.

5.3 Business, Non-Profit, Institutions (BNI) Incentives

Incentives assist non-residential buildings (including businesses, non-profits, institutions, and co-operatives) to reduce emissions and energy use. The program offers incentives on products and on installation of energy efficiency measures. The initial core offerings would be expanded over time. Examples of products eligible for BNI incentives include lighting, heating, ventilation, air-conditioning systems and water heating.

5.4 Small Solar Photovoltaic (PV) Program

The Small Solar Photovoltaic (PV) program provides financial incentives to support the installation of solar photovoltaic systems on buildings, including homes, businesses, and community structures, under Alberta's Micro-Generation Regulation. The program will reduce greenhouse gas emissions, generate electricity at the point-of-use, and ensure reliable electricity generation for over 25 years. The financial incentive will lower the cost of installing the solar system and help ensure net financial savings on electricity.

The Small Solar PV program builds on programs already available for farms, municipalities, and Indigenous communities. This new program extends the ability to participate in solar PV to the rest of the province.

6. FUTURE PROGRAMMING – ENERGY EFFICIENCY

The Panel's recommendations for initial programming have a broad reach, are quick and relatively easy to implement, and accessible to all Albertans. Over time, Energy Efficiency Alberta must conduct research to inform future program selection and target programs to specific audiences as needed.

6.1 The Panel recommends the development of additional programming for energy efficiency similar to that of other jurisdictions pending proper assessment for applicability in the Alberta market. It is also recommended that future programs be advanced as soon as possible to maximize the benefits of these programs for Albertans in the short term.

6.2 The Panel recommends Alberta-specific market research be undertaken to inform future program selection, design and evaluation. This includes the development of a comprehensive conservation potential review for the province to guide the development of a long-term energy efficiency and conservation strategy.

7. FUTURE PROGRAMMING – COMMUNITY ENERGY SYSTEMS

To maximize contributions to renewable energy targets:

7.1 The Panel recommends at the earliest time possible the Government of Alberta identify its targets for the scale of community-owned energy systems, together with financial mechanisms consistent with achieving these targets – for example, incentives to promote their adoption through the Alberta Electric System Operator or another agency. See also Recommendations 12.1 and 12.2.

Failure to act on this recommendation will delay or limit the development of community-owned energy systems in the province. Groups expressing interest in the development of co-operatives, Indigenous communities and others, need technical, financial and regulatory certainty if they are to participate in such programs and if Alberta is to generate a significant portion of its renewable electricity target from community-owned systems.

7.2 The Panel recommends Energy Efficiency Alberta develop a program to provide financial support for initial community-owned renewable energy systems and ongoing technical support over the long term.

7.3 The Panel recommends the Government of Alberta work with Energy Efficiency Alberta and all other relevant organizations to determine how best to support community-owned renewable energy systems over the long term, consistent with Recommendation 7.1.

7.4 While the development of regulatory enabling mechanisms is beyond the scope of Energy Efficiency Alberta, the Panel recommends the Government of Alberta continue efforts to enable community-owned, renewable energy systems either through updates to the existing Micro-Generation Regulation or through new regulations.

7.5 The Panel recommends Energy Efficiency Alberta develop an approach for supporting the advancement of a broad range of community energy systems that are able to contribute to the province's climate change objectives.

8. TRANSPORTATION

While transportation was not selected for initial incentive programs, the Panel recognized that it is important to raise awareness around ways to reduce fuel use in the short term and develop a transportation-related strategy in the long term.

8.1 The Panel recommends early outreach messaging by Energy Efficiency Alberta include information on no-cost and low-cost ways to save fuel. This includes consideration of driver training outreach for fleets in the municipal, education and non-profit sectors.

8.2 The Panel recommends Energy Efficiency Alberta develop a strategy for future programming related to transportation and how it will align with the efforts of other initiatives.

9. INDIGENOUS COMMUNITIES

Indigenous communities identified jurisdictional issues, both political and operational, as barriers to adoption of energy efficiency and community energy systems. They pointed to a need for multi-government collaboration with respect to First Nations and Métis settlement infrastructure and housing.

9.1 The Panel recommends the province works in collaboration with Indigenous Communities and the federal government to define best practices in applicable codes and standards for First Nations and Métis settlement housing, including those related to the Alberta Building Code and the National Energy Code.

9.2 The Panel recommends the provincial Department of Indigenous Relations and Energy Efficiency Alberta work with communities to ensure the provision of independent technical and financial capacity at the community level to undertake energy efficiency measures and develop community energy systems, thereby instilling a pride of ownership in these initiatives and contributing to employment and economic development and diversification.

9.3 The Panel recommends the provincial Department of Indigenous Relations work with Energy Efficiency Alberta to ensure intergovernmental and interagency collaboration so that Indigenous communities can efficiently and equitably access and leverage all available energy efficiency and renewable energy related complementary funding, including funding related to housing, land use and infrastructure planning.

9.4 The Panel recommends Energy Efficiency Alberta establish a formal Indigenous advisory mechanism with representation from the Departments of Education and Economic Development and Trade, as well as relevant technical fields. Representation from Indigenous and Northern Affairs Canada would also be important to the success of the advisory mechanism.

10. ACCESS TO DATA

Access to data is critical to the design and delivery of both energy efficiency and community energy systems.

10.1 The Panel recommends the Government of Alberta develop mechanisms, including the development of a regulation, to enable Energy Efficiency Alberta to employ user-specific energy consumption data to enhance program design and delivery while maintaining appropriate privacy controls.

10.2 The Panel recommends Alberta Energy also incorporate the issue of access to data within their regulatory review process.

11. FINANCING

Financing, along with information, incentives and regulations, is one of the primary tools to advancing energy efficiency and community energy systems.

11.1 The Panel recommends Energy Efficiency Alberta investigate opportunities for innovative financing for energy efficiency and community energy systems; and support them where appropriate.

12. INTEGRATION WITH UTILITIES

There is an important role for the utility system in the advancement of energy efficiency and community energy systems in the province.

12.1 The Panel recommends Alberta Energy consider creating an energy efficiency and community energy system mandate for its utility regulator and electric system operator.

12.2 The Panel recommends Service Alberta consider adding an energy efficiency and community energy system mandate for the Utilities Consumer Advocate.

13. LINKS TO INNOVATION, RESEARCH AND DEVELOPMENT AND COMMERCIALIZATION

Alberta may achieve competitive economic advantage through the research, development and commercialization of products and services that emerge from its efforts to transition to cleaner energy.

13.1 The Panel recommends Energy Efficiency Alberta be formally represented within the new innovation structures and initiatives being developed by the Government of Alberta under the mandate of the Climate Technology Task Force through explicit governance and operational links.

13.2 The Panel recommends Energy Efficiency Alberta support the recommendations of the Climate Technology Task Force when they emerge and that 'contribution to innovation' be used as a potential criterion for certain programming of the agency (e.g., where community level and other demonstration projects are deemed to meet the normal criteria for programming and where long-term economic benefits may accrue).

OTHER POLICIES AND INITIATIVES

In addition to its recommendations, the Panel has noted policies and initiatives that will have a bearing on Energy Efficiency Alberta's work, including potential changes to the Micro-Generation Regulation and anticipated changes to Alberta's Building Codes. A more detailed listing and discussion of these items is provided in the last section of the report.

3

INTRODUCTION

There is perhaps no greater challenge for our planet than climate change. Climate change demands a serious response from all of us, Albertans included. Will our response be effective, capable, and perhaps even exemplary? Do we have the strategies and tools to make it so?

Through the Alberta Climate Leadership Plan, the Government of Alberta is taking steps to address the challenge of climate change. It will protect the province's health, environment and economy by:

- Phasing out emissions from coal-generated electricity and developing more renewable energy;
- Implementing a new carbon levy on greenhouse gas emissions;
- Legislating a limit on oil sands emissions; and
- Introducing a new methane emissions reduction plan.

The legislation requires that the money raised by the carbon levy may "only be used for initiatives related to reducing emissions of greenhouse gases or supporting Alberta's ability to adapt to climate change, or to provide rebates or adjustments related to the carbon levy to consumers, businesses and communities, including adjustments in the form of tax credits or tax rate reductions."

This report supports the Government of Alberta's Climate Leadership Plan by recommending programs that can help Albertans achieve energy efficiency.

In Canada, every dollar spent on energy efficiency programs generates between $4 and $8 of gross domestic product.

Federal Minister of Environment and Climate Change Catherine McKenna

WHY AN ENERGY EFFICIENCY ADVISORY PANEL?

Alberta's Climate Leadership Plan highlights the development of energy efficiency and community energy systems as an important complementary policy to the carbon levy. To help launch Energy Efficiency Alberta, the government struck the Energy Efficiency Advisory Panel. The Panel was chaired by Dr. David Wheeler. Biographical information on all members is included in Appendix B.

The Panel was asked to advise on:

- A long-term vision for the goals and outcomes for Energy Efficiency Alberta;
- First-stage energy efficiency and community energy programs; and
- Initial education and outreach initiatives.

The Panel was also asked to engage with a cross-section of Albertans, including individuals, Indigenous communities, educators, students, co-operatives, municipalities, and industry stakeholders, to determine the types of energy savings and community energy programs that Energy Efficiency Alberta can deliver in the short term.

The Panel would like to thank all those who provided input during the engagement process. The input was wide ranging and, in many cases, of greater breadth or depth of detail than could be accommodated within the Panel's recommendations. The list of individuals and organizations contributing written submissions is provided in Appendix I; these submissions will continue to be available to the public on the project website and will of course be available to the new Agency when it is established. While the Panel's recommendations focus on programming and a high-level long-term vision for Energy Efficiency Alberta, it is expected that other input provided by Albertans will be used by Energy Efficiency Alberta to inform its work going forward.

Alberta's leadership on climate change has been recognized both internationally and federally, from President Obama's recognition of the Government of Alberta's Climate Leadership Plan, to the positive and collaborative relationships Alberta has with its federal partners. Energy Efficiency Alberta has an opportunity to leverage Alberta's partnerships with federal, business and non-profit organizations.

ABOUT ENERGY EFFICIENCY ALBERTA

The Government of Alberta, through the *Energy Efficiency Alberta Act*, established Energy Efficiency Alberta as a not-for-profit Crown Agency. It is expected the agency will be operational by the end of 2016, and programs will be launched in early 2017. The agency will:

- Raise awareness among consumers about energy use and its impact on the economy and environment.
- Promote, design and deliver energy efficiency and conservation programs; and develop community energy systems.
- Promote the development of an energy efficiency and community energy services industry.

