

109

IDEAS FOR CHANGE



CCEMC

*CLIMATE CHANGE AND EMISSIONS
MANAGEMENT CORPORATION (CCEMC)
ANNUAL REPORT 2014/2015*

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This annual report has been converted from its original format of an interactive website. For the full experience of the report, please visit www.ccemc.ca/annual-report-2015

INTRODUCTION

The past year has been earmarked by change for the CCEMC. We welcomed a new Chair and a new government. As we prepare this report, a new approach to address climate change in Alberta is taking shape, and it will set the focus for the CCEMC in the years ahead.

We're changing too. Six years in, we took careful stock of our performance, and this year, we began reshaping our organization to ensure we can respond and adapt to the needs of a world in transformation.

In the midst of this dynamic environment, we have made good progress, inviting new submissions and adding new projects to our portfolio. We've committed funding to a total of 109 projects, and each of them play a role in helping Alberta reduce GHG emissions or adapt to climate change. We are pleased with the progress of our projects, and are proud of the completed projects that reduce GHG emissions in Alberta every day.

We know the year ahead will hold many more changes for the CCEMC, but funding projects that help Alberta to reduce GHG emissions will remain our focus and our constant quest.

This is our story. It's a glance back to the past year, and the bright ideas that will lead us into the future.



CCEMC ACHIEVEMENTS TO DATE

109

Number of projects

\$359.7 MILLION

CCEMC investment

\$2.3 BILLION

Total value of projects

5.5:1

Investment leverage

12.7 MEGATONNES BY 2020

Estimated GHG reductions in Alberta - equivalent to removing more than 2.5 million cars from the road

12,000 PERSON YEARS OF FTE EMPLOYMENT

Estimated employment impact of CCEMC supported projects in Alberta between 2011 and 2016, according to the Conference Board of Canada

\$1.95 BILLION

Forecast total economic benefit of CCEMC projects for Alberta between 2011 and 2016, according to the Conference Board of Canada

LETTER FROM THE CHAIR

PROGRESS IN A CHANGING WORLD

Our world is changing. In 2014, the United Nations Intergovernmental Panel on Climate Change said human influence on the climate system is clear and that climate warming is unequivocal. Leaders of all stripes are raising their voices to call on the world to address climate change as a moral imperative.

Here, at home in Alberta, we have made quiet progress. We saw the Province of Alberta strengthen the Specified Gas Emitter's Regulation, with increasing levies over time. By the time this report is published the government will have released a new approach to address climate change. CCEMC played an active role in these changes, providing input and information to support the province in their work to help Alberta transition to a lower carbon economy.

Over the past fiscal year, CCEMC added several projects to its portfolio with a commitment of \$153 million in funding. With this commitment, our projects to date are estimated to reduce cumulative GHG emissions by 12.7 megatonnes by 2020. This number could grow substantially if the technologies we support are adopted and deployed more broadly in the marketplace.

CCEMC will shift direction to support the new climate change plan and help Alberta to address its climate change objectives. Over the past year, we reflected on our progress to date and decided that we could do better. We completed a comprehensive review and identified a number of shifts to operations and governance to prepare for the journey ahead.

Transformative technologies will continue to be an important part of our balanced portfolio as well. Investments are required now to advance innovative, developing technologies that will transform whole industries and provide significant emissions reductions for Alberta in the decades ahead as we transition to a lower carbon world.

CCEMC has made substantial progress toward its goals during a very complex time. As the new Chair, it's my pleasure to recognize the outstanding work of our former Chair and good friend Eric Newell, Vice Chair David Lewin, and our departing board members. Their counsel and wise guidance has served the CCEMC well, and helped us chart a course forward.

Kathy Sendall
Chair, Climate Change and Emissions Management (CCEMC) Corporation

BOARD OF DIRECTORS



Kathleen Sendall, C.M.
Chair



Doug Beever



Rick Blackwood



Jim Carter, O.C.



Paul Clark



Dr. Joseph Doucet, PhD.



Iris Evans



Dr. Brenda Kenny, PhD.



Dr. Robert Mansell, PhD.



Patricia Mohr



Stephen Snyder



Aleasa Tasker



Dr. Dan Wicklum, PhD.



Dr. David Lewin



Charlie Fischer

CCEMC board members Eric Newell, Shannon Flint, Lorna Rosen, David Lynch, Patrice Merrin and Aaron Falkenburg left our board during the fiscal year. The CCEMC gratefully acknowledges their contributions and guidance over the past year.

A YEAR OF DYNAMIC CHANGE. A YEAR OF MEASURABLE SUCCESS.

Greenhouse gas emissions and climate change are continuing to impact our world. Accelerating actual and sustainable reductions in greenhouse gas emissions, supporting climate change adaptation, and collaboration in the discovery, development and deployment of technology for application in Alberta is the mission of the CCEMC.

Funded by the Alberta Government's Climate Change and Emissions Management Fund (CCEMF), the CCEMC invests compliance money from Alberta's large-scale industrial emitters into clean technology projects. We play a key role in helping the Government of Alberta meet its GHG reduction objectives, while funding projects that provide jobs and strengthen the economy.

This past year has been one of transformative change for the CCEMC, the province of Alberta and the global markets. With this change has come a renewed focus within the CCEMC. In the years ahead, our portfolio will continue to focus on projects that provide real reductions in GHG emissions and real change for Alberta.



2014/2015 RESULTS

OUR YEAR IN FUNDING PROJECTS

2015 PERFORMANCE

This year, we committed funding to projects that will help to reduce GHG emissions across Alberta's industry sectors including agriculture, forestry, power generation and in the oil sands.

REAL CHANGE. MEASURED RESULTS.

The CCEMC tracks and reports on the following metrics:

- **GHG Reductions** - Amount of GHG emissions at the project level predicted to be reduced from a business-as-usual scenario and an assessment of possible market penetration as anticipated from the projects approved. Reporting will be done on a cumulative and an annualized basis and against specified reporting periods such as 2020.
- **Fund Allocations** - CCEMC funds allocated to sectors and strategic investment areas.
- **Leverage** - Leveraged funding through projects, partnerships and collaboration.
- **Project Success** - Successful, challenged or incomplete projects (status), the extent projects span or progress along the innovation spectrum, attrition and where possible, relevant co-benefits.
- **Adaptation** - Success in informing public policy and building capacity to adapt.
- **Corporate Efficiency** - Ability of CCEMC to run operations as efficiently as possible.

Progress for many of these indicators is updated quarterly and reported on the CCEMC website at **CCEMC.ca**.

2014/2015 RESULTS

OUR YEAR IN FUNDING PROJECTS

2015 PERFORMANCE

BIOLOGICAL GHG MANAGEMENT PROJECTS

Alberta has the potential for up to 23 megatonnes of greenhouse gas reductions from biological sources. This is a significant opportunity. In 2013 the CCEMC issued a request for proposals for projects that reduce GHG emissions or enhance carbon sequestration from biological sources.

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Number of Approved Projects

\$192.7 MILLION

Total Project Value

\$23.3 MILLION

CCEMC Contribution

600,000 TONNES BY 2020

GHG Reductions

2014/2015 RESULTS

OUR YEAR IN FUNDING PROJECTS

2015 PERFORMANCE

BIOLOGICAL PROGRAM

The CCEMC partners with Alberta Innovates Bio Solutions to fund initiatives that reduce emissions from biological sources such as crop and livestock production, the forest industry and municipal waste handling. By exploring new areas to create leading-edge solutions, the projects funded through this program could make a significant contribution towards Alberta achieving its reduction targets. This program funds small-scale research and demonstration projects.

17 TO DATE, INCLUDING 5 THIS YEAR

Number of Approved Projects

\$7.3 MILLION

Total Project Value

\$4.0 MILLION

CCEMC Contribution

900,000 TONNES ANNUALLY BY 2020

GHG Reductions

2014/2015 RESULTS

OPEN CALL PROJECTS

In 2014, the CCEMC issued an Open Request for Proposal for any type of technology in any investment area that could deliver significant, verifiable and sustainable greenhouse gas reductions in Alberta.

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Number of Approved Projects

\$473.3 MILLION

Total Project Value

\$113.1 MILLION

CCEMC Contribution

1,100,000 TONNES BY 2020

GHG Reductions

2014/2015 RESULTS

ACCELERATOR PROJECTS

CCEMC identified a potential accelerator project in 2015. We received the submission in response to the open request for proposals that was seeking projects that could provide significant near term emissions reductions. It was separated from the group, and we are exploring the opportunity to fund this project separately as an accelerator project. Accelerator projects advance transformative technologies so they can move to deployment to achieve greenhouse gas emission reductions as soon as reasonably possible.

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Number of Projects in Negotiation

\$38 MILLION

Total Project Value

\$15 MILLION

CCEMC Contribution

2014/2015 RESULTS

OUR YEAR IN FUNDING PROJECTS

2015 PERFORMANCE

2014/2015 COMPLETED PROJECTS

The CCEMC deemed 10 projects as complete in 2014/15. A complete project is one where the project has provided a final project report, a final financial report (including an audit) and the project has received any final payments from the CCEMC.

