

GROUND BREAKERS

2016/17 ANNUAL REPORT



Investing in technologies
for a lower carbon future.

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We are ERA.

We are a community of innovators. Of partners. Of leaders.

Together, we are ground breakers on the cusp of a critical transition.

The global population is 7.5 billion and growing, and with that comes an increasing demand for energy, food and water.

At the same time, there are concerns about the impacts that we are having on our world. It is clear that we must reduce greenhouse gas (GHG) emissions. It is an urgent need that cuts across industries and continents. And for Alberta, it is an opportunity to lead.

ERA provides investment to support new technology development, but funding is just one part of the solution. Transitioning to a lower carbon future requires a suite of policy, regulatory, program, and business innovation tools that are necessary to address system challenges.

That's why ERA is working closely with partners from government, industry, and post-secondary organizations to create a lower carbon future for Alberta. By working together, we will help Alberta to accelerate development of innovative, GHG-reducing technologies.

We are a not-for-profit corporation funded by the Government of Alberta. We work in collaboration with partners in the innovation ecosystem, innovators and industry to identify and accelerate promising technologies that will reduce GHGs, create jobs, and help Alberta meet its climate leadership goals.

We are ERA.

MANDATE

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

VISION

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

CORE VALUES

- ▶ Leadership
- ▶ Innovation
- ▶ Collaboration
- ▶ Transparency
- ▶ Integrity

STRATEGIC PRIORITIES

To achieve our vision and mandate, ERA will:

1 REDUCE GHG EMISSIONS

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

2 ADVANCE INNOVATION SYSTEM PRIORITIES

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

To deliver on priorities 1 and 2, ERA will:

3 MEASURE AND COMMUNICATE SUCCESS

Define and report on metrics to demonstrate results.

4 ADVANCE OPERATIONAL EXCELLENCE

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

BOARD OF DIRECTORS



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Executive Support

LETTER FROM THE MINISTER



Albertans are energy innovators.

Only a few decades ago, many speculated that Alberta's vast oil sands deposits could never be viable, much less influential. But thanks to the ingenuity of our energy sector and support from the provincial government, Alberta proved itself to be a global leader.

Innovation was crucial in the past. It remains key to Alberta's economic future. Albertans are still leading the way, finding ways to grow in a competitive global environment while taking steps towards the challenges of a carbon-constrained future. Our government is still here, supporting energy innovators and building an economy for the future.

Emissions Reduction Alberta is central to this innovative culture—and emblematic of it as well.

The \$50 million Oil Sands Innovation Challenge, for example, will push our best and brightest to reduce the carbon footprint of oil sands operations. Our Methane Challenge will help advance new technologies that better detect, quantify and reduce harmful methane emissions.

Emissions Reduction Alberta's work is proof that Alberta doesn't have to choose between economic growth and environmental protection. That's where innovation comes in—and it's that spirit that will make life better for decades to come.

Sincerely,

*The Honourable Shannon Phillips
Minister of Environment and Parks
and Minister Responsible for the
Climate Change Office*

LETTER FROM THE CHAIR



Imagining new possibilities is the first step to advancing innovation. At ERA, we surround ourselves with those who imagine a better future—a sustainable, lower carbon future. We do this because we recognize that achieving the goals in Alberta’s Climate Leadership Plan is a shared responsibility. It will involve passionate and motivated individuals and organizations willing to create together.

Collaboration is critical. Our success relies on our ability to build the right connections with the right people at the right time. It requires looking at ideas in new and creative ways. ERA has been a ground breaker in this area. We are working closely with government, industry and innovators to accelerate the development of promising new technologies sought by the market—to secure new jobs, industries, and technologies for a diversified Alberta economy.

Our Methane Challenge was shaped by the input of our stakeholders and directly supports the Climate Leadership Plan goal to reduce methane emissions by 45 per cent by 2025 (see page 14 for details).

In March 2017, we announced four finalists in Round Two of the ERA Grand Challenge: Innovative Carbon Uses. The four technologies selected in Round Two will transform carbon dioxide from a waste material into new products while significantly reducing GHG emissions.

In partnership with Alberta Innovates, ERA will host SPARK 2017 in November. This conference will inspire, motivate and support researchers and innovators by connecting them with others working to accelerate the development of new products and technologies and take them closer to commercialization.

The Board and the ERA team is excited about the year ahead and the opportunity to continue to work alongside passionate, action-oriented Albertans who want to help create a stronger province and a lower carbon future.

Kind regards,

Kathleen Sendall, C.M., LL.D.
Chair, Emissions Reduction Alberta

LETTER FROM THE CEO



This year's annual report theme—Ground Breakers—is a great summation of our work in 2016/17.

We've rebranded our organization. A new name and a new look—Emissions Reduction Alberta—helps reinforce the focus on our core business of reducing GHG emissions, creating jobs, and delivering better environmental outcomes.

And, we are well on our way.

Over the past 12 months, we've taken significant steps toward achieving the goals set out in Alberta's Climate Leadership Plan. This work has had us looking far and wide for new ideas. We've consulted with our stakeholders to chart a course that aligns with Alberta's innovation ecosystem. The newly developed ERA Technology Roadmap now serves as a guide for focusing our investments and achieving the right portfolio mix.

This approach has proven valuable in designing the ERA Methane Challenge and the ERA Oil Sands Innovation Challenge. In June, we announced funding for 12 methane-reducing technologies with a combined total project cost of more than \$83 million, including up to \$29.5 million in ERA funding. In September, we will review applications for our \$50 million Oil Sands Innovation Challenge, designed to advance projects that will help meet GHG emissions limits by 2030 and increase the global competitiveness of Alberta's oil sands industry.

Through our Technology Roadmap and competitive calls for proposals we are refining our decision-making processes and helping to accelerate the pace of innovation. We completed the evaluation and approval process for ERA's Methane Challenge in about five and

a half months—approximately two months faster than our past practice. Future calls are planned with similar turnaround times.

This past year we have been tapping into the collective wisdom of the broader innovation system to set our projects on the path for success. In Alberta, ERA is working with Alberta Innovates and universities. Nationally, trusted partners like Natural Resources Canada (NRCan) and Sustainable Development Technology Canada (SDTC) help us make certain that projects submitted to ERA for funding consideration can also be considered for additional support. The 2016/17 ERA-SDTC joint funding opportunity for Canadian small and medium-sized enterprises is a great example. This collaboration has led to four new projects to advance innovative technologies that address GHG emissions in Alberta.

To respond to a greater need for funding flexibility, we introduced the Partnership Intake Pilot this year. This enables ERA to invest in innovative GHG-reducing projects that are brought forward by our trusted funding partners in the system.

It's true that some promising ideas never get off the ground, and others change our lives forever—success takes time, the right partnerships and investment. By learning from our successes and failures, we will continue to adjust our own approach to finding solutions that will accelerate the advancement of clean technology. ERA enters its next year well positioned to deliver investments that support Alberta's Climate Leadership Plan, stimulating economic diversity and job growth along the way.

On behalf of the team at ERA, I thank our Board for their leadership over the past year. We are also grateful to our innovation system partners for working with us to accelerate bold solutions to address GHG challenges.

In Alberta, we never want to be in a position where we have to ask ourselves if we have done enough to create more sustainable industries. The world is calling for action and ERA is responding.

