

# VEHGAN

## Mild-hybrid urban vehicle

### with a downsized turbocharged CNG engine

#### An efficient concept: mild-hybridization

- improves driving agreement during start/stop phases by reducing noise and vibrations;
- provides tight control of the torque flow through the powertrain for vehicle start-up;
- enables choice of high-efficiency engine running modes to reduce energy consumption;
- enables braking energy recovery.

#### An environment-friendly vehicle

IFP Energies nouvelles has proven with previous demonstrators that CNG vehicles can cut CO<sub>2</sub> emissions by 25% or more compared to equivalent gasoline vehicles.

With Vehgan, IFP Energies nouvelles reaches CO<sub>2</sub> emissions 32% lower than those of standard gasoline vehicles (less than 80 g/km against 118 g/km), with customer-attractive performance, improved fuel economy, and compliance with Euro 5 emissions standards.



Vehgan demonstrator vehicle.



StARS electric machine extension from Valeo.

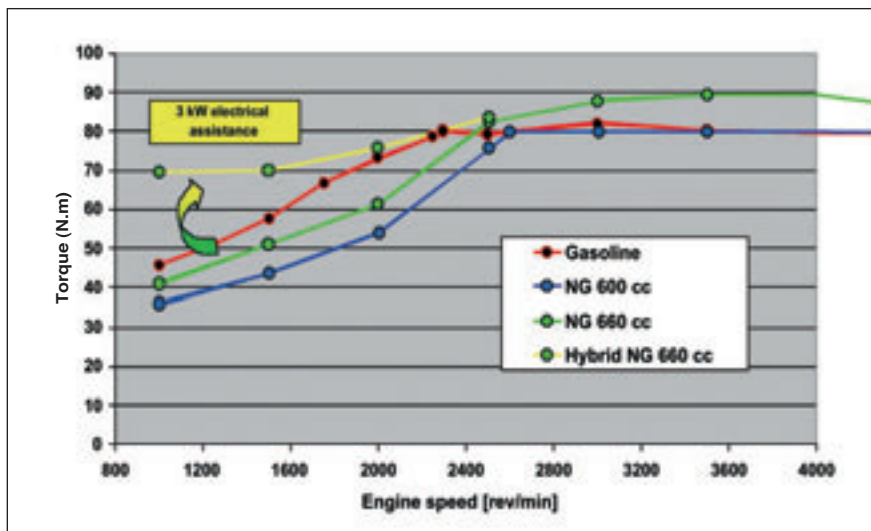
IFP Energies nouvelles is a public-sector research, industrial innovation and training center. Its mission is to develop efficient, economical, clean and sustainable technologies in the fields of energy, transport and the environment.

## A fun-to-drive urban vehicle

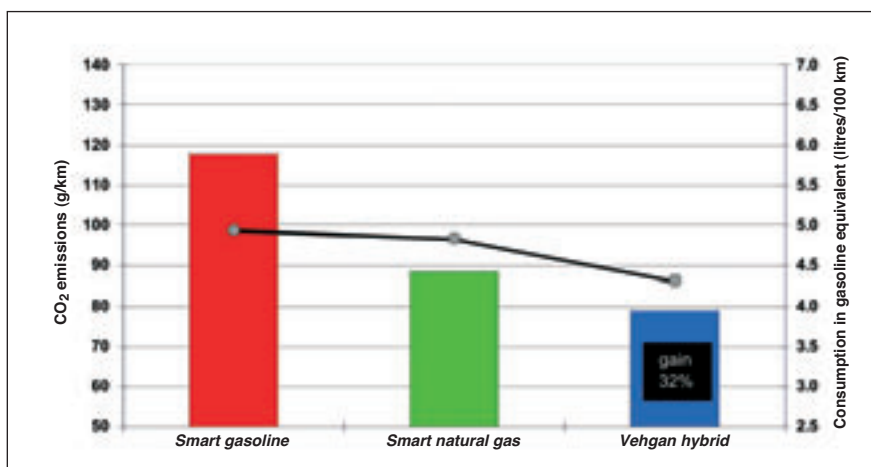
- quiet start/stop;
- excellent low-end torque thanks to electrical assistance;
- integration of the three ultra-light composite tanks under the chassis: no increase of vehicle weight, passenger space and ground clearance unchanged;
- average driving range of the order of 300 km.

## A concentration of technologies

- strong downsizing concept;
- dedicated CNG engine;
- mild hybrid version with recuperative braking;
- dedicated IFP Energies nouvelles engine management developed with the latest tools (Hardware in the Loop model based calibration):
  - mastery of the automatic manual transmission (AMT);
  - implementation through a network of decentralized electronic control units (ECUs), with a powertrain control system integrating engine, motor, and transmission control.



Torque comparison at full load.



CO<sub>2</sub> emissions and consumption in NEDC (New european driving cycle).

The information contained in this document is not contractual

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