

FINAL CONFERENCE PROCEEDINGS

PATHWAYS TOWARDS GREEN TRANSITION OF EUROPEAN URBAN AREAS CITY MINDED Final International Conference

November 22, Pula, Croatia



Co-funded by the Erasmus+ Programme of the European Union





PATHWAYS TOWARDS **GREEN TRANSITION OF EUROPEAN URBAN AREAS**

22 NOVEMBER 2022

FINAL INTERNATIONAL CONFERENCE

CITY MINDED, PULA











Pathways towards green transition of European urban areas

CITY MINDED Final International Conference

Edited by Andrea Poldrugovac and Antonio Franković

IRENA – Istrian Regional Energy Agency Ltd.

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PATHWAYS TOWARDS GREEN TRANSITION OF EUROPEAN URBAN AREAS

CONFERENCE ORGANIZING COMMITTEE

Andrea Poldrugovac, IRENA – Istrian Regional Energy Agency Antonio Franković, IRENA – Istrian Regional Energy Agency







FOREWORD

The development and testing of an innovative, creative, European-scaled learning environment called "City decarbonisation itinerant workshops", where students, specialists and stakeholders can come together to address common onsite challenges and propose measures for the decarbonisation of targeted urban areas through a "learning-by-doing" method has been the focus of the CITY MINDED (City Monitoring and Integrated Design for Decarbonisation) project for the past three years. The project intends to help to fulfil the needs of Higher education in fields related to the built environment and urban sustainability, which often lack an interdisciplinary approach, real-world experiences and contacts with real urban contexts and actors beyond classroom activities.

The sustainability of cities is currently a key challenge in Europe. Around 70% of Europeans live in cities and this number will rise, therefore urban areas are the most important test-bed for energy transition and decarbonisation models. Decarbonisation measures concern a wide variety of topics which require a systemic interdisciplinary approach and development of new professional profiles, able to coordinate different sources of information, stakeholders and practitioners.

The final CITY MINDED conference in Pula is the culmination of the project activities and the main dissemination event of the project. With the title "Pathways towards green transition of European urban areas", the conference is divided into three main sessions: teaching decarbonisation – methodologies and experiences from CITY MINDED, approaches to urban sustainability and multi-level perspectives and experiences of urban decarbonisation. The aim of the conference is to present project outputs, together with examples of good practices and partners and stakeholder's expertise in the fields focused on the decarbonisation and green transition of the urban areas.







Program of the Final International Conference

- 9:30 Registration of the participants
- 10:00 Welcome speech

IRENA – Istrian Regional Energy Agency (HR)

10:10 The CITY MINDED project: general features

Andrea Poldrugovac, IRENA – Istrian Regional Energy Agency

10:30 Session 1 - Teaching decarbonisation – Methodologies and experiences from CITY MINDED

 Methodology and guidelines – a roadmap for the establishment of the CITY MINDED itinerant workshops

Matteo Maccanti, UNISI – University of Siena (IT)

• Roadmaps for the carbon neutral urban areas of the City Decarbonisation Itinerant Workshops

Josefina López Galdeano, UPO – University Pablo de Olavide (ES)

• The CITY MINDED modular course on decarbonisation: learning and teaching tools for students and teachers

Francesca Paola Mondelli, UNIROMA3 – University of Roma Tre (IT)

• The CITY MINDED web platform

Diane Cassar, MIEMA – Malta Intelligent Energy Management Agency (MT)

11:30 Session 2 – Approaches to urban sustainability

• Risks, vulnerability, resilience and adaptation to climate change

Yago Martín Gonzalez, UPO – University Pablo de Olavide (ES)

- Research, study, and proposals for a Carbon Neutral future
 - Valentina Niccolucci, Michela Marchi, UNISI University of Siena
- The City of Poreč-Parenzo Sustainable transport and mobility solutions in service of achieving European energy and climate policy goals

Gordana Lalić, City of Poreč





• From climate change to decarbonisation via energy planning. Roma Tre's research experiences in the field.

Lorenzo Barbieri, UNIROMA3 – University of Roma Tre

Raša, a masterpiece of Modern architecture

Mladen Bajramović, association IUR Raša

14:00 Session 3 - Multi-level perspectives and experiences of urban decarbonisation

Position of heritage buildings within energy transition paradigm

Dalibor Jovanović, IRENA – Istrian Regional Energy Agency

• City of Labin – The new look

Dolores Sorić, Labin Stan d.o.o.

• Empowering consumers through renewable energy self-consumption and energy communities

Diane Cassar, MIEMA – Malta Intelligent Energy Management Agency (MT)

• Apsyrtides energy cooperative - an energy community initiative on the Cres-Lošinj archipelago

Ugo Toić, Island Development Agency (OTRA)

15:00 **Q&A**

15:15 Conclusions - Outcomes from CITY MINDED project

Andrea Poldrugovac, IRENA – Istrian Regional Energy Agency







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General overview

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The CITY MINDED project: General features

Andrea Poldrugovac

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The sustainability of the cities and urban areas is a key challenge in Europe and ensuring a sustainable urban environment is a crucial task for all the actors. Nowadays, around 75% of the European population lives in urban areas and an estimated prediction is that this number will rise up to 80 % in 2050. Urban areas are leading Europe's economy and are key players in Europe's transition towards a low-carbon economy. Conducting proper actions and solutions on local level is the best way to ensure carbon neutrality and purse the decarbonisation of urban areas. By using adequate decarbonisation measures, we can resolve environmental challenges, whilst ensuring a good quality of life for the citizens. The decarbonisation measures and actions should be developed, organised and implemented by experts who are able to coordinate actions from different sources.

The absence of such type of processional profiles was the main goal of preparing the project CITY MINDED – City Monitoring and Integrated Design for Decarbonisation. The three-year project is funded under the Key Action 203 – Strategic Partnerships for higher education of the Erasmus+ Programme and it started with its implementation at the end of 2019.

The CITY MINDED project involves five European partners - three Universities and two Energy Agencies: the lead partner, IRENA - Istrian Regional Energy Agency (HR); the Italian Universities of Roma Tre – Department of Architecture and University of Siena - Department of Earth, Environmental, and Physical Sciences (IT); the University 'Pablo de Olavide' - Department of Geography (ES); and the Malta Intelligent Energy Management Agency (MT). The partnership was composed according to the experience of the partners in fields related to environmental sustainability in urban areas, and with the twofold objective to ensure a wide geographical coverage (and thus a variety of urban contexts with diverse characteristics) and to address different thematic areas (geography, architecture and urban design, environment, energy) in order to gather together diverse approaches to the project topic, and take advantage of cross-disciplinary interaction and sectorial expertise.

The partner's competencies were exploited during the project implementation in order to perform the following planned actions:

- Develop a draft methodology to address the different aspects of decarbonisation within multidisciplinary workshops,

- Conduct and test the draft methodology during three local workshops in different target cities (Seville, Siena, Rome), each one involving students from the hosting partner university, experts from partner organisations and local stakeholders in the drafting of city decarbonisation roadmaps for target neighbourhoods/districts,

 Adapt and prepare the final methodology according to the results of the workshops,

- Develop a set of educational tools, including a modular online course on urban decarbonisation, a toolkit for teachers to replicate the CITY MINDED workshops, and an open web platform where all the materials produced by the project will remain freely accessible to students and professors beyond the project lifetime,

- Organise a two week Intensive Course in Malta, involving students and teachers from participating universities in the drafting of a sustainable development agenda for a target area in the city of Valletta.





- Present main project results and Intellectual Outputs on the projects Final International Conference.

The City Minded activities gave the possibility to the students, enrolled in geography, urban planning, architecture and environment courses, to experience a real-life planning process in a stimulating, international and multidisciplinary learning environment. The students acquired transdisciplinary competencies and they have improved their ability to deal with complex, interdisciplinary urban issues, to work in a team, to correctly interpret the urban context and identify shared solutions to common problems. In the long term, this is expected to result in the increased employability of students, both in the public and the private sector, as energy managers,

Biography:

Andrea Poldrugovac is the CITY MINDED project coordinator. By profession, he obtained his Master's degree in Economics from the University of Rijeka. His main interests concern energy efficiency in buildings, renewable energy technologies and the overall preservation of the environment. He has been managing EU funded projects related to energy and the urban environment since 2018 and he is involved in the implementation of interregional projects funded under different programmes. He has been involved in the organisation and delivery of several training activities and lectures addressed to different target groups including SMEs, public authorities and students, both in Croatia and abroad.

consultants, urban planners, policymakers, etc. As regards the participating teachers/trainers, they have also benefited from the innovative educational experience set up by the project, by testing a teaching practice that can be replicated in regular academic and training activities, increasing the appeal and relevance of their courses. The longterm aim of the project is to improve cooperation and share knowledge to manage energy transition and foster the decarbonisation of European urban areas, combining multidisciplinary competences. The teaching/learning experiences implemented and materials provided in the projects web platform are therefore expected to allow for building capacity of new professional figures able to manage this urgent and necessary transition to carbon neutrality.





