



Bécancour PEM Green Hydrogen Plant

Nomination for ACEC Award: Project Management category





Source Airliquide.com

Project name: **Bécancour PEM Green Hydrogen Plant**

Location of Project

Street Address: **5400 boul. Raoul Duchesne**

City: **Bécancour**

State/Province/Region: **Québec**

Country: **Canada**

Category: **G. Project Management**

Completed by: **Hatch**

Contacts Information:

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P.Eng: **Yes**

As part of its long-term commitment to the hydrogen energy markets, Air Liquide commissioned Hatch to provide project management support for the construction a 20-megawatt proton exchange membrane (PEM) electrolysis unit to produce low-carbon hydrogen. This project is the largest of its kind to produce green hydrogen (3,000 tonnes of output annually). Despite delays caused by the COVID-19 pandemic, the project was delivered ahead of schedule and under budget.

Project Highlights

Global trends for a low-emission environment require the search for alternative power sources such as green hydrogen. When industrial processes are combined with renewable energy sources in the generation of electricity for the electrolysis of water, green hydrogen is produced without carbon emissions.

As part of Air Liquide's mandate to increase green hydrogen production capacity, they constructed a 20-megawatt proton exchange membrane (PEM) hydrogen system at their Bécancour plant located in Québec, Canada.

In an official statement, Michael J. Graff, executive vice president & executive committee member of Air Liquide S.A. and chairman & CEO of American Air Liquide Holdings, Inc. said, *"This investment will help further contribute towards carbon-free hydrogen supply for Air Liquide industrial and mobility markets in North America and complement the recently announced hydrogen investment for the energy markets in the western U.S. Both are reflective of the Group's climate objectives to reduce the carbon intensity of its activities and work with customers towards a sustainable industry and the development of a low-carbon society."*

The project is the largest of its kind to produce green hydrogen, producing 3,000 tonnes of hydrogen output annually, and significantly reducing carbon dioxide emissions for the region by nearly 27,000 tonnes annually, the equivalent of more than 107 million kilometres driven by the average passenger car. Hatch provide project management support for the new facility's construction project, budget, and timeline.

This cutting-edge project includes the implementation of the first large-scale use of novel PEM technology. The new 20 MW PEM electrolyzer, equipped with Cummins technology, is the largest operating unit of its kind in the world and will help meet the growing demand for low-carbon hydrogen in North America. Bécancour's proximity to the main industrial markets in Canada and the United States will help ensure their supply of low-carbon hydrogen for industrial use and mobility. The commissioning of this electrolysis unit increases by 50 percent the capacity of Air Liquide's Bécancour hydrogen production complex.

Hatch provided civil, structural, and architectural engineering for the main process plant and other critical plant infrastructure components; heating, ventilation, and air conditioning engineering; construction management and site preparation; health and safety management; as well as project management and controls.



From Airliquide.com

Meeting Clients Needs

Hatch partnered with Air Liquide to execute the project. Under Air Liquide's supervision, Hatch provided civil, structural, architectural, heating, ventilation, air conditioning engineering and construction, health and safety management and cost control services for the installation of the PEM electrolyzer technology to form a 20 MW system. Air Liquide provided the process and balance of plant with other partners.

The schedule and budget had a major impact on the project's return on investment (ROI) and the internal rate of return (IRR). COVID-19 had jeopardized this when the site was required to close and construction stopped for multiple weeks (6). We suggested finalizing all engineering during this period and managed the delivery of major items on site in a safe and controlled environment. We also built a 'return to work' plan and proposed an acceleration scenario to compensate for the delays caused by the closure of the project for the first wave of COVID-19. The tight management of the re-opening of the site and the accelerated schedule has permitted us to **finish the construction two weeks earlier than planned and within budget with hundreds of thousands of dollars to spare.** This incredible effort permitted Air Liquide to finalize the start-up within acceptable standards and has generated optimal returns.

Environmental Benefits

The Bécancour facility, which is powered by 99 percent renewable, local hydroelectricity from Hydro-Québec, is now producing up to 8.2 tonnes of green hydrogen per day—close to 3,000 tonnes annually. That is enough to fuel over 2,000 cars, 16,000 forklifts, 275 buses, or 230 large trucks. This production capacity makes it possible to supply the Air Liquide's North American customers with decarbonized, high-purity hydrogen and help reduce their carbon footprint.

Compared to the traditional hydrogen production process, this new production unit will avoid the emission of around 27,000 tonnes of CO per year, which is equivalent to the emissions of 10,000 cars per year. The choice of Bécancour is based on two attributes of the site: the access to abundant renewable power from Hydro-Québec and the proximity to the hydrogen mobility market in the northeast of the continent.

“The fight against climate change is at the heart of the Air Liquide Group's strategy. The inauguration of the Bécancour site in Canada marks an important step in the implementation of this strategy. With this world's first, Air Liquide confirms its commitment to the production of low-carbon hydrogen on an industrial scale and its ability to effectively deploy the related technological solutions. Hydrogen will play a key role in the energy transition and the emergence of a low-carbon society.”

Susan Ellerbusch, CEO, Air Liquide North America
and Group Executive Committee Member

Innovation

With Hatch's extensive management services and support in the structural engineering of the plant complementing Air Liquide's deep process and technology knowledge, this cutting-edge project will implement the first large-scale use of novel PEM technology. The project consists of increasing the green-hydrogen production capacity at the plant by 50 percent, while simultaneously reducing carbon dioxide emissions for the region by nearly 27,000 tonnes per annum.

Social and/or Economic Benefits

The PEM electrolyzer in Bécancour would not have been possible without an exceptional mobilization of human resources. Through 40,000 hours of work on the build site and 20,000 hours of engineering, project management, safety inspection, and supervision, the project was made operational in under two years