DEFINING ENERGY EFFICIENCY AND COMMUNITY ENERGY SYSTEMS

Energy efficiency means using less energy to provide the same service, often through the use of new technologies or more efficient products – for example, LED lighting versus traditional incandescent bulbs. Similarly, a low-flow shower head will cut down on the use of energy (as well as conserve water) as there is less water to heat. Energy conservation (e.g., turning off lights that are not needed) can also be considered a form of energy efficiency and is also within the mandate of Energy Efficiency Alberta. The Panel recommends the agency include energy efficiency as it relates to electricity, heating, cooling and transportation fuels for all sectors paying the carbon levy.

Community energy systems can be defined in a variety of ways. The Panel recommends Energy Efficiency Alberta consider including the following definitions of community energy systems within its scope of operations:

- Renewable and low-emissions alternative electricity generation technologies less than five megawatts.
- Community-owned electricity generating systems (of any size) involving majority ownership by Indigenous communities, municipalities, institutions (including schools), co-operatives and other non-profits.
- Heating and/or cooling technologies considered renewable or alternative energy.

For all community energy systems, the Panel recommends the agency focus on technologies and applications that create a clear net reduction in greenhouse gas emissions compared with conventional ways of producing electricity, heat and/or cooling for sectors paying the carbon levy. Examples of these technologies include solar photovoltaic (PV); solar heating; wind power; geothermal heating, cooling or power; combined heat and power systems; and district heating and cooling.

Through energy efficiency and community energy systems, Albertans can choose to:

- Reduce greenhouse gas emissions
- Save on energy bills
- Innovate with new technologies and create jobs
- Increase the comfort and value of homes, businesses and public buildings
- Live with cleaner air and improved health

Appendix C provides a comprehensive list of common energy efficiency measures and community energy technologies and practices.

4

ENGAGEMENT

To obtain a well-rounded perspective on the challenges and opportunities related to energy efficiency and community energy systems, the Energy Efficiency Advisory Panel engaged with many individuals and stakeholders.

METHODOLOGY AND APPROACH

A general discussion document supported all engagements, and it was available both online and at engagement sessions. The engagement process gathered input in four areas:

- What are the barriers to implementing energy efficiency and community energy systems, and how do we overcome these barriers?
- What programming tools best promote energy efficiency and community energy systems?
- What are the best measures of success?
- What energy efficiency technologies and practices should Alberta adopt?

Input from the various engagements was summarized and posted online; these summaries will continue to be available to the public on the project website and will be available to the new Agency when it is established. Engagements were held during the months of July through October, and included:

- Five open houses held in Medicine Hat, Edmonton, Calgary, Lethbridge and Grande Prairie attended by approximately 500 people.
- Three full-day technical sessions designed to give stakeholders an opportunity to share their perspectives in these areas: buildings; program design and implementation; and community energy systems. The sessions were attended by stakeholders from the private and public sectors as well as think tanks and industry organizations.
- Municipal sessions were attended by 41 municipal representatives. Six municipalities presented overviews of their own energy efficiency and community energy systems.
- A separate youth and educator engagement session with 52 participants including teachers, students, school board trustees, non-governmental organizations, not-for-profit organizations and the private sector. The session consisted of several presentations including those made by three schools in Edmonton, Calgary and Fort McMurray, recognized as leaders in the adoption of energy efficiency and community energy systems.

- Six sessions with Indigenous communities in Edmonton, Fort McMurray, Calgary, Grande Prairie, Maskwacis and Enoch Cree Nation. Panel members also participated in conferences hosted by the Assembly of First Nations and the Technical Services Advisory Group to provide information on the engagement process and Energy Efficiency Alberta. In addition, the Panel received a submission from the Métis Nation of Alberta.
- Panel members also heard from members of the non-profit and voluntary sector on the unique challenges and opportunities of the sector.

WHAT WE HEARD

A significant majority of those who provided input to the Panel – both in engagement sessions and online – did so with a keen interest in taking action to reduce their carbon footprints. They shared a wide array of opinions, ideas and concerns, and all have been considered in the development of this report. A common theme was that "we are all in this together" and it will take a united effort to capture the full potential of energy efficiency and community energy systems in the province.

Barriers

Participants in all sessions cited barriers to adoption of energy efficiency and community energy systems. Lack of awareness is considered a barrier, as is the perception that some systems have high startup costs and uncertainty regarding returns on investment. Participants in the public sessions said the implications of daily energy use, positive and negative, are not easily understood. Technical knowledge and expertise are not readily available, and many people do not know where or how to begin to use less energy.

Participants in public sessions also said the way the electricity grid is currently structured is an impediment to getting community energy systems started. A lack of enabling regulations, few or inadequate incentives, and issues related to split incentives[2] were cited as additional barriers.

> *Making people aware of what is available is a good start. Maybe you can have people who come to your home to show you where you are losing or wasting energy.*
>
> *– Public comment (online submission)*

Technical experts identified additional barriers, including:

- Building codes and standards that have not promoted energy efficiency.
- The need to verify energy savings.
- Uncertain program funding over time (key to Energy Efficiency Alberta's ability to create savings over the long term).
- The need to translate complex issues of energy efficiency and community energy systems into language that is compelling for consumers.

> *Many people want to buy into the fundamental change in our society that is underway; they want to help to address the climate change issue. They simply don't know how.*
>
> *– Alberta Geothermal Energy Association (online submission)*

Participants in both the technical and municipal sessions expressed concerns about lack of data – how, where and when energy is used and by whom – for developing proper indicators to measure energy efficiency.

Many small municipalities said they have neither the technical expertise nor the money to identify opportunities for energy efficiency. They expressed interest in information sharing and the development of a clearinghouse for education and tools related to energy efficiency and community energy systems.

2. Split incentives are a barrier to the deployment of energy efficiency measures in buildings. Split incentives occur when those responsible for paying energy bills (the tenant) are not the same entity as those making the capital investment decisions (the landlord or building owner). In these circumstances, the landlord may not be inclined to make the necessary upgrades to building services when the benefits associated with the resulting energy savings accrue to the tenant.

Keep the programs simple. Choose projects that will have the greatest certain impact on energy efficiency. Grant funding should be upfront and part of a long-term strategy. That way municipalities can plan and budget for their share of costs.

– Municipal representative comment (Municipalities technical session)

Students, trustees and educators identified three main barriers to learning more about energy efficiency in school:

- Teachers need professional development to gain a better understanding of the benefits of conserving and producing energy.
- There is not enough time within the curriculum to explore additional subject matter.
- Study related to energy efficiency would probably involve field trips and projects; school boards are increasingly sensitive to costs and potential liabilities.

It's important to provide support – financial, resources, expertise, to enable the exceptional on-the-ground work being done by schools and school districts to move toward a sustainable future.

– Educator comment (Youth and educator engagement session)

Indigenous communities expressed profound concerns over climate change and its impact on the environment. While they support the adoption of energy efficiency and community energy systems, they identified barriers, many in keeping with what other groups reported, and some unique to their communities. Indigenous communities identified jurisdictional issues, both political and operational, as barriers to adoption of energy efficiency and community energy systems. They pointed to a need for i) dedicated in-community independent expertise for equitably accessing and delivering programming; and ii) intergovernmental/interagency collaboration with respect to improving First Nations and Métis Settlement infrastructure and housing by ensuring clear channels to coordinated funding opportunities.

The non-profit and voluntary sector identified a strong need to update aging infrastructure to be more functional and energy efficient. However, they pointed to limited access to capital for upfront investment as a barrier to doing this.

Programming Tools and Options

All participants said education and outreach are critical to the adoption of energy efficiency and community energy systems. Greater energy literacy, including a deeper understanding of one's own energy use, will lead to greater program participation in the short term and, ultimately, market transformation. And while reducing greenhouse gas emissions is a priority, participants said awareness programs must also focus on cost savings and other benefits.

Much of the discussion in the public realm has been to lower emissions for the sake of the environment. The 'environment' can be a very abstract idea; some people relate that term to glaciers and waterways, others to their personal garden and family pet. More effort is needed to educate the public on the benefits of well-designed homes and commercial buildings.

– Public comment (online submission)

Public participants expressed interest in solar energy (both for individuals and community systems), and energy efficiency tools like thermostats, LEDs and energy audits.

They also recommended the use of incentives to increase adoption of energy efficiency and community energy systems. Incentives could take multiple forms, including direct grants or loans, indirect tax breaks or rebates.

Those participating in the technical sessions recommended implementing standards, regulations and other policy tools to maximize efficiency. Examples included performance standards for equipment and appliances, and enhanced building codes. Distribution utilities indicated their support for energy efficiency programs, and cited the need to account for them properly within the utility regulatory system. There was a range of perspectives on how the utilities could support outreach and delivery of energy efficiency programming.

Because cost was cited as a barrier to the adoption of community energy systems like solar power, technical experts suggested the use of a long-term revenue certainty and financing to drive uptake of these systems.

Municipalities highlighted the unique role they can play as local governments to help deliver energy efficiency and community energy systems programming. See also online submissions from the City of Medicine Hat, the Alberta Urban Municipalities Association and the Alberta Association of Municipal Districts and Counties. Many municipalities across the province have been demonstrating leadership on energy efficiency and climate change.

> *Many municipalities have implemented successful energy efficiency and community energy programs and can assist in promoting and delivering programs at the local level.*
>
> *– Alberta Urban Municipalities Association (online submission)*

To further enable collaboration, municipal representatives recommended provincial programming be coordinated with that of municipalities. They recommended developing a roadmap to coordinate programs, and reduce redundancies and overlaps. They suggested a clear mandate for municipalities, perhaps as a program delivery agent. They also recommended resources be developed and shared with municipalities as a means of enabling those communities with fewer resources to also play a meaningful role.

> *Funding and resource supports dedicated to empower municipalities in implementing policy and operational improvements will benefit local communities and strengthen Alberta's action taken to address climate change impacts. To increase capacity, municipalities would benefit from having additional resources available in the form of staff support, predeveloped toolkits, and access to approved vendors to implement energy efficiency improvements.*
>
> *– Alberta Association of Municipal Districts and Counties (online submission)*

Students and educators said energy efficiency should be part of the core curriculum, and professional development on this topic should be offered to teachers. They also recommended the creation of an energy efficiency expert group to assist with building energy efficiency capacity in school districts.