Session 1 - Teaching decarbonisation – Methodologies and experiences from CITY MINDED

14	Matteo Maccanti – University of Siena
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24	Francesca Paola Mondelli – University of Roma Tre
26	Diane Cassar – Malta Intelligent Management Energy Agency







Methodology and guidelines – a roadmap for the establishment of the CITY MINDED itinerant workshops

Matteo Maccanti¹, Michela Marchi¹, Valentina Niccolucci¹, Simone Bastianoni¹ and Riccardo M. Pulselli²

¹Ecodynamics Group, Department of Physical, Earth and Environmental Sciences, University of Siena, Siena, Italy ²Department of Architecture, University of Florence, Florence, Italy

1. Introduction

The main objective of the Erasmus+ City Minded project was to develop and test an innovative and creative, European-scaled learning environment in which students, specialists, and stakeholders can collaborate to identify and design the best solutions for decarbonizing European cities. The methodology developed focused primarily on the analysis and potential transformation of target districts, neighbourhoods, and counties to address site-specific challenges and provide roadmaps for the decarbonization of urban areas. The sustainability of cities is currently a fundamental challenge: 75% of the world population now lives in urban areas and it will grow further in the coming years (EC, 2022a). In Europe, the urbanisation rate was 72% in 2015 (EC, 2022a) and is expected to increase to approximately 84% in 2050 (EC, 2022b). Furthermore, building stock is responsible for approximately 40% of EU energy consumption and 36% of the greenhouse gas emissions (EC, 2020). For this reasons, urban areas are the perfect testbed for energy transition and decarbonisation models. The methodology described herein was tested in four European cities during the three City Decarbonisation Itinerant Workshops (Siena - IT, Rome - IT, and Seville - ES) and the Intensive Course (Valletta - MT) carried out within the activity of the City Minded project.

2. The City Minded Methodology

The City Minded Decarbonisation Itinerant Workshops aims to address the improvement of the methodology, based on the combination of different skills, and designed as an innovative teaching and learning experience aimed at university students, Ph.D. students, and young researchers. Each workshop starts with a meeting with local stakeholders and policymakers to talk about the study area and highlight peculiarities, strengths, and weaknesses of the urban system that students will analyse. The focus of the Workshops is to design urban sustainability agendas, as well as to create the process that leads to plans definition and the learning environment in which this process takes place. This framework is the result of the sum and integration of the skills and expertise of the City Minded partnership, composed by IRENA (Istrian Regional Energy Agency), UNISI (University of Siena), UNIROMA3 (Roma Tre University), UPO (University Pablo de Olavide) and MIEMA (Malta Intelligent Energy Management Agency). Each partner has proposed a module of the methodology, which is explained to students in training sessions and applied in co-working sessions so that in a short time (usually 5 days) students may define a decarbonization roadmap of the study area.

2.1 UNIROMA3 – Community Mapping

The Place-making Module intends to provide students with basic knowledge of urban landscape interpretation, considering their different backgrounds and the variety of the neighbourhoods selected as case studies. To ensure the social sustainability of decarbonisation actions, any urban transformation, should be underpinned by the ability to read the codes, forms, and elements that shape the cityscape, and to understand their



relationships with the experience, the memory, and the needs of the inhabitants. The place-making methodology has been addressed to define strategies for the improvement of the urban environment, putting in place adaptation measures to climate change and decarbonisation pathways. The method is divided into different phases: a) experience; b) analysis; and c) strategies. Therefore, the first step is the acquisition of basic knowledge of the study area, through training lessons (aimed at providing the basic tools for reading and analysing the context), and field visits of the study area during which students can annotate, sketch and pin down the significant elements of the area or conduct surveys to the population. Then the mapping of the mobility system, the build-up landscape, green urban areas, and the network of public spaces and services with all the values and criticalities of the study area is reported. The students can provide a community map to record and represent the spatial knowledge of local communities, their experience, and scientific features. Thanks to a simplified SWOT students can list the Strengths, analysis, Weaknesses, Opportunities, and Threats of the case study. In this way, they were able to identify on a satellite map three main features: barriers (natural and artificial), connections (ecological and mobility), and key elements (main natural spaces, derelict areas, and public spaces). Finally, students developed a more critical thinking exercise, during which they devised objectives and actions for the urban improvement of the urban area and highlighted on the map possible solutions for mobility (e.g., soft mobility and sustainable transport connections), green infrastructure (e.g., green areas, parks, community gardens, green corridors) and public space (squares, co-working hubs).

2.2 UPO – The Vulnerability Index

This Module wants to introduce students to the nature of risk through the assessment and analysis of vulnerability in different case studies. Vulnerability assessment has become one of the main tools for preventing and mitigating natural hazards' effects on society, the economy, and the environment. The proposed method is based on the framework adopted by Intergovernmental Panel on Climate Change (IPCC) that defines vulnerability



based on three main components: Exposure, Sensitivity, and Adaptive Capacity (Vulnerability = Exposure + Sensitivity - Adaptive Capacity) (IPCC, 2012; 2014). It was applied and tested throughout different research projects with several applications in the river basin scale (droughts and floods) and in urban areas (heatwaves) (Vargas & Paneque, 2017; 2019; Martín & Paneque, 2022; Vargas, Olcina & Paneque, 2022). A specific methodology to calculate a vulnerability compound index is used to evaluate a) vulnerability assessment; b) analysis of the causes that generate the vulnerability. After that, the vulnerability structure triangle is applied, to analyse the causes of vulnerability and compare results. Due to the multidimensional nature of the vulnerability, are used data of different type (social, physical, environmental, institutional, and economic) and source (official database, surveys, interviews, official reports, etc.). The first step is to select the variables and indicators to characterize each of the vulnerability components and calculate the value of the indicators. Afterward, the indicators are normalized on a scale from 0 to 1. Then, a weighting of the drivers is applied to integrate them into the different Indices of Exposure, Sensitivity, and Adaptive Capacity which contribute the same weight to the composite index, i.e., the Vulnerability Index (VI), which quantifies the vulnerability level (from very low to very high) of each case study. Each students group selected a case study for which calculate VI by following a series of steps. Starting from the calculated indices, that compose the Vulnerability Index, it was analysed how the VI is structured, evaluating how each of the components influences its final value. This allows a first approach to the causes that generate vulnerability. Once each group had calculated the VI for their case study, the results were shared and the index values for each district compared.

2.3 UNISI – The Carbon Accounting Methodology

This Module aims to quickly assess the Carbon Footprint (CF) mitigation of an urban neighbourhood, above all quantifying the current and direct Greenhouse Gases (GHG) emissions and removals of the study area, and then estimating the effects of action plans toward carbon neutral status. The combination of new devices and





technologies, as well as other measures related to citizens' behaviour and initiatives organized by local staff and administrations provide the opportunity to evaluate the effects of different solutions and mitigation plans. The visual approach developed (i.e., maps and Equivalent Forest game) is a useful communication tool for a wide audience, such as citizens, policymakers, companies, and other local stakeholders. This method is inspired by the IPCC Standard Methodologies for GHG Emissions Inventory of Nations (IPCC, 2006; 2019; 2021) and based on the research work carried out to adapt it to the evaluation of subnational scales, like regions, provinces, municipalities, neighbourhoods, or specific activity sectors (Marchi et al., 2012; 2017; 2018; Bastianoni et al., 2014; Maccanti et al., 2017; Pulselli et al., 2018; 2019; 2020; 2021). The method starts with the data collection, usually obtained from local administrations and operators. However, sometime much information come from national databases and official reports, which contain data that must be split to urban level applying specific downscaling parameters. The collected activity data are subsequently elaborated and aggregated. Several specific emission sectors (i.e., Energy, Industrial activities, Waste, and Agriculture, Forestry, and Other Land Use - AFOLU) and emission sources (e.g., energy use, mobility, waste, and wastewater management, and eating habits) are considered to quantify the overall GHG balance of the analysed urban district, considering both climate-altering emissions and removals. All the human activity data are converted into tons of carbon dioxide equivalent (CO²eq) using specific emission factors (expressed in kg CO²eq/unit activity). To better understand the climate change pressure in the study area, the CF is represented and visualized in terms of virtual forestland equivalent, i.e., the forest surface needed to absorb carbon emissions generated within the area. In the end, a sequence of mitigation measures is applied to show how they could progressively reduce the carbon footprint of the urban area potentially obtaining a net GHG balance (i.e., all the emissions are reduced towards mitigation pathways or compensated by local ecosystems uptake). A dynamic representation of the decarbonisation plan for city neighbourhoods by 'crunching' the virtual forestland is carried out. The "Pac-Man" game is used as a gimmick; the yellow creature

appears every time a mitigation measure is applied to the neighbourhood, eating the equivalent forest squares corresponding to the amount of CO2eq emissions saved thanks to the application of the action.

