Regione Emilia-Romagna

TPER Cambia il movimento

HYDROGEN FORUM HESSEN 2025

HOLM Frankurt, 26th november 2026

137 H2 buses for Bologna and Ferrara – Infrastructure requirements and changes in fleet management

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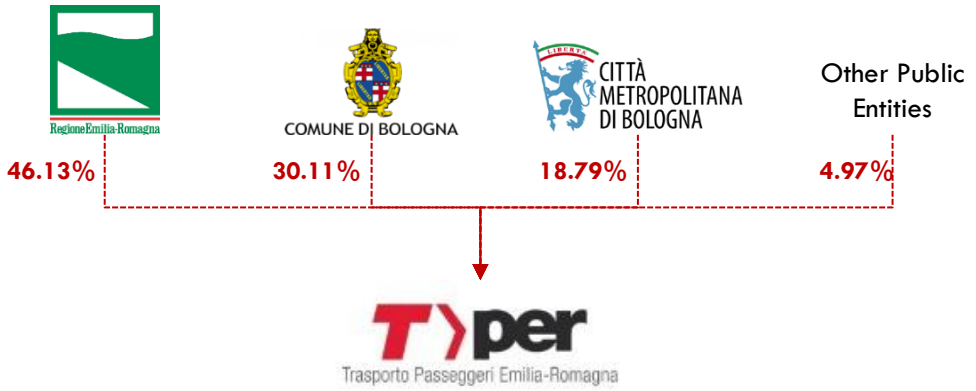
Who we are

Tper is one of Italy's leading public transport operators and the largest company in Emilia-Romagna in the collective mobility sector.

Where we are (public transport):

Our shareholders:



Regional/Local Public shareholders, but none with controlling majority

About TPER Group

WHAT WE DO:

- urban and suburban public transport services in Bologna and Ferrara Basins
- People Mover
- Sharing mobility services (Corrente)
- Regional rail transport (shares in TrenitaliaTPER)
- Freight services (rail yard management and rail transport)
- Trains maintenance

Tper currently ranks 6th in revenue among passenger transport operators in Italy

marconi express

44 MLN
buseskm

150 MLN
passengers

>91.000
vehicle sharing subscribers

300 MLN
Euro revenues

2.350
employees

1.200
buses

TPER's commitment to environmental sustainability

TPER has defined its corporate strategic guidelines in line with the UN 2030 Agenda for Sustainable Development and has identified, among the set of "Global Goals," a panel of objectives applicable to the company context.

Sustainable development goals

Goals applicable

- **3** - Good health and well-being for people
- **7** - Clean and affordable energy
- **8** - Decent work and economic growth
- **9** - Industry, innovation, and infrastructure
- **10** - Reduce inequalities
- **11** - Sustainable cities and communities
- **12** - Responsible consumption and production
- **13** – Climate changes
- **17** - Partnerships for the goals

Renewing the fleet with zero-emission vehicles is an integral part of TPER's sustainable development strategy.

TPER has always been active locally, regionally, and nationally in initiatives and projects for environmental sustainability.

Public Admin.'s strategies for sustainable mobility

Emilia-Romagna Region and the Local Administrations in our operating area (within the Eastern Po Valley – highly polluted area) have provided clear guidelines on targets and constraints for the eco-sustainable renewal of the fleet.

Emilia-Romagna Region

Goal to reduce Climate altering emission by at least 55% by 2030

Municipality of Ferrara

- Stop purchasing of diesel vehicles from 2022

Target for Metropolitan Area of Bologna

- Stop purchasing of diesel urban vehicles from 2020
- Exclusive purchase of Zero Emission vehicle effective from 2025
- Entire operating fleet at Zero Emission by 2030 (*currently non achievable!*)

Target 2030 - Bologna

- Municipality of Bologna is included in the list of 100 European cities aiming for climate neutrality by 2030

Moving toward a ZERO EMISSION MOBILITY is mandatory!

Choices of vehicle power supply

Technologies for vehicle propulsion are continuously and rapidly evolving, also driven by EU and national policies for eco-sustainable fleet renewal, and are not yet fully consolidated.

For this reason, TPER, that is always at the forefront of innovation in the public transport sector, has chosen to adopt the technologies that are currently most suitable, now and in the future, according to different transport needs.