> *This work is important. Short term costs are of minimal consequence to the long-term integrity of humanity's legacy . . . Education is the way to create a social movement of environmental responsibility.*
>
> *– Educator comment (Youth and educator engagement session)*

Indigenous communities said programming must be unique to individual community needs and sustainable over the long term. Additionally, programming should address issues where energy costs are not associated with home occupants, and must ensure the provision of education that supports energy efficiency and promotes pride in ownership of infrastructure and facilities. Indigenous representatives identified the importance of engaging elders and youth in discussions that encourage support for change at the community level.

The not-for-profit and voluntary sector said capacity building and support are necessary to assist the sector to participate in programming. See for example, an online submission from the Calgary Chamber of Voluntary Organizations at climate.alberta.ca.

Regarding transportation, feedback suggested the use of rebates for alternate fuel vehicles, electric vehicles, zero or low emissions vehicles, hybrid vehicles and fueling or charging stations.

> *Direct partnership between Energy Efficiency Alberta and municipalities will be required for activities such as installing charging stations for electric vehicles on municipal rights-of-ways. Adjustments to municipal policies and bylaws may be required to successfully enable activities that reduce emissions such as the installation of solar panels.*
>
> *– Alberta Urban Municipalities Association (online submission)*

Defining Success

Participants said that, to achieve success, Energy Efficiency Alberta must first and foremost be recognized as an "honest broker" – a credible, timely, and reliable source of information and programming. Participants said engaging diverse stakeholders on an ongoing basis will help build that reputation, provide important input that informs the Agency's decision-making, and improve and modify programs to meet consumer needs.

Public participants and technical experts identified the following key success measures:

- Measurable greenhouse gas reductions.
- Energy and cost savings.
- Program uptake and participation.
- Widespread benchmarking and reporting of energy use reductions.
- Number of jobs created provincially and regionally.
- Degree of awareness of energy efficiency and community energy systems.

- Adoption rate of new and effective technologies.
- Access and reach of programs into all sectors and regions of the province, including low-income, Indigenous and non-profits.

Public members also cited the number of households participating in programs, more renewable energy on the Alberta electricity grid, and reduced vehicle use as evidence of success.

Technical experts recommended the use of enhanced building codes and standards[3] and long-term program funding as contributors to success. Undertaking an Alberta-specific study on conservation potential was discussed as an important part of selecting and designing programs.

Municipal and education stakeholders agreed with the success measures mentioned above. Municipalities reinforced the need to ensure programs and information is relevant and available to rural municipalities, as well as urban ones.

Success may be defined differently for each First Nation or Métis Settlement depending on variables such as location, economic factors and the views of leaders, as well as the need to recognize different Treaty and Settlement agreements regarding territories. Success for Indigenous communities will be the development and adoption of broad standards for improved energy infrastructure and housing for First Nations and or Métis Settlements in order that they may equitably obtain the benefits of energy efficiency and community renewables.

In all cases, participants said program results must be measured and verified, as transparency and accountability are important for program performance and public buy-in.

> ***Program outcomes need to consider several factors: cost-effectiveness, socioeconomic impacts, and regional diversity. Simply focusing on cost-effectiveness will isolate certain stakeholder groups, including lower income Albertans.***
>
> ***– Technical expert (Program and Design technical session)***

Program Design Considerations

In determining which technologies and practices should be included in potential programs, public participants cited cost, and cost savings as important factors, particularly costs related to start-up and technology, and cost savings resulting from the implementation of energy efficiency and community energy savings.

3. It should be noted that some of the recommended programming options and technologies fall within the mandate of other areas of government, and not the Agency itself. For example, the provincial government has already committed to timely adoption of the National Building Codes when they are updated.

As such, participants suggested early programs be easy to implement, be low risk, and have immediate, measurable gains to generate public interest. They also suggested short-term programs focus on financial incentives for energy efficiency, while long-term programs focus on enabling cultural shifts and transformation to the efficient use of cleaner, renewable sources of energy. In addition to being cost-effective and driving change, participants said Agency programs should:

- Be easy to access,
- Build on existing programs, where possible,
- Allow for flexibility,
- Reward collaboration, and
- Be described in plain language.

When discussing technology, respondents said ease of use is key. Several people stated that programs should be "technology neutral" and based on greenhouse gas reduction performance. There was considerable public support for community and small-scale system development. It was also noted that certain programs may not always be the most cost-effective, but they may have important socio-economic outcomes (e.g., support for low-income households). Both public and technical experts identified programs and products to advance energy efficiency measures:

- Energy audits,
- Programmable thermostats, low-flow faucets and kits for low-income homes,
- Retail incentives to influence behaviours,
- Building assessments and retrofits,
- Improved commercial lighting, building tune-ups and assessments,
- New home construction ('beyond code'),
- Improved insulation and energy efficient furnaces,
- Energy assessments on farms, and
- The presence of on-site energy managers.

Technical experts also suggested making data available to consumers, including data that allows consumers to compare their energy use to that of others as a way of influencing behaviour related to energy consumption.

Similarly, the public and technical experts identified programs and focus areas to advance the adoption of community energy in Alberta:

- Small-scale renewable electricity initiatives should focus on building-associated solar PV due to the accessibility and reliability of the technology.
- For proven technologies, funding or long-term revenue certainty is necessary to increase adoption rates.
- Financing tools are required for larger systems with significant up-front capital costs.
- There is a need to improve regulatory ease of installing larger systems.
- Newer technologies and opportunities could be explored and could be informed by pilot projects in Alberta and other jurisdictions.

In the longer term, those involved with developing community energy systems – co-operatives, distribution companies, Indigenous communities, municipalities, businesses and others – need to be supported through initiatives such as:

- Some form of long-term revenue certainty.
- Examining opportunities with legacy assets and unused land for generation.
- Using pilots/demonstration projects to experiment with technologies and programs.
- Looking at the results of pilot/demonstration projects in other jurisdictions.
- Designing program roadmaps for different sectors.

To facilitate community small-scale renewable generation, the need exists for a mechanism that allows communities and co-operatives, as well as individual entities, to pursue the benefits of distributed generation through renewable energy investment.

– Comment from Community and Co-operative Owned Renewable program (online submission)

Municipalities reinforced the need for collaboration between the province and themselves in the delivery of programs, as many municipalities already have programs to support energy efficiency and community energy systems.

Students and educators noted there are good examples of innovative energy solutions within the school system, and suggested Energy Efficiency Alberta may want to work with the education system to promote greater learning.

Indigenous programming may need to address foundational community infrastructure needs, including housing, prior to launching programming that will deliver measurable savings or greenhouse gas reductions.

The non-profit and voluntary sector suggested it could work with Energy Efficiency Alberta on the development and hosting of new programs. They suggested partnership financing models should be explored as should economies of scale for the whole sector.

With one of the world's largest network of cooperatively owned rural utilities, Alberta co-operatives can play a significant role in our renewable energy future

– Co-operative Renewable Energy Coalition (online submission)

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OTHER SOURCES OF INFORMATION

CASE STUDIES

Case studies were requested and reviewed by the Panel, including those of Nova Scotia's EfficiencyOne, Energy Trust of Oregon, and the Climate Change and Emissions Management Corporation, all of whom have direct experience in the energy efficiency or community energy field. A full list of the organizations requested to present case studies is attached in Appendix E.

These are some of the most important things the Panel learned from the case studies:

Consumer education is a significant factor in achieving program participation and overall success; it should not be underestimated.

Ongoing stakeholder engagement will be the foundation of future partnerships and ongoing interest in the Agency's efforts.

> *Cultivating valuable partnerships with contractors, engineers, architects, realtors and other professionals is important and it grows local businesses.*
>
> *– Energy Trust of Oregon*

Not all energy efficiency programs are accessible to all consumers and, as a result, most jurisdictions have implemented programs that specifically target low-income households.

Stability of funding and government support is key to the long-term viability of Energy Efficiency Alberta. The Agency must be further supported by committed, talented and innovative staff.

A balanced and diversified portfolio of programs is essential. Any single program has strengths and weaknesses that need to be complemented by other program approaches to magnify their overall effectiveness.

About 255,000 families in Alberta live in energy poverty—that is roughly one in six households.[4] These families are unable to maintain 'adequate' energy services – those safeguarding health and well-being – at reasonable cost. They often face difficult choices between competing necessities such as energy, water, food and clothing. Improved efficiency is an important way of alleviating these challenges.

4. All One Sky Foundation

Projects must accomplish multiple objectives (e.g., emissions reductions, fuel savings, other environmental and economic benefits) to interest consumers. Results must be measured and validated to ensure the Agency is delivering programs that optimize these objectives.

> *In the past five years alone, the energy efficiency industry in Nova Scotia has grown to employ more than 1,000 people. These are meaningful, full-time jobs in both urban and rural areas of the province.*
>
> *– EfficiencyOne (case study)*

Investigating new measures or program activities by testing and evaluating prior to a full-scale offering can increase both internal and external understanding, help to clarify and coordinate roles and prioritize opportunities.

Information sharing is critical to the advancement of new technologies and programs.

Partnering with established businesses can provide access to large networks of existing customers, and connect customers to relevant programs and services.

Energy Efficiency Alberta must have a good understanding of clients' needs in the different sectors and target programs to support them.

ADVICE ON PROGRAM DESIGN

Throughout its deliberations, the Panel received technical advice from Dunsky Energy Consulting. See appendices H(a, c, d and e). The company provided an analysis of a range of program options related to:

- Residential programming, including but not limited to: energy audits, lighting, direct install programs, new home construction, consumer products, and solar PV systems.
- Commercial, institutional and industrial programming: energy efficiency opportunities for small businesses, non-profits, and medium-sized industrial facilities.
- Cross-sectoral programming: energy efficiency and community energy system opportunities for communities including Indigenous communities, low-income households, and the transportation sector.

ADVICE ON OUTREACH ACTIVITIES

The Panel asked EfficiencyOne[5] of Nova Scotia to provide advice for developing a robust marketing and communications strategy that employs a variety of tools, including actions to:

- Promote the cost savings and environmental benefits of implementing energy efficiency.
- Position Energy Efficiency Alberta as the 'go to' energy efficiency agency in the province, a reliable source of information and programming.
- Seek out and form strategic partnerships.
- Reinforce the message of energy efficiency by celebrating what Albertans are already doing.

See Appendix H(f).