Students were required to a) quantify the CF of the studied urban system; b) quantify the virtual forestland equivalent area needed to absorb total GHG emissions; c) discuss potential policies (brainstorming activity); d) simulate the CF mitigation of the City. To do this, students were equipped with an Excel file for the calculations (where activity data specific emission factors, and other conversion factors are provided), the teachers' presentations, and some scientific articles for further research.

2.4 IRENA & MIEMA – Energy efficiency and renewable energy technologies in the active service of the city decarbonisation processes

This Module ensures and а systematic comprehensive approach to expand the student's knowledge and motivate them to analyse the study area in the terms of the existing building stock and its characteristics, focusing on the energy needs and its improvement by proposing relevant energy efficiency measures and the implementation of the Renewable Energy Sources (RES). Considering that urban areas have also expanded by the construction of new buildings, the latest requirements for new fabricated buildings are considered (called nearly-zero energy building standards, which are mandatory for all new in Europe are provided). The method starts with the analysis and presentation of a specific building and then the measures in the module are explained and proposed to reduce the consumption of energy needed for heating, cooling, lightening, ventilation, and hot water. An urban energy strategy is defined next, where four main pillars are presented: a) maximize energy efficiency, through energy renovation; b) integration of RES systems within existing buildings; c) maximize energy selfconsumption using energy storage to reduce energy losses; d) carry out smart load management to decrease costs and reduce stress on the grid infrastructure. Then some solutions are presented: different types of RES for the urban environment (micro-wind, heat and power systems, photovoltaic





remote experiences that mimicked face-to-face group work.

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panels, etc.); energy self-consumption and local energy communities; micro-grids and battery storage systems. The next part focuses on the identification of different building typologies within the urban area and understanding specific barriers and challenges to energy renovation and the integration of RES systems. This is followed by the presentation of a strategy for defining solutions and mitigation measures to address the challenges and barriers. The final part is dedicated to the presentation of best practices and innovative projects from different European countries concerning the integration of RES systems within buildings. Students had to select a building/group of buildings in the study area and then identify aspects of the area which have a bad energy performance and what would be the main energy consumers. Then they should propose measures to maximise the energy performance and identify challenges and mitigation measures for the implementation. The last task was to propose an implementation timeline (short, medium, long term) for the identified measures.

3. Conclusion

The methodology here presented was designed, implemented, and tested as part of the Erasmus+ City Minded project, to offer students a tool that would integrate different working methods that aim to study, improve, and implement the urban context. The four modules presented are integrated to create a framework that allows observing the context from both a qualitative and quantitative point of view. This operational tool, in addition to allowing the identification of problems, flaws, and merits of a neighbourhood, aims to identify realistic solutions and proposals to make the urban area more sustainable, smart, and, if possible, carbon neutral in the medium- to long-term. The Covid-19 Pandemic that began when the City Minded project started, put a strain on the initial structure that had been planned. Three individual 5-day workshops and a 15-day Intensive Course were planned. The events were all intended to be held in presence in different European locations, but this was only possible for the last of them. The Pandemic forced a complete revaluation and restructuring of the planned methodology, to find the most engaging and interesting ways possible for students to have



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Biography:

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implemented within numerous local investigations (e.g., REGES, CaN-Be, Carbon Neutral Alliance: Parma, Siena, Grosseto), and European projects (e.g., Interreg-MED BLUE DEAL, FP7 City-Zen, Horizon 2020 BUILD IN WOOD, and Erasmus+ City Minded).

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Biography: Full Professor of Environmental and Cultural Heritage Chemistry at the University of Siena. Chair of the Ph.D. School in Environmental, Geological and Polar Sciences, Provost for Sustainability, co-Director of the interdisciplinary Ecodynamics Group, President of the Siena Alliance Carbon Neutrality. Research for focus: Sustainability indicators (e.g., based on Emergy evaluation, Ecological Footprint, Greenhouse Gases Balance, Life Cycle Assessment, Exergy analysis, etc.); Energy and bio-energy systems; application of thermodynamics to ecological systems and of kinetic models to systems of environmental relevance. In 2001 receives the "2001 Meritorious Award" from the International Institute for Advanced Studies in Systems Research and





Cybernetics. In 2004 receives the first Prigogine Junior Medal for research in complex systems. In 2021 receives the Prigogine Medal for his work on ecological systems. Author of more than 170 papers in peer reviewed International Journals and around 70 other reviewed publications.

Riccardo Maria Pulselli, Department of Architecture, University of Florence, Florence, Italy - Professor. Researcher and teacher at the Department of Architecture of the University of Florence. In 2000 obtains the master's degree in Architecture, and in 2005 a Ph.D. in Environmental Sciences at the University of Siena. Works for many years in the Ecodynamics Group of the University of Siena. Co-author, with Prof. Enzo Tiezzi, of "City Out of Chaos. Urban Self-organization and Sustainability" (WITpress, 2009), besides scientific papers and books. Founder and director (2013-2021) of a consultancy company with expertise in systems/processes sustainability (e.g., Life Cycle Assessments), namely Indaco2. Studies and develops methods and models for investigating sustainability of territorial systems, urban settlements, buildings, food and goods value chains, resource management, mobility, and renewable energy sources.





Roadmaps for the carbon neutral urban areas of the City Decarbonisation Itinerant Workshops

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The City Monitoring and Integrated Design for Decarbonisation output consists of decarbonisation roadmaps collected and systematised during the 3 students intensive workshop hold online format due to Covid-19 restrictions and the Intensive 2weeks' Intensive course and workshop in Valleta, Malta. After each workshop, and the intensive course, hosting partners have collected, selected and systematised all the resulting materials according to the common methodology agreed upon at the beginning of the project.

After each workshop, hosting partners have collected, selected and systematised all the resulting materials - according to the common methodology agreed upon at the beginning of the project – and have delivered them to UPO that has checked these materials, further harmonising them, reorganised and they will uploaded in the project web platform in collaboration with MIEMA.

The City Minded decarbonisation roadmaps have not been conceived as traditional text documents, but rather as a structured repository of data and solutions for decarbonisation in different urban contexts that will be used as a reference during the final Intensive Course and could be updated, upgraded and exploited during future educational experiences inspired by the City Minded project.

This output includes the Carbon footprints produced during the city decarbonisation workshops, as well as the analyses and studies of real urban contexts and environmental sustainability conducted in each target area.

The structure of the workshops in all the city decarbonisation workshops and the intensive course in Malta was very similar: a first half-day dedicated to the presentation of the hosting city and of the target neighbourhood, followed by the training and co-working sessions conducted by the hosting organization; three half-days dedicated to the training and co-working sessions conducted by the other partners; and a final half-day dedicated to a wrap-up of the results achieved and of the problems incurred, which involved both partners and participating students.

The objective of the workshops was to put together project partners (teachers, researchers, or trainers), students, and local stakeholders in order to address common onsite challenges and define collaborative urban decarbonisation roadmaps for the Ravacciano (Siena), Torrino-Mezzocammino (Rome), Seville's north district and Valleta's neighbourhoods through a 'learning-by-doing' method.

The respective thematic areas, based on each of the partners expertise, presented in each training and co-working session have been vulnerability associated with climate change, carbon accounting, place-making framework and energy efficiency and renewable energy technologies.

The results of the different workshops' exercises surely validate the methods used in the workshops and intensive course and confirm that the chosen approach is a good one and can be used in future workshop and lectures:

- Vulnerability Assessment Methodology. After the application of the methodology in the different learning cases it can be concluded that this methodology has proved to be very useful and interesting to introduce students, with different background and interest, to the theoretical and practical approaches of risk assessment, and to the methodologies of vulnerability analysis and assessment. The exercise has been well adapted to the different scales of work (province in the Italian cases and municipalities in the Spanish case, fig. 1) and could be adapted to other territorial realities. The main difficulty encountered is related to the availability of data in the appropriate form, updating and scales. Regarding the results





obtained, the exercise was useful to demonstrate and discuss with students the hybrid nature of risk and the need to approach vulnerability studies from its multifaceted nature (social, environmental, institutional, economic, physical).



