

# 2019/22 BUSINESS PLAN

## EMISSIONS REDUCTION ALBERTA



ERA



# TABLE OF CONTENTS

---

|                               |          |
|-------------------------------|----------|
| <b>MESSAGE FROM THE CHAIR</b> | <b>1</b> |
|-------------------------------|----------|

---

|                             |          |
|-----------------------------|----------|
| <b>MESSAGE FROM THE CEO</b> | <b>2</b> |
|-----------------------------|----------|

---

|                               |          |
|-------------------------------|----------|
| <b>ERA CORPORATE OVERVIEW</b> | <b>3</b> |
|-------------------------------|----------|

---

|                              |          |
|------------------------------|----------|
| <b>1.0 EXECUTIVE SUMMARY</b> | <b>5</b> |
|------------------------------|----------|

---

|                                   |          |
|-----------------------------------|----------|
| <b>2.0 ABOUT OUR ORGANIZATION</b> | <b>9</b> |
|-----------------------------------|----------|

---

|  |   |
|--|---|
| 2.1 WE ARE EMISSIONS REDUCTION ALBERTA | 9 |
|--|---|

---

|   |   |
|---|---|
| 2.2 WE ARE A PART OF ALBERTA'S CLIMATE AND INNOVATION HISTORY | 9 |
|---|---|

---

|                                 |           |
|---------------------------------|-----------|
| <b>3.0 STRATEGIC PRIORITIES</b> | <b>15</b> |
|---------------------------------|-----------|

---

|                           |    |
|---------------------------|----|
| 3.1 ACCELERATE TECHNOLOGY | 17 |
|---------------------------|----|

---

|                             |    |
|-----------------------------|----|
| 3.2 DRIVE COMMERCIALIZATION | 29 |
|-----------------------------|----|

---

|                     |    |
|---------------------|----|
| 3.3 MAXIMIZE IMPACT | 37 |
|---------------------|----|

---

|                             |           |
|-----------------------------|-----------|
| <b>4.0 OPERATING BUDGET</b> | <b>47</b> |
|-----------------------------|-----------|

---



# MESSAGE FROM THE CHAIR

**ERA is taking action on climate change and creating competitive industries in Alberta by accelerating the most promising clean technologies.**

Jurisdictions around the world are seeking solutions to meet rising energy demand and create new economic opportunities, all while delivering increasingly sustainable environmental outcomes. Alberta is rising to this challenge.

At ERA, we invest the revenues from the carbon price paid by large final emitters into the development and adoption of technology solutions that will reduce GHG emissions and grow the province's economy. These solutions will help industry reduce their reliance on valuable natural resources; use less water and energy to operate facilities or even produce food; create value out of waste; and develop lower carbon products.

Each year, we review our priorities and investment portfolio to ensure our organization remains responsive to the evolving needs of Alberta's industries and innovators. For 2019/2022, this review has led us to hone in on ERA's unique value proposition and put a greater emphasis on communicating the successes and lessons learned from our projects. It also led us to adapt and refine our four priority investment areas. These include a focus on:

- ▶ Cleaner oil and gas
- ▶ Low emitting electricity supply and demand
- ▶ Food, fibre and bioindustries
- ▶ Low carbon industrial processes and products.

Technological innovation and disruption in these areas is fast-paced, and ERA's entrepreneurial approach helps us keep pace. Through increased collaboration, networking, and sharing of best practices, we not only fund innovation—we bring together the resources and relationships required to de-risk and scale-up technologies and remove barriers to get clean technology to market.

I'd like to thank my predecessor, Kathy Sendall, for her many contributions during her term as Chair of ERA. I am very appreciative of the opportunity to serve with other members of the Board and the ERA management team, as we work to build a more diversified, resilient, and lower carbon economy in Alberta.

Sincerely,

**Dave Collyer**  
**Chair, Emissions Reduction Alberta**



# MESSAGE FROM THE CEO



**For 10 years, ERA has been a key partner in helping Alberta achieve its environmental, innovation and economic goals.**

Since we were established in 2009, we have committed \$572 million toward 164 projects that are helping to shape a province with a competitive and diverse economy, a healthier environment, stronger and more resilient communities, and a robust innovation ecosystem.

These projects range from technologies that convert residential waste into value-added fuels to projects that utilize heat and power from pulp mills and industrial buildings to delivering renewable solar energy to more than 3,000 homes in Southern Alberta. ERA's investments are delivering real results.

Each year, we have engaged our stakeholders to gain valuable input on how our funds can lead to the greatest impact. This feedback has led to more refined funding challenges with clearer guidelines, Call for Proposal timelines that work better for innovators, and guidance to our team of experts that helps them identify the most promising projects, with the highest potential for commercial deployment.

Moving forward, ERA will continue to support the projects we have already committed to fund, and seek out and accelerate the new technologies we need. In 2019, we plan to launch two new focused funding challenges to identify solutions that respond to both industry needs and government priorities.

Our Partnership Intake Program, which began as a pilot in early 2017, will be fully operational in 2019. This program allows ERA to support promising technologies outside our traditional Call for Proposals, enabling us to better respond to the needs of Alberta's innovation system and leverage the funding and due diligence of our partner network.

In 2019, we will also initiate our Innovator Support Pilot (ISP). This new pilot program will test a mechanism to support applicants who have promising technologies but need to improve aspects of their business model, team, or financing before they are ready to receive ERA funding. The pilot will take ERA's role as a convener of resources for technology deployment to a new level.

ERA will continue to invest wisely and report on successes and lessons learned through quarterly and annual reports and through face-to-face events that bring innovators together.

I am pleased to present to you our Business Plan, which sets out our strategic focus for the coming year.

Sincerely,

**Steve MacDonald**

**CEO, Emissions Reduction Alberta**



# ERA CORPORATE OVERVIEW

## MANDATE

Reduce GHG emissions and grow Alberta's economy by accelerating the development and adoption of innovative technology solutions.

## VISION

Alberta has competitive industries that deliver sustainable environmental outcomes, attract investment, and are building a diversified, lower carbon economy.

## ERA'S VALUE PROPOSITION

We fund projects using the revenues from the carbon price paid by large final emitters that reduce GHGs and create competitive industries in Alberta.

Our investment helps innovators develop and demonstrate GHG-reducing technologies that enable new business opportunities.

## Strategic Priorities

### 1. Accelerate Technology

Invest in GHG-reducing technologies that help Alberta grow existing industries and create new ones.

### 2. Drive Commercialization

Convene the resources required to accelerate the adoption of technology solutions that lead to economic growth and GHG reductions in Alberta.

### 3. Maximize Impact

Maximize our impact through leveraged funding, communications and operational excellence.

ERA was created in 2009 as the Climate Change Emissions Management (CCEMC) Corporation. It was established to invest the revenue generated from the Specified Gas Emitters Regulation (SGER) into innovative, GHG-reducing technologies.

# Core Values



**INNOVATION**



**COLLABORATION**



**TRANSPARENCY**



**INTEGRITY**

## Key Performance Metrics



**ENVIRONMENT**

GHG emissions reductions.



**TECHNOLOGY**

Project Technology Readiness Level (TRL)<sup>1</sup> progression, and technologies to market.



**ECONOMY**

Direct investment into Alberta, GDP impact, job creation, and new companies/revenues.



**COMMUNITY**

Stakeholder awareness, knowledge sharing and collaborative partnerships.

<sup>1</sup> Technology Readiness Levels (TRL) are a type of measurement system used to assess the maturity level of a particular technology. TRL ratings are assigned based on the project's readiness. TRL 1 (scientific discovery) is the lowest and TRL 9 (commercial implementation and technology adoption) is the highest.



# 1.0 EXECUTIVE SUMMARY

The world is seeking solutions that can address the climate change challenge and support ongoing economic growth. At ERA<sup>2</sup>, we know that technology innovation is critical to delivering sustainable environmental outcomes, attracting investment, and building a diversified, lower carbon economy.

## A DECADE OF FUNDING INNOVATION



ERA investments will lead to emissions reductions of 43MT of CO<sub>2</sub>e by 2030. This is equivalent to eliminating emissions associated with electricity use from approximately 5.1 million homes or bringing 9,112 wind turbines online.

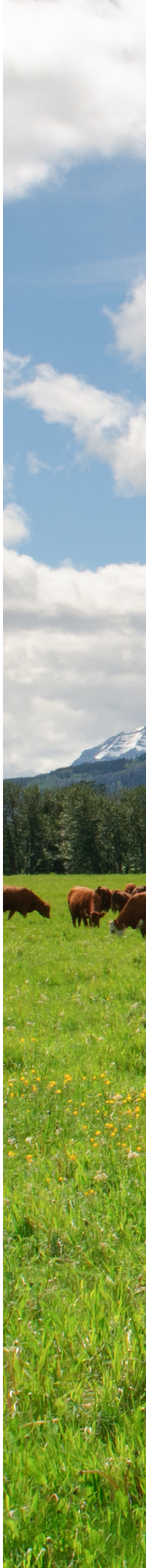
For 10 years, ERA has been investing the revenues from the carbon price paid by large final emitters to accelerate the development and adoption of innovative clean technology solutions. Since we were established in 2009, we have committed \$572 million toward 164 projects that are helping to reduce GHGs, create competitive industries and are leading to new business opportunities in Alberta.

## OUR PORTFOLIO

ERA's portfolio includes projects that align with Alberta's economic and environmental priorities. We regularly review and refine our four priority areas of focus to ensure we are being responsive to the needs of the province's industries and innovators. Our investment priorities reflect the need for Alberta to reduce GHGs, grow our existing industries, and create new ones:

- ▶ Cleaner oil and gas
- ▶ Low emitting electricity supply and demand
- ▶ Food, fibre, and bioindustries
- ▶ Low-carbon industrial processes and products.

<sup>2</sup> The CCEMC legal name continues to exist but is not public facing. Emissions Reduction Alberta (ERA) is a legal tradename of Climate Change and Emissions Management (CCEMC) Corporation.









## THREE STRATEGIC PRIORITIES

To deliver on our mandate we have established three key strategic priorities:

### 1. Accelerate Technology

Core to our business is investing in the pilot, demonstration and deployment of GHG-reducing technologies. These investments are guided by our Technology Roadmap—a living document that defines technology pathways, enabling platforms, and areas of focus for ERA's funding.

### 2. Drive Commercialization

At ERA, we know that funding alone will not result in the economic growth and GHG reductions we envision for Alberta. Today's innovators face significant and numerous challenges that hinder technologies from scale-up, commercialization and marketplace deployment and adoption. Success requires that we convene resources and facilitate strategic partnerships with industry, government, business, academia, and other funders to foster a suite of policy, regulatory, program and business innovation tools that will help address barriers to commercialization.