COORDINATION WITH OTHER GOVERNMENT DEPARTMENTS

The Panel also reviewed other government programs and initiatives that have a bearing on energy efficiency including the Green Infrastructure Program, renewal of the Micro-Generation Regulation, Growing Forward 2 (Appendix E, Alberta Agriculture and Forestry case study) and government support for the Municipal Climate Change Action Centre. Appendix E contains a list of energy efficiency programs operating in Alberta.

5. EfficiencyOne is located in Nova Scotia and delivers efficiency programs and services to a variety of clients including governments, public institutions and industry.

SOLAR POWER – A PRIME RESOURCE FOR ALBERTA

Theo and Esther Slingerland have owned their farm and corn maze for over 20 years and recently decided to make it even greener by taking advantage of southern Alberta's sunshine.

The couple approached a local solar company in May and the solar panels were installed on the roof and south side of their barn. Since then, the farm and the two houses on the Slingerland's property have been completely self-sufficient.

"In the summer we had enough to power everything . . . freezers, fridges, microwaves, fans and all the things we use on the farm," said Theo. "For years the price was a little out of range. In the last few years the price for solar panels has come down and there is a little bit of funding from the government."

With the help of the provincial government's Emissions Management Fund and the Growing Forward 2 program, the Slingerlands installed 30 solar panels at 250 watts each.

Supporters believe the expansion of solar energy in Alberta not only allows for a greener future but will also create jobs, in addition to electricity and revenue in the community.

- Excerpt from Global News Report, Sept. 12, 2016

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RECOMMENDATIONS

The following recommendations build on input received from the public and stakeholders, a review of research and best practices and the deliberations of the Energy Efficiency Advisory Panel.

The Panel would again like to thank all those who provided input during the engagement process. The input was wide-ranging and, in many cases, of greater breadth or depth of detail than the ultimate Panel recommendations. While the Panel's recommendations focus on initial programming and a high-level long-term vision for Energy Efficiency Alberta, it is expected that other input provided will be used by the Agency to inform its work going forward.

1. A VISION FOR ENERGY EFFICIENCY ALBERTA

Energy Efficiency Alberta is the first agency of its kind in the province. Expectations for the agency are high – not only will its actions contribute to the government's climate change goals for 2030, it will also serve as a model for engagement with Albertans, stakeholders and Indigenous communities.

As previously noted, one of the Panel's duties was to recommend a long-term vision and outcomes for Energy Efficiency Alberta. The Panel recognizes the following vision may be modified once the Agency begins operation:

1.1 Energy Efficiency Alberta is a catalyst for saving money, creating jobs and reducing emissions – all at the same time.

By 2025, Energy Efficiency Alberta will play an ongoing, central role in achieving the following outcomes:

- Alberta will be a leader in the development and delivery of programs related to energy efficiency and community energy systems.
- Albertans will embrace energy efficiency and readily access new energy-saving technologies, whether at home, school or work.
- Energy solutions will be more affordable, clean and diverse; communities will be more self-reliant and new jobs will be created.
- Alberta will be home to a flourishing energy efficiency services industry.
- Energy Efficiency Alberta's programs, information and incentives will be an important driver in ongoing market transformation.

Creating a culture of efficiency in Alberta is a long-term vision, however, the Panel has identified short- term success factors that will set the Agency up for success. The Panel has identified a number of key areas that will support successful operations in the Agency's early days:

- Ease of programming – programming that is easily accessible to all Albertans.
- Broad outreach – raising awareness of recommended actions, their benefits and supporting programs is critical to driving participation.
- Honest broker – develop the Energy Efficiency Alberta brand as an independent, trusted source of information and support.
- Human capital – developing local capacity to deliver the services needed to undertake energy efficiency upgrades and develop local energy systems.
- Performance based – delivering cost-effective energy savings and reducing greenhouse gas emissions.
- Accountability – using third-party evaluators and transparent processes to demonstrate whether Energy Efficiency Alberta is delivering tangible benefits for Albertans.

Achieving short-term success in these areas will help Energy Efficiency Alberta make the case for long-term, stable funding so that it can continue to deliver solid returns on investment for Albertans.

THE ROLE OF RENEWABLES

Thirty per cent of the province's electricity will come from renewable sources such as wind, hydro and solar by 2030. In addition to reducing greenhouse gas emissions, the government anticipates this target will generate $10.5 billion in new investment and 7,200 new jobs.

Agency Model

The Energy Efficiency Advisory Panel commissioned research on the various models for the delivery of energy efficiency programs by independent agencies, government and utilities, before confirming the best practice model chosen by the Government of Alberta [e.g., an arms-length, not-for-profit agency, see Appendix H(b)].

Given Alberta's market consisting of generators, distributors, and retailers, Energy Efficiency Alberta is best positioned to coordinate programs across all sectors and fuel types. In fact, this is a model that other Canadian jurisdictions have already adopted or are now moving towards (such as, Manitoba, Quebec). The Panel also recognizes that other

entities such as utilities, product and service providers, and municipalities can play valuable roles in outreach and program delivery. See, for example, the online submission from EPCOR at climate.alberta.ca.

A Portfolio of Programs for the Long Term

The focus of this document is on recommendations for programs that can be launched in early 2017. However, these programs are only the beginning. Reaching all Albertans in a meaningful and effective way, as well as cultivating their interest and enthusiasm, will require the development of a wide portfolio of programs:

- Other jurisdictions commonly present complementary programs that target different audiences (e.g., homeowners, renters and landlords, low-income households, multi-family buildings, co-operatives, Indigenous communities, small and medium-sized businesses, large businesses, non-profit organizations, institutions and the transportation sector).
- They also use different approaches (e.g., general information, user-specific benchmarking, incentives, financing, training, engaging stakeholders, industry capacity building, supportive regulatory changes and long-term market transformation).

1.2 The Panel recommends Energy Efficiency Alberta build a diversified portfolio of programs that evolves in a timely fashion.

It was also identified during the Panel's deliberations that a typical approach to delivering programs is to work with other organizations to maximize program effectiveness. This can take the form of hiring organizations through a competitive procurement process or identifying organizations or sectors to work with that are particularly well-suited to engage a target audience (e.g., product and energy retailers or wholesalers, municipalities and institutions, associations, other existing professional, organizational or personal networks).

1.3 The Panel recommends Energy Efficiency Alberta work with a variety of actors that are well-suited to be involved in the outreach and delivery of specific programs.

> *Alberta should actively seek to benefit from the experience of other jurisdictions which have decades of experience with demand-side management.*
>
> *– ATCO (online submission)*

2. AGENCY OVERSIGHT

A robust oversight process is required to assess the performance of Energy Efficiency Alberta against certain targets and to help design and optimize its activities.

2.1 The Panel recommends the Government of Alberta consider the following when designing Agency oversight:

- Set clear reporting, approval and evaluation procedures.
- Hire third-party evaluators to assess program impacts/performance, and include stakeholders in the process.
- Clearly delineate the role of government (powers and limitations).
- Support the development of strong marketing and independent branding of Energy Efficiency Alberta, in addition to marketing of programs.
- Ensure transparency of information and data with links to accountability and reporting mechanisms.

See also Appendix H(c). With a robust oversight process in place, the next question becomes: What is success?

2.2 The Panel recommends Energy Efficiency Alberta track outcomes against set performance targets and indicators for both individual programs and the Agency's entire portfolio. The Panel also recommends Energy Efficiency Alberta set up a formal, rigorous process to assess and report on all performance targets and indicators.

Examples of potential performance targets and indicators include energy savings, cost savings, greenhouse gas reductions, cost-effectiveness, job creation, market transformation metrics (e.g., through contributions to innovation) and regional and socioeconomic impact and reach of programs. For example, see Appendix H(c).

It is recognized that a thorough assessment of program potential will need to be undertaken before these targets and indicators are selected and set.

3. FUNDING

Based on previous experience with energy efficiency and community energy system programs in Alberta and in other jurisdictions, it has been identified that stable long-term funding is essential to create cost-effective and lasting results. For example, see Appendix H(d). This will give the Agency the certainty it needs to plan and implement effective programming and in turn, it will demonstrate a clear commitment to those individuals and organizations that participate in Agency programs and activities. Other organizations will be able to confidently plan for energy efficiency and community energy systems in their own operations, including taking advantage of opportunities, collaborating in programming, or hiring and training staff to deliver energy efficiency and community energy system services.

3.1 To support the long-term operation of Energy Efficiency Alberta, the Panel recommends the Government of Alberta make a commitment to provide ongoing funding that always ensures a minimum of a rolling five-year budget (similar to the Climate Leadership Plan budget). This is a minimum time horizon to enable effective planning cycles.

The Agency and all parts of the provincial government should work collaboratively to establish budget levels consistent with outcomes, performance and the long-term vision for energy efficiency and community energy in Alberta.

3.2 The Panel recommends the Government of Alberta establish a formal interdepartmental oversight committee to ensure the effective and complementary use of all funds contributing to energy efficiency and community renewable energy in the province (e.g., funds allocated to the Agency as well as other non-Agency programs).

This committee (or another complementary mechanism established by the Agency) should ensure opportunities for leveraging investments from all orders of government and the private sector are constantly reviewed and pursued. It should also ensure consumers and communities can access multiple sources of available funding for efficiency and community energy schemes where possible.

4. EDUCATION AND OUTREACH

In engagement sessions, the Panel heard that education and outreach are vital to effective programming and larger market transformation. They are critical to everything the Agency does, whether building awareness and energy literacy or developing and delivering programs. Education and outreach initiatives must apply at multiple levels – from high-level knowledge about efficiency and renewable energy to specific program-level understanding to formal education.

> Investment in creating awareness has helped build a culture of energy efficiency in Nova Scotia. While providing rebates and other incentives is critical to help Nova Scotians take action on energy efficiency, it must always be balanced with robust investment in marketing and outreach initiatives that help educate and inspire Nova Scotians to embrace energy efficiency as a new way of thinking.

Broad Outreach

Albertans said they want to be part of the transition to a more energy efficient province, but they need to know how to take action. Energy Efficiency Alberta must increase awareness of energy efficiency and community renewables if it wants Albertans to access its programs. Communications should be three-fold:

- Energy Efficiency Alberta must make Albertans aware of its existence as a central source of information, programming, and support.
- To encourage long-term change, Energy Efficiency Alberta must communicate the benefits of energy efficiency as they relate to cost savings, job creation, economic resiliency, and reduction in greenhouse gas emissions.
- Energy Efficiency Alberta must employ both general and program-specific messaging to motivate consumers to adopt energy efficiency, and encourage them to sign up for Agency programs.

