

PhD in Urban and Regional Development

Research Title: Integrated evaluation for supporting Climate Positive Circular Communities

VIS-CPCC

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| Funded by | DIST/Ateneo fondi CRT |
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| Contact | www.valium.polito.it https://www.eurac.edu/it/research/technologies/renewableenergy/Pages/default.aspx |
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| Context of the research activity | <p>The research activity is part of the recently funded ARV project within the European Programme H2020 (Green Deal Call H2020-LC-GD-2020) of which the Politecnico di Torino is a joint partner together with EURAC research institute in Bolzano. The project investigates the large-scale implementation of the model of the Climate Positive Circular Communities (CPCC), which implies a wide range of interventions that go beyond the simple construction of new buildings or the development of energy infrastructures (and / or retrofit of existing ones). This innovative model, in fact, focuses on further issues, such as the enhancement of social inclusion, the increase in the quality of life of citizens, the valorization of local cultural assets, the protection of environmental resources, the promotion of sustainable economic development, and so on. In this perspective, in addition to the economic-financial aspects of the regeneration operations, other impacts, co-costs and co-benefits need to be considered within a multidisciplinary approach able to provide a complete overview of the strategies under investigation. Grounding on a strong interdisciplinary and intersectoral collaboration (urban planning, social sciences, economics, energy, building physics),</p> |
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| | <p>the doctoral research aims at estimating the multiple benefits generated by energy regeneration operations at the local level (cases pilot / CPCC / urban scale) through qualitative-quantitative and monetary scales, thus providing to decision makers and actors involved in the sustainable transition of the city a useful support for the definition of innovative strategies.</p> <p>Part of the activities planned in the three-year period of the doctorate, even on a non-continuous basis and indicatively to the extent of 50%, will be carried out at the EURAC research centre, Institute for Renewable Energy, located in Bolzano (in compliance with any COVID-19 health provisions). This will allow the student to expand his/her horizons through interdisciplinary exchanges and sharing research with other PhD students and researchers belonging to the structure.</p> |
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| Objectives | <p>To operate on a large scale, as in the case of Climate Positive Circular Communities (CCPC), financial resources are needed to achieve specific objectives, such as modernization generation plants, the redevelopment of buildings, the promotion of specific initiatives through financial subsidies, etc. Recently the academic and scientific literature has tried to focus on identifying the complex of direct and indirect positive impacts, called co-benefits, which such investments generate. In particular, methods for their quantification and monetization have been studied in order to allow their inclusion in decision-making frameworks. As requested by the European Commission, in fact, large-scale projects require economic feasibility analyses that take into account not only the financial aspects, but also the macroeconomic effects generated in terms of net benefits for the players involved. Life Cycle Assessment (LCA) and Life Cycle Cost Cost - LCC), Multicriteria Analysis (MCA) and Cost Benefit Analysis (CBA) are the most frequently used evaluation methods when dealing with decision-making problems regarding energy requalification. In this context, the co-benefits investigation has become crucial in recent years and a growing body of literature has been developed. Despite this, a complete methodology capable of systematizing all these impacts and evaluating the best options for intervention continues to be lacking. The proposed research aims to bridge the gap in this context, studying the benefits associated with interventions related to the CCPC model, considering the different dimensions of the urban system and investigating their performance in terms of costs and benefits in the decision process.</p> <p>In the first year of the PhD, the research will focus on the investigation and collection of data through literature analysis. In particular, in a first phase, the PhD student will be involved in examining existing case studies on the CCPC model at an international level in order to have a broader understanding of</p> |
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| | <p>the potential of the projects under development, as well as of the existing solutions. In a second phase, the investigation will concern the concepts of co-benefits and externalities in the context of the urban energy transition. The student will propose a classification starting from existing research and studies, in order to provide an overall picture of the state of the art on this topic. A third phase will focus on a bibliographic search of the metrics used for the evaluation of co-benefits in this sector, and on the specific estimation procedures.</p> <p>During the second year, the PhD student will experiment different co-benefits evaluation techniques on the pilot case studies of the ARV project, in order to provide reference data to tackle complex real decision-making problems. Subsequently, the combined approaches will be compared with each other in order to define the most suitable one to describe the energy, economic and environmental performance of the case studies under examination. Given the complexity of the decision problem, the use of GIS (Geographic Information System) tools will support the management of the initial data, the development of the analyses, as well as the visualization of the results.</p> <p>In the last year, the research will aim at the construction of an integrated evaluation model capable of providing public decision makers with an overall view of the project under investigation in terms of costs and benefits generated. The final phase will involve the validation of the model on a real case study. The results will be further reviewed and validated with a panel of experts chosen on the basis of their specific knowledge and expertise in the fields of the dimensions explored in the scoreboard.</p> <p>Throughout the three-year period, the PhD student will organize specific meetings with stakeholders to share the results, and will be involved in finalizing research for the publication of articles in scientific journals and presentations at national and international conferences.</p> |
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| <p>Skills and competencies for the development of the activity</p> | <p>The candidate is expected to have preliminary competencies in the field of environmental, socio-economic and energy performance evaluation and integrated analysis of urban and territorial development. The candidate must demonstrate a strong interest in the proposed topic and show capacity to work in a multidisciplinary team and to prioritize the own work for accomplishing deadlines. The candidate should also feel comfortable working in an international context.</p> |
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