

2010 Annual Report

# Charting a path for change.



CCEMC





For Canadians, the climate change conversation has taken on an urgent tone. While emissions continue to rise, pressure mounts for decisive action and meaningful results.

In any organization's life, the first year often proves to be the most daunting. In the case of the CCEMC, our first 365 days came with enormous challenges and obstacles, as well as the achievement of significant milestones. Like other organizations, with each measure of adversity came an equal dose of pride.

For Canadians, the climate change conversation has taken on an urgent tone. While emissions continue to rise, pressure mounts for decisive action and meaningful results. The CCEMC's value proposition constitutes a unique response to these concerns, and with ongoing dedicated funds and public policy regulation as its base, the future looks bright for climate change innovation.

Like most start-ups, we spent our first year honing our business plan and defining the Corporation's focus areas: climate strategy, clean technology project investment, performance tracking and accountability, developing our governance and operating systems and advising Alberta's Minister of the Environment on emerging funding priorities. We also spent the past year establishing clear benchmarks for our performance. These measures focused on not only the work of the Corporation but also the success of its projects. At this stage it is too early to report on any measurable greenhouse gas reductions related to our operation, but we are confident that the time we've invested in clearly defining success will result

in transformative change. I encourage you to read more about our performance measures later in this report.

Once the 'business' of CCEMC was put in place, we were able to look forward to receiving project submissions and funding outstanding ideas.

And what an exciting journey it has been. Our first Expression of Interest elicited 223 project proposals – far exceeding our expectations. The strength of the response revealed the breadth of talent working to tackle the issues surrounding climate change. After evaluating each proposal, we narrowed the list to 30 organizations before announcing 16 ground-breaking projects. These 16 projects hold enormous promise, not just for Alberta, but for how the world will tackle the climate change agenda.

With \$71 million in funds soon to be hard at work, we are expecting big things. I hope that after reading this report, you'll feel the same way, and we look forward to reporting fuller results in next year's report.

Sincerely,

A handwritten signature in black ink that reads "Eric P. Newell". The signature is written in a cursive, flowing style.

Eric Newell



## Board of Directors

### **Chair**

Eric Newell is the retired Chancellor of the University of Alberta, a position he held from 2004 to 2008. He is the retired Chair and CEO of Syncrude Canada Ltd., positions he held from 1994 and 1989, respectively, until 2004. He served as President of Syncrude from 1989 to 1997. Prior to that, he worked with Imperial Oil Limited and Esso Petroleum Canada Ltd. He is an Officer of the Order of Canada, a member of the Alberta Order of Excellence, and a recent inductee into the Canadian Petroleum Hall of Fame.





**Board Members** (from left to right)

Dr. David Lynch, *Academia*  
Aaron Falkenberg, *Public*  
Dr. Brenda Kenny, *Pipeline Industry*  
Paul Clark, *Chemical Producers*  
Doug Beever, *Fertilizer Industry*  
Gary Holden, *Public*  
Dr. David Lewin, *Electricity Generation*

*Full biographies are available  
at [www.ccemc.ca](http://www.ccemc.ca)*

Eric Newell, *Conventional Oil and Gas*  
Paul Galachiuk, *Oil Sands*  
Roy Neehall, *Municipal*  
Patrice Merrin, *Public*  
Charles Fischer, *Conventional Oil and Gas*  
Dr. Robert Mansell, *Public*

MISSING:

Jim Carter, *Mineral Manufacturing*  
Aleasa Tasker, *Forestry Industry*

Canadians know that our future can hold an optimal balance between economic growth and environmental responsibility. This is a reflection of our dual concern for providing a healthy economy with plenty of employment opportunities and a high standard of living and fostering the stewardship of a healthy planet that supports life on earth.

However, as part of a general upward trend, Canada's greenhouse gas emissions totalled 747 megatonnes in 2007<sup>1</sup>. Industrial-scale oil and gas production, coal-fired electricity generation, and heavy motor vehicle use are all identified as significant contributing factors to Canada's impact on the environment. And long-term global projections show a steady and constant increase of greenhouse gas emissions around the world.

If business continues as usual, by 2050 Alberta will contribute 400 megatonnes all on its own.<sup>2</sup> But with policies for effective change in place, our province plans to cut that projection in half.

<sup>1</sup> Environment Canada, 2007 Greenhouse Gas Inventory  
<sup>2</sup> Environment Canada, 2007 Greenhouse Gas Inventory

By fostering an economy with a healthy base in clean technologies and green jobs, Alberta, already rich in natural resources, can make substantial short term improvements in the production and use of energy until the green energy sector takes off – while constantly leading positive change in Canada and around the globe.

In April 2007, Alberta became the first jurisdiction in North America to pass climate change legislation requiring large emitters to reduce emissions. The CCEMC was created to be a key part of Alberta's movement toward a greener economy and a greener environment. Its policy roots are in Alberta's Climate Change Strategy, the Climate Change Emissions Management Act and Alberta Environment's mandate to reduce greenhouse gas emissions.

By collecting compliance funds from large industrial emitters, the CCEMC technology funding model turns the challenge of controlling GHGs into a massive opportunity, potentially transforming our economy while addressing our climate change challenges.

## The CCEMC's goals are as follows:

**GOAL 1:** To fund clean technology projects that achieve actual and sustainable reductions in GHG emissions.

**GOAL 2:** To support the research, development and deployment of transformative technology.

**GOAL 3:** To improve the knowledge and understanding of climate change impacts, mitigation strategies, adaptation and technological advancements.

**GOAL 4:** To demonstrate full accountability to all Albertans.

### Laying the groundwork

Much of the past year was spent building the organizational framework for the CCEMC to operate efficiently and effectively. The CCEMC was incorporated and became operational in the summer of 2009, aligning its mission and values with public policy and the direction established in Alberta's 2008 Climate Change Strategy.

