

# Flex hybrid

## Plug-in hybrid lab car

### An open, generic test platform

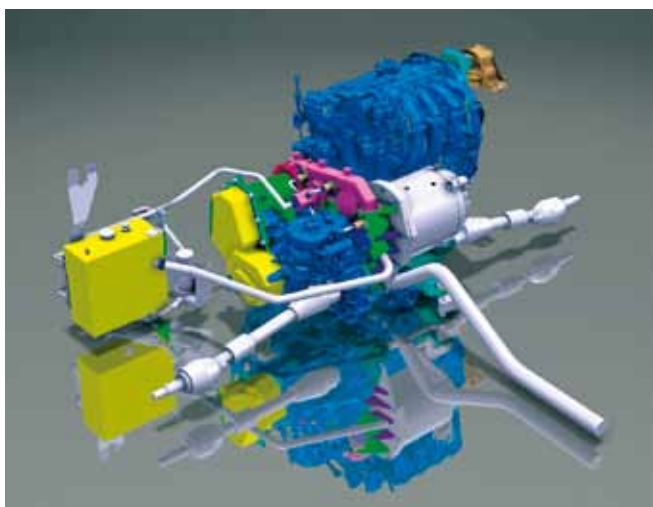
- Providing tests of P-HEV control algorithms, battery packs and power electronics, in real life conditions;
- Supporting a wide range of technologies and components, this advanced laboratory car can be used by IFP Energies nouvelles industrial and research partner for their development projects.

### An environmentally-friendly vehicle

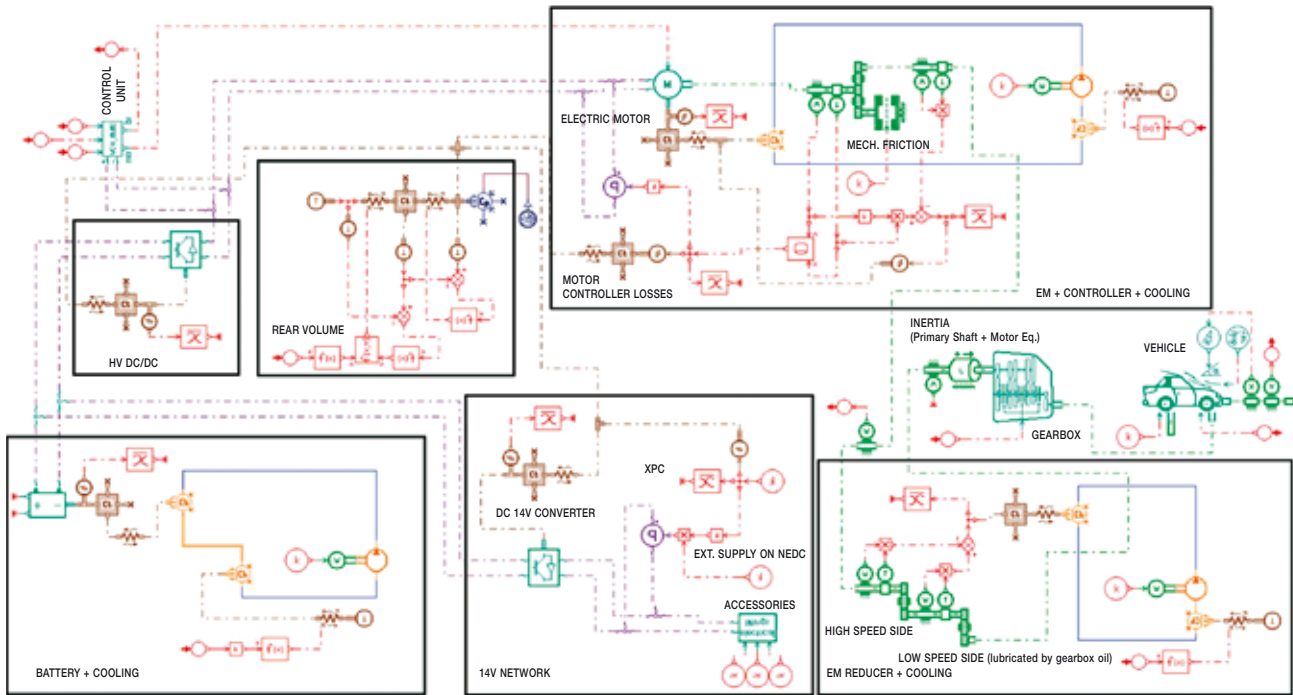
Through its past demonstration vehicles, IFP Energies nouvelles has implemented various technological solutions suited to the specific architectures of hybrid vehicles. With the Flex Hybrid lab car, a 15 km ZEV range is achieved in urban driving conditions. Overall consumption is expected to improve by 50% compared with the original gasoline vehicle.

### Key features

- Hybrid gasoline light duty vehicle;
- Parallel hybrid architecture;
- Plug-in functionality;
- Compliance with Euro 6 emissions standards;
- E85 and CNG versions still to come.



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



## Key achievements

- Design of the whole powertrain prototype from architecture definition to vehicle integration, calibration and testing;
- Selection of high-efficiency engine running modes to reduce energy consumption;
- High dimensioning through simulation;
- Real-time simulation (SiL-xMOD and HIL platform for Flex Hybrid);
- Prioritized control of embedded sub-systems: thermal, electric, transmission; onboard energy optimization with the latest in house tools;
- Optimization of the split of energy onboard.

## In-house real-time simulation tools

### X-MOD platform

A multi-model integration and virtual experimentation platform.

- Increase in model exchange and collaboration across the various engineering fields;
- Increased independence with respect to usual design software;
- Extension of the simulation usability to non-expert users;
- Ensure models confidentiality and know-how protection.

### HIL platform

A generic suite of software tools.

- Physical modeling of components (integration into the LMS Imagine.Lab AMESim simulation platform);
- Prediction and assessment of the complex architectures of HEVs;
- System validation on a high dynamic test bench.



*The information contained in this document is not contractual*

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