

PhD in SCIENZE E TECNOLOGIE ENERGETICHE E NUCLEARI / ENERGY AND NUCLEAR SCIENCE AND TECHNOLOGY - 41st cycle

THEMATIC Research Field: AN EVIDENCE-BASED POLICY DE-RISKING FRAMEWORK TO ENHANCE THE IMPACT OF CLEAN ENERGY TECHNOLOGIES

Monthly net income of PhDscholarship (max 36 months)		
1700.0		
In case of a change of the welfare rates during the three-year period, the amount could be modified.		

Motivation and objectives of the research in this field	In the light of the evolving challenges for the energy trilemma (security, equity and environmental sustainability) in both industrialized and emerging countries, our mission is to study sustainable pathways for the technological evolution . More in details in the domain of developing and emerging regions, despite notable progress over the last 50 years, access to energy remains a major global challenge . According to the International Energy Agency, 685 million people still do not have access to affordable, reliable, and modern electricity, while 2.1 billion lack clean cooking solutions. A World Bank and UNDP study further reveals that 1.18 billion people are considered energy poor—unable to make meaningful use of electricity.Energy poverty refers to the absence of sufficient, reliable, and affordable energy for essential needs like lighting, cooking, heating, and supporting livelihoods. This lack hinders welfare, economic opportunity, and inclusive development. A fair and inclusive energy transition is therefore vital. It not only addresses climate change but also enables access to sustainable, clean, reliable, and affordable energy—key to improving health, gender equity, education, and economic growth. A diverse set of technologies has emerged to expand energy access,

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	backed by governments, private sector, and international agencies. Strategic energy planning tools have been developed to guide technology deployment, usually emphasizing cost-efficiency through economic and engineering models.
	Research Gap: Current national energy planning often overlooks social, economic, and environmental factors. This is especially problematic in developing countries, where such plans are frequently fragmented and not well- integrated into broader development agendas. While energy access and transition are increasingly recognized as pillars of sustainable development, most planning remains focused on least-cost, technical solutions. This narrow approach fails to reflect the complex realities of development, weakening the alignment between energy policy and national development goals, and limiting its broader societal and environmental impact.
	Objectives and motivations of the research: The main objective of this research is to develop an evidence-based policy framework for de-risking investments in clean energy technologes, with a particular focus on decentralized off-grid systems. Despite global investments in clean technologies expected to surpass USD 2 trillion in 2024, only 15% of these funds are allocated to developing countries, with Africa receiving just 2%. This research aims to identify key regulatory, financial, and investor confidence barriers and propose mitigation measures to unlock private capital and strengthen public-private partnerships.
Methods and techniques that will be developed and used to carry out the research	 Within he framework fo the Comprehensive Energy Solution Planning (CESP) methodology at national level the research will adopt an interdisciplinary approach, combining: Comparative Analysis of International Case Studies and Best Practices including Policy and Regulatory Framework: Detailed analysis of public policies, regulatory structures, and governance mechanisms, with attention to how regulatory uncertainty and barriers



	 impact investment flows in clean energy. Derisking Renewable Energy Investment (DREI) introduces an innovative, quantitative framework to assist policymakers in developing countries Input-Output (IO) analysis to ensure the intricate interconnections between diverse economic sectors. By offering a numerical representation of the flows of goods and services in an economy, these models enable analysts to evaluate the effects of alterations in demand or supply on a range of economic, social, and environmental factors. Collection and Systematization of Empirical Data: Gathering quantitative and qualitative data from diverse geographies to inform evidence-based recommendations and enhance the reliability of policy advice. The added value of this research lies in building upon and expanding existing work initiated within the UNDP and in collaboration with the SESAM group of Politecnico di Milano.
Educational objectives	The specific objectives are to improve and develop - Energy System modelling tools with financial details, - Integrate them with Impact assessment models- Identify a Decision Support System able to assist an evidence- based policy framework for de-risking investments in clean energy technology by the UN system.
Job opportunities	Energy Analyst for energy utilities and/or for NGOs and international organization or public institutions
Composition of the research group	2 Full Professors 4 Associated Professors 2 Assistant Professors 7 PhD Students
Name of the research directors	Emanuela Colombo, Riccardo Mereu, Matteo Rocco

Contacts

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Please, Keep all in copy of any communication

Additional support - Financial aid per PhD student per year (gross amount)		
Housing - Foreign Students		
Housing - Out-of-town residents		

Scholarship Increase for a period abroad			
Amount monthly	850.0 €		
By number of months	6		

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

*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, instrumentations and computer, etc. The amount is about Euro 3.000,00.

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 regulations. *Computer availability:* individual use. *Desk availability:* individual use.

Awards: Awards can be recognized to the PhD candidate up to Euro 2.000,00 (gross amount, per year). More details about this program will be provided by PhD Program Steering Committee.