



CLIMATE CHANGE AND EMISSIONS MANAGEMENT (CCEMC) CORPORATION

2016-2019 BUSINESS PLAN

August 2016

CCEMC is a TM of the Climate Change and Emissions Management (CCEMC) Corporation



MESSAGE FROM THE CHAIR

Albertans are global citizens who know that as leaders in energy production, we have a responsibility to be leaders in environmental protection. Equal to this ethic of protection is the innovative and entrepreneurial spirit that allows Alberta to evolve, persevere and prosper, even in times of hardship.

Today, Alberta and jurisdictions around the world are recognizing that resource development and environmental protection are not competing propositions. Alberta can excel and lead at both. We are taking steps to diversify our economy, improve energy efficiency and advance new clean technologies. And we will bring to the climate change technology challenge the same innovation and resolve that has brought our province success in so many other areas.

CCEMC is helping Alberta lead the way. Since it was established in 2009, CCEMC has been delivering solutions to address the challenges of climate change and reduce greenhouse gas emissions. The 2016 – 2019 Business Plan lays the foundation for a renewed CCEMC, ready to further drive ingenuity and innovation at home and abroad in pursuit of solutions to climate change that can work for Alberta.

Our refreshed vision, mandate and strategic priorities, aligned and calibrated to the desired outcomes of Alberta's Climate Leadership Plan will bring renewed focus and energy to the task.

Delivery on this plan will ensure CCEMC continues to lead the way to accelerating the bold and innovative solutions required to reduce greenhouse gases, grow and diversify our economy, and secure Alberta's success in a low carbon future.

The Climate Change and Emissions Management (CCEMC) Corporation budget and business plan for the period June 1, 2016 through May 31, 2019 was prepared in accordance with the requirements of the Climate Change and Emissions Management Fund Administration Regulation, which was enacted pursuant to the Climate Change and Emissions Management Act.

All of the CCEMC's policies and accountability obligations and relationships have been considered in preparing this budget and business plan. As well, the Government of Alberta's business plan, public policy statements such as the Climate Leadership Plan and relevant government departments' business plans and priorities such as Alberta Economic Development and Trade were taken into account in the development of the CCEMC's business plan.

The CCEMC is committed to achieving the planned results laid out in this budget and business plan.

Approved by the Board of Directors

Climate Change and Emissions Management (CCEMC) Corporation

Per: Kathleen Sendall, OC

CCEMC CORPORATE OVERVIEW

Mandate

To identify and accelerate innovative solutions that secure Alberta's success in a lower carbon economy.

Vision

Alberta is recognized as an innovation and technology leader in a lower carbon world.

2016 – 2019 Strategic Priorities

To achieve its vision and mandate, CCEMC will:

- 1** **reduce GHG emissions**
Fund innovative solutions that result in meaningful greenhouse gas emissions reductions in Alberta and contribute to a lower carbon world.
- 2** **advance innovation system priorities**
Leverage our strengths to contribute to critical climate change innovation priorities in Alberta.

To deliver on priorities 1 and 2, CCEMC will:

- 3** **measure and communicate success**
Define and report on metrics to demonstrate results.
- 4** **achieve operational excellence**
Strive for excellence in operations and efficiency while maintaining responsiveness to stakeholders and funders.

Core Values

Leadership, innovation, collaboration, transparency, integrity

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1.0. INTRODUCTION

The Climate Change and Emissions Management (CCEMC) Corporation is uniquely positioned within Alberta's innovation system to help deliver on Alberta's goals. With its strong technological expertise, extensive investment experience, and sound industry connections, CCEMC is an existing asset that can help Alberta accelerate its desired climate change outcomes, address challenges within the innovation system, and deliver positive reputational and economic impacts for Albertans.

The importance of CCEMC's contribution to delivering real solutions that provide definitive change has never been greater. Today, governments, industry and individuals are uniting with the common goal of reducing our collective environmental impact on the world. From world leaders aligning to sign the United Nations Paris Climate Agreement, to the strong public climate change commitments by the Alberta and Canadian governments, and individual efforts to use energy more wisely, we are shifting towards a greener global mindset.

The Government of Alberta has committed to taking greater action on climate change and becoming "the world's most progressive and forward-looking energy producer."¹ Alberta's Climate Leadership Plan commits to taking immediate action and investing in innovation and technology that will contribute to² :

- Creating an environmentally responsible sustainable and visionary Alberta energy industry;
- Creating green jobs and green infrastructure;
- Protecting human health; and
- Diversifying the economy and improving market access.

Meeting our collective emission reduction objectives will require bold and innovative technologies and solutions. Delivering those solutions will require clearly defined expected outcomes, a focus on areas of strength and promise, and alignment of all the components of our innovation system.

Alberta's industries are also stepping up to the challenge. Groups like the Canada's Oil Sands Innovation Alliance (COSIA) and the Energy Futures Lab (EFL) are bringing Alberta's public and private sector thought-leaders together to collaborate and take meaningful action to address climate change through innovation.

CCEMC is well positioned to leverage Alberta's long history of success in innovation to provide solutions for the climate change challenge. Through the leadership of our provincial government, the mobilization of our restructured innovation system, and the engagement and participation of industry and technology developers, CCEMC can help Alberta meet its global leadership goals and support national and global greenhouse emission reduction objectives. In the process, we will create jobs, gross domestic product (GDP) in new sectors, and diversify our economy and become a stronger and more resilient province.

CCEMC, along with other key players in the innovation system, is committed to working with the Government of Alberta to restructure, better align, and ensure clearer policy direction for the system. From the reorganization of Alberta Innovates to the development of Alberta's Research and Innovation Framework (ARIF), the Government of Alberta is taking steps to prepare the innovation system to address significant challenges like climate change.

¹ Ceci, Joe. *Fiscal Plan 2016 – 19*. The Alberta Jobs Plan. Budget 2016. April 14, 2016. Alberta Government. Data accessed on April 19, 2016 (URL: <http://finance.alberta.ca/publications/budget/budget2016/fiscal-plan-complete.pdf>)

² *Climate Leadership Plan*. Alberta Government. Data accessed on April 19, 2016 (URL: <http://www.alberta.ca/climate-leadership-plan.cfm>)

2.0. STRATEGIC CONTEXT

As the world's population continues to grow, greenhouse gas emissions are increasing and there is growing concern about the impacts of climate change. The world is becoming more attuned to the work that must occur to address this global challenge.

The United Nations Paris Climate Agreement, based on the UN Sustainable Development Goals – Goal 13: Climate Action, has set the stage for governments around the world to mobilize resources and seek out solutions.³

Alberta and Canada have embraced the opportunity, and are creating the policy, regulatory and technological conditions required to significantly reduce greenhouse gas emissions. They recognize that this global challenge cannot be addressed by individual jurisdictions – we will need to work together to meet our shared climate change goals.

2.1. The Challenge

Alberta's greenhouse gas emissions by sector are shown in figure 1 below. A substantial share of greenhouse gases in the province come from oil and gas and other large industrial sources. Alberta must find ways to reduce its emissions while continuing to grow its economy.

