



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

**PNRR 630 Research Field: TECHNO-ECONOMIC EVALUATION OF SMALL MODULAR REACTORS FOR SUSTAINABILITY AND POLICY ANALYSIS**

**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**

Energy is a key pillar in the transition to a sustainable world. The objective of obtaining “affordable and clean energy” (SDG 7) should be accomplished limiting the CO2 emission to combat the climate change (SDG13). Recent events have been also pointed out the need to ensure energy in difficult geo-political scenario as well as to consider the environmental footprint in terms of raw materials, land use and water resources.

To achieve these goals, several pathways have been outlined from different organization (IPCC, IEA, ...) and the majority of them foresees a role for nuclear energy not only in the electricity market but also in hard-to-abate sectors (heating, transportation, industry...).

In this light, Small Modular Reactors (SMRs) and their integration into a hybrid energy system may play a key role in the next decades, both at World and at European level. The integration of nuclear with other energy sources and carriers is a cutting-edge research topic to satisfy the aforementioned objectives.

The PhD project will develop tools to evaluate the technological, economic and financial features of SMRs. The final objective is to elaborate a thorough sustainability analysis of their deployment to support policies for a sustainable energy transition .The analysis will include – but not limited to: i) the identification of the key elements of the profitability of SMR projects, ii) a comparison with “business-as-usual” Large Reactor deployment, including resilience to techno-economic-financial risk, iii) the



	<p>identification of the most suitable KPIs, useful to evaluate the degree of sustainability of SMR projects, from the environmental, social and governance points of view, including potential supporting policies.</p>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>A comprehensive approach will be adopted to address the multidisciplinary characteristics of the problem, from the technical challenges to the economic and financial assessment, considering also environmental and societal impacts.</p> <p>Techno-economic models will be used (e.g. INCAS) or developed. LCA (Life Cycle Assessment) methods and tools will be adopted.</p>
<p><b>Educational objectives</b></p>	<p>This activity will allow the student to gain knowledge and understanding in the role of the nuclear energy for future energy scenarios, giving the opportunity to become an expert in the integration between nuclear and other energy sources both from a technical and economics point of view. The student will become able to support the evidence-informed policymaking process of the energy transition to a sustainable development. The presence of European projects devoted to SMR investigation will allow the student to interact with the main European institutions in this research field.</p>
<p><b>Job opportunities</b></p>	<p>The job opportunities for a PhD graduate in this research area are:</p> <ul style="list-style-type: none"> <li>- Utilities and economic-financial stakeholders interested in innovative nuclear reactors deployment</li> <li>- Academic career in the field of innovative nuclear reactors and energy scenario assessment</li> <li>- Industry involved in the development of SMRs</li> <li>- Research centres and support organizations</li> </ul>
<p><b>Composition of the research group</b></p>	<p>1 Full Professors                      3 Associated Professors                      1 Assistant Professors                      15 PhD Students</p>
<p><b>Name of the research directors</b></p>	<p>prof. Marco Ricotti ; prof. Stefano Lorenzi</p>



Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
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Housing - Foreign Students	--
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Housing - Out-of-town residents (more than 80Km out of Milano)	--
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Scholarship Increase for a period abroad	
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Amount monthly	750.0 €
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By number of months	6
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National Operational Program for Research and Innovation	
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Company where the candidate will attend the stage (name and brief description)	Edison S.p.A.
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By number of months at the company	6
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Institution or company where the candidate will spend the period abroad (name and brief description)	To be defined
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By number of months abroad	6
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Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
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**Educational activities:**

Financial aid per PhD student is available for purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences. The educational activity will be discussed based on the candidate's competences.

**Teaching assistantship:**

Availability of funding in recognition of supporting 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 PhD program's regulations.

**Computer availability:**

individual use.

**Desk availability:**

The candidate will be hosted at Department of Energy in Bovisa campus