### 3. Maximize Impact

ERA is funded by the Government of Alberta (GoA). We maximize the value of these funds by communicating successes, sharing lessons learned, and by leveraging our investment through partnerships with the Federal Government and other organizations focused on climate innovation. For every dollar ERA invests, another \$6.40 is also invested by industry, innovators and other project funders. We will also maximize our impact by delivering excellence in operations, and through rigorous performance measurement and reporting.

## THE PATH FORWARD

This 2019/2022 Business Plan sets out the actions ERA will take to deliver on our mandate, based on a budget assumption of receiving \$100 million per year from the Province. Our three strategic priorities provide the framework for these actions.

Critical among these actions is the delivery of two targeted funding opportunities annually, for a total of \$80 million per year. These competitive funding opportunities will be guided by our Technology Roadmap and market needs, and will build on our existing portfolio. Examples of potential focus areas for future competitive calls for proposals could include:

- ▶ Natural gas value chain innovation
- ▶ Sustainable communities and smart infrastructure
- ▶ Innovative agriculture and agri-food
- ▶ Carbon capture, utilization, and storage (CCUS).

Annual Calls for Proposals will be augmented by our now fully operational Partnership Intake Program—a flexible mechanism for ERA to fund innovative GHG-reducing projects that are brought forward by our trusted funding partners in the innovation system. We have allocated \$20 million per year for the program.

ERA will continue to convene the resources required to accelerate the adoption of technology solutions. This will include implementation of our Innovator Support Pilot, as well as further growth and leverage of our trusted partner network to further support scale-up, adoption, growth and export of made-in-Alberta solutions.

In 2019/2022, we will continue to raise the profile of our mandate and make certain our unique value proposition is clear to industry and innovators alike. We will do this by putting a greater focus on our content strategy, which will include a renewed commitment to telling our story through our website, social media channels, strategic events, and the launch of a podcast series.

## A SCALABLE PLAN

This Business Plan—and the activities ERA has committed to undertake— are scalable. Additional resources invested in innovative, GHG-reducing technologies could result in greater environmental and economic outcomes for Alberta.

ERA's recent competitive Calls for Proposals have been oversubscribed and with our Partnership Intake Program now fully operational, we anticipate the pipeline of potential projects will grow. Additional funds would allow ERA to better respond to the needs of Alberta's innovation system and leverage the funding and due diligence of our partner network to identify and accelerate the most promising solutions.



For every dollar ERA invests,  
another \$6.40 is also invested  
by industry, innovators and other  
project funders.

# 2.0 ABOUT OUR ORGANIZATION

## 2.1 We are Emissions Reduction Alberta

Our organization was created in 2009, as the Climate Change Emissions Management (CCEMC) Corporation, to help deliver on the province's environmental and economic goals. We take action on climate change and support economic growth and diversification by investing in the pilot, demonstration and deployment of clean technology solutions that reduce GHGs, attract investment, and create jobs in Alberta. We invest in technologies that allow Alberta to:

- ▶ Sustainably grow its existing industries.
- ▶ Create new business opportunities that reduce industry's GHG impact and lead to further economic growth.





# ERA's unique business model

While many jurisdictions have a mechanism to invest in clean technology, the ERA model is unique:

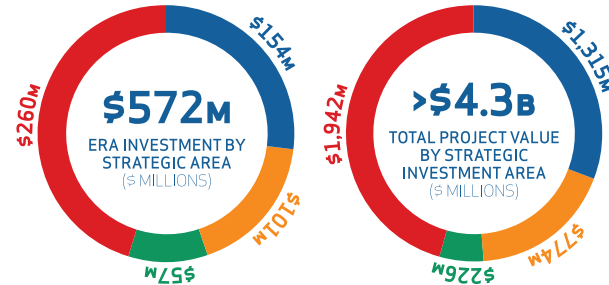
- ▶ Our funding is sourced from Alberta's large emitters who are required to reduce their GHG emissions to meet regulated targets under Alberta's climate change regulations.
- ▶ We offer a clear line of sight from the carbon price paid by industry to investment in the solutions industry needs to help achieve emissions reductions.
- ▶ We fund later-stage technology, which means we accelerate projects toward broader industry deployment and adoption by helping to de-risk projects in the crucial pilot, demonstration, and scale-up stages of development.
- ▶ Our non-dilutive grant funding helps accelerate clean technologies through development stages where private industry and financial institutions are often unwilling to invest due to technology risk.
- ▶ Our Delegated Administrative Organization (DAO) structure means we have no annual investment caps, we can fund multi-year projects, we carry funding over from year to year, and reinvest funds when projects do not progress.
- ▶ Our operating model is extremely efficient; in 2018, our operating costs represented just two per cent of the total funds we invest.
- ▶ We require that every dollar invested by ERA is matched 1:1 by private investment, ensuring there is a market demand for the technology. Historically, we have significantly exceeded this requirement. For every dollar invested by ERA, another \$6.40 is invested by industry, innovators and other project funders.
- ▶ We take action on climate change and support economic growth and diversification by accelerating projects that reduce GHGs, attract investment, and create jobs in Alberta.



## INVESTING IN A DIVERSE PORTFOLIO

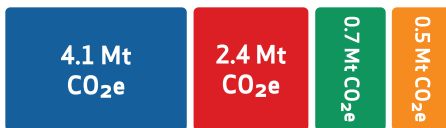
### 164 Projects Total

- ▶ **Cleaner Oil & Gas**  
(58 Projects)
- ▶ **Low Emitting Electricity Supply & Demand** (26 Projects)
- ▶ **Food, Fibre, & Bioindustries**  
(46 Projects)
- ▶ **Low Carbon Industrial Processes & Products** (34 Projects)



## CUMULATIVE PROJECT EMISSION REDUCTIONS\*

### 7.8 Mt CO<sub>2</sub>e Total by 2020



### 42.7 Mt CO<sub>2</sub>e Total by 2030



ERA estimates our investments will result in emissions reductions of an average of 3.2 million tonnes per year. This is equivalent to reductions achieved by switching approximately 121.5 million incandescent light bulbs in homes to LEDs, or bringing 678 wind turbines online.

\*We have estimated emission reductions for all projects with approved funding commitments and executed funding agreements and assumed the projects will continue successfully and as planned. Should circumstances change for these projects, emission reduction estimates may change materially.

## CREATING JOBS AND DIVERSIFYING THE ECONOMY

Since our inception, ERA has committed \$572 million in funding to 164 projects. ERA funding is leveraged, and for every dollar we invest, another \$6.40 is also invested by industry, innovators and other project funders.

### ALBERTA



### CANADA

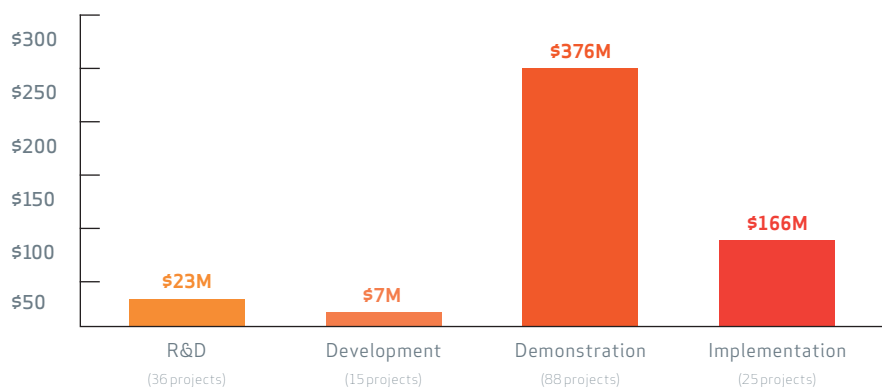


\*A person-year is equal to one-year of employment for one individual. Please note: economic impact is reported on a calendar year basis, not fiscal year.

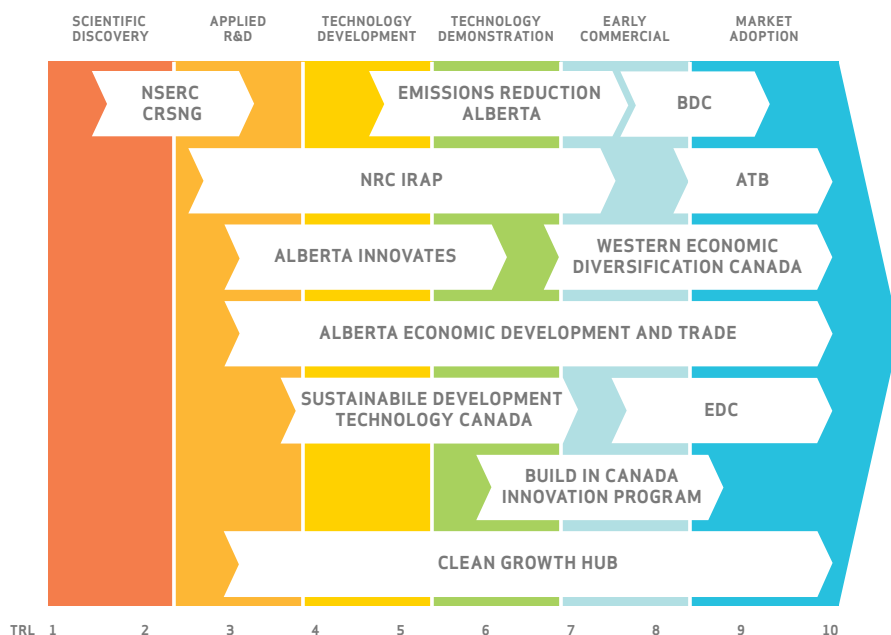
## ERA/INVESTMENT BY INNOVATION STAGE

(\$ Millions)

ERA's funded projects span the innovation spectrum, but have largely focused on field pilot, demonstration and first-of-a-kind deployment projects. We partner with other organizations in Alberta and Canada who are working to advance GHG-reducing solutions. This is creating a continuum of support that spans the innovation development spectrum, and includes like-minded organizations such as Alberta Innovates, Sustainable Development Technology Canada (SDTC), Energy Efficiency Alberta (EEA), and Business Development Bank of Canada (BDC).



ERA is well placed to deal with the risks of innovation. Our independent, transparent, and rigorous due diligence and selection process is designed to minimize this risk. When projects are not successful, we focus on the lessons learned, sharing the knowledge we gain with others who may innovate more quickly as a result of those experiences.