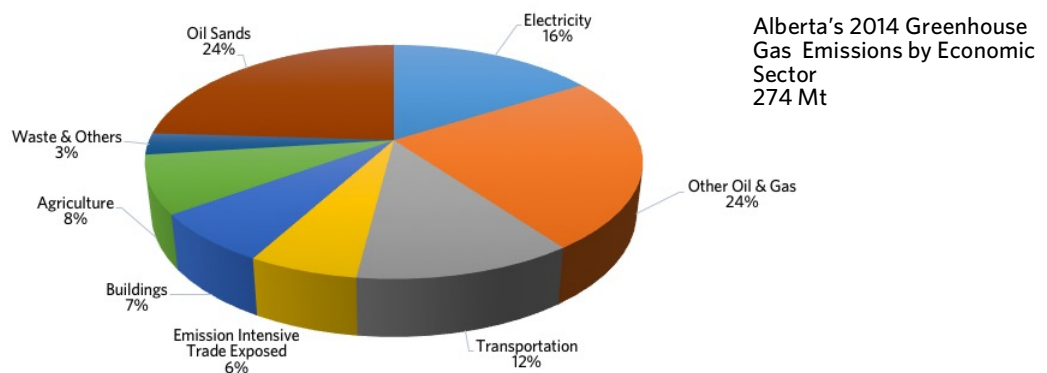


Figure 1: Breakdown of Alberta's emissions by economic sector in 2014 (Source: Environment Canada).

2.2. Alberta's Climate Leadership Plan

CCEMC was born out of the Government of Alberta's 2008 climate strategy. Since then, CCEMC has focused on reducing GHG emissions and continuing to identify and support the development and deployment of innovative climate technologies. Now six years after the first climate strategy, in November 2015, the Government of Alberta announced its new Climate Leadership Plan. The plan commits Alberta to become a leader in sustainable energy production. The objectives of the Plan include:

- Accelerated phase out of coal-fired electricity emissions by 2030 and a shift to generating 30 percent of our electricity from renewable energy;
- A 100 Mt annual limit on greenhouse gas emissions from oil sands by 2030;
- Reduction of methane emissions from O&G operations by 45% from 2013 levels by 2025; and
- Investment of revenues from the carbon levy into renewable energy, bioenergy, technology, green infrastructure like transit, and helping households businesses and communities adjust to the carbon price.

³ Goal 13: *Take urgent action to combat climate change and its impacts.* Sustainable Development Goals. 17 Goals to Transform Our World. UN website. Data accessed on April 22, 2016 (URL: <http://www.un.org/sustainabledevelopment/climate-change-2/>)

Investment in innovation and technology is required to deliver on these objectives. Multiple technologies and solutions will be required to build a strong Alberta energy industry and more diverse economy; there is no “silver bullet” solution.

The Climate Leadership Plan was informed by the work of Alberta’s Climate Change Advisory Panel (the Panel), which engaged with Albertans and key stakeholders during the summer and fall of 2015 before providing its advice to the Government of Alberta in November 2015. With regards to innovation and technology, the Panel’s report suggested:

- Refocusing toward a portfolio-driven funding approach;
- Investing in riskier ventures;
- Reducing barriers to the deployment of new technology; and
- Considering more than just fossil fuel technologies.

Alberta’s 2016 Budget focused heavily on implementation of the Climate Leadership Plan and how revenues from an increased and expanded carbon levy would be used to invest in greenhouse gas reductions, job creation, and economic growth in Alberta.

It is expected over the next five years that \$9.6 billion will be collected from the carbon levy and that the Government of Alberta will spend \$6.2 billion on energy diversification, including: ⁴

- \$3.4 billion for large scale renewable energy, bioenergy and technology;
- \$2.2 billion for green infrastructure like transit; and
- \$645 million for Energy Efficiency Alberta, a new provincial agency that will support increasing energy efficiency for homes and businesses.

The 2016 Budget emphasized that Alberta would work in partnership with other governments and industry to support research, innovation and technology focused on our climate change objectives.

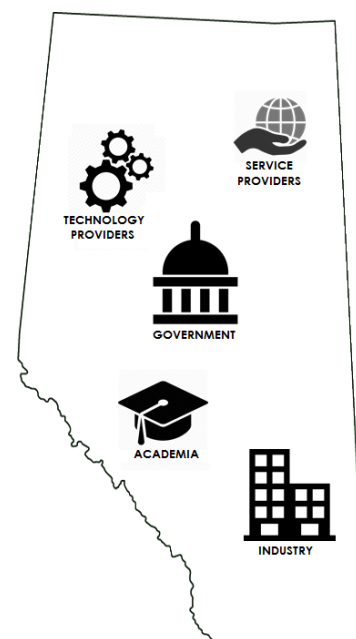
2.3. Alberta’s Innovation System

CCEMC plays a significant investment and mentorship role for projects and companies moving through Alberta’s innovation system. CCEMC is dedicated to working with organizations that promote innovation in Alberta and across Canada, such as Alberta Innovates, TEC Edmonton, Innovate Calgary, and Sustainable Development Technology Canada (SDTC).

Alberta’s innovation system is a continuum of support organizations intended to allow entrepreneurs, small businesses and corporations alike to move forward with innovative technologies to meet the critical challenges the world faces – including climate change. Alberta is home to multiple government and private agents, service providers, and academic institutions that can assist the Government of Alberta not only in achieving its climate change objectives, but also in supporting innovators and entrepreneurs.





CCEMC has engaged in conversations with industry, government, academia, and innovation system thought leaders from across Alberta and other parts of Canada to understand how Alberta’s innovation system as a whole can help better meet the climate change challenge. From these conversations CCEMC has identified challenges that can be grouped into four areas for innovation success:

- Funding;
- Infrastructure;
- Innovation Environment; and
- System Linkages.



⁴ Highlights. Overview of Alberta’s budget. Alberta Government. Data accessed on May 13, 2016 (URL: <http://www.alberta.ca/budget-highlights.cfm#energy>)

Figure 2: Innovation System Challenges

 FUNDING	<ul style="list-style-type: none"> • Provide secure, sustainable and predictable funding. The system needs certainty and confidence that the Government of Alberta will continue to play a role in funding innovation and technology. • Create large and patient capital to support scalability. Scaling up can require hundreds of millions of dollars and has long lead times in the energy sectors – large pools of capital for long term investment are required.
 INFRASTRUCTURE	<ul style="list-style-type: none"> • Develop facilities/sites to de-risk and scale new GHG reducing technologies. Industry has indicated it is critical to have “sandboxes” in which to test and de-risk new ideas so they can be commercially deployed. • Innovate more, cheaply and quickly. Remove barriers to allow for swifter innovation; invest in solutions that hold promise and stop funding where needed, but learn from those that do not succeed.
 INNOVATION ENVIRONMENT	<ul style="list-style-type: none"> • Invest in solutions where there is a market pull. Need to seek out solutions that are solving the right problem by going out to the market to understand industry’s innovation and technology needs. • Consider the entire supply chain. Solutions need to cover the entire value chain of products and services. • Address both technological and economic risks. Removing both technological and economic barriers is key to delivering innovation in both the short and longer terms.
 SYSTEM LINKAGES	<ul style="list-style-type: none"> • Include governance, infrastructure and policy innovation. Do not create fragments of solutions, offer complete solutions that include the policy, regulatory and infrastructure innovation required to successfully implement new technologies. • Take a portfolio approach (across the innovation life cycle) with a focus on select technologies (broader than fossil fuels). Investment is required in solutions from new idea to commercialization and deployment – and we must invest in existing industries as well as explore new areas of promise. • Address multiple time scales (near and long-term wins). Industry deals in quarters; government deals in 3-4 year political cycles; and game-changing innovation takes decades. We need to deliver wins at all levels.

