UBC SMART HYDROGEN ENERGY DISTRICT (SHED) - HYDROGEN GENERATION AND FUELING STATION

2025 CANADIAN GREEN BUILDING AWARDS

PART **ONE**

PART 1
PROJECT DESCRIPTION

Use for all categories. Projects are judged based on criteria of sustainable design, architectural merit and innovation. **Please submit Part 1 and Part 2 as separate pdf files.**

2025 CANADIAN GREEN BUILDING AWARDS

THE NATIONAL PROGRAM OF SUSTAINABLE ARCHITECTURE & BUILDING MAGAZINE SABMag

PROJECT CATEGORIES

Identify which Award category you are entering

☐ **1. Residential [small]**
Open to new or renovated buildings less than 600m² in area, of which a minimum of 75% is dedicated to single-family or multi-family residential uses.

☐ **2. Residential [large]**
Open to new or renovated buildings [typically multi-unit buildings or groups of related buildings] greater than 600m² in area, of which at least 75% is dedicated to residential uses.

■ **3. Commercial/Industrial [small]**
Open to new or renovated buildings up to 2,000m² in area, of which more than 75% is dedicated to commercial or industrial uses.

☐ **4. Commercial/industrial [large]**
Open to new or renovated buildings [or groups of related buildings] greater than 2,000m² in area, of which at least 75% of the floor area is dedicated to commercial or industrial uses.

☐ **5. Institutional [small]**
Open to new or renovated buildings up to 2,000m² in area, of which more than 75% is dedicated to institutional uses.

☐ **6. Institutional [large]**
Open to new or renovated buildings [or groups of buildings] greater than 2,000m² in area, of which at least 75% of the floor area is dedicated to institutional uses.

☐ **7. Mixed Use**
Open to new or renovated buildings [or groups of related buildings] of any size, in which no individual use exceeds 75% of the overall floor area.

☐ **8. Existing Building Upgrade**
Open to buildings of any size or type in which the primary focus of the work has been to enhance the performance or extend the life of an existing structure. Entries in this category are required to respond only to the submission criteria appropriate to the project.

☐ **9. Interior Design**
Open to interior design projects of any size or type. Entries in this category are required to respond only to the submission criteria appropriate to the project.

An award will be given in each category at the discretion of the jury.

PROJECT DETAILS

Project name: UBC Smart Hydrogen Energy District (SHED) - Hydrogen Generation and Fueling Station
Address: 6085 Thunderbird Blvd, Vancouver BC V6T 2A1
Year completed: 2024

PROGRAM AND CONTEXT

Project type: [Identify all uses occupying 10% or more of gross floor area]

On-site hydrogen production, advanced storage, and dispensing. Interpretive learning, and public art.

Project site: [Check all that apply]

☒ Previously undeveloped land ☐ Urban ☐ Rural

☐ Previously developed land ☐ Suburban

Other Building description: [Check only one]

■ New ☐ Renovation ☐ Both [If both, list __% new and __% renovation]

STATISTICS* Provide the following metrics as applicable to your project.

- Site Area: 1390 m²
- Building gross floor area: 306 m²
- Energy Intensity: n/a KWhr/m²/year [Include both base building and process energy]

[optional: report energy intensity separately as follows:

- Energy Intensity, base building: n/a KWhr/m²/year
- Energy Intensity, process energy: n/a KWhr/m²/year

This project does not have a defined occupancy or an energy use that is relevant to its floor area. However, its energy is supplied by PV power with battery back-up.

- Reduction in energy intensity: n/a %.
- State the reference standard on which the % reduction is based: MNECB, NECB or ASHRAE 90.1

[include version]: n/a

- Recycled materials content: n/a % by value
- Construction materials diverted from landfill: n/a %
- Regional materials by value: n/a
- Water consumption from municipal source: n/a litres/occupant/year

[Include both base building and process consumption]

- Reduction in water consumption: n/a %
- State the reference on which the % reduction is based: ☐ LEED or other ☐

*NOTE FOR PART 9 RESIDENTIAL PROJECTS: PROVIDE THE STATISTICS ABOVE IF AVAILABLE. Include in the Executive Summary [see next page] the EnerGuide or the Home Energy Rating System [HERS] ratings if available, and the WalkScore rating [see www.walkscore.com]. Also, a qualitative assessment of project performance should be included in the appropriate sections of the narrative.

UBC HYDROGEN HUB

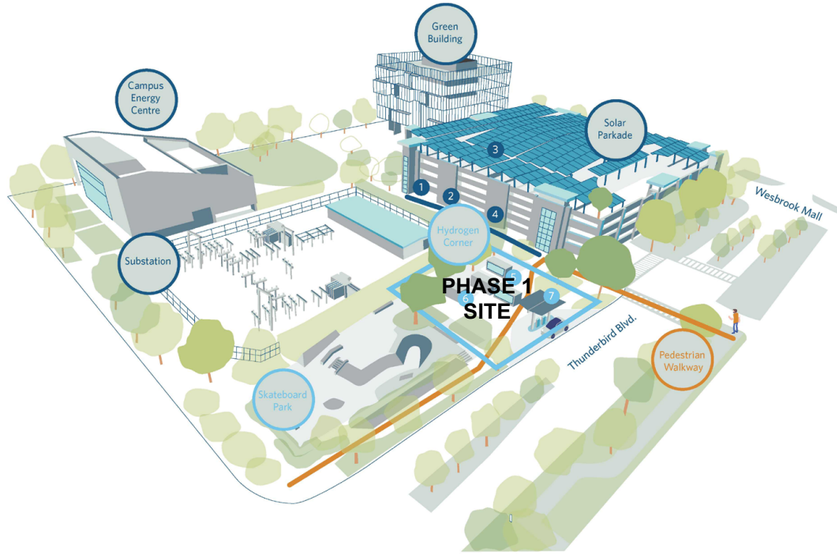
PROJECT SUMMARY

The hydrogen production and fueling station at UBC Vancouver campus is part of a groundbreaking, multi-phase clean energy initiative that serves as a model for what can be achieved on a standard city block. Phase 0 includes an eHouse, providing critical energy management infrastructure. Phase 1 introduces the hydrogen station (this project), combining on-site hydrogen production, advanced storage, and fueling for passenger vehicles, transit buses, and fleet operations. Phase 2 adds a photovoltaic array atop an adjacent parking garage, integrating renewable energy into the project.