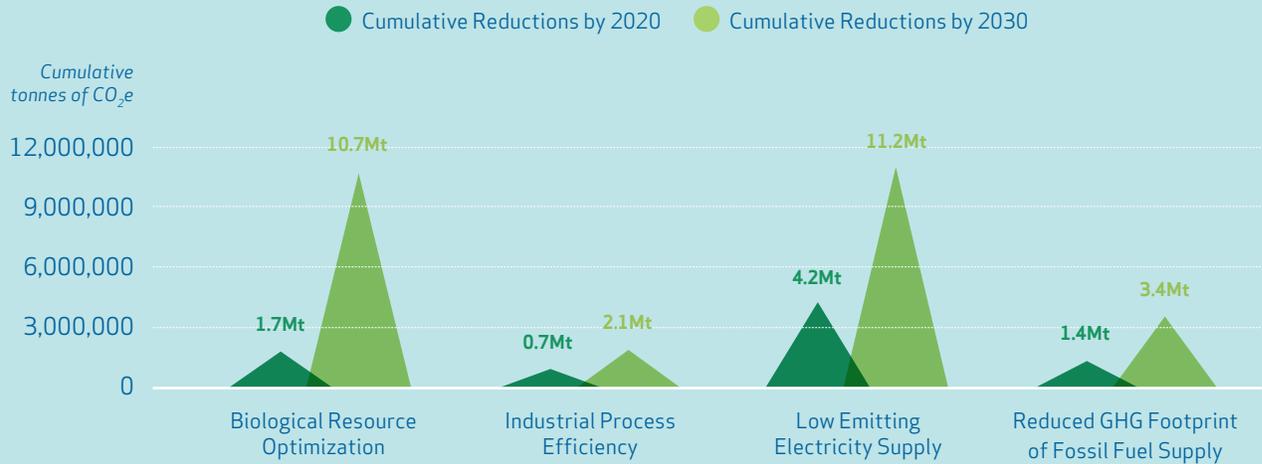
Regards,

Steve MacDonald
CEO, Emissions Reduction Alberta

ACHIEVEMENTS

REDUCE GREENHOUSE GAS EMISSIONS

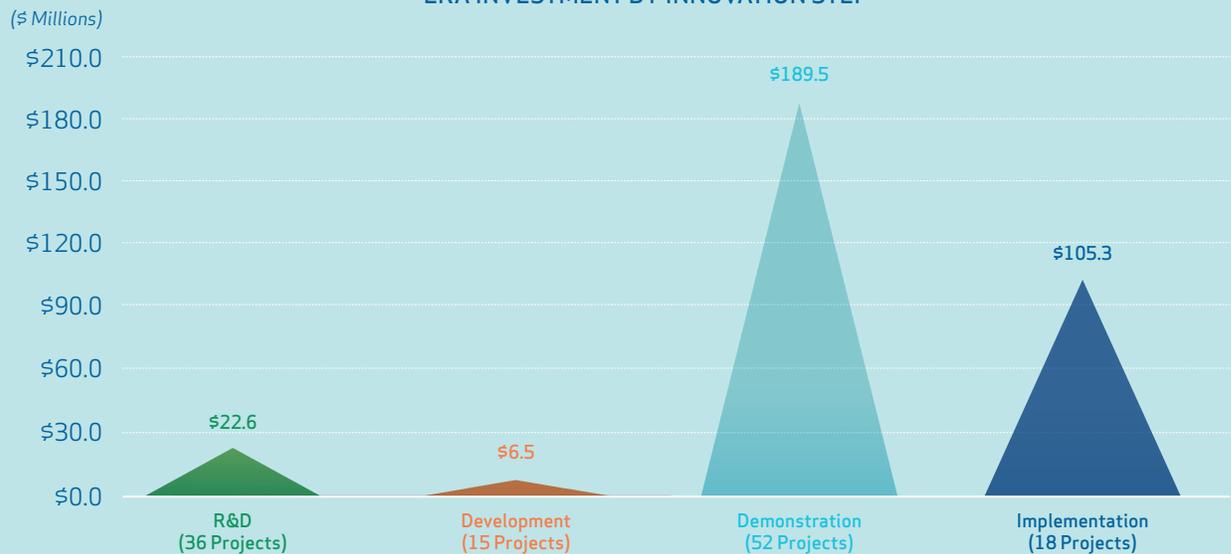
PROJECT EMISSION REDUCTIONS BY STRATEGIC INVESTMENT AREA



= x 67M or x 507

Each year, between now and 2030, ERA estimates its investments will result in emissions reductions of an average of two megatonnes per year. This is equivalent to reductions achieved by switching approximately 67 million incandescent light bulbs in homes to LEDs, or bringing 507 wind turbines on line.

ERA INVESTMENT BY INNOVATION STEP



ADVANCE INNOVATION SYSTEM PRIORITIES

ERA's Technology Roadmap guides investment decisions and informs our portfolio mix.

AREAS OF FOCUS

POTENTIAL INITIATIVES

<p>Reduced GHG Footprint of Fossil Fuel Supply</p>	<ul style="list-style-type: none"> Advanced recovery Fugitive emissions Partial Upgrading 	<ul style="list-style-type: none"> Electricity oil sands integration Beyond combustion Carbon Capture Utilization and Storage
<p>Low Emitting Electricity Supply</p>	<ul style="list-style-type: none"> Co-generation Advanced Grid Management Technology Geothermal 	<ul style="list-style-type: none"> Wind, Solar Storage Hydropower
<p>Biological Resource Optimization</p>	<ul style="list-style-type: none"> Biofuels Bio-products - materials Bioenergy 	<ul style="list-style-type: none"> Carbon retention N₂O & CH₄ emissions Waste management
<p>Industrial Process Efficiency</p>	<ul style="list-style-type: none"> Industrial efficiency Process improvements 	<ul style="list-style-type: none"> Low grade heat utilization Products of CO₂

Some initiatives could fall under multiple areas of focus.

QUICK FACTS



MEASURE AND COMMUNICATE SUCCESS



*A person-year is equal to one-year of employment for one individual

ACHIEVE OPERATIONAL EXCELLENCE



DECREASED OPERATING COSTS BY
10%



REDUCED PROJECT EVALUATION AND APPROVAL PROCESS CYCLE TO
5.5 MONTHS





We are innovators.

We imagine a better future. As innovators, ERA invests in and propels promising technologies that reduce GHG emissions from idea to market.

ADVANCING INNOVATIVE TECHNOLOGY

STRATEGIC PRIORITY 1: REDUCE GHG EMISSIONS

We are funding innovative solutions that result in meaningful GHG emissions reductions in Alberta and contribute to a lower carbon world. This first strategic priority is essential to achieving our mandate.

In 2016/17, we delivered funding commitments to 21 new projects that will reduce cumulative GHG emissions by more than one megatonne by 2020 and eight megatonnes by 2030.

Funding commitments included:

- ▶ \$29.5 million for 12 methane emissions monitoring, detection and reduction technologies. ERA funding is leveraged and the projects have a combined total project cost of more than \$83 million.
- ▶ \$12 million for transformative technologies advancing through the second round of the ERA Grand Challenge: Innovative Carbon Uses. These technologies have the potential to make a significant impact on GHG emissions in Alberta and around the world.
- ▶ \$12 million for projects from Small and Medium Enterprises that we are advancing in partnership with Sustainable Development Technology Canada, creating jobs and boosting the economy.

WHAT WE ACCOMPLISHED

Twenty-one new projects initiated

In 2016/17, the ERA Board selected 20 projects for funding from three opportunities that reflect policy direction and market demand. In addition, we added one new project through our Biological GHG Management Program before the program was fully integrated into our investment portfolio (see page 17 for details).

Through these funding opportunities we committed more than \$53 million to projects that are estimated to reduce cumulative GHG emissions by more than one megatonne by 2020. The projects also have the potential to reduce cumulative emissions by more than eight megatonnes by 2030.

ERA GRAND CHALLENGE

In March 2017, we announced the four winners of the second round of the ERA Grand Challenge: Innovative Carbon Uses. Through the Grand Challenge, we aim to identify technologies from around the world to transform carbon dioxide from a waste material to an asset, while significantly reducing GHGs.

The four successful Round Two projects, with a total combined value of more than \$12 million, will each receive up to up to \$3 million to advance their technologies. We estimate these projects will reduce GHG emissions by 79,000 tonnes by 2020, but there is even greater potential over the long term. The aim for the winner is to ultimately reduce GHG emissions by one megatonne annually.

The ERA Grand Challenge will conclude in 2019, when one of the four Round Two winners profiled on the following pages will be eligible for up to \$10 million in additional funding to help commercialize their technology in Alberta.

Solidia Technologies

A sustainable method for cement production and CO₂ utilization

Solidia reduces the carbon footprint of cement and concrete by up to 70 per cent. Their process results in lower GHG emissions during cement production. They use CO₂ that would normally be released into the environment, and permanently sequester it during the curing process. As a further benefit, water consumption is reduced 60 to 80 per cent in the manufacturing process. Based in New Jersey, Solidia has paired with Lafarge, one of the major cement producers in Alberta, to pilot test their technology. They are currently in commercialization for precast products, such as pavers for the landscape market.



CarbonCure Technologies

Carbon dioxide utilization in concrete

CarbonCure Technologies injects CO₂ into concrete to sequester the carbon and improve the concrete's performance. The retrofit technology can be installed at existing concrete plants, and allows concrete producers to sequester CO₂ emissions directly into concrete, while also making the concrete stronger and less expensive to manufacture. CarbonCure has already started to commercially deploy the technology with leading concrete producers. For the ERA Grand Challenge, CarbonCure will work with multiple concrete plants across Alberta to maximize the overall GHG benefits and improve the economics associated with the technology to attract smaller concrete plants as customers. The project includes a range of partners from across the supply chain, including Praxair Canada Inc. and BURSCO Rock Products.

Mangrove Water Technologies

A technology for conversion of CO₂ and saline waste water to oil and gas field chemicals and re-useable water

Mangrove's innovation converts CO₂ and saline wastewater produced during oil and gas operations to re-usable water and oil field chemicals. The technology offers a solution that would allow the oil and gas sector to reduce operational costs in addition to reducing their water consumption, wastewater generation, and carbon footprint. The core of the technology is a reactor that uses electricity to convert carbon dioxide and desalinate wastewater to produce value-added chemicals such as carbonate salts and hydrochloric acid. Mangrove has partnered with NORAM Engineering and Constructors, Questor Technology Inc., and the Saskatchewan Research Council to demonstrate a field pilot of the technology coupled with a waste-gas to power system at a Questor site in Alberta.

McGill University

Field-deployment of a CO₂ transformation system powered by sunlight

McGill University and its commercialization partner, Lumenfab, are developing a novel technology that has the potential to create high quality fuels from CO₂ emissions and wastewater by using solar power. The team, which also includes representatives from the University of Alberta, McMaster University and Hydro Quebec, will build and field test a high efficiency, scalable system that converts CO₂ emissions and waste water into fuels, such as methanol. It will be field demonstrated in Alberta near the end of the project. The approach further reduces GHG emissions by using low-cost silicon wafer solar cells as its energy source, while having the additional environmental benefit of drawing on waste water from oil sands operations. The fuels produced through the process can be used as 'green' feedstocks for petrochemical processes. The initial target market for this technology is oil sands operations in Alberta.

