

+ Hydrogen

Capability statement

## Pioneering the application of green hydrogen; leading the way for alumina refineries

Hatch is supporting Rio Tinto's Yarwun Hydrogen Calcination Pilot Demonstration at their world-class alumina refinery in Queensland, Australia. This project will use electrolytic hydrogen to replace natural gas in their calcination process to produce alumina.

This commercial demonstration is a first-of-a-kind, and an example of integrating hydrogen into a brownfield site with minimal impact to the existing facility. This project is moving Rio Tinto toward their emission reduction goals and supporting decarbonization efforts for alumina refining.

We are completing the detailed design of the hydrogen storage and delivery system for this project.

# Putting hydrogen in its place

Collaborating with our clients in the metals, energy, and infrastructure sectors, and supporting their climate change strategies, enables us to view hydrogen through a comprehensive yet critical lens.

Hydrogen continues to have significant potential as a decarbonization tool for hard-to-abate industries – as a reductant in green steelmaking, as a replacement to natural gas in industrial processes, as a fuel for heavy-duty transport, and as a feedstock for synthetic fuels. With an emphasis on conventional hydrogen production with

carbon capture (blue hydrogen) or hydrogen production from electrolysis (green hydrogen), projects are moving in a positive direction regardless of pace – from concept to execution.

We help our clients navigate what climate change approach is most applicable as a decarbonization solution, and where hydrogen has a practical place. We then partner with our clients to implement solutions that lead to real progress.

We have the expertise to both help you generate hydrogen, as well as implement its use. The below key differentiators make us a valuable partner to deliver results.



**Execution experience.** It cannot be understated – from pilot-scale to grid-scale, we have a portfolio of built hydrogen projects. Our project implementation experience is drawn upon to deliver new, successful projects.



**Understanding your processes and operations.** Our experts in the mining and metals, energy, and infrastructure sectors have vast operational experience. Hydrogen is often part of the bigger picture, and all factors are considered when integrating new elements into established operations.



**Holistic approach.** Decarbonization is approached holistically, and in the best interest of the specific application. From carbon capture to direct electrification and energy efficiency, all paths to decarbonization are pursued. Our breadth and first-hand knowledge of the needs of the application allows us to tailor the best solution for your needs.