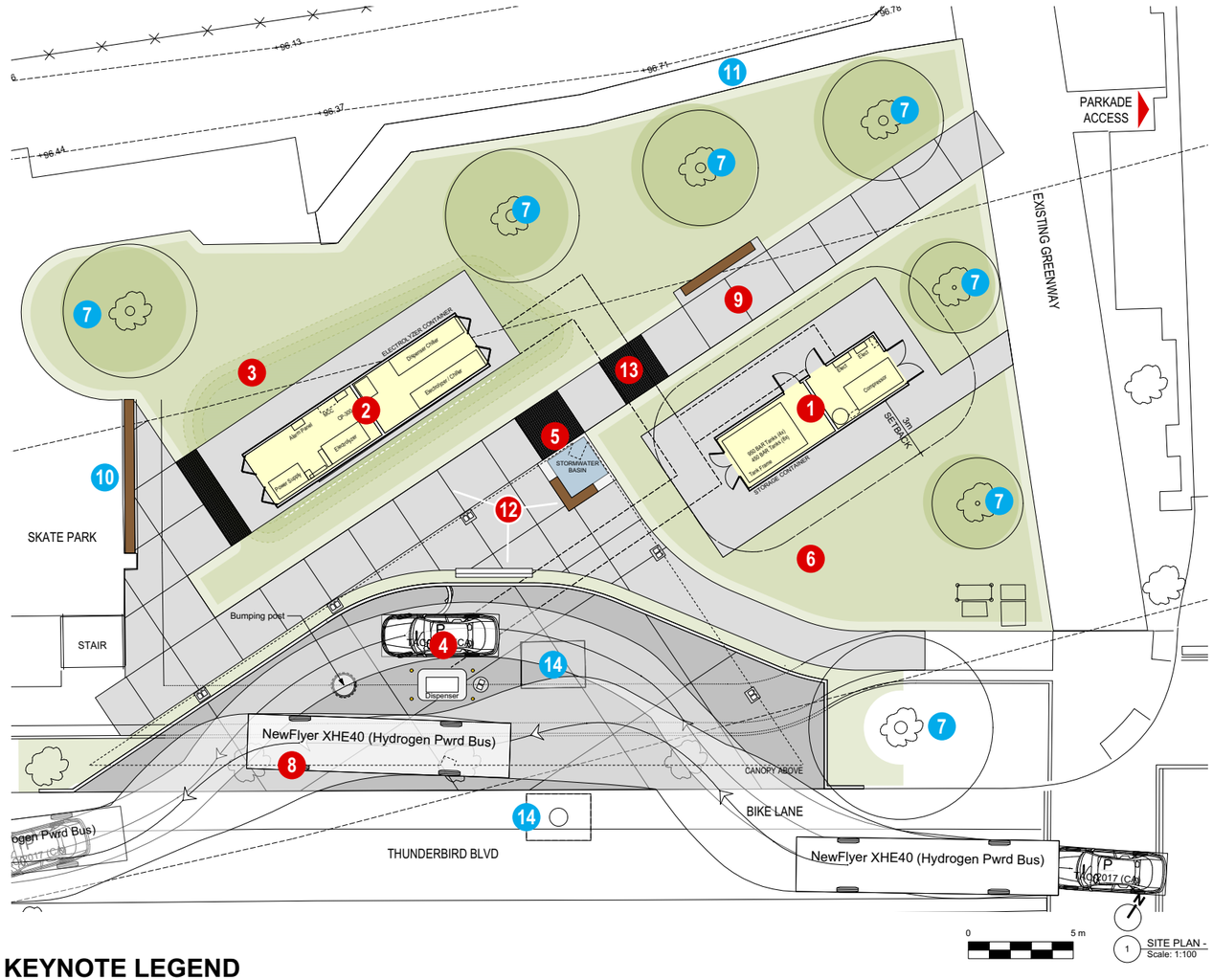
The station's design reflects a thoughtful, forward-looking aesthetic that seamlessly integrates with UBC's urban and natural surroundings. The architecture prioritizes user experience, with clear circulation pathways, intuitive functionality, and a welcoming appearance that invites community engagement with sustainable technology. Materials and finishes emphasize durability, safety, and sustainability, while incorporating natural elements to soften the facility's presence within the campus.

Beyond functionality, the design aims to inspire and educate, positioning the station as both a working facility and a symbol of UBC's commitment to innovation and environmental stewardship. By balancing advanced engineering with architectural sensitivity, the project demonstrates how clean energy infrastructure can be both highly practical and visually compelling in urban settings.

This project does not have a defined occupancy or an energy use that is relevant to its floor area. However, its energy is supplied by PV power with battery back-up.



"The UBC Smart Hydrogen Energy District (SHED) is yet another leap forward in building a clean economy and creating new opportunities for British Columbians" - Honourable Josie Osborne, Minister of Energy, Mines and Low Carbon Innovation



KEYNOTE LEGEND

1 HYDROGEN STORAGE CONTAINER
- Hydrogen Storage Cylinders
- Compressor Module
- Concrete pad with 3m Safety Zone
- Vinyl wrap graphic surface treatment, TBD

2 ELECTROLYZER CONTAINER
- Electrical Room
- Electrolyzer
- Supporting Equipment
- Vinyl wrap graphic surface treatment, TBD

3 BIOSWALE / DETENTION BASIN
- Filters discharge water from electrolyzer process
- Retains water for slow infiltration
- Natural safety buffer

4 VEHICLE FORECOURT / DISPENSER

5 STORMWATER BASIN
- Canopy runoff
- Drains to bioswale / detention basin

6 GRASS PAVING GRID
- Temporary staging area for hyrdrogen resupply truck when needed

7 EXISTING DECIDUOUS TREES

8 TREES TO BE REMOVED

9 CONCRETE PATHWAY
- Establishes "desire line" connection to main north - south walkway

10 EXISTING BENCH

11 EXISTING PATHWAY

12 INTERPRETIVE "EDUCATION HUB"
- Infographic displays / panels

13 METAL GRATING
- Expose and feature piping trenches

14 EXISTING UNDERGROUND UTILITY VAULT

ONE
STRATEGIC DECISIONS

Strategic decisions for the hydrogen station were largely shaped by proximities to other campus energy infrastructure, as well as a parking garage that could accommodate a large photvoltaic array as part of the larger project considerations. The site, previously an outdoor basketball court, was repurposed to capture a pedestrian desire line through the space, enhancing connectivity while integrating vehicle access and maintaining necessary safety clearances between equipment containers. Placement of equipment containers aligns with existing campus pathways to support accessibility and efficient movement. Program organization prioritizes safety, functionality, and public engagement, ensuring user-friendly operations and educational opportunities. The design transforms a recreational space into a functional, sustainable hub, advancing UBC's climate goals and fostering innovation, collaboration, and community interaction.