4.1 The Panel recommends Energy Efficiency Alberta develop and deliver general outreach and information programs to create Agency awareness, promote efficiency program uptake and change consumer behaviours.

The Panel recognizes these efforts will cost money. As such, a percentage of the Agency's funding must be dedicated to education and outreach.

4.2 The Panel recommends Energy Efficiency Alberta benchmark its budgeting for education and outreach with that of other jurisdictions.

Eventually, Energy Efficiency Alberta will need to report publicly on its performance and energy savings. It is suggested this reporting also include information on cost savings, job creation, emissions reductions and capacity building, as well as case studies or stories that demonstrate the contributions energy efficiency and community energy systems are making to the lives of Albertans.

Formal Education (K-12, post-secondary)

Case studies affirmed consumer education is the biggest factor in achieving success with energy efficiency programs. Extending this approach to the formal education system itself will arm future generations with a deeper understanding of energy efficiency and its benefits, and it will make them ambassadors for responsible energy use.

These initiatives will require the support of both Alberta Education and school boards, trustees, teachers and, most importantly, students and youth. For example, see online submissions from the Alberta Council for Environmental Education[6] and from the Calgary Board of Education. Areas for collaboration that have already been identified include:

- Alberta Education's review of the school curriculum, currently underway.
- Innovative learning and student demonstration projects.
- Energy-saving initiatives within school infrastructure.

> *Schools can also show climate leadership by reducing their consumption of resources. We think there should be a focus on making a greener school or a way in naturalizing it. We believe that small everyday changes make significant impacts.*
>
> *– Supporting Climate Leadership in Alberta Schools: Recommendations by students for Alberta's Educational Leaders, June 2016*

6. A particularly relevant contribution in this area was published by the Centre for Global Education and released in June 2016: *Supporting Climate Leadership in Alberta Schools: Recommendations by students for Alberta's Educational Leaders.*

4.3 The Panel recommends an education advisory group be established with a broad representation of stakeholders including a significant number of student leaders.

The group would work to help identify opportunities for climate leadership at all levels of Alberta's education system.

Capacity Building (professional, post-secondary, organizational)

A goal of Energy Efficiency Alberta is to increase the capacity of the energy efficiency and community energy services industry alongside capacity development for individuals and organizations. Capacity development can take the form of post-secondary education and training, professional development and training activities, conferences and other events, and direct outreach that is customized to a specific audience. These provide excellent opportunities for a wide range of Albertans to participate in the advancement of energy efficiency and community energy systems as part of their job, as a new career or as a consumer or volunteer.

4.4 The Panel recommends Energy Efficiency Alberta undertakes capacity building activities that support a wide range of Albertans to successfully participate in the development, delivery and uptake of energy efficiency and community energy systems. It is also recommended that this capacity building be undertaken in a way that leverages existing programs, industry groups, professional associations, post-secondary institutions and unions.

It should be noted that capacity development activities should be targeted not only at the energy efficiency and community energy industries, but also at related services that provide support. These services include but are not limited to: technical, financial, insurance, regulatory, human resources and communications.

Given the experience of other jurisdictions, it is also important that Energy Efficiency Alberta identify ways that communities and community-based groups can i) develop capacity and, or ii) access specific expertise to participate fully in energy efficiency and community energy systems. For example, see online submission from the Pembina Foundation. This may include the development of technical expertise within communities or associations of communities, the embedding of temporary expertise within organizations on secondment from Energy Efficiency Alberta or other bodies, or simply the provision of accessible technical, environmental, regulatory or financial advice from an authoritative and independent source. This point was raised by small municipalities, Indigenous communities, co-operatives, non-profits and others.

4.5 The Panel recommends Energy Efficiency Alberta identify a clear strategy for assuring itself that communities and community-based groups are able to develop or have access to appropriate expertise to participate fully in Energy Efficiency Alberta programming. This includes ensuring that resources are provided for such expertise, either directly or from other agencies.

Ongoing Engagement

It is important for Energy Efficiency Alberta to have an ongoing relationship with different groups, both formal and informal, to build the effectiveness of its programs and support participation in the advancement of energy efficiency and community energy systems. These groups may include product and service providers, business associations and utilities, Indigenous communities, co-operatives, and non-profit organizations and institutions that support end-users or program implementation. Positive ongoing engagement will create champions for energy efficiency, helping to build top-of-mind awareness of services and programs.

4.6 The Panel recommends Energy Efficiency Alberta develop ongoing relationships with a wide range of groups to advance energy efficiency and community energy systems so that the Agency can assure programs are relevant, effective and accessible. It is recommended that these relationships build on the preliminary engagement work already completed by the Panel.

4.7 The Panel recommends Energy Efficiency Alberta form a collaborative relationship with municipalities to build on existing municipal initiatives, to leverage existing capacity and funds, and to coordinate the sharing of resources and data where possible.

There are also a wide range of government and non-government policies and practices that could support the uptake of energy efficiency and community energy systems within Alberta, but are not within the power of the Agency to change itself (e.g., energy codes for buildings, utility system regulations, municipal and industry policies and practices). That does not mean, however, that the Agency should not play a role in conversations about these enabling mechanisms. In fact, the Agency will be ideally placed to be an important part of these processes given its expertise and relationships with all interested parties.

4.8 The Panel recommends Energy Efficiency Alberta play a supporting role in the advancement of government and non-government policies and practices that support the uptake of energy efficiency and community energy systems in the province.

> *A lack of awareness of the benefits of renewable energy is recognized as a barrier for its uptake. Partnership with organizations whose mandate includes education is considered a favourable strategy*
>
> *– Alberta Solar Co-op (online submission)*

STUDENTS TAKE CHARGE OF THEIR FUTURE WITH SMART METERING

A school can save three to five per cent on energy consumption with smart meters – thousands of dollars annually.

Back in 2011, Queen Elizabeth High School became the first school in Canada to install solar panels. The installation was part of a hands-on project called “Innovate” to teach students about energy. Students then began to explore ways of enhancing their use of solar energy.

“Instead of time consuming and costly measures to install more panels, we looked at ways of reducing energy consumption,” said Aaron Dublenko, Innovate coordinator for Queen Elizabeth and Argyll schools. “We turned to smart metering. That way we could monitor electrical use in real time, the carbon emissions equivalent, and the cost to taxpayers to operate a building.” The students use an improved smart technology called Circuit Meters, invented by Dan Seto, an entrepreneur in Toronto. They then drafted projects and found City of Edmonton staff to work with. “The students presented to facilities managers, who were immediately on board. They became our community partners.”

The students have presented at many conferences, including those attended by educators, facilities managers, businesses, and decision-makers interested in climate change. They demonstrated that a school can save three to five per cent on energy consumption with these smart meters – thousands of dollars annually.

This year, more students will install this technology in their schools and begin to do energy audits in response to the new carbon levy.

“This levy promotes innovative ways of learning about climate change through energy use, policy and renewable energies,” said Dublenko. “Innovate students are encouraged to become agents of change and take charge of their energy futures. The goal with these projects is to help raise generations of energy-literate Albertan citizens and connect them to career pathways in sustainable development.”

5. INITIAL PROGRAMMING

The Panel was asked to recommend energy efficiency and community energy system programs that can be launched by Energy Efficiency Alberta in early 2017. Based on technical analysis undertaken by Dunsky Energy Consulting [see Appendix H(a)] and rigorous cross-referencing with technical and other stakeholder advice, the Panel determined that early programs must align with the following criteria:

- Cost-effectiveness: Programs should produce good results (real energy savings and greenhouse gas reductions) in a cost-effective way.
- Equity: Selected programs and resources should be broadly available across sectors and across the province.
- Speed to launch: Initial programs should be launched in a timely manner so consumers can start adopting energy efficiency measures right away.
- Public interest: Programs should stimulate public interest and participation.
- Potential risks: Programs should be low risk.

The Panel recommends Energy Efficiency Alberta first launch the following programs:

1. **Residential Direct Install (DI)**
2. **Consumer Products**
3. **Business, Non-Profit, Institution (BNI) Incentives**
4. **Small Solar PV**

Collectively, these four programs have a relatively quick speed to launch, and they are considered cost-effective in both reducing emissions and saving consumers' money. As important, the benefits of these programs are available to all Albertans, regardless of income, sector or geography. Each program would include significant elements of education and outreach, included as part of the detailed design work prior to launch. Over time, these programs would be supplemented with offerings that increase the breadth and depth of programming of the Agency.

> *Programs should ensure all Alberta households and organizations can participate. This builds broad understanding of energy efficiency and management opportunities over the long term, and takes advantage of high potential retrofit opportunities.*
>
> *– Alberta Energy Efficiency Alliance (online submission)*

5.1 Residential Direct Install (DI)

In a Residential Direct Install program, low-cost energy efficiency products are installed in homes at no cost to consumers. Installation is conducted by qualified agents who schedule home visits. Both single-family homes and multi-family dwellings are eligible for the program, as are all income levels. Examples[7] of direct install products include:

- LED lighting;
- LED night lights;
- Smart power bars;
- Low-flow showerheads and aerators;
- Hot water pipe wrap; and
- Smart thermostats.

A secondary benefit of a Direct Install program is that it opens the door to larger conversations about energy efficiency and the value of more comprehensive assessments and upgrades.

5.2 Consumer Products

Consumer Products offers incentives (point-of-sale, online or mail-in) for purchase of energy efficient appliances and electronics that are independently certified to save energy without sacrificing features or functionality. It is recommended that incentives include appliances only at the top tier of energy efficiency to maximize effectiveness. Examples of eligible consumer products include:

- LED lights, smart power bars and timers, smart thermostats, and low-flow showerheads and aerators;
- Appliances and electronics;
- Insulation and draft-proofing products; and
- Water heaters.

7. These are examples only. Actual products available through the Direct Install program or any other identified program may vary.

A Consumer Products program fits well with a Direct Install program because it includes affordable products like those included in the Direct Install program, but it also includes more expensive purchases.

5.3 Business, Non-Profit, Institutions (BNI) Incentives

Business, Non-Profit, Institutions incentives assist non-residential buildings (including businesses, non-profits, institutions, and co-operatives) to reduce their emissions and energy use. The program offers incentives on products and installation of energy efficiency measures. The initial core offerings would be expanded over time. Examples of products eligible for BNI Incentives include lighting, heating, ventilation, air-conditioning systems and water heating.