ERA-SDTC JOINT FUNDING OPPORTUNITY

ERA and Sustainable Development Technology Canada (SDTC) jointly made funding available to help small and medium-sized businesses create jobs and reduce GHG emissions through the advancement of clean technologies that are applicable in Alberta. We received 139 submissions and the ERA Board selected four innovative projects for funding in December 2016.

ERA is contributing \$12 million to advance these projects that have a combined total project cost of more than \$39 million.

Purlucid Treatment Solutions Inc.

Low-energy water treatment for steam assisted heavy oil recovery

Today, in situ bitumen recovery requires steam to heat bitumen. Although water is recycled and reused, the process is extremely energy intensive, requiring pumping, cooling and then reheating of the recycled water. Purlucid's technology employs a number of innovations, including replacing part of the energy-intensive process with a novel membrane filter to remove contaminants from water before it returns to the boiler. This will reduce GHG emissions because the technology allows water treatment to occur at a higher temperature, so water doesn't need to be cooled and then reheated to the degree reheating is necessary today.





Mariner Partners Inc.

Beta testing of Energy Optimization Software Technology

Mariner Partners is leading the development of data analytics and process automation to improve the energy efficiency of large commercial buildings. Large buildings have complex systems to manage heating, cooling, ventilation, lighting and other building functions. Mariner Partners' Energy Optimization Software (EOS) reduces GHG emissions and energy costs by optimizing the way building conditions are maintained. For example, it minimizes required operating times for boilers, reduces simultaneous heating and cooling, and improves overall building efficiency. The technology will be tested at a number of sites including the Kaye Edmonton Clinic and the Fort Saskatchewan Community Hospital.

Calscan Energy Ltd.

Demonstration of Near Zero Emission Well Control System

Pneumatic devices are the largest source of oil and gas methane emissions in Alberta. Valves, controllers and pumps at well sites run using pressurized methane that is released directly to the atmosphere. Alberta-based Calscan Energy aims to change this with the development and scale-up of their Near Zero Emission Well Control System. The solar-electric system eliminates all pneumatic equipment and is designed for reliable winter operations at remote off-grid well sites and incorporates a solid acid fuel cell (SAFC) that is powered by industrial grade on-site methanol. If it is successful, the solar-fuel cell hybrid power system would also eliminate the need for expensive small-scale propane or natural gas generators that are commonly used to power communication systems and auxiliary equipment at remote sites.

Acceleware Ltd.

Radio Frequency XL Enhanced Oil Recovery

Acceleware will complete a commercial scale pilot test of its patent pending RF XL electromagnetic heating technology that has the potential to significantly reduce oil sands production costs, while also reducing GHG emissions and eliminating external water use. This game changing technology uses radio waves to heat the water already present in the reservoir to efficiently mobilize heavy oil and bitumen. RF XL requires no chemicals or solvents, no external water, requires a smaller surface footprint, and can reduce GHG emissions by 50-100%. Project developers estimate the potential exists for capital and operating cost reductions in the range of 70 and 40 per cent respectively when compared to Steam Assisted Gravity Drainage (SAGD).

ERA METHANE CHALLENGE

ERA's Methane Challenge directly supports Alberta's Climate Leadership Plan goal to reduce methane emissions by 45 per cent by 2025. The Challenge aims to accelerate the development of technologies that monitor, detect, and reduce methane emissions.

ERA worked closely with the Government of Alberta, the Canadian Association of Petroleum Producers (CAPP), Alberta Energy Regulator (AER), Canada's Oil Sands Innovation Alliance (COSIA), Pembina Institute, and others to develop the Challenge.

These projects are expected to reduce methane emissions by more than one megatonne by 2020, and more than seven megatonnes by 2030. They are estimated to lead to more than \$60 million in spending in Alberta and approximately 60 direct jobs.



Titanium Corporation

Reducing methane and other environmental impacts from oil sands tailings and ponds

Titanium Corporation is working with Canadian Natural Resources Limited (Canadian Natural) to conduct engineering design for an oil sands tailings treatment system that eliminates certain tailings streams while recovering bitumen, solvent, and high-value minerals. By preventing solvent and bitumen release, the vast majority of methane emissions from mined oil sands operations can be reduced. This technology is targeted at froth treatment tails, which are estimated to be responsible for more than 90 per cent of methane emissions from tailings ponds. Results from the Canadian Natural-sponsored project will be applicable to other large oil sands mines, and results will be shared and disseminated through COSIA.

Gentherm Global Power Technologies

Remote generator compressor systems

This project involves developing a Remote Generator Compressor System (RGCS) to help oil and gas operators quickly eliminate methane emissions from pneumatic devices. It will facilitate the long-term transition from pneumatic controls to digital controls. The RGCS is a self-contained, skid-mounted system that efficiently converts natural gas into electricity and compressed air. Gas facility operators can deploy the RGCS and use the compressed air to convert their existing pneumatic devices from methane to compressed air.

Peyto Exploration & Development

In-pipe turbine generator field demonstration

ZKO partnered with Peyto Exploration & Development to demonstrate an in-pipe turbine generator that uses flowing natural gas in the pipeline from the wellhead to generate electricity. The electricity produced powers chemical injection pumps, eliminating a large source of methane venting in natural gas production. Chemical injection pumps currently operate pneumatically and vent methane to the atmosphere. The ZKO in-pipe turbine generates power from wellhead pressure with zero emissions and will be used to power electronic pumps to eliminate this methane venting.

Alphabet Energy

Power generating combustor to eliminate methane emissions

Alphabet has partnered with Alberta-based CDN Controls and Airworks Compressors to develop and demonstrate an innovative electricity generator for off-grid oil and gas sites to power pneumatic instrumentation, eliminating a major source of methane venting. Methane emissions from pneumatic devices at oil and gas sites will be eliminated by using electricity to power instrumentation instead of compressed natural gas, which is the current practice.



Petroleum Technology Alliance of Canada (PTAC)

Targeted PureJet incinerators for methane challenges

PTAC partnered with Alberta-based Atlantis labs, Cenovus Energy and Husky Energy, to develop and demonstrate a small-scale, enclosed incinerator. The incinerator will be tested at industry sites in the province where flaring is currently unavailable or uneconomic, eliminating methane that would otherwise be vented. The portability of the patented PureJet Incinerator device, coupled with its ability to handle a wide range of pressures and flow rates, makes this technology unique.

Kairos Aerospace

Demonstration of aerial methane imaging for wide-area methane detection

Kairos Aerospace has developed a technology to rapidly and cost-effectively locate and quantify methane releases over large areas. Early and accurate detection will lead to the faster repair of major methane leaks from a variety of sources. The project will demonstrate and validate its aerial methane imaging and quantification platform in Alberta.

GHGSat

Satellite-aircraft hybrid detection and quantification of methane emissions

GHGSat has partnered with COSIA, Schlumberger, Encana, GreenPath, and others in Alberta to develop and demonstrate a Calgary-based satellite-aircraft hybrid methane detection and quantification system. The two-tiered satellite/aircraft approach will allow for screening and detection of large leaks from diffuse or point sources from orbit, followed by more detailed imaging and quantification by aircraft surveys that can enable directed repair of methane leaks.

Canadian Natural Resources Limited (Canadian Natural)

Area measurements of methane and carbon dioxide

This project is led by Canadian Natural with involvement from Alberta-based LuxMux, Boreal Laser, RWDI Air, Southern Alberta Institute of Technology (SAIT), University of Alberta, and others. They will conduct a comprehensive program to improve detection, monitoring and quantification of methane emissions from area sources such as mine faces and tailings ponds. By developing a holistic system of sensors and models, Canadian Natural plans to achieve significantly more accurate quantification of diffuse methane emissions, which will enable more targeted reduction strategies.

ATCO Ltd.

Imaging and quantification system for fixed site monitoring

ATCO has partnered with MultiSensor Scientific of Boston, MA along with Alberta-based Envent Engineering and Target Emission Services for this project. They will develop and pilot test a portable methane imaging and leak detection system. This system can be deployed temporarily or permanently at wells, compressors and industry sites to continuously scan for methane leaks and quantify emission rates. Faster detection, quantification and accurate locating of leaks will lead to more rapid and directed remediation of inadvertent methane releases. ATCO hopes to adopt the technology for use at its industrial sites and make it available as a service.



Minnich and Scotto

Proof-of-concept testing: software to quantify emission rates in real-time

Minnich and Scotto partnered with Alberta-based Boreal Laser to develop a methane quantification package. Existing laser-based sensors will be used in conjunction with AERMOD, the U.S. Environmental Protection Agency (EPA)'s air quality dispersion model, to convert methane concentrations to real-time calculation of leak rates. The algorithm will enhance the capability of existing sensors and allow the modeling tool to be used for methane quantification. These advancements will lead to better quantification of methane emissions from sites such as feedlots, mines, and landfills that are well-suited for open-path laser sensors.

Viresco Solutions

Demonstration of reduced enteric methane emissions in growing/finishing beef cattle

Viresco Solutions, DSM and a consortium of Alberta agricultural partners have worked together to demonstrate a feed ingredient for cattle that significantly reduces cattle-based methane emissions. The ingredient can be introduced to regular feeding regimes to reduce the methane produced by each animal. This will lead to reductions in emissions from Alberta's beef and dairy industries.

Capital Power

Genesee wood waste biomass co-firing project

Capital Power, with the support of West Fraser, is working to develop a project that will use sawmill wood waste as a renewable energy source for the Genesee 2 power facility. Each tonne of wood waste will replace an equal volume of coal. The wood waste would otherwise be stockpiled where it produces methane through decomposition.