"By integrating energy, transportation, and design, SHED not only supports our CleanBC goals but it also positions British Columbia as a world leader in the hydrogen economy" - Honourable Josie Osborne, Minister of Energy, Mines and Low Carbon Innovation

TWO
COMMUNITY

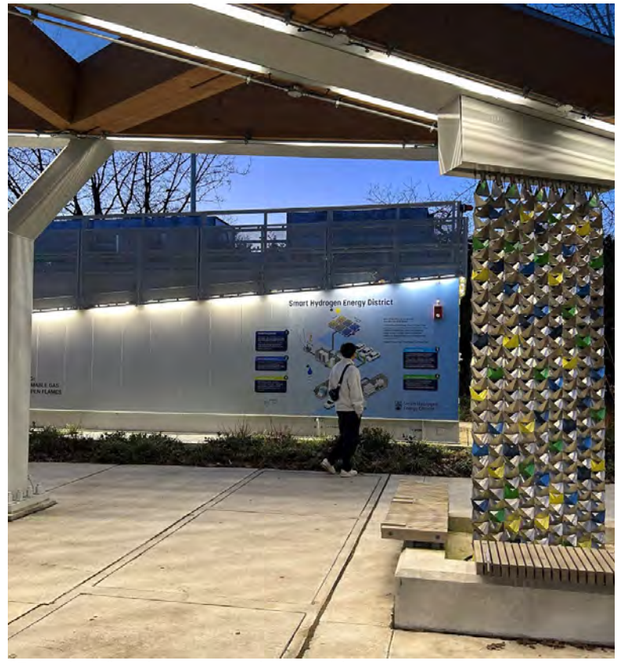
The hydrogen production and fueling station at UBC Vancouver campus enhances the public realm through thoughtfully designed spaces that integrate with campus pathways, inviting engagement and interaction. Landscaped areas, weather-protected zones, and interpretive displays educate visitors on hydrogen and renewable energy, transforming the station into a community asset.

Ample lighting and visible circulation pathways prioritize safety and accessibility, while rainwater management features celebrate the natural water cycle, blending functionality with sustainability. The rain chain manages runoff while poetically celebrating water, symbolizing the hydrogen production process. It enhances the facility's aesthetics with the soothing sound of trickling water as it drains into nearby plantings.

By reducing reliance on fossil fuels, the project supports community resiliency, improving air quality and fostering energy diversification. It enriches the campus as a hub for innovation and collaboration.

"This new space gives UBC scholars significant new research and learning opportunities that will help shape our society and economy in the years ahead." - UBC President and Vice-Chancellor Dr. Benoit-Antoine Bacon

Educational tour of site



"Rain chain" and stormwater basin, with seating

"Interpretive" pathway through the site

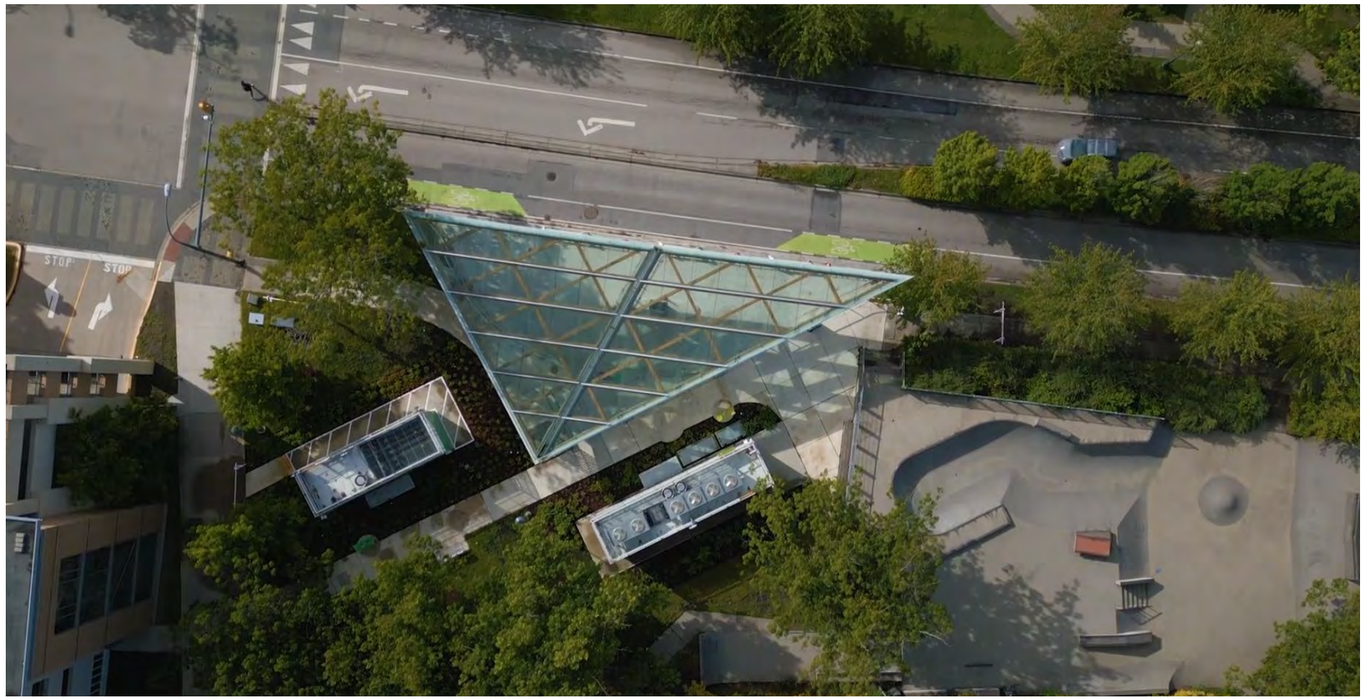
THREE
SITE ECOLOGY

The new hydrogen fueling station transforms a site dominated by asphalt into a more ecologically vibrant and socially engaging space. By preserving nearby mature trees and introducing a diverse planting palette of indigenous, drought-tolerant, and pollinator-friendly species, the project establishes a new vegetated ground plane that enhances biodiversity and reduces heat island effects.