The CCEMC was pleased with the results of the completed projects that helped build our understanding of the barriers and opportunities that rest with new technologies. Collaboration and technology demonstration projects can help address those barriers by building new pathways and informing policy.

PROJECTS COMPLETED IN 2014/15 INCLUDE:

- **Lethbridge Biogas** - Lethbridge Biogas Cogeneration Project
- **Nova Chemicals Corporation** - Energy Footprint Reduction for Ethylene Manufacturing
- **NR Green** - Whitecourt Recovered Energy Project
- **Cenovus** - REMVue/Slipstream Air/Fuel Ratio Control and Vent Gas Capture
- **Encana** - Vent Gas Capture for Engine Fuel Use
- **CO₂ Solutions** - Optimization of Enzymatic System for CO₂ Capture from Oil Sands Production
- **Saltworks Technologies** - Low Energy Produced Water Treatment
- **B&C Energy Services** - Enzergy™ The Next Generation Coal Combustion for Cleaner Environment
- **Canadian Fertilizer Institute** - Farming 4R Land, Phase II
- **Alberta Innovates - Energy and Environment Solutions/Watersmart Solutions Ltd.** - South Saskatchewan River Basin Adaptation to Climate Variability

ECONOMIC IMPACT

REDUCING EMISSIONS, BOOSTING EMPLOYMENT AND ECONOMIC GROWTH

The CCEMC does more for Alberta than reduce emissions; the sum of our efforts also has a positive impact on the economy.

CONFERENCE BOARD OF CANADA REPORT - FINDINGS AND BENEFITS

Investments in GHG emissions-reduction technology that were funded, in part, by the CCEMC from 2011 to 2016 will contribute more than \$2.4 billion and add 15,017 person-years of full-time-equivalent employment to the Canadian economy, according to a Conference Board of Canada analysis, *Investing in GHG Emissions-Reduction Technology: Assessing the Impact*.

The impact on Alberta's GDP is forecast at \$1.95 billion.

"Reducing GHG emissions has become a priority for many countries, including Canada. Beyond potentially lowering emissions, investments in transformative technologies generate economic benefits," said Pedro Antunes, Deputy Chief Economist, The Conference Board of Canada.



2014/2015 FUNDED PROJECTS

BIOLOGICAL PROJECTS

REDUCING GHG EMISSIONS FROM AGRICULTURE, LIVESTOCK, FORESTRY AND LANDFILLS

The Biological Program seeks to discover, develop, and deploy solutions for reducing biological GHG emissions. Biological GHG emissions come from industries vital to the social and economic well-being of Alberta including agriculture, livestock production, forestry and municipal waste management. The potential for emissions reductions from biological sources is significant. In fact, early research indicates there is the potential to reduce GHG emissions from biological sources in Alberta by as much as 23 megatonnes of CO₂ equivalent.

The CCEMC runs this program in partnership with a provincial research agency, Alberta Innovates – Biological Solutions, who administers the program on our behalf.

While the projects in the program are addressing barriers to reducing GHG emissions from biological sources, some will also reduce GHG emissions overall. We estimate that by 2020, the projects in this program will reduce GHG emissions by 900,000 tonnes.

Building on the success of the Biological Program, the CCEMC launched its first competitive funding opportunity with a focus on reducing GHG emissions or enhancing carbon sequestration from biological sources in late 2013 and selected projects for funding in December 2014.

2014/2015 FUNDED PROJECTS

REDUCING GHG EMISSIONS FROM BIOLOGICAL SOURCES

A selection of biological projects that CCEMC committed funding to in the past year are profiled below.

SUSTAINABLE REMEDIATION OF PETROLEUM HYDROCARBONS (PHCS) USING PHYTOTECNOLOGIES

DR. ALLISON RUTTER, QUEEN'S UNIVERSITY

PROJECT VALUE: \$56,830

CCEMC CONTRIBUTION: \$56,830

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: 95% COMPLETE

Can you clean contaminated soil using native plants and biochar? We think you can, while also reducing GHG emissions in the process. Soil can become contaminated with petroleum hydrocarbons (PHCs) as a result of accidental spills and improper waste disposal. Cleaning contaminated soil is typically time-consuming and expensive. It can involve excavating contaminated soil and then trucking it to a proper disposal site. In addition to GHG emissions directly related to the contamination, traditional clean-up strategies generate additional emissions as a result of both disturbing the soil and transporting it for disposal.

This project is testing a better option. Planting native trees and plants in contaminated soil encourages the growth of petroleum-eating bacteria and removes carbon from the atmosphere naturally. Mixing biochar into the soil helps the plants grow faster, and reduces GHG emissions from organic decay.

This project will test native plants and biomass in a greenhouse in preparation for field testing in Alberta. Although her team is focused on one specific site at the moment, Dr. Rutter is confident that the techniques they're exploring will be useful for PHC cleanup across industries — from light products like gasoline, to heavy lubricating oils.

ARTIFICIAL PHOTOSYNTHESIS FOR MANAGING INDUSTRIALLY PRODUCED CO₂ EMISSIONS THROUGH CARBON CAPTURE AND VALUE CREATION

DR. CARLO MONTEMAGNO, UNIVERSITY OF ALBERTA

PROJECT VALUE: \$1,300,000

CCEMC CONTRIBUTION: \$500,000

STAGE OF DEVELOPMENT: DEVELOPMENT

PROJECT STATUS: EARLY STAGES

The CCEMC has been interested in generating valuable products from carbon dioxide emissions since we launched our Grand Challenge in 2013. If captured carbon dioxide can be converted to make useful and high-value products, it will create market interest that will accelerate technology development.

Dr. Montemagno, one of the world's leading experts in nanotechnology, has identified an opportunity we're supporting through our Biological GHG Management program. He is working with his team to fine-tune a scalable system that uses industrial GHG emissions to generate high-value chemicals compatible with Alberta's petrochemical infrastructure. It's a novel idea inspired by photosynthesis – the process plants use to convert light into chemical energy and fuel to grow. The process is carbon negative and energy efficient, and results in no unwanted byproducts or toxic waste.

At an industrial scale, solar energy and inexpensive electricity (intermittent and off-peak) would be used to power the chemical reactions that turn CO₂ into valuable chemicals. This process may be one way we can sustainably reduce industrial GHG emissions, while further reducing GHGs by generating high-demand, value-added chemicals that otherwise would be produced through energy-intensive petrochemical manufacturing.

WASTE CHARACTERIZATION STUDY

CITY OF LETHBRIDGE

PROJECT VALUE: \$124,000

CCEMC CONTRIBUTION: \$69,000

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: EARLY STAGES

Methane is one of the most potent greenhouse gasses. It is 25 times more effective at trapping heat in our atmosphere than carbon dioxide. One of the main sources of methane emissions is from decomposing organic waste at landfill sites. Today, Alberta offset protocols for landfill emissions use calculations that are based on studies from outside of the province and they may not be completely accurate. Data from this project will help refine Alberta offset protocols associated with landfill gas. The City of Lethbridge will recover core samples from landfills for testing. Results will verify, and if necessary, correct the models the province uses to measure methane emissions from landfills.

ECO-MIMICRY APPROACH TO METHANE CAPTURE IN TAILINGS PONDS: DESIGN OF A MULTI BIOREACTOR AND GAS SAMPLING SYSTEM FOR TESTING THE PERFORMANCES OF KNOWN METHANE OXIDIZING MATERIALS

DR. PETER DUNFIELD, UNIVERSITY OF CALGARY

PROJECT VALUE: \$69,850

CCEMC CONTRIBUTION: \$57,500

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: EARLY STAGES

The unique properties of biochar give it the potential to be applied to many different GHG-reducing applications. This project explores using biochar as a cap for tailings ponds to minimize methane emissions. It includes building a small

bioreactor, creating tailings pond conditions, adding biochar with specific bacteria, and then carrying out analysis to measure effectiveness and nail down the science behind the idea. This work is an important step towards a future demonstration project that would design and place biochar mats on a tailings pond.

REGIONALLY APPROPRIATE GRAZING

DR. CAMERON CARLYSLE, UNIVERSITY OF ALBERTA

PROJECT VALUE: \$715,100

CCEMC CONTRIBUTION: \$487,500

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: EARLY STAGES

Alberta's grasslands span 93,000 square kilometres across the province, providing food for livestock and homes for hundreds of native species. Research shows that grasslands can store twice as much soil carbon as adjacent cropland, which means they are important in the battle to reduce greenhouse gas emissions, but the relationship between grazing and carbon storage is unclear. We also need to understand how drought-related changes in plant quantity and quality will affect cattle, and the carbon balance.

This project studies the role of different grazing systems in maximizing carbon storage and minimizing greenhouse gas emissions throughout Alberta's grasslands. The aim is to better understand how grazing affects carbon storage in grasslands and the role grazing plays mitigating drought impacts and reducing greenhouse gas emissions. The results can inform policy to support cattle producers in their efforts to maximize for carbon storage in grasslands.