BIOLOGICAL GHG MANAGEMENT PROGRAM

In 2012, ERA committed funding to a Biological GHG Management Program that was administered by Alberta Innovates. Funding focuses on projects that address biological GHG emissions, including areas such as agriculture, forestry, and waste management.

As a result of our business delivery model review, Biological Resource Optimization remains one of the four focus areas for ERA investment, and we are no longer administering this important area as a separate program.

One new project was added to our portfolio in 2016/17.

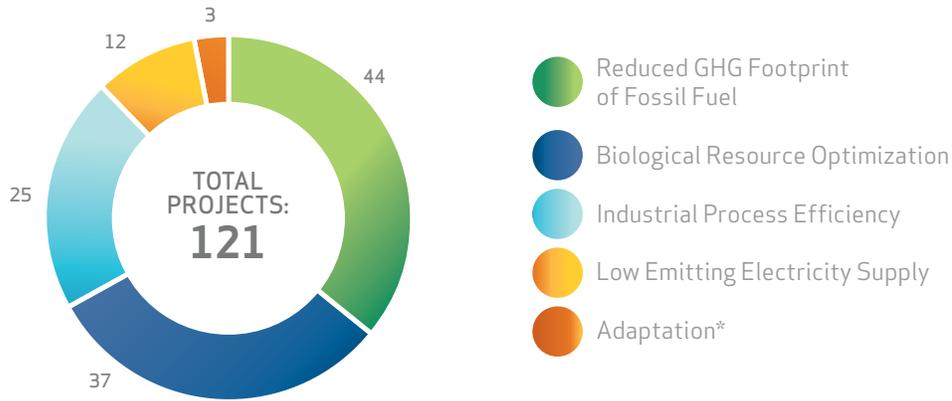
University of Calgary

Multi-site cement industry low carbon fuel implementation and supply chain optimization

The objective of this project is to develop new fuel pathways to lower the carbon footprint of the cement industry. Cement and concrete industries are large emitters of carbon dioxide. This project will measure air emissions at combustion under full scale commercial operations, optimizing the process of combustion by understanding the fluid dynamics, and developing a combustion guide for regionally viable low carbon fuels. The project also includes a life cycle assessment and scenario analysis to ensure that the fuel pathways deliver environmental benefits in efficient and cost-effective ways under a range of future policy and market conditions.

MEASURING RESULTS

Number of projects



**In 2012 ERA provided funding for 3 adaptation projects in consultation with Alberta Environment and Water (now Alberta Environment and Parks).*

GHG emission reductions



- ▶ ERA is funding 121 projects that will reduce GHG emissions by an estimated eight megatonnes CO₂e by 2020, and more than 27 megatonnes CO₂e by 2030.

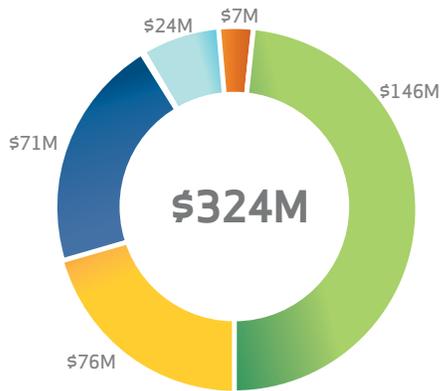


- ▶ In 2016/17, we added 21 new projects to reduce cumulative GHG emissions by more than one megatonne by 2020, and eight megatonnes by 2030.

INVESTMENT IMPACT SINCE INCEPTION

ERA has committed \$324 million to advance innovative technologies that reduce GHG emissions in Alberta. Our projects have a combined total project cost of more than \$2 billion.

ERA funding by strategic investment area



Biological Resource Optimization

We have committed \$71 million to support biological resource optimization, including biofuel development, bioenergy, and projects to reduce GHG emissions from waste management activities.

Low Emitting Electricity Supply

Since inception, ERA has committed \$76 million to advance technologies that support low emitting electricity supply, including renewable energy such as wind and solar. We estimate that projects in this focus area will provide the most significant GHG emissions reductions by 2020.

Reduced GHG Footprint of Fossil Fuel Supply

To date we have committed nearly \$146 million to reduce the GHG footprint of fossil fuel supply. This focus area offers transformative technologies that can reduce GHG emissions over the long term and maximize the value of Alberta's resources.

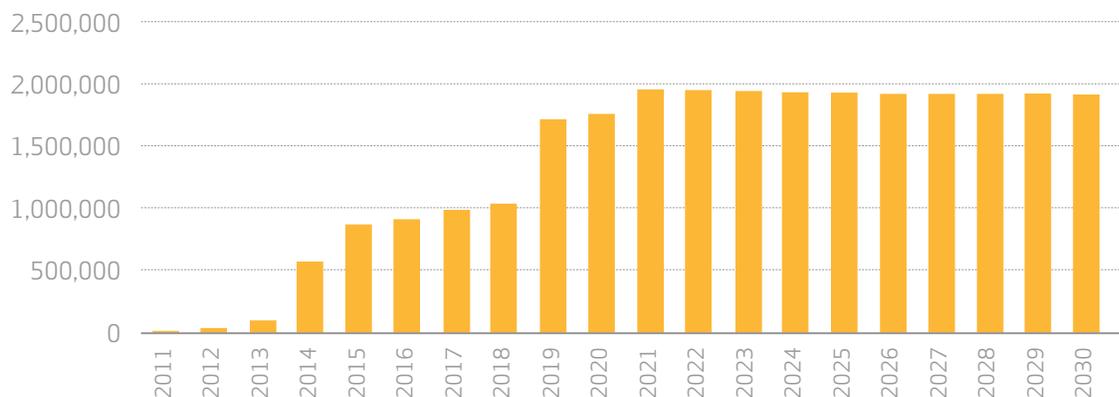
Industrial Process Efficiency

ERA has committed \$24 million to support industrial process efficiency. This area includes initiatives such as development of the Alberta Oil Sands Energy Efficiency and GHG Mitigation Road Map and the ERA Grand Challenge carbon conversion projects that reduce GHG emissions associated with the production of cement and concrete.

Adaptation

In 2012, ERA provided funding for three adaptation projects in consultation with Alberta Environment and Water (now Alberta Environment and Parks). No new investments are planned for adaptation at this time.

Estimated annual GHG reductions 2011-2030 (tonnes CO₂e)



THE YEAR AHEAD

In 2016/17, the ERA Board and Management had a strong focus on ensuring our mandate, vision and strategic direction aligned with the Government of Alberta and the needs of the marketplace. This focus was reflected in the launch of our new brand and through funding provided by the Government of Alberta in October 2016.

In 2017/18, ERA will continue to work with the Government of Alberta to secure funding that will support our capacity to accelerate innovative GHG-reducing technologies by conducting two funding calls each fiscal year.

ERA funding opportunities will support Alberta's Climate Leadership Plan and innovation outcomes while responding to the needs of the marketplace. ERA is working with the newly established Energy Efficiency Alberta and other key innovation system partners to explore the opportunity to accelerate industrial process efficiency technologies. Future opportunities will advance technologies that optimize biological resources, support the phase out of coal-fired electricity generation, and accelerate additional renewable energy capacity.



We are partners.

We know that partnerships are critical to our success. From supporting innovators to collaborating with government, investors and industry, we are working together to develop solutions to secure a lower carbon future for Alberta.

ALIGNING ON COMMON OUTCOMES

STRATEGIC PRIORITY 2: ADVANCE INNOVATION SYSTEM PRIORITIES

We are leveraging our strengths to contribute to critical climate change innovation priorities in Alberta. Achievement of our mandate will not be possible without working with our partners to deliver on this critical strategic priority.

In 2016/17, we delivered:

- ▶ ERA's Technology Roadmap, aligning our portfolio with government and industry needs.
- ▶ New and strengthened partnerships with six organizations, maximizing and leveraging shared investment capacity to support technology development.
- ▶ The program design for SPARK 2017, a conference to be hosted with Alberta Innovates, for the purpose of connecting innovators to advance complete solutions.
- ▶ An Innovator Support Pilot to provide collaborative resources to help steward projects and companies.
- ▶ The launch of a \$15 million Partnership Intake Pilot.

WHAT WE ACCOMPLISHED

ERA Technology Roadmap

To make certain ERA is delivering the most impact through our investments, in 2016, we worked with government, industry and innovators to develop a Technology Roadmap to guide investment decisions and inform our portfolio mix.

The Technology Roadmap identifies four focus areas for technologies in the ERA portfolio:

- ▶ Reduced GHG footprint of fossil fuel supply:
 - › Transformative technologies and innovation to reduce the GHG footprint of the fossil fuel supply chain and methane emissions while reducing production costs.
- ▶ Low emitting electricity supply:
 - › Technology and innovation to reduce the GHG footprint of Alberta's electricity supply mix and add more non-emitting supply to meet overall demand.
- ▶ Biological resource optimization:
 - › Innovation and early stage technologies for biological resource optimization in support of energy system transformation, such as biofuels, bioproducts and carbon retention opportunities.
- ▶ Industrial process efficiency:
 - › Industrial process efficiency technologies to deliver GHG reductions and costing savings through energy conservation and energy efficiency.

ERA's Technology Roadmap is a living document, and is part of a continuous process designed to support a flexible and nimble organization that can adjust to new information, challenges and opportunities.

