



Blindman Brewing is adopting a CO<sub>2</sub> capture and reuse technology in its fermentation process to reduce GHG emissions.

## BLINDMAN BREWING adopts carbon capture and reuse technology

The next time you enjoy a refreshing beer from Blindman Brewing, chances are you will be consuming CO<sub>2</sub> that was captured during the fermentation process, filtered, and reused to bottle it.

Located in Lacombe, AB, Blindman Brewing recently partnered with Earthly Labs to adopt its CO<sub>2</sub> capture and reuse technology for its brewing process in collaboration with Olds College and the Alberta Machine Intelligence Institute. ERA committed \$100,000 to the project through its Food, Farming, and Forestry Challenge to help the brewery invest in the new technology, a project valued at \$200,000.

Blindman Brewing is the first brewery in Canada to adopt the innovative technology, which is forecasted to reduce more than 1000 tonnes of greenhouse gas (GHG) emissions per year by 2025. Successful demonstration could unlock opportunities across a large craft-brew market; there are currently about 130 breweries in Alberta that could adopt this technology at a similar scale.

"Breweries are perfect candidates for CO<sub>2</sub> capture and reuse because we produce CO<sub>2</sub> during the fermentation process and we use it to carbonate beer, so this allows us to create a closed loop that reduces our GHG emissions, while also generating a fairly substantial financial return," said Kirk Zembal, co-founder of Blindman Brewing.

During the fermentation process sugars that are extracted from malted barley are eaten by yeast, which in turn produces ethanol and CO<sub>2</sub>. During this process, the CO<sub>2</sub> that is generated is almost entirely free from oxygen and nitrogen and sent to a foam trap where most of the liquid is removed.

An onboard sensor monitors the incoming gas stream to determine the concentration of CO<sub>2</sub> and O<sub>2</sub>. Once the concentration of O<sub>2</sub> drops below 0.1 per cent, the gas is filtered to remove any impurities and compressed for storage in dewar tanks. It can then be re-used in several processes, such as carbonation, packaging, and purging tanks.

The new technology will save the brewery approximately \$60,000 annually in CO<sub>2</sub> costs.

"If we can utilize the technology to both reduce our CO<sub>2</sub> emissions and cut our operating costs it's a win-win," said Zembal, adding the technology is already in operation in breweries in Texas and Colorado.

"Anytime you're the first to do something in the country it's a gamble, but with ERA's help we'll be able to de-risk this project, validate the technology, and hopefully get other breweries to take it on as well. That will lead to significant GHG reductions."



Planning is underway for over 25 potential projects related to the supply, delivery, and use of low-carbon hydrogen through the Edmonton Region Hydrogen HUB.

## ERA COMMITS \$450,000 to kick start Edmonton Region Hydrogen HUB

The Edmonton region took a giant step forward to become a global leader in clean energy thanks to over \$2 million in funding committed by three levels of government to create Canada's first hydrogen hub.

The Edmonton Region Hydrogen HUB was launched on April 14, 2021 by an alliance of government, Indigenous, academic, and economic development leaders. The initiative will kickstart the region's low carbon hydrogen economy and position Alberta and Canada for success as countries around the world announce strategies of how they'll use hydrogen to reach their energy and GHG reduction goals.

ERA committed \$450,000 towards the project, with another \$600,000 coming from Alberta's Industrial Heartland Association and \$1.2 million in funding from Western Economic Diversification Canada.

"Low emission hydrogen represents an enormous environmental and economic opportunity for Alberta, Canada, and the world. The Edmonton Region Hydrogen HUB is a key part of our integrated and aligned efforts to put in place all the conditions for success needed to realize hydrogen's true potential in Alberta," said Steve MacDonald, ERA CEO.

Planning is underway for over 25 potential projects related to the supply, delivery, and

use of low-carbon hydrogen. Potential projects include the use of hydrogen for municipal and commercial vehicle fleets and home and industrial heat and power, with more specific project details to come as they are available.

A report released by Alberta's Industrial Heartland Hydrogen Task Force outlined that Canadian hydrogen has a wholesale market potential of up to \$100 billion a year and identified the Edmonton region as the best launch point for a pan-Canadian hydrogen economy.

"Hydrogen has the potential to be not just a key part of the world's cleaner energy future, but the future of Alberta's dynamic energy industry. The launch of the Edmonton Region Hydrogen HUB is a critical step towards building that future by establishing the local connections which will pave the way for provincial, national, and international networks in the years to come," said Dale Nally, Associate Minister of Natural Gas and Electricity, Government of Alberta.

