**Research title:** Alternative fuels for internal combustion engines

**Abstract:**
The aim of the research activity is the experimental assessment of the impact of biofuels, and in particular of biodiesel, on emissions and performance of last generation automotive engines.

**Background and state of the art:**
The usage of bio-derived fuels as an alternative to fossil fuels for diesel engines has been widely investigated in recent years, since it can provide interesting opportunities in terms of reductions of greenhouse gases emissions and of particulate matter (PM) emissions, as well as in terms of energy sources diversification. In particular, in the transportation sector the usage of transesterified vegetable oils (often referred to as biodiesel, or FAME, Fatty Acid Methyl Ester), pure or in blend with fossil fuels, has been spreading, thanks to the similarity between its chemical and physical properties with those of fossil diesel fuel. However, although several research programs have been carried out on the performance and emissions of compression ignition engines, fuelled with pure biodiesel and blends with diesel fuel, most scientific literature has dealt in the past with engines equipped with conventional injection systems, and even if more recent works also examined engines with high pressure, electronically controlled injection systems, only few studies concerning last generation automotive engines are available. The proposed research activity is therefore focused on the analysis of the effects of neat biodiesel usage on performance and exhaust emissions from small displacement Euro 5 and 6 passenger car diesel engines.

**Objectives:**
Investigate the impact of biofuels, and in particular of biodiesel, on emissions and performance of last generation automotive engines, in order to develop methodologies for the optimization of the combustion process in automotive diesel engines fuelled with biodiesel blends, with a special focus on new generation biofuels.

**INTERNATIONAL AND INDUSTRIAL COOPERATION**

- General Motors Powertrain Europe
- Università di Roma Tor Vergata
- Università degli Studi di Perugia
- Universitatea POLITEHNICA Bucuresti – Romania
- CNAM – Conservatoire National des Arts et Metiers – Paris – France

**RESEARCH GROUP**

Prof. Federico Millo  
Prof. Carlo Vincenzo Ferraro  
Ing. Alberto Poggio  
Ing. Davide Vezza (dottorando)  
Ing. Theodoros Vlachos (dottorando)

**REFERENCE PAPERS**


CONTACTS
Federico Millo, federico.millo@polito.it