Maximizing our investment capacity and expertise through partnership

ERA continues to build strong partnerships that will enable us to maximize and leverage shared investment capacity and expertise. Highlights from 2016/17 include:

- ▶ New relationships with organizations such as Natural Resources Canada (NRCan), research and academic institutions—the University of Alberta, University of Calgary and NAIT—and investors like Evok Innovations, who share our interest in advancing innovative technologies that reduce GHG emissions.
- ▶ Experts from NRCan, TEC Edmonton, Innovate Calgary, Alberta Energy Regulator, as well as subject matter experts, worked alongside our ERA team providing support to help design funding opportunities and evaluated project submissions.
- ▶ The joint funding opportunity with SDTC added innovative GHG-reducing projects to our portfolios, led to improvements in our already rigorous review processes, and made it easier for applicants to apply to both funds through one seamless and stream-lined process.

Of special note is our critical partnership with Alberta Innovates, who provide ERA with expert resources to inform our investment decisions. Together we have built a strong knowledge base that allows our organizations to work more efficiently to accelerate technology development.

Strategic collaboration to support technology development

To achieve our mandate, ERA must not only propel game-changing technology solutions, but also foster successful companies. This requires convening resources for collaboration across Alberta's broader innovation ecosystem under a complete solutions approach, including policy and regulatory, financing and business development tools.

ERA's focus is typically on technologies at the field pilot, demonstration and first-of-a-kind deployment stages of development (Technology Readiness Levels 5 through 8)*. By working with our partners in the innovation system, we are creating connections to earlier stage ideas that originate in post-secondary institutions, accelerating innovation that has been supported by organizations like Alberta Innovates, and advancing technologies that are moving beyond our traditional portfolio. **We are not just investing in projects, we are stewarding ideas toward market success.**

By actively working with our partners, we put in place all of the conditions for success, making it clear to investors and inventors — and all the players in between — that Alberta is the place to turn ideas into products and products into companies.

* Technology Readiness Levels (TRL) are a type of measurement system used to assess the maturity level of a particular technology. Each project is evaluated against the parameters for each technology level and is then assigned a TRL rating based on the project's progress.

Partnership Intake Pilot

In 2017, ERA introduced the Partnership Intake Pilot to fund innovative GHG-reducing projects brought forward by our trusted funding partners in the system. Trusted partners have rigorous, fair and transparent due diligence processes that are comparable to ERA's, and are seeking similar strategic outcomes.

We have set aside \$15 million for the Pilot, which will allow us to consider funding for promising technologies on an ongoing basis, outside of our traditional call for proposal process.

Targeted outreach

In 2016/17, ERA engaged extensively with colleagues in government and industry to chart a path that will help Alberta achieve its Climate Leadership Plan goals.

In preparation for the launch of the ERA Methane Challenge in October 2016, ERA worked closely with Alberta government departments, including:

- ▶ Alberta Climate Change Office
- ▶ Alberta Energy
- ▶ Alberta Economic Development and Trade
- ▶ Alberta Agriculture and Forestry

We also engaged industry representatives and associations, such as the Canadian Association of Petroleum Producers (CAPP), and non-governmental organizations, such as the Pembina Institute.

In January 2017, we hosted a discussion with stakeholders from across the Alberta innovation system to better understand opportunities for GHG reductions in Alberta's oil sands. Participants included representatives from:

- ▶ Oil sands companies
- ▶ Canada's Oil Sands Innovation Alliance (COSIA)
- ▶ Oil Sands Advisory Group (OSAG)
- ▶ Alberta Innovates
- ▶ Natural Resources Canada (NRCan)
- ▶ Sustainable Development Technology Canada (SDTC)
- ▶ The Alberta Clean Technology Industry Alliance (ACTia)
- ▶ Innovate Calgary
- ▶ TEC Edmonton
- ▶ EVOK Innovations
- ▶ University of Alberta
- ▶ University of Calgary
- ▶ University of Lethbridge

Outcomes from this discussion helped us refine the ERA Technology Roadmap and provided valuable input to design our funding opportunities. These discussions now serve as a best practice for ERA.

Facilitating connections

In 2016/17 ERA and Alberta Innovates joined forces to plan SPARK 2017, a conference to connect innovators and explore solutions that will accelerate technology development. The three-day event in November 2017 will include panel discussions, abstract presentations, plenary sessions, and an innovation showcase.

Project stewardship

In addition to the project advisors that ERA dedicates to each project, we have worked with TEC Edmonton and Innovate Calgary since 2014. We leverage staff from these organizations through a collaborative service provider we call “IC.TEC,” to ensure innovators have access to local business knowledge as they advance their technology toward commercialization. The team of business advisors offers tremendous business knowledge, process expertise, mentoring, and access to a network of connections.

The support IC.TEC has provided to ERA projects is diverse. For example, IC.TEC helped TetraTech focus on specific target markets and provided the organization with detailed market intelligence, which is streamlining TetraTech’s efforts to identify new customers and bring their GHG reduction technology to market faster.

IC.TEC staff are also assisting ERA Grand Challenge Round Two technology developers. They have worked with McGill University to identify commercial needs and build an economic case for deploying their CO₂ transformation system technology in Alberta, including local prototype development and manufacturing expertise. IC.TEC also worked with Mangrove to improve their business strategy and market positioning and created an investment strategy.

Innovator Support Pilot

ERA has identified an opportunity to explore additional support for promising technologies. The Innovator Support Pilot targets projects that show promise but do not yet qualify for funding due to specific issues, such as various technological, financial or other business challenges.

Through this pilot we can pinpoint—at an early stage—potential barriers to commercialization and identify the resources required to overcome these barriers. To support the pilot we are leveraging the knowledge of existing entities and experts within the innovation ecosystem, who are able to identify or provide the resources needed for success. This will ultimately lead to more successful funded projects and fewer stranded grants when project proponents are unable to find private investment to match ERA’s public funding.

MEASURING RESULTS

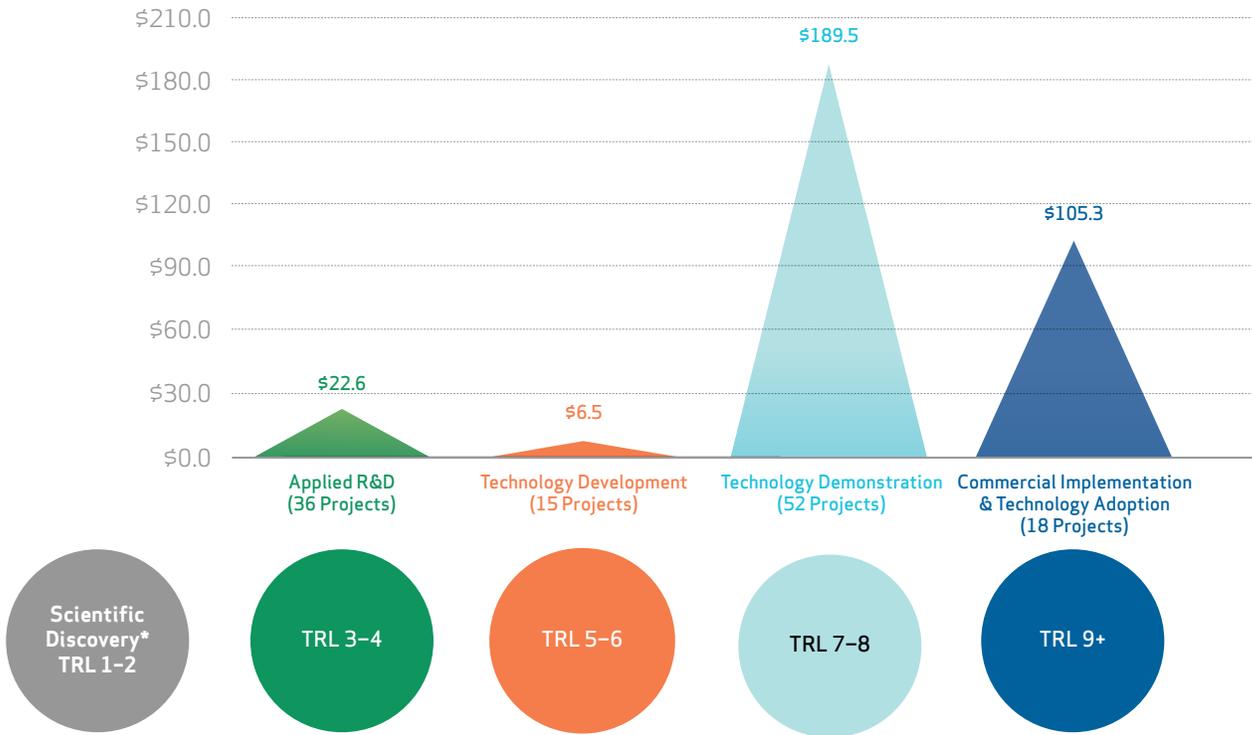
ERA supports technology development with the expectation that the technology will progress and advance over the duration of the project.

While our primary focus is on technologies that will reduce GHG emissions beyond 2020, ERA has also supported projects that have produced near-term reductions.

In 2016/17, we initiated work to implement TRL progression tracking as a key metric for all our projects. Beginning with the ERA Methane Challenge, applicants are required to self-assess the TRL level of their technology as well as the expected advancement over the course of the project. We will monitor and report on results in next year's annual report.

Going forward, we will continue work to establish robust performance metrics that also address factors such as success rate, economic impact, and progress toward reducing technology cost.