FORESTRY WASTE TO ELECTRICAL POWER – FUEL VARIABILITY MINIMIZATION, LA CRETE PROJECT

MUSTUS ENERGY LIMITED

PROJECT VALUE: \$157,772,395

CCEMC CONTRIBUTION: \$10,000,000

GHG REDUCTIONS: 748,000 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: IMPLEMENTATION

PROJECT STATUS: EARLY STAGES

Mustus Energy is building a 41.5 megawatt, biomass-fuelled power plant at La Crete, in north-central Alberta. The plant will require extensive fuel handling equipment to ensure proper delivery of the biomass to the boiler.

The plant will reduce emissions by offsetting fossil fuel power generation, using forest harvest waste as fuel and taking waste streams from sawmills that would otherwise be landfilled. This project will be the first of a fleet of four on Alberta's energy grid.

It may seem counterintuitive to generate electricity by burning wood rather than clean-burning natural gas.

From an accounting perspective though, the project will be GHG-neutral. The reason is that biomass absorbs carbon dioxide from the atmosphere as it grows. When it burns, it gives carbon dioxide back. For this to work, biomass has to be continually growing – new trees, new plants, new growth of every kind.

Mustus' plan to use biomass to heat a high-efficiency boiler will enable its electricity generation facility to be GHG neutral. The biomass combustion technologies available today are highly sophisticated with control systems that minimize contaminants and air emissions.

CCEMC funded this project to minimize the variability of biomass delivered to the boiler, ensuring that the power plant gets consistent energy out of its biomass fuel and that the greenhouse gas benefits are realized.

IMPROVED CONSTRUCTION OF ROADS AND PIPELINES TO MINIMIZE IMPACT ON PEATLAND GHG EMISSIONS

DR. MARIA STRACK, UNIVERSITY OF CALGARY

PROJECT VALUE: \$554,870

CCEMC CONTRIBUTION: \$277,070

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: EARLY STAGES

The CCEMC often supports projects that help us to find a better way forward. That's certainly the case with this project, one that may change the way we build roads and pipelines through peatlands. Northern peatlands form natural CO₂ reduction systems known as carbon sinks. As vegetation and other life forms die, the bog absorbs them, preventing fire and natural decay from delivering GHGs into the atmosphere. Road and pipeline construction can disturb the natural operations of these carbon sinks so the bog on one side of the disturbance dries up, while the other side becomes excessively wet.

With support from industry, University of Calgary professor Maria Strack is investigating if changing road construction practices could preserve the ability of these sinks to store carbon. The project is quantifying the impact of alternative road construction techniques and recommending better construction practices.

BIOLOGICAL PLANT INOCULANTS TO INCREASE CARBON SEQUESTRATION IN ALBERTA'S AGRICULTURE AND FORESTRY SECTORS

MIKRO-TEK INC.

PROJECT VALUE: \$968,000

CCEMC CONTRIBUTION: \$453,000

STAGE OF DEVELOPMENT: DEVELOPMENT

PROJECT STATUS: EARLY STAGES

2014/2015 FUNDED PROJECTS

Soil fungi help the plants that grow around them to access the nutrients and water they need for optimal growth and development. Where soils have been degraded due to forest fire or heavy agricultural production, for example, populations of soil fungi are low. As a result, plant growth can be severely impaired. Mikro-Tek has developed a technology that uses select strains of naturally occurring soil fungi which colonize the root tissue of plants and make the host plant more efficient in accessing moisture and nutrients which enhance plant growth and survival.

The goal of this project is to demonstrate widespread use of these inoculants in Alberta's forestry, agriculture and reclamation sectors to improve profitability and sustainability, while providing GHG reductions through decreased fertilizer use and increased biomass sequestration. Replenishing the soil with these fungi has been demonstrated to increase carbon sequestration.

TECHNOLOGIES FOR REDUCING GHG EMISSIONS AND PROVIDING OFFSET OPTIONS FOR THE BEEF AND DAIRY INDUSTRIES

AGRICULTURE AND AGRI-FOOD CANADA

PROJECT VALUE: \$2,755,047

CCEMC CONTRIBUTION: \$1,377,523

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: EARLY STAGES

Alberta's beef and dairy herds make a significant contribution to provincial GHG emissions. Feed additives could provide a good alternative to address the issue while we work towards making longer term changes at the genetic level.

Feed additives that reduce an animal's intestinal emissions are attractive because they are simple to implement and require only limited changes to feed rations. This project will test two new feed additives (and adjustments to feed rations) to assess their impact on methane reduction, animal performance and marketability.

This project is a collaborative effort between Canadian and Australian experts, and aims to deliver offset options for the beef and dairy industries.

A MATTER OF TIMING AND SOURCE: ENHANCED EFFICIENCY NITROGEN FERTILIZERS AND PRODUCTS TO REDUCE NITROUS OXIDE EMISSIONS IN THE PRAIRIE PROVINCES

UNIVERSITY OF MANITOBA

PROJECT VALUE: \$1,638,966

CCEMC CONTRIBUTION: \$711,022

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: EARLY STAGES

It's no secret that Alberta's cropping systems require fertilizer to optimize yields and economic returns. But synthetic nitrogen fertilizers are a source of toxic nitrous oxide emissions — a greenhouse gas 300 times more potent than carbon dioxide.

Farmers typically apply fertilizer at the end of growing season and may over apply fertilizer to compensate for fertilizer that disappears as the snow washes it out of the soil. To help address the problem, this project is testing high-efficiency fertilizers to reduce the release of nitrous oxide. The researchers are testing different prairie scenarios, different fertilizers and different crop covers. We expect that the results of this work will help not only Alberta producers, but those in Saskatchewan and Manitoba as well. With supporting funding from a number of project partners, this project will lead towards significant GHG emissions reductions and carbon offsets in Western Canada.

BIOCOVERS FOR GREENHOUSE GAS MITIGATION FROM LANDFILLS

TETRA TECH, INC.

PROJECT VALUE: \$3,490,331

CCEMC CONTRIBUTION: \$1,745,166

STAGE OF DEVELOPMENT: DEMONSTRATION

PROJECT STATUS: EARLY STAGES

Many Alberta municipalities are working toward solutions to address challenges associated with landfills. One solution proposed by Tetra Tech may reduce GHG emissions by taking a new approach to landfill covers. This project will demonstrate the effectiveness of a hybrid of landfill biocover technologies which destroy fugitive methane emissions from landfills. The approach is superior to today's traditional low-permeability cover systems and, to test it out, we're supporting a full-scale demonstration of the technology in Leduc, Alberta. Instrumentation will help Tetra Tech measure the impact so the results can support the development of a protocol to accurately quantify the performance of the technology.

**DEPLOYING AN ADVANCED ANALYTICS PLATFORM
TO QUANTIFY LIVESTOCK GHG EMISSIONS AND
MONITOR REDUCTION STRATEGIES AT INDIVIDUAL
ANIMAL AND WHOLE OPERATION SCALE**

GROWSAFE SYSTEMS LTD.

PROJECT VALUE: \$1,988,788

CCEMC CONTRIBUTION: \$994,394

STAGE OF DEVELOPMENT: DEMONSTRATION

PROJECT STATUS: EARLY STAGES

Alberta has one of the largest beef herds in the world. The production of beef and dairy contributes to Alberta's overall emissions of GHGs, specifically methane, which is released from manure and from the animals as a natural part of their digestion. Reducing GHG emissions through selecting the most efficient cattle offers an opportunity to reduce livestock's environmental footprint. Building on extensive research, technology development and industry investment, this project will demonstrate how an advanced data analytics platform can improve operation profitability and reduce emissions. This project will demonstrate at a commercially relevant scale how this computer platform can monitor, audit and verify GHG emissions from cattle on a life cycle basis.

GrowSafe will develop and apply algorithms to help the beef and dairy producers select efficient animals for breeding and managing production for GHG reductions.

2014/2015 FUNDED PROJECTS

OPEN CALL FOR REQUESTS FOR PROPOSAL

Our mandate was to identify innovative projects with strong potential for significant, verifiable, and sustainable greenhouse gas reductions in Alberta. A selection of projects from the Open Call that CCEMC committed funding to are profiled below.

COMMERCIAL DEMONSTRATION OF BIOCATALYTIC PROCESS FOR LOW COST CARBON CAPTURE

CO₂ SOLUTIONS INC.

PROJECT VALUE: \$30,000,000

CCEMC CONTRIBUTION: \$15,000,000

GHG REDUCTIONS: GHG emissions reductions are anticipated to occur when the technology is deployed into the marketplace (after 2020).

STAGE OF DEVELOPMENT: DEMONSTRATION

PROJECT STATUS: CONTRIBUTION AGREEMENT

The United Nations' Intergovernmental Panel on Climate Change has identified that carbon capture technologies are key to helping the world try to limit global temperature increases. While the technology is proven, it continues to be uneconomic.

CO₂ Solutions Inc. is developing a capture and recovery technology that may help lower the cost of carbon capture. They use a "super enzyme" in their process called carbonic anhydrase — the same enzyme the human respiratory system uses to convert carbon dioxide. The enzyme has been bioengineered by CO₂ Solutions to function in the harsher conditions of a carbon capture process. A previous CCEMC-funded project showed that the company's patented technology has the ability to capture about 90 per cent of the CO₂ from flue gases more cost effectively than conventional amine-based processes.