As indicated by stakeholders, funding to support all stages of technology development is critical to delivering innovative solutions for the climate change challenge. Figure three provides a simple, conceptual diagram of these stages, including some of the key funders within Alberta’s innovation system and the roles they have traditionally played. Critical investment gaps are often identified by the system in two areas: firstly in the investment “valley of death” between prototype and commercial scale; and secondly at the critical point where a product or technology that has been successfully demonstrated is commercially deployed and becomes a successful business.

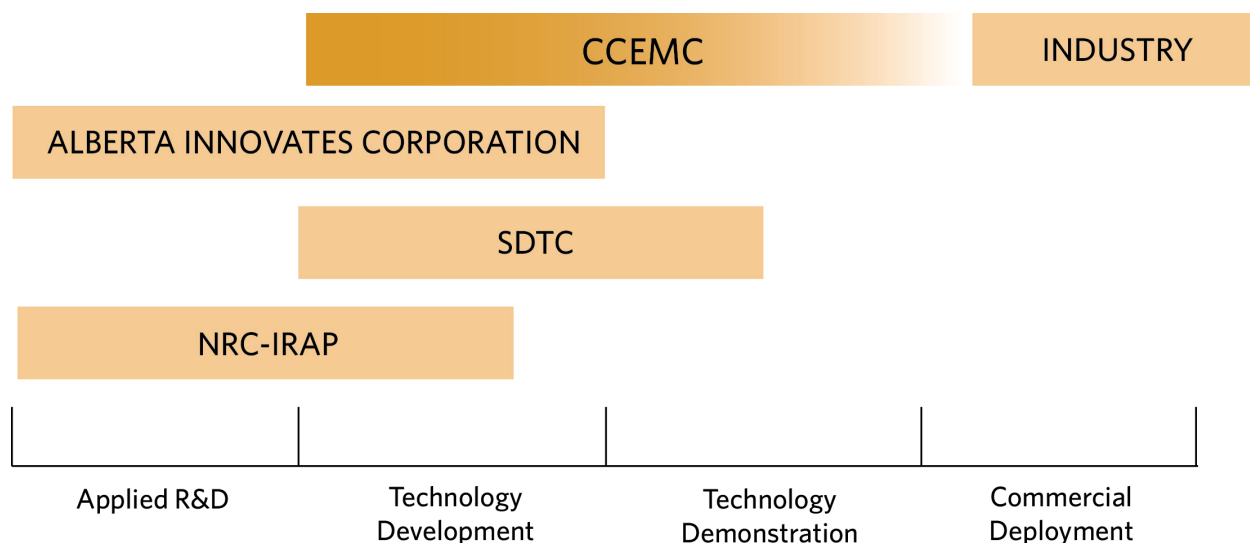


Figure 3: Innovation System Funding Solutions in Alberta

CCEMC is working with the Government of Alberta and other innovation system agents to address many of these challenges. Alberta's Research and Innovation Framework (ARIF), which is under development by the Government of Alberta with input from organizations like CCEMC and Alberta Innovates, will provide the strategic direction required for innovation partners to better work together to generate and apply knowledge that benefits Albertans. The ARIF will provide Innovation Targets for 2030 to help coalesce system players around common objectives. These will include targets to:

- Improve oil sands production efficiency and economics by decreasing greenhouse gas emissions by 50 percent per barrel;
- Generate up to 30 percent of Alberta's electricity generation from renewable sources; and
- Accelerate solutions to reduce methane emissions by 45 percent by 2025.



Figure 4: Alberta Research and Innovation Framework Construct

As part of the process to implement the Climate Leadership Plan, the Ministry of Economic Development and Trade is working with CCEMC and other players in the system to develop a Climate Change Innovation and Technology Framework that will help to:

- Ensure coordinated, high-impact investments in research innovation and technology;
- Support alignment of the research and innovation system's current capacity;
- Address the risk of making uncoordinated investments; and
- Advance government priorities and effectively deploy the funding within the research and innovation system to accelerate our provincial climate change and economic objectives.

In addition to the Government of Alberta objectives and funding, the Government of Canada has committed to providing national leadership and joining with the provinces and territories to take action on climate change. It has also committed that investment in clean energy, clean technology, and green infrastructure will play a critical role in protecting Canada's communities and growing its economy. This includes investment of \$2.9 billion over the next five years to reduce greenhouse gas emissions.⁵

3.0. CCEMC: A KEY PARTNER IN ALBERTA'S INNOVATION SYSTEM

3.1. Who We Are

CCEMC is the Government of Alberta's primary green technology investment tool. It allows the province to fully leverage the capacity of the innovation system in support of innovative technologies that will help Alberta be a leader in addressing climate change.

CCEMC accelerates the pace of technology development by providing non-dilutive funding that helps projects and companies attract significant capital more quickly. A funding commitment from CCEMC allows industry and technology developers to plan for and depend on it as a reliable financing source.

CCEMC can also help projects and companies overcome technological barriers by providing patient capital that does not demand short-term financial returns and by allowing researchers and technology developers alike the freedom to innovate without demanding intellectual property (IP) ownership. It also assists by sharing the financial uncertainty for research and development, which is inherently risky and by working closely with funded projects and companies to provide strategic guidance and business development advice.

CCEMC also accelerates the most promising technologies to market by fostering high-potential opportunities through follow-up funding opportunities. CCEMC also works with its partners to provide a comprehensive support system for innovators to help them move through the innovation system. In 2015/16 CCEMC, in cooperation with TEC Edmonton and Innovate Calgary, developed an educational video series that focuses on providing critical information to assist technology entrepreneurs to successfully launch their technologies and see them deployed in Alberta.

CCEMC enables promising technologies to advance and benefits Alberta by helping to maximize the value of both our renewable and non-renewable resources. By using a competitive process to seek out the best innovative solutions, CCEMC is supporting Alberta's efforts to diversify the economy and create jobs and GDP in new sectors. In addition, the technologies CCEMC supports have the potential to be deployed around the world, and contribute significantly to the global effort to address climate change.

CCEMC is funded by the Government of Alberta from the Climate Change and Emissions Management Fund (CCEMF). Under the Specified Gas Emitters Regulation (SGER), facilities that emit 100,000 tonnes or more of greenhouse gas emissions are required to annually reduce their emissions intensity by 15%. Facilities can comply by making improvements to their facilities; by using emission performance credits generated at facilities that achieve more than the required reductions; by purchasing Alberta-based carbon offset credits, or by contributing to the CCEMF. Facilities that contribute to the CCEMF currently pay \$20 for every tonne over their reduction target. The price increases to \$30 and the intensity reduction increases to 20% as of January 1, 2017.

