



PRESS RELEASE

« Demand-responsive H₂ public transport & decarbonised H₂ production and supply in the Geneva region »

Demo Case Overview

The **Switzerland pilot, Demo Site #6**, aims to introduce a **demand-responsive transport (DRT) hydrogen-powered shuttle** alongside an **H₂ refuelling station** in the outskirts of Geneva. This initiative is being implemented through a collaboration between Hitachi Energy—a leader in the development of innovative and sustainable energy solutions—Transports Publics Genevois (TPG), Geneva's main public transport operator, and the University of Geneva (UniGe).

The key objectives of this demonstrator include:

- ✓ Introducing a **hydrogen-powered vehicle** into tpgFlex DRT operations
- ✓ Deploying the region's **first hydrogen refuelling hub** in the Geneva area
- ✓ Providing a **mobility support vehicle** tailored for PRMs to support tpgFlex services
- ✓ Utilizing surplus photovoltaic **renewable energy**
- ✓ Assessing the operational integration of hydrogen technology within PT



Co-funded by
the European Union

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Challenges and Solutions

TpgFlex is a Demand-Responsive Transport (DRT) service designed to address mobility challenges in underserved, low-density zones in the peri-urban region of Geneva where it primarily serves the needs of residents without private vehicles and individuals requiring accessible transport options. In line with the approach envisioned by the H2020 ULTIMO project, this service is expected to be operated by autonomous shuttles in the near future and the absence of on-board personnel in these vehicles will limit assistance for persons with reduced mobility (PRMs). To bridge this accessibility gap and ensure inclusive service delivery, a hydrogen-powered vehicle operated by a driver trained for PRM assistance will be introduced.

This solution not only guarantees accessibility but also eliminates tailpipe CO₂ emissions, offering a clean mobility alternative with minimal environmental impact. As the hydrogen is produced locally from renewable energy sources, it aligns with both the sustainability goals and the operational requirements of tpgFlex. Hydrogen is also particularly well-suited for demand-responsive transport due to its high energy density, fast refuelling times, and operational autonomy, making it ideal for peri-urban shuttle services with variable routing and limited access to fixed infrastructure. The hydrogen-based solution also offers a high degree of energy autonomy, further enhancing the resilience and sustainability of the tpgFlex service. Currently, no commercially available hydrogen vehicle meets the specific operational criteria of the service, particularly in terms of dimensions (6–8 seats). Therefore, the demonstration project entails the conversion and homologation of a hydrogen-powered commercial vehicle into one suitable for public passenger transport.

Given the current lack of hydrogen refuelling infrastructure in Geneva, the demonstrator project has taken on the ambitious objective of building a new local H₂ production and distribution system to enable the operation of the hydrogen-powered tpgFlex shuttle. This infrastructure will not only overcome the longstanding barrier to hydrogen vehicle deployment in the region but also fill the critical gap between the existing hydrogen stations in Lausanne and Lyon—an absence that has made travel along this corridor particularly difficult. The hydrogen will be produced locally using surplus electricity from Hitachi Energy's rooftop photovoltaic modules and from those of other companies in the nearby industrial zone during off-peak hours. This approach enables the conversion of underutilized energy into green hydrogen, thereby supporting regional decarbonization goals and advancing the integration of renewable energy (zero CO₂ emission and 196 tons of expected CO₂ savings).

This initiative is fully aligned with Hitachi Energy's corporate strategy to advance hydrogen technologies and foster a sustainable energy future, while enabling TPG to evaluate the practical integration of hydrogen solutions within its operational ecosystem and more specifically within TPG Flex DRT services.



Implementation

The tpgFlex service covers Geneva's Champagne area, with over 30 km² and 1,743 km of roads. The H₂ vehicle will be fully operational and will integrate tpgFlex regular services in 2026.



Figure 1. Map of the “champagne” tpgFlex service



Figure 2. H2 shuttle

The hydrogen refuelling station, commissioned for March 2026, will be installed at Hitachi Energy’s headquarters in Satigny, on the outskirts of Geneva, within the area served by the tpgFlex services. Hitachi Energy’s facilities are equipped with rooftop photovoltaic panels, providing 1.2 MW (peak) of available solar power. The excess solar energy (289 MWh/year) will power a 100-kW water electrolyser, enabling the on-site production of 100% green hydrogen. This industrial area is also home to several companies equipped with rooftop photovoltaic panels offering additional unused renewable energy that could be harnessed for green H₂ production.