N-SOLV BEST OIL SANDS SCALE-UP PROJECT

N-SOLV CORPORATION

PROJECT VALUE: \$238,000,000

CCEMC CONTRIBUTION: \$25,000,000

GHG REDUCTIONS: 395,000 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: DEMONSTRATION

PROJECT STATUS: CONTRIBUTION AGREEMENT

The most common way to get bitumen out of Alberta's oil sands is through Steam Assisted Gravity Drainage, or SAGD. It involves injecting steam into one horizontal well to heat the bitumen. The bitumen then travels, often with gas and water condensation, through a parallel well that runs a few meters below the first. This process creates significant GHG emissions because it requires a tremendous amount of heat to create steam. With growing demand for energy, GHG emissions from in situ operations are set to rise 300% by 2030 (Council of Canadian Academies Report, p. xv). It presents a tremendous opportunity for technologies to address the challenge.

One opportunity to reduce GHG emissions from SAGD operations is through solvent-assisted technologies where solvent replaces steam, like the technology N-Solv is testing.

ALBERTA SOLAR ONE

MORGAN SOLAR INC.

PROJECT VALUE: \$23,000,000

CCEMC CONTRIBUTION: \$10,000,000

GHG REDUCTIONS: 70,000 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: DEMONSTRATION

PROJECT STATUS: CONTRIBUTION AGREEMENT

Morgan Solar has partnered with Enbridge to build a 10 megawatt flagship utility-scale solar power plant. The project will use Morgan Solar's revolutionary high efficiency Sun Simba CPV modules mounted on Savanna dual-axis trackers. Located in Southeast Alberta, the project will take advantage of the best solar resource in the country to produce clean energy while also creating local jobs and raising the productivity of marginal land.

Their unique solar technology is expected to be nearly double the efficiency of conventional solar panels while still competitive on sticker price. The solar project will be located in South Eastern Alberta to take advantage of the best irradiance in the country.

GTE SOLAR BROOKS #1

GTE SOLAR INC.

PROJECT VALUE: \$29,994,000

CCEMC CONTRIBUTION: \$14,997,000

GHG REDUCTIONS: 100,000 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: IMPLEMENTATION

PROJECT STATUS: CONTRIBUTION AGREEMENT

Alberta has tremendous solar potential. To help tap into the sun's energy, the CCEMC is helping to fund what is expected to become Alberta's first utility-scale solar project. GTE Solar will construct a 15 megawatt solar facility near Brooks. This innovative project will demonstrate the advantages and performance of large-scale solar power in Alberta. In addition to reducing GHG emissions, this project will bring direct benefits to the community as well. Local Brooks vendors will be contracted for engineering, site preparation, metal fabrication and installation, and maintenance, totalling over 50,000 person-hours.

ENABLING INCREASED INTERMITTENT GREEN GENERATION VIA WIND ENERGY STORAGE

TRANSALTA CORPORATION

PROJECT VALUE: \$22,673,700

CCEMC CONTRIBUTION: \$11,146,300

GHG REDUCTIONS: Battery storage has the potential to reduce greenhouse gas emissions through improving grid efficiency, displacing higher greenhouse gas intensive electricity generation, and supporting

the installation of more solar and wind electricity. The GHG emissions reductions will be reported at the completion of this project.
STAGE OF DEVELOPMENT: DEMONSTRATION
PROJECT STATUS: CONTRIBUTION AGREEMENT

Today wind power meets less than 5 per cent of Alberta's power needs. One barrier to adding significant new wind and solar sources to our electricity grid is storage. Wind and solar power is intermittent — turbines and solar panels only produce power when the wind is blowing and the sun is shining. That poses challenges as renewable energy grows because the North American power grid was designed to draw power from large reliable sources that provide a consistent level of baseload power, like large hydro facilities and coal-fired generating stations.

That's why the CCEMC is supporting renewable storage projects, like this initiative by TransAlta, that will test the world's most advanced lithium ion batteries made by Elon Musk's Tesla Energy. TransAlta will install 10 megawatts of Tesla lithium ion batteries at their windfarm in southwest Alberta. This type of technology will support broader adoption of renewable energy by enhancing reliability.

DROP-IN FUELS MADE FROM ALBERTA RENEWABLE FEEDSTOCKS

SBI FINE CHEMICALS INC.

PROJECT VALUE: \$20,484,127
CCEMC CONTRIBUTION: \$10,000,000
GHG REDUCTIONS: 600,000 TONNES OF CO₂E BY 2020
STAGE OF DEVELOPMENT: DEMONSTRATION
PROJECT STATUS: CONTRIBUTION AGREEMENT

Could plants provide a substitute for diesel fuel in today's engines? This project explores that question by supporting a project led by SBI Fine Chemicals. The company will construct a pilot plant in the Edmonton Research Park to demonstrate their proprietary technology that converts plant oils into renewable transportation fuels. The facility will have capacity to produce 10 million litres of renewable diesel fuel annually. The technology reduces GHG emissions by displacing diesel and biodiesel with a drop-in renewable fuel that doesn't require further processing.

PRE-COMMERCIAL DEMONSTRATION FOR CONVERSION OF RESIDUAL FOREST BIOMASS FEEDSTOCK TO RENEWABLE BIO-SYNTHETIC CRUDE OIL (BIO-SCO)

STEEPER ENERGY CANADA LTD.

PROJECT VALUE: \$26,000,000
CCEMC CONTRIBUTION: \$11,500,000
GHG REDUCTIONS: 50,000 TONNES OF CO₂E BY 2020
STAGE OF DEVELOPMENT: DEMONSTRATION
PROJECT STATUS: CONTRIBUTION AGREEMENT

Danish-Canadian company Steeper Energy has developed a process that uses the high temperatures and pressures of supercritical chemistry to turn lignite (also known as brown coal), peat, and other forms of biomass into synthetic crude. The chemistry is complex, but if it works, it could create opportunities for Alberta's forestry industry by converting waste from pulp mills into biosynthetic crude oil. To test it out, Steeper Energy is working with Daishowa-Marubeni International (DMI) to build a 100 barrel/day pre-commercial plant co-located with DMI's Alberta Peace River pulp mill. The pilot plant will convert forestry waste into a liquid hydrocarbon fuel as a renewable alternative to synthetic crude oil.

ACCELERATOR PROJECTS

One way that the CCEMC is working to accelerate the development of transformative technologies is through identifying them as unique opportunities, and branding them as accelerator projects. For accelerator projects, the CCEMC will work with the project proponent to hasten the development of transformative technologies that can help Alberta achieve significant and sustainable greenhouse gas emissions reductions once the technologies are deployed in the market.