⁵ *Growing the Middle Class*. Budget 2016. March 22, 2016. Government of Canada. Data accessed on April 20, 2016 (URL: <http://www.budget.gc.ca/2016/docs/plan/budget2016-en.pdf>)

Since its establishment in 2009, CCEMC has committed over \$320 million in funding to more than 100 projects. CCEMC projects have a combined value of more than \$2.2 billion and CCEMC's funding is leveraged by more than 5 to 1 – for every dollar invested by CCEMC, more than \$5 has been invested in innovative greenhouse gas reducing technologies.

CCEMC invests in solutions that are expected to deliver real greenhouse gas emissions. Its projects are estimated to reduce GHG emissions by more than 11 megatonnes by 2020. Figure three below shows CCEMC's projected emissions reductions by industry sector.

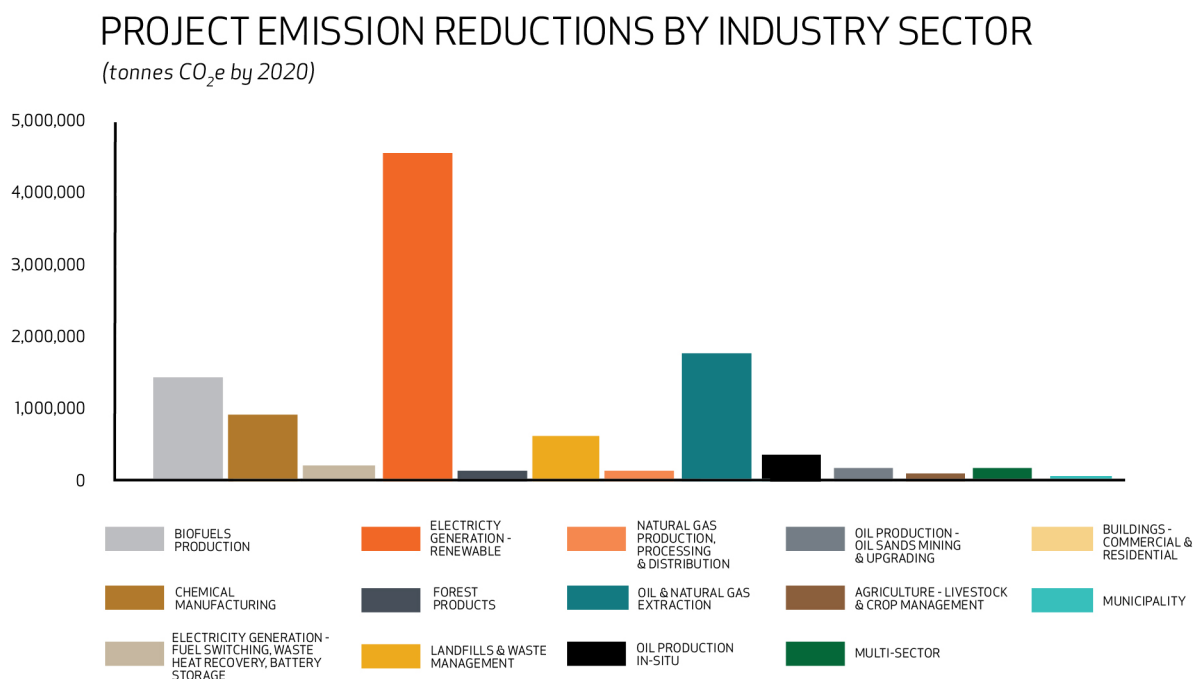


Figure 5: CCEMC Projected Emissions Reductions by Industry Sector

Advancing such innovation offers a host of economic benefits as well. According to a 2015 Conference Board of Canada report, the total economic impact (including direct, indirect, and induced effects) of CCEMC and related investments from 2011 to 2016 will be more than \$2.4 billion (2007 \$), indicating that for each dollar invested, economic activity is lifted by nearly \$1.90. In terms of the impact on jobs, the Conference Board of Canada estimates that an additional 15,017 person-years of full-time-equivalent employment will be added over the six-year period. The impact on GDP for Alberta is forecast to be \$1.95 billion.⁶

CCEMC takes a portfolio approach to its investments, which include projects to reduce GHG emissions from fossil fuels; renewable energy and bioenergy projects; energy efficiency and conservation; and projects to reduce costs associated with carbon capture and carbon conversion.

CCEMC has committed more than 42% of its investments to advancing renewable energy, more than any other sector. Approximately 33% of CCEMC investments support efforts to reduce emissions from in situ oil production, oil sands mining and upgrading. CCEMC has committed 6% of its investments to efforts to reduce GHG emissions from oil and gas extraction, including three projects that address methane emissions.

⁶ McIntyre, Jane, Pedro Antunes. *Investing in GHG Emissions-Reduction Technology: Assessing the Economic Impact*. February 2015. The Conference Board of Canada. Data accessed April 19, 2016 via the University of Alberta Libraries databases.

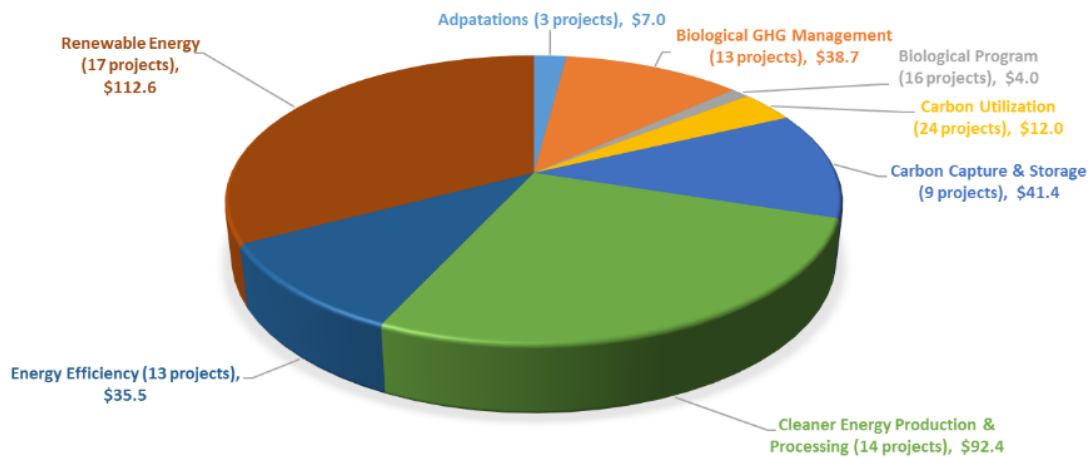


Figure 6: CCEMC Portfolio Composition (as of February 12, 2016)

More specifically, CCEMC has invested in a number of promising technologies including:

- **Eliminating the need for steam in the oil sands.** CCEMC is supporting several projects that focus on this problem, including ESEIEH (pronounced “easy”), a consortium that includes an international communications and IT company, and several oil sands developers. CCEMC is working with ESEIEH to demonstrate their proprietary technology that replaces the need for steam in situ bitumen extraction by using electromagnetic heating in combination with solvent dilution in Alberta.
- **Developing renewable fuels.** CCEMC is supporting a project to scale up technology that develops a renewable diesel fuel from non-food grade canola and other oils that is virtually indistinguishable from diesel and can be used directly in today’s diesel engines. The SBI BioEnergy product can be used for the purposes of Alberta’s Renewable Fuels Standard, which requires renewable fuels to be blended with fuels that are sold to consumers. Today, Alberta must import renewable fuels to support the standard.
- **Reducing methane emissions from oil and gas sector.** CCEMC invested in a trio of projects to support Alberta oil and gas producers in understanding and implementing projects to reduce methane emissions. These projects demonstrated what was possible and also required that projects share their learnings with all industry players to support and encourage broader adoption.
- **Advancing biological solutions.** CCEMC’s Biological GHG Management Program, administered in partnership with Alberta Innovates Bio Solutions, is a unique program that allows CCEMC to accelerate innovative projects focused on reducing emissions from agriculture, forestry or municipal wastes, or using biological products or processes to reduce emissions from other sectors. This program is designed to help us reach faster and deeper carbon emission reductions by addressing knowledge gaps, linking science to industry and aiding in the deployment of carbon management strategies.

3.2. Our Organization

The CCEMC is a delegated administrative organization, which is incorporated under the *Canada Not For Profit Corporations Act*. While the CCEMC is arm’s length of the Crown, there are a host of regulatory and contractual mechanisms in place to ensure accountability to the government and responsibility for environmental stewardship in Alberta. These include a designating regulation, the *Climate Change and Emissions Management Fund Administration Regulation* and a memorandum of understanding. The Chair of the CCEMC is appointed by the Minister. Like all DAOs, the CCEMC is required to annually submit a business plan and an annual report to the Minister and is subject to the *Freedom of Information and Protection of Privacy Act*.

In 2014 CCEMC asked MNP LLP to conduct an internal review of its costs, operations and service providers. The review indicated that CCEMC is efficient – comparing well to other organizations providing similar services. However, it was identified that we could do better.

In December 2015 CCEMC's structure changed from a team of independent service providers managed by a contracted executive director and came under the leadership of an in-house Interim Chief Executive Officer. Two dedicated staff were added to bring internal operational, financial, strategic policy and planning capacity to the organization.

Steps were taken to streamline process and eliminate low priority expenditures or duplication of effort. The provision of services has been rationalized, with some services being terminated or cut back substantially. Operating expenditures for 2015/16 will come in 24% under budget, and the 2016/17 budget will see a reduction of 15% from the 2015/16 budget as service providers implement additional actions to improve operational effectiveness and efficiencies.

From a strategic standpoint, CCEMC is acutely aware of the shifting global mindset and the alignment of governments, industry and individuals around the common goal of addressing climate change, and of the key role innovation and technology will play. It has heard loud and clear from the Government of Alberta, industry and thought leaders in Alberta's innovation system that they have clear desired outcomes in mind, but there are significant challenges to achieving them that CCEMC can help address.

4.0. CCEMC: SUCCESSFULLY ACCELERATING CLIMATE CHANGE INNOVATION

Alberta has committed to becoming a leader in addressing climate change, and CCEMC is a critical asset through which the Government of Alberta is demonstrating its commitment to achieving greenhouse gas emissions reductions in not only Alberta but to achieve an overall lower carbon world. Moreover, the CCEMC model enables the Government of Alberta to leverage industry funds to support climate change innovation while providing industry with a clear line of sight for how contributions to the CCEMF are used.

CCEMC will help deliver on Alberta's Climate Leadership Plan priorities by:

- Accelerating bold solutions that reduce greenhouse gases at home and abroad;
- Bolstering the alignment of innovation system agents in support of Alberta's climate change goals;
- Seeking out solutions that are in demand by Alberta's market;
- Providing direction and support to Alberta's entrepreneurs in Alberta's climate industries;
- Working with partners at home and abroad to deliver on common objectives; and
- Helping to build a more diversified economy that attracts investment and expands market access.

CCEMC's most recent funding rounds included our Grand Challenge, which committed \$35 million in funding to identify innovative technologies that will convert carbon dioxide emissions into new carbon-based products and markets. The Grand Challenge is a three-stage competition with opportunities for funding at each stage. The process enables CCEMC to support the development of multiple ideas that can progress simultaneously. In the first stage, CCEMC awarded \$12 million through 24 grants of \$500,000. Phase Two of the Challenge closed on February 1, 2016 and will see up to \$15 million awarded through five \$3 million grants. The final phase will award a final winner with \$10 million and will see the technology commercialized in Alberta.

Recent calls also leveraged the opportunity for partnership with likeminded organizations. CCEMC's joint call for proposals with Sustainable Development Technology Canada (SDTC) closed April 13, 2016 and made a total of \$40 million available to small and medium sized businesses. A maximum of \$10 million is available to individual GHG reducing technologies that are deployable in Alberta and that are focused on energy efficiency and conservation, new and better uses of carbon dioxide, methane reduction, or cleaner energy production and usage.

CCEMC demonstrated its desire to support the needs of government and industry with the decision not to proceed with its 11th funding round, which focused on shovel ready projects and near term emissions reductions, as CCEMC wanted to ensure alignment with the Climate Leadership Plan. CCEMC has also reviewed and elected to discontinue projects that were not delivering on expected outcomes.

CCEMC's investments add value when focused in the pre-commercial to field demonstration stage, helping to address a critical investment gap. However, CCEMC can also play a role in helping government connect and steward projects and solutions through the system. CCEMC is well positioned to support small, medium, and large innovative climate focused ideas, projects and companies along the commercialization pathway.

CCEMC is also well positioned to partner with other organizations and jurisdictions that support innovative and clean technology development. As in the case of its recent partnership and joint call with SDTC, CCEMC can partner to leverage funds and capacity in other jurisdictions, whether provincial, federal or international, in support of Alberta's and the world's climate and innovation objectives.

CCEMC provides an existing mechanism through which to demonstrate action towards climate change and innovation policy outcomes while government makes final decisions regarding Climate Leadership Plan implementation details. Investments are structured to ensure direct benefits to Alberta, and CCEMC has direct connections to industry that can help validate areas of market pull (the problems that they need to solve).

5.0 CCEMC STRATEGIC PRIORITIES

Alberta has articulated its strategic climate change desired outcomes and priorities through the Climate Leadership Plan. We know that innovation and technology will play a critical role. We have heard from key players in the innovation system that there are important challenges and areas for innovation success that must be addressed in order to deliver on those outcomes.

CCEMC cannot address these challenges and deliver on the desired outcomes alone – however through the strategic priorities outlined below, CCEMC is demonstrating how it fits within the Alberta innovation system and how it will play a key role in achieving success. These strategic priorities will help guide and shape CCEMC's activities going forward, including its investment priorities.

