



PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 40th cycle

THEMATIC Research Field: SUSTAINABILITY ASSESSMENT OF GREEN TECHNOLOGIES FOR NAVAL MOBILITY IN NEARBY LAKE AND SEA BASINS

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0
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	<p>The nautical mobility has significant impact on the environment especially in touristic regions. The environmental concerns, public pressure and changing regulation and market factors are forcing the naval industry to become green with the reduction its impact on environment. In the past large focus has been dedicated to increase engines efficiency, but energy sources remain based on fossil fuel derivatives (diesel, gasoline, etc). The global decarbonisation path designs future scenarios where mobility will be green and sustainable looking at the entire life cycle. The naval operations are all energy-intensive activities, and these operations result in significant pollution, waste, contamination, and produces significant amounts of air emissions, including greenhouse gases which can have a negative impact on both the environment and human health. “Green nautical mobility” or net zero in nautical mobility can only be achieved with development of “green ship” concept. A ship is considered green when the energy source for its mobility is green, and, at the same time, sustainable from economic and environmental point of view along the entire life cycle of fuels, engines and mobility infrastructure. In other words, Green Ship aims to minimize the emission, waste and pollution during the manufacturing (repair and recycle) and operations of ships.</p>
Methods and techniques that will be developed and used to carry out the research	<p>This PhD project will investigate the technologies, the economics and the environmental impact associated to</p>



	<p>economics and the environmental impact associated to the decarbonisation path achieving a zero emission target at 2050. This project will feed into the knowledge in this area by investigating the different options for nautical mobility to meet the goals of Net-Zero and investigate the impacts of the suggested improvements using scenarios' simulations and optimization techniques. Overall, this project will investigate the transition from the use of today fossil fuels and resources, towards bio-fuel and e-fuel and increasing efficiency of the operations and sustainability. The successful candidate will join the research centre of eni spa that provides a collegiate, vibrant, and welcoming environment. Research findings will be published in high-impact journals with the opportunity to present at international conferences</p> <p>Theoretical tools: Linear and MILP programming, constrained Optimisation, Multi-objective Analysis, Input-Output analysis, Life Cycle Assessment,</p> <p>Computational tools: Matlab, Python and open source energy & industrial ecology models, GIS.</p>
<p>Educational objectives</p>	<p>The doctoral program offers advanced training organized in three pillars:</p> <p>Basic Research, which includes methodological courses related to key aspects of theoretical and applied research in science, policy, and technology of sustainable change;</p> <p>Specific Research, designed to strengthen candidates' knowledge on specific topics aligned with their research interests and increase their presence in the international scientific community through participation in conferences and presentation of their scientific work in academic contexts.</p> <p>Development of the Doctoral Thesis, which allows candidates to develop leading-edge research competencies and produce original scientific work on a topic that contributes to scientific debate and has societal impacts.</p> <p>Periods of study in worldwide most recognized research</p>



	institutions and in eni company are supported by the doctoral school and the supervisor.
Job opportunities	Public and private entities, industrial companies, universities and private research institutes in the areas of energy production, conversion and transmission, rational use of energy and sustainability.
Composition of the research group	2 Full Professors 3 Associated Professors 3 Assistant Professors 7 PhD Students
Name of the research directors	Prof. Fabio Inzoli

Contacts	
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p>The educational activity will be discussed based on the candidate?s competences.</p> <p>There are various forms of financial aid for teaching assistant activities. The PhD student is encouraged to take part in these activities, within the limits allowed by the PhD program?s regulations.</p> <p>The candidate has the possibility to manage his own budget for supporting research instruments, initiative, or conference participations.</p> <p>The candidate will be hosted at Department of Energy in Bovisa campus, and he has access to High Performance Computation infrastructure (www.cfdhub.polimi.it) to manage the research</p>



project.