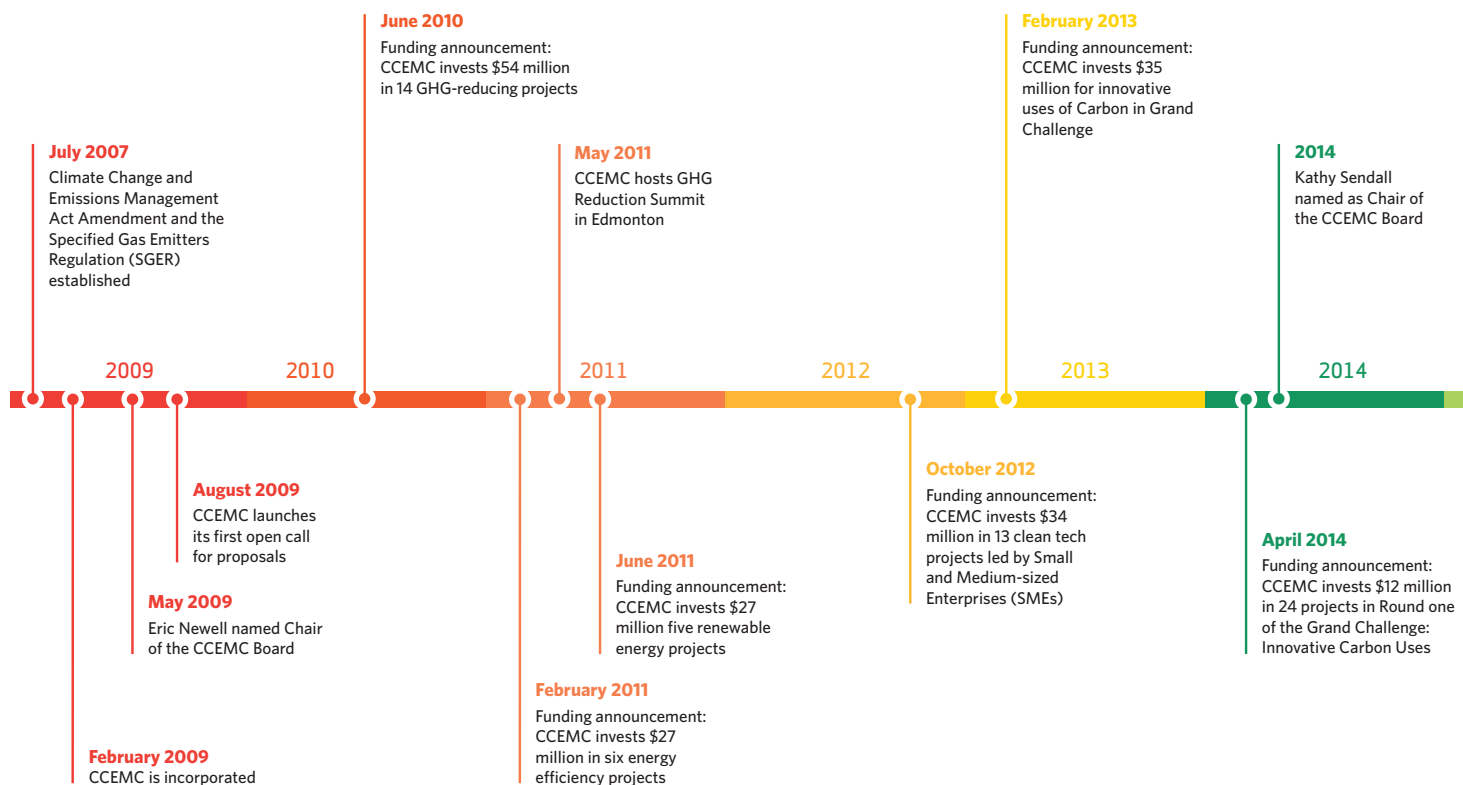


This diagram, from our June 19, Maximizing Funding workshop, shows where participating partners invest on the path to commercialization.



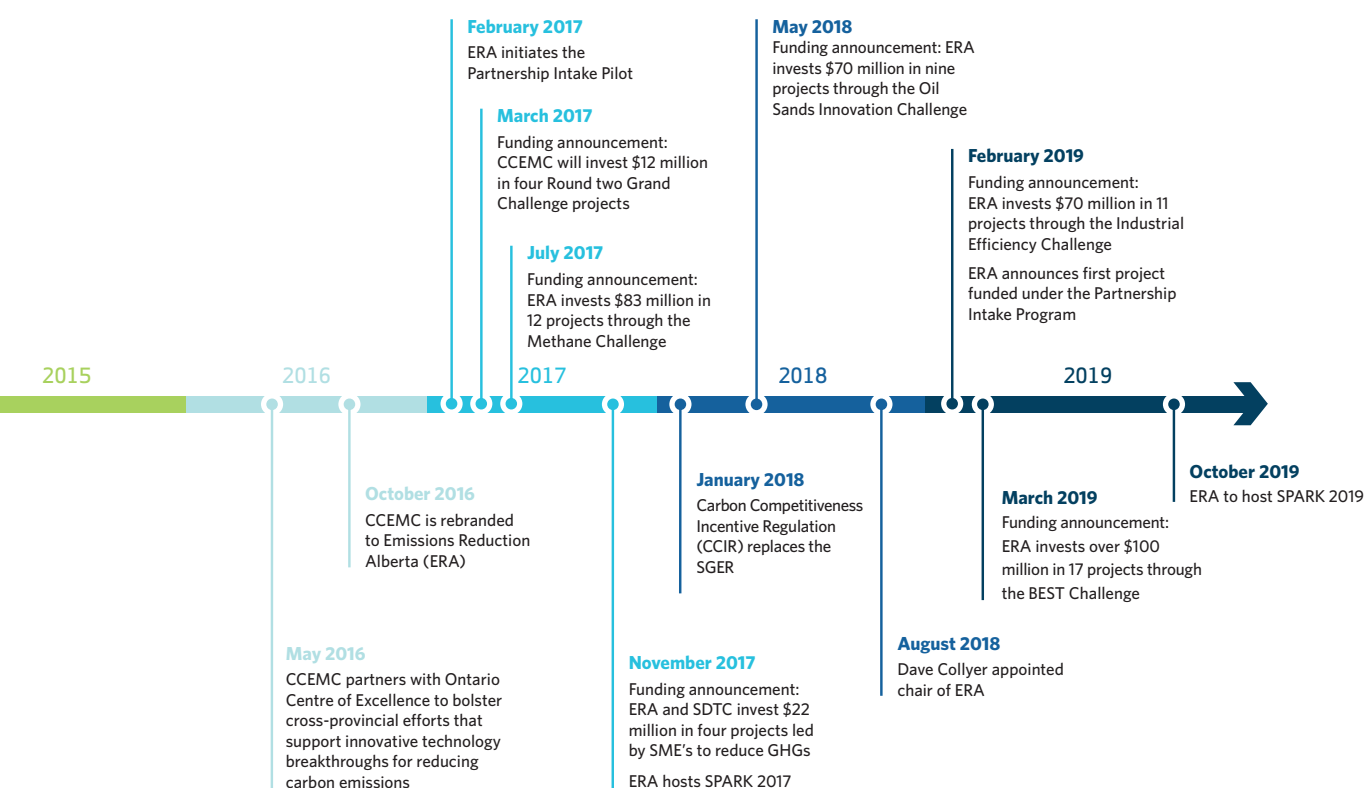
## 2.2 We are a part of Alberta's Climate and Innovation History

Over the past 10 years, ERA has been a key player in helping to reduce GHGs, attract investment, and create jobs in Alberta. Beginning with Alberta's 2008 Climate Change Strategy and the Specified Gas Emitters Regulation (SGER), and transitioning through Alberta's 2015 Climate Leadership Plan and the Carbon Competitiveness Incentive Regulation (CCIR), ERA has been the mechanism for investing the revenues from the carbon price paid by large final emitters directly into clean technology solutions.



The Alberta government has two frameworks to help guide the Province's actions and investments in technology and innovation: Alberta's Research and Innovation Framework (ARIF) and the Climate Change Innovation and Technology Framework (CCITF). The ARIF establishes a suite of aspirational innovation targets intended to align collective action to develop transformational solutions that improve the lives of Albertans. The CCITF serves as the overarching guide for the investment of public funds from the pricing of carbon emissions in clean innovation and technology.

A decade of climate policy, environmental regulation, and innovation frameworks in Alberta have all pointed to the need for the outcomes ERA is delivering. We are and will remain an integral part of Alberta's strategy for achieving its climate change and innovation and economic goals, which will result in sustainable prosperity for Alberta.



# 3.0 DELIVERING ON OUR STRATEGIC PRIORITIES

To deliver on our mandate, the GoA provides ERA with a grant based on the actions outlined in our Business Plan and the resources required to fulfill them. Our three strategic priorities, described in the sections that follow, provide the framework for these actions. Fulfillment of this 2019/2022 Business Plan requires \$100 million per year over three years.

**STRATEGIC PRIORITY 1: ACCELERATE TECHNOLOGY**

**STRATEGIC PRIORITY 2: DRIVE COMMERCIALIZATION**

**STRATEGIC PRIORITY 3: MAXIMIZE IMPACT**

## A scalable plan

This Business Plan, and the activities ERA has committed to undertake, are scalable.

Additional resources invested towards innovative, GHG-reducing technologies could result in greater GHG and economic impacts for Alberta.

ERA's last three competitive Calls for Proposals have been oversubscribed. Should additional funds be available, ERA could increase the funding made available per competitive funding round, funding more projects for each round, or providing individual projects with greater funding per project.

With our Partnership Intake Program now fully operational, we anticipate this pipeline of potential projects will grow. Additional funds could be allocated toward this important mechanism.

Should competing priorities result in fewer funds allocated to ERA, we would remain committed to delivering on our mandate and maximizing the impact of our investments by reducing the number of competitive calls administered per year from two to one.







# 3.1 Accelerate Technology

**Invest in GHG-reducing technologies that help Alberta grow existing industries, and create new ones.**

### WHAT WE PLAN TO DO

- 3.1.1 Invest in the pilot, demonstration and deployment of projects that align with ERA's Technology Roadmap and market needs, and support Alberta's economic and environmental priorities.
- 3.1.2 Fund innovative technology solutions through two competitive funding calls (\$80 million per year) and our Partnership Intake Program (\$20 million per year).
- 3.1.3 Select innovative technologies through a rigorous process and transparent criteria that facilitate GHG emission reductions and have the strongest potential for uptake by the market.
- 3.1.4 Identify the right projects for funding through increased technology scouting at workshops, and matchmaking events.
- 3.1.5 Engage with stakeholders by hosting and participating in conferences and workshops that help ERA identify and accelerate GHG-reducing technology opportunities to grow and diversify Alberta's economy.

### WHAT WE SEEK TO ACCOMPLISH

- ▶ Acceleration of Alberta-based clean technology projects toward commercialization and uptake by the market.
- ▶ Decreased GHG emissions in Alberta from projects funded by ERA.



# Where we plan to have an impact

- ▶ Accelerate the commercialization and widespread adoption of bold clean technology solutions that reduce GHG emissions in Alberta, Canada and internationally.
- ▶ Alberta achieves greater economic competitiveness, growth and diversification through existing and new industries supported by investment in innovation.
- ▶ Enhance the global reputation for Alberta as a progressive steward of the environment.
- ▶ Increased skills, employment and investment attraction in Alberta's clean technology sectors.