CCEMC's future funding rounds will seek to accelerate solutions that align with Alberta's climate change priorities as articulated in the Climate Leadership Plan, while reflecting areas of market pull as identified by engagement with industry. Our calls will support greening of existing industries and historical areas of strength, such as our oil and gas sectors, as well as help identify and support technologies in new industries in support of economic diversification, such as our growing renewable and bioenergy industries. CCEMC will also be exploring opportunities to allow promising emerging ideas to be considered for funding outside of these formal calls. In all cases, CCEMC's investments will be structured to ensure direct benefits to Alberta.

Directed innovation will play an increasingly important role in determining CCEMC's investment priorities. Directed innovation for CCEMC involves defining a select number of bold, ambitious greenhouse gas reduction technology development initiatives so that they are more easily understood and can be solved by innovation providers. The bold outcomes are then unpacked into a series of deliverables that in sum allow attainment of the outcome. This allows us to use innovation to forge a deliberate future, rather than accepting more passive futures.

Although CCEMC's enabling legislation allows for the Corporation to fund technologies and projects in support of climate change adaptation, CCEMC's funds and expertise can best add value by focusing on technologies in support of climate change mitigation.

While CCEMC investment can support projects throughout the technology development continuum, CCEMC's technological expertise and funding capacity lends itself to targeting an area of known need between prototype and technology scale-up.

2016 – 2019 Strategic Priorities

To achieve its vision and mandate, CCEMC will:



- 1** **reduce GHG emissions**
Fund innovative solutions that result in meaningful greenhouse gas emissions reductions in Alberta and contribute to a lower carbon world.
- 2** **advance innovation system priorities**
Leverage our strengths to contribute to critical climate change innovation priorities in Alberta.

To deliver on priorities 1 and 2, CCEMC will:

- 3** **measure and communicate success**
Define and report on metrics to demonstrate results.
- 4** **achieve operational excellence**
Strive for excellence in operations and efficiency while maintaining responsiveness to stakeholders and funders.





STRATEGIC PRIORITY #1: REDUCE GHG EMISSIONS

Fund innovative solutions that result in meaningful greenhouse gas emissions reductions in Alberta and contribute to a lower carbon world.

<p>what we plan to do</p>	<ul style="list-style-type: none"> Invest in both open and directed innovation opportunities that reduce greenhouse emissions. Invest in innovation that aligns with the Climate Leadership Plan and addresses an identified market need. Engage in active management of the CCEMC portfolio both at the board and management levels (e.g. breadth and depth of technology / innovation type). 				
<p>what we plan to deliver</p>	<ul style="list-style-type: none"> Innovative technology solutions identified through a minimum of two funding calls per year focused in areas such as: <ul style="list-style-type: none"> Methane emissions detection and reduction; Next generation technologies to reduce emissions from the oil sands; Energy storage and smart grid; and Industrial and municipal waste to value-added. Fund innovative projects focused on reducing emissions from agriculture, forestry or municipal wastes, or using biological products or processes to reduce emissions from other sectors.  Ongoing quantitative sectoral greenhouse gas emissions analysis to inform CCEMC investment portfolio mix. Public reporting of project outcomes including delivery of GHG reductions and learnings from technology development.  				
<p>what we seek to accomplish</p>	<table> <tr> <th data-bbox="479 1113 941 1144">At CCEMC:</th><th data-bbox="958 1113 1421 1144">Within the Innovation System:</th></tr> <tr> <td data-bbox="479 1144 941 1621"> <ul style="list-style-type: none"> Technology solutions funded, in part, by CCEMC, that result in meaningful GHG emission reductions. Technological learnings and knowledge sharing to help accelerate commercial deployment of greenhouse gas reducing technologies. Measurable jobs (temporary and permanent), GDP creation in new sectors, and economic benefit created in Alberta from projects funded, in part, by CCEMC. </td><td data-bbox="958 1144 1421 1621"> <ul style="list-style-type: none"> Projects and initiatives supported that enhance our knowledge of science, markets, economics or other factors that can lead to greater GHG emissions reductions. Increased investment by private sources in technologies that are demanded by the marketplace, diversify Alberta's economy and increase employment in the short and long term. </td></tr> </table>	At CCEMC:	Within the Innovation System:	<ul style="list-style-type: none"> Technology solutions funded, in part, by CCEMC, that result in meaningful GHG emission reductions. Technological learnings and knowledge sharing to help accelerate commercial deployment of greenhouse gas reducing technologies. Measurable jobs (temporary and permanent), GDP creation in new sectors, and economic benefit created in Alberta from projects funded, in part, by CCEMC. 	<ul style="list-style-type: none"> Projects and initiatives supported that enhance our knowledge of science, markets, economics or other factors that can lead to greater GHG emissions reductions. Increased investment by private sources in technologies that are demanded by the marketplace, diversify Alberta's economy and increase employment in the short and long term.
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<p>where we plan to have impact</p>	<ul style="list-style-type: none"> Accelerate bold solutions that reduce GHG emissions in Alberta, Canada, and internationally. Increase global reputation for Alberta and Canada as an effective steward of the environment. Alberta achieves greater economic diversification through industries supported by the innovation system. Increased attraction of investment to Alberta. 				

STRATEGIC PRIORITY #2: ADVANCE INNOVATION SYSTEM PRIORITIES









Leverage our strengths to contribute to critical climate change innovation priorities in Alberta.

what we plan to do	<ul style="list-style-type: none"> Rebrand the organization to raise awareness and emphasize CCEMC's contribution to the province's climate change and innovation policy objectives. Define CCEMC's role in the innovation value chain in order to better move projects, solutions and companies through the entire system, including pulling projects up the pipeline (e.g. from Alberta Innovates) and supporting projects that 'graduate' from CCEMC's portfolio. Maintain existing and establish new partnerships that maximize and leverage our shared investment capacity and expertise (e.g. Alberta Energy Efficiency Agency, Alberta Innovates, COSIA, Ontario Centres of Excellence, SDTC). Engage in targeted outreach, collaboration and communications to help educate key stakeholders and to inform policy development. Drive development of a climate leadership innovation and technology roadmap that informs and measures contribution of future investments. Provide greater international engagement through shared value partnerships to raise the awareness of CCEMC's strengths and credibility as an organization that reduces GHG emissions and is contributing to a lower carbon world. 	
what we plan to deliver	<ul style="list-style-type: none"> Funding calls structured to leverage investment from our key partners (e.g. federal and provincial governments, municipalities, industry partners, etc.) Collaborative resources available to and utilized by relevant entrepreneurs. Demonstrate progress in support of targets and deliverables defined in the Alberta Research and Innovation Framework and the climate change innovation and technology roadmap. Annual report demonstrating CCEMC's contribution to government priorities and the innovation system. 	   
what we seek to accomplish	<p>At CCEMC:</p> <ul style="list-style-type: none"> Strong strategic partnerships in Alberta, Canada, and internationally that accelerate technology development in Alberta and build CCEMC's reputation (e.g. SDTC joint funding and resource sharing) CCEMC's strengths and contributions aligned with and supported by provincial and federal governments. 	<p>Within the Innovation System:</p> <ul style="list-style-type: none"> More effective support resources available to technology entrepreneurs. Investment is leveraged to create larger pools of capital for innovation and technology than would otherwise be available. Cross pollination of ideas, actions, and shared resources are the way of doing business between interconnected organizations.
where we plan to have impact	<ul style="list-style-type: none"> More efficient and effective use of publicly funded programs focused on stimulating GHG emission reducing technology deployment. 	