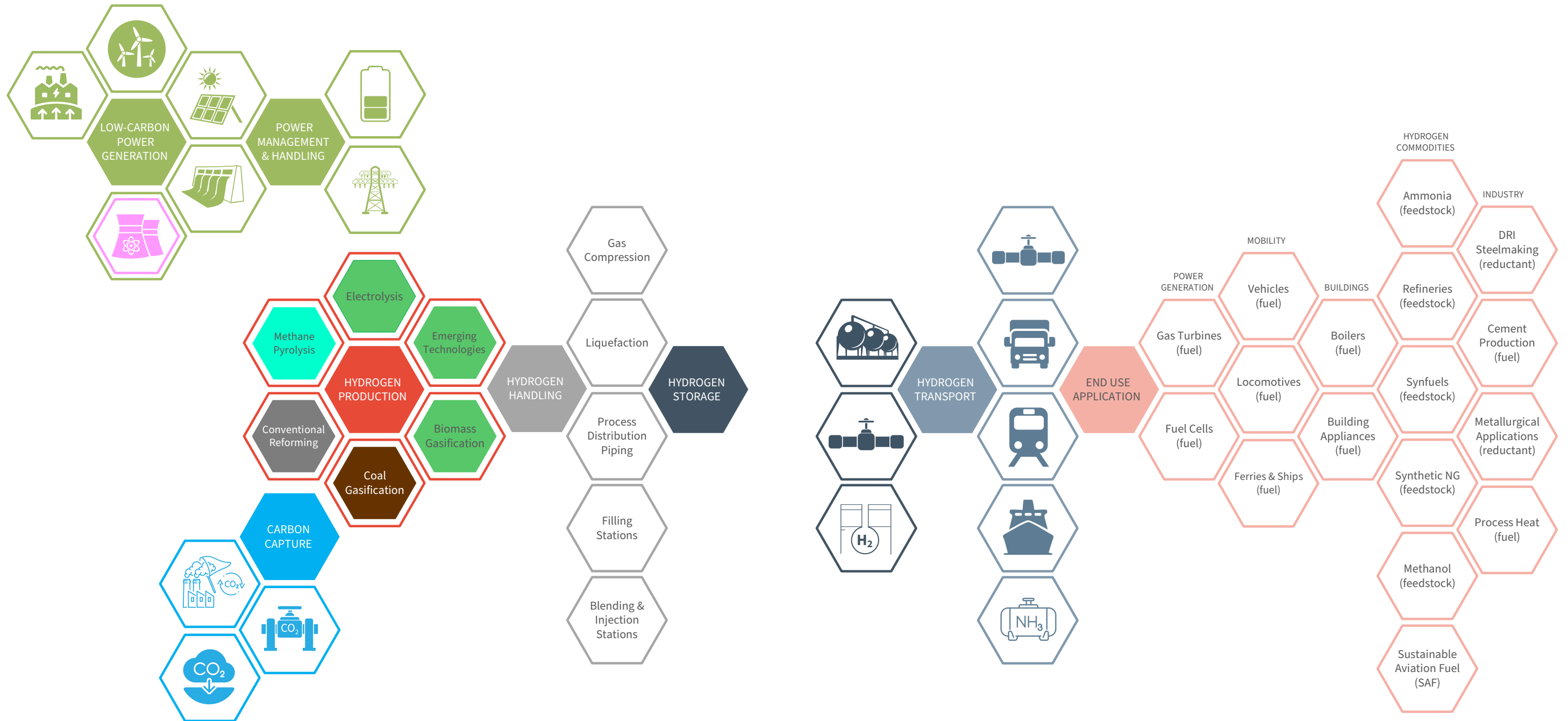
**Innovation at our core.** First-of-a-kind projects are given their best chance at success. We have a portfolio of over forty unique solutions, and over thirty active development projects, giving us a proven track record of successfully implementing new technologies around the globe.

Your successful implementation of hydrogen projects today will set the stage for decades to follow.

**We can help.**

# What we do

Hatch is a global engineering, project management and construction, and professional services firm that delivers projects across the entire hydrogen value chain. We integrate hydrogen systems into your sites and operations, from production to end use and balance of plant.



**Championing a lower carbon future**  
 More than engineers who create positive change, we provide sustainable solutions.



# Our services

We offer a comprehensive array of technical services in hydrogen, including engineering, advisory, project and construction management, and operational support.

## Project implementation

- Conceptual, feasibility studies, and front-end engineering design (e.g., FEL-1 to -3, Pre-FEED, FEED)
- Engineering, procurement, and construction management (e.g., FEL-4, EPCM)
- Project management and controls
- Safety assessments (e.g., hazard and operability studies [HAZOPs], consequence modeling, quantitative risk assessments [QRAs])
- Permitting and regulatory compliance

## Operational support

- Asset management
- Performance enhancement
- Digitization
- Continuous engineering support

