## PhD in ENERGETICS

## Research Title: Technological $H_2$-readiness of the gas distribution network

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| **Funded by** | Energy Center Lab/DENERG |

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| **Context of the research** | The downstream gas industry is seeing an unprecedented push to innovate to maintain the gas grid infrastructure at the center of national energy systems. Digitalisation, energy efficiency, and the introduction of decarbonized or carbon neutral gas are the pillars of many grid operators. In fact, one way in which the existing gas networks could contribute to this energy transition is via adaptation or repurposing of existing infrastructure, so that they could handle biomethane, blends of of hydrogen and natural gas, or pure hydrogen injections. In this regard, it is thus relevant to assess the technological readiness of current and future grid infrastructure – both physical and digital/cyber assets – towards these new fuel mixtures. Of course, also end-user devices should be compliant with new gases and this another relevant segment to assess.<br><br>Besides energy aspects, the gas grid is much concerned about emissions of GHG from their network. A binding legislation on methane emissions from the gas grid (and all gas industry sectors) is being enacted in Europe. In this regard, it is important to investigate the current methodologies used to monitor and report gas emissions occurring during normal and incidental gas grid operations and how decarbonized blends could impact on such methodologies. |

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| **Objectives** | The main objective of the proposal is to identify the key technological aspects that determine the $H_2$-readiness of the gas distribution network, and to develop a quantitative readiness assessment methodology on them looking at both the state-of-the-art and current/coming innovations in the gas grid distribution network.<br><br>Specific objectives are:<br><br>- Identify which admixtures of green/decarbonized fuels could feed the grid in the next decade;<br>- Identify the injection strategies;<br>- Assess the H2 tolerance of components;<br>- Define new methodologies for gas emission measurements in presence of H2-CH4 blends.<br>The research work should bring an impact to an overarching ambition that is study the energy, economic and environmental impact of decarbonized gas on the national energy system. |

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| **Skills and competencies for the development of the activity** | • Background in the area of energy system modelling.<br>• Good programming skills (e.g., Python)<br>• Elementary experience on data analysis and elaboration.<br>• Inclination to multi-disciplinary team-working. |