- Work with partners provincially, nationally, and internationally is aligned and delivering on common priorities and goals.
- Increased attraction of investment to Alberta.
- Successful and profitable companies commercialize solutions demanded by the market place.





STRATEGIC PRIORITY #3: MEASURE AND COMMUNICATE SUCCESS

Define and report on metrics to demonstrate results.

what we plan to do	<ul style="list-style-type: none"> Celebrate and communicate our expertise, successes, and learnings. Active monitoring and stewardship of current and future funded technology projects. Review and revise operating activities to maximize contribution to Government of Alberta priorities. Demonstrate the return on CCEMC's investments. 	
what we plan to deliver	<ul style="list-style-type: none"> Benchmark study and ongoing assessment of the level of awareness of and attitudes toward CCEMC. Semi-annual review of alignment of operating activities with government priorities. Annual report published on CCEMC website. Disclosure of total amount of funds invested in projects. Disclosure of project outcomes and impacts, including total GHG emission reductions. Quarterly reporting to the Government of Alberta regarding measures of success (e.g. 2030 innovation targets). Increased measurement of CCEMC's contribution towards economic diversification, GDP creation in new sectors, and job creation. Work with government to develop and track portfolio-based performance measures aligned with government priorities and market needs. 	       
what we seek to accomplish	<p>At CCEMC:</p> <ul style="list-style-type: none"> CCEMC is viewed by government and other stakeholders as an accountable and transparent funder of solutions to reduce greenhouse gases. 	<p>Within the Innovation System:</p> <ul style="list-style-type: none"> CCEMC is viewed by government and other stakeholders as an effective partner for accelerating solutions to reduce greenhouse gases through the innovation system.
where we plan to have impact	<ul style="list-style-type: none"> Increased public confidence in Alberta's investment in GHG emission reduction technologies. Increased confidence in the federal and other provincial governments in Alberta's action on climate change. Increased global reputation regarding Alberta's environmental stewardship efforts and results. 	

STRATEGIC PRIORITY #4: ACHIEVE OPERATIONAL EXCELLENCE

Strive for excellence in operations and efficiency while maintaining responsiveness to stakeholders and funders.

<p>what we plan to do</p>	<ul style="list-style-type: none"> • Improve the CCEMC intake process and make the decision making cycle more efficient, including exploring opportunities for continuous intake and directed investment. • Examine CCEMC's investment portfolio to ensure it is optimizing solution delivery, including its investment focus, composition, and the suite of supports it provides. • Build our corporate capacity by maintaining a strong link to Alberta Innovates Energy and Environment Solutions and other key service providers. • Create a sustainable and predictable funding model. • Develop a "market-pull strategy" to ensure CCEMC is investing in solutions that are demanded by industry.
<p>what we plan to deliver</p>	<ul style="list-style-type: none"> • Decrease turnaround time from the beginning of a call to the approval of funded projects.  • Investment in projects in strategic focus areas (e.g. renewable energy, energy efficiency, cleaner energy production and processing, carbon capture and utilization, etc.).  • Multi-year funding commitment to the innovation system.  • Articulated model where government and industry can best continue to share in the return on projects. 
<p>what we seek to accomplish</p>	<div> <div> <p>At CCEMC:</p> <ul style="list-style-type: none"> • Measurable organizational results aligned with stated goals and budgets. </div> <div> <p>Within the Innovation System:</p> <ul style="list-style-type: none"> • CCEMC's operations contribute to overall innovation system goals and objectives. </div> </div>
<p>where we plan to have impact</p>	<ul style="list-style-type: none"> • Recognition of Alberta as an innovation and technology leader in a lower carbon world.

6.0. MEASURING SUCCESS

Performance management for CCEMC is critical to demonstrate that the corporation is delivering results that are consistent with its mandate, vision, strategic objectives, established goals, and core values. Relevance, quality, and performance are important dimensions of the organization's performance.

CCEMC is an integrated partner of the overall innovation system that has been established and its efforts are aligned with the system's defined provincial, national, and international metrics. To demonstrate its contribution, CCEMC will track and report on CCEMC Output metrics on a cumulative and an annualized basis.



financial / economic

- Public reporting on each funded project's achievements:
 - GHG emission reductions
 - Amount invested
- Reporting on achievements and contributions to economic diversification, GDP creation in new sectors, and job creation



technical / innovative

- Number of open funding rounds per year
- Number of directed innovation funding rounds per year
- Number of joint funding calls per year
- Reporting on achievements and contributions to provincial priorities and goals
- Number of collaborative resources developed
- Investment in projects in strategic focus areas (e.g. renewable energy, energy efficiency, cleaner energy production and processing, carbon capture and utilization, etc.)



community focused

- Semi-annual report on alignment of operating activities with government priorities
- Report demonstrating contribution to innovation system measures of success (e.g. 2030 innovation targets)
- Report on level of awareness of and attitudes toward CCEMC



environmental

- Amount of GHG emission reductions achieved by each funded project
- GHG and environmental benefits from funded projects
- Reporting on achieving and contributing to provincial, national, and international priorities and goals
- Investment in projects in strategic focus areas (e.g. renewable energy, energy efficiency, cleaner energy production and processing, carbon capture and storage, carbon utilization, etc.)