### How the CCEMC Board came to be

In May of 2009 Eric Newell became the CCEMC's inaugural Chair, appointed by the Government of Alberta. Mr. Newell brings a wide skill set to the position, thanks to a 35-year career in the private sector and his tenure as Chancellor of the University

created, comprised of diverse service providers who collectively operate as a team to address:

- Program management and operations
- Project adjudication
- Communications
- Legal issues and requirements
- Financial management and accountability

### The first round of proposals

The 'real' work of the CCEMC began in August 2009 when the Corporation issued its first Expression of Interest document. While the organization had modest expectations for the number of project applications, the final total of 223 request for proposal

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For every dollar CCEMC invests in these projects, roughly two-and-a-half more dollars are also invested from other sources. As a result, the CCEMC's investment is more than doubled.

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of Alberta and Chair and CEO of Syncrude Canada. His perspective on climate change from both an industry and public perspective is unmatched, and his understanding of the social responsibility inherent in business is vital. Mr. Newell was tasked with selecting a Board of Directors for the CCEMC.

### Getting operationally sound

The Board's initial responsibilities included selecting service providers who could not only manage the day-to-day operations of the Corporation, but also help identify risks and opportunities in its start-up phase. A 'virtual' organizational model was established to provide optimal program performance while minimizing unnecessary overhead. The CCEMC's Operations Management Committee was

responses was both assuring and inspiring. After a robust review of the applications, 16 projects were selected as offering the best path to immediate and lasting change.

### 16 reasons to be proud

May 2010 was a big month for our environment, our province, and our economy; the CCEMC announced the 16 ground-breaking projects that will receive a total of more than \$71 million in funding. These projects span four key areas:

- Renewable energy – \$37.5 million
- Energy efficiency – \$5.7 million
- Cleaner energy production – \$23.3 million
- Carbon capture and storage – \$4.8 million

Project proponents estimate that these projects will cut emissions by a combined total of 3–4 megatonnes.

The 16 projects that will ultimately receive CCEMC funding are incredibly diverse, ranging from a one-person business operating out of a garage to corporations with university partnerships and consortiums. You can learn more about these projects throughout this report.

## **A year of growing – and learning**

Much was accomplished this past year: projects were selected; planning and development targets were met; and a clear path lies ahead. Through a survey of project proponents, the Corporation sought feedback on ways to improve its operation and acted on the information provided. These included engaging a fairness monitor to ensure objectivity, improving application procedures and systems, and shortening the review and decision-making process.

The 16 projects that will ultimately receive CCEMC funding are incredibly diverse, ranging from a one-person business operating out of a garage to corporations with university partnerships and consortiums.

## **Financial Highlights**

The CCEMC's financial statements provide an overview of the funds and resources used to deliver its initiatives. A few highlights of 2009/10 include:

- Approximately \$126 million was received in grant revenue from the Government of Alberta. Investment income of \$371,000 was generated from this revenue during the year.
- Overall operating costs related to start-up were well within budget.
- The administration cost ratio was 2.5% of total funds, reflecting the costs associated with the start of the CCEMC and the execution of the first call for proposals.
- Program management costs related to service providers who report directly to the Board of Directors represented 2.1% of total funds.
- The level of legal support required for the CCEMC exceeded planned expenditures but was necessary to establish its policies, procedures and the governance essential to establishing operations.
- Board remuneration and expenses were approximately \$91,000, or 0.07% of total funds.
- On May 25, 2010, the Board approved 16 projects for CCEMC funding; however, no contribution agreements were executed prior to year end. The anticipated financial commitment over the next five years is expected to total \$71,032,477. No projects received funding in 2009/10.
- Delegation of authority was established to ensure that the funds are appropriately disbursed.
- Cash management strategies were established to ensure that the capital in the CCEMC is preserved.



Alberta is leading the way – spending more than all other provinces combined, with total identified spending at \$6.1 billion in climate-related technology investments over the next five years.

**E**arly in 2010, the CCEMC asked the Conference Board of Canada for a perspective on climate-related technology funds and their impact on employment and the economy.

The resulting Report estimated that Canadian governments and companies will invest \$11.75 billion in climate-related technology projects between 2010 and 2014 through publicly funded programs alone.

Alberta and Ontario, the provinces with the largest greenhouse gas emissions, are also the provinces with the highest level of clean technology investment. In fact, Alberta is leading the way – spending more than all the other provinces combined, with total identified spending at \$6.1 billion in climate-related technology investments over the next five years.

Key findings of the Conference Board of Canada Report include:

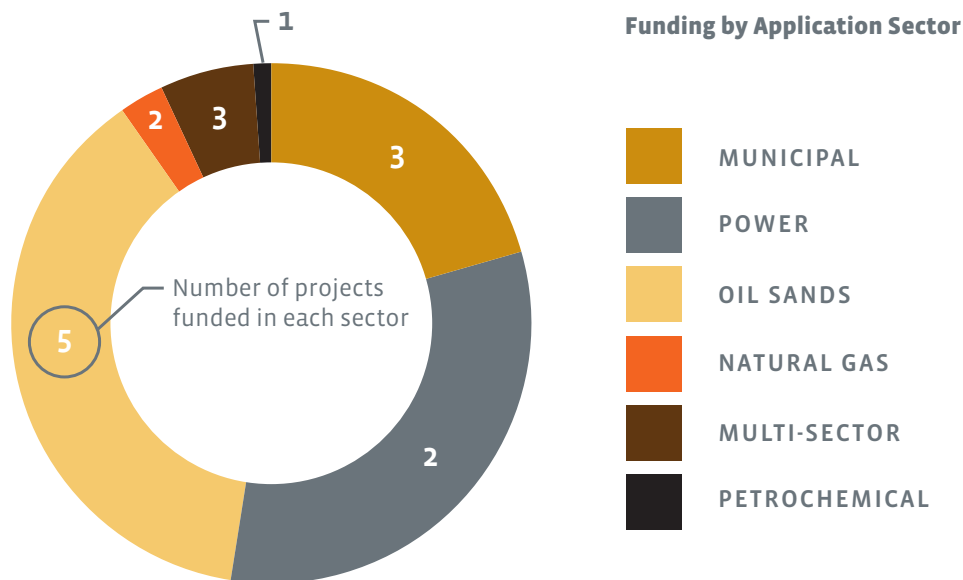
- Spending generated by technology funding over the next five years in Alberta is estimated to boost real GDP by over \$4.5 billion
- This spending will create more than 55,000 person-years of employment
- There is an ongoing need to directly link the sources of emissions with solutions
- Projects developed in the private sector with substantial investment from project proponents are most likely to succeed
- Technology investments are likely to be more effective when combined with other public policy instruments

These insights – coupled with the real impact of GHG emission reductions – confirm that the CCEMC model is not only correct but leading-edge in its approach.