Figure 1 - Vulnerability Structure Triangle Results from workshops

Carbon Accounting Methodology. The methodology developed and tested during the project workshops proved to be extremely versatile and useful for the project purpose. The students in the workshops and course demonstrated to be interested in the subject matter presented in the framework and they had a critical and proactive approach that allowed them to carry out the exercise correctly and to identify useful solutions to reduce the emissions of the neighbourhood (fig. 2). The students were protagonists in a process of study, evaluation, and planning that really aimed at obtaining neighbourhood that could become smart, people-friendly, and greener.



Figure 1 - Scaled representation of the equivalent virtual forest that would be required to absorb gas emissions from the City of Valletta.

- Community Mapping Methodology. This being a qualitative exercise, its added value is not easy to quantify: even solutions or project proposals are not the end result of the exercise. Rather, the exercise aimed to provide students with the tools that help them analyse a neighbourhood. Together with the tools they gain the knowledge to look at cities from a different point of view. At the end of the first exercise, students proposed, along with the analysis of the neighbourhood, some solutions for the issues they highlighted and pictures relating to case studies that they looked up (fig. 3).

Energy efficiency and renewable energy technologies solutions to achieve a greener and carbon-neutral target district. The results of the conducted exercises with the students have proved that the methodology was well balanced and tailored to the student knowledge about the topics and that the theoretical presentations were easily understandable and useful for solving the exercises during the co-working session. The students within the group engaged in interesting discussions about the energy requirements of different buildings types and what measures can be proposed to improve the energy performance of the building and reduce the CO2 emissions, including interventions to the building envelope, upgrading of building systems such as heating, cooling, domestic hot water and lighting as well as the generation of on-site energy through renewable energy technologies.



Figure 4 - The proposed solutions for Valletta's case study building





Biography:

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The CITY MINDED modular course on decarbonisation: learning and teaching tools for students and teachers

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The Modular course on decarbonisation has been conceived mainly to enhance the experience gained by the project Consortium in virtual teaching during the pandemic, and to increase the replicability of the City Minded experience. The course brings together the multidisciplinary expertise acquired during the project and organizes it as an E-learning platform, with the aim of enhancing knowledge on urban decarbonization. The goal is achieved not only through a series of lectures, but also by stimulating further study through literature references, examples and practical activities.

The E-learning platform is divided into six sections. The first five (the course overview and the four thematic modules) are addressed at students, i.e., those who want, on their own, to deepen their skills on urban decarbonization. In an estimated duration of about 50 hours, students will achieve the objectives of: (i) Understand how to retrieve relevant information; (ii) Learn how to achieve decarbonisation; (iii) Set a place-making framework; (iv) Assess climate vulnerability; (v) Calculate carbon footprint; (vi) Measure energy efficiency.

The four thematic modules (each edited by a different partner organization) have a similar structure. Each module contains lectures in the form of video-presentations (about 10 to 15 minutes long), corresponding to the contents of the "training sessions" of the City Minded workshops; an exercise to be performed, explained in detail; and a multiple-choice test for the evaluation. Additional Resources are also included, such as factsheet of the module, glossary, references and further readings.

The topics covered in the four modules are:

Module 1) *Place-making Framework* looks at the neighbourhood from a qualitative point of view and seeks to engage students into reading an area through its assets and community.

Module 2) *Climate Change and Natural Hazards Vulnerability* works at different scales and looks at the quantitative and qualitative evaluation of the components of vulnerability.

Module 3) *Urban Carbon Accounting* is about the calculation of carbon emissions from a quantitative point of view at a neighbourhood and building scale.

Module 4) Energy Efficiency and Renewable Energy Self-Consumption for City Decarbonisation builds on the previous module and looks at possible solutions to improve the energy performance of buildings.

The sixth section of the E-learning platform, on the other hand, is meant for teachers. It consists of a toolkit that complements the course and has the purpose of helping teachers and tutors in academic institutions or other organizations that want to use the City Minded methodology for teaching decarbonisation. It is supposed to provide the prospective tutor with the right tools to prepare and carry out training and co-working sessions on the various topics covered within the project. Therefore, it includes:

- instructions for the implementation of both training and co-working sessions on the 4 decarbonisation-related topics addressed by the project, including data and materials to be used;
- a set of tools that can be used to implement the sessions (templates, graphic tools, etc.) and to assess their results (evaluation questionnaire for participants, evaluation grid to verify the learners' acquired knowledge);





• practical examples taken from the City Minded workshops.

For a better consultation, the Toolkit is structured in five sections:

- General guidelines on training sessions: for each training session, the objectives and structure are specified, including the number, title and duration of lectures;
- Step-by step general organization of co-working sessions: for each topic, it suggests the optimal tutor-to-learner ratio for online and in-person workshops and the tested structure of the sessions, specifying the different phases to go through, their contents and duration;
- Exercises factsheets: each one displays a clear and synthetic description of a single exercise; the structure of the exercise, including implementation phases, procedure and timing for each phase; a table, listing and synthetically describing data, materials and equipment needed for the implementation of the exercise; an evaluation grid to assess the knowledge acquired by learners;
- **Biography:**

Francesca Paola Mondelli, Architect and PhD in "Landscapes of Contemporary City" at Roma Tre University (2022). Master degree cum laude in Architecture at Roma Tre University (2016). Second-level master's degree at Roma Tre University "OPEN - Landscape Architecture and Representation" (2018). Two-time Erasmus+ scholarship winner: in 2015/2016 at the ETSA in Granada, where she develops her Master thesis; in 2018 at the ETSA in Valladolid, where she carries out research activities during an internship within the recognized research group LAB PAP. Since 2016

- Examples: collects sample materials and outputs taken from the project workshops;
- Annexes: collects both the materials to be used in exercises (tables, templates, etc.) and the evaluation questionnaire model to be submitted to learners.

Each section and each exercise factsheet is conceived as a stand-alone document and can be downloaded separately.

The implementation of the E-learning platform the systematic collection enabled and reorganization of the materials and methods developed within the project. The modular course, together with the teacher toolkit, constitutes an innovative tool of great educational value on the topic of decarbonisation. It represents a project output that is certainly successful and through which the work done with City Minded project could be kept up-to-date over time, thanks to other students and teachers who will use the platform, and exploit and disseminate the materials therein.

he has been collaborating with Roma Tre University as an academic tutor in several courses. In 2019 she participated in the "NATIONAL DAYS ON THE IMPLEMENTATION OF THE EUROPEAN LANDSCAPE CONVENTION IN FRANCE" at the Council of Europe in Strasbourg. In 2021, she was a Visiting Researcher at the Escuela Tecnica Superior de Arquitectura de Barcelona - Universitat Politecnica de Catalunya. She currently collaborates with Studio COFFICE - Architecture and Urban Planning, on the topics of rehabilitation, urban regeneration and public space design.





The CITY MINDED web platform

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Output 2 of the City Minded Project was related to the creation of a virtual platform, open to the public, with the aim of providing information on the project methodology and the creation of a decarbonisation roadmap for cities and neighborhoods. Target groups of the online platform include higher education students, PhDs, postdocs, public administrations, professional associations and practitioners.

The online platform has been designed to serve as:

- an e-learning environment providing access to educational modules on integrated sustainability planning in urban areas developed as part of Output 4: Modular course on urban decarbonisation,
- a repository of multi-media materials provided by partners, including databases, legal frameworks, and relevant scientific papers related to the fields of urban sustainability, sustainable energy, and urban design across Europe,
- a tool to communicate and disseminate project results.

The web platform embeds the project website (www.cityminded.eu) and has been designed to be easily managed and updated with relevant information about the project's activities and results, and to be accessible by all users according to the current regulations and international standards on websites accessibility. The project partners' web pages as well as the Erasmus+ programme website have been linked to the platform.

The eLearning platform, which includes an online course covering a set of topics related to urban decarbonization as well a toolkit for teachers, is linked through to the project main website and is directly accessible from the homepage or through http://elearning.cityminded.eu/. It is based on the Modular Object-Oriented Dynamic Learning Environment – Moodle, a free and open-source software learning management system. Moodle represents one of the most widely used opensource e-learning platforms, that enables the creation of a course website with access to enrolled students.