7.0. OPERATING BUDGET

Climate Change and Emissions Management (CCEMC) Corporation					
Budget Forecast 2016/17-2018/19					
	2015/16	2015/16	2016/17	2017/18	2018/19
	Budget	Forecast	Budget	Budget	Budget
	\$	\$	\$	\$	\$
Revenue					
Grant revenue	70,000,000	-	70,000,000	70,000,000	70,000,000 (a)
Interest income	3,357,234	3,461,384	3,156,544	2,692,089	2,423,815 (b)
Total Revenue	73,357,234	3,461,384	73,156,544	72,692,089	72,423,815
Program Expenditures	133,990,062	30,723,862	95,150,760	83,243,724	92,157,117 (c)
Revenue less Program Expenditures	(60,632,828)	(27,262,478)	(21,994,216)	(10,551,635)	(19,733,302)
Operating Expenses					
General & Administrative Expenses					
Corporate costs (i.e. phone, printing, meals & travel)	60,000	80,000	80,000	81,600	83,232
Insurance	11,000	20,000	20,000	20,400	20,808
GST expense	225,000	165,098	156,000	150,000	157,000
Total General & Admin Expenses	296,000	265,098	256,000	252,000	261,040 (d)
Contractor / Service Provider Expenses					
Administration, financial risk reviews, GhG reviews, project monitoring and internal project audits	1,951,153	1,422,600	1,650,845	1,683,862	1,717,539 (e)
Project review, evaluation and management	951,567	873,208	1,046,627	1,067,560	1,088,911 (f)
Legal	500,000	500,000	440,000	448,800	457,776 (g)
Operations	496,800	501,456	415,000	423,300	431,766 (h)
Communications	1,828,149	1,437,475	794,975	810,875	827,092 (i)
Commercialization Support	300,000	200,000	251,000	256,020	261,140 (j)
Total Mgmt Support Contractors	6,027,669	4,934,739	4,598,447	4,690,416	4,784,224
Other Contracted Services and Special Initiatives					
Consulting contracted services	795,000	147,500	400,000	400,700	401,414 (k)
Grand Challenge	725,000	684,600	-	-	- (k)
Outreach	150,000	10,000	50,000	50,000	50,000 (l)
Biological Program	750,000	529,070	595,000	400,000	400,000 (m)
International Network Program	-	-	125,000	225,000	325,000 (n)
Adaptation Program	150,000	68,000	-	-	- (o)
CCEMC Conference Costs	75,000	10,000	250,000	-	75,000 (p)
Total Other Contracted Services and Special Initiatives	2,645,000	1,449,170	1,420,000	1,075,700	1,251,414
Governance					
Board remuneration and expense	125,000	75,000	75,000	76,500	78,030 (q)
Professional fees (i.e. audit)	45,000	45,000	45,000	45,900	46,818 (r)
Total Governance	170,000	120,000	120,000	122,400	124,848
Total Operating Expense	9,138,669	6,769,007	6,394,447	6,140,516	6,421,526
Surplus / (Deficiency) of Funds for the year	(69,771,497)	(34,031,485)	(28,388,663)	(16,692,151)	(26,154,828)
Total Funds Under Management - beginning of year	296,464,555	296,464,563	262,433,078	234,044,415	217,352,265 (s)
Total Funds Under Management - end of year	226,693,058	262,433,078	234,044,415	217,352,265	191,197,437
Committed Funds for Approved Projects	482,295,024	371,494,241	470,494,241	534,494,241	598,494,241 (t)
Total Project Funds paid to date	(249,286,473)	(146,020,268)	(241,171,028)	(324,414,752)	(416,571,869)
Remaining Funds required to fulfill approved project commitments	233,008,551	225,473,973	229,323,213	210,079,489	181,922,372
Uncommitted Funds	(6,315,493)	36,959,105	4,721,202	7,272,776	9,275,065
Operating costs as a % of Funds Required to Fulfill Approved Project Commitments	3.9%	3.0%	2.8%	2.9%	3.5% (u)

Notes and assumptions

- (a) *Grant Revenue* for all three years is forecast to be \$70 million per year. CCEMC's allocation is decided each year after the compliance deadline has passed. CCEMC's Grant agreement and MOU with the Government of Alberta is currently expired and renewal is expected in the coming months. The FY16 Grant allocation and payment remains outstanding as of budget preparation.
- (b) *Interest income* has been based on cash flow projections for the Corporation. Interest rate assumptions are based on interest rates currently being earned by the Corporation at 1.20% for the Premier Investment Account for amounts held over \$225M and 0.90% for the Operating Account.
- (c) *Program expenditures* have been budgeted based on signed contribution agreements or on a set of assumptions regarding approved and anticipated funding for projects.
- (d) *General and Administration Expenses* are budgeted to be consistent with the current year and the new operational model for CCEMC.
- (e) *Administration, due diligence, project monitoring and internal project audits* costs are anticipated to increase in FY17 over the actual FY16 expenditures primarily due to increased activity related to Rounds 12, 13 and Grand Challenge. This has been offset by a decrease in Project Audit costs (fewer forecast audits in FY17) and other OMC and strategic related initiatives based on the current CCEMC operating model. Overall a decrease of 15% from the FY16 budget has been achieved.
- (f) *Project review, evaluation and management* costs are expected to increase for FY17 due to the increase in activity related to Rounds 12, 13 and Grand Challenge Round 2.
- (g) *Legal* costs are expected to be consistent with FY16 budget and forecast results
- (h) *Operations* costs are expected to be in line with the current interim contracts. This represents a 9% reduction from FY16 budget.
- (i) *Communications* costs have been contemplated in conjunction with a CCEMC Communications Plan for FY17. This has been reviewed by the Communications Committee of the CCEMC Board of Directors.
- (j) *Commercialization Support* costs have been budgeted in FY17 to be 16% lower than the FY16 budget. Reduction related to decreased engagement of eligible proponents for commercialization support.
- (k) *Consulting Contracted Services* include research consulting costs to support the RFP process and costs related to the Grand Challenge. A significant reduction is budgeted for FY17 as a result of the Round 2 Grand Challenge project solicitation process nearing completion.
- (l) *Outreach* costs are budgeted to be consistent with the FY16 budget. FY16 actual costs were lower due to transitional issues with the CCEMC and the Government of Alberta. This is expected to resolve in FY17.
- (m) *Biological Program* is budgeted to extend for one year and the cost is consistent with historical spend for this program over the past 3 fiscal years. Approximately \$2 million remains to be allocated to Biological projects from the original \$6 million allocated in FY12.
- (n) *International Network Program* is a new initiative for the CCEMC in FY17 to enable the CCEMC to identify and assess international partnership or program opportunities.
- (o) *Adaptation Program* costs for FY16 represented a new initiative for the CCEMC and included costs associated with a Symposium and a Leader's Forum. No initiatives are budgeted for FY17.
- (p) *Zero2017 Conference* is expected to be held in April 2017. Costs represent CCEMC's anticipated net investment in the conference.
- (q) *Board remuneration and expense* budget remains consistent with the current year forecast.
- (r) *Professional fees* comprise audit fees and remain consistent with the current year forecast.
- (s) Based on Cash flow model for the month ended December 31, 2015. Represents CCEMC's total funds under management.
- (t) Based on actual funding approved for remaining active projects in Round 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Grand Challenge, Adaptation and Biological and assumptions for Rounds 12. For future approved rounds, this has been based on estimates. Funds are shown as committed once the EOI cycle has started for a particular round.

	\$	
Round 1	56,972,722	
Round 2	24,076,714	
Round 3	10,000,000	
Round 4	36,023,000	
Round 5	4,093,569	
Round 6	6,716,405	
Round 7	26,304,788	
Adaptation	6,990,662	
Biological	6,000,000	Note: Includes \$2.0 million for future projects
Grand Challenge	36,953,765	Note: Includes \$25 million for Rounds 2 & 3
Round 8	9,161,141	
Round 9	15,558,175	
Round 10	97,643,300	
Accelerator Fund	15,000,000	
Round 12	20,000,000	Note: EOI process began in Q4 FY16
	371,494,241	
<hr/>		
Future Rounds	\$	
2016/17	99,000,000	Note: Includes forecast of \$67 million for Round 13 and Directed Innovation & \$32 million for Round 14
2017/18	64,000,000	Note: Includes forecast of \$32 million each for Round 15 & 16
2018/19	64,000,000	Note: Includes forecast of \$32 million each for Round 17 & 18

- (u) This metric represents total CCEMC Operating costs for the year as a percentage of the funds required to fulfill all remaining project commitments approved by the CCEMC Board of Directors.
- (v) This budget is dependent on the level of financial support and direction from the Government of Alberta. Should the Grant vary materially from \$70 million, the operating budget will be adjusted to reflect the associated changes in activity level.