The challenges surrounding climate change transcend borders and cross the spectrum of public opinion. Citizens the world over are beginning to demand action and are looking for pragmatic ways to deliver results. The CCEMC views technology funding as a legitimate and promising path to compliance and – ultimately – greenhouse gas reductions. Strong leadership and a significant, concerted presence in major political centres have been required to deliver our message of progress.

The CCEMC recognized an opportunity to tell the story of climate change action in Alberta and communicate the promise its business model holds for transformative change. A delegation travelled to Ottawa in November 2010 to meet with key stakeholders and policy makers, across the spectrum from Environment Canada to the Canadian Council of Chief Executives. This ‘face time’ resulted in a greater understanding of Alberta’s action on climate change, as well as the core business of the CCEMC.

In addition, a group of representatives travelled to Washington, D.C. in May 2010 to inform key stakeholder groups about the role and function of the CCEMC and the part it plays in lowering GHG emissions. The delegation met with many organizations and public policy leaders who responded positively to the CCEMC model and expressed renewed interest in Alberta’s initiatives.



**April 2007** – Alberta becomes the first jurisdiction in North America to pass climate change legislation requiring our large emitters to reduce emissions

**May 2007** – Eric Newell is named Chair of the Climate Change Emissions Management Corporation

**July 2009** – The CCEMC’s Board is named, including representatives from industry, academia, municipalities and the public at large

**August 2009** – The CCEMC announces its first Call for Proposals Expression of Interest Stage

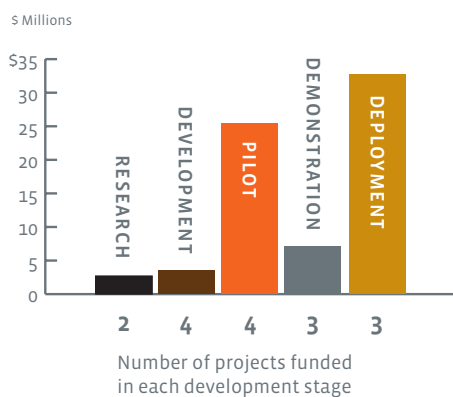
**September 2009** – 223 submissions are received in response to the first Expression of Interest, representing a total funding request of more than \$1.6 billion

The CCEMC realized early on the importance of establishing a system of performance measurements for all of the projects it funds. Clearly established metrics will allow the Corporation to demonstrate that it is delivering results consistent with its mission, strategic direction, established goals and values.

But the performance of the CCEMC won't just be measured on the strength of the projects it funds. In addition, measures of corporate efficiency will focus on the performance of the organization and ensuring it remains relevant, timely and ahead of the innovation curve.

The CCEMC will track and report on the following metrics (a more detailed description of these metrics can be found at [www.ccemc.ca](http://www.ccemc.ca)):

### Funding by Technology Development Stage



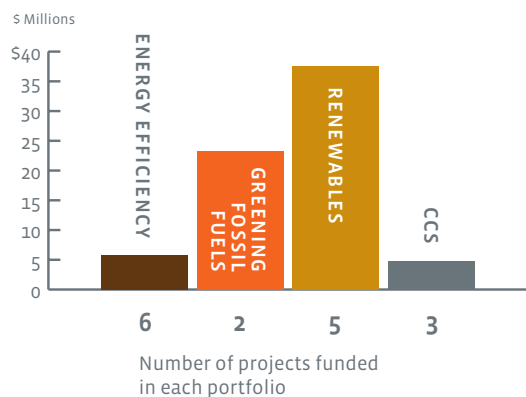
### GHG Reductions

Going forward, an essential element of success will be the amount of GHG emissions reduced from a 'business as usual' scenario. Because projects are not yet operational, the CCEMC cannot report on actual reductions.

### Fund Allocations

The CCEMC is dedicated to ensuring that funds are allocated to key sectors and strategic investment areas, as well as demonstrating the opportunities for leverage they provide.

### Portfolio Balance



### Corporate Efficiency

Put simply, the ability of CCEMC to run operations as efficiently as possible.

### Project Success

This metric monitors project success and the extent to which projects span or progress along the innovation spectrum.

**November 2009** – The CCEMC invites full proposals from 30 organizations for a total of up to \$120 million in funding

**May 2010** – Independent Fairness Monitor is appointed to oversee evaluation process

**May 2010** – Conference Board of Canada Report indicates that the CCEMC's technology fund will make a meaningful contribution to Alberta's environment and create jobs

**Late May 2010** – The CCEMC selects 16 clean technology projects for funding to address energy efficiency, renewable energy, greening energy production and carbon capture and storage

## 16 Ground-breaking Projects.

The following projects hold enormous promise, not just for Alberta, but for how the world will tackle the climate change agenda.



As the 16 CCEMC-funded projects begin to work towards realizing GHG emission reductions, the Corporation is moving forward to the next cycle of funding. A second RFP focused on energy efficiency will close in the fall of 2010, inviting applicants to submit proposals for projects of up to \$40 million. Other RFPs are also planned for 2010.

In addition, the CCEMC will host the inaugural GHG Reduction Summit in May 2011. This Summit will draw industry leaders, scientific experts and key stakeholders together from across the country to explore the best ways to stimulate innovation, enhance technology development and tackle climate change challenges. Its focus will be on making recommendations for tangible improvements to the climate change management system.



## ESEIEH Consortium

*Enhanced Solvent Extraction Incorporating  
Electromagnetic Heating (\$16,474,839)*

The Harris Corporation of Melbourne, Florida, Laricina Energy Ltd., Nexen Inc., and Suncor Energy Inc. make up the ESEIEH Consortium. The goal is to replace steam for in situ bitumen extraction with electromagnetic heating in combination with solvent dilution.

The ESEIEH process eliminates the need for steam, requiring less energy while providing an improved framework for significant reduction in carbon emissions. On a full cycle basis, emissions may be reduced by up to 80 percent of the GHG from steam-assisted gravity drainage.







