

# Politecnico di Milano

## PhD in Environmental and Infrastructure Engineering (IAI)

### Research Area N. 03 Environmental and Hydraulic Engineering and Geomatics (Environmental Engineering Sector)

**Research Title: Optimization of biological reduction of  
CO<sub>2</sub> to methane in ex situ reactors, for power to gas  
conversion**

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. 1.225,00 (In case of a change of the welfare rates during the three-year period, the amount could be slightly modified)
Increase in the scholarship for stays abroad	€ 566,36 per month, for up to 6 months
Number of scholarships	1
Beginning of PhD	1 May 2021
Deadline for application	<b>8 March 2021</b>
Context of the research activity	
Motivations and objectives of the research in this field	Power to Gas entrusts an important role in achieving the decarbonisation objectives established by the Paris agreement. RSE has focused its attention on biological methanation processes: the research aims to demonstrate the ability of trickle bed biological reactors to produce methane with characteristics suitable for feeding into the gas network and to identify an

	optimized configuration to maximize the gas/liquid mass transfer
Methods and techniques that will be developed and used to carry out the research	<p>Experimental activities and modelling of bioprocesses will be both held within the PhD.</p> <p>The research activity will be developed at RSE SpA in Milan and POLIMI DICA. RSE realized an experimental test facility with 2 operating trickle-bed reactors and a third reactor dedicated to the experimental characterization, investigation and optimization of gas liquid transfer.</p> <p>It is requested to the PhD student to have a basic knowledge of Italian in order to interact with plant technicians and to be able to write a technical report in Italian.</p>
Educational objectives	The main objective is the formation of professionals that can develop autonomous research in anaerobic bioprocesses applied to gas phase, understanding and solving the main critical issues for full scale application of these technologies in the different fields
Job opportunities	Typical outlets into the job market are: Universities, Research Centres, local and national Authorities and environmental Agencies, environmental consulting companies.
Composition of the research group	<p>Please Indicate links to web-pages of the research group</p> <p>Number of Full Professors: 1</p> <p>Number of Post-Docs: 1</p> <p>Number of PhD students: 1</p> <p>Number of contracted Polimi researchers: 1</p> <p>3 RSE Researchers</p>
Names of the research directors	<p>Francesca Malpei – anaerobic bioprocesses and technologies</p> <p>Carmen Valli - RSE</p>
Contacts	<p>francesca.malpei@polimi.it</p> <p>Phone +39 02 23996434 Fax +39 02 23996499</p>
<b>Additional support</b>	
<u>Housing:</u> financial aid per PhD student per year (gross amount)	No financial aid
<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other informations</b>	
<p>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other informations</p> <p>Educational activities (purchase of study books and material, funding for participation to courses, summer schools, workshops and conferences): financial aid per PhD student per year</p> <p>1st year: max 1.020,00 euros per student on average</p>	

2nd year: max 1.020,00 euros per student on average

3rd year: max 1.020,00 euros per student on average

Teaching assistanship:

availability of funding in recognition of support to teaching activities by the PhD student

There are various forms of financial aid for activities of support to the teaching practice.

The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

Computer and desk availability:

1st year: individual use

2nd year: individual use

3rd year: individual use