CENOVUS - POST COMBUSTION CARBON CAPTURE USING MOLTEN CARBONATE FUEL CELL PILOT

\$38,000,000

Project Value

\$15,000,000

CCEMC Potential Contribution

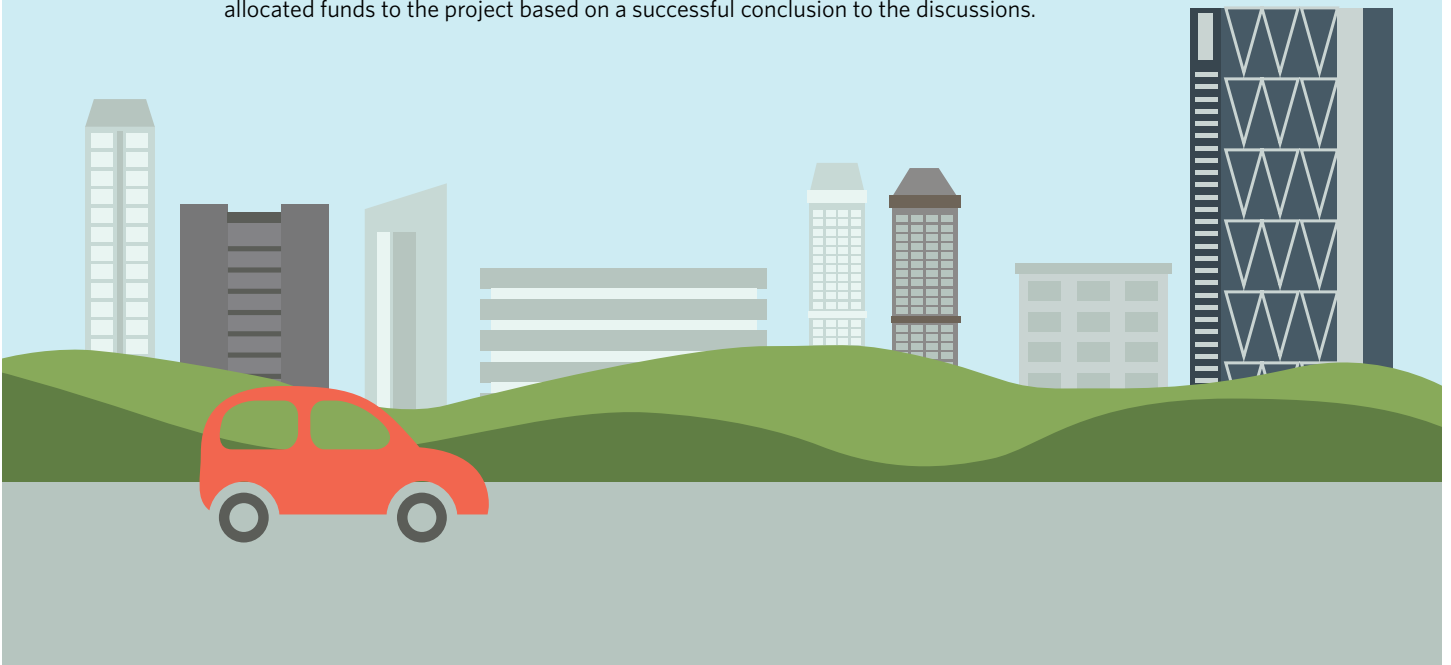
DEMONSTRATION

Stage of Development

NEGOTIATION

Project Status

CCEMC is in negotiations with Cenovus, in partnership with Shell and Devon, to explore innovative molten carbonate fuel cell (MCFC) technology for carbon capture from oil sands operations. MCFC is well suited for oil sands operations, and generates electricity and water in addition to capturing carbon dioxide. The project will demonstrate the use of MCFC for both carbon capture and electricity and water generation before deploying at full commercial scale. CCEMC will actively partner with the project proponents to design this project that will accelerate the achievement of technology results and GHG reductions. CCEMC has notionally allocated funds to the project based on a successful conclusion to the discussions.



COLLABORATIVE INITIATIVES

COLLABORATION TURNS IDEAS INTO ACTION

As a virtual corporation, teamwork is at the root of all we do, and many of the projects we support are earmarked by collaboration.

CCEMC continued work with the Low Carbon Innovation Alliance, a group of diverse clean tech funding organizations that share a vision to accelerate technology innovation and achieve large scale reduction of greenhouse gas emissions in Canada through successful collaboration and synergy.

We also worked with Sustainable Development Technology Canada to develop a Memorandum of Understanding so we could effectively work together to address mutual goals.

The Biodiversity Management and Climate Change project, led by the Alberta Biodiversity Monitoring Institute, successfully pulled in expertise from a diverse group to develop a body of knowledge about how climate change will affect our province, and how we could respond.

It included staff from the University of Alberta, the Miistakis Institute, University of Saskatchewan, the Alberta Conservation Association, Alberta Innovates

Technology Futures and the Boreal Avian Modelling Project. The work was completed under the wise counsel of a group that included representatives from several different departments in the Government of Alberta.

The CCEMC Biological program offers many examples of collaboration. Alberta Innovates Bio Solutions administers the program on behalf of the CCEMC. Further, many of our biological projects involve multiple organizations working together to address a common goal.

Clean technology developers benefit through working together as well. In 2013 we supported Cleantech Canada research that explored the barriers and opportunities for Canadian companies that are working to develop clean technology.

To follow up on that work, we hosted an Inspired Conversation in Calgary where we discussed the support required to commercialize innovative clean technology and published our findings.

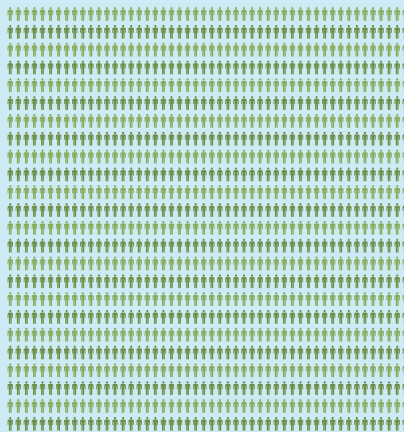


RESULTS TO DATE



CCEMC projects combine to reduce GHG emissions by 12,700,000 tonnes by 2020.

The total additional estimated GHG emissions reductions from market deployment of CCEMC projects funded to date, is an additional 9,000,000 tonnes.



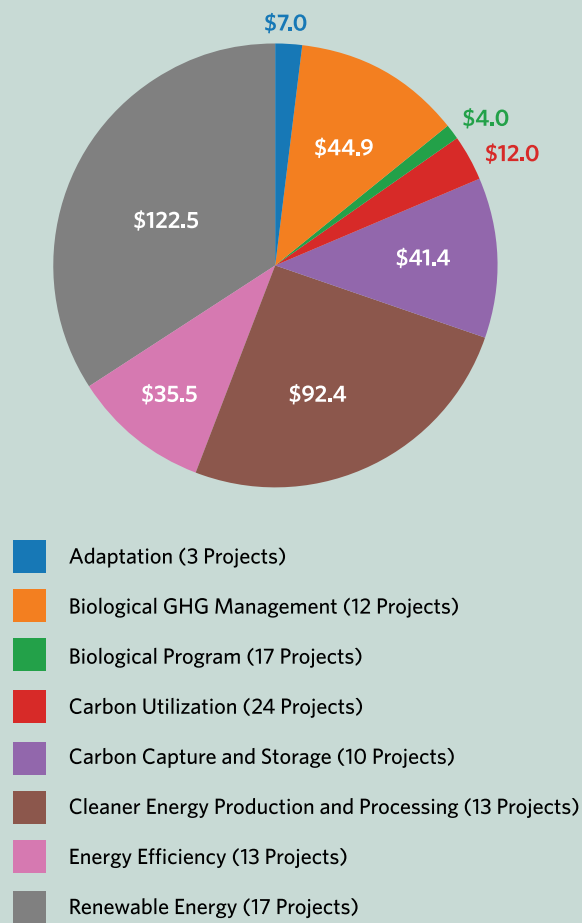
We'll add more than 12,000 person years of FTE employment in Alberta from projects we supported between 2011 and 2016.



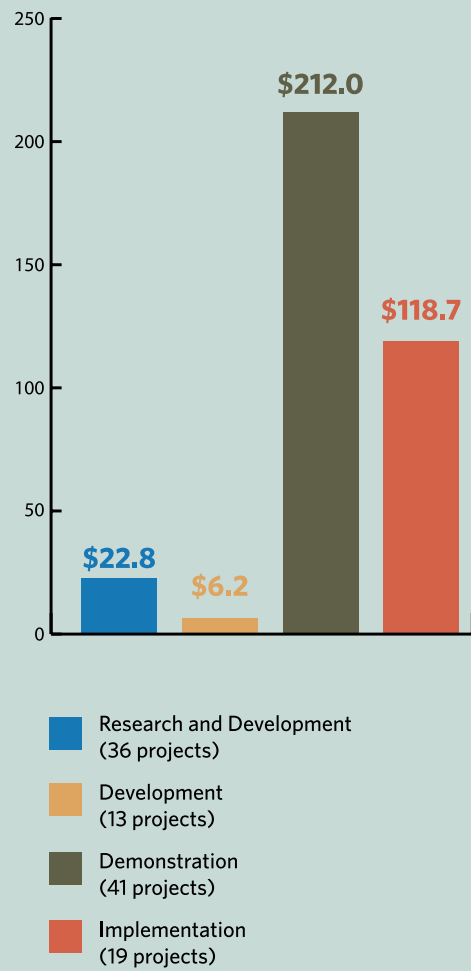
The Conference Board of Canada estimates that the total economic benefit of investments partly funded by the Climate Change and Emissions Management Corporation from 2011 to 2016 will be more than \$2.4 billion including \$1.95 billion in Alberta.

CCEMC INVESTMENT BY STRATEGIC AREA (ALL PROJECTS) (\$MILLIONS)

TOTAL INVESTMENT TO DATE: \$359.7



CCEMC INVESTMENT BY INNOVATION STEP (\$MILLIONS)



COMPLETED PROJECTS

CCEMC was pleased with the results of the completed projects that helped build our understanding of the barriers and opportunities that rest with new technologies. Collaboration and technology demonstration projects can help address those barriers by building new pathways and informing policy.

Energy efficiency efforts continue to hold potential for Alberta's industrial sectors. Projects such as those led by Cenovus and Encana are showing the tremendous potential that Alberta's energy efficiency offers to Alberta's industrial sectors.

Innovations from CO₂ Solutions bring down the cost of carbon capture, and Saltworks Technologies has developed their work that will reduce the GHG footprint for water treatment in the oil sands.

Managing Alberta's water resources will become more and more important as Alberta's climate continues to change. The South Saskatchewan River Basin Adaptation to Climate Variability project demonstrates that, for critical issues like water resource management where the effects are widespread, it is essential to engage stakeholders to build understanding and forge workable solutions.

Moving forward CCEMC will continue to foster the most promising technologies, in some cases through offering further funding, to accelerate achievement of greenhouse gas emissions reductions.

Bright ideas lead to action. And action leads to results. The following projects that were completed in 2014/15 illustrate the CCEMC commitment to progress in reducing GHG emissions.

