

PROJECT

## UPGRADE

### High efficient Particulate free Gasoline Engines

**Funding:** European (Horizon 2020)

**Duration:** Oct 2016 - Sep 2019

**Status:** Complete

**Total project cost:** €8,119,767

**EU contribution:** €8,119,767



**Call for proposal:** H2020-GV-2016-INEA

[CORDIS RCN : 205607](#)

#### Objectives:

The UPGRADE project aims to support the transition to a high efficient, cleaner and affordable powertrain technology systems, based on Spark Ignited GDI (Gasoline Direct Injection) approach, suitable for future Light Duty applications. The project also includes a deep analysis of the phenomenon of the formation of the nanoparticles in relationship to the engine design and its operating conditions and, with regard to the after-treatment solutions, the study and development of new Gasoline Particulate Filter (GPF) technologies.

To increase the engine efficiency under Real Driving conditions, the following steps will be carried out:

- address stoichiometric combustion approach on the “small” size engine and lean-burn combustion approach on the “medium” size one
- study and develop the best combinations of technologies, including advanced VVA/VVT capabilities, advanced boosting system (including electrically assisted booster operations), EGR (Exhaust Gas Recirculation) and thermal management systems
- Explore and implement advanced fuel injection (direct) and ignition system supported by new dedicated control strategies that will be integrated in the ECU (Engine Control Unit) software.

In order to demonstrate the call overall targets (15% improvement on CO<sub>2</sub> emissions based on the WLTP cycle and compliance with post Euro 6 RDE standards) the project will see the realization of two full demonstrator vehicles: one B-segment vehicle, equipped with the small downsized stoichiometric engine, and one D/E vehicle equipped with the medium size lean-burn engine. The vehicle will be fully calibrated and assessed by independent testing, according to on road test procedures, using the available best representative PEMS (Portable Emission Measurement System) technology and considering also PN measurement below 23 nm diameter.

#### Parent Programmes:

[H2020-EU.3.4. - Horizon 2020: Smart, Green and Integrated Transport](#)

**Institute type:** Public institution

**Institute name:** European Commission

**Funding type:** Public (EU)

#### Lead Organisation:

**Centro Ricerche Fiat - Societa Consortile Per Azioni**

**Address:**

Strada Torino, 50  
10043 ORBASSANO (TO)  
Italy

**Organisation Website:**

<http://www.crf.it>

**EU Contribution:** €1,884,208

## **Partner Organisations:**

### **Volvo Personvagnar Ab**

**Address:**

Avd 50090 Hb3S  
405 31 Goteborg  
Sweden

**EU Contribution:** €1,602,531

### **Aristotelio Panepistimio Thessalonikis**

**Address:**

KEDEA BUILDING, TRITIS SEPTEMVRIOU, ARISTOTLE UNIV CAMPUS  
54636 THESSALONIKI  
Greece

**Organisation Website:**

<http://www.auth.gr>

**EU Contribution:** €365,000

### **Schaeffler Technologies Ag & Co. Kg**

**Address:**

INDUSTRIESTR 1-3  
91074 HERZOGENAURACH  
Germany

**EU Contribution:** €992,485

### **Valeo Systemes De Controle Moteur Sas**

**Address:**

Avenue Des Beguines 14  
95800 Cergy  
France

**EU Contribution:** €268,500

### **Avl List Gmbh**

**Address:**

Hans-List-Platz  
8020 Graz  
Austria

**Organisation Website:**

<http://www.avl.com>

**EU Contribution:** €984,750

### **Politecnico Di Milano**

**Address:**

Piazza Leonardo Da Vinci 32  
20133 Milano  
Italy

**Organisation Website:**

<http://www.polimi.it>

**EU Contribution:** €380,000

**Ifp Energies Nouvelles****Address:**

1et 4 avenue de Bois-Préau  
92500 RUEIL MALMAISON  
France

**Organisation Website:**

<http://www.ifp.fr>

**EU Contribution:** €1,398,941

**Università Degli Studi Di Genova****Address:**

N/a  
16126 Genova  
Italy

**EU Contribution:** €302,500

**Valeo Equipements Electriques Moteur Sas****Address:**

2 Rue Andre Boulle  
94000 Creteil  
France

**EU Contribution:** €328,500

**Johnson Matthey Plc****Address:**

40-42 Hatton Garden  
London  
EC1N 8EE  
United Kingdom

**Organisation Website:**

<http://www.matthey.com/>

**EU Contribution:** €252,789

**Chalmers Tekniska Hoegskola Ab****Address:**

-  
41296 GOTHENBURG  
Sweden

**Organisation Website:**

<http://www.chalmers.se>

**EU Contribution:** €803,019

**Technologies:**

Road vehicle propulsion  
Downsized spark ignition engine

**Development phase:** Research/Invention

Emissions control systems  
Gasoline Particulate Filter

**STRIA Roadmaps:** Vehicle design and manufacturing

**Transport mode:** Road transport

**Transport sectors:** Passenger transport

**Transport policies:** Environmental/Emissions aspects

**Geo-spatial type:** Other