ERA has identified several areas to support the hydrogen economy in its Technology Roadmap, including decarbonizing blue hydrogen, generating low or no emitting electricity by using hydrogen from the oil and gas sector, improving fuel cell viability and integration, and finding alternative uses for hydrogen to create other value-added products. "The race is on," said Nally.

## COMMITTED TO ACTION

- ▶ ERA is a key partner in addressing Alberta's climate and economic priorities. We fund and de-risk late-stage technologies to reduce GHG emissions and help grow and create competitive industries in Alberta.

## CONVENING RESOURCES FOR COLLABORATION

- ▶ For more than 10 years, ERA has been investing revenues from the carbon price paid by Large Final Emitters (LFEs) to accelerate the development and adoption of innovative and clean technology solutions.
- ▶ We work with industry, government, and technology developers to make Alberta a hub for innovative ideas that reduce GHG emissions and improve economic competitiveness.
- ▶ 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.
- ▶ With our stakeholders, we developed a Technology Roadmap that guides investment decisions and informs our portfolio mix.

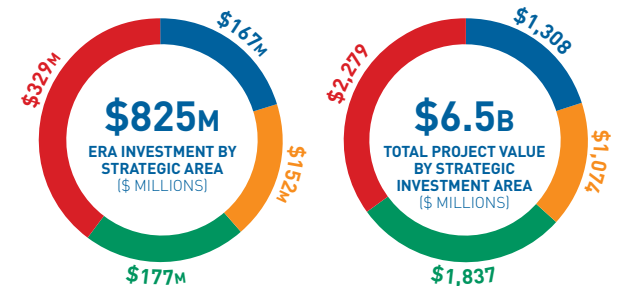
FUNDING OPPORTUNITY	WHAT'S IT ABOUT?	ERA FUNDING	HIGHLIGHTS
<b>GRAND CHALLENGE</b>	Technologies to transform CO <sub>2</sub> from waste to value-added	\$31M	2 projects awarded \$5M each in the final round
<b>METHANE CHALLENGE</b>	New methane detection and reduction technologies	\$26M	11 projects funded worth \$65M in total project value
<b>OIL SANDS INNOVATION</b>	Late-stage, GHG-reducing technologies to help Alberta's oil sands industry remain competitive	\$56M	8 projects funded worth \$475M in total project value
<b>INDUSTRIAL EFFICIENCY CHALLENGE</b>	Technologies to increase efficiencies for LFE industrial facilities	\$59M*	9 projects funded worth \$235M in total project value
<b>BEST CHALLENGE</b>	GHG-reducing technologies in biotechnology, electricity, and sustainable transportation	\$76M	13 projects funded worth \$283M in total project value
<b>NATURAL GAS CHALLENGE</b>	Unlocking innovation across Alberta's natural gas value chain	\$58M	20 projects funded worth \$156M in total project value
<b>FOOD, FARMING, AND FORESTRY CHALLENGE</b>	Accelerating innovation for sustainable growth	\$33M	17 projects funded worth \$107M in total project value
<b>SHOVEL-READY CHALLENGE</b>	Support for companies ready to implement leading-edge technologies in applications for both greenfield and brownfield operations	\$176M*	16 projects funded worth over \$2B in total project value
<b>PARTNERSHIP INTAKE PROGRAM</b>	Evaluating promising GHG-reducing projects referred to ERA by Trusted Partners	\$66M*	18 projects funded to date worth over \$1.3B in total project value
<b>ENERGY SAVINGS FOR BUSINESS</b>	Support for small- and medium-scale industrial and commercial businesses for cost-saving and emissions reducing projects	\$55M*	Applications open February 1, 2021; 49.3% of available incentives requested

\*This program is funded in part by the Government of Canada's Low Carbon Economy Leadership Fund.

## INVESTING IN A DIVERSE PORTFOLIO

### 220 Projects

- ▶ **Cleaner Oil & Gas** (77 Projects)
- ▶ **Low Emitting Electricity System** (28 Projects)
- ▶ **Food, Fibre, & Bioindustries\*** (59 Projects)
- ▶ **Low Carbon Industrial Processes & Products** (56 Projects)



\*In 2012, ERA provided funding for three adaptation projects in consultation with Alberta Environment and Parks.

## CUMULATIVE PROJECT EMISSION REDUCTIONS

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



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



Note: 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.

## LEVERAGING FUNDING AND CREATING JOBS

Technology is the engine of environmental and economic opportunity. For every ERA dollar we commit to advancing new technologies, over \$6 has been invested by funding partners.



\*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.