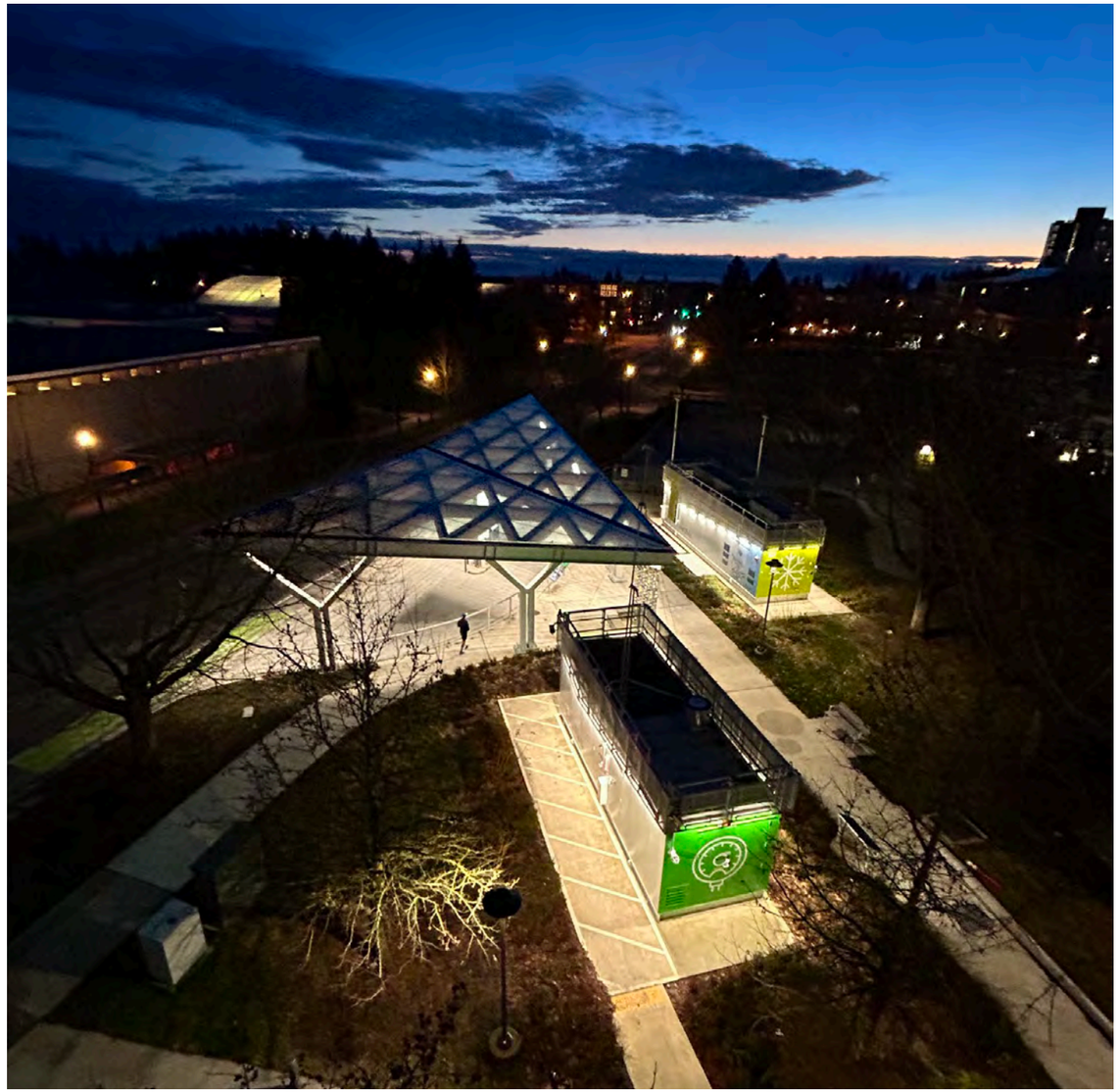
Integrated pathways connect users to educational opportunities and create spaces for socialization, with a central seating area becoming a key node in UBC's outdoor space network. This thoughtful design not only improves site ecology but also aligns with the university's sustainability and community-building goals.

WHAT IF... a vehicle fueling station could be integrated into the public realm as an urban amenity?

Original Site use, highlighting street trees and basketball court



Current site, highlighting mature trees and greenery. Site now features a skate park.



“Hydrogen can play a critical role in Canada’s transition to a low-carbon economy…we demonstrate hydrogen as a bridge between renewable electricity and sustainable energy services.” - Dr. Walter Mérida, SHED research lead and professor of mechanical engineering in the faculty of applied science.

SEVEN
ENERGY, PRESENT & FUTURE

The hydrogen fueling station at UBC integrates seamlessly into the campus’s district energy system, serving as a pivotal element in the transition to a low-carbon future. By producing and distributing green hydrogen, it reduces greenhouse gas emissions and supports clean transportation. Its design anticipates the decarbonization of energy systems by enabling scalable and flexible hydrogen solutions. Beyond its immediate impact, the station serves as a launchpad for partnerships, business models, and spinoff ventures, providing a platform to demonstrate de-risked, scalable climate solutions. This forward-thinking project is a catalyst for innovation and aligns with long-term goals to eliminate reliance on fossil fuels.

