

Challenge: LCBA – TransAlta on Low-Cost Hydrogen Storage Solutions

Challenge Statement/Synopsis:

TransAlta is seeking low-cost hydrogen storage solutions that can be integrated into a distributed hydrogen production facility.

We are agnostic with respect to the type of hydrogen storage technology selected—whether as hydrogen in physical storage, as an intermediate chemical carrier such as methanol, or in a material storage like a hydride—provided the technology can be economically integrated into a distributed hydrogen production plant.

Context for the Challenge:

Net-zero electricity is at the heart of TransAlta’s strategic vision. Our growth plan for renewables is aggressive with a target to add 3 GW of new renewable capacity by 2025 while building a pipeline of future renewable capacity worth 5 GW from 2025 to 2030.

As the grid becomes more deeply penetrated with renewable energy (> 60% of generation), the intermittent nature of solar and wind resources will demand wholly new energy technologies be deployed to help firm the grid and compliment the intermittency of cheap wind and solar.

TransAlta’s Energy Innovation team has a mandate to identify the suite of new and innovative technologies that can be leveraged to firm the grid and deliver the elusive 24/7, affordable, safe, net-zero electron

Hydrogen fuel is increasingly discussed as one such technology that could both decarbonize electricity supply while also serving as a dispatchable energy resource to compliment renewable energy resources. To date, the major hurdle for wider adoption of hydrogen for use in thermal power plants is the high cost of transporting and storing low or zero emission hydrogen fuel.

Response Criteria:

- The storage technology must be cost competitive in deployments with storage volume of between 3-60 tons-equivalent of gaseous hydrogen fuel.¹
- If the storage technology selected has associated greenhouse gas emissions, then please outline the volume of emissions related to storage processes in kg CO₂e/kg-H₂

¹ Storage volume range is based on the volume of hydrogen fuel required to run a 10 MW fuel cell plant with a heat rate of 6469 btu/kWh over durations from 6 hours to 96 hours. See. EIA, *Capital Costs and Performance Characteristics for Utility Scale Power Generating Technologies, 2020*. https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2020.pdf



- TransAlta Corporation is looking for companies with solutions at a technology readiness level of 5 or greater. Especially novel concepts at a lower TRL will be considered. Please provide details of pilots and deployments to date.
- Candidates must describe indicative capital and operating costs for the storage related components of the plant. If possible, please include capacity-scaling factors for capital and operating costs of the technology selected.

The Opportunity:

As part of the LCBA Canada project you may have the opportunity to:

- Potentially pilot or deploy your technology with TransAlta if your solution is selected and deemed suitable.
- Innovative solutions with a path to commercial application may also gain exposure for their technology through introductions to TransAlta's network of energy customers and funding partners.

About TransAlta Corporation:

TransAlta owns, operates and develops a diverse fleet of electrical power generation assets in Canada, the United States and Australia with a focus on long-term shareholder value. TransAlta provides municipalities, medium and large industries, businesses and utility customers with clean, affordable, energy efficient and reliable power. Today, TransAlta is one of Canada's largest producers of wind power and Alberta's largest producer of hydro-electric power. For over 111 years, TransAlta has been a responsible operator and a proud member of the communities where we operate and where our employees work and live. TransAlta aligns its corporate goals with the UN Sustainable Development Goals and its climate change strategy with CDP (formerly Climate Disclosure Project) and the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. TransAlta has achieved a 61 per cent reduction in GHG emissions since 2015.