The use of an eLearning environment has several advantages such as increased access, improved quality of learning, better preparation of students for a knowledge-based society and "lifelong" learning opportunities. It provides flexibility in terms of time and place since learning content is available in short modules that can be followed intermittently depending on the users' requirements. The field of electronic learning has gained increasing popularity during the past decade and particularly during the COVID-19 pandemic which contributed significantly to the increased interest in the use of eLearning and online training tools, since to reduce the spread of the virus, education institutions, including the partner universities, were forced to switch to eLearning using available educational platforms. The pandemic had a significant impact on the City Minded project, in particular during the first two years its implementation. The challenge posed by the pandemic however also provided an opportunity to better test online learning with students from the partner universities.

The virtual environment enables the organisation of material in different work areas with multiple functionalities, supporting participative and collaborative activities, shared didactic contents and tests. The platform is also equipped with a specific search filter, to facilitate a quick and effective search for the requested resources and several tools and plugins are available which can be further integrated and used according to needs of





the users. It is foreseen that the City Minded eLearning platform also serves as a place for interaction within a continuous educational programme, both during and after the project

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Appanna, S. (2008). A Review of Benefits and Limitations of Online Learning in the Context of the Student, the Instructor and the Tenured Faculty. International Journal on E-Learning, 7(1), pp.5-22

Biography:

Diane Cassar is an Electrical Engineering by profession, specializing in the field of energy. She obtained her Bachelor's in Engineering (Hons) and Master of Science in Engineering from the University of Malta. Her main interests concern renewable energy technologies, energy efficiency in buildings, energy management and e-mobility. Diane joined MIEMA in 2010 and presently leads the Projects Department within the agency and serves as Secretary to the Management Board. closure. The platform shall be kept active for a minimum period of 3 years following the end of the project.

During the past 12 years, Diane was responsible for project and financial management of EU funded projects under different programmes including Horizon 2020, Interreg Europe, Interreg MED, Erasmus+ and Italia-Malta. In particular, she was responsible for the coordination of the first pilot projects in Malta in relation to micro-grids and energy communities as part of the EMPOWER (H2020) and PEGASUS (Interreg MED) projects which were implemented between 2015 and 2019.







Session 2 - Approaches to urban sustainability

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Risks, vulnerability, resilience and adaptation to climate change

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The theoretical understanding of risk has gone through multiple conceptualizations and terminology over the last decades of research and public debate. Addressing risk within our societies implies acknowledging how it is constructed and determined, which in turn is a matter of how we define risk and the underlying factors. Researchers have long debated both the definition and scope of what constitutes risk and some sort of consensus has grown on how to deal with these concepts. However, despite the lengthy literature, differences persist and many express confusion as to what constitutes terms such as risk, hazard, exposure, susceptibility, adaptive capacity, vulnerability, resilience, adaptation or coping capacity. The development of the disaster risk reduction field has benefited from the contribution of numerous disciplines.

In this contribution, we delve into how the conceptualization of risk has moved from equating risk to hazard (risk-hazard paradigm), a clear heritage of the determinism of the late 19th century, towards more possibilist theories where humans have a lot to do with the construction of their own risk. The risk-hazard paradigm considered the triggering hazard (many related these hazards to God's will) solely responsible for disasters; in fact, here, hazard and disaster could be taken as synonymous. As a response, focus pivoted to people's adjustments to risk and uncertainty in natural systems, therefore moving past determinism in risk science and including the decision-making process of people, their risk awareness, and risk perception. The bounded rationality paradigm thus advocated for the rationality of people living at risk but blamed poor decisions -alternatives- on limited knowledge.

Despite the great advancement that the bounded rationality paradigm meant for the field, it soon received critiques for obviating socio-political processes that made people prone to dangerous situations and solely blaming the victim for their situation. A new wave of researchers began wondering about the root causes of the susceptibility of people to hazards and concluded that their differential vulnerability levels was a major factor in the overall risk. These contributions entailed a shift towards vulnerability as the leading concept within the debate over risk (vulnerability paradigm). Political scientists and sociologists looked for the root causes of vulnerability in sociocultural heritages and sociopolitical processes, while geographers pushed to include location (exposure) as a determinant factor of vulnerability. While earlier paradigms were rejected for either depicting people as helpless victims of hazards (riskhazard paradigm) or blaming them for their poor decisions (bounded rationality paradigm), this notion of the vulnerability paradigm was attacked for placing people at risk as mere victims of their position, often determined by external agents. The field therefore had swung from an overly environmentally deterministic view of risk to an excessively socially deterministic one. The vulnerability paradigm experienced a turn towards a consideration of the internal capacities knowledge, skills, and resources-of communities to deal with hazards. Interest grew on the adaptive mechanisms of different groups/societies/communities and how these proactively make decisions to protect themselves from hazards regardless of their preset vulnerability. The discourse in the field seems to have found a new concept -resilience. Resilience implies a shift from the negativity of vulnerability of



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victims to the positivity of people's adaptive capacity and self-protection. The term resilience, with roots in mechanics and ecology, has been separated from vulnerability (reducing its scope to physical exposure and sensitivity) and setting its core in the capacity of communities to resist to (absorb), cope with, and recover from hazards/disasters. Due to being the last addition to the risk/hazard lexicon, there is still a lack of consensus in the conceptualization of vulnerability/resilience and different disciplines and authors tend to establish their own definitions according to the objectives of their studies. The resilience paradigm arrives when climate change concerns introduce an important nuance into the risk equation: the uncertainty about tomorrow (the future). Risk assessments tended to evaluate the risk of a place, a community, or a system in the present time. In other words, these assessments estimated the current probability of a certain magnitude event of a particular hazard (e.g., floods, earthquakes, or heatwaves), evaluated the existing exposure and susceptibility (vulnerability), and calculated the coping capacity (resilience) to that hazardous event. However, another type of risk assessment has gained traction over the last years. These risk assessments include a predictive component based on the change in magnitude and

Biography:

Yago Martín is a Marie Curie Researcher at the Geography, History and Philosophy department at Pablo de Olavide University in Seville, Spain. He received his B.A. en Geography (2014) and his M.A. in Geographical Information Technologies (2015) from the University of Zaragoza (Spain). He's a PhD in Geography (2019) from the University of South Carolina (United States) after being granted with a Fulbright scholarship and worked as a postdoctoral

frequency that certain hazards might experience due to climate change and the adaptation process of more increasingly aware communities. The relevance of the adaptive capacity is therefore particularly important in this newest conceptualization of risk, as it is the only human component (i.e., vulnerability and resilience) that introduces the necessary dynamism to predict the changes made by communities to reduce their future risks.

Many of the paradigms earlier discussed, and several combinations of them (i.e., transitioning models), have coexisted (and many still do) in the rhetoric of those dedicated to understanding and reducing risk, which inevitably percolates through official documents from institutions such as the United Nations International Strategy for Disaster Reduction (UNDRR) and the International Panel on Climate Change (IPCC). Understanding how concepts such as vulnerability, resilience, or adaptation have emerged and evolved is consequently of critical importance to successfully navigate both the current research and the public and political debate over the actions taken to reduce our risk and lessen the consequences of an accelerated climate change and therefore to become an involved and proactive citizen.

researcher at the deparment of Public Administration at the University of Central Florida (United States). His primary research interests are in the area of disaster risk reduction science and climate change adaptation, including their measurement, monitoring and assessment. Currently, he leads a project funded by the European Comission on adaptation to extreme heat in EU's urban areas.





Research, study, and proposals for a Carbon Neutral future

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The University of Siena (UNISI) believes deeply in the importance of conducting activities to raise awareness and promote good environmental practices and has always invested concrete efforts in the study and promotion of sustainable development. UNISI has been leading the Mediterranean Centre of the United Nations Sustainable Development Solution Network (SDSN Mediterranean), promoting international collaboration on environmental issues, and fully embracing the United Nations Sustainable Development Goals (UN SDGs) and the Agenda 2030. Since 2019 UNISI published the Organization Sustainability Report, which also contains the Greenhouse Gases (GHG) emissions accounting of direct (i.e., heating rooms and fossil fuels consumption for owned vehicles) and indirect (i.e., consumption of electricity imported from the national grid) impacts. UNISI is planning and implementing measures for building efficiency with the aim to reduce GHG emissions, taking as a reference point the 2050 carbon neutrality targets set by the European Commission (European Union, 2022).

The Ecodynamics Group (EG) is a transdisciplinary team of researchers made of environmental chemists, biologists, economists, engineers, architects, and natural and environmental scientists as a part of the Department of Physical Sciences, Earth and Environment of UNISI. The research activity of EG is aimed at the identification and study of connections between environmental and anthropogenic systems both at the theoretical level by investigating the scientific basis of sustainability, and at the application level by developing environmental indicators and sustainability assessments (Ecodynamics Group, 2022).

