POLITECNICO DI MILANO

PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 38th cycle

THEMATIC Research Field: FINE-TUNING REGIONAL CLIMATE AND ENERGY POLICIES THROUGH MULTI-SCALE INTEGRATED ASSESSMENT MODELLING

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0
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	The impacts of greenhouse gases emissions on Earth's climate require a rapid decarbonization and adaptation of the global economy, especially in the water, energy, and agricultural sectors. While integrated assessment modelling scenarios define roadmaps at the global and continental level (see IPCC AR6 scenario database), it is not straightforward to translate these in regional and country level policies and regulations, in particular for rapidly growing economic regions such as Africa and Asia. The resulting global/continental policies may thus produce unintended impacts across interconnected systems at finer scales (see Giuliani et al., 2022). For these reasons, new methodologies need to be devised to consider local scale dynamics in the design of global policies as well as to adjust regional and national strategies to comply with higher level targets. By avoiding conflicts between the different decision scales and promoting involvement of small-scale actors, the newly designed policies can overcome present hurdles and effectively guarantee a sustainable transition.
Methods and techniques that will be developed and used to carry out the research	State of the art integrated assessment modelling tools will be used together with optimization, optimal control, and mathematical modelling of environmental and socio-economic systems. Water, energy, and agricultural systems models will be used to derive projections and design local sustainable transition strategies. Big data, statistics, and machine learning will be leveraged to

	statistics, and machine learning will be leveraged to manipulate and examine the large set of scenarios available at the global and continental scale.
Educational objectives	The doctoral program offers advanced training organized in three pillars: - Basic Research, which includes methodological courses related to key aspects of theoretical and applied research in science, policy, and technology of sustainable change; - 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. - 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. A period of study in worldwide most recognized research institutions is supported by the doctoral school and the supervisor.
Job opportunities	The PhD graduates will be equipped with distinctive skills and advanced trans-disciplinary knowledge that open up career opportunities as analysts, researchers, or planners at universities, international research centers, public and international institutions, R&D departments, regulatory authorities, policy institutions, and other public bodies.
Composition of the research group	2 Full Professors 0 Associated Professors 9 Assistant Professors 4 PhD Students
Name of the research directors	Prof. Andrea Castelletti

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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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
A desk in the lab offices and a personal laptop will be provided over the duration of the PhD programme. Teaching assistantship opportunities might be available over the triennium. Super computing facilities are available both at the department and with external associated partners.