## A new day in the oil sands

Alberta's oil sands are home to the world's second-largest proven oil reserves. This puts Alberta in an enviable position that offers both incredible opportunity and immense responsibility. As demand for our energy resources increases, the need to reduce our environmental footprint grows. Clearly, there is a compelling need for transformative change.

In downtown Calgary, a partnership has formed that will impact oil sands development some 650 kilometres north. The consortium, put together by Laricina Energy, will explore using electromagnetic waves to heat up reservoirs in place, making the oil easier to recover. "If you can, imagine a large radio tower radiating electrical energy underground," explains Mauro Cimolai, Laricina's Technical Advisor. "By combining this process with a solvent, the consortium believes it could help reduce energy requirements with the potential to eliminate the need for steam." Steam generation in situ in the oil sands industry is its largest use of energy; Laricina, Harris (Florida), Nexen and Suncor are working together to solve this problem. "The CCEMC's investment is pivotal to the development of the project, and was the impetus for the partnership," adds Cimolai.

As one of the oil sands' largest players, Suncor has the most to gain from improving the energy efficiency of its operations. It plans to use additional CCEMC funding to kickstart efforts that will uncover system-wide opportunities for green innovation. "By looking at our operations as a whole, we expect to identify gaps in technology and operations, and see opportunities all along the way" explains Mark Bohm, Climate Change Engineering Specialist for Suncor Energy. From in situ processing to mining the oil to upgrading it, no opportunity will go unexplored. While the CCEMC funding keeps the project high on the priority list, Bohm believes it will offer another benefit. "We see this as a key element of maintaining the oil sands industry's competitive position as we move into a carbon-constrained world."

Alberta's oil sands continue to offer enormous benefits to our economy and our need for a stable energy supply. By spurring the development of innovative technologies and better processes, the CCEMC hopes to support efforts that turn oil sands development into a model for large-scale emissions reduction. "While improving energy management for the oil sands can reduce greenhouse gas emissions, it's also good for the bottom line," offers Cimolai.



## Evergreen Energy Technologies

*Reliable Power for Remote Locations (\$250,000)*

Darryl West – owner, President, and the only full-time employee of Evergreen Technologies – began his start-up technology company in Calgary with a mandate to develop and commercialize new ideas for curbing the energy industry's environmental impact.

Evergreen's Power Pod Technology replaces pneumatics – venting devices that waste natural gas and emit GHGs – with hybrid Direct Methanol Fuel Cell (DMFC)/Solar power generation. Using solar power primarily, DMFC provides a reliable source of energy in the darker winter months. The early stages of development have been successful; the CCEMC's funding will help cover field-testing, evaluate market value, and move the project towards commercialization.



## Innovation big and small

In order to tackle greenhouse gas emissions, we need to let our brightest minds do what they do best: innovate. Whether it's a passionate entrepreneur working in his garage or a large corporation wanting to implement a proven technology, the CCEMC believes that every step forward is a valuable one. That's why all 16 projects approved by the Corporation span the innovation chain, from the early stages through to commercialization.

At the small-business end of the spectrum you'll find Darryl West and his company called Evergreen Energy Technologies. His target: the pneumatic pumps that operate at many of the approx 120,000 gas wells scattered across remote corners of Alberta. "Pneumatic pumps that inject chemicals at traditional off-grid well sites waste natural gas and vent greenhouse gases into the atmosphere," explains West. "Our hybrid Direct Methanol Fuel Cell system works in combination with solar power by using liquid methanol to produce electricity on demand." According to West, these 'Power Pods' will reduce CO<sub>2</sub>e emissions by over 99% and provide reliable power in winter months for electric pumps, control systems, and other equipment. Evergreen has just passed its initial testing phase and is about to field test six units.

At the 'shovel ready' end of the scale, an impressive Medicine Hat project is set to change how we think about generating power. If you've been to Medicine Hat, you already know that it's one of the sunniest spots in Canada. Currently, the city's power plant is typical of most – using large amounts of natural gas to fire a turbine in order to create electricity. "We are proposing using solar thermal technology – essentially focused sunlight – to produce steam and reduce the amount of gas we need to run the turbines," explains Russ Smith, Manager, Energy Sustainability for the City of Medicine Hat. With the last bit of funding from the CCEMC, the project will shift to development mode. "We'll never be able to quit our use of fossil fuels, but this kind of transitional technology is a huge first step," he suggests.

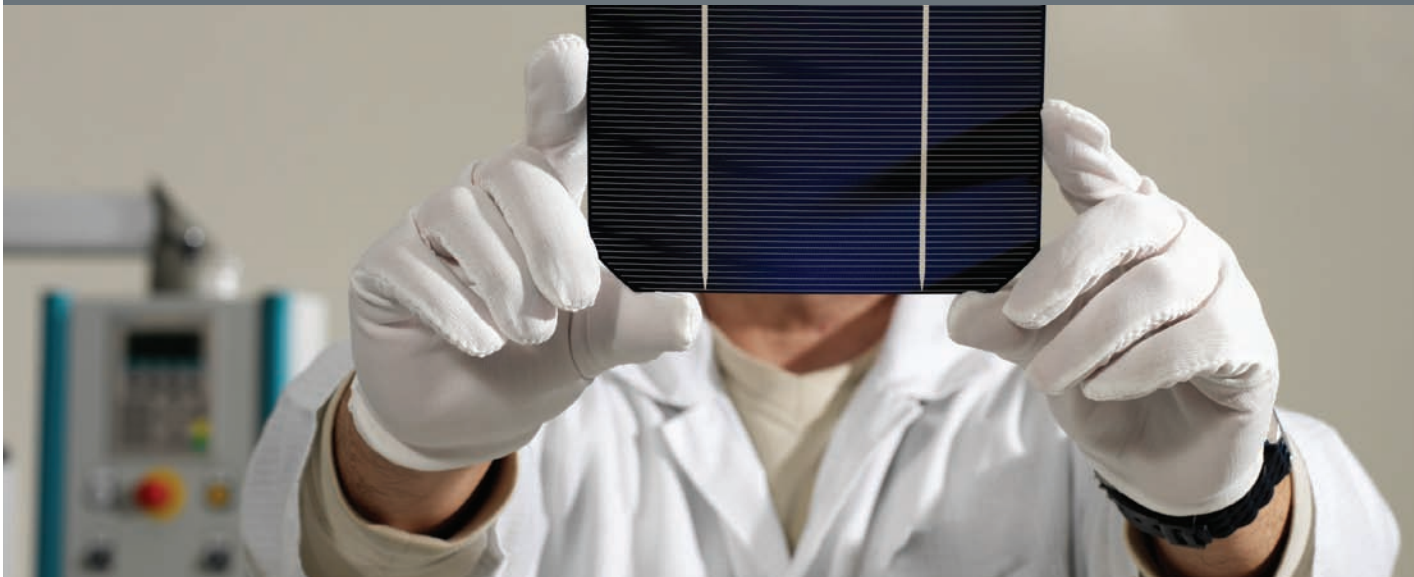
The CCEMC's funding strategy not only ensures entrepreneurs get the support they need to keep innovating, but it will also help advance projects to the commercial stage.