> *Commercial lighting, including interior lighting, exterior lighting and building signage all contribute to significant GHG emissions. Upgrading lighting to LEDs is a proven measure that is cost-effective and can benefit Albertans in all communities.*
>
> *– Comment from Alberta business (online submission)*

5.4 Small Solar Photovoltaic (PV)

It was clear from the public consultations that there is significant interest in solar PV systems. Their visibility often creates discussion and can serve as a useful stimulus for public engagement. In addition to the three programs mentioned above, and subject to some further analysis and modeling, the Panel recommends the launch of a cost-effective and high impact Small Solar PV program to be followed by additional initiatives to support the development of community energy systems in the province.

The Small Solar PV program could provide financial incentives to support the installation of solar photovoltaic systems on buildings, including homes, businesses, and community structures, under the Micro-Generation Regulation. This program will reduce greenhouse gas emissions, generate electricity at the point-of-use, and ensure reliable electricity generation for over 25 years. A financial incentive will lower the cost of installing the solar system and help ensure a net financial savings on electricity. A secondary benefit of a Small Solar PV program is that investment in on-site electricity generation often leads to an increase in energy conservation and energy efficiency measures.

A Small Solar PV program builds on programs already available today. There currently are programs for farms, municipalities, and Indigenous communities (see Appendix F). This new program extends the ability to participate in solar PV to the rest of the province. See also Section 7.

Investments from grassroots Albertans through community-owned solar and micro-generation have the ability to significantly contribute to the electricity grid transformation when we appropriately support its development

– Starland County (online submission)

Timelines and Future Programming

To launch these programs successfully in early 2017, the Panel recommends they be developed immediately and requests for proposals for their delivery be released as soon as possible. Additional programming, as is seen in other jurisdictions and as discussed in Recommendation 1.2, should also be pursued to target specific audiences.

6. FUTURE PROGRAMMING (ENERGY EFFICIENCY)

Economic energy efficiency and conservation opportunities exist in every building and industrial facility – new and old – but are sometimes not seized because of lack of awareness, expertise, motivation, capital or confidence. Programs to address these barriers exist in nearly every jurisdiction in Canada and the United States and they regularly demonstrate that they save consumers more money than they cost. At the same time they create jobs and reduce emissions.

CALGARY PUBLIC BUILDING – HISTORIC AND FUNCTIONAL

Is it possible to preserve the historical integrity of Alberta's original structures and, at the same time, their functionality? The Calgary Public Building, completed in 1931 in the Modern Classical style and renovated in 2010, has been recognized as a prime example of this.

To achieve modern comfort and efficiency (up to LEED Platinum standards, in fact), engineers protected the building from the elements within an energy efficient envelope liner. They renewed the building's original daylighting and natural ventilation and then installed modern systems all kept running at optimal efficiency through digital technology and streamlined operations and maintenance.

The renovation has lowered operating costs in the Calgary Public Building by an impressive 46 per cent, while reducing greenhouse gas emissions by 54 per cent. The installation of low-flow toilets and automatic faucets has reduced water consumption by 45 per cent; solar technology now heats 60 per cent of the building's hot water.

Other jurisdictions commonly use a portfolio of programs to address different barriers, support a wide range of technologies and practices, and target a range of sectors, sub-sectors and consumer types. Refer to an online submission from the UK Energy Savings Trust and case studies from EfficiencyOne and the Energy Trust of Oregon, for examples. In addition to those recommended for initial programming, the Panel also considered the following programs addressing:

- Home heating systems. Heating systems are a significant energy user in homes. Installing a high efficiency heating system can reduce energy bills and improve comfort and health. Programs for home heating system typically involve incentives for buying top tier high efficiency furnaces.

- Whole home assessments and retrofits. There are many ways to increase the energy efficiency of a home. This type of program uses an energy assessment to identify high priority opportunities specific to a given home (e.g., insulation, air sealing, water heaters, drain water heat recovery, solar water heating, windows) and provides incentives to support upgrades.

- Multi-family building assessments and retrofits. This program supports energy assessments and upgrades, but is tailored to the needs of multi-family buildings which have unique ownership and tenancy structures. Measures that can be supported range from direct installation of low-cost energy efficient products to those included in both residential and commercial programs.

- Custom assessments and upgrades for businesses, non-profits and institutions. Beyond the basic incentive program for businesses, non-profits and institutions (BNI) listed under initial programming, this program supports energy assessments for buildings as well as building improvements such as demand control ventilation, envelope improvements, building automation and control systems, energy management systems and custom measures. Note that is expected that BNI programming should be available to all non-residential buildings, small and medium-sized industrial facilities and agricultural operations, including but not limited to businesses, non-profits, institutions, co-operatives and farms.

- New homes and buildings. One of the best times to upgrade the energy features of homes and buildings is during initial construction. This program provides incentives to build to high energy efficiency levels and encourages many of the measures found in retrofit programs, but takes a customized approach for new builds.

- Low-income households. Low-income households are less able to participate in energy efficiency programs than those with higher incomes. While they typically participate in direct install and consumer products programs (with a focus on lower-cost items), a program targeted to those with low incomes helps to increase uptake of additional measures. Eligible measures can include those available in other residential upgrade programs, but offered at greater incentive levels.

- Small businesses, non-profits and institutions. Small businesses, non-profits and institutions have differing abilities when it comes to participation in energy efficiency programs (as compared with large businesses). In some cases, programs are customized for the specific needs of each sub-group. These programs can include direct install of low-cost measures, incentives for large upgrades, no-cost energy assessments, turn-key services for upgrades, and attractive financing arrangements to help make upgrades financially accessible.

- Energy reports for homes and buildings comparing energy use to peers. Reports comparing the energy use of a home or building to its peers has proven to be effective in reducing energy consumption and increasing the uptake of energy efficiency incentive programs. Making these reports widely available to individuals and organizations across the province is an opportunity to not only increase awareness of energy use, but to drive energy savings.

6.1 The Panel recommends the development of additional programming for energy efficiency similar to that of other jurisdictions pending proper assessment for applicability in the Alberta market. The Panel recommends the development of additional programming for energy efficiency similar to those in other jurisdictions pending proper assessment for applicability in the Alberta market. It is also recommended that future programs be advanced as soon as possible to maximize the benefits of these programs for Albertans in the short term.

It is also important to note that as a best practice, programming is often developed with the support of jurisdiction-specific market research. Given the importance of launching programming quickly, initial efficiency programming (Direct Install, Consumer Products, and BNI Incentives) was chosen for its very low risk nature despite the lack of Alberta-specific market research. However, in the longer-term, this information gap must be filled. Refer to an online submission by the Alberta Energy Efficiency Alliance.

To the best of the Panel's knowledge, no detailed research exists that assesses the detailed technical and economically achievable potentials for energy savings in the province. While there are similarities to other North American jurisdictions, Alberta's energy system is unique in many respects. Market research is important to be able to quantify the savings opportunities, and to design the best approaches to capture them. While the initial recommendations are common short-term programs known to have widespread applicability, a thorough technical potential study (along with regular updates), is important to establish long-term goals and the programming required to meet them. Given the importance of obtaining the data, the following recommendation is an important near-term step as Energy Efficiency Alberta begins its work.

6.2 The Panel recommends Alberta-specific market research be undertaken to inform future program selection, design and evaluation. This includes the development of a comprehensive Conservation Potential Review for the province to guide the development of a longer-term energy efficiency and conservation strategy.

7. FUTURE PROGRAMMING (COMMUNITY ENERGY SYSTEMS)

The benefits of community energy systems are many: greater grid diversity, reduced transmission requirements, involvement of local communities, reduced emissions and job creation. See, for example, online submissions from the Pembina Institute and Canadian Wind Energy Association. These systems have a place in Alberta's future energy infrastructure and are a part of the mandate of Energy Efficiency Alberta. They present opportunities for efficiency in many different sizes, applications and technologies.

The Panel's initial program recommendations focus on Small Solar PV installed to reduce or offset electricity consumption from homes, businesses and other buildings.

To drive further adoption of community energy systems, the Government of Alberta needs to outline a vision for what role these systems will play in meeting the energy needs of Alberta. Without proper policy direction, it will be difficult for Energy Efficiency Alberta to develop and implement meaningful programs that support community energy. As such, in addition to a Small Solar PV program:

7.1 The Panel recommends at the earliest time possible, the Government of Alberta identify its targets for the scale of community-owned energy systems together with financial mechanisms consistent with achieving these targets, for example, incentives to promote their adoption through the Alberta Electric System Operator or another agency. See also Recommendation 12.1 and 12.2.

Failure to act on this recommendation will delay or limit the development of community-owned energy systems in the province. Groups expressing interest in the development of these systems – co-operatives, Indigenous communities and others – need clarity and support to do so.

In addition to the recommendations above there are two distinct categories of community energy systems that offer unique benefits and have distinct challenges: the Agency could play a role to support community-owned renewable energy systems and non-utility scale community energy systems.

Community-Owned Renewable Energy Systems

As the name suggests, community-owned renewable energy systems are systems that generate electricity from renewable sources through systems that have a joint ownership across a collection of individuals. These systems can take on many forms, including rooftop solar, distribution-connected solar farms, distribution-connected wind energy systems, and run-of-the-river hydro-electricity systems. Community-owned systems are typically larger than individually owned systems and do not necessarily aim to offset the on-site electricity needs of a particular building, but rather they aim to provide a benefit to the participants through a revenue and profit-sharing arrangement.

They can offer a lower cost approach to renewable energy generation relative to individual systems due to economies of scale, and they can enable much broader participation from Albertans who may not have a home suitable for individual systems (e.g., condos, apartments, shaded rooftops) or may wish to invest in only a small share.

The most significant barriers to implementation identified were lack of funding to reduce the overall cost of investments, limited access to financing mechanisms to spread the up-front costs over the life of the investment, and the need for regulations that support these types of systems.

With the currently allocated budget, Energy Efficiency Alberta is not well-suited to provide effective capital and revenue incentives to support a significant amount of community-owned renewable energy systems over the long-term. However, until a long-term approach is implemented in Alberta, the Agency could play a role to support a collection of projects that pioneer this concept, perhaps through partnerships with elements of the provincial and national innovation systems to demonstrate what may be possible (see also Section 13).

7.2 The Panel recommends Energy Efficiency Alberta develop a program to provide financial support for initial community-owned renewable energy systems and ongoing technical support over the long term.

This program would focus on projects that are not applicable to the Small Solar PV program (see Section 5.4) and could include community wind and other renewable energy installations combined with complementary technologies, for example, storage and smart grid applications in demonstration projects.