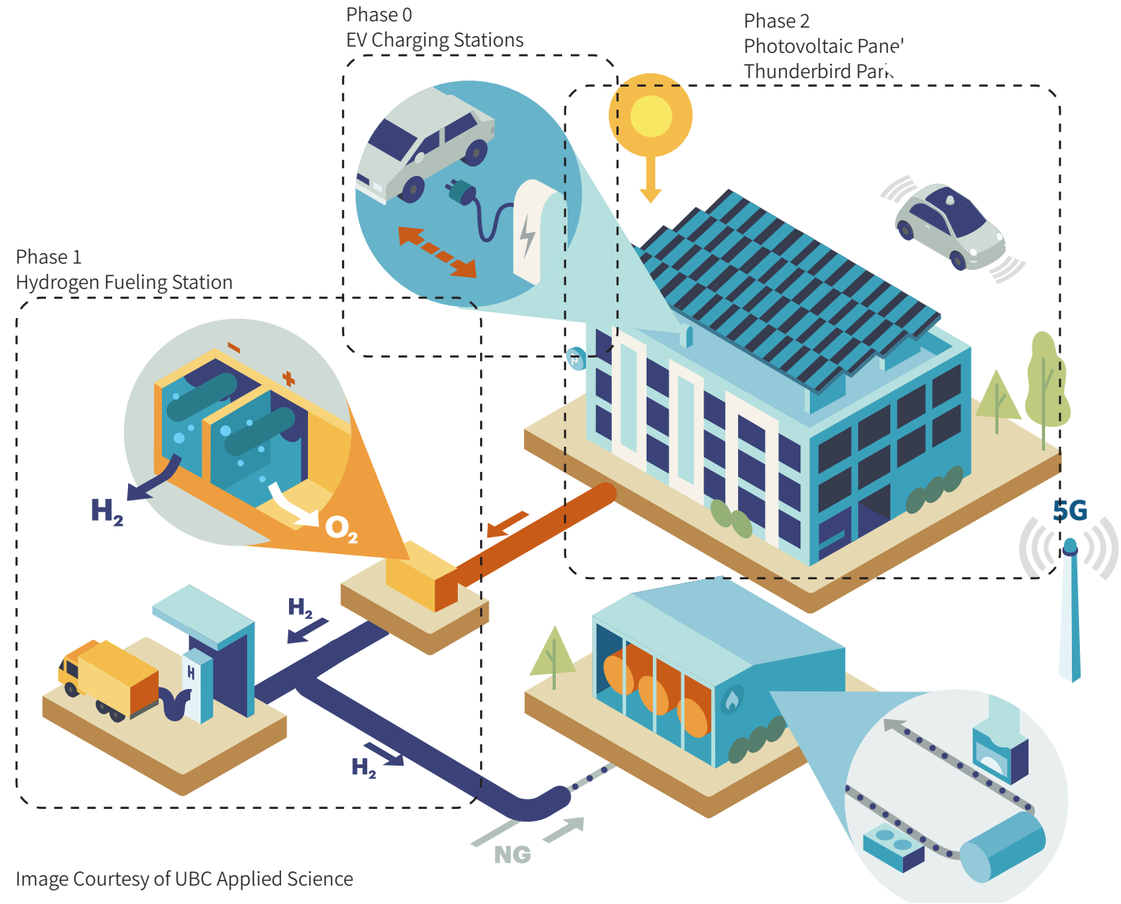


Image Courtesy of UBC Applied Science

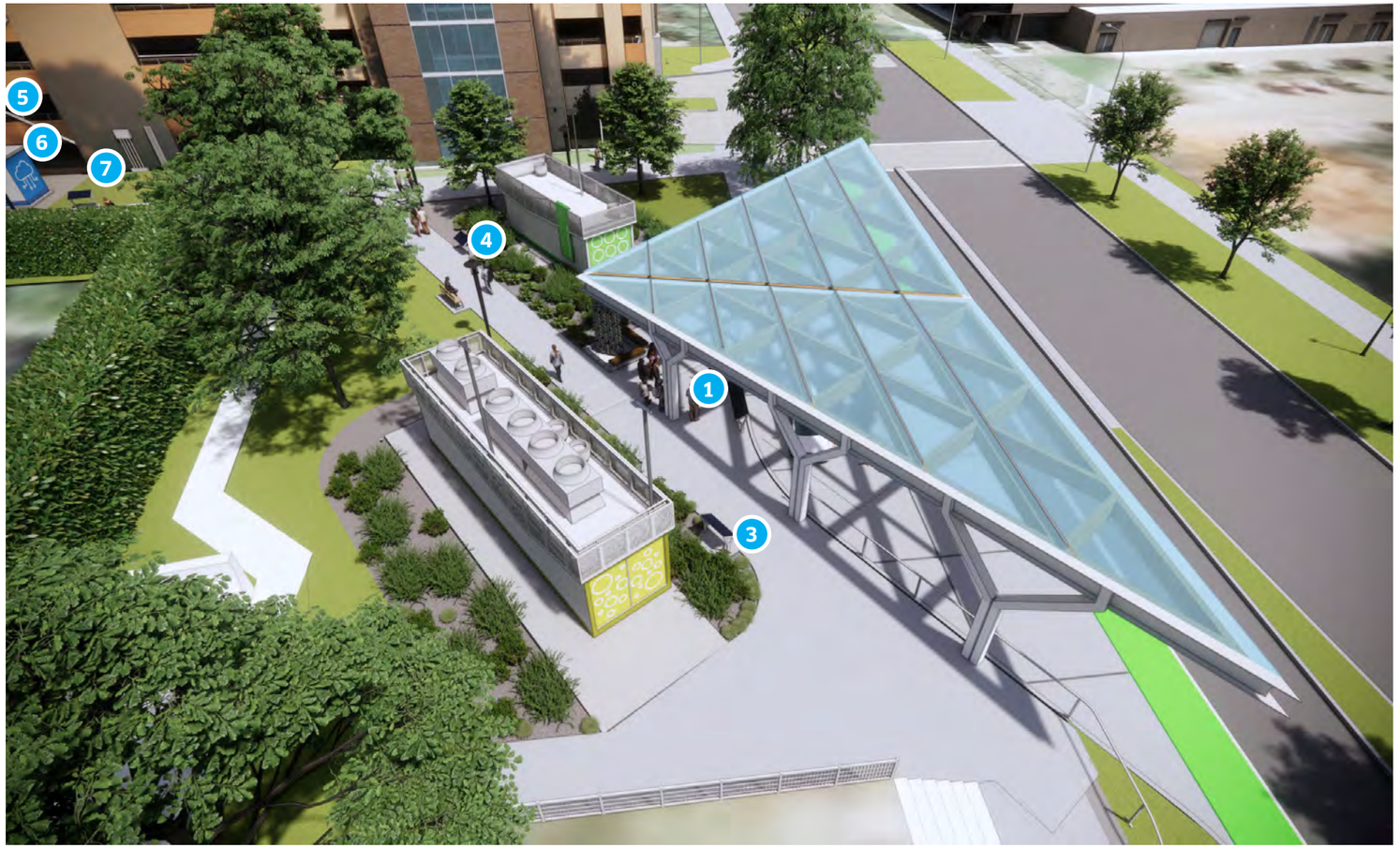
TEN
EDUCATION & INFORMATION SHARING

This project addresses sustainable design through a dual approach. Top-down, it aligns with UBC's climate leadership by integrating cutting-edge technologies like hydrogen production, renewable energy, and rainwater management, setting a benchmark for resilient, scalable infrastructure. Bottom-up, it fosters public awareness through interpretive signage, and visible sustainable elements that engage users and visitors, inspiring higher expectations for green building performance.

