

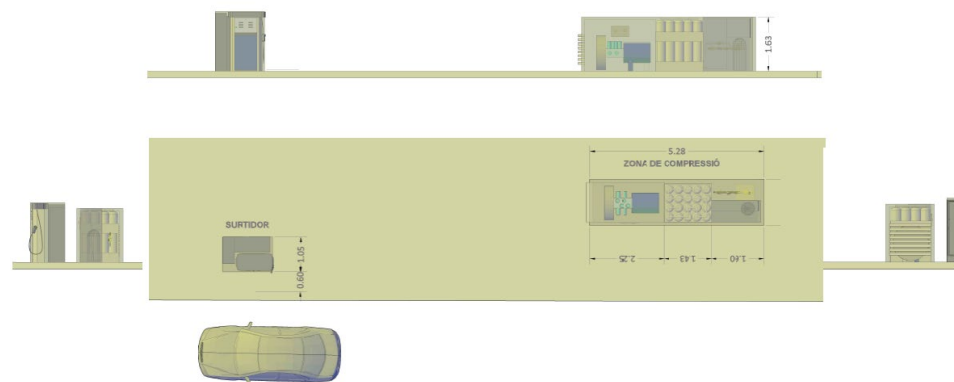
FACTSHEET

SUSTAINABLE
URBAN
MOBILITY



Small distributed CNG grid

SMART SOLUTION 11: ALTERNATIVE FUEL DRIVEN VEHICLES



- Small, compact, flexible and adaptive CNG (Compressed Natural Gas) charging infrastructure could be the future for station design for inner cities implementation.
- Natural Gas for Vehicles (NGV) reduces local pollutant's emissions.
- New business models of public-private partnership could be an incentive for alternative fuels usage inside cities.

Barcelona

Industry partners:

- Naturgy

City contact:

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What is the solution?

This solution includes the implementation of one small and compact CNG (Compressed Natural Gas) filling station servicing CNG vehicles in the city of Barcelona with an innovative and unique design, while maintaining station CAPEX & OPEX at the same level of a conventional filling station. This kind of small CNG charging infrastructure technology has not yet been tested for urban public use.

How does it work?

The following main CNG station components are present:

- 1x Compressor of 60 Nm³/h (30kW)
- 1x Storage unit. (capacity of tanks: 1.600 litres)
- 1x CNG dispenser
- 24h remote assistance, remote control and video surveillance and payment system
- Automatic fire extinction equipment

The figure below shows the conceptual CNG filling station main components layout, where MRS is the Measurement and Regulation Station, for gas inlet regulation before its usage inside the compressor:

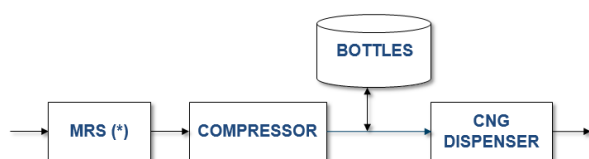


Figure 1: CNG filling station main components layout

Station performance

In an initial phase, moderate vehicle's affluence is expected and for this reason CNG station is defined for giving service to a first 3 light vehicles (15kg gas tank) in a row, representing a charging time of less than 5 minutes each. For the following vehicles, and because the CNG compressed gas inside the tanks will not be available for a short period of time, a maximum charging time of 15 minutes is expected.

Environmental and economical savings scenario considerations

The following station's scenario considerations have been defined for CNG station:

- Affluence: 85 cars & taxis (33 MWh/yr)
- Affluence: 25 Light commercial vehicles (50 MWh/yr)
- Daily charging capacity: 50 vehicles
- Replacement: 290.700 liters (diesel fuel)
- Consumed fuel: 235.000 kg of CNG

Estimated emissions savings

Station's estimated emissions savings are considered as follows:

CO₂ = 142.000 kg/yr; NO_x = 4.300 kg/yr; PM₁₀ = 350 kg/yr

Expected Impact

Improving quality of life:

- Promotion of new alternative fuels for mobility with low environmental impact.

Reducing environmental impact:

- Station's estimated emissions savings are considered as follows:
CO₂ = 142.000 kg/yr; NO_x = 4.300 kg/yr; PM₁₀ = 350 kg/yr

Promoting sustainable economic development:

- Improvement of end users consciousness regarding GNV usage and knowledge of the benefits that GNC offers regarding local emissions savings, consumption, noise and costs reduction.
- The possibility of replication of this measure in multiple strategic locations will enhance GNV usage and the promotion of new alternative fuels for mobility.

Potential for replication

Pre-conditions of replication in other European cities:

- Current local network of filling stations, future deployment plan and future urban implementations in the selected location area have to be taken into account.

- It is desirable to locate the CNG station close to a high pressure gas pipe in order to minimize the electrical consumption of the compressor unit at the same time that civil works costs are optimized.
- It is clear that this action must be accompanied by an awareness campaign for end users, in order to potentiate GNV usage.

Organizational resources and knowledge required within the public administration:

- Awareness campaigns by public administration on the high consumption and local emissions' reduction potential due to GNV implementation.

Stakeholders to be involved:

- Private customers
- Companies' and city vehicle fleets
- Taxis
- Public administration

Potential barriers:

- Relative significant investment effort
- Public administration requirements for locating this type of infrastructure
- Unawareness of GNV as an effective and real solution for as a cleaner mobility alternative.