URBAN SYSTEMS

Battery-Electric, Trolleybus/Tram, Hydrogen

SUBURBAN SYSTEMS

Battery-Electric, methane-powered bus (CNG, LNG), Hydrogen, BusRapid Transit

EXTRAURBAN SYSTEMS

Methane-powered bus (CNG, LNG), Hydrogen

DECISION FACTORS:

PURCHESE COSTS

FUEL COSTS

OPERATIONAL CONSTRAINTS

OTHER MANAGEMENTS COST

OFFERED SEATS

OTHER FACTORS…

The hydrogen Project in TPER

Target within 30/06/2026

BOLOGNA

127 urban buses (12 meters) powered FCEV

1 refuelling station

1 more refuelling station with other public funds

RRP Funds: **€ 90.165.087**

FERRARA

10 urban buses (12 meters) powered FCEV

1 refuelling station (ACTIVE)

RRP Funds: **€ 7.045.780**

Finanziato dall'Unione europea NextGenerationEU

Ministero delle Infrastrutture e dei Trasporti

Italiadomani

137 Hydrogen Fuel Cell Electric Vehicles (around 11% of TPER' bus fleet)

The biggest hydrogen bus project in Italy

Refuelling facilities with innovative solutions

RPP Funds:

Total investment by June, 2026 is about €105 million, with contribution covering around 93% of the total

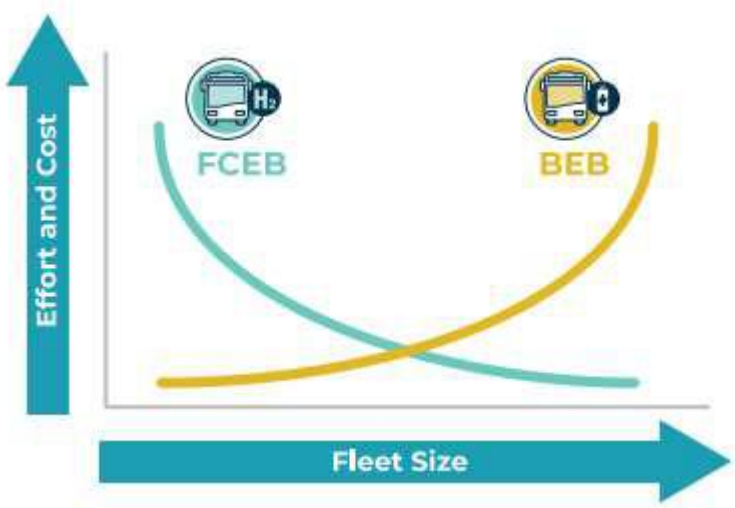
BEV vs FCEV in our vision

PERFORMANCE

Currently FCEV vehicles are the only zero-emission technology capable of delivering performance similar to traditional vehicles.

Also in terms of management activities for the charging phase (refuelling times and the need for staff – number and hours – on duty).

SCALE FACTORS



With fleet increasing

- BEV: increase in power and number of charging station
- FCEV: scale factors

SPACES

Urban depots are often undersized and located in city area without possibility of expansion (typical in historic Italian cities!)

The hydrogen refuelling facilities (1/2)

TPER's project for hydrogen bus refuelling facilities is extremely innovative and high-performing, allowing no impact on depot organization and yard operating costs.

WHAT WE HAVE SEEN

- Hydrogen refuelling plants for buses that exist so far - often serving limited fleets - have refuelling times and conditions that are not suitable for a large fleet.

SEARCH FOR TECHNICAL PARTNER

- TPER has established a joint Company with HGeneration (Wolftank – Adisa Group) for the design and construction of hydrogen storage and refueling facilities for the depots in Bologna and Ferrara.