By blending innovation with education, the project demonstrates how institutional leadership and community engagement can work together to drive cultural shifts, encourage market transformation, and accelerate the adoption of clean energy and sustainable practices across the built environment.

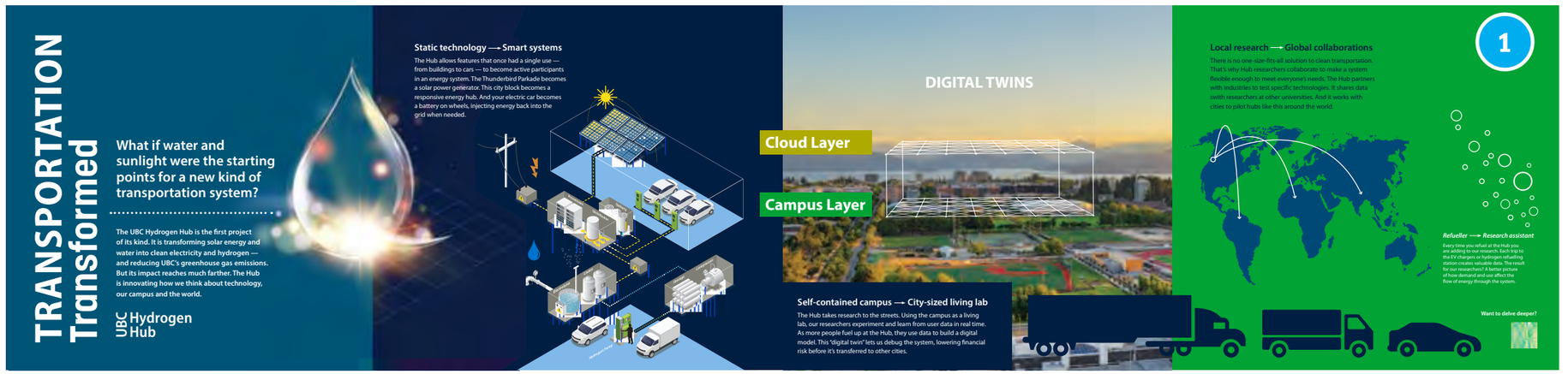
"This is one example of the ground-breaking work taking place across our province that is propelling us towards a net-zero future." - Honourable Harjit S. Sajjan, Minister of Emergency Preparedness

Electroyzer container with system overview graphic

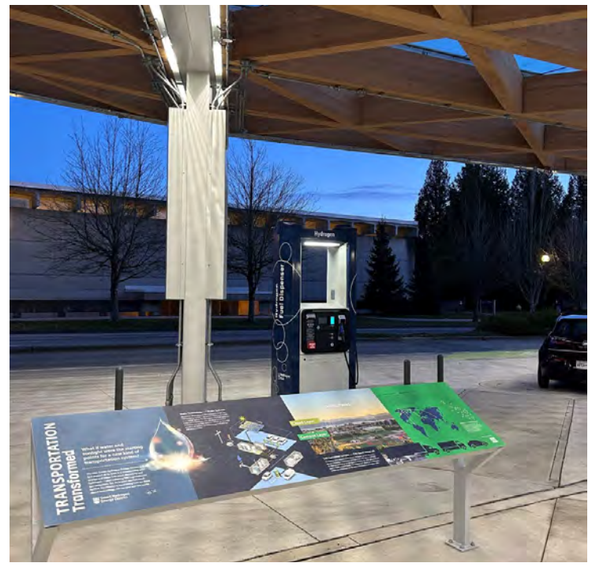


The images on the following pages go into more detail on the systems highlighted above as a part of the education and information sharing.