LETHBRIDGE BIOGAS, BIOGAS COGENERATION PROJECT

LETHBRIDGE BIOGAS

PROJECT VALUE: \$28,575,742

CCEMC CONTRIBUTION: \$8,200,000

GHG REDUCTIONS: 224,300 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: IMPLEMENTATION

PROJECT STATUS: COMPLETE

Lethbridge Bio Gas opened the largest anaerobic digester co-generation facility in Canada in 2003. Owned and operated by Lethbridge Biogas LP, a private firm, it uses manure and other organic wastes to produce methane for power generation and provides a liquid fertilizer byproduct used by farmers in the region. The plant has the capacity to process more than 100,000 tonnes of organic waste per year. The facility has reduced emissions by more than 10,000 tonnes since it opened. Read the final report to learn more.

ENERGY FOOTPRINT REDUCTION FOR ETHYLENE MANUFACTURING

NOVA CHEMICALS CORPORATION

PROJECT VALUE: \$1,396,659

CCEMC CONTRIBUTION: \$700,000

GHG REDUCTIONS: 946,400 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: R&D

PROJECT STATUS: COMPLETE

This energy efficiency project aimed to improve separation processes in ethylene manufacturing by developing innovative micro-porous molecular sieves that separate similar hydrocarbon molecules. Current ethylene manufacturing gas separations consume energy to condense

and boil hydrocarbon mixtures. The energy consumed in molecular sieve separation is inherently lower, significantly reducing carbon dioxide emissions in ethylene manufacturing.

WHITECOURT RECOVERED ENERGY PROJECT

NR GREEN

PROJECT VALUE: \$96,971,544

CCEMC CONTRIBUTION: \$7,000,000

GHG REDUCTIONS: 637,700 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: DEMONSTRATION

PROJECT STATUS: COMPLETE

Using innovative waste heat technology, NR Green is working to generate up to 14MW of electricity - enough energy to power 14,000 homes - from Alliance Pipeline's natural gas compressor station near Whitecourt, Alberta. Waste heat recovery units capture the exhaust from natural gas turbines and convert it into electricity.

REMOVUE/SLIPSTREAM AIR/FUEL RATIO CONTROL AND VENT CAPTURE PROJECT

CENOVUS ENERGY INC.

PROJECT VALUE: \$7,710,426

CCEMC CONTRIBUTION: \$2,676,714

GHG REDUCTIONS: 327,300 TONNES OF CO₂E BY 2020

STAGE OF DEVELOPMENT: IMPLEMENTATION

PROJECT STATUS: COMPLETE

The energy efficiency project involved installing two distinct efficiency technologies in select engines: the REMVue air/fuel ratio controllers and a Slipstream vent-gas injection controller. Combined, the technologies will significantly reduce fuel usage, natural gas and GHG emissions.

VENT GAS CAPTURE FOR ENGINE FUEL USE

ENCANA CORPORATION

PROJECT VALUE: \$5,921,690
CCEMC CONTRIBUTION: \$2,400,000
GHG REDUCTIONS: 548,600 TONNES OF CO₂E BY 2020
STAGE OF DEVELOPMENT: IMPLEMENTATION
PROJECT STATUS: COMPLETE

SlipStream® technology captures methane currently being vented into the atmosphere. This process will redirect the natural gas and use it to help fuel the compressor resulting in higher fuel recovery and lower GHG emissions.

OPTIMIZATION OF ENZYMATIC SYSTEM FOR CO₂ CAPTURE FROM OIL SANDS PRODUCTION

CO₂ SOLUTIONS INC.

PROJECT VALUE: \$1,794,239
CCEMC CONTRIBUTION: \$500,000
STAGE OF DEVELOPMENT: DEVELOPMENT
PROJECT STATUS: COMPLETE

This CO₂ Solutions project demonstrated the company's enzymatic CO₂ capture and recovery technology. This technology has the ability to capture more CO₂ from flue gases more cost effectively than conventional amine based processes. The capture efficiency and the improvement in operational costs results in better economics for the supply of industrial volumes of CO₂ for beneficial use.

LOW ENERGY PRODUCED WATER TREATMENT

SALTWORKS TECHNOLOGIES INC.

PROJECT VALUE: \$3,386,396
CCEMC CONTRIBUTION: \$500,000
GHG REDUCTIONS: 400 TONNES OF CO₂E BY 2020
STAGE OF DEVELOPMENT: IMPLEMENTATION
PROJECT STATUS: COMPLETE

Sometimes CCEMC projects that reduce GHG emissions also provide other benefits, like clean water. With CCEMC funding, Saltworks developed and tested a desalination technology to treat water in the Albertan oil sands industry. The technology uses waste heat, which is abundant in the oil sands, to produce freshwater from Steam Assisted Gravity Drainage (SAGD) blowdown water. The results include reduced wastewater discharge, reduced freshwater withdrawal, and reduced carbon emissions compared to conventional treatment technologies.

ENERGY™ THE NEXT GENERATION COAL COMBUSTION FOR CLEANER ENVIRONMENT

B&C ENERGY SERVICES INC.

PROJECT VALUE: \$557,102
CCEMC CONTRIBUTION: \$232,541
STAGE OF DEVELOPMENT: DEMONSTRATION
PROJECT STATUS: COMPLETE

Alberta has abundant coal resources. While we have used coal as a cheap form of energy for years, the impact it has on GHG emissions has made it a focus for reduction efforts. The CCEMC supported a project by B&C Energy Services Inc. who put their Enenergy™ technology to work. The technology helps coal-fired generating facilities improve combustion and thermal efficiencies of burning coal while reducing flue gas emissions such as CO₂, NO_x and SO₂.

FARMING 4R LAND, PHASE II

CANADIAN FERTILIZER INSTITUTE

PROJECT VALUE: \$252,500
CCEMC CONTRIBUTION: \$227,500
STAGE OF DEVELOPMENT: DEMONSTRATION
PROJECT STATUS: COMPLETE

The CCEMC supported two Canadian Fertilizer Institute (CFI) projects that help farmers to reduce dangerous nitrous oxide emissions from the application of fertilizers, and save money in the process. Farming 4R Land provides Alberta producers with information, tools and advice on management practices under the 4R Nutrient Stewardship program. National and global interest in the 4R Nutrient Stewardship program has grown dramatically in the past year, with completion of the CCEMC-funded demonstration project in Alberta. CFI is now known as Fertilizer Canada (<http://fertilizercanada.ca>).

SOUTH SASKATCHEWAN RIVER BASIN (SSRB) ADAPTATION TO CLIMATE VARIABILITY PROJECT

WATERSMART SOLUTIONS LTD/ALBERTA INNOVATES – ENERGY AND ENVIRONMENT SOLUTIONS

PROJECT VALUE: \$1,600,000
CCEMC CONTRIBUTION: \$1,600,000
STAGE OF DEVELOPMENT: DEVELOPMENT
PROJECT STATUS: COMPLETE

This initiative aimed to harness the energy and creativity of southern Albertans to explore practical options for adapting the basin's water management to climate variability and change. Water is fundamental to community sustainability and growth, and the way water is managed in the South Saskatchewan River Basin (SSRB) will become even more important in the face of changing weather patterns and climate. The work built on and integrated existing data, capacity and knowledge of water users and decision makers to improve understanding and explore how to manage for the range of potential impacts of climate variability throughout the SSRB's river systems. Alberta Innovates-Energy and Environment Solutions (AI-EES) joined with WaterSMART Solutions Ltd. to facilitate an informed and collaborative approach to identifying specific and implementable water resource management adaptation strategies.



2014/2015 FINANCIAL HIGHLIGHTS

In our mission to achieve real and sustainable GHG emissions reductions to help mitigate climate change, a key component of our success is effectively utilizing the money given to us through the CCEMF to fund projects that can make a difference.

**Climate Change and Emissions
Management (CCEMC) Corporation**

Financial Statements
May 31, 2015

Independent Auditor's Report

To the Board of Directors of
Climate Change and Emissions Management Corporation

We have audited the accompanying financial statements of Climate Change and Emissions Management Corporation, which comprise the statement of financial position as at May 31, 2015, and the statements of changes in net assets, operations and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's responsibility for the financial statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Climate Change and Emissions Management Corporation as at May 31, 2015, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.



Chartered Professional Accountants, Chartered Accountants

September 22, 2015

Climate Change and Emissions Management (CCEMC) Corporation
 Statement of Financial Position
 As at May 31, 2015

	2015 \$	2014 \$
Assets		
Current assets		
Cash	296,768,566	285,476,706
Accounts receivable	5,041,685	279,792
Interest receivable	343,465	403,259
Prepaid expenses	1,972	1,750
	<u>302,155,688</u>	<u>286,161,507</u>
Liabilities		
Current liabilities		
Accounts payable and accrued liabilities	<u>5,691,133</u>	<u>4,032,872</u>
Net Assets		
General Fund – unrestricted	-	-
Restricted Fund (note 3)	<u>296,464,555</u>	<u>282,128,635</u>
	<u>296,464,555</u>	<u>282,128,635</u>
	<u>302,155,688</u>	<u>286,161,507</u>
Commitments and guarantees (note 6)		

Approved by the Board of Directors

_____ Director _____ Director

The accompanying notes are an integral part of these financial statements.