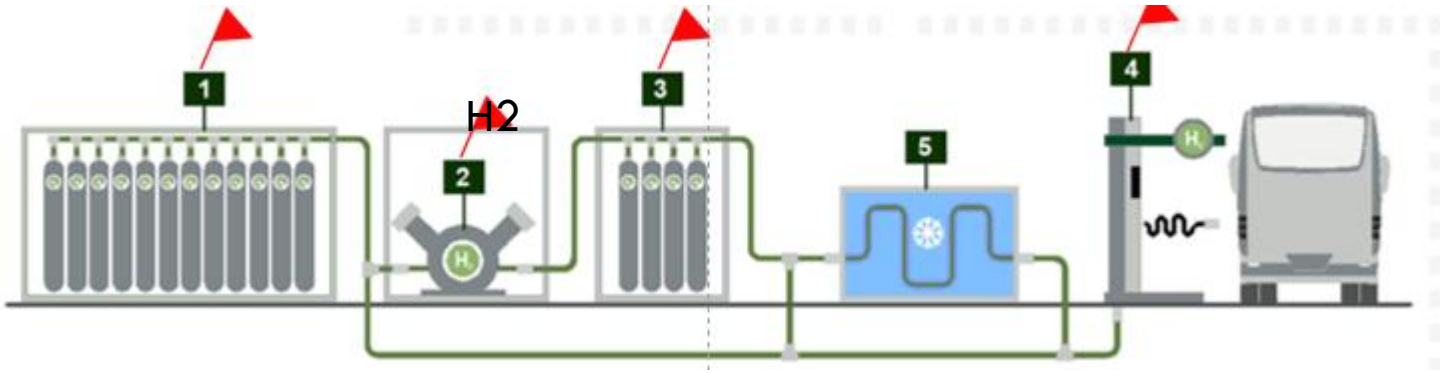
GOAL

- TPER's project has developed a technical solution capable of refuel vehicles in the same time as a diesel/methane vehicle (currently for the largest depots)

The hydrogen refueling facilities (2/2)

The project in the depot in Ferrara has been delivered; in the first depot in Bologna the realization phase will conclude in February, 2026. The second refueling station in Bologna will conclude will be ready in June, 2026.

Illustrative scheme



1 H2 tank truck from 200 to 500 bar

2 Compressor

3 Fixed storage (up to 540 kg of H2) at 500 bar

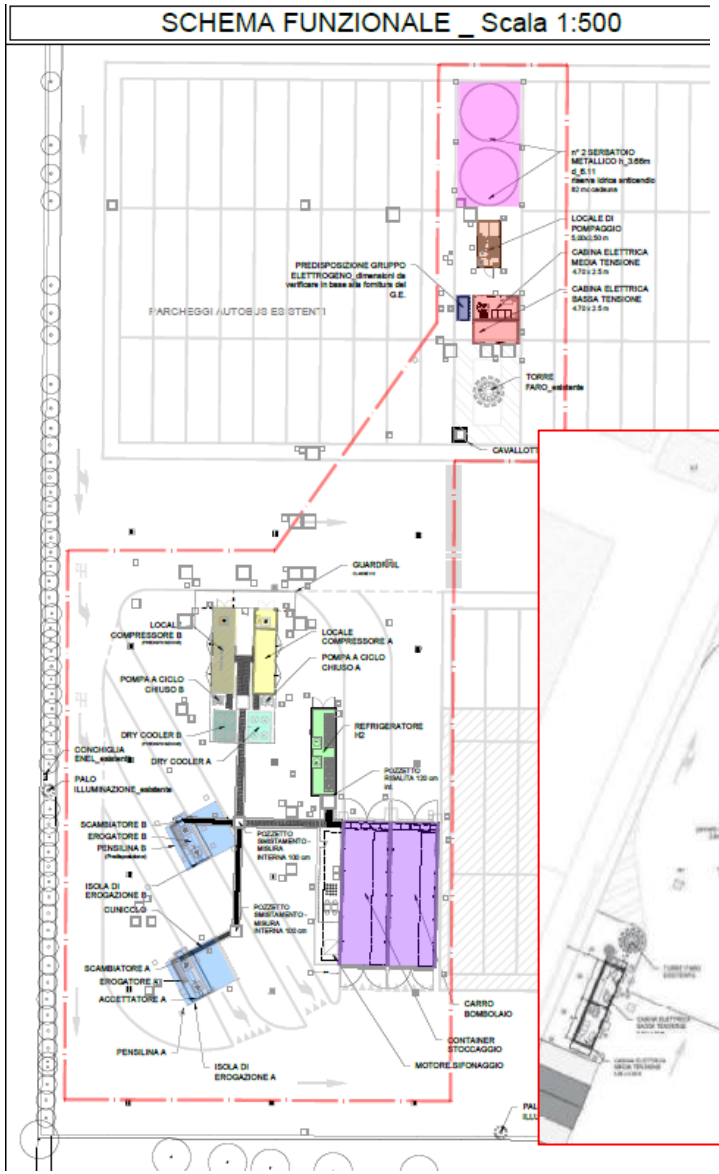
Sequential discharge (patent)