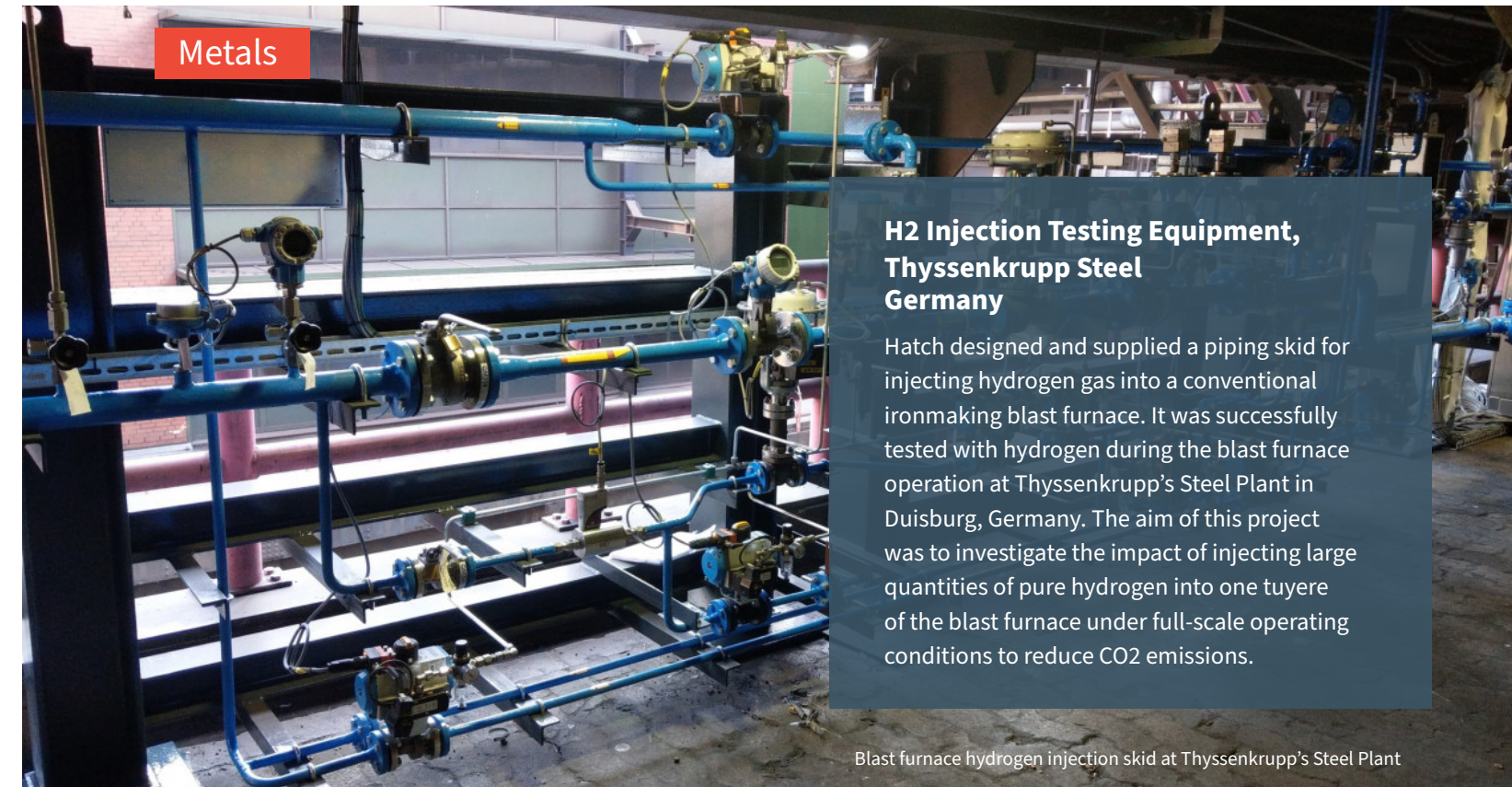
## Business and engineering consulting

- Technology evaluations and trade-off studies
- Decarbonization roadmaps and climate change strategies
- Market and economic trends
- Owner's engineering
- Due diligence

## Technology development

- Pilot and demonstration plants and trials
- Process and technology development, scale-up, and commercialization
- Custom equipment design and supply

# Selected project experience



### H2 Injection Testing Equipment, Thyssenkrupp Steel Germany

Hatch designed and supplied a piping skid for injecting hydrogen gas into a conventional ironmaking blast furnace. It was successfully tested with hydrogen during the blast furnace operation at Thyssenkrupp's Steel Plant in Duisburg, Germany. The aim of this project was to investigate the impact of injecting large quantities of pure hydrogen into one tuyere of the blast furnace under full-scale operating conditions to reduce CO2 emissions.