Climate Change and Emissions Management (CCEMC) Corporation
Statement of Changes in Net Assets
For the year ended May 31, 2015

	General Fund \$	Restricted Fund \$	2015 Total \$	2014 Total \$
Balance – Beginning of year	-	282,128,635	282,128,635	260,196,750
Excess of revenue over expenses for the year	-	14,335,920	14,335,920	21,931,885
Balance – End of year	-	296,464,555	296,464,555	282,128,635

The accompanying notes are an integral part of these financial statements.

Climate Change and Emissions Management (CCEMC) Corporation

Statement of Operations

For the year ended May 31, 2015

			2015	2014
	General Fund \$	Restricted Fund \$	Total \$	Total \$
Revenue				
Grant revenue (note 4)	-	50,000,000	50,000,000	64,117,000
Interest income	-	4,446,374	4,446,374	4,316,523
Conference	-	-	-	456,002
	-	54,446,374	54,446,374	68,889,525
Project expenses (note 6)	-	33,034,492	33,034,492	37,129,851
Excess of revenue over project expenses	-	21,411,882	21,411,882	31,759,674
Operating expenses				
Program management (note 5)	-	5,628,589	5,628,589	6,840,962
Consulting contracted services	-	1,066,416	1,066,416	1,631,010
Corporate costs	-	227,212	227,212	400,169
Board remuneration and expenses (note 5)	-	72,805	72,805	91,056
Outreach	-	28,306	28,306	70,727
Professional fees	-	42,396	42,396	46,796
Insurance	-	10,238	10,238	10,500
Conference costs	-	-	-	736,569
	-	7,075,962	7,075,962	9,827,789
Excess of revenue over expenses for the year	-	14,335,920	14,335,920	21,931,885

The accompanying notes are an integral part of financial statements.

Climate Change and Emissions Management (CCEMC) Corporation
Statement of Cash Flows
For the year ended May 31, 2015

	2015 \$	2014 \$
Cash provided by (used in)		
Operating activities		
Excess of revenue over expenses for the year	14,335,920	21,931,885
Net change in non-cash working capital items		
Increase in prepaid expenses	(222)	-
Increase in accounts receivable	(4,761,893)	(178,159)
Decrease (increase) in interest receivable	59,794	(89,479)
Increase in accounts payable and accrued liabilities	1,658,261	1,724,808
	<hr/>	<hr/>
Increase in cash during the year	11,291,860	23,389,055
Cash – Beginning of year	285,476,706	262,087,651
	<hr/>	<hr/>
Cash – End of year	296,768,566	285,476,706
	<hr/>	<hr/>

The accompanying notes are an integral part of these financial statements.

Climate Change and Emissions Management (CCEMC) Corporation

Notes to Financial Statements

For the year ended May 31, 2015

1 Organization

Climate Change and Emissions Management (CCEMC) Corporation (CCEMC) is an Alberta based, independent, not-for-profit organization incorporated under the Canada Corporations Act on February 17, 2009; its operations commenced on June 1, 2009. CCEMC's mandate is to reduce greenhouse gas emissions and adapt to climate change by supporting the discovery, development and deployment of clean technologies. The Climate Change and Emissions Management Fund (the Fund) was established under the Climate Change and Emissions Management Act by the Government of Alberta to support investment in innovation and clean technologies that will reduce Alberta's greenhouse gas emissions and improve its ability to adapt to climate change. The Fund provides the primary source of revenue for CCEMC. As a not-for-profit organization, CCEMC is exempt from tax in accordance with Section 149(1) (l) of the Canadian Income Tax Act.

2 Summary of significant accounting policies

These financial statements have been prepared by management in accordance with Canadian accounting standards for not-for-profit organizations (ASNPO) within the framework of the accounting policies summarized below.

Fund accounting

For financial reporting purposes, the accounts have been classified into the following funds:

- General Fund

The General Fund includes all resources available for immediate purposes and accounts for CCEMC's activities other than those directly attributable to funding innovation and clean technologies and adaptation to climate change.

The General Fund includes all unrestricted monies received that are available for use at the CCEMC's discretion.

- Restricted Fund

The Restricted Fund includes those funds that are to be used to support investment in innovation and clean technologies and adaptation to climate change.

Climate Change and Emissions Management (CCEMC) Corporation

Notes to Financial Statements

For the year ended May 31, 2015

Revenue recognition

These financial statements have been prepared using the restricted fund method of accounting for contributions, the key elements of which are:

- Unrestricted contributions are recognized as revenue in the General Fund when received or on becoming receivable if the amount to be received can be estimated and collection is reasonably assured.
- Externally restricted contributions are recognized as revenue in the Restricted Fund when received or receivable if the amount to be received can be estimated and collection is reasonably assured. Externally restricted amounts can only be used for the purposes designated by external parties.
- Investment income earned on contributions subject to external restrictions is recorded as revenue in the Restricted Fund in the year it is earned.

Financial instruments

Financial assets and financial liabilities are initially recognized at fair value less transaction costs when CCEMC becomes a party to the contractual provisions of the financial instrument and subsequently measured at amortized cost with any changes recorded in the statement of operations. CCEMC currently does not hold any equity instruments that would be measured after initial recognition at fair value.

Cash

Cash consists of cash on deposit.

Project expenses and liabilities

Project expenses and the associated project liability (included in accounts payable and accrued liabilities) are recognized on receipt of a valid project progress report and associated milestone invoices by CCEMC. A commitment for a project expense is disclosed as such when a contribution agreement is executed.

3 Restricted Fund

The Restricted Fund consists of funds that are externally restricted by the Government of Alberta for the purpose of investing in various initiatives and projects relating to one of the four strategic investment areas: conservation and efficiency, carbon capture and storage, greening energy production and adaptation and knowledge. The funds are also restricted for the purpose of administering CCEMC, which includes fees, expenses, liabilities and other costs.

In the prior year, \$280,567 was transferred from the Restricted Fund to the General Fund for the purpose of supporting the Zero 2014 conference held in April 2014. This expenditure was approved in the annual CCEMC business plan. No such transfer was made in the current year.

Climate Change and Emissions Management (CCEMC) Corporation

Notes to Financial Statements

For the year ended May 31, 2015

4 Grant revenue

Funds are granted from the Government of Alberta to CCEMC on an annual basis through the Grant Agreement dated March 31, 2009 (Grant Agreement), which is effective through to June 30, 2015. The Grant Agreement was amended on March 30, 2010 and was further amended on August 8, 2014. The Government of Alberta is currently reviewing the Climate Change Strategy for the Province of Alberta and as such, no further extensions to the Grant Agreement are expected until this process is complete. The Annual Grant amount is determined each provincial year-end and is based on the amount contributed to the Fund in the previous compliance year.

Annual grant amount	2015 \$	2014 \$
March 31, 2013	-	64,117,000
March 31, 2014	50,000,000	-
	<u>50,000,000</u>	<u>64,117,000</u>

5 Board and management remuneration

Total honoraria and expenses related to the directors of the board were \$72,241 (2014 – \$89,713) in the fiscal year. Remuneration paid to directors or their employers includes honoraria totalling \$45,243 (2014 – \$64,365) as follows:

	2015 \$	2014 \$
D. Beaver	2,937	1,274
R. Blackwood	-	-
J. Carter	782	1,851
P. Clark	10,776	10,587
J. Doucet	1,892	-
I. Evans	6,354	2,986
A. Falkenberg	-	2,932
C. Fischer	2,155	1,564
S. Flint	-	-
B. Kenny	1,441	3,447
D. Lewin	9,135	13,895
D. Lynch	-	2,056
R. Mansell	2,932	3,984
P. Merrin	-	4,864
P. Mohr	-	-
E. Newell	1,752	9,361
L. Rosen	-	984
K. Sendall	1,822	-
S. Snyder	-	-
A. Tasker	3,265	4,580
D. Wicklum	-	-
	<u>45,243</u>	<u>64,365</u>

Climate Change and Emissions Management (CCEMC) Corporation

Notes to Financial Statements

For the year ended May 31, 2015

Of these amounts, \$2,009 (2014 – \$11,898) is included in accounts payable and accrued liabilities. Expenses paid to directors of \$26,998 (2014 – \$25,348) relate to reimbursements for meals, travel and accommodation.

Program management expenses include remuneration to contract management who report directly to the board, totalling fees of \$5,628,589 (2014 – \$6,840,962); of this amount, \$307,049 (2014 – \$653,026) is included in accounts payable and accrued liabilities.

6 Commitments and guarantees

During the year, contribution agreements for CCEMC funding were executed for 12 projects (2014 – 38). Also during the year, three of the executed contribution agreements were cancelled. As at May 31, 2015, CCEMC has 89 executed contribution agreements outstanding and has commenced or completed funding for 76 of these approved projects. Total committed funds for executed projects is the difference between the total funding approved for executed contribution agreements and project expenses incurred to date or contribution agreements cancelled. A summary of these amounts is outlined as follows:

	2015 \$	2014 \$
Total committed funds for executed projects – Beginning of year	126,543,375	110,090,075
Total funds for executed projects approved or adjusted during the year	12,486,728	57,174,858
Project expenses incurred during the year	(33,034,492)	(37,129,851)
Contribution agreements cancelled during the year	(11,951,581)	(3,591,707)
Total committed funds for executed projects – End of year	<u>94,044,030</u>	<u>126,543,375</u>

As at May 31, 2015, funding for 13 of the 89 executed projects has not commenced. Funds allocated to the executed contribution agreements are subject to CCEMC's review and approval prior to disbursement to ensure full compliance with the terms of the contribution agreement. The actual financial commitment could therefore differ materially from \$94,044,030, but will not exceed that amount.