4 H2 dispenser 350 bar

5 Cooling machine

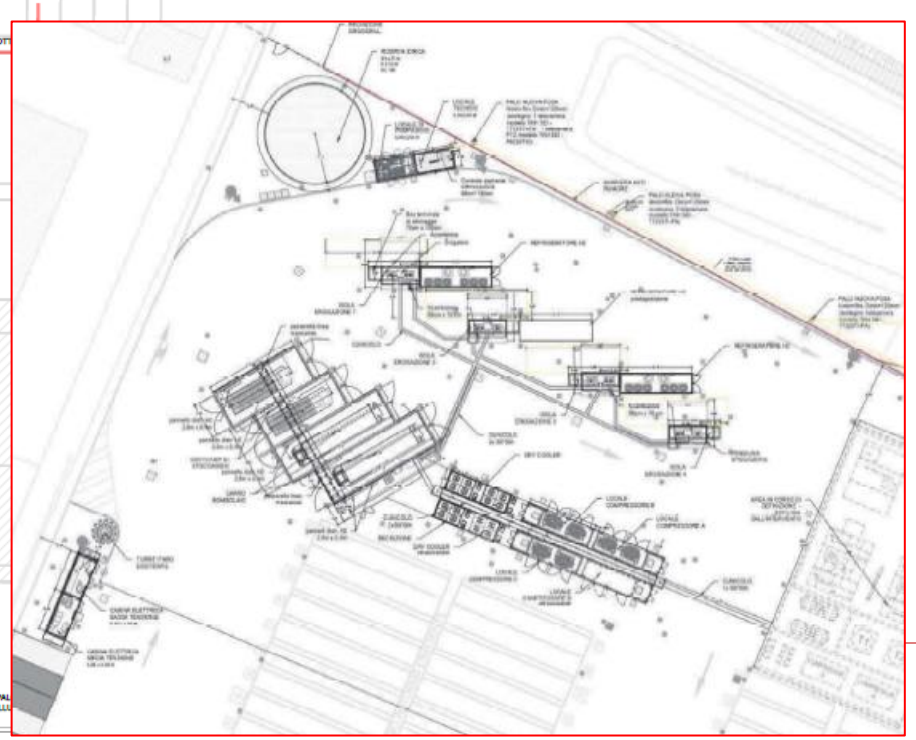
Logistic container for fixed storage

Designing hydrogen facilities in Italy..

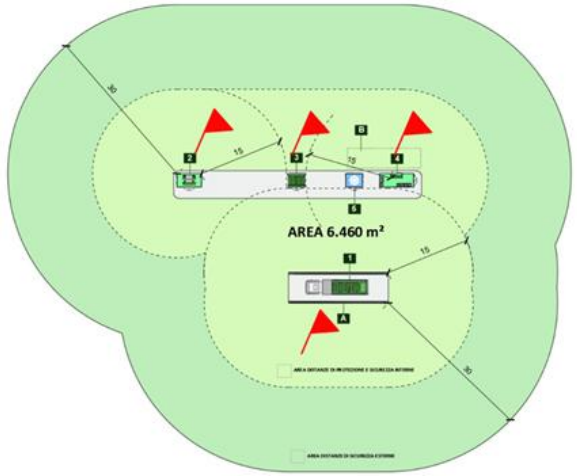


- Very strict regulations regarding distances and constraints.
- Limited specific knowledge and experience among technicians who must evaluate and authorize the facilities.

Lay out of our refuelling stations in Bologna



Internal and external distances



In Italy, internal distances:

- for storage units and box for tank truck ↦ x3 vs German rules
- for dispenser ↦ x6 vs German rules
- for compressors ↦ 15 m. vs 0 with German rules

Operations with a FCEV fleet: limits and challenges

Vehicle usage

- Bus rotations with attention to returning to the depots with refuelling stations (similar limits to those for methane buses)
- Ongoing learning regarding range (km for single full charge) under different operating conditions (in the future: models with or without Range Extender)

Maintenance

- Heavy reliance on bus manufacturer service, due to limited knowledge of the vehicles
- Presence of critical components not maintainable by the public transport operator (fuel cells; batteries)
- Actual real operating availability of vehicles is still being verified

Hydrogen

- The hydrogen molecule market is still very underdeveloped and unstable (molecule availability)
- A number of Projects for the construction of RFNBO hydrogen production plants will be completed in 2026 or later (in Italy)
- RFNBO hydrogen costs are high and are not expected to decrease in the short term (is still real an hydrogen price forecast under 5,2 Euro/kg by 2030?)
- Hypothesis of OPEX contributions, in Italy, to make the RFNBO hydrogen sustainable for public transport

But we have done it (in Ferrara)

Refueling station in Ferrara is running.

Dispenser

Loading bays for tank truck and logistic container (fixed storage)

Compressors and Cooling Machine

Thank you for your attention

www.tper.it