**May-Ruben Technologies Inc.**

*BFE Thermally Driven Refrigeration System (\$569,704)*

Founded by the Alberta Mining Corporation (AMC) and Chief Scientist Wayne May, this Calgary-based company is seeking to provide people around the world with clean energy and water through technological innovation.

Implementing an unprecedented method, Binary Fluid Injector technology uses a high-performance heat pump or refrigeration cycle that is driven directly by thermal energy – rather than electricity. This unlocks the potential for widespread use of renewable thermal energy – such as waste heat, geothermal, and solar thermal energy – on an industrial scale. And where industrial energy is unavailable, switching from electricity to natural gas will reduce energy costs by 75% – specifically in air conditioning use – and reduce GHG emissions even more.

**Suncor Energy Inc.**

*Alberta Oil Sands Energy Efficiency and GHG Mitigation Roadmap (\$790,905)*

Suncor Energy Inc., one of Canada's premier integrated energy companies, works in the development and upgrading of oil sands, conventional and offshore oil and gas production, petroleum refining, and product marketing under the Petro-Canada brand. Part of the company's mandate is to increase its application of renewable energy.

In collaboration with Jacobs Consulting, the Alberta Oil Sands Energy Efficiency and GHG Mitigation Roadmap provides an opportunity to assess and quantify potential GHG emission reductions in a real-time environment during the mining of bitumen, the use of Steam-Assisted Gravity Drainage (SAGD), and the upgrading of facilities. The roadmap will be measured against alternative GHG mitigation solutions, and will help assess the future needs of the energy industry.



## **Genalta Power Systems Inc.**

### *Amine Facility Waste Energy Power Utilization (\$1,849,000)*

Genalta Power Systems Inc., a Canadian-owned renewable energy company, focuses primarily on creating cost-effective and environmentally responsible electricity with technologies that convert waste energy into power for use in the oil and gas industry.

Site owners are provided with solutions like base load green energy, increased plant efficiencies, operating cost reductions, greenhouse gas emission credits, emission reductions, and long-term sustainable energy.

This particular project will produce clean electricity from the recovery of sour gas waste, supplying 1 to 3 million watts of power for use in plant operations.



## **Great Northern Power Corporation**

### *Waste-Heat EXPANDER System (\$1,570,000)*

Great Northern Power, an independent Calgary-based power generation company, uses its EXPANDER System technology to convert waste heat from reciprocating engines – used in natural gas compression – into clean electricity.

Along with replacing electricity that would otherwise come from burning fossil fuels, this technology reduces overall fuel consumption by making shaft horsepower production more efficient. The CCEMC funding will go towards the production of 10 EXPANDER units and helping to demonstrate its capabilities, ensuring the application of this technology across Alberta.

A photograph of four people standing in a modern laboratory hallway. In the center is a man in a dark suit and light blue shirt. To his left is a woman in a white lab coat over a black turtleneck. To his right is another man in a white lab coat over a patterned shirt and blue jeans. On the far right is a woman in a white lab coat and glasses. The hallway has large windows on the right, industrial pipes and ductwork on the ceiling, and a polished floor.

## General Electric

*Ceramic Membrane-based  
Technology (\$2,000,000)*

Operating in more than 100 countries with over 300,000 employees, General Electric is a global infrastructure, finance and media company with strong roots in Canada's industrial sector.

In collaboration with the University of Alberta and Alberta Innovates, GE has developed a ceramic membrane-based technology for the capture of sequestration-quality carbon in syngas streams. With the demonstration of this project at an end-user site, the materials and manufacturing challenges will be addressed in order to move toward the full-scale adoption of the technology around the world – making the reduction of 10 million metric tons per year by 2020 a very real possibility.

## Carbon Capture and Storage Innovation

If we're going to make significant reductions in our greenhouse gas emissions, the most obvious place to look is in our energy production. The CCEMC recognizes the incredible possibilities that new technologies hold for greening our energy production, and has announced \$28.1 million in funding for five exciting projects. Together, these projects have the potential of reducing about 1.5 megatonnes of GHG emissions.

Jessie Inman, Executive Director of Corporate Development with HTC Pureenergy, believes her company has a compelling solution. They've developed a modular carbon capture plant, the Pureenergy CCS® System that captures emissions generated from natural gas-fired boilers at oil sands SAGD operations. The best part? These plants can be built alongside existing operations. "The more oil sands operations expand, the more need there is for a good capture solution," she explains. "These units allow companies to scale their CO<sub>2</sub> emissions capture over a number of years instead of installing one mega project to capture them all at once." Once captured, the CO<sub>2</sub> can be transported and used to help enhance oil recovery in other locations. "One modular plant can capture up to 1,000 tonnes of CO<sub>2</sub> a day." HTC Pureenergy will be using the CCEMC funding to demonstrate the feasibility of the approach on a broad scale.

Meanwhile, a cross-continent partnership between GE, the University of Alberta and Alberta Innovates Technology Futures is leveraging \$2 million of CCEMC funding to tackle the emissions generated by upgrading bitumen. "We're using something called zeolites – a naturally occurring material – to help filter CO<sub>2</sub> out from emissions," describes University of Alberta researcher Dr. Steve Kuznicki. "Think of it as a giant coffee filter – the good stuff goes through, the grinds stay behind." Anthony Ku, project leader for GE Global Research adds: "It's a powerful partnership between academic research and industry to address a key problem. Steve's team knows the material better than anyone, and our expertise is making it scaleable." The first field trials for the approach should be unveiled within four years.