EG has expertise in methodologies for environmental monitoring and assessment through

the application of systemic indicators used to evaluate the sustainability of systems-processes relative to the direct and indirect use of resources, GHG emissions, and other impacts on the environment. Among study subjects there are and urban regional systems, cities and neighbourhoods, buildings, and construction technologies, energy production systems, mobility systems, agricultural and agroforestry systems, waste, and water management, and so on. These methodologies and indicators are used as tools to address choices, inform design, and identify impact mitigation solutions and best practices.

The GHG inventory is one of the most studied methodologies because it is a useful scientific tool for defining and implementing environmental policies at global and local levels (Marchi et al., 2018). Over the years EG has conducted many studies on several types of target areas to enable and perfect the application of the Intergovernmental Panel on Climate Change (IPCC) Standard Methodology for GHG Emissions Inventory of Nations (IPCC, 2006; 2019; 2021) to subnational areas. This work has made it possible to quantify the Carbon Accounting for Regions, Provinces, Municipalities, and urban landscapes (e.g., a medieval historic centre) or specific activity sectors (e.g., an integrated waste management system) (Marchi et al., 2012; 2017; 2018; Bastianoni et al., 2014; Maccanti et al., 2017).

In the last decade, EG has done deep investigations with the administration of the Province of Siena (Italy) to equip it with an environmental program focused on GHG emissions accounting and environmental impact assessment (Bagliani et al., 2008; Bastianoni et al., 2008; Pulselli et al., 2008a, b; Tiezzi and Bastianoni, 2008; Marchi et al., 2018). The "Siena Carbon Free 2015" was the project that allowed Siena to reach the status of "Carbon





Neutral Province" being the greenhouse gas emission fully balanced by the absorption by local ecosystems within the area. EG has developed the time-series GHG monitoring (REGES project), verified and validated following the ISO14064-1 standard. These GHG balances were used to inform policy actions and achieve the carbon neutral goal. In 2006 (the baseline or reference year) the percentage abatement of gross emissions was 72%. In 2011 the Province of Siena achieved carbon neutrality with a percentage abatement of 102% (Bastianoni et al., 2014), and a continuing decreasing trend in subsequent years (Caro et al., 2014).

To maintain this goal and ensure its continuous improvement, UNISI, local administrations, and the Monte dei Paschi Foundation (FMPS) have established the "Alleanza Carbon Neutrality – Siena", an alliance between administrations, universities, companies, and citizens to create an operational territorial network and foster the dissemination and replication of this methodology (Alleanza Carbon Neutrality, 2022); in just a few years, projects for greenhouse gas accounting and reduction have already sprung up in several Italian areas: Belluno, Grosseto, and Parma.

Based on this application of GHG accounting at the subnational level, EG defined and tested a procedure assessed to inform urban design practices and provide credible and realistic results in a short time and "take a picture" of a city, neighbourhood, or single household (Pulselli et al., 2018; 2019; 2020). This framework was developed during the Roadshows of the EU FP7 City-Zen Project with a dual role: first, to assess the GHG emissions of the city and, afterward, to ex-ante estimate the effects of GHG emission mitigation measures (van den Dobbelsteen et al., 2018; Pulselli et al., 2021).

The modus operandi experimented in City-Zen was also the basis of the Laboratories carried out during the Interreg-MED BLUE DEAL project which hypothesized the installation of Blue Energy devices (for example, floating wind turbines, devices for the exploitation of waves or sea currents) in coastal cities of several Mediterranean countries, also carrying out a preliminary assessment of the contribution of these devices to the reduction of local GHG emissions (see for example BLUE DEAL, 2022).

Finally, this framework is the basis of the methodology proposed and implemented during the City Decarbonisation Itinerant Workshops of the EU Erasmus+ City Minded project. The aim, in addition to perfecting and improving the methodology, is to make it accessible and applicable also by non-experts in the sector, starting with students and teachers at other university disciplines. Also, in this case, the experience acquired by EG in other projects involving students of various levels has proved to be a useful skill for the definition of a suitable operating model: for example, see the work of EG in the EU Erasmus+ Eusteps (Eusteps, 2022) and sCOOLFOOD projects, financed and promoted by FMPS (FMPS, 2022).

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Biography:

Maccanti, Ecodynamics Matteo, Group, Department of Physical, Earth and Environmental Sciences, University of Siena, Siena, Italy - Research fellow. Born in Siena (IT) in 1989 but spent his youth years in Grosseto (IT). In 2013, graduates in "Environmental Sciences" and then completes studies with a master's degree in "Ecotoxicology and Environmental Sustainability" at the University of Siena. In March 2021, receives a Ph.D. in "Environmental, Geological, and Polar Sciences and Technologies" at the Ecodynamics Group (EG) of the University of Siena. To date, collaborates in the EG as a research fellow. Research focus: and refinement application, testing, of methodology for the assessment of environmental sustainability, using tools such as Carbon Accounting, Life Cycle Assessment (LCA), and Emergy Evaluation. These methodologies have been applied to different fields, such as Blue Energy, urban and territorial contexts (e.g., provincial, municipal, and urban areas, housing), agricultural systems, pesticide production processes, etc. The research activities concerned numerous European projects, on Interreg-MED (MAESTRALE and BLUE DEAL), FP7 (City-Zen), and Erasmus+ programs (City Minded).

Marchi, Michela, Ecodynamics Group, Department of Physical, Earth and Environmental Sciences, University of Siena, Siena, Italy - Research fellow. Born in Siena (IT) in 1979. In 2006, completes the studies with a master's degree in "Biology" at the University of Siena. In 2011, receives a Ph.D. in "Chemical Sciences" at the University of Siena. To date, collaborates within the Ecodynamics Group (EG) of the University of Siena as a research fellow and expert teacher in the field of environmental indicators. Research focus: application and development theoretical of environmental indicators for the sustainability assessment. The studied methodologies are the greenhouse gas inventory, the Footprint Family Indicators (i.e., Van den Dobbelsteen, A., Martin, C.L., Keeffe, G., Pulselli, R.M., Vandevyvere, H. (2018). From problems to potentials - The Urban Energy Transition of Gruž, Dubrovnik. Energies 11 (4), 922. doi: 10.3390/en11040922

Carbon, Nitrogen, Water and Solar Footprint), the Life Cycle Assessment (LCA) and dynamic models for the simulation of global biogeochemical cycles. These tolls have been applied to territorial contexts (e.g., provincial, municipal, urban areas, and housing), agricultural systems, industrial processes, and the service sector. The research activity is implemented within numerous local investigations (e.g., REGES, CaN-Be, Carbon Neutral Alliance: Parma, Siena, Grosseto), and European projects (e.g., Interreg-MED BLUE DEAL, FP7 City-Zen, Horizon 2020 BUILD IN WOOD, and Erasmus+ City Minded).

Niccolucci, Valentina, Ecodynamics Group, Department of Physical, Earth and Environmental Sciences, University of Siena, Siena, Italy - Technical Ph.D. Technical Ph.D. at the Department of Physical, Earth and Environmental Sciences of the University of Siena. In 1998 obtains the master's degree in Chemical Science and in 2002 receives a Ph.D. in Chemical Sciences with a thesis about the chemicalphysical approaches for the study of systems of environmental interest. Research focus: Sustainability indicators like Emergy Evaluation, Life Cycle Assessment (LCA), Ecological Footprint, Water Footprint, Carbon Footprint, Nitrogen Footprint, and Thermodynamic models for the study of ecological systems. From 2011 is member of the "Standard Committee" of the Ecological Footprint, and of the Italian Chemical Society. Guest Editor for the journal Resources for the special issue called "Ecological Footprint Assessment for Resources Management". Author of more than 40 papers in peer reviewed International Journal.





Bastianoni, Simone, Ecodynamics Group, Department of Physical, Earth and Environmental Sciences, University of Siena, Siena, Italy - Professor

Biography: Full Professor of Environmental and Cultural Heritage Chemistry at the University of Siena. Chair of the Ph.D. School in Environmental, Geological and Polar Sciences, Provost for Sustainability, co-Director of the interdisciplinary Ecodynamics Group, President of the Siena Alliance for Carbon Neutrality.

Research focus: Sustainability indicators (e.g., based on Emergy evaluation, Ecological Footprint, Greenhouse Gases Balance, Life Cycle Assessment, Exergy analysis, etc.); Energy and bio-energy systems; application of thermodynamics to ecological systems and of kinetic models to systems of environmental relevance.