ERA investment by innovation step (\$ millions) and TRL progression



*ERA does not fund Scientific Discovery.

THE YEAR AHEAD

Looking ahead, ERA will continue work to advance partnerships to support GHG-reducing technologies. The Board will consider the first projects evaluated for funding under our Partnership Intake Pilot in 2017/18.

By working with our trusted partners, we will ensure that projects submitted to ERA for funding consideration can also leverage funding from other organizations that share our commitment to reducing GHG emissions. Partnerships like these can help to streamline and simplify access to funds for project proponents, and accelerate the pace of technology development and commercialization.

We will also work with our innovation system partners to continue to evolve ERA's Technology Roadmap to make certain our portfolio mix—both in terms of its areas of focus and technology readiness levels—are keeping pace with technological opportunity and policy direction.



We are builders.

We demonstrate progress and communicate successes to advance innovative solutions that help build a prosperous Alberta. We are a key partner in advancing the province's climate leadership priorities.

ADVANCING PRIORITIES

STRATEGIC PRIORITY 3: MEASURE AND COMMUNICATE SUCCESS

Defining, monitoring and reporting on results is critical to delivering on strategic priorities one and two.

In 2016/17, we delivered:

- ▶ A rebranded organization that better reflects our mandate.
- ▶ Performance tracking measures aligned with Climate Leadership Plan metrics.
- ▶ Clear metrics that demonstrate ERA's contribution toward economic diversification, GDP creation in new sectors, and job creation.
- ▶ Enhanced communication.

WHAT WE ACCOMPLISHED

ERA rebranding



ERA CEO Steve MacDonald (left) was joined by President of Spartan Controls Grant Wilde, Minister of Alberta Environment and Parks and Minister Responsible for the Climate Change Office Shannon Phillips, CAPP President and CEO Tim MacMillan and Seal Well President Homer Spencer on October 21, 2016 to announce the rebranding of Emissions Reduction Alberta, funding for ERA, and the ERA Methane Challenge. (Photo courtesy CAPP).

In October 2016, the Climate Change and Emissions Management (CCEMC) Corporation rebranded as Emissions Reduction Alberta (ERA). The purpose of rebranding was to:

- ▶ Reinforce that the organization is Alberta-based.
- ▶ Provide greater clarity around the organization's purpose to contribute to the province's climate leadership and innovation policy objectives.
- ▶ Make clear our organization's focus on technology solutions.
- ▶ Reflect alignment with policy direction and the needs of Alberta's emitters.

Combined with the announcement of our rebranding, the Minister of Environment and Parks and Minister Responsible for the Climate Change Office, Shannon Phillips, committed \$33 million in funding to ERA.

Aligning with Climate Leadership Plan metrics

ERA collaborated with the Alberta Climate Change Office, Economic Development and Trade, and Alberta Innovates to create metrics that are aligned with the Climate Leadership Plan. Aligned metrics will ensure that ERA can support Government efforts to report on Climate Leadership, and innovation and technology outcomes.

Measuring GDP and employment impact

At ERA, we believe in the genius of “and”—where sometimes seemingly different goals can be addressed at the same time. For example, technology is essential to delivering on Alberta’s environment *and* economic goals.

In 2017, the Alberta Ministry of Economic Development and Trade carried out an analysis on behalf of ERA to better understand the economic impact of our investments. That work confirmed that:

- ▶ For every dollar ERA commits to advancing new technologies, more than five additional dollars have been invested by funding partners.
- ▶ In terms of economic impact, ERA projects will add almost \$1.8 billion to Alberta’s GDP from 2011 to 2021, and \$2.3 billion to the Canadian economy as a whole.
- ▶ Taken together, ERA projects support an average of 1,400 jobs in Alberta annually from 2011 to 2021, with a total impact of over 15,000 person-years of work (a “person year” is equal to one year of employment for one person). Across Canada, our projects result in an increase of employment of over 21,000 person-years of work.

Enhancing communications

In 2016/17, ERA initiated work to enhance communication through increasing visibility and broadening access to quarterly reports that are now posted online.

Efforts included participation in more than 10 conferences and speaking engagements, as well as hosting two workshops and one webinar that built awareness of ERA’s funding opportunities and contributions to Alberta Climate Leadership goals. In addition, ERA broadened distribution of quarterly stewardship reports to the Government of Alberta.

REPORTING ON ERA PROJECT RESULTS

ERA requires that projects complete final reports. These reports are posted on the ERA website, and promoted through ERA communication channels when appropriate, so knowledge can be shared to accelerate technology advancement.

Our projects produced important findings in 2016/17. Following are a few highlights:

ConocoPhillips Canada

Energy Efficiency Program

The final report on the ConocoPhillips Canada Energy Efficiency Program outlines the effectiveness of a number of technologies and delivered insights into how large oil and gas producers can take a systematic approach to improve energy efficiency and reduce greenhouse gas emissions. This report includes valuable direction to support industry deployment, including the need for field training and support, the potential to combine technologies to produce more significant results, and the need for flexible planning to leverage the momentum of early successes.



ENMAX Energy

Micro-Renewable Energy Generation

The ENMAX Energy Micro-Renewable Energy Generation final report provides insights into the Alberta solar market. The project increased rooftop solar installation capacity in Alberta and demonstrated a new financing model that allowed Alberta households to purchase rooftop solar panels without covering all costs up front. This project demonstrated that residential solar adoption rates are significantly impacted by government policy direction. The work led to the creation of an approved GHG quantification protocol for Distributed Renewable Energy Generation. The report also offers insight into the challenges and opportunities associated with distributed energy offset programs for customers and service providers. It includes a comprehensive analysis of residential solar business models and commercial approaches.

Solidia Technologies

CO₂-curing Technology

Over the course of the ERA Grand Challenge, Solidia Technologies' CO₂-curing technology for concrete has advanced from laboratory to pilot to full manufacturing scale. Solidia Concrete products now meet basic CSA standards and appear poised for acceptance by the concrete marketplace. The technology is generating interest among precast concrete manufacturers in Alberta, as well as Ontario and Quebec.

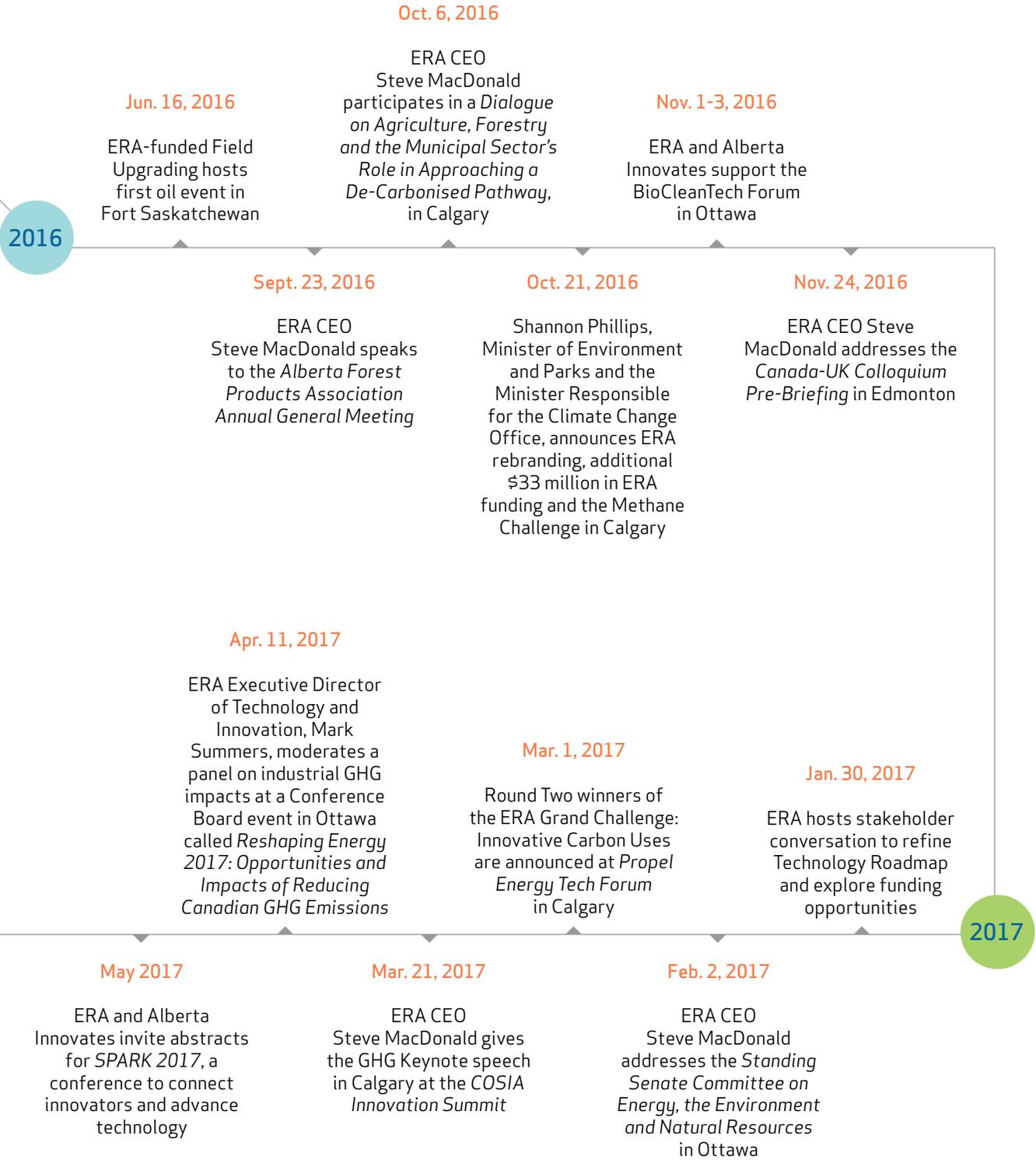
West Fraser Mills

Combining Biomethanation With Power Generation

West Fraser Mills released its final report, which includes a summary of the successful project definition and execution process that spanned from bench-scale testing all the way to first-of-its-kind implementation. It offers lessons around the commercial viability of biological biogas cleaning technology and the impact of natural gas prices on system economics.