There are also an additional 21 projects, totalling \$153,518,299 (2014 – \$28,847,677), that have been approved for funding by CCEMC's board of directors but for which contribution agreements have not yet been executed. Subsequent to year-end, one of the approved projects, totalling \$3,194,334, has been cancelled, seven of the approved projects, totalling \$14,397,759, have executed contribution agreements and funding adjustments of \$7,120 related to executed projects have occurred. As at September 22, 2015, the CCEMC has 13 projects remaining, totalling \$135,926,206, that have been approved for funding by CCEMC's board of directors but for which contribution agreements have not been executed.

CCEMC indemnifies its directors against claims reasonably incurred and resulting from the performance of their services to the CCEMC. No amounts are reflected in the financial statements related to these indemnifications.

Climate Change and Emissions Management (CCEMC) Corporation

Notes to Financial Statements

For the year ended May 31, 2015

7 Financial instruments

CCEMC's financial instruments are exposed to certain financial risks, including credit risk, market risk and liquidity risk.

Credit risk

Credit risk is the risk of financial loss to CCEMC if a party to a financial instrument fails to meet its contractual obligation and arises principally from the cash and accounts receivable. The maximum amount of credit risk exposure is limited to the carrying value of the balances disclosed in these financial statements.

Management monitors these accounts regularly and does not believe that CCEMC is exposed to significant credit risk at the statement of financial position date.

Market risk

Market risk is the risk changes in market prices, such as interest rates, will affect the CCEMC's interest income or the value of the financial instruments held. CCEMC is subject to interest rate cash flow risk arising primarily from fluctuations in interest rates applied to its cash balances, which are subject to floating interest rates.

Liquidity risk

Liquidity risk is the risk CCEMC will not be able to meet its financial obligations as they come due. Management mitigates liquidity risk by monitoring forecasted and actual cash flows to ensure sufficient liquidity to meet its liabilities. Accounts payable and accrued liabilities are due within the current operating period.

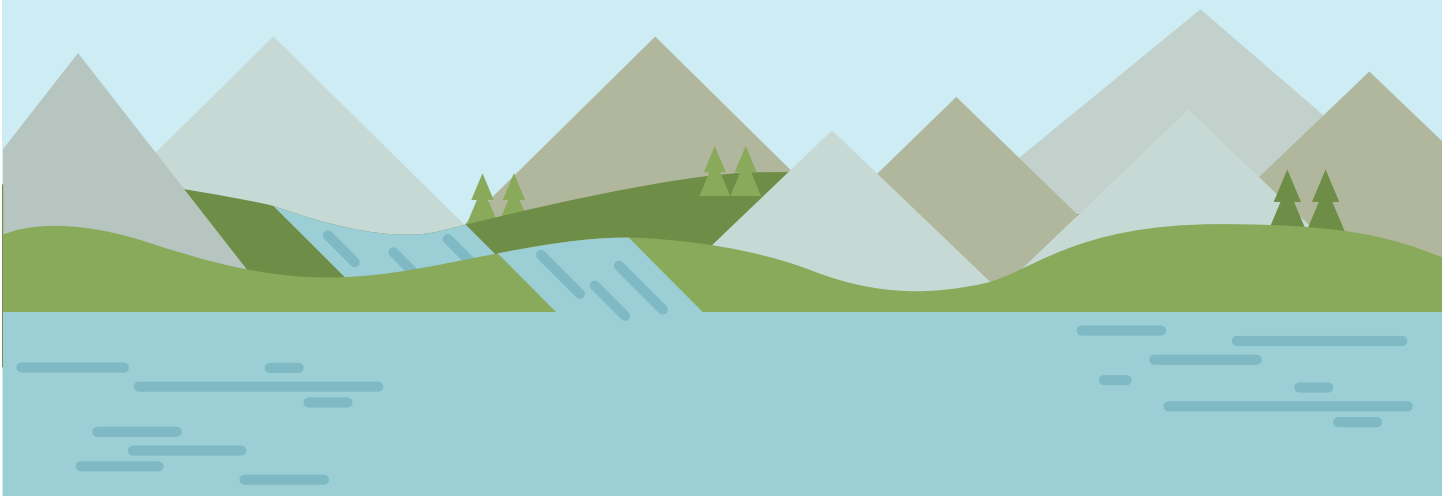
8 Economic dependence

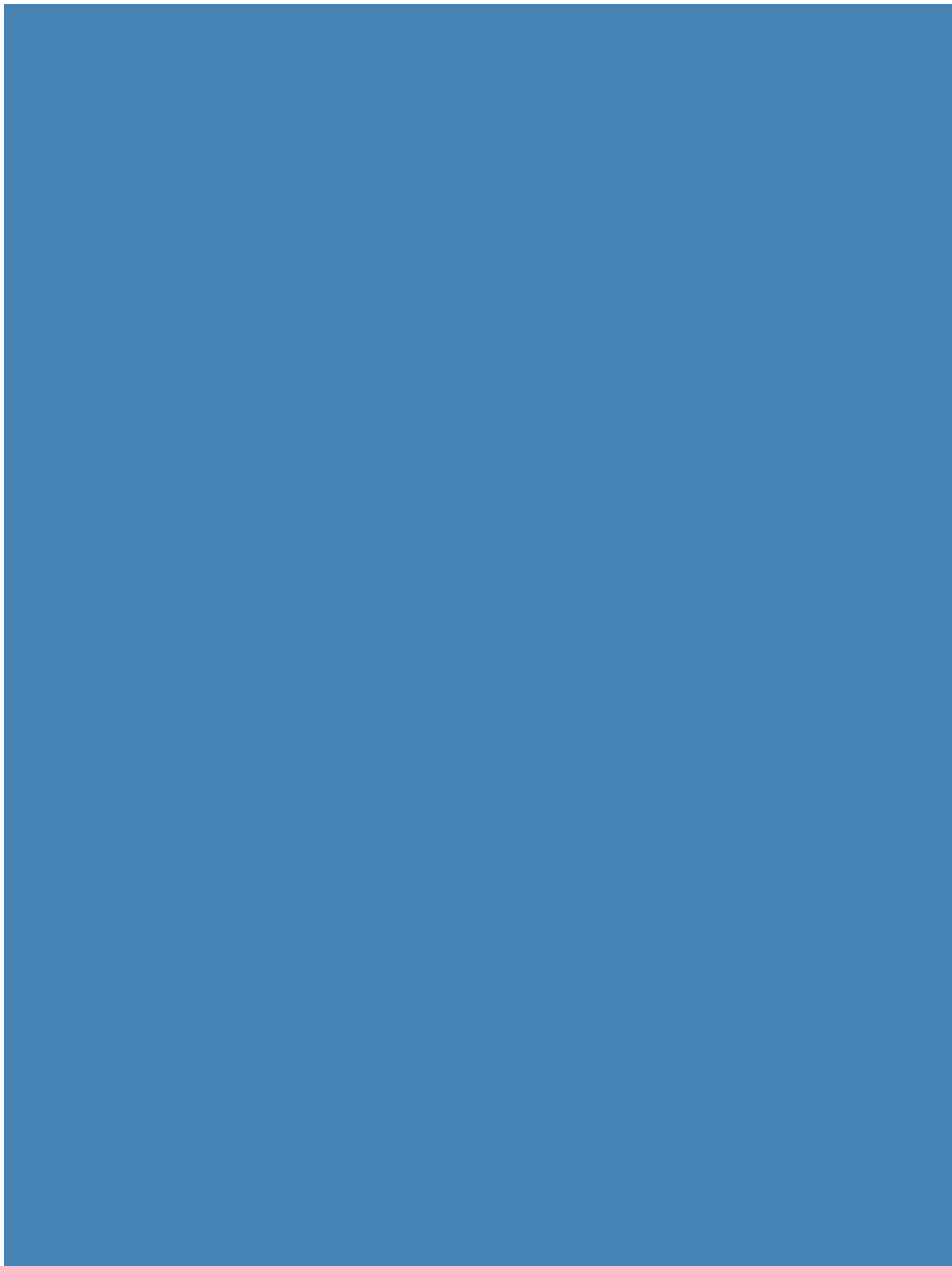
100% of CCEMC's grant revenue is received from the Fund. The loss of this funding would have a material adverse impact on CCEMC's operations and financial position. Should a loss of funding occur, all approved project commitments would remain in effect.

THE LAST WORD

While CCEMC's business will be shaped by the Government of Alberta's new approach to address climate change that is still in development, we greet the year ahead with enthusiasm. It includes plans for a joint funding opportunity with Sustainable Development Technology Canada, the launch of the second round of the CCEMC Grand Challenge and the advancement and completion of many more GHG-reducing projects.

We're looking forward to building on what we have learned over of the past six years, and charting a bold path into the future.







CCEMC

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