Figure 3. Location of the Hitachi Energy facilities

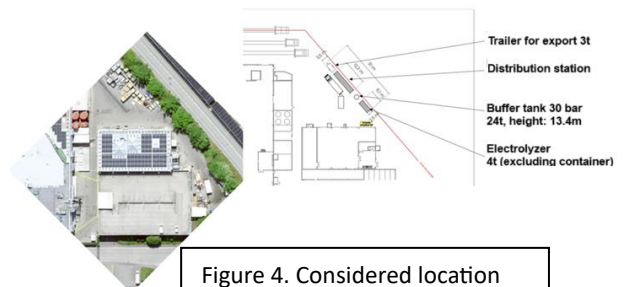


Figure 4. Considered location



Figure 5. Aerial view of Hitachi Energy’s rooftop PVs

All stages of hydrogen processing—compression, storage, and distribution—will be managed on-site, eliminating the need for any transport between the production and refuelling phases. This fully integrated approach enhances energy efficiency and operational simplicity. Moreover, the concept is inherently scalable and easily replicable at other industrial sites, particularly those with access to surplus renewable electricity, making it a robust model for sustainable hydrogen infrastructure deployment.

Key features of the system:

- **Average hydrogen production:** 40 kg/day (~20 tons/year)
- **Storage capacities:**
 - 120 kg at 30 bar (low pressure)
 - 100 kg at 380 bar (medium pressure, for export)
 - 180 kg at 500 bar (high pressure)
- **Distribution:**
 - Direct fuelling or export at 350 bar (option for 700 bar)
 - **Cooling unit** available for accelerated filling (optional)
- **Attractive pricing** for small-volume hydrogen customers

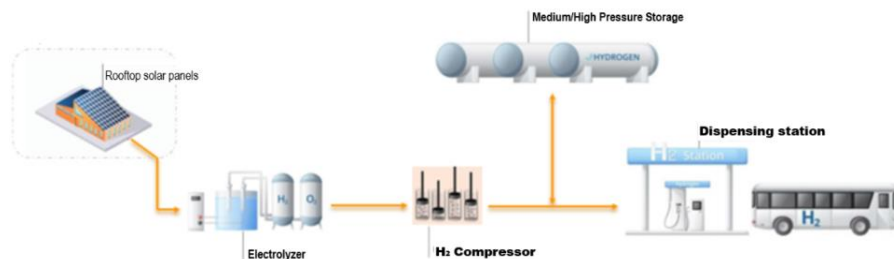


Figure 6. H2 production and supply chain steps



Figure 7. H2 distribution via a mobile trailer as envisioned

Results and Impact

- **Enable full accessibility of the tpgFlex service to persons with reduced mobility (PRMs)** by deploying a hydrogen-powered shuttle operated by staff trained in PRM assistance, significantly improving daily mobility for users who currently face access limitations.
- **Install and operate the first hydrogen refuelling station in Geneva**, providing a local and sustainable hydrogen supply. This will facilitate further development of hydrogen-based mobility in the region and reduce reliance on external infrastructure.
- **Bridge the current infrastructure gap between Lausanne and Lyon**, ensuring that hydrogen-powered vehicles can travel across this corridor without range anxiety, and supporting wider regional adoption of H₂ mobility solutions.
- **Demonstrate the successful use of a small hydrogen vehicle** (6–8 seats) for DRT public transport use, setting a replicable precedent for other cities and operators.
- **Showcase a circular energy model** by producing green hydrogen from surplus renewable electricity generated in the industrial zone, increasing energy efficiency and supporting decarbonization efforts.
- **Generate operational and research insights** for the integration of hydrogen technologies into public transport.

This demonstrator uniquely combines clean mobility, local H₂ production, and inclusive transport in a peri-urban setting. It acts as a laboratory for validating operational models, energy autonomy, and the use of surplus solar energy in mobility applications. It not only supports Geneva's ambitions for sustainable mobility but also acts as a model for other European cities seeking to deploy inclusive hydrogen-based DRT solutions.

Testimonials:

"Bringing hydrogen into our DRT service is a major milestone. It offers the range and reliability we need for flexible routes, ensures accessibility for passengers with reduced mobility, and significantly reduces our environmental footprint. We are combining clean tech with smart, inclusive mobility"

Quentin M., EU Project Manager



Disclaimer

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