"The CCEMC funding is a key piece of the puzzle," says Ku. "This project involves high risk research and development, and it's much more attractive when leveraged by other partners. It allows for much bigger results."

## **Enerkem Inc.**

### *Greening Biofuel Production and CO<sub>2</sub> Utilization (\$1,800,000)*

Enerkem Inc. develops community-based advanced bio refineries using their proprietary thermo-chemical technology that converts residual materials, such as municipal solid waste (MSW), into clean transportation fuels and advanced chemicals. This Montreal-based company operates both a pilot plant and commercial-scale facility, with two additional plants set to open.

By using waste materials to produce clean biofuels and incorporating CO<sub>2</sub> directly into the process, this project demonstrates the potential for GHG reduction in the environment – and its potential for market success. Once testing at the Advanced Energy Research Facility is completed, this City of Edmonton and Alberta Innovates joint project will be implemented at Enerkem’s commercial waste-to-biofuels facility.



## **City of Medicine Hat**

### *Concentrating Solar Thermal Power Project (\$3,000,000)*

Medicine Hat’s vision is to be the ‘community of choice’ for more than 60,000 residents, numerous businesses and countless visitors. The City of Medicine Hat employs more than 1,200 people and has readily available natural gas resources, allowing the city to explore innovative solutions in the areas of wind power, solar heating, and a water aquifer to heat and cool homes.

Solar thermal technology – using reflective surfaces to focus sunlight – can produce heat, power, and chemicals without burning fossil fuels and adding to toxic air emissions. This project uses a hybrid system of partial solar power and low-burning fossil fuels and will be implemented at the Medicine Hat power plant. The real-world testing of this technology will work to prove its potential for use across the province.



## **ECB Enviro North America Inc.**

*Biogas Cogeneration Project (\$8,200,000)*

ECB Enviro North America Inc. has designed, built, and now operates the Lethbridge Biogas cogeneration facility using both in-house employees and contracted engineering and consulting firms from around the world.

Biogas cogeneration is fueled by organics comprised of agricultural manures and food processing wastes. The 15-km-wide project site offers more than enough organic 'fuel'. This technology generates electrical and thermal energy through anaerobic digestion of organic waste, and reduces up to 75% of greenhouse gases by using an innovative biological air treatment system – the first patented use of thermal hydrolysis technology in Canada that destroys prions, which cause BSE in cattle.



## **E-T Energy Ltd.**

*ET-DSPTM for Development of Athabasca Oil Sands (\$6,862,000)*

Established in 2004, E-T Energy Ltd.'s team of eight scientists is developing environmentally friendly, energy-efficient and economically viable methods of oil sands production through the process of Electro-thermal Dynamic Stripping (ET-DSPTM). This is an electrical heating technology used extensively in the environmental industry to remediate contaminated soil and groundwater.

E-T Energy Ltd. will operate a pilot test-site on its Poplar Creek property to determine the feasibility of the technology. The transfer of ET-DSPTM to oil sands production will demonstrate how the use of water and electricity can nearly eliminate the emission of greenhouse gases on-site.





## **Enmax Corporation**

*Home Generation (\$14,500,000)*

Enmax has provided its more than 640,000 customer sites with electricity, natural gas, and renewable energy for over 100 years. Owned by the City of Calgary, this utility company has an environmentally responsible attitude toward business and takes an integrated approach to risk management.

Enmax plans to deliver 9,000 turnkey solar and wind micro home generators to residential consumers across Alberta – significant reductions in greenhouse gas emissions can be expected to follow.

## A new look at renewables

Renewable energy is a beautiful concept. It uses a lot of what you have: wind, sun, and waste; and produces a lot of what you need: power. The CCEMC has announced plans to invest more than \$37.5 million dollars in five renewable energy projects that have the potential to reduce GHG emissions by an estimated 1.1 megatonnes per year. It's a long-term, sustainable energy source that is, quite literally, right under our noses.

In the heart of cattle country, ECB Enviro is turning 150,000 metric tonnes of local plant and animal waste into an organic fuel. With the help of anaerobic digestion – micro-organisms that help break down waste – the processing plant generates biogas without a single dumpster of waste. Instead, the manure returns to local fields as a more balanced, and yes – less stinky – fertilizer. “The local agricultural community benefits, but we also keep enormous amounts of phosphorus out of the watershed,” says President Thane Hurlburt. He says the CCEMC funding will allow the company to focus on its business and not start-up struggles. “We can be more strategic and credible,” he says. “But we’re never at the finish line.”

In fact, some would say we’re just at the start. There’s no doubt Albertans are curious about wind and solar power, but as Doug Sullivan, VP of Distributed Generation for ENMAX Energy, points out: “We just don’t see enough of it around. If your neighbour had a solar panel, you’d see it as a real option.” ENMAX Energy’s goal is to install 9,000 renewable energy generating kits across Alberta over the next five years: wind turbines on farms and acreages, solar panels on homes. “Our goal is to remove almost 650,000 tonnes of carbon from the atmosphere, and to make renewable energy an easy, affordable option for Albertans – because the solution has a low upfront cost. You should be able to drive on any Alberta highway and see a working solar installation.” From this, Sullivan says, comes the critical mass needed to grow the market and create a thriving, locally-based industry.

CCEMC funding puts renewable energy front and centre as a long-term solution for drastically reducing GHG emissions. Change is in the air.

**HTC Pureenergy Inc.**

*Carbon Capture FEED Study (\$315,000)*

Founded in 1997, HTC Pureenergy is a Regina-based organization that is aligned with the University of Regina and has commercial offices in Calgary, Vermont, and Sydney, Australia. With a staff of more than 30 scientists, the company is dedicated to implementing full-scale carbon capture and storage techniques.

