EMISSIONS REDUCTION ALBERTA

MEDIA RELEASE

1800, 10020 101A Avenue
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March 1, 2017

Emissions Reduction Alberta announces winning projects for Round Two of the ERA Grand Challenge: Innovative Carbon Uses

$12 million in funding to advance carbon conversion technologies

CALGARY — Emissions Reduction Alberta (ERA) announced four winning projects for the second round of the ERA Grand Challenge: Innovative Carbon Uses at the Propel Energy Tech Forum in Calgary.

The international competition seeks technologies to transform carbon dioxide from a waste material to an asset, while significantly reducing greenhouse gas emissions. Each Round Two project will receive up to $3 million to accelerate their technologies over the next two years. In 2019 one will be eligible for up to an additional $10 million in funding to help commercialize their technology in Alberta.

"Government investment in innovation is critical to accelerate the transformative technologies that Alberta, Canada and the world will need to reduce both GHG emissions and costs," said ERA CEO Steve MacDonald. "We searched the world for the best solutions for Alberta to move carbon dioxide from a waste stream to an asset, and in the process, we are attracting new companies and new ideas to the province."

Government provides grants to ERA to enable it to fulfil its mandate. Its funding comes from Alberta's large emitters who choose to pay into the Climate Change and Emissions Management Fund.

"Carbon reinvestments lead to innovation and jobs. That makes life better for Albertans and supports our industries. Emissions Reduction Alberta plays a crucial role in advancing innovation and technology in this province," said Alberta Minister of Environment and Parks and the Minister Responsible for the Climate Change Office, Shannon Phillips.

(MORE)

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The winning projects are:

- A sustainable method for cement production and CO_2 Utilization – from Solidia Technologies
- Carbon dioxide utilization in concrete – from CarbonCure Technologies
- A technology for conversion of carbon dioxide and saline waste water to oil and gas field chemicals and re-useable water – from Mangrove Water Technologies
- Field-deployment of a carbon dioxide transformation system powered by sunlight – from McGill University

All but one new entrant, CarbonCure Technologies, progressed from the first round of the international competition. In the first round, ERA selected 24 projects from 344 submissions from around the world. First round projects received up to $500,000 in funding to develop their technologies. Nineteen winners from Round One submitted applications to continue their project development in Round Two and 69 submissions were received from new applicants.

Submissions were subject to a due diligence process, and assessed by a team of external experts as well as an Executive Advisory Panel. Final funding decisions are made by the ERA Board of Directors.

-30-

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March 1, 2107

Solidia Technologies®

Project: Solidia Cement™ & Solidia Concrete™ - A Sustainable Method for Cement Production and CO_2 Utilization

Solidia Technologies® has progressed to the second round of the ERA Grand Challenge Innovative Carbon Uses from Round One. Their technologies reduce the carbon footprint of cement and concrete up to 70%.

First, their process results in lower GHG emissions during cement production, and second, their technology uses carbon dioxide emissions, that would normally be released, and permanently sequesters it during the curing process. As a further benefit, water consumption is reduced 60 – 80% in the manufacturing process.

In addition to its environmental benefits, the technology improves the workability, durability and aesthetics of the concrete products, and they reach full strength in 24 hours as compared to the 28 day-curing process required for traditional concrete.

Based in New Jersey, Solidia has paired with Lafarge, one of the major cement producers in Alberta, to pilot test their technology. They are currently in commercialization for precast products, such as pavers for landscape market.

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CarbonCure Technologies

Project: Carbon dioxide utilization in concrete

CarbonCure Technologies injects CO_2 into concrete to sequester the carbon and improve the concrete's performance. The retro-fit technology bolts on to existing concrete plants, and allows concrete producers to sequester carbon dioxide emissions directly into concrete, while also making the concrete stronger, and less expensive to manufacture.

CarbonCure has already started to commercially deploy the technology with leading concrete producers such as Alberta-based BURNCO Rock Products.

For the ERA Grand Challenge: Innovative Carbon Uses, they are working to maximize the overall GHG benefits and improve the economics associated with their technology to attract smaller concrete plants as customers.

During the project, multiple concrete plants across Alberta will be installed with the retro-fit technology to permanently sequester carbon dioxide emissions in concrete, making the concrete both stronger and greener.

Their technology draws on the existing concrete manufacturing process and allows concrete manufacturers to permanently sequester carbon dioxide emissions in concrete.

CarbonCure Technologies is the only new entrant for the ERA Grand Challenge:Innovative Carbon Uses. All other technologies that are progressing in Round Two also received funding through the first round of the competition.

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Mangrove Water Technologies

Project: Field demonstration of Mangrove Water Technologies waste-to-value innovation for conversion of carbon dioxide and desalination of wastewater in Alberta

Mangrove's innovation recovers extractable value for on-site utilization by converting carbon dioxide and saline wastewater produced during oil and gas operations to re-usable water and oil field chemicals.

The technology offers a "bolt-on" solution that would allow the oil and gas sector to reduce operational costs in addition to reducing their water consumption, wastewater generation and carbon footprint.

The core of the technology is a reactor which uses electricity to convert carbon dioxide and desalinate wastewater to produce value-added chemicals such as carbonate salts and hydrochloric acid.

For Round Two, Mangrove has partnered with NORAM Engineering and Constructors, Questor Technology Inc., and the Saskatchewan Research Council to demonstrate a field pilot of the technology coupled with a waste-gas to power system at a Questor site in Alberta.

Mangrove Water Technologies is a spin-off company from the Chemical Engineering Department at the University of British Columbia where the technology was developed in the Wilkinson Research Group during Round One of the ERA Grand Challenge.

In addition to ERA, the technology has been supported by funding through Western Economic Diversification, Natural Sciences and Engineering Research Council of Canada and the Pacific Institute for Climate Solutions.

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McGill University

Project: Field-Deployment of a Carbon Dioxide Transformation System Powered by Sunlight

The fourth project is from McGill University with its commercialization partner Lumenfab. The novel technology they are developing has the potential to create high quality fuels from CO_2 emissions and wastewater by using just solar power.

The team, which also includes representatives from the University of Alberta, McMaster University and Hydro Quebec, will build and field test a high efficiency scalable system that converts CO_2 emissions and wastewater into fuels, such as methanol. It will be field demonstrated in Alberta near the end of the project.

The approach further reduces GHG emissions by using low-cost silicon wafer solar cells as its energy source, while having the additional environmental benefit of drawing on wastewater from oil sands operations.

In addition, the fuels produced through the process can be used as 'green' feedstocks for petrochemical processes.

The initial target market for this technology is the oil sands operations in Alberta -- sources of both high-intensity CO_2 emissions as well as wastewater.

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