

CP LOOKS TO HYDROGEN TO LEAD DECARBONIZATION OF FREIGHT TRANSPORTATION

\$176 million announced for 16 shovel-ready projects worth \$2 billion

Decarbonizing transportation, Canada's second largest source of GHG emissions, requires transformational change in technologies and best practices. Hydrogen use is going to be critical to reducing emissions globally and meeting mid-century climate goals, especially in the freight industry.

Canadian Pacific (CP) is designing and building North America's first zero emission hydrogen-powered locomotives using fuel cells and batteries. While CP is starting with less than a handful of prototypes, the prospect for growth is huge; the Calgary-based company has 30,000 diesel-burning locomotives in its fleet.

To help grow CP's Hydrogen Locomotive Program, ERA committed \$15 million through its Shovel-Ready Challenge. This will enable CP to increase the number of locomotive retrofits in the project from one to three and add hydrogen production and fueling facilities. The project has the potential to reduce three kilotons of CO₂ emissions per year; significant reductions will come as more locomotives adopt the technology.

"We sincerely appreciate the Government of Alberta and ERA's belief in our work and our people. As a sustainably driven organization, we share their goal of reducing greenhouse gas emissions through advanced technology. CP will combine the grant with our own funds to expand our research and development of real-world hydrogen technology in Alberta," said Keith Creel, CP's President and Chief Executive Officer.

All-in-all, 16 shovel-ready projects will share \$176 million in provincial and federal funding through the Shovel-Ready Challenge to accelerate Alberta's economic recovery while supporting environmental sustainability. The projects represent a total investment of more than \$2 billion in public and private funding.

Projects were split amongst three categories: five from oil and gas, six representing low carbon energy, and five in bioindustry and waste-to-value



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.

add. They include strategically located energy storage that can eliminate emissions from oil sands tailings ponds, renewable energy initiatives in remote communities, diverting contaminated waste from landfills and transforming them into high-demand products, and more. Visit eralberta.ca for a full list of projects.

Premier of Alberta, Jason Kenney, and Jason Nixon, Alberta's Minister of Environment and Parks, announced the finalists of the Shovel-Ready Challenge with ERA CEO, Steve MacDonald, on Monday, November 1, 2021, at Capital Power's Genesee Generating Station.

"Alberta continues to show leadership by using technology in practical ways to reduce emissions and combat climate change. These investments will help us grow our economy and pave the

way to an even brighter future for all Albertans by building on Alberta's strong foundation as a responsible and innovative energy leader," said Jason Kenney, Premier of Alberta.

This is the largest funding announcement ever made through ERA. These technology innovations have the potential to deliver cumulative GHG reductions of 6.8 million tonnes of CO₂e by 2030—equal to eliminating emissions from the electricity used by 4.5 million homes—with an average annual emissions reduction of one million tonnes by 2030. It is anticipated these projects will also support approximately 5,600 new jobs.

In total, \$126 million of stimulus funding is being sourced from Alberta's industry-funded Technology Innovation and Emissions Reduction (TIER) fund. The remaining \$50 million will be

supported by the federal Low Carbon Economy Leadership Fund (LCELF).

"These investments are unlocking innovation and mobilizing private spending to create economic opportunities and improve environmental performance. They build on Alberta's strengths across industries and turn emission reduction ambitions into action," said Steve MacDonald, ERA CEO.

ERA's portfolio of projects is key to ensuring Alberta can achieve its economic and environmental objectives. Shovel-Ready was designed as an economic stimulus initiative in response to the impacts of COVID-19. This significant investment encourages immediate economic activity while also creating solutions for long-term recovery, investment attraction, growth, and environmental sustainability.

Shovel-Ready Challenge funding will help implement leading-edge technologies in applications for both greenfield and brownfield operations. Work is anticipated to commence within 60 days of funding approval and outcomes must include commercial demonstration or deployment of technologies in operational environments.

ERA received a total of 281 applications for its Shovel-Ready Challenge. Projects were selected through ERA's competitive review process. A team of experts in science, engineering, business development, commercialization, financing, and greenhouse gas quantification conducted an independent, rigorous, transparent review overseen by a Fairness Monitor.

All recipients are required to produce a final outcomes report that will be shared publicly for the broader benefit of Alberta.

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.

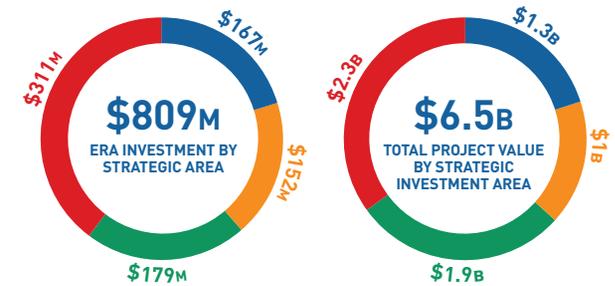
FUNDING OPPORTUNITY	WHAT'S IT ABOUT?	ERA FUNDING	HIGHLIGHTS
GRAND CHALLENGE	Technologies to transform CO ₂ from waste to value-added	\$30M	2 projects awarded \$5M each in the final round
METHANE CHALLENGE	New methane detection and reduction technologies	\$23M	11 projects funded worth \$60M in total project value
OIL SANDS INNOVATION	Late-stage, GHG-reducing technologies to help Alberta's oil sands industry remain competitive	\$45.6M	7 projects funded worth \$577M in total project value
INDUSTRIAL EFFICIENCY CHALLENGE	Technologies to increase efficiencies for LFE industrial facilities	\$59M*	9 projects funded worth \$235M in total project value
BEST CHALLENGE	GHG-reducing technologies in biotechnology, electricity, and sustainable transportation	\$76M	13 projects funded worth \$295M in total project value
NATURAL GAS CHALLENGE	Unlocking innovation across Alberta's natural gas value chain	\$58M	20 projects funded worth \$156M in total project value
FOOD, FARMING, AND FORESTRY CHALLENGE	Accelerating innovation for sustainable growth	\$33M	17 projects funded worth \$117M in total project value
SHOVEL-READY CHALLENGE	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
PARTNERSHIP INTAKE PROGRAM	Evaluating promising GHG-reducing projects referred to ERA by Trusted Partners	\$61M*	18 projects funded to date worth over \$1.2B in total project value
ENERGY SAVINGS FOR BUSINESS	Support for small- and medium-scale industrial and commercial businesses for cost-saving and emissions reducing projects	\$55M*	\$22.4 million in incentive obligations to date

*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** (73 Projects)
- ▶ **Low Emitting Electricity System** (28 Projects)
- ▶ **Food, Fibre, & Bioindustries*** (60 Projects)
- ▶ **Low Carbon Industrial Processes & Products** (59 Projects)



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

CUMULATIVE PROJECT EMISSION REDUCTIONS

6.1 Mt CO₂e Total by 2020



42 Mt CO₂e 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. These projections do not include the Energy Savings for Business program

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.