Using their patented Pureenergy CCS System, the company will provide process design, Front End Engineering and Design (FEED) for a 1,000-tonne/day capture method in Devon Energy's SAGD boilers at its Jackfish in situ oil sands development. This plant will allow Pureenergy to demonstrate the success of its post-combustion amine CO<sub>2</sub> capture technology, and illustrate the feasibility of applying it across industries, and around the world.

**Suncor Energy Inc.**

*OTSG Oxy-fuel Demonstration Project (\$2,500,000)*

Praxair, Devon, Cenovus, Statoil, and Suncor Energy have come together to launch a one-of-a-kind project.

The Carbon Capture Project is a means to develop a reliable, low-cost solution to capture CO<sub>2</sub> from once-through steam generators that can be used on a commercial scale for in situ bitumen production. The five partners will construct and operate a pilot plant to determine the operational challenges and real-world benefits. The results will be made public and shared across industries.

## Plasco Energy Group

### *Renewable Energy and Waste Conversion (\$10,000,000)*

Plasco Energy Group is an environmentally focused organization that uses their patented plasma technology to convert municipal solid waste (MSW) into usable green energy and other valuable products. This unique approach employs responsible waste management and environmentally friendly solutions to tackle urban waste challenges.

In partnership with Red Deer County, Plasco Alberta will build and operate the Plasco Waste Conversion and Renewable Energy Facility to receive, process, and convert MSW from a total of eight counties in Alberta. The facility will deliver renewable baseload power to the local distribution network and reduce overall GHG emissions across the province.







## **Nova Chemicals Corporation**

*Energy Footprint Reduction for Ethylene Manufacturing (\$700,000)*

Headquartered in Calgary, Nova Chemicals manufactures chemicals, plastic resins, and end products while keeping their environmental impact to an absolute minimum.

This project aims 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.

## More efficient every day

Whether it's keeping an upgrader running at full capacity or turning on the furnace at home, Albertans use a lot of energy. As one of its funding priorities, the CCEMC is planning to invest in six energy efficiency projects that will help industry reduce its energy consumption, contribute to achieving Alberta's greenhouse gas targets and support Canada's clean technology objectives. It doesn't mean changing what we do; it just means doing it better.

More than \$5.7 million will be directed towards projects of every shape and size. From converting sour gas waste into power, to looking at large oil sands operations from a holistic perspective, these initiatives have the potential to reduce GHG emissions by an estimated 1.6 mega tonnes per year, and create an impact far beyond Alberta.

Consider the production of ethylene, a chemical used as a 'building block' for many common items including plastics such as pipe and film material, anti-freeze and many more. To produce ethylene, manufacturers use a process called steam cracking, and from that, separation of the chemical components by distillation is required – a process that uses significant amounts of energy. CCEMC funding recipient NOVA Chemicals is exploring the use of membrane separation technology to replace conventional distillation and reduce the energy requirements within that process.

"Membrane separation has been used in other areas, but not in the production of ethylene," says Daryll Harrison, Vice President of Technology for NOVA. "We'd like to see it done commercially." This would likely have an impact on ethylene production around the world. "If it works properly, we could reduce plant emissions by up to 15 per cent at NOVA Chemicals facilities. This could make it immediately attractive to other operations across the globe."

When CCEMC contributes to energy efficiency projects, other funding is also invested from other sources. "In our case, the CCEMC funding will work in unison with our other partners to help accelerate technical development and move it closer to commercial reality," says Harrison. "We have the potential to break new ground together."



## Auditors' Report

To the Board of Directors of  
Climate Change and Emissions Management (CCEMC) Corporation

We have audited the statement of financial position of Climate Change and Emissions Management (CCEMC) Corporation as at May 31, 2010 and the statements of changes in net assets, operations and cash flows for the year then ended. These financial statements are the responsibility of CCEMC's management. 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 plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of CCEMC as at May 31, 2010 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

*Deloitte & Touche LLP*

Chartered Accountants

June 16, 2010

# Climate Change and Emissions Management (CCEMC) Corporation

## Statement of Financial Position

As of May 31, 2010

	\$
<b>Assets</b>	
Current assets	
Cash	123,930,119
Accounts receivable	70,015
Prepaid expenses	1,927
<b>Total Assets</b>	<b>124,002,061</b>
<b>Liabilities</b>	
Current liabilities	
Accounts payable and accrued liabilities	695,222
	695,222
<b>Commitments and Guarantees (note 7)</b>	
<b>Net Assets</b>	<b>123,306,839</b>
<b>Unrestricted Fund</b>	<b>-</b>
<b>Restricted Fund (note 3)</b>	<b>123,306,839</b>
	123,306,839
<b>Total Liabilities and Net Assets</b>	<b>124,002,061</b>

# Climate Change and Emissions Management (CCEMC) Corporation

## Statement of Changes in Net Assets

For the year ended May 31, 2010

	Restricted Fund \$
<b>Balance - Beginning of year</b>	<b>-</b>
Excess of revenues over expenses	123,306,839
<b>Balance - End of year</b>	<b>123,306,839</b>



# Climate Change and Emissions Management (CCEMC) Corporation

## Statement of Operations

For the year ended May 31, 2010

	<b>Restricted Fund \$</b>
<b>Revenues</b>	
Grant revenues (note 4)	126,157,000
Interest income	371,255
<b>Total revenues</b>	<b>126,528,255</b>
<b>Expenses</b>	
Program management	2,654,100
Consulting contracted services	185,166
Professional fees	113,766
Corporate costs	97,425
Board remuneration and expenses (note 5)	90,513
Outreach	70,660
Insurance	9,786
<b>Total expenses</b>	<b>3,221,416</b>
<b>Excess of revenues over expenses</b>	<b>123,306,839</b>

# Climate Change and Emissions Management (CCEMC) Corporation

## Statement of Cash Flows

For the year ended May 31, 2010

	<b>\$</b>
<b>Cash generated from (used in)</b>	
<b>Operating activities</b>	
Excess of revenues over expenses for the year	123,306,839
Items not affecting cash	
Net change in non-cash working capital items	
Increase in prepaid expenses	(1,927)
Increase in accounts receivable	(70,015)
Increase in accounts payable and accrued liabilities	695,222
Cash generated from operating activities	123,930,119
<b>Increase in cash</b>	<b>123,930,119</b>
<b>Cash – Beginning of year</b>	<b>–</b>
<b>Cash – End of year</b>	<b>123,930,119</b>
<b>Supplementary information</b>	
Interest received	371,255

**1) Organization**

The Climate Change and Emissions Management (CCEMC) Corporation (the "CCEMC") is an Alberta-based, independent, not-for-profit organization incorporated under the Canada Corporations Act on February 17, 2009, whose 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 the CCEMC. As a not-for-profit organization, CCEMC is exempt from tax under Part I of the Income Tax Act.