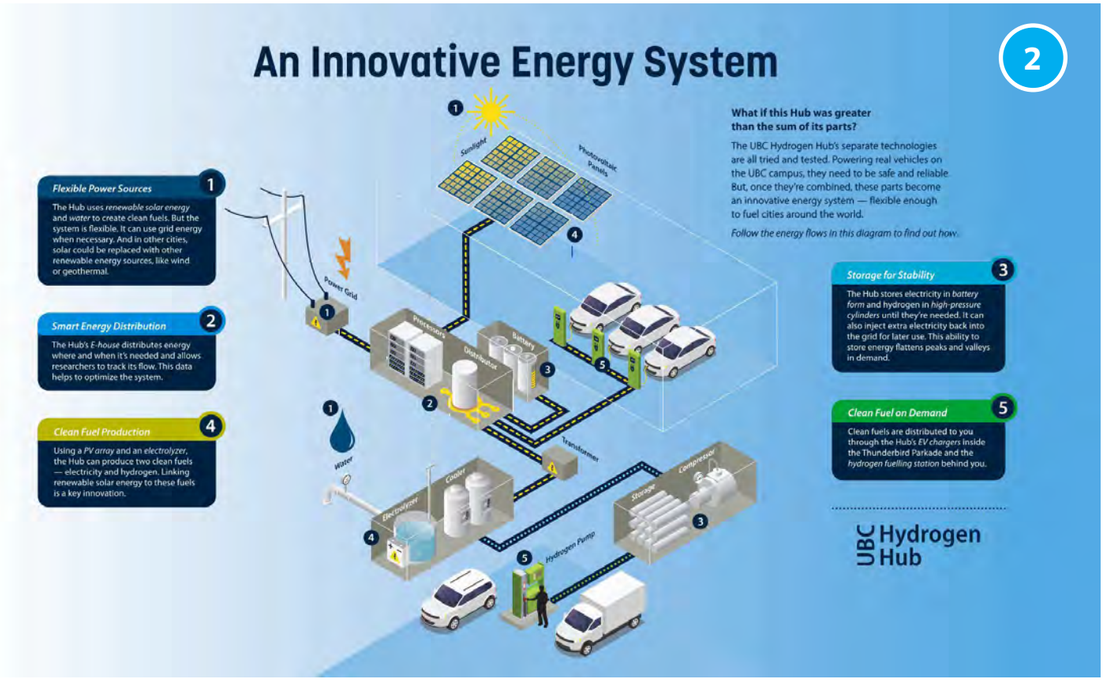
TEN EDUCATION & INFORMATION SHARING



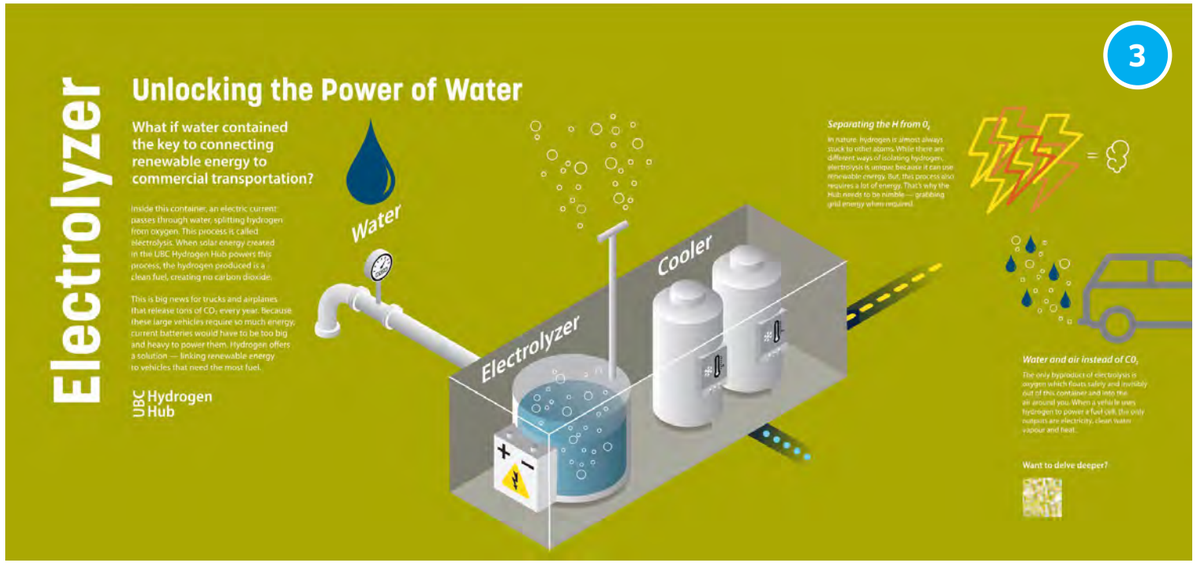
Project Overview graphic on reader rail



Project Overview graphic on reader rail - current day

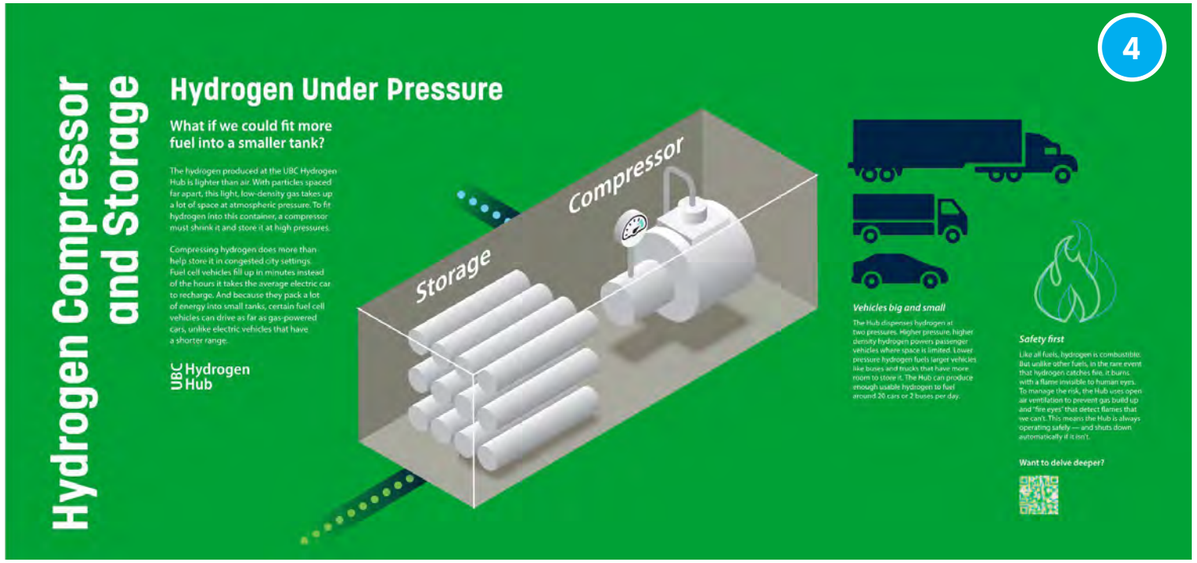


System overview graphic on electroyzer container

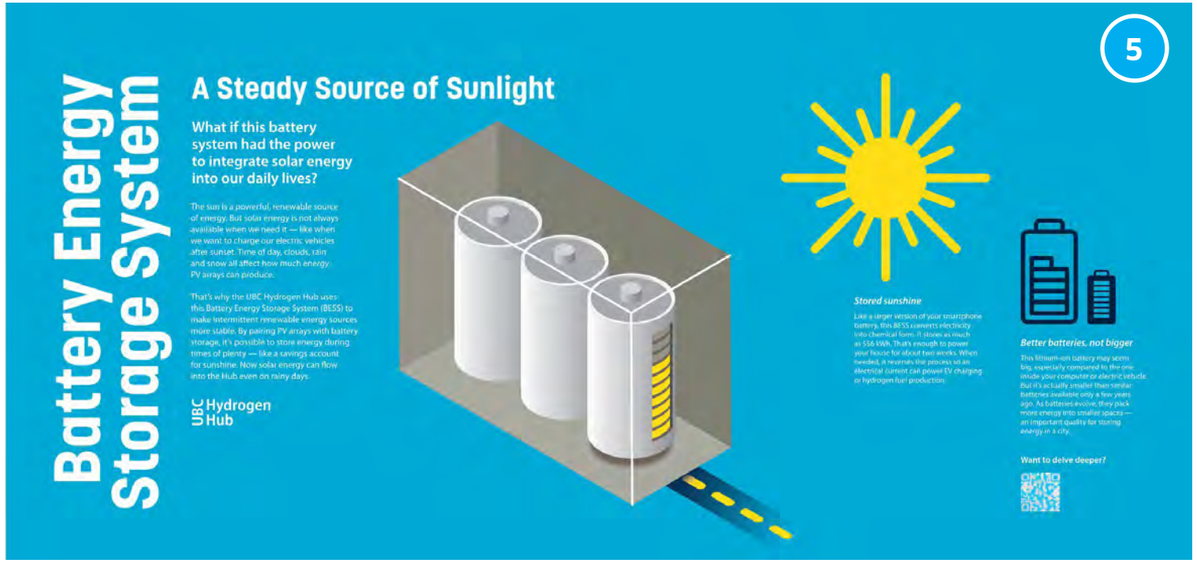


