



# PhD in INGEGNERIA AMBIENTALE E DELLE INFRASTRUTTURE / ENVIRONMENTAL AND INFRASTRUCTURE ENGINEERING - 39th cycle

Research Area n. 3 - Environmental and Hydraulic Engineering and Geomatics

**PNRR 117 Research Field: ENVIRONMENTAL IMPACTS RELATED TO THE USE OF  
ELECTROFUELS, PURE BIOFUELS AND SPECIFIC BIOFUELS BLENDS IN THE  
AUTOMOTIVE SECTOR**

**Monthly net income of PhDscholarship (max 36 months)**

**€ 1400.0**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

## Context of the research activity

### Motivation and objectives of the research in this field

As the European Parliament has recently approved a ban on the sale of vehicles running on CO<sub>2</sub>-emitting fuels starting from 2035 and the European Commission has proposed a plan to allow sales of new cars with internal combustion engines after 2035, provided they exclusively run on climate-neutral electrofuels (e-fuels), the aim of the project is to evaluate the environmental impacts related to the use of e-fuels, in purity biofuels and specific biofuels blends in the automotive sector.

### Methods and techniques that will be developed and used to carry out the research

The objective of this research is to comprehensively explore the emerging concept of e-fuels and the environmental performances of in-purity biofuels and specific biofuels blends, already available on the market, covering their production and usage in vehicles as an alternative to conventional fuels. The ultimate goal is to highlight the strengths and the limits associated to all the considered alternatives by performing a Life Cycle Assessment (LCA) study.

The research activity will develop through:

- i) data collection and literature review concerning e-fuels regulation, features, synthesis, use, and on vehicles?



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|                                          | <p>modifications in construction, utilization, maintenance and end-of-life stages resulting from the use of e-fuels;</p> <p>ii) laboratory and real drive emission tests, conducted on the chassis dynamometer and on road with the support of the Sustainable Mobility Team of Innovhub SSI, in order to measure and evaluate key parameters related to combustion performances and emissions;</p> <p>iii) Life Cycle Assessment (LCA) analysis in order to provide valuable insights into the environmental sustainability of e-fuels and in purity biofuels and to compare their performances with those of conventional fuels and of electric vehicles.</p> |
| <b>Educational objectives</b>            | The research activity is intended to develop knowledge on the environmental issues within the automotive sector and on techniques suitable for comparative assessment of the local/global scale impacts of the used fuels.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Job opportunities</b>                 | Automotive sector, Environmental consultancy sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Composition of the research group</b> | 0 Full Professors<br>3 Associated Professors<br>0 Assistant Professors<br>0 PhD Students                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Name of the research directors</b>    | M. Grosso, G. Lonati, L. Rigamonti, S. Casadei                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| <b>Contacts</b>                                                                                                                                                                                                                                                                                                                                          |
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| <b>Additional support - Financial aid per PhD student per year (gross amount)</b> |    |
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| <b>Housing - Foreign Students</b>                                                 | -- |



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| Housing - Out-of-town residents<br>(more than 80Km out of Milano) | -- |
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| Scholarship Increase for a period abroad |         |
|------------------------------------------|---------|
| Amount monthly                           | 700.0 € |
| By number of months                      | 6       |

| National Operational Program for Research and Innovation                                             |                                                                                                                                                            |
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| Company where the candidate will attend the stage (name and brief description)                       | Innovhub SSI (Stazioni Sperimentali per l'Industria) - Sustainable Mobility Team - <a href="https://www.innovhub-ssi.it/">https://www.innovhub-ssi.it/</a> |
| By number of months at the company                                                                   | 6                                                                                                                                                          |
| Institution or company where the candidate will spend the period abroad (name and brief description) | To be defined                                                                                                                                              |
| By number of months abroad                                                                           | 6                                                                                                                                                          |

| Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p><u>Educational activities</u> (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): the Ph.D. course supports the educational activities of its Ph.D. students with an additional funding equal to 10% of the scholarship, starting from the first year.</p> <p><u>Teaching assistantship</u> (availability of funding in recognition of support to teaching activities by the PhD student): Ph.D. students are encouraged to apply, upon prior authorization, to the calls to support teaching activities at the undergraduate and Master levels at Politecnico, being paid for that. The teaching assistantship will be limited up to about 80 hours, maximum half of them devoted to teaching and classroom activities and the rest to support classworks and exams.</p> <p><u>Computer availability and desk availability</u>: each Ph.D. student has his/her own computer for individual use. Each Ph.D. student has his/her own desk, cabinet and locker.</p> |