**2) Significant accounting policies**

These financial statements have been prepared by management in accordance with accounting principles generally accepted in Canada. These financial statements have, in management's opinion, been properly prepared within reasonable limits of materiality and within the framework of the accounting policies summarized below.

**a) Fund accounting**

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

**i) Unrestricted:**

The Unrestricted Fund includes resources available for immediate purposes and accounts for the Foundation's general administrative activities.

**ii) Restricted:**

The Restricted Fund includes those Funds whose resources are to be used for an identified purpose as specified by the donor, by funding initiative or as determined by the Board of Directors (the "Board").

**b) Revenue recognition**

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

i) Unrestricted contributions are recognized as revenue when received or upon becoming receivable if the amount to be received can be estimated and collection is reasonably assured.

ii) Externally restricted contributions are recognized as revenue in the Restricted Fund when received or receivable if the amount received can be estimated and collection is reasonably assured. Externally restricted amounts can only be used for the purposes designated by external parties.

iii) Investment income earned on contributions subject to external restrictions is recorded as revenue in the Restricted Fund in the year it is earned.

**c) Financial instruments**

CCEMC's financial assets include cash and accounts receivable. Cash is classified as held-for-trading and is recorded at fair value with realized and unrealized gains and losses reported in the statement of operations for the period in which they arise. Accounts receivable is classified as loans and receivables and is accounted for at amortized cost using the effective interest rate method. Accounts receivable is initially recorded at fair value. Due to the short term nature of CCEMC's receivables, the carrying amount approximates fair value.

CCEMC's financial liabilities include accounts payable and accrued liabilities. These are classified as other liabilities and are accounted for at amortized cost using the effective interest rate method. Financial liabilities are initially measured at fair value. Due to the short term nature of CCEMC's payables, the carrying amount approximates fair value.

The fair value of a financial instrument on initial recognition is normally the transaction price, which is the fair value of the consideration given or received. Subsequent to initial recognition the fair values of financial instruments that are quoted in active markets are based on bid prices for financial assets. Purchases and sales of financial assets are accounted for at trade dates. Transaction costs on financial instruments are expensed when incurred.

All derivative instruments, including embedded derivatives, are recorded at fair value unless exempted from derivative treatment as a normal purchase and sale. CCEMC does not currently have any derivative instruments and is not anticipated to enter into any hedge transactions.

**d) Measurement uncertainty**

The financial statements, by their nature, contain estimates and are subject to measurement uncertainty that affect the reported amounts of assets and liabilities, revenue and expenses at the date of the financial statements.

Significant estimates include accrued liabilities, fair value of financial instruments and commitments. Actual results could differ from estimates.

**e) Cash**

Cash consists of cash on deposit.

**3) Restricted Fund**

The Restricted Fund consists of funds that are restricted 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 the CCEMC which includes salaries, fees, expenses, liabilities and other costs. As at May 31, 2010, CCEMC has not executed any agreements to fund initiatives or projects.

# Climate Change and Emissions Management (CCEMC) Corporation

## Notes to the Financial Statements

For the year ended May 31, 2010

### 4) Grant revenues

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 September 1, 2014. The annual grant is determined each provincial year-end and is based on the amount contributed to the Fund in the previous compliance year.

	2010
	\$
March 31, 2008 Annual Grant Amount	43,000,000
March 31, 2009 Annual Grant Amount	83,157,000
	<hr/>
	126,157,000

### 5) Board and management remuneration

Total honorariums and expenses related to the directors of the Board were \$90,513 in the fiscal year. Remuneration to directors consists of honorariums totalling \$60,242 as follows:

	2010
	\$
D. Beever	2,624
J. Carter	5,776
P. Clark	2,800
A. Falkenberg	5,952
C. Fischer	1,564
R. P. Galachiuk	1,534
G. Holden	-
B. Kenny	2,624
D. Lewin	8,404
D. Lynch	8,360
R. L. Mansell	3,556
P. Merrin	4,926
E. Newell	-
R. Neehall	5,538
A. Tasker	6,584
	<hr/>
	60,242

Of these amounts, \$21,574 is included in accounts payable and accrued liabilities. The remaining expense balance of \$30,271 relates to reimbursements for meals, travel and accommodations.

Program management expenses include remuneration to contract management who report directly to the Board, totalling fees of \$2,552,714. Of this amount, \$444,746 is included in accounts payable and accrued liabilities.

### 6) Capital disclosures

CCEMC defines capital as its unrestricted and restricted funds. The majority of CCEMC's funds are granted by the Government of Alberta and paid through the Fund annually. CCEMC's objectives for managing capital are to ensure that there are sufficient funds to support its expenses and approved project funding.

To meet this objective, CCEMC develops and monitors annual and long term budgets. Commitments are based on existing Contribution Agreements, budgets and accumulated reserves. Refer to note 7 for information on commitments.

### 7) Commitments and Guarantees

Prior to year end, the Board approved 16 projects for CCEMC funding. The anticipated financial commitment over the next five years is expected to total \$71,032,477. Contribution agreements have not yet been executed and the total financial commitment could differ materially from this amount.

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.

### 8) Financial instruments

CCEMC's financial instruments are exposed to certain financial risk, 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 balance sheet date.

#### MARKET RISK

Market risk is the risk that changes in market prices such as interest rates will affect the CCEMC's earnings or the value of the financial instruments held. CCEMC is subject to interest rate risk arising primarily from fluctuations in interest rates applied to its cash balance.

#### LIQUIDITY RISK

Liquidity risk is the risk that the CCEMC will not be able to meet its financial obligations as they become due. Management reduces 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.

### 9) 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.

### 10) Comparative figures

There are no comparative figures as this is the first year of operations.







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

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