7.3 The Panel also recommends the Government of Alberta work with Energy Efficiency Alberta and all other relevant organizations to determine how best to support community-owned renewable energy systems over the long term, consistent with Recommendation 7.1.

Existing legislation does allow community-owned renewable energy systems. However, due to the ownership model and large range in the size and types of systems in this category, many community-owned systems currently face a relatively complex approval and grid connection process.

7.4 While the development of regulatory enabling mechanisms is beyond the scope of Energy Efficiency Alberta, the Panel recommends the Government of Alberta continue efforts to enable community-owned renewable energy system either through updates to the existing Micro-Generation Regulation or through new regulations.

INDIGENOUS COMMUNITIES: A LOOK AT EXISTING PROGRAMS

The Alberta Indigenous Solar Program provides grants of up to $200,000 per project to First Nations, Métis Settlements and Indigenous organizations. The money is used to install solar panels on buildings owned by communities or organizations, such as offices, medical centres, schools and more.

The Alberta Indigenous Community Energy Program helps First Nations and Métis Settlements reduce emissions and save on energy costs through community energy audits funded to a maximum of $90,000.

Together, the two pilot programs will provide $2.5 million for First Nations and Métis Settlements to undertake renewable energy projects and energy efficiency audits in their communities.

Non-Utility Scale Community Energy Systems

For other technologies and applications that meet the definition of community energy systems, Energy Efficiency Alberta should work with proponents to identify opportunities for their advancement that are within the abilities of the Agency. This may include working to identify and overcome barriers to further adoption in the province and incorporating opportunities into Agency programming where appropriate.

7.5 The Panel recommends Energy Efficiency Alberta develop an approach for supporting the advancement of a broad range of community energy systems that are able to contribute to the province's climate change objectives.

8. TRANSPORTATION

Opportunities to reduce costs, and or greenhouse gas emissions associated with transportation include: changes to driving habits, vehicle maintenance, carpooling, combining or avoiding trips, improved vehicle efficiencies (including efficiency add-ons for freight vehicles), vehicle scrappage programs, alternative fuel vehicles (e.g., electricity natural gas, biofuels), and using transit and active transportation.

While transportation was not selected for initial incentive programs, the Panel recognized that it is important to raise awareness around no/low-cost actions to save fuel. Therefore:

8.1 The Panel recommends early outreach messaging by Energy Efficiency Alberta include information on no and low-cost ways to save fuel. This includes consideration of driver training outreach for fleets in the municipal, education and non-profit sectors.

In the medium-term, it is recognized that while Energy Efficiency Alberta has a role to play in supporting transportation initiatives, there are many other influences in this area that need to be considered. For example, municipalities play a significant role when it comes to personal transportation. The province's green infrastructure funding, also funded through the carbon levy, will play a significant role in the development of transportation infrastructure.

8.2 The Panel recommends Energy Efficiency Alberta develop a strategy for future programming related to transportation and how it will align with the efforts of other initiatives.

Based on research into transportation programming in other jurisdictions, investigation of future programming for Alberta could include:

- Support for passenger car alternatives like car-pooling, public transportation and active transportation.
- Vehicle scrappage programs.
- Incentives (such as rebates) for alternate fuel vehicles, and fueling or charging stations.
- Freight specific opportunities such as driver training and feedback, aerodynamic devices and anti-idling technologies.

Investments in public transit to improve public transportation services within and between communities will reduce GHG emissions and create more livable communities.

– Alberta Urban Municipalities Association (online submission)

9. INDIGENOUS COMMUNITIES

The Panel sought input from Indigenous communities on what programs and services would benefit them, given their unique circumstances related to jurisdictional complexity, geography, economic situation, and reliance on the environment – all of which affect their ability to equitably access services and funding. While much useful input was provided, some Indigenous community attendees at formal meetings expressed concerns about the engagement process itself. The Panel will share with Energy Efficiency Alberta suggestions for improving future engagements, including the need to involve Indigenous communities more directly in their setup. In addition to formal outreach events, Panel member Desmond Bull conducted successful personal outreach on behalf of the Panel (see Appendix D).

Indigenous communities told the Panel that housing and infrastructure are two of their biggest concerns. They said it is difficult to retrofit homes to be more energy efficient when current housing is either inadequate or unavailable. A further complication is that there are no uniform building standards that apply to First Nations communities and Métis Settlements.

9.1 The Panel recommends the province works in collaboration with Indigenous Communities and the federal government to define best practices in applicable codes and standards for First Nations and Métis settlement housing, including those related to the Alberta Building Code and the National Energy Code.

The Panel heard Indigenous Communities want to participate in community scale projects, but often do not have the capacity to do so.

9.2 The Panel recommends the provincial Department of Indigenous Relations and Energy Efficiency Alberta work with communities to ensure the provision of independent technical and financial capacity at the community level to undertake energy efficiency measures and develop community energy systems, thereby instilling a pride of ownership in these initiatives and contributing to employment and economic development and diversification.

The Panel recognizes there are a number of funding programs at the federal, provincial and local levels that Indigenous communities could access to advance energy efficiency in their homes and communities. As we heard in our outreach sessions, Energy Efficiency Alberta will also need to assure itself that individual members of Indigenous communities feel they have fair access to relevant programming and qualified contractors.

To increase awareness and make program application processes simple and efficient:

9.3 The Panel recommends the provincial Department of Indigenous Relations work with Energy Efficiency Alberta to ensure intergovernmental and interagency collaboration so that Indigenous communities can efficiently and equitably access and leverage all available energy efficiency and renewable energy related complementary funding, including funding related to housing, land use and infrastructure planning.

To ensure ongoing dialogue with Indigenous communities:

9.4 The Panel recommends Energy Efficiency Alberta establish a formal Indigenous advisory mechanism with representation from the Departments of Education and Economic Development and Trade, as well as relevant technical fields. Representation from Indigenous and Northern Affairs Canada would also be important to the success of the advisory mechanism.

Additionally, Indigenous communities said they would value programing, outreach and education specifically directed to them, including:

- Local capacity development and training that supports economic development and diversification.
- The development of community-based energy systems that support energy security and resilience and that provide opportunities for economic development and diversification.

- Education opportunities that expand on formal education. These would respect the cultural sharing of stories using a variety of methodologies, including in-person community-level education. It was noted that the Agency could facilitate the exchange of information nation-to-nation, including success stories and examples related to energy efficiency and community energy systems.

- Programming that encompasses the whole community, focuses on housing, and addresses the specific issues and needs of each community.

The Alberta Departments of Labour, Human Services and Advanced Education have all conducted work with a view to creating an approach to 'lifelong learning' for adults in Alberta, from foundational learning to post-secondary education. There may be some value in including representatives from these departments to support climate-related and energy-related education within Indigenous communities. It is equally important to leverage the work of Indigenous community institutions, for example those that provide training programs through Employment and Social Development Canada in the Aboriginal Skills and Employment Training Strategy or through the First Nations colleges of which there are five. See online submission from TREC Education for examples of education and awareness initiatives related to sustainable energy in First Nations communities in Ontario.

10. ACCESS TO DATA

The Panel heard several times that access to energy-use data and the use of benchmarking is an important part of designing and delivering effective programs. See, for example, online submissions from the Canada Green Building Council, Quest, and North American Insulation Manufacturers Association Canada. For example, user-specific energy consumption data are commonly used to individualize outreach efforts and increase program participation. It is also important for accurately measuring the impact of programs. This can all be accomplished while maintaining appropriate privacy protection.

10.1 The Panel recommends the Government of Alberta develop mechanisms, including the development of a regulation, to enable Energy Efficiency Alberta to employ user-specific energy consumption data to enhance program design and delivery while maintaining appropriate privacy controls.

10.2 The Panel recommends Alberta Energy also incorporate the issue of access to data within their regulatory review process.

LOUIS BULL TRIBE SUPPORTS GREEN ENERGY

Two-and-a-half years of concentrated effort has resulted in four public buildings on the Louis Bull reserve having solar energy. But more than that, it has shown that First Nations can take a leadership role in green energy development.

Solar power is a common means by which many First Nations communities are embracing green energy, said Louis Bull Tribe Councilor Desmond Bull.[8] Solar power is easier to maintain and easier to install. Training can be done within a few months.

"Once you've learned how to do installations on your own, once you've learned the effectiveness of hardware, then you're able to go out and develop your own private partnership or expand on the work your tribe or Nation is doing," said Bull.

In moving forward with renewable energy development, Councilor Bull would like to see First Nations form a co-operative. By working together, he says, they can pool their expertise, develop trustworthy sources for advice and inspections, and buy hardware and equipment in bulk therefore reducing the costs.

- Excerpt from AAMSA article by Shari Narine Sweetgrass, Contributing Editor, Sept. 27, 2016

8. Desmond Bull is a member of the Energy Efficiency Advisory Panel. Desmond has successfully led and fundraised to advance solar energy projects for his Nation.

11. FINANCING

Financing, along with information, incentives and regulations, is one of the primary tools to advancing energy efficiency and community energy systems. See, for example, online submissions by the Canadian Coalition for Green Finance[9] and the RMI case study. Financial tools can play a very key role in opening access for a much broader range of people and businesses to participate in energy efficiency and community energy programming. Examples of financing models include equity financing, property-tied financing, on bill financing, low-interest loans, leases, green banks and other financing tools that specialize in energy efficiency and community energy systems.

11.1 The Panel recommends Energy Efficiency Alberta investigate opportunities for innovative financing for energy efficiency and community energy systems; and support them where appropriate. This includes, but is not limited, to the following opportunities:

- Property-tied financing known as Property Assessed Clean Energy or PACE, which has been successful in the United States and is emerging in Canada. The Panel recommends the government examine the option of empowering municipalities to enable property-tied financing for energy efficiency and on-site energy systems. See also online submission from Property Assessed Clean Energy.

- The Capital Borrowing Regulation for schools in Alberta, which allows them to finance energy efficiency upgrades at a low interest rate as long as the energy savings are guaranteed by a third party. It is suggested that the Government of Alberta consider expanding this mechanism to other institutions. A complementary action would be for the government to formally authorize the use of energy service performance contracts (which include energy-saving guarantees) for public sector buildings which is common practice in the United States.

- A Community Economic and Development Investment Fund (CEDIF) is a tax-efficient investment vehicle for individual community members to establish a pool of capital to invest in for-profit entities within a defined community. These funds are controlled by a local group of officers and directors, who may be chosen by the founders and promoters of the CEDIF or by the CEDIF's investors at an annual general meeting. These funds have been used successfully in Nova Scotia to establish significant quantities of community renewable energy in that province.