Blast furnace hydrogen injection skid at Thyssenkrupp's Steel Plant

### Raglan Hybrid Energy Storage Project, Tugliq Energy Co. Canada

Glencore's Raglan Nickel Mine has installed a first of a kind wind-powered energy storage system at its remote site in northern Québec. Phase 1 of this project involved a 3 MW wind turbine, battery bank, flywheel, and hydrogen system, containing a 315 kW electrolyzer, a 200 kW fuel cell, and 300 kg of gaseous storage. Since its installation, the hybrid system has reduced the need for diesel by approximately 2.4 million liters of fuel per year.

Hatch contributed to all engineering phases of this project: conception, feasibility, execution, construction, and operational optimization.

### Greenfield Hydrogen Steel Plant, Confidential Client Europe

Hatch completed a feasibility study for a greenfield green steel plant involving a 2.1 Mtpa direct-reduced iron (DRI) plant and a 2.5 Mtpa steel mill. The project had a goal of abating up to 93 percent of the CO2 emissions associated with a traditional blast furnace route of steelmaking.

We acted as the client's technical advisor for the 750 MW green hydrogen production facility, which supplies clean hydrogen to the DRI plant, by providing design support, technical consulting, and vendor coordination services. The hydrogen facility included a baseload of alkaline electrolyzers and a demonstration of solid oxide electrolysis cells.

To date, we have completed over fifty electrolytic hydrogen studies and projects. We take a rigorous code-based approach with an emphasis on quality and safety and lean on our understanding of details to inform the early-stage design.



Total capacity



Studies



Execution projects



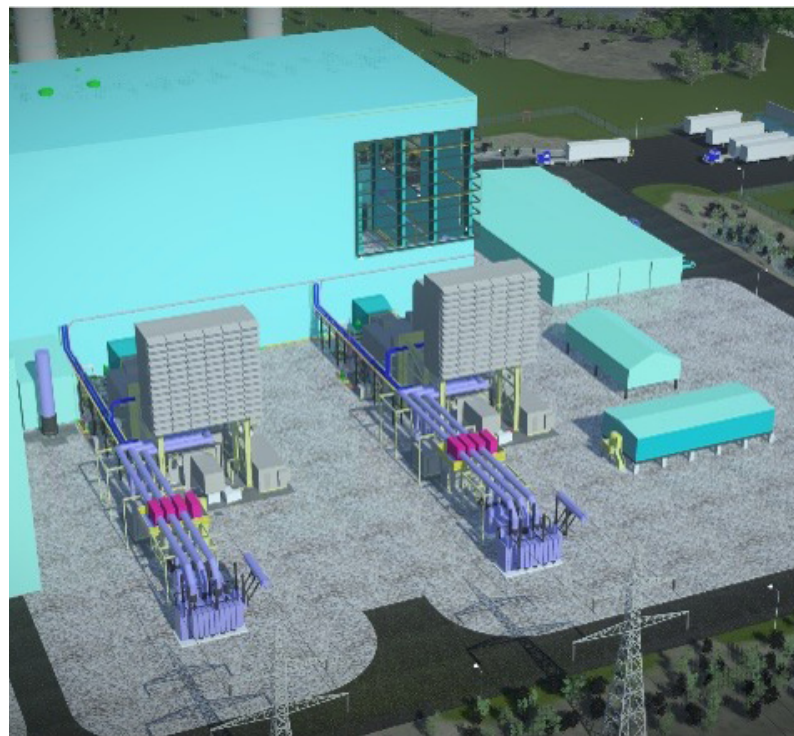
Countries

## Energy

### Halton Hills Blending and Cofiring Project, Atura Power Canada

Atura Power is implementing a low-carbon hydrogen project at its Halton Hills Generation Station that will blend hydrogen with natural gas to reduce carbon emissions from combined cycle gas turbine electricity generation and support grid decarbonization in Ontario.

Hydrogen will be delivered to site in gaseous tube trailers where it will be unloaded, let-down in pressure, and blended with natural gas up to fifteen percent by volume. Hatch is completing the detailed design, which includes all discipline engineering and safety assessments, and is providing site, permitting, and regulatory approval support.



