



PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 39th cycle

THEMATIC Research Field: MODELLING INDUSTRIAL DECARBONIZATION AND DIGITALIZATION TOWARDS CLIMATE NEUTRALITY

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

Industrial sectors face the twin challenges of the ecological and digital transitions. On the one hand, to achieve climate change mitigation targets industries will have to move away from carbon intensive energy inputs; on the other hand, the widespread diffusion of digital technologies is promoting key changes in industrial production and in the provision of goods and services. Digitalization plays an important role for industrial decarbonization narratives and pathways because it may lead to higher or lower reference emissions in the absence of climate policy. Yet, modelling tools used to generate decarbonization pathways lack a detailed representation of energy demand by industrial sectors; they also do not account for digitalization dynamics and their impact on energy efficiency and demand.

The aim of this scholarships, funded by the ERC project 2D4D (www.2d4d.eu), is break new ground in the joint modelling of industrial energy demand and decarbonisation dynamics in the context of Integrated Assessment Models. This will require to (1) understand how digitalization dynamics impact different industrial sectors; (2) map potential decarbonization strategies for energy intensive industrial sectors; (3) explore different modelling approaches to the modelling of energy demand and technological change dynamics; (4) identify the key policy levers affecting both industrial energy demand and digital technologies adoption and diffusion; (5) develop a



	modelling framework which allows to generate decarbonization pathways for industrial sectors while fully accounting for production changes brought about by novel digital technologies.
Methods and techniques that will be developed and used to carry out the research	The research will use state-of-the-art toolbox of methodologies. Data science approaches and econometric techniques will be applied to variety of data sources, including firm-level and patent data, to improve the understanding of energy demand by industrial sectors and its heterogeneity as well as to estimate the relevance and diffusion of different key digital technologies. A variety of modelling methods will be explored to develop a new modelling approach for industrial energy demand in an increasingly digitalized world: these range from bottom-up models with a high level of details within the energy system modeling to top-down models providing an aggregated description of the energy system, and from simulation to optimization.
Educational objectives	To educate on the application of econometric methods and integrated assessment modelling to identify climate change mitigation challenges and opportunities for industrial sectors and related climate and digitalization policies.
Job opportunities	Professional careers in universities, research organizations, national and international institutions interested in ex-ante evaluation of energy, climate, and digitalization policies through the use of enhanced integrated assessment models.
Composition of the research group	2 Full Professors 0 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	Massimo Tavoni ; Elena Verdolini

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>educational activity: PhD course plus seminars and summer schools</p> <p>teaching assistantship: possibility to do some TA</p> <p>computer availability: computer will be provided</p> <p>desk availability: desk will be provided</p> <p>any other information: The candidate will have the opportunity to be affiliated with the European Institute on Economics and the Environment, part of Fondazione CMCC, the Italian research institute on climate change of which Politecnico di Milano is one of the member</p>