# What we plan to measure



PROJECT AND MARKET  
GHG REDUCTIONS



TOTAL PROJECT  
INVESTMENT



TRL  
PROGRESSION



## STRATEGIC PRIORITY 1

### 3.1.1 Invest in the pilot, demonstration, and deployment of projects that align with ERA's Technology Roadmap and market needs, and support Alberta's economic and environmental priorities.

Our vision is for Alberta to have competitive industries that deliver sustainable environmental outcomes, attract investment, and are building a diversified, lower-carbon economy. Without a doubt, meeting the world's growing energy demand while reducing GHG emissions requires innovation and transformative technologies.

ERA's investments are guided by our Technology Roadmap—a living document that we regularly refresh and revisit to ensure our organization remains responsive to the evolving needs of Alberta's industries and innovators. The Roadmap defines technology pathways and areas of focus for ERA's funding that will deliver the most impactful environmental and economic outcomes for Alberta.

#### **The Roadmap:**

- ▶ Defines potential innovation and technology pathways for achieving Alberta's desired environmental and economic outcomes
- ▶ Maps the tactical options and initiatives to deliver needed solutions for each pathway
- ▶ Identifies potential high impact technology investments that can help reduce GHGs and grow Alberta's economy.

The Roadmap can help align the broader innovation system to deliver meaningful GHG reductions and economics impacts in Alberta.

# ERA's Technology Roadmap identifies four areas of focus for our investments:



## **Cleaner Oil & Gas**

Transformative technologies and innovation to reduce the GHG footprint of Alberta's fossil fuel supply chain and explore value-add opportunities that can help sustainably grow and diversify the province's energy economy.



## **Low Emitting Electricity Supply & Demand**

Technology and innovation to support a reliable, lower carbon electricity system, including reducing the GHG footprint of Alberta's electricity supply mix, increasing the deployment of renewable energy, and enabling a smarter electricity grid that can power Alberta's homes and businesses.



## **Food, Fibre, & Bioindustries**

Innovative processes and technologies to advance Alberta's bioeconomy, and reduce GHG's, including novel agricultural and forestry practices; bioenergy and biomaterials; waste management and waste to energy; and enhanced carbon retention.



## **Low-Carbon Industrial Processes & Products**

Technologies to deliver GHG reductions through energy efficiency, industrial process innovation, and low-GHG materials and chemicals.



## STRATEGIC PRIORITY 1

### 3.1.2 Fund innovative technology solutions through two competitive funding calls (\$80 million per year) and our Partnership Intake Program (\$20 million per year).

ERA's funding will be made available primarily through the delivery of two targeted, competitive funding opportunities annually, totalling \$80 million per year.

The following section identifies four specific areas of interest that represent potential opportunities for future Calls for Proposals. These areas have been informed by the priorities and guideposts laid out in our Technology Roadmap and stakeholder engagement activities held in late 2018 and early 2019.

#### Recognizing emerging technologies

Across our portfolio, many of the promising and innovative solutions that will help to address Alberta's GHG challenges and grow our economy are shifting toward emerging technologies that have applications across multiple sectors, such as data enabled innovation and digital technologies. These technologies can support "quick wins" for existing industries where Alberta already has strength and capacity, as well as longer-term business opportunities for emerging sectors.

Our partners at Alberta Innovates are shifting away from sector specific initiatives and toward emerging technologies in four core areas:

1. Digital technology for business transformation
2. Data-enabled innovation through machine intelligence combined with advanced analytics
3. Leveraging concentrations of local engineering talent to scale and accelerate clean tech innovations
4. Building advanced manufacturing capacity through innovations in production and distribution.

These cross-cutting core areas are key to delivering on ERA's mandate and to identifying the right projects for funding across the four priority areas of investment in our Technology Roadmap.

## Examples of potential focus areas for future competitive calls for proposals could include:

### 1. Natural Gas Value Chain Innovation

Natural gas is the cleanest of all hydrocarbon fuels available today, yet in Alberta the upstream oil and gas industry emits 126.6Mt CO<sub>2</sub>e, with natural gas production and processing contributing approximately 40Mt CO<sub>2</sub>e of this total<sup>3</sup>. In Alberta it is used to warm our homes, power our businesses, and as an input for materials manufacturing and industrial processes.

Around the world, global electricity generation is moving from coal and oil-fired generation to lower-emitting natural gas. According to the 2018 Natural Gas Advisory Panel's Report to the Minister of Alberta Energy, our province's substantial natural gas resource base, highly skilled workforce, and access to Canadian and international capital creates an opportunity for Alberta to participate in and benefit from the global shift to natural gas.

Today, gas-fired power generation is an important option as coal-fired plants reach end of life, and as a complement to wind and solar, ensuring demand is met at all times. However, technology innovation could create the opportunity for natural gas to be a longterm, low carbon solution throughout the value chain, and not just the "transition fuel" some have labeled it. Jurisdictions around the world are exploring innovative technologies that could reduce emissions and extract additional value out of natural gas, such as producing hydrogen from methane, and utilizing or storing the remaining carbon.

Innovative opportunities to reduce emissions and grow Alberta's natural gas industry vary across the value chain. Upstream, Alberta can lead by producing the cleanest natural gas globally. GHG reductions can be achieved by using alternative fuels or improvements to combustion, flaring, and venting. This includes focusing on technologies to reduce the costs of carbon removal and technologies to decarbonize natural gas. Producers may also look at recovering thermal energy from facilities and integrating retrofit techniques to repurpose current assets or utilization of brownfield sites.

Downstream, natural gas can be an enabling, clean fuel of the future. Natural gas is an input in large Alberta industries such as oil sands and chemicals production. Opportunities exist to integrate carbon capture, use and storage, while chemical producers are looking at greener ways to produce their products, including using catalysts that enable a lower energy reaction.

The global liquefied natural gas (LNG) opportunity could also be an important opportunity for Alberta's natural gas sector. Renewable natural gas, and building refineries and plants with additional value-add opportunities such as chemical and petrochemical production are ways to continue growing the industry. While Alberta natural gas is already quite low in carbon emissions, accelerating technologies to eliminate methane venting, decarbonize our natural gas, and integrate natural gas with renewable generation can help our province continue to demonstrate leadership in this industry.

<sup>3</sup>. <http://data.ec.gc.ca/data/substances/monitor/national-and-provincial-territorial-greenhouse-gas-emission-tables/D-Tables-Canadian-Economic-Sector-Provinces-Territories/?lang=en>



# STRATEGIC PRIORITY 1

## 2. Innovation in Agriculture and Agrifood

Our agricultural sector is an important part of Alberta's economy, and is ripe with opportunities for growth, diversification and GHG reductions. In 2017, Alberta produced over 40 per cent of Canada's total cattle inventory, 33 per cent of the country's wheat, 32 per cent of its canola, and over half of its barley.

The impact our agricultural activities can have on GHG emissions and the sector's vulnerability to extreme weather events and other results of climate change have recently brought more focus to this important area of Alberta's economy. In 2015, agriculture was responsible for 21.5Mt CO<sub>2</sub>e or eight per cent of the province's emissions, including 3.3Mt from on farm fuel use, 5.9Mt from crop production, and 12.3Mt from animal production.

Unlike many other sectors, improvements in agricultural management have the potential to do more than just reduce GHGs—they can also serve to sequester or remove emissions from the atmosphere. Agricultural processes and practices that increase efficiency of resource use and lower GHG emissions are increasingly being termed “climate-smart” agriculture. Some large multinational companies are now beginning to expect their suppliers to demonstrate progress towards climate-smart agricultural practices.

The ARIF identifies food and agriculture as a priority area of focus that can increase Alberta's competitiveness, growth and export readiness. Several of Alberta's large final emitters, including fertilizer, food processing and forest product facilities, are found within this sector, which represents a significant opportunity to use resources more efficiently, reducing emissions, and growing production.

Innovation will play an important role in capitalizing on opportunities throughout the agricultural value-chain. This includes more incremental process and efficiency innovation in the field and at the plant, as well as game-changing genomics applications and digital technologies. There is an opportunity to build on traditional farming practices such as crop rotation; tillage; mixed animal foraging; and fertilization through integration of advances in digital technologies ranging from optimization of internet access, data collection and processing, and satellite imagery.

Integration of alternative energy sources and fuels in agriculture and food waste management practices also represent promising opportunities. Bioenergy opportunities can reduce emissions that would otherwise result from the use of fossil-based energy sources.

ERA funding can play a role in accelerating these promising and innovative processes, practices and technologies, while helping to address challenges and barriers such as first-mover risk and resistance to implementation.

## 3. Emerging Technologies for Smart Communities and Sustainable Infrastructure

Alberta is home to 17 cities, 108 towns, 93 villages, 64 municipal districts, eight Metis settlements, and 140 First Nations reserves. These communities in which we live, work and gather represent important economic, social and cultural hubs. Yet these concentrations of people, buildings, businesses, industries, and vehicles also represent a significant and growing source of GHG emissions.

In March 2018, Edmonton was host to the Intergovernmental Panel on Climate Change (IPCC) Cities and Climate Change Science Conference. A “Cities Accelerating

Change” event held during the conference assembled more than 40 city and community leaders from across Alberta, as well as delegates from the conference. Participants discussed four key areas that can most efficiently reduce emissions within cities and communities: buildings, transportation, electricity generation and waste. In 2015, the combined emissions from these sectors amounted to 100Mt CO<sub>2</sub>e in Alberta.

These cities and communities also represent hubs for entrepreneurialism and innovation. Across the province and the country, populations are rising to the challenge of responsibly growing their communities, and the neighbourhoods, businesses, and industries they encompass, while reducing GHG emissions. ERA funding could play a role in accelerating opportunities, including innovative building construction using green materials and inputs, sustainable urban planning, digitization, electrification, and modernization of the electricity grid. Globally, solar roads; microgrids and smart-grids; autonomous vehicles; and improved vehicle fleet management all represent innovative opportunities that Alberta communities could leverage.

In Alberta, bridging the gap between rural and urban centres presents some challenges but also represents an opportunity. Rural communities generally have fewer resources to devote to innovative technology development and are more focused on delivery of core essential services. However, improvements to essential services delivery such as waste management, heating capacity in older buildings, and public transportation also represent prime areas for innovative, GHG reducing-technologies. Furthermore, smaller, less dense rural communities could be pioneers for new technologies (e.g., electrification of transportation or building heating), which can then be scaled for integration into more dense and complex urban environments.

#### 4. Carbon Capture, Use and Storage Technologies

In November 2018, ERA hosted a public “Lessons Learned” event focused on carbon capture, utilization, and storage (CCUS) investments in Alberta. The event built awareness of ERA’s role in accelerating CCUS and other GHG-reducing technologies, while exploring Alberta’s potential to be a global CCUS and clean technology leader. ERA and Alberta have made significant investments into CCUS to date, including \$35 million for ERA’s Grand Challenge, and the Government of Alberta’s support for the Alberta Carbon Conversion Technology Centre (ACCTC), the Alberta Carbon Trunk Line (ACTL) and Shell Quest.