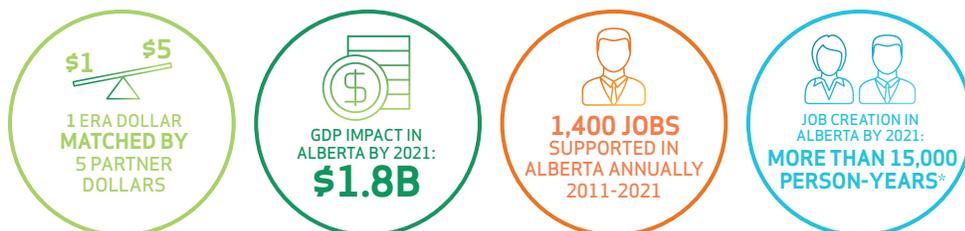
EVENTS AND OUTREACH

In 2016/17, ERA participated in a number of events to build awareness of our organization and funding opportunities. Highlights include:



MEASURING RESULTS

Economic impact



Stakeholder awareness

ERA is developing metrics to gauge stakeholder awareness and attitudes going forward.

Research conducted in 2010 and 2014 has identified there is significant public support for emissions reduction initiatives, with about 80 per cent of Albertans supportive of ERA's mandate and funding model.

Number and impact of communications and outreach events



- ▶ In 2016/17, ERA participated in more than 10 conferences and speaking events to build awareness of our funding opportunities, generate interest in our funded projects and to support efforts to build awareness of ERA's contributions to Alberta's Climate Leadership Plan.



- ▶ We saw demand for information from ERA increase during the past year, with subscriber growth of the ERA Update Newsletter increasing by 17 per cent. In addition, we have become increasingly active on social media, using both Twitter and LinkedIn to communicate with members of the innovation community.



- ▶ To support the ERA Methane Challenge, we held a webinar for potential proponents that drew more than 240 participants. Communications and outreach led to 118 quality submissions.



- ▶ We hosted two workshops to gather input on the ERA Technology Roadmap and to design our funding opportunities.

THE YEAR AHEAD

In 2017/18, ERA is carrying out a benchmark study and ongoing assessment of the level of awareness of ERA and its mandate, as well as attitudes toward the organization among key stakeholder groups. This input will shape ERA's updated communication strategy. In addition, we will deliver SPARK 2017, increase social media engagement levels, and increase the distribution of our ERA Update newsletter and stakeholder reports.

To further enhance ERA GHG reporting, we will continue to improve our methodology for estimating GHG reductions that occur after the technologies we fund are adopted in the marketplace.



We are leaders.

We are committed to continuous improvement in how we deliver on our mandate to identify and accelerate innovative solutions. We seek out and adopt processes that enable ERA to operate with greater efficiency and transparency.

ENHANCING PERFORMANCE

STRATEGIC PRIORITY 4: ADVANCE OPERATIONAL EXCELLENCE

We are striving for excellence in operations and efficiency while maintaining responsiveness to stakeholders and funders. A focus on efficient execution is key to delivering on our strategic priorities, and achieving our mandate.

In 2016/17, we delivered:

- ▶ Strengthened corporate capacity through addition of a CEO and two Executive Directors.
- ▶ A faster turnaround time from the beginning of a call to the approval of funded projects.
- ▶ Progress toward a multi-year funding commitment.
- ▶ An assessment of our integrated business delivery model.
- ▶ An assessment of our Biological GHG Management Program.

WHAT WE ACCOMPLISHED

Strengthened corporate capacity

ERA initiated a number of operational changes in December 2015, with the aim of continuously improving our operating practices.

ERA moved operations under the leadership of an Interim Chief Executive Officer. In 2016/17, the CEO role was formalized to address the increasingly complex needs of a growing organization that manages projects valued at more than \$2 billion. In addition, two Executive Director roles were established to embed operational, technical, strategic policy and planning capacity within the organization and strengthen relationships with government, industry and the innovation community.

Faster turnaround time to fund projects

In 2016/17, our team accelerated our evaluation and approval process. Our funding process invites submissions for consideration through a competitive call for proposals. This process includes two stages of expert review prior to a Board decision, and has proven to be an effective way to ensure that the best projects are selected.

In the past, the duration of the process has been identified as a barrier to some applicants' success. In 2016/17, ERA effectively shortened the turnaround time for funding approval by two months (see page 38 for details).

Progress toward a multi-year funding commitment

ERA renewed its Memorandum of Understanding (MOU) and Grant Agreement with the Government of Alberta in 2016/17, and received an additional \$33 million in funding. The renewed MOU and Grant Agreement describe the terms under which ERA is funded and operates, and underpin our business model.

Integrated business delivery model assessment

As the number of projects we manage continues to grow, there is a greater need to ensure that ERA's business delivery model allows for efficient and effective long-term operations.

In 2016/17, ERA initiated an assessment of its integrated business delivery model.

The assessment has three goals:

- ▶ Addressing ERA's business needs efficiently and effectively, and in a way that is aligned with Alberta's Climate Leadership Plan, addresses market pull, and ensures promising technologies can be accelerated from idea to commercialization through Alberta's innovation system.
- ▶ Providing the best possible value by operating efficiently, effectively and transparently.
- ▶ Ensuring accountability to stakeholders.

The review will be completed in 2017/18, and ERA will take steps to address the opportunity areas it presents for process improvement and efficiency gains.

Biological GHG Management Program assessment

Beginning in 2012, ERA committed funding to support a separate Biological GHG Management Program. Administered by Alberta Innovates, the aim of the program was to specifically target biological emissions reduction projects that were not likely to achieve funding through typical ERA calls for proposals.

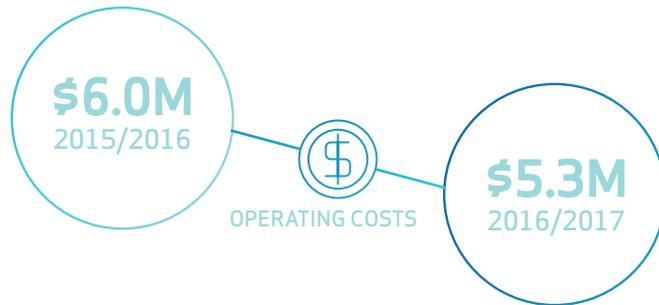
As part of its business model assessment, ERA undertook a review of this program. The assessment confirmed that biological resource optimization should remain as one of ERA's four focus areas moving forward; but, as a result of the review ERA is making changes to how we address opportunities in the biological sectors. Going forward, ERA will fund biological projects using the same process as other ERA priority areas, and will support a smaller number of focused investment priorities within the biological opportunity space.

Through the review, Alberta Innovates and ERA have developed a greater shared understanding of how we can work together to advance biological initiatives that serve to reduce GHG emissions. Clearer role delineation and accountability for Alberta Innovates and ERA will ensure there is an integrated approach to advance biological projects over the long term.

The ERA Partnership Intake Pilot program and our Innovator Support Pilots (see pages 24 and 25) will provide further opportunities for us to address the unique challenges faced by Alberta's biological sectors.

MEASURING RESULTS

Operating costs



ERA's 2016/17 operating costs were \$5.3 million, compared to \$6 million in 2015/16, representing more than a 10 percent decrease while supporting three active funding opportunities. Another measure of efficiency at ERA is operating costs as a percentage of the funds required to fulfill project commitments approved by our Board of Directors. In 2016/17, ERA's operating costs were 3.2 percent of total funds committed to projects.

Length of ERA evaluation and approval process

In 2016/17 we completed the evaluation and approval process for the ERA Methane Challenge in about five and a half months, a two-month efficiency improvement.



Board effectiveness

Each year, the ERA Board completes a candid and confidential self-assessment that addresses areas such as leadership, strategic direction and compliance with terms of reference and ethical and legislative standards. The Board uses the assessment to help chart its path forward.

For 2016/17, effectiveness ratings were high overall, with mean rating scores between 4.2 and 4.7 on a 5-point scale. The Board provided highest overall ratings for complying with their terms of reference and disclosing conflicts of interest.

THE YEAR AHEAD

ERA will complete the business delivery model assessment in the 2017/18 fiscal year. The service provider conducting the review will categorize recommendations in two areas related to administration and core business activities, and analysis of the recommendations by ERA and our Board will help to determine next steps.

We will continue to work with the Alberta Government to demonstrate ERA's value as a delivery agent under the Climate Change Innovation and Technology Framework and the Climate Leadership Plan. To effectively deliver under these important Alberta frameworks, we hope to secure a multi-year commitment for further funding from the Government of Alberta in 2017/18.



Financials.



**Climate Change and Emissions
Management (CCEMC) Corporation**
(operating as Emissions Reduction Alberta)

Financial Statements
May 31, 2017

Independent Auditor's Report

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

We have audited the accompanying financial statements of Climate Change and Emissions Management (CCEMC) Corporation, which comprise the statement of financial position as at May 31, 2017 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 (CCEMC) Corporation as at May 31, 2017 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.

The image shows the signature of Deloitte LLP in a cursive, handwritten style.

Chartered Professional Accountants
September 19, 2017

Climate Change and Emissions Management (CCEMC) Corporation

(operating as Emissions Reduction Alberta)

Statement of Financial Position

As at May 31, 2017

	2017 \$	2016 \$
Assets		
Current assets		
Cash	277,292,114	268,044,991
Accounts receivable	41,560	848,912
Interest receivable	257,308	275,502
Prepaid expenses	29,072	1,698
	<u>277,620,054</u>	<u>269,171,103</u>
Non-current assets		
Capital assets	1,907	3,178
	<u>277,621,961</u>	<u>269,174,281</u>
Liabilities		
Current liabilities		
Accounts payable and accrued liabilities	2,630,535	3,237,442
Net Assets		
General Fund – unrestricted	-	-
Restricted Fund (note 3)	274,991,426	265,936,839
	<u>277,621,961</u>	<u>269,174,281</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

(operating as Emissions Reduction Alberta)

Statement of Changes in Net Assets

For the year ended May 31, 2017

			2017	2016
	General Fund \$	Restricted Fund \$	Total \$	Total \$
Balance – Beginning of year	-	265,936,839	265,936,839	296,464,555
Excess (deficiency) of revenue over expenses for the year	-	9,054,587	9,054,587	(30,527,716)
Balance – End of year	-	274,991,426	274,991,426	265,936,839

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

Climate Change and Emissions Management (CCEMC) Corporation

(operating as Emissions Reduction Alberta)

Statement of Operations

For the year ended May 31, 2017

			2017	2016
	General Fund \$	Restricted Fund \$	Total \$	Total \$
Revenue				
Grant revenue (note 4)	-	33,000,000	33,000,000	-
Interest income	-	3,057,450	3,057,450	3,465,228
	-	36,057,450	36,057,450	3,465,228
Project expenses (note 6)	-	21,654,278	21,654,278	27,992,007
Excess (deficiency) of revenue over project expenses	-	14,403,172	14,403,172	(24,526,779)
Operating expenses				
Program management (note 5)	-	4,383,880	4,383,880	4,310,124
Consulting contracted services	-	474,281	474,281	1,376,399
Corporate costs	-	187,438	187,438	193,192
Amortization	-	1,271	1,271	636
Board remuneration and expenses (note 5)	-	72,014	72,014	60,806
Outreach	-	-	-	5,500
Professional fees	-	47,910	47,910	43,679
Insurance	-	11,185	11,185	10,601
Conference	-	170,606	170,606	-
	-	5,348,585	5,348,585	6,000,937
Excess (deficiency) of revenue over expenses for the year	-	9,054,587	9,054,587	(30,527,716)

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

Climate Change and Emissions Management (CCEMC) Corporation

(operating as Emissions Reduction Alberta)

Statement of Cash Flows

For the year ended May 31, 2017

	2017 \$	2016 \$
Cash provided by (used in)		
Operating activities		
Excess (deficiency) of revenue over expenses for the year	9,054,587	(30,527,716)
Amortization	1,271	636
Net change in non-cash working capital items		
(Increase) decrease in prepaid expenses	(27,374)	274
Decrease in accounts receivable	807,352	4,192,773
Decrease in interest receivable	18,194	67,963
Decrease in accounts payable and accrued liabilities	(606,907)	(2,453,691)
	<u>9,247,123</u>	<u>(28,719,761)</u>
Investing activities		
Purchase of capital assets	-	(3,814)
		<u>(3,814)</u>
Increase (decrease) in cash during the year	9,247,123	(28,723,575)
Cash – Beginning of year	<u>268,044,991</u>	<u>296,768,566</u>
Cash – End of year	<u>277,292,114</u>	<u>268,044,991</u>

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

Climate Change and Emissions Management (CCEMC) Corporation

(operating as Emissions Reduction Alberta)

Notes to Financial Statements

May 31, 2017

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. On October 21, 2016, CCEMC registered the trade name of Emissions Reduction Alberta (ERA) and uses this as its operating name. ERA's mandate is to identify and accelerate innovative solutions that secure Alberta's success in a lower carbon economy. 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 emissions of specified gases and support its ability to adapt to climate change. The Fund provides the primary source of revenue for ERA. As a not-for-profit organization, ERA 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 ERA'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 ERA'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

(operating as Emissions Reduction Alberta)

Notes to Financial Statements

May 31, 2017

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 ERA becomes a party to the contractual provisions of the financial instrument and subsequently are measured at amortized cost with any changes recorded in the statement of operations. ERA currently does not hold any equity instruments that would be measured after initial recognition at fair value.

Cash

Cash consists of cash on deposit.

Capital assets

Capital assets are recorded at cost, less accumulated amortization. Capital assets are amortized over their estimated useful lives of 36 months using the straight-line method.

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 ERA. 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 related to reducing emissions of specified gases or supporting Alberta's ability to adapt to climate change as established by the Fund. The funds are also restricted for the purpose of administering ERA, which includes fees, expenses, liabilities and other costs.

Climate Change and Emissions Management (CCEMC) Corporation

(operating as Emissions Reduction Alberta)

Notes to Financial Statements

May 31, 2017

4 Grant revenue

Funds are granted from the Government of Alberta to ERA on an annual basis through a Grant Agreement. The initial Grant Agreement was dated March 31, 2009, which was 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 announced the New Climate Leadership Plan in April 2016 and a new Grant Agreement was executed on March 8, 2017 and is effective until March 31, 2020 unless extended or terminated in accordance with the agreement. No grant monies were received during fiscal 2016. The annual grant amount for fiscal 2017 was announced in October 2016 and was paid on May 24, 2017.

5 Board and management remuneration

Total honoraria and expenses related to the directors of the board were \$71,171 (2016 – \$59,918) in the fiscal year. Remuneration paid to directors or their employers includes honoraria totalling \$33,668 (2016 – \$39,893) as follows:

	2017 \$	2016 \$
C. Bak (a)	2,721	-
D. Beaver (b)	-	5,259
R. Blackwood (c)(f)	-	-
J. Carter	2,144	1,417
P. Clark (b)	82	7,618
J. Doucet	2,697	3,397
I. Evans (d)	1,018	3,458
S. Hastings-Simon (a)	2,041	-
B. Kenny	5,048	3,336
S. Locke (e)(f)	-	-
R. Mansell	5,398	4,241
C. Mather (a)	2,868	-
P. Mohr	3,250	1,236
K. Sendall	6,401	5,418
A. Tasker (b)	-	4,513
D. Wicklum (d)(f)	-	-
	<hr/>	<hr/>
	33,668	39,893

- a) Appointed December 2016
- b) Term expired June 2016
- c) Resigned February 2017
- d) Term expired September 2016
- e) Appointed February 2017
- f) Honoraria have been waived by these directors

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Of these amounts, \$3,039 (2016 – \$11,385) is included in accounts payable and accrued liabilities. Expenses paid to directors of \$37,503 (2016 – \$20,025) 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 \$4,383,880 (2016 – \$4,310,124); of this amount, \$760,787 (2016 – \$504,225) is included in accounts payable and accrued liabilities.

6 Commitments and guarantees

During the year, contribution agreements for ERA funding were executed for five projects. Also during the year, one project was reactivated. As at May 31, 2017, ERA has 100 executed contribution agreements outstanding and has commenced or completed funding for 94 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:

	2017 \$	2016 \$
Total committed funds for executed projects – Beginning of year	68,379,054	94,044,030
Total funds for executed projects approved or adjusted during the year	39,543,621	14,176,060
Project expenses incurred during the year	(21,654,278)	(27,992,007)
Contribution agreements cancelled during the year	-	(11,849,029)
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Total committed funds for executed projects – End of year	86,268,397	68,379,054
Total funds for projects approved by the Board	97,892,765	112,643,300
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Total executed and approved commitments	184,161,162	181,022,354

As at May 31, 2017, funding for six of the 100 executed projects has not commenced. Funds allocated to the executed contribution agreements are subject to ERA'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 \$86,268,397 but will not exceed that amount.

There are also an additional 22 projects, totalling \$97,892,765 (2016 – \$112,643,300), that have been approved for funding by ERA's board of directors but for which contribution agreements have not yet been executed.

Subsequent to year-end, one of the approved projects, totalling \$25,000,000, has been cancelled, and three of the approved projects, totalling \$6,150,000, have executed contribution agreements. As at September 19, 2017, ERA has 18 projects remaining, totalling \$66,742,765, that have been approved for funding by ERA's board of directors but for which contribution agreements have not been executed. In addition, ERA has launched the Oil Sands Innovation Challenge and has allocated up to \$50,000,000 to fund approved projects under this call.

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

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7 Financial instruments

ERA'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 ERA if a party to a financial instrument fails to meet its contractual obligations and arises principally from 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 ERA 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 ERA's interest income or the value of the financial instruments held. ERA 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 ERA 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 ERA's grant revenue is received from the Fund. The loss of this funding would have a material adverse impact on ERA's operations and financial position. Should a loss of funding occur, all approved project commitments would remain in effect.