In 2001 receives the "2001 Meritorious Award" from the International Institute for Advanced Studies in Systems Research and Cybernetics. In 2004 receives the first Prigogine Junior Medal for research in complex systems. In 2021 receives the Prigogine Medal for his work on ecological systems. Author of more than 170 papers in peer reviewed International Journals and around 70 other reviewed publications.





TOWN OF POREČ – PARENZO -Sustainable transport and mobility solutions in service of achieving European energy and climate policy goals

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As one of the areas responsible for 1/3 of the total carbon dioxide emissions in the EU, transport represents an area in which significant efforts should be made in order to achieve the European Green Deal goals and to ensure the sustainability of the economy by turning climate and environmental challenges into opportunities in all policy areas and ensuring a just and inclusive transition. All this is carried out with the ultimate goal of Europe becoming the first climate-neutral continent by 2050.

The role of cities in climate change is great. About 54% of the world's population lives in them, they consume about 70% of energy and produce about 75% of greenhouse gas emissions. These data are subject to growth because cities, especially in developing countries, are constantly growing. It is estimated that by 2050, up to 68% of the world's population will live in urban areas, which means that the consumption of resources in them will also increase. However, apart from the fact that cities mean a huge consumption of resources, they are also a very sustainable invention. People live and work close together, enabling sustainable mobility, shorter journeys from home to work and smaller, energy-efficient homes. Therefore, urban environments, if their population density is properly distributed, are more sustainable than suburban settlements. Cities also play a key role in climate change mitigation and adaptation procedures, and all new projects involving urban development must be guided by this.

Town of Poreč-Parenzo, as a top tourist destination, has long recognized sustainable development in the fields of climate energy and environment protection as an imperative of the 21st century. Following its vision of an energy-conscious European city, by becoming a Covenant of Mayors signatory in 2012, Poreč-Parenzo embarked on a dedicated fight against climate change. In 2013, Sustainable Energy and Action Plan (SEAP) for the period from 2013 to 2020 was created, binding Poreč-Parenzo to reduce its CO_2 emissions by 20%.

Soon, it became evident that mitigation measures and activities will not be a sufficient tool to achieving the desired goals. Therefore, in 2016, Town of Poreč-Parenzo, as one of the first 6 cities in the Republic of Croatia signed the New Integrated Covenant of Mayors for Climate and Energy, committing both to the implementation of measures and activities that will result in 40% CO₂ emissions reduction until 2030, as well as to the implementation of measures that would result in adaptation and increased resilience to climate change, at the same time creating the Sustainable Energy and Climate Action Plan (SECAP) and the Climate Change Adaptation Strategy for the period from 2020 to 2030.

As the second largest city in the Istria County, Town of Poreč-Parenzo is a city with positive demographic trends, a city of an extremely high infrastructural and comunal equipment and a city that, in many areas, provides high and above at national level available standards for all its citizens.

Town of Poreč-Parenzo:

- Has implemented more than 40 projects related to sustainable development in the fields of climate energy and environment protection in the past 9 years,
- In 2015, opened the first public, and to this day, completely free for users, charging station for electric vehicles. Today, a total of 12 charging stations in its area and its on average per capita puts Poreč-Parenzo at the very top of the Republic of Croatia,





- Has a fleet of vehicles, with a share of 30% dedicated to electric ones,
- Is a city whose citizens and visitors rest at the first PARKLET in Croatia and "smart benches" where they charge their "smart devices" with "green" energy produced from solar energy,
- Within the EUCF mechanism, is developing a Study and an Investment concept that will assess the real potential of the decarbonization of the transport sector in the area of the Central and Western Istria sub region.

Urban transport is a significant contributor to climate-warming greenhouse gas (GHG) emissions in cities, with most urban transport emissions coming from cars. More than 70% of global CO₂ emissions come from cities, making mitigation efforts at the local level an important contributor to

Biography:

Gordana Lalić graduated in 2004 in the department of energy, power and environmental engineering. For the diploma thesis prepared under the mentorship of prof.dr.sc. Zvonimir Guzović, she was awarded the "Hrvoje Požar" award for a particularly notable graduate thesis in the field of energy. Since 2013 she has been the CEO of the Municipal company for the construction of the city, as well as the activities of energy efficiency and environmental protection. As a creator and implementer of energy development policies at the local level, she has so far coordinated the implementation of over 40 projects in the field of decarbonization. Urban transport plays a fundamental role in the economic activity and welfare of urban citizens. Local governments / cities must find a way to continue to improve accessibility, while decoupling growth in travel demand from growth in GHG emissions. Affordable, safe, and convenient urban passenger mobility systems are critical for the welfare of urban residents, connecting people to jobs, education, health care, and recreation.

However, it is not realistic to expect that the problem of decarbonization of the transport sector will be solved in such a way that all related measures and activities are carried out by the public sector / local governments/cities. A successful decarbonisation process lies in the implementation of the concept in such a way that, in addition to the public sector providing support, citizens also become active participants contributing to the decarbonisation / energy transition process.

energy efficiency, renewable energy sources, emobility, environmental protection, sustainable development, and climate change mitigation and adaptation policies. As an author of all, so far, developed strategic documents at the local level that aim to achieve the goals of European energy policy in the field of climate change mitigation and adaptation, Gordana has dedicated her professional career to to creating synergies between local, regional and national levels in order to inspire and accelerate climate actions. In 2021, she was appointed the European Climate Pact Ambassador.





From climate change to decarbonisation via energy planning. Roma Tre's research experiences in the field

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Roma Tre University is a relatively young school, having been established in 1992, just thirty years ago. Research on town planning was carried out therein by the dedicated Department of Urban Studies until 2013 and, after that date, by the Department of Architecture. Even before being involved in CITY MINDED, research at Roma Tre had already been addressing the topics of climate change and energy planning, and their impacts on cities and landscapes, through the implementation of studies and EU-funded projects.

In 2012 a working group of professors, postdoctoral fellows and PhD students started working on the development of a climate vulnerability map of Rome. The work aimed to test a quick yet efficient and reproducible procedure that can provide – swiftly and with limited resources – a clear framework of the main climate vulnerability issues of a city.

The chosen methodology was based, though simplified and adapted to the urban scale, on the one used in the research *Climate Change and territorial effect on regions and local economies*, developed within the ESPON 2013 Programme. It followed the analytical steps of Exposure, Sensitivity, Impacts, Adaptive Capacity and Vulnerability.

In order to better appreciate the spatial variability of climate vulnerability, the administrative area was subdivided into Spatial Units (SUs), which have variable dimensions, approximately corresponding to a neighbourhood or part of it, and identify homogeneous parts of the city. Due to the technical impossibility to retrieve some of the data required for the analysis (climate data in particular) the research group sought to render the spatial differentials of exposure to the chosen phenomena by using observed events and risk maps as proxies. The end result was an aggregate vulnerability map that highlighted the vulnerability of the city centre, the eastern section of the city and the area of Ostia on the seaside. The product of this work was by no means an exhaustive analysis, but shows a research work done with limited resources and data, as is often the case in many local authorities.

Between 2015 and 2017 the department took part in the Erasmus+ project E-RESPLAN, which involved 6 partners from 6 countries (Slovenia, Croatia, Malta, Portugal, Italy, Spain), aiming to fill a gap in higher education programs, focusing on renewable energy sources (RES) development and spatial planning.

The project worked on 2 levels: it addressed the integrated energy planning issue, which is central in local, national and EU strategies, and it fulfilled the need of specific, interdisciplinary educational tools and activities in this field. E-RESPLAN's overall objective was to reinforce the interdisciplinary skills of higher education institutions (HEI) staff, students and young professionals regarding integrated energy planning, through the development and testing of new approaches and learning and teaching techniques through concept maps.

Between 2016 and 2018 the Department also participated in the Erasmus+ project ENEPLAN, which involved 18 partners from 7 countries (Italy, Malta, Spain, Portugal, Lebanon, Egypt, Jordan), dealing with education and research on RES topics. In a similar way to the previous project, it was conceived to address the lack of interdisciplinary approaches in RES development and planning, specifically in higher education programmes in Mediterranean countries.

Partner universities involved one or more departments in the project, with the aim to improve their current educational offer on the development



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and planning of renewable energies in different curricula. The other partners were called to disseminate a responsible approach to RES development and energy planning within their mission.

The project was based on the assumption that it was necessary to go beyond the widespread idea that renewable energy systems have no undesirable impacts on environment, landscape and socio-economic contexts. This called for an integrated approach to impact assessment, which, taking into account the multiple territorial aspects influenced by energy production processes, required interaction between different disciplines.

