

# ENERGETICS

## MUR DM 117/PWT - Development of suitable modeling methodologies to support the exploitation of hydrogen and e-fuels in internal combustion engines

<b>Funded By</b>	POWERTECH ENGINEERING S.R.L. [P.iva/CF:09644490014] MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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<b>Context of the research activity</b>	<p>The usage of net-zero carbon fuels such as hydrogen and innovative e-fuels in internal combustion engines can speed up the decarbonization process of “hard-to-abate” sectors for which electrification cannot be adopted. Indeed, hydrogen and fuels made by synthesizing captured CO<sub>2</sub> emissions and hydrogen produced using CO<sub>2</sub>-free electricity, are going to be decisive to achieve the “Fit for 55” goal of the EU Green Deal, as well as the target “M2C2: Energia Rinnovabile, Idrogeno, Rete e Mobilità Sostenibile” of the Italian PNRR. In this context, this research proposal aims to develop suitable modeling methodologies to support the exploitation of hydrogen and e-fuels in internal combustion engines. The developed models will be able to capture the peculiar behavior of these innovative fuels both in terms of combustion phenomenon and pollutant emissions, being therefore essential to support the growth of a new generation of internal combustion engines, capable to achieve low or net zero carbon dioxide emissions while reaching unprecedented efficiency figures.</p> <p>Progetto finanziato nell'ambito del PNRR - DM 117/2023 - CUP E14D23001950004</p>
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<b>Objectives</b>	<p>The usage of net-zero carbon fuels such as hydrogen and innovative e-fuels in internal combustion engines can speed up the decarbonization process of “hard-to-abate” sectors for which electrification cannot be adopted. Indeed, hydrogen and fuels made by synthesizing captured CO<sub>2</sub> emissions and hydrogen produced using CO<sub>2</sub>-free electricity, are going to be decisive to achieve the “Fit for 55” goal of the EU Green Deal, as well as the target “M2C2: Energia Rinnovabile, Idrogeno, Rete e Mobilità Sostenibile” of the Italian PNRR. In this context, this research proposal aims to develop suitable</p>
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**Objectives**

modeling methodologies to support the exploitation of hydrogen and e-fuels in internal combustion engines. The developed models will be able to capture the peculiar behavior of these innovative fuels both in terms of combustion phenomenon and pollutant emissions, being therefore essential to support the growth of a new generation of internal combustion engines, capable to achieve low or net zero carbon dioxide emissions while reaching unprecedented efficiency figures.

**Skills and competencies for the development of the activity**

Excellent knowledge of fluid-dynamics and engine thermodynamics  
Knowledge of 1D/3D CFD simulation codes (such as GT-SUITE, CONVERGE CFD)