Digital rendering of Phase 1 at the Halton Hills Generating Station

### Bécancour Hydrogen Plant Expansion, Air Liquide Canada

Air Liquide has installed 20 MW of proton exchange membrane electrolyzers at its existing hydrogen production plant in Bécancour, Québec to form – at the time – the largest plant of its kind in the world. The project increased production capacity at the plant by 50 percent, while simultaneously reducing carbon dioxide emissions for the region by nearly 27,000 tonnes per year.

Hatch provided civil, structural, and architectural engineering for the main process plant building, electrical room, water treatment area, and pipe racks and cooling towers, HVAC design, construction management and site preparation, health and safety management, and project management and controls.



Electrolyzer installation inside the Air Liquide Bécancour Hydrogen Complex



### Methane Pyrolysis Reactor Technology Review and Integration Design, Hazer Group Australia

Through the Hazer Group in Australia, Hatch completed a technology review of prototype and small commercial demonstration-scale methane pyrolysis reactors for deployment in Canada and Australia. The integration of a methane pyrolysis reactor with balance of plant for the overall hydrogen and carbon production facility was also evaluated.

### Blue Hydrogen Prefeasibility Study, FortisBC Canada

We led a prefeasibility study on behalf of FortisBC to evaluate the techno-economic potential of a proposed ATR-based blue hydrogen facility. The study assessed the generation of hydrogen from a natural gas feedstock using autothermal reforming, with the hydrogen produced being used to decarbonize the FortisBC natural gas transmission and distribution grid.

The scope of work included the development of technical deliverables, CAPEX and OPEX estimates, carbon intensity and levelized costing calculations, and a desktop logistics study.

### HyNQ Green Ammonia Export Study, Energy Estate Australia

Energy Estate engaged Hatch to complete a pre-FEED study for the North Queensland Clean Energy Project (HyNQ), a GW-scale green ammonia project in Australia for export to Japan. The overall facility includes 1,000 MW wind power, 1,200 MW solar power, 1,100 MW of electrolyzers, a 1,600 MTPD ammonia plant, and a 30 MTPD liquid hydrogen plant.

Our scope included the design of the electrolysis, liquid hydrogen, and ammonia production plants, associated storage and distribution equipment, plant utilities, and electrical supply. It also included a AACE Class 4 CAPEX and OPEX estimates, and a levelized cost analysis to optimize plant capacity.



Hybrid energy storage system at the Glencore Raglan Mine with a fuel cell, an electrolyzer, and hydrogen storage vessels

## Infrastructure

### Zero-Emission Buses Transition Planning, Island Transit USA

We participated in the development of a transition plan for the transit authority and assessed the feasibility of battery-electric and hydrogen vehicle technologies to support public transit operations.

The scope of work included field surveys of routes and existing vehicle emissions, detailed operational analysis of battery-electric and hydrogen vehicles, life cycle costs, conceptual design of the service depot, filling stations, and trade-off analysis between on-site hydrogen production versus hydrogen supply.

### Zero-Emission Vehicles Infrastructure Options, Intercity Transit USA

Intercity Transit engaged Hatch to evaluate zero-emission vehicles (ZEV) infrastructure options and assess site-specific characteristics that will influence the transition to battery-electric or hydrogen technology vehicles.

The scope of work included site surveys, development of infrastructure and siting requirements, detailed analysis of battery-electric and hydrogen vehicles, associated supporting systems/equipment, guidance on potential regulatory implications for the proposed infrastructure solutions, and trade-off analysis regarding on-site versus off-site hydrogen production options.





# About Hatch

Whatever our clients envision, our professionals can design and build. With over six decades of business and technical experience in the mining, infrastructure, and energy sectors, we know your business and understand that your challenges are changing rapidly.

We respond quickly with solutions that are smarter, more efficient, and innovative. We rely upon our 10,000 staff with experience in more than 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

## Key contacts

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