ENEPLAN addressed the issue of integrated energy planning and responded to the need of interdisciplinary educational tools in this field, in order to improve the quality of HE teaching and research in the field of energy, help the modernization of HE curricula, and reinforce the graduates' employability. The project used concept mapping as an innovative method to teach integrated energy planning, by shaping a critical, proactive and sustainable approach to the topic.

Its results regarded the methodology, in terms of the transfer and dissemination of the concept mapping method and tools and the contents, in terms of the outcomes of knowledge exchanges and reflections on integrated energy planning issues. The project outputs were Open educational resources (OERs), educational materials that are available to be freely used for non-commercial purposes.

These few examples highlight the involvement of the Department of Architecture in research relating to climate change and energy, which was further confirmed with its participation in the CITY MINDED project.

Biography:

Lorenzo Barbieri, town planner and PhD, studied town planning in Venice (2007), Milan (2010) and Newcastle upon Tyne (2011). He gained a PhD in territorial policies at Roma Tre (2016) with a thesis on public transport and climate change in Rome. Later he was research assistant at the same university within the Smart Environments program, where he worked on tourism and slow mobility. Between 2017 and 2020 he worked with the Italian environmental protection agency (ISPRA) on the LIFE Master Adapt project, which promoted the mainstreaming of climate change adaptation in regional and local authorities. In 2020 he returned to Roma Tre, where he worked on the Erasmus+ projects CITY MINDED and INCLIMATE, on teaching decarbonization and promoting climate education through concept maps respectively. Another strand of his research was on sustainable development strategies in metropolitan areas. He currently works with U-Space on a wide range of projects, from climate change adaptation to sustainable transport.





Session 3 – Multi-level perspectives and experiences of urban decarbonisation

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Position of heritage buildings within energy transition paradigm

Dalibor Jovanović IRENA-Istrian Regional Energy Agency, Croatia Dalibor.Jovanovic@irena-istra.hr

Despite significant developments in the process of energy transition of buildings in the Republic of Croatia witnessed in the last few years, one segment of building stock remained, somewhat unfairly, neglected. The energy renovation of buildings has largely become a process dependent on the availability of various European funds and grant schemes in which, despite the principled availability of a wide range of energy transition scenarios, the implementation of energy efficiency measures, and above all thermal insulation of the building envelope, was clearly favored. In such conditions, cultural heritage buildings mostly become objects that are not usually associated with the concept of energy renovation. On the other hand, their number, but also their importance, both cultural and economic, especially with regard to their contribution to the tourism sector, certainly does not justify such approach. Concept of heritage and in particular heritage buildings is important part of European identity that is self-evident but also recognized by new initiatives related to the Green Deal program such as The New European Bauhaus. This is particularly pronounced, especially in terms of in-space density, in European Mediterranean areas, Croatia included. With 102,615 protected buildings within cultural and historical units, of which 1,950 are individually protected, the Republic of Croatia has one of the highest densities of such buildings in the EU. Their concentration is particularly pronounced in the coastal area, where there are 57,726 of them, of which approximately 15.000 are in the County of Istria. With 102.615 protected buildings within cultural-historical entities, of which 1.950 are individually protected, the Republic of Croatia has one of the highest densities of such buildings in EU. Their concentration is particularly pronounced in

the coastal area, where there are 57.726 of them, of which approximately 15.000 are in Istrian region.

On one hand, it is evident that heritage buildings are underrepresented in energy transition process, on the other one, it is relevant to ask whether they should be at all, particularly when "energy efficiency first" principle is concerned. Does overall goal of energy transition need to trump all the others, in this case, preservation of important aspect of afore mentioned European identity? It can be argued that communal value of such buildings as both cultural and economic entities requires specific approach to their refurbishment, and especially energy one which is usually an intrusive process. They have specific value that goes beyond the general principles embedded into regulations related to implementation of energy efficiency agendas. Unlike most of the other buildings, they are also income generators, not solely for themselves but also for their surroundings. This capacity is almost exclusively related to their visual identity that needs to be, especially in relation to their exterior, preserved as much as possible. With that in regard, it is valid to ask whether "energy efficiency first" maxim should abandoned here in favour of energy be consumption-production balance thus prioritizing measures of renewable energy use, particularly ones that have no or negligible impact on building exterior such as use of water to water or brine to water heat pumps. Even if so, it needs to be recognized that more often that not heritage buildings are unique entities often requiring one-off solutions that are seldom easily replicable in whole. The techniques used in energy transition process have to be the least aggressive ones with out of box thinking often required. The refurbishment process is the one to be adapted, and not the building.





Returning to the identity issue, it is essential to recognize building as an integral part of its surrounding and community as whole. Same principle applies when evaluating building, especially heritage one, as economic and in particular, income generating entity. But, on the other hand, surroundings should be seen as integral part of heritage building when evaluating its environmental impact. To say it in a different way, it should give something back especially in terms of offsetting its energy demands and greenhouse emissions. If adopted correctly, concept of energy communities being developed lately could prove to be particularly suitable offsetting concept.

With all this in mind, it is important to remember the essential purpose of each building, heritage ones included, and that is some form of habitation and thus to keep in mind the need of its occupants.

Biography:

Dalibor Jovanović, born in Dubrovnik, 1982. By profession, he is a Master of Economics with many years of experience working in the field of energy. Since 2013 he is employed at IRENA - Istrian Regional Energy Agency on the preparation and implementation of projects co-financed by the EU. He has extensive experience in project preparation and project management in various programs: preparation of strategic documents for the County of Istria in the field of energy, creation of energy analyses for the needs of the County of Istria, coordination of investments in the energy renovation of buildings, especially in the installation of heat pumps, implementation of educational programs, especially for students of secondary technical schools. He is a co-author of several scientific/professional articles in the field of heat pumps and geothermal energy and one book on business simulation. He participated in numerous professional and scientific meetings on the topic of heat pumps and renewable energy sources and particularly heritage buildings energy refurbishment and he is a member and from 2021 vice president of HUDIT, the Croatian Heat Pumps Association.

Building has a life of its own and to certain extent it is essential to allow its users to use it in accordance with current trends and technology possibilities. Quite often, this is not taken in consideration and such tendencies often create buildings unsuitable for any contemporary use which, in more extreme cases, are then abandoned and left to deteriorate. This problem is especially pronounced in private buildings and when dealing with it, it is almost impossible to firmly claim where the priorities lie. Certainly, living comfort, and in particular healthy living conditions, cannot be demoted to second place. It seems that here again, proper implementation of "energy efficiency first" principle has the upper hand. In order to reconcile this principle with need of visual identity preservation, new technological advancements are necessary.





The new look of the City of Labin

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Labin stan d.o.o. is a public company owned by the City of Labin whose main activity is real estate management in terms of maintaining common elements of multi-apartment buildings. There are currently about 560 buildings under management in the area of the City of Labin, the Municipality of Raša, the Municipality of Sveta Nedelja and the Municipality of Kršan. The company employs 7 people.

The City of Labin is situated on the east coast of Istria whose history was marked by mining. Coal production was for many years the backbone of the economy of Labin and surrounding settlements. In 2000, the last coal mine closed and Labin started in a new direction. Due to its favourable geographical position by the sea, it is turning to the intensive development of tourism, an entrepreneurial zone is opening where clean industries have found their place, the IT sector is developing, and the private sector is strengthening in entrepreneurship.

In parallel with the substitution of mining in the public sector, there is reflection on the green transition, and the City of Labin signed the Energy Charter in 2009, which expresses awareness of the need for energy management, care for environmental protection and rational management of resources for the benefit of all citizens of Labin. The City of Labin and Labin stan d.o.o. later also signed the Decarbonisation Charter. It is precisely on these foundations that Labin stan d.o.o. begins with the energy renovation of multi-apartment buildings. The beginnings of the energy renovation of buildings were not easy at all. Our co-owners were quite distrustful of institutions and some newspapers in the renovation of facades brought about by energy renovation. A lot of work was done to educate the co-owners about what

energy renovation is and what benefits it brings. The promotion of energy renovation was carried out at meetings of co-owners, by leaflets and through the media. The promotion bore fruit so we started the renovation already in 2005 and by 2013 we had renovated the facade of 31 buildings, 18 of which with thermal insulation thanks to the coowners who showed great awareness for the renovation of their buildings and allocated considerable financial resources even before the public calls for co-financing. In 2014, the Environmental Protection and Energy Efficiency Fund published the first public call for energy renovation of multi-apartment buildings, to which 7 buildings applied. They have all achieved the right to co-finance the renovation in the amount of 40%. After the renovation