9. These included a significant report from the International Renewable Energy Agency on *Unlocking Renewable Energy Investment: The Role of Risk Mitigation and Structured Finance.*

- Opportunity Development Co-operatives which pool capital through the sale of shares eligible for Registered Retirement Savings Plans and Tax Free Savings Accounts. They allow for the local control of private capital to be directed towards economic development. This has created vibrant local economies through new jobs and an increase in local business activity. There are currently seven Opportunity Development Co-operatives across the province that have invested close to $2 million into their local economies, created numerous jobs, and charted new courses for economic development in parts of the province that were dwindling. A notable example is the Sangudo Opportunity Development Co-operative, which recently completed its fifth capital investment. Most recently, the structure has been used to create the Alberta Solar Co-operative, which is seeking to create the first co-operatively owned distributed generation solar farm.

The Panel recognizes there is no one single tool that can fill the financing needs for Energy Efficiency Alberta and associated programming. Rather, the Agency must determine which financing tool works best for each situation and identify opportunities to work with others on their advancement.

12. INTEGRATION WITH THE UTILITY SYSTEM

A nearly universal approach to energy efficiency and community energy systems in other jurisdictions is to consider them holistically within the oversight of the utility system. This is done, in large part, by including demand-side management within the mandate of regulators and electric system operators. This enables those entities to give full consideration to energy efficiency and community energy system benefits and opportunities, and make available tools used in other jurisdictions to support their uptake in a way that is in the interests of consumers.

For example, regulators routinely identify that net savings for consumers can be generated by investing a portion of utility revenues into demand-side management and deferring the construction of supply-side resources (including the expansion of transmission lines). Taking a similar approach to demand-side management in Alberta has the potential to increase the role of energy efficiency and community energy systems in the province while creating cost savings, employment and greenhouse gas reductions.

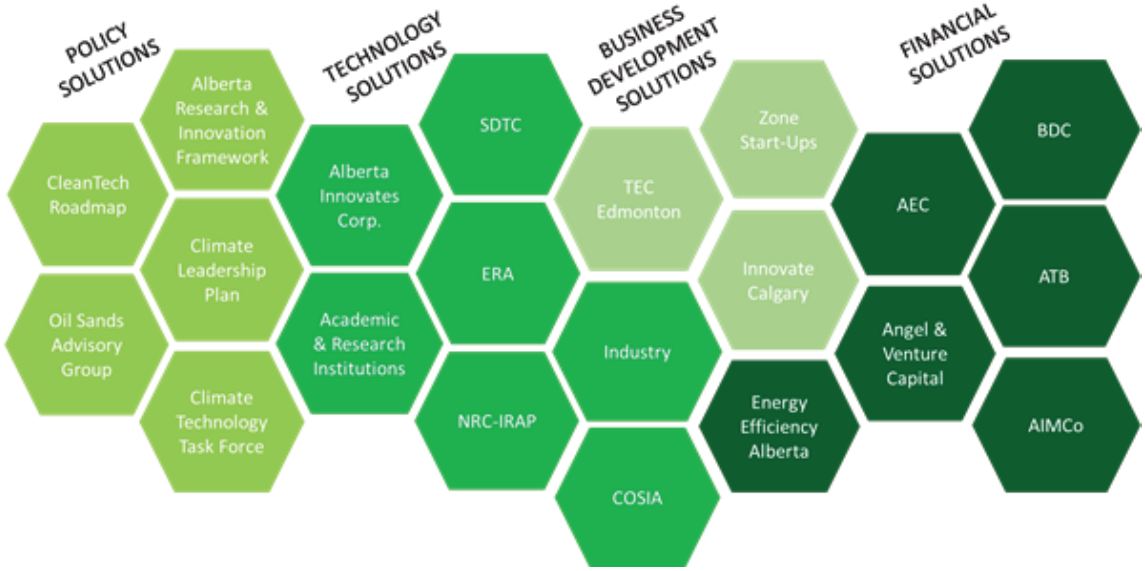
12.1 The Panel recommends Alberta Energy consider creating an energy efficiency and community energy system mandate for its utility regulator and electric system operator.

12.2 The Panel recommends Service Alberta should consider adding an energy efficiency and community energy system mandate for the Utilities Consumer Advocate.

13. LINKS TO INNOVATION, RESEARCH AND DEVELOPMENT, AND COMMERCIALIZATION

Many mechanisms for the promotion of innovation, research and development, and commercialization of clean energy technologies are emerging in Alberta and Canada. These mechanisms may be expected to significantly enhance the growth of 'clean tech' elements of the private sector within the provincial economy and further enhance the impact of investments by Energy Efficiency Alberta.

Below we reproduce a map - courtesy of Stephen MacDonald of Emissions Reduction Alberta - of the emerging provincial and national innovation landscape for clean technology and clean energy related research and development that may lead to commercially viable technologies and business models in Alberta. While not necessarily fully capturing all the parts of the system, it does clearly show that the ecosystem is complex and involves a number of interrelated processes and structures.



Given the transformation that is about to occur throughout the Alberta economy and energy system, and this rich array of complementary innovation actors and programs, it is important for strong links to be created between the market 'pull' of Energy Efficiency Alberta programming and the capacity of the private sector and post-secondary institutions to develop novel products and services to satisfy the new demands. In this way, Alberta may achieve competitive economic advantage through the research, development and commercialization of products and services that emerge. Such commercialization should generate significant private sector employment and export opportunities for the province.

Important entities in our context include:

- The Climate Technology Task Force, formed September 2016, "to provide recommendations on targeting investments in climate technology to help transition to a lower-carbon economy." Chaired by Gord Lambert, the task force will provide advice to the provincial government on how to achieve competitive advantage as a result of the many investments now being made in climate science and technology both by industry and by provincial and federal governments.

- Emissions Reduction Alberta, formerly the Climate Change and Emissions Management Corporation (CCEMC), has a mandate to "identify and accelerate innovative solutions that secure Alberta's success in a lower carbon economy." See also CCEMC case study in appendix E.

- The Alberta Innovates Corporation. It oversees the Energy and Environment Solutions program and aspires to be "the lead agency for advancing energy and environmental technology innovation in Alberta."

- The federal government itself, which recently granted $150 million under the Canada First Research Excellence Fund to two climate-related research institutes at the University of Alberta and the University of Calgary (see Appendix G for a description of these and other post-secondary activities relevant to the work of Energy Efficiency Alberta).

- Alberta Economic Development and Trade. The department has already commissioned a Cleantech Sector Roadmap to examine opportunities in energy efficiency, power generation and material efficiency. While the Cleantech Sector Roadmap is still in draft form, it identifies wind, digital oilfield technology and green buildings as promising opportunities for the short term. The Roadmap highlights synergies between the Climate Leadership Plan 'innovation system' enhancements and the Economic Growth and Diversification Plan with potential economic benefits for Alberta including job creation and diversification of the economy.

13.1 The Panel recommends Energy Efficiency Alberta be formally represented within the new innovation structures and initiatives being developed by the Government of Alberta under the mandate of the Climate Technology Task Force through explicit governance and operational links.

13.2 The Panel recommends Energy Efficiency Alberta support the recommendations of the Climate Technology Task Force when they emerge and that 'contribution to innovation' be used as a potential criterion for certain programming of the Agency (e.g., where community level and other demonstration projects are deemed to meet the normal criteria for programming and where long-term economic benefits may accrue).

7

COMPLEMENTARY POLICIES AND INITIATIVES

There are complementary policies and initiatives Energy Efficiency Alberta should be aware of once it starts its operations. All have a bearing on the programs and success of the Agency. The most important are noted here.

LARGE INDUSTRY

While large industry is not within the mandate of the Panel, the Panel would like to acknowledge the numerous government initiatives designed to reduce greenhouse gas emissions by large industry. Studies show there is also untapped potential for energy efficiency within large industry. The Panel expects the government will continue to explore opportunities to encourage energy efficiency upgrades within industry (beyond those already in place or under development), and that industry will make progress in implementing energy efficiency measures as part of a broader Alberta-wide commitment to securing a more energy efficient province.

MICRO-GENERATION REGULATION

Alberta Energy is currently reviewing its Micro-Generation Regulation to determine whether changes are required. The Regulation enables small-scale generation of electric power by individuals, small businesses and communities to meet their own needs, as an alternative or supplement to traditional centralized grid-connected power. The current Micro-Generation Regulation expires on December 31, 2016.

BUILDING CODES

Building codes ensure a minimum level of energy efficiency for new construction, whereas information and incentive programs typically increase construction practices beyond common practice. However, an integrated approach of energy efficiency programs, collaboration with industry, and timely adoption of new building codes can support consistent energy efficient construction across Canada. It is recognized that the Alberta Building Code is an important complementary policy to increasing energy efficiency.

FIXED VERSUS VARIABLE UTILITY CHARGES

During consultations, many stakeholders suggested authorities investigate the potential for greater adoption of energy efficiency and community energy systems by reducing the ratio of fixed versus variable charges on utility bills. Increasing the amount of variable charges associated with electricity transmission costs, for example, can help reduce electricity consumption and the demand for transmission infrastructure thus creating system-wide cost savings. It is recognized, however, that the cost of utility infrastructure must be spread among the consumers that are benefiting from it and without overly burdening vulnerable Albertans. The continued evolution of this conversation will be important for both consumers and Energy Efficiency Alberta as the structure of utility charges has significant bearing on how the utility system is used and its associated economic impacts.

BUILDING ENERGY PERFORMANCE AND DISCLOSURE

Benchmarking and disclosing a building's energy use is a tool increasingly used to support attention and action for energy efficiency. The Climate Change Advisory Panel recommended the government enable municipalities to advance energy-performance reporting and disclosure for buildings and homes within their communities if they so choose.

ALIGNMENT WITH OTHER GOVERNMENT PROGRAMS

The Agency must identify and align with other government programs delivering energy efficiency, and or community energy system programs. This will be essential to avoid unnecessary duplication, inefficiency or working at cross purposes.

SOLAR FARM

Half of the provincial government's electricity needs may soon be powered by solar energy.

To encourage growth in green technologies and further diversify Alberta's power grid, the government is asking solar companies to provide advice on how they would approach a large-scale project to supply power to government. This initiative would result in many "firsts" for Alberta: Canada's first 50 per cent solar-powered government, Western Canada's first large-scale solar farm to provide the electricity and Alberta's first utility-scale jobs. This initiative illustrates how the Government of Alberta can lead by example.