Electroyzer overview graphic on reader rail

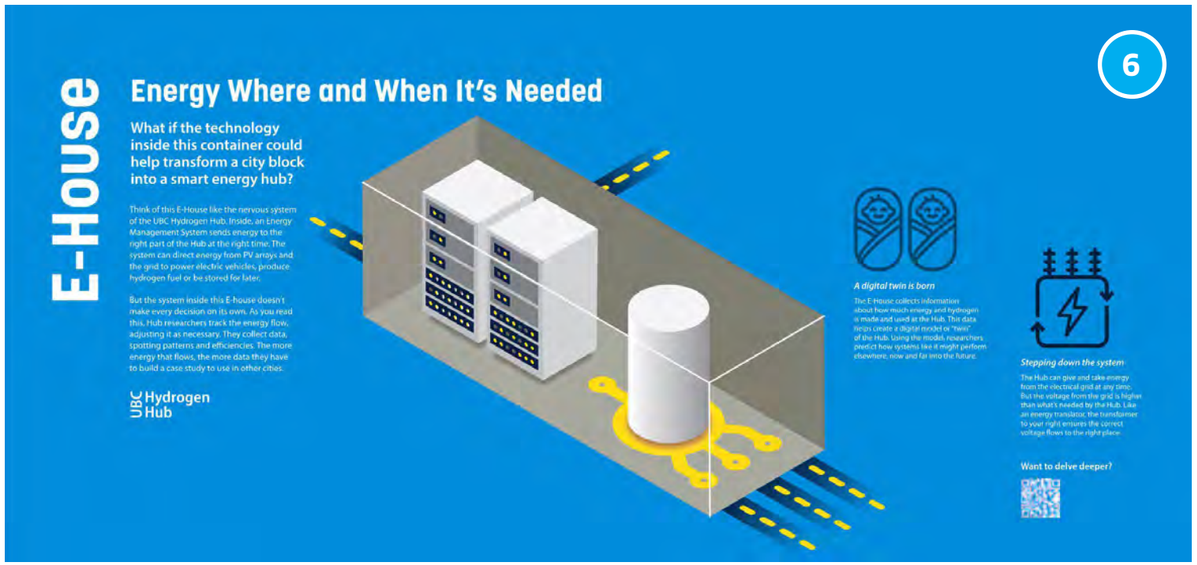
TEN EDUCATION & INFORMATION SHARING



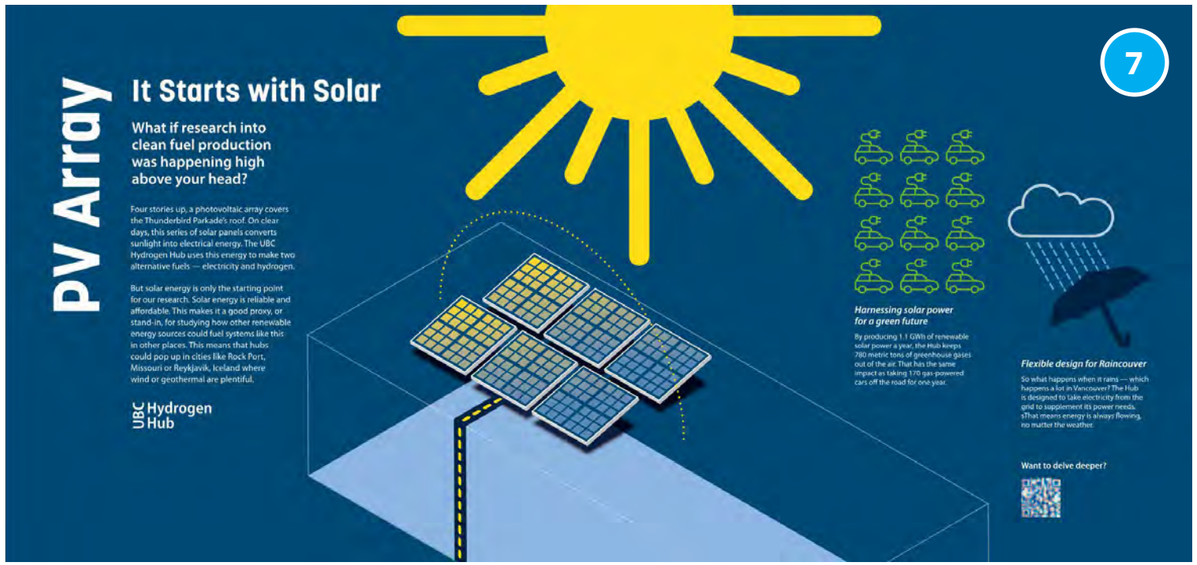
Hydrogen Compressor and Storage graphic on reader rail



Battery Energy Storage System (BESS) overview graphic on reader rail



E-House overview graphic on reader rail



PV Array overview graphic on reader rail