CCUS is a vital endeavour for the move to a lower carbon economy. ERA’s Grand Challenge made significant advances toward the acceleration of CCUS technologies, and ERA has the opportunity to continue de-risking technology by leveraging Alberta’s existing expertise and new CCUS infrastructure.

The NRC-COSIA Carbon XPRIZE is another example of collaboration to help test CCUS technology applications in various sectors using the ACCTC. There is an opportunity to continue to build a pipeline of projects entering the ACCTC to further utilize this infrastructure and enable increased CCUS initiative development. The ACTL and other technologies, together with organizations dealing with enhanced oil recovery and production of byproducts, provide an economic incentive to carbon capture technologies. ERA funding can accelerate these technologies, which have potential to reduce GHGs and help diversify Alberta’s economy.



## STRATEGIC PRIORITY 1

### Partnership Intake Program

In addition to our competitive Call for Proposals process, projects can also be brought forward for consideration by trusted funding partners through our Partnership Intake Program. Our trusted partners are funding organizations with rigorous, fair and transparent due diligence processes comparable in principle to ERA's, including elements such as peer review and technical expertise. We plan to invest approximately \$20 million per year in projects identified through this program.

ERA's Call for Proposals process is effective and efficient for evaluating multiple opportunities and for comparing the relative merits of different opportunities side-by-side. However, the scope and timing of ERA's Call for Proposals process has resulted in some challenges and missed opportunities.

Examples of instances where challenges may occur include:

- ▶ Projects that receive funding from ERA and one or more partnering organizations often undergo multiple lengthy and sometimes duplicative due diligence processes.
- ▶ ERA is sometimes presented with strong opportunities through partnering organizations, but is unable to evaluate these opportunities in a timely manner because the next Call for Proposals is not open or is not aligned by focus area.

In September 2018, ERA approved the first set of projects under the Partnership Intake Program. The process has been highly effective for accelerating innovation, maximizing impact through leverage of partner funds, and reducing the administrative burden for project proponents.

Going forward, ERA will seek to further leverage these existing partnerships and seek out new, value-add partners that can help advance technologies.

### ERA has established trusted partnerships with:

- ▶ Alberta Innovates
- ▶ Sustainable Development Technology Canada (SDTC)
- ▶ Natural Resources Canada (NRCan)
- ▶ Energy Efficiency Alberta
- ▶ Northern Alberta Institute for Technology (NAIT)
- ▶ University of Calgary
- ▶ University of Alberta
- ▶ Business Development Bank of Canada (BDC)
- ▶ Ontario Centres of Excellence
- ▶ Natural Gas Innovation Fund
- ▶ Evok Innovations
- ▶ XPRIZE Foundation.



### 3.1.3 Select innovative technologies through a rigorous process and transparent criteria that facilitate GHG emission reductions and have the strongest potential for uptake by the market.

All of ERA's potential investments are assessed against a set of transparent criteria and undergo a rigorous due diligence review to select projects that can best deliver on our mandate and Technology Roadmap. We rely upon a three-stage process to ensure that our funds are invested prudently.

#### 1. EXPRESSION OF INTEREST (EOI) STAGE



Public Call for EOIs



EOI Submission



Expert Team Evaluation



Shortlist Decision



Decision Letter  
to Applicants

#### 2. FULL PROJECT PROPOSAL (FPP) STAGE



FPP Submission



Oral Presentation



Expert Team Evaluation



Board Decision



Decision Letter  
to Applicants

#### 3. PROJECT EXECUTION STAGE



Work Plan Finalization



Contribution Agreement



Project Monitoring



Progress Reporting



Sharing of Results

The entire ERA evaluation process involves oversight by an independent Fairness Monitor who ensures all applicants are treated in a fair and impartial manner. The Monitor reports directly to our Board of Directors and shares findings before any funding decisions are made.



## STRATEGIC PRIORITY 1

### 3.1.4 Identify the right projects for funding through increased technology scouting at workshops, matchmaking events.

In 2019/2022, ERA plans to further develop its technology scouting capacity. For example, ERA's broad network of partners provides the opportunity to identify shared challenges, become aware of opportunities and engage with innovators. In addition, ERA has purposefully engaged in targeted outreach and hosted workshops that involve a multitude of critical stakeholders who provide intelligence that helps us shape our Calls for Proposals.

By actively seeking out innovative solutions under development, we will ensure that the best technologies are accelerated to meet the evolving needs of the province.

### 3.1.5 Engage with stakeholders by hosting and participating in conferences and workshops that help ERA identify and accelerate GHG-reducing technology opportunities to grow and diversify Alberta's economy.

In 2019, ERA will host SPARK, a biennial conference with the intent to bring together more than 700 clean tech researchers and innovators alongside Alberta's business community, government and the broader innovation system. The primary purpose of the event is to showcase GHG-reducing projects, spark new ideas and connections that will help accelerate technology solutions that can grow existing industries sustainably and help identify new opportunities to drive Alberta's global competitiveness.

This large event will be complemented by a series of ERA hosted workshops that bring together thought leaders who can inform our funding processes and help us gather technology intelligence.

In 2019/2022, we intend to continue to attending key conferences and place our ERA experts at events that provide a platform to achieve our broader communication goals of raising awareness of our mandate and funding opportunities.









# 3.2 Drive Commercialization

**Convene the resources required to accelerate the adoption of technology solutions that lead to economic growth and GHG reductions in Alberta.**

### WHAT WE PLAN TO DO

- 3.2.1 Help broker opportunities for policies and regulation to stimulate adoption of clean technology solutions.
- 3.2.2 Manage a portfolio that reflects both “policy push” from government and “market pull” from industry.
- 3.2.3 Be a convener of resources and facilitate strategic partnerships that help address barriers to commercialization through initiatives like our Innovator Support Pilot.

### WHAT WE SEEK TO ACCOMPLISH

- ▶ Increased commercialization and market adoption of ERA-funded technologies.
- ▶ Technological learnings and knowledge sharing to help accelerate commercial deployment of GHG-reducing technologies.
- ▶ Measurable jobs (temporary and permanent), GDP creation in new and existing sectors, and economic benefits (direct and indirect) created in Alberta from projects funded by ERA.
- ▶ Increased recognition of Alberta as an innovation and clean technology leader and strong environmental steward.

# Where we plan to have an impact

- ▶ Accelerated commercialization and adoption of Alberta-based clean technologies across Canada and around the world.
- ▶ Successful and profitable Alberta companies commercialize solutions that the market needs.
- ▶ Recognition of ERA as a key contributor to Alberta's innovation and technology leadership in the economy of the future.

# What we plan to measure



COLLABORATIVE  
PARTNERSHIPS



TECHNOLOGY INVESTMENT  
TRL PROGRESSION



INVESTMENTS  
GDP IMPACT



JOB  
CREATION



## STRATEGIC PRIORITY 2

### 3.2.1 Help broker opportunities for policies and regulation to stimulate adoption of clean technology solutions.

For a new technology to successfully advance to commercialization, the right market, policy and regulatory conditions need to exist. Policy mechanisms, such as Alberta's SGER and CCIR can spur the advancement of technologies that help achieve desired environmental outcomes while growing our economy.

Alignment with provincial and federal regulatory mechanisms is essential to our success. ERA collaborated with the Alberta Energy Regulator (AER) on the development of both our Methane and Oil Sands Innovation Challenges. Equally important, AER is engaging with ERA's Methane Challenge recipients to ensure regulation is not a barrier to developing and deploying technologies to monitor, detect and reduce methane emissions.

Going forward, ERA will continue to engage and collaborate with regulators and policy makers to support the design of each Call for Proposals. We will also work with these key stakeholders on an ongoing basis to help ensure policy and regulation are enablers of innovation and technology deployment, rather than barriers.

For example, in designing and implementing ERA's Industrial Efficiency Challenge, ERA worked closely with Energy Efficiency Alberta, Environment and Parks, and Alberta Energy and other departments and agencies to develop a comprehensive suite of programming to reduce GHG's and improve competitiveness of Alberta's industry through industrial efficiency opportunities. This approach will serve as a model to ERA going forward, as we continue engaging with these and other departments and agencies to ensure we are developing complementary and aligned programs and funding opportunities.

For a new technology to successfully advance to commercialization, the right market, policy and regulatory conditions need to exist.







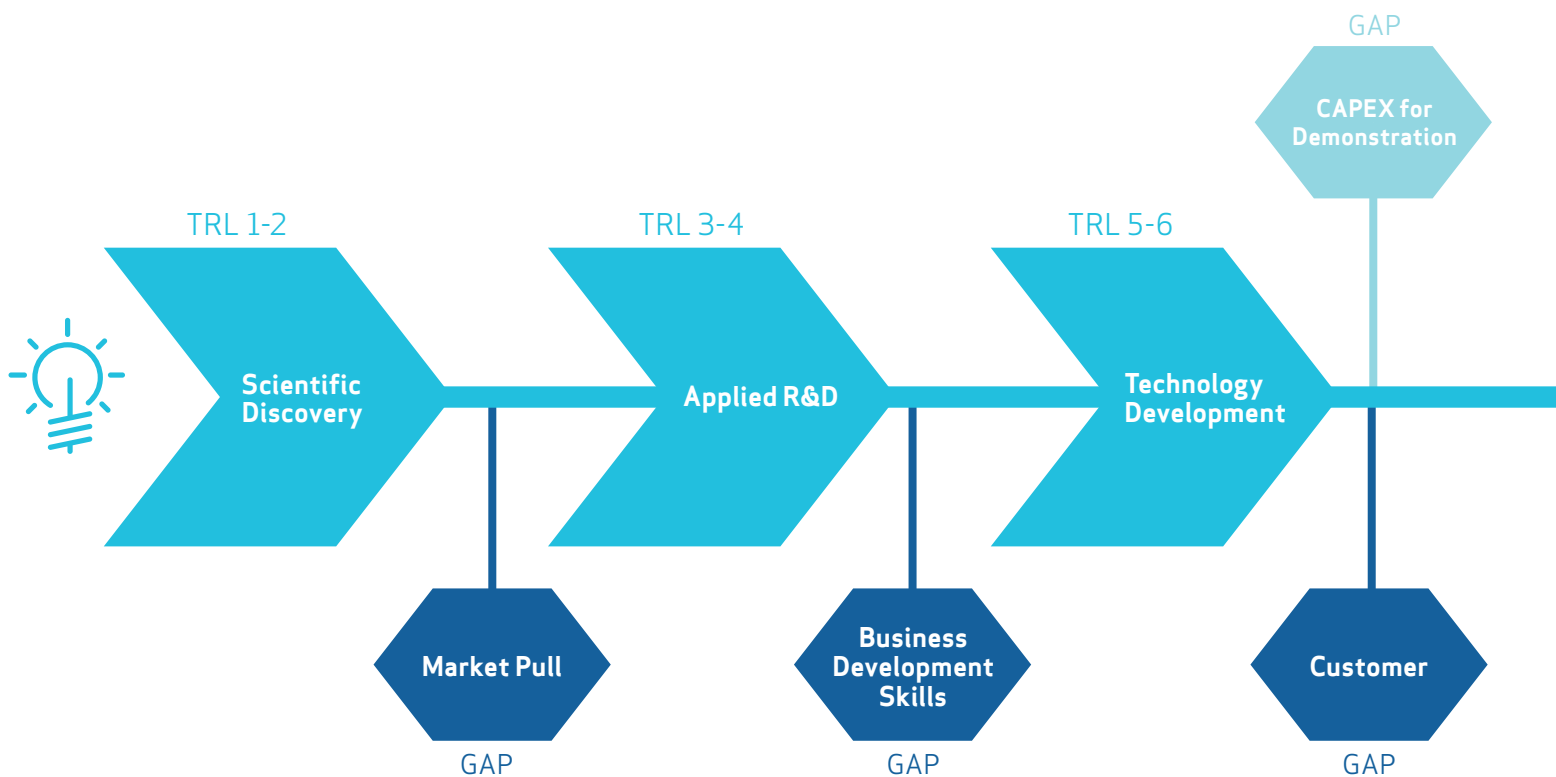


## STRATEGIC PRIORITY 2

### 3.2.2 Manage a portfolio that reflects both “policy push” from government and “market pull” from industry.

For new technology to become commercialized, it must provide a solution that aligns with a market opportunity. To ensure we are funding technologies that will be taken up by the market, ERA invests in solutions that tackle the problems Alberta must solve today, while also seeking out transformative technologies to grow and diversify our economy and address Alberta’s largest GHG sources over the longer-term.

ERA’s funding opportunities are always informed by multi-stakeholder workshops and engagements that bring together government, industry, technology developers, academia, and others to discuss Alberta’s opportunities and challenges. Bringing together the best and brightest to understand the needs of industry and formulate funding opportunities that address both government and market needs is an effective model that ERA will continue to employ.

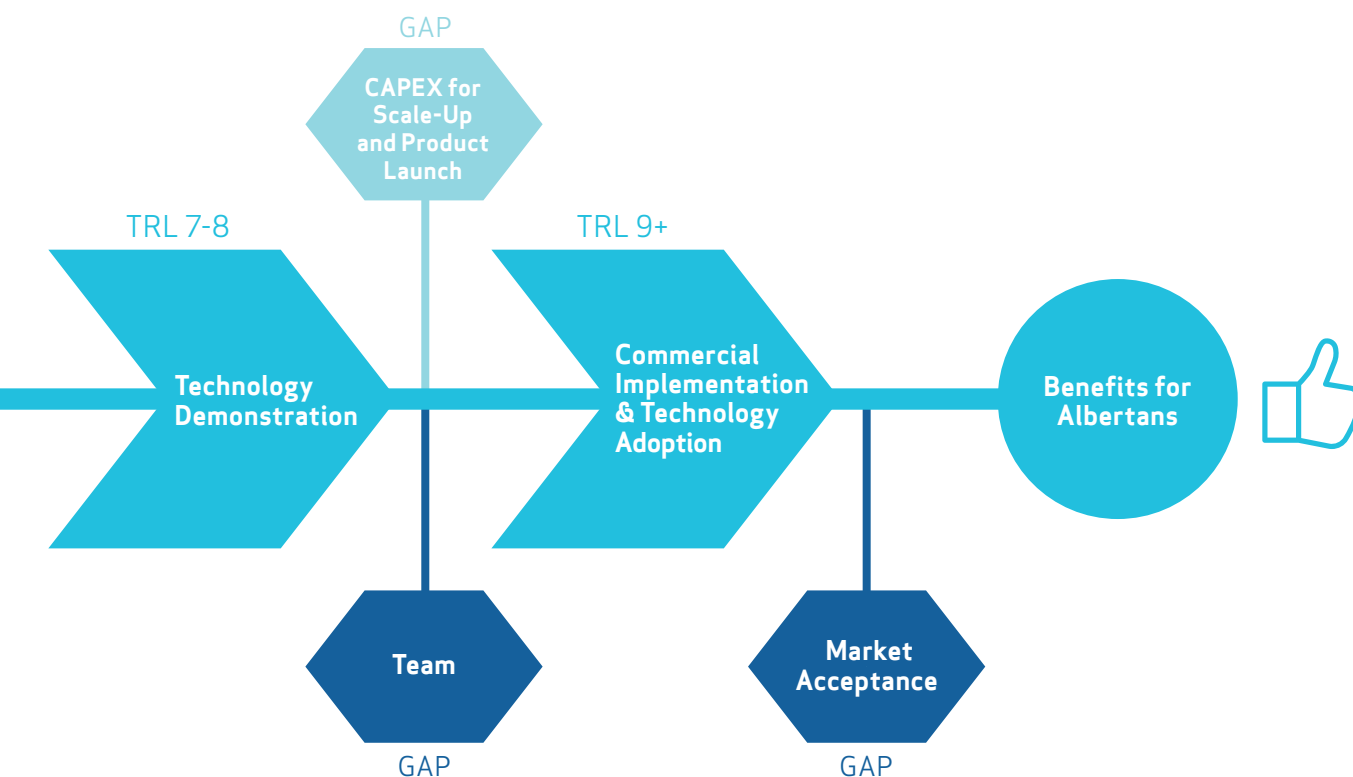




### 3.2.3 Be a convener of resources and facilitate strategic partnerships that help address barriers to commercialization through initiatives like our Innovator Support Pilot.

Beyond funding, innovators face additional challenges that hinder technology advancement and adoption by industry. Public funding is often not enough to accelerate these new technologies through to commercialization. Addressing these gaps requires an all-hands-on-deck approach, with government and industry sitting at the same table. ERA works with government and industry to help address these gaps and accelerate new technologies through to commercialization.

To support economic diversification, job creation, education, training and climate change action, ERA will work in close alignment with the evolving Alberta innovation system. In addition to funding, we will do our part to convene the resources required for success, including informing the suite of policy, regulatory, program and business innovation tools required to address system gaps and deploy new technologies. By helping to put these conditions for success in place, we will make it clear to investors and inventors and all the players in between, that Alberta is a place to commercialize clean technology solutions.



## STRATEGIC PRIORITY 2

### Building Collaborative Partnerships

Partnerships are central to our success, and are critical to delivering on our commitment to drive commercialization, helping us to convene the right resources and bridge the gaps on technological, business development, financial resources and capacity challenges.

Partnerships enable us to:

- ▶ Align around outcomes, challenges and directed innovation opportunities, so we can limit duplication in the innovation system
- ▶ Develop funding calls that will provide the greatest benefits for our province leverage funds
- ▶ Share risk
- ▶ Accelerate technology development.

Our ongoing relationship with Alberta Innovates is critical to achieving our strategic and operational goals. More importantly, the partnership provides the innovators and technologies we fund with a simplified means for accessing our resources and supports.

We have learned a great deal through collaboration, and partnerships will continue to play an important role as we fulfill our mandate. In 2019/2022, we will seek to strengthen existing partnerships with organizations like SDTC and Canada's Oil Sands Innovation Alliance (COSIA), as well as look to develop new collaborative relationships with academic and research institutions, accelerators and incubators like Creative Destruction Labs (CDL) and Foresight, and organizations such as ATB and Export Development Canada, who are exploring opportunities for clean technology investment and green financing.

The innovation system in Canada and Alberta is complex, yet rich in resources and capacity.

## Supporting Innovators on the Path to Commercialization

The innovation system in Canada and Alberta is complex, yet rich in resources and capacity. ERA is uniquely positioned to leverage and convene capacity in the system to foster the commercialization of innovative technologies, over and above the funding and technical expertise we bring to the table.

When projects are selected and contracted for funding, ERA assigns a project advisor to help steward the project in accordance with its funding agreement. Furthermore, ERA has worked with select funded or contracted projects to address business, financial or commercial readiness challenges.

ERA also incorporates commercial potential criteria for each project into funding applications and contribution agreements. To enhance this perspective, ERA works jointly with Calgary Technologies Inc. and TEC Edmonton (CTI.TEC) who participate in the upfront project review process and jointly support ERA proponents alongside Alberta Innovates.

Based upon the success of these efforts, ERA sees an opportunity to explore additional proponent support for the benefit of unfunded projects or technologies. ERA is piloting a structured process for providing support capacity to assist promising projects and technologies.

### Introducing the Innovator Support Pilot

Through our Call for Proposals process, ERA often identifies projects or technologies that show promise but are not ready for funding due to specific challenges.

The Innovator Support Pilot (ISP) will test a mechanism to support ERA applicants who have promising technologies but need to improve aspects of their business model, team, or financing before they are ready to receive ERA funding. The ISP will leverage the knowledge of existing entities and experts in the innovation ecosystem, with ERA providing a triage and connecting function.

ERA has brought together a team of business development and commercialization experts who will work with a small cohort of ISP participants. The expert team will support ERA in identifying critical challenges to development and commercialization of promising technologies, in convening the right resources to address these challenges, and ultimately aims to help prepare a project that can qualify for ERA funding. This pilot will test a mechanism that we believe will lead to more successful funded projects, and fewer stranded grants strengthening Alberta's economic competitiveness with stronger companies and more innovative "made in Alberta" products and processes.



## STRATEGIC PRIORITY 3

# 3.3 Maximize Impact

**Maximize our impact through leveraged funding, communications and operational excellence.**

### WHAT WE PLAN TO DO

- 3.3.1 Share successes and learnings from funded projects through ERA's communication channels, including annual and quarterly reporting, media outreach, and strategic events.
- 3.3.2 Maximize and leverage shared investment capacity and expertise.
- 3.3.3 Build a stronger performance management approach that allows ERA to measure how we are performing against our deliverables and continuously improve.

### WHAT WE SEEK TO ACCOMPLISH

- ▶ Leveraged investments to create larger pools of capital for innovation and technology than would otherwise be available.
- ▶ Increased operational effectiveness and efficiency in ERA's decision making cycle.
- ▶ Demonstrated progress on our Strategic Priorities and how we are contributing to broader provincial priorities such as emissions reductions and economic growth.

# Where we plan to have an impact

- ▶ Increased awareness in ERA's ability to support Alberta's action on climate change.
- ▶ Demonstrated innovation and clean technology leadership and partnership through active leverage of collaboration and funding.
- ▶ More efficient and effective use of public funds to help maintain competitiveness and stimulate GHG emission-reducing technology deployment.

# What we plan to measure



STAKEHOLDER AWARENESS AND COLLABORATIVE PARTNERSHIPS



OPERATING COSTS AS A PERCENTAGE OF APPROVED PROJECT COMMITMENTS



LENGTH OF ERA INTAKE AND DECISION MAKING CYCLE



LEVERAGED INVESTMENT



## STRATEGIC PRIORITY 3

### 3.3.1 Share successes and learnings from funded projects through ERA's communication channels, including annual and quarterly reporting, media outreach, and strategic events.

ERA is committed to investing public funds wisely and responsibly, and to communicating our successes and lessons learned for the benefit of Alberta's innovation system, environment and economy.

We publish final reports for projects, share successes through our annual reports and provide shorter project summaries on our website. ERA is constantly refreshing its communication strategy with a focus to better understand the lessons learned and develop a stronger content strategy to share these learnings with those who may be able to innovate faster as a result of this knowledge translation.

ERA launched its Lessons Learned Event series in 2018, and in 2019/2022, plans to further elevate learnings by continuing this series, sharing quarterly Stewardship Reports that put more profile on projects, introducing podcasts, and adding new content to our website.



Igniting ideas to combat climate change  
and energize the economy

**October 28-30, 2019**

Edmonton Convention Centre, Edmonton, AB





## STRATEGIC PRIORITY 3

### Communicating Success

In 2018, ERA's communications approach was driven by six key insights uncovered in our 2017 stakeholder research:

- 1. Increase visibility** on a national and global level of ERA as a leader in the demonstration and deployment of technologies that reduce GHG emissions.
- 2. Increased collaboration** with funders and like organizations nationally and internationally—more leveraging of funding and partnering where goals are aligned.
- 3. Grow continuous intake** as well as Call for Proposals on a specific theme.
- 4. Continue to engage with allies** and ensure they are aware of the successes of ERA, so that they can spread the word about ERA as well.
- 5. Increase transparency** at the adjudication stage—share more information about how proposals are adjudicated and provide more feedback for unsuccessful proposals.
- 6. Ensure the findings of funded research are utilized.** If they are successful, aid them in finding partners to move the project through to commercialization; if they are unsuccessful, ensure the findings can be used to benefit future research.

A robust communications strategy is critical to successfully delivering on our mandate and on the government's desired outcomes. Our communications activities allow us to raise ERA's profile to secure the highest quality EOI submissions, ensuring the projects we select for funding are among the best-of-the-best.

Effective communications help us make certain our trusted partners and key stakeholders understand our processes, and benefit from lessons learned as a result of our projects. This also helps us develop and retain strong advocates in the system who recommend ERA as a partner to advance technologies to reduce GHGs and improve Alberta's competitiveness.

In 2019/2022, we will continue to raise the profile of our mandate and make certain our unique value proposition is clear to our stakeholders and customers—the innovators in the ecosystem who need access to funding and business supports. We will do this by putting a greater focus on our content strategy, which will include a renewed commitment to storytelling through our website, social media channels, annual report, strategic events and the launch of a podcast series.

In late 2019, we intend to update our stakeholder research to identify the effectiveness of our 2017/2018 communications strategy and gain insight that will further inform our 2019/2022 approach.



### 3.3.2 Maximize and leverage shared investment capacity and expertise.

The government plays a key role in developing and commercializing clean technologies and innovation through investments. Leveraged investment refers to additional funding from other sources and partners for every dollar invested. ERA project funding is leveraged, and we require that every ERA dollar invested is at least matched by private resources. In practice, we find on average that for every dollar we invest in a project, more than another \$6.40 are also invested by industry, innovators and other project funders.

Actively seeking out funding partners who desire similar outcomes as ERA can help maximize the value of our investments, allowing for significant and sustained resources to support advancement and commercialization of innovation and clean technology. This leverage is particularly important in the Alberta context where advancing, scaling and commercializing novel energy technologies can cost hundreds of millions of dollars.

Recent Federal Budgets have included numerous funding programs to support clean technology, including the NRCan Clean Growth in Natural Resources Program, SDTC's SD Tech Fund, and Environment and Climate Change Canada's (ECCC) Low Carbon Economy Leadership Fund (LCELF).

Private funders can also provide investment leverage, including:

- ▶ Evok Innovations, a cleantech fund that accelerates the development and commercialization of solutions to the environmental and economic challenges facing the oil and gas sector
- ▶ The Natural Gas Innovation Fund, created was created by the Canadian Gas Association to support research, demonstration and deployment of innovation in the natural gas value chain.

ERA is actively leveraging its investment through co-funding of projects with trusted partner organizations under our partnership intake process.

We will continue to seek out opportunities to maximize value by partnering and leveraging our investments with federal funding programs and other organizations investing in climate innovation. And as always, we will have an ongoing commitment to efficient and effective operations.

### Leveraging investments through collaboration

ERA has established collaborative relationships under our Partnership Intake Program with both NRCan and SDTC. These relationships have allowed us to identify promising technologies to cofund with these and other programs. We also leveraged investment from the LCELF for our Industrial Efficiency Challenge.



## STRATEGIC PRIORITY 3

### Ongoing Operational Improvements

ERA has a responsibility to ongoing operational improvements, including discretionary and operational expenditures. While ERA's operating budget has always been lean, we have consistently sought opportunities to reduce the overall operating budget for the organization.

Our 2018/19 operating budget showed a reduction of close to 20 per cent from the approved 2017/18 budget. While actual 2017/18 operating expenses were well below the approved budget, this was largely due to the deferral of call activity into the current year for the Industrial Efficiency Challenge. It is expected that ERA operating costs for 2018/19 will be in line with the budgeted \$5 million.

Since establishment in 2009, ERA's business needs have been carried out by a network of outstanding service providers and delivery partners contracted to carry out specific functions. In 2018, our operating costs represented just two percent of the total funds we invest, including payments to our service providers and contracted delivery partners.

However, every good business delivery model requires review and assessment to ensure it is providing the best possible value. During 2018, ERA completed a request for proposal for one of its key service providers and will continue to systematically review the core services to ensure we are receiving the best value for money.

For the development of our 2019/20 budget, service providers were advised not to increase per unit service provider rates, and further suggestions for operational cost savings have been encouraged. Any discretionary spending continues to be restrained.

ERA's rigorous and transparent funding process has a strong track record for identifying projects and technologies with high potential to decrease Alberta's GHG emissions and improve economic outcomes.

ERA continuously reviews and evaluates our intake process to seek opportunities to make the decision-making cycle more efficient, without sacrificing rigour or credibility. Our Partnership Intake Program also provides opportunities to improve the efficiency of our intake process.

ERA's rigorous and transparent funding process has a strong track record for identifying projects and technologies with high potential to decrease Alberta's GHG emissions and improve economic outcomes.

### 3.3.3 Build a stronger performance management approach that allows ERA to measure how we are performing against our deliverables and continuously improve.

Performance management is critical to demonstrating that ERA is delivering on its mandate, and living its core values.

ERA is a well established delivery agent of Alberta's climate change and economic policy, and our efforts are aligned with defined provincial, national and international metrics. Our Business Plan and Annual Report are key tools for ERA to communicate how we are delivering on our commitments. Additionally, ERA produces a quarterly Stewardship Report, which provides more frequent updates on our current portfolio, investments and performance.

To demonstrate and communicate how we are delivering results, ERA is committed to establishing and reporting on portfolio-based performance outcomes and measures. These include:

- ▶ Investment by strategic area
- ▶ Project value by strategic area
- ▶ Cumulative project emission reductions
- ▶ Economic impact

Tracking and reporting these metrics on a cumulative and annualized basis demonstrates a commitment to project investments that ERA makes and leads to new opportunities that further capitalize on our available data.

While reduced GHG emissions are at the core of both ERA's mandate and Alberta's climate and innovation policies, they are not the only success metric. ERA's vision and Alberta's policy outcomes are aligned in striving to deliver a sustainable, diversified economy. That is why ERA is looking to incorporate more metrics around technology deployment and adoption and prompting stakeholders to envision scenarios where funded innovative technology is broadly commercialized.

ERA is working to establish goals and metrics that also quantify our expected contributions to Alberta's desired economic and societal outcomes, including economic competitiveness, investment attraction and employment.



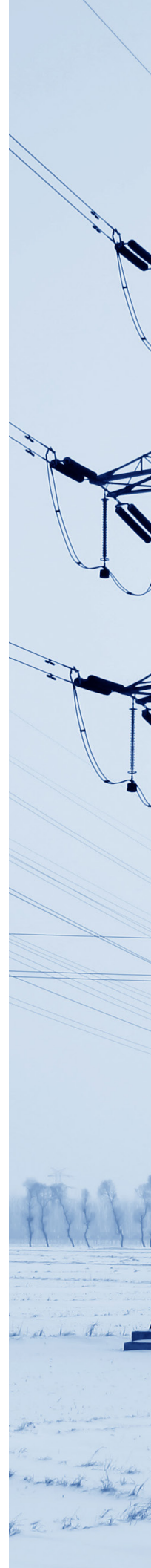
## STRATEGIC PRIORITY 3

### Measuring GHG Reductions

ERA currently quantifies and reports projected GHG emissions reductions that will be delivered by our projects. In 2018, we worked with Alberta Economic Development and Trade and Alberta Innovates to share ERA's methodology for estimating GHG reductions from investment in innovation and technology so it can be adopted for measuring performance of programs under the CCITF.

ERA calculates two different but related emissions reductions projections for projects in our investment portfolio. The first is the total of the GHG emissions reductions anticipated from each project directly. This value is provided by our project proponents and reviewed by ERA to ensure the basis and methodology for the estimate is sound.

The second metric is the market potential for GHG reductions. Market potential estimates the total emission reductions expected to occur should the technology be commercialized and adopted under forecast market conditions. A number of considerations and assumptions underpin this calculation, including policies and measures currently in place and arising from the successful commercial adoption of technologies into Alberta, GHG emissions intensity, the estimated market size, various economic indicators and the lifespan of the technology.







# 4.0 OPERATING BUDGET

2019/20 to 2021/22

|   | 2018/19<br>Budget<br>\$ | 2018/19<br>Forecast Actual<br>\$ | 2019/20<br>Budget<br>\$ | 2020/21<br>Budget<br>\$ | 2021/22<br>Budget<br>\$ |     |
|---|-------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|-----|
| <b>Revenue</b>  |                         |                                  |                         |                         |                         |     |
| Grant revenue   | 20,000,000              | 20,000,000                       | 90,000,000              | 100,000,000             | 108,000,000             | (a) |
| Interest income   | 6,969,167               | 8,638,252                        | 8,447,599               | 6,864,887               | 5,719,574               | (b) |
| <b>Total Revenue</b>  | <b>26,969,167</b>       | <b>28,638,252</b>                | <b>98,447,599</b>       | <b>106,864,887</b>      | <b>113,719,574</b>      |     |
| <b>Program Expenditures</b>   | <b>103,953,053</b>      | <b>47,893,906</b>                | <b>130,075,808</b>      | <b>157,630,935</b>      | <b>128,730,850</b>      | (c) |
| <b>Revenue less Program Expenditures</b>  | <b>(76,983,886)</b>     | <b>(19,255,654)</b>              | <b>(31,628,209)</b>     | <b>(50,766,049)</b>     | <b>(15,011,276)</b>     |     |
| <b>Operating Expenses</b>   |                         |                                  |                         |                         |                         |     |
| <b>General &amp; Administrative Expenses</b>  |                         |                                  |                         |                         |                         |     |
| Corporate costs   | 165,000                 | 200,000                          | 200,000                 | 204,000                 | 208,080                 |     |
| Insurance   | 11,000                  | 11,000                           | 11,220                  | 11,445                  | 11,674                  |     |
| GST expense   | 125,000                 | 125,000                          | 137,000                 | 138,000                 | 141,000                 |     |
| <b>Total General &amp; Admin Expenses</b>   | <b>301,000</b>          | <b>336,000</b>                   | <b>348,220</b>          | <b>353,445</b>          | <b>360,754</b>          | (d) |
| <b>Contractor / Service Provider Expenses</b>   |                         |                                  |                         |                         |                         |     |
| Administration, financial risk reviews, GhG reviews, project monitoring and internal project audits | 1,353,094               | 1,096,825                        | 1,163,059               | 1,186,320               | 1,210,048               | (e) |
| Project review, evaluation and management   | 763,597                 | 785,231                          | 835,960                 | 852,679                 | 869,733                 | (f) |
| Legal   | 370,000                 | 370,000                          | 351,500                 | 358,530                 | 365,701                 | (g) |
| Operations  | 675,000                 | 965,096                          | 977,096                 | 996,638                 | 1,016,571               | (h) |
| Communications  | 900,000                 | 900,000                          | 1,000,000               | 1,020,000               | 1,040,400               | (i) |
| Commercialization Support   | 209,373                 | 155,775                          | 179,098                 | 182,679                 | 186,333                 | (j) |
| <b>Total Mgmt Support Contractors</b>   | <b>4,271,064</b>        | <b>4,272,927</b>                 | <b>4,506,713</b>        | <b>4,596,847</b>        | <b>4,688,785</b>        |     |
| <b>Other Contracted Services and Special Initiatives</b>  |                         |                                  |                         |                         |                         |     |
| Consulting contracted services  | 435,000                 | 235,000                          | 435,000                 | 443,700                 | 452,574                 | (k) |
| Spark Conference Costs  | 75,000                  | 125,000                          | 125,000                 | 127,500                 | 130,050                 | (l) |
| <b>Total Other Contracted Services and Special Initiatives</b>                                      | <b>510,000</b>          | <b>360,000</b>                   | <b>560,000</b>          | <b>571,200</b>          | <b>582,624</b>          |     |
| <b>Governance</b>   |                         |                                  |                         |                         |                         |     |
| Board remuneration and expense  | 75,000                  | 85,000                           | 85,000                  | 86,700                  | 88,434                  | (m) |
| Professional fees   | 45,000                  | 45,000                           | 45,900                  | 46,818                  | 47,754                  | (n) |
| <b>Total Governance</b>   | <b>120,000</b>          | <b>130,000</b>                   | <b>130,900</b>          | <b>133,518</b>          | <b>136,188</b>          |     |
| <b>Total Operating Expense</b>  | <b>5,202,064</b>        | <b>5,098,927</b>                 | <b>5,545,833</b>        | <b>5,655,010</b>        | <b>5,768,351</b>        |     |
| <b>Surplus / (Deficiency) of Funds for the year</b>   | <b>(82,185,950)</b>     | <b>(24,354,581)</b>              | <b>(37,174,041)</b>     | <b>(56,421,059)</b>     | <b>(20,779,627)</b>     |     |
| <b>Total Funds Under Management - beginning of year</b>   | <b>376,446,551</b>      | <b>376,446,551</b>               | <b>372,091,970</b>      | <b>344,917,929</b>      | <b>288,496,870</b>      | (o) |
| <b>Total Funds Under Management - end of year</b>   | <b>294,260,601</b>      | <b>372,091,970</b>               | <b>344,917,929</b>      | <b>288,496,870</b>      | <b>267,717,243</b>      |     |
| <b>Committed Funds for Approved Projects</b>  | <b>588,106,755</b>      | <b>580,766,138</b>               | <b>680,766,138</b>      | <b>780,766,138</b>      | <b>880,766,138</b>      | (p) |
| <b>Total Project Funds paid to date</b>   | <b>(318,486,197)</b>    | <b>(246,921,177)</b>             | <b>(376,996,985)</b>    | <b>(534,627,920)</b>    | <b>(663,358,770)</b>    |     |
| <b>Remaining Funds required to fulfill approved project commitments</b>                             | <b>269,620,558</b>      | <b>333,844,961</b>               | <b>303,769,153</b>      | <b>246,138,218</b>      | <b>217,407,368</b>      |     |
| <b>Uncommitted Funds</b>  | <b>24,640,043</b>       | <b>38,247,009</b>                | <b>41,148,776</b>       | <b>42,358,652</b>       | <b>50,309,875</b>       |     |
| <b>Operating costs as a % of Funds Required to Fulfill Approved Project Commitments</b>             | <b>2.7%</b>             | <b>1.5%</b>                      | <b>1.8%</b>             | <b>2.3%</b>             | <b>2.7%</b>             | (q) |

## Notes and assumptions

- (a) 'Grant Revenue' for all three years is forecast to be consistent with recent correspondence from the Government of Alberta with respect to allocations under the Climate Leadership Plan as well as assumptions made by ERA as outlined in the 2019/20 Business Plan. Confirmed allocations include \$80 million for the core grant funding anticipated to be distributed as follows: \$70 million in 2017/18 and \$10 million in 2018/19. In addition, \$35 million for Industrial Process Efficiency is anticipated to be distributed as follows: \$15 million in 2017/18, \$10 million in 2018/19 and \$10 million in 2019/20. Revenue for 2019/20 has been reduced by the \$10 million Grant allocation as this was recorded as revenue and an associated receivable in 2017/18. An additional \$44.5 million was received in 2017/18 for initiatives that will be funded by application-based programming for Industrial Process Efficiency for Large Final Emitters and community generation. \$5 million received in 2017/18 for methane reduction programming was reallocated to another delivery entity in 2018/19. In addition to this confirmed funding, \$100 million has been included as a placeholder for projected grant revenue in 2019/20, 2020/21 and 2021/22, however no commitments have been made. A further \$8 million related to Low Carbon Economy Leadership Fund through the GOA's bilateral agreement has been included for reimbursement in 2021/22 as confirmed by the GOA. This estimate is based on the desired outcomes described in the 2019/20 Business plan. It should be noted that ERA can easily adapt its budget to any Grant amount received.
- (b) Interest income has been based on cash flow projections for the Corporation. Interest rate assumptions are based on interest rates currently being earned by the Corporation at 2.15% for balances up to \$100M, 2.25% for balances in excess of \$100M, 2.35% for balances in excess of \$150M and 2.45% for balances in excess of \$200M. The Operating Account rate is 2.15%. A further rate increase has been forecast for Q3 2019 to be consistent with the current CIBC interest rate forecast.
- (c) 'Program expenditures' have been budgeted based on signed contribution agreements or on a set of assumptions regarding approved and anticipated funding for projects.
- (d) 'General and Administration Expenses' are expected to increase to include the lease expense of the new office.
- (e) 'Administration, due diligence, project monitoring and internal project audits' costs have been budgeted including efficiencies and policy adjustments identified in the last two fiscal years along with an increase of expected call volume.
- (f) 'Project review, evaluation and management' costs are anticipated to increase due to increased number of EOI and FPPs anticipated for planned calls.
- (g) 'Legal' costs are anticipated to decrease by 5% in FY20 for efficiencies identified.
- (h) 'Operations' costs are expected to increase due to the addition of Ms. Stephens and Ms. Tarasco, as well as increased rates in amended contracts. The FY20 budget is consistent with the actual FY19 forecast spend.
- (i) 'Communications' costs have been contemplated in conjunction with the ERA Communications Plan for FY20 and are expected to remain stable.
- (j) 'Commercialization Support' costs have been budgeted to increase modestly for services contemplated with existing proponents.
- (k) 'Consulting Contracted Services' include research consulting costs to support the RFP process, research initiatives and collaboration projects. FY20 budget will be consistent with prior year budgets, however spend will be monitored in conjunction with the overall operating budget.
- (l) 'Spark Conference' will be held November 2019. ERA's net investment is budgeted to be approximately \$250,000.
- (m) 'Board remuneration and expense' budget remains consistent with the current year forecast.
- (n) 'Professional fees' comprise audit fees and remain consistent with the current year forecast.
- (o) Based on Cash flow model for the month ended December 31, 2018. Represents ERA's total funds under management.
- (p) Based on actual funding approved for remaining active projects approved calls and assumptions for future calls. Future approved rounds are based on estimates. Funds are shown as committed once the EOI cycle has started for a particular Call.

|  | \$                 |   |
|--|--------------------|---|
| Round 1  | 54,443,172         |   |
| Round 2  | 24,047,999         |   |
| Round 3  | 10,000,000         |   |
| Round 4  | 36,023,000         |   |
| Round 5  | 4,093,569          |   |
| Round 6  | 6,525,147          |   |
| Round 7  | 25,375,135         |   |
| Adaptation   | 6,990,662          |   |
| Biological   | 4,051,062          |   |
| Grand Challenge  | 33,518,740         | Note: Includes \$10 million for Round 3                         |
| Round 8  | 9,161,141          |   |
| Round 9  | 7,759,675          |   |
| Round 10 and Accelerator                                       | 55,943,568         |   |
| Round 12 -SDTC Joint Call                                      | 12,181,402         |   |
| Call 1 - Methane Reduction Challenge                           | 30,555,296         |   |
| Call 2 - Oil Sands Innovation Challenge                        | 60,600,000         | Board approval scheduled for February 2018                      |
| Call 3 - Industrial Efficiency Challenge                       | 70,190,650         | Board approval scheduled for September 2018                     |
| Partnership Intake   | 21,625,087         |   |
|  | <b>473,085,305</b> |   |
|  | \$                 |   |
| Future Rounds  |                    |   |
| Call 4 - BEST Challenge  | 94,629,858         | Board approval scheduled for February 2019                      |
| 2018/19 Partnership Intake and Unallocated Special Initiatives | 13,050,975         | Approval scheduled for fiscal 2019                              |
| Call 5 & 2019/20 Partnership Intake                            | 100,000,000        | Note: Includes forecast for funding calls and continuous intake |
| Call 6 & 2020/21 Partnership Intake                            | 100,000,000        | Note: Includes forecast for funding calls and continuous intake |
| Call 7 & 2021/22 Partnership Intake                            | 100,000,000        | Note: Includes forecast for funding calls and continuous intake |

- (q) This metric represents total ERA Operating costs for the year as a percentage of the funds required to fulfill all remaining project commitments approved by the ERA Board of Directors. The relative percentage increases over the three year budget as the funds required to fulfill remaining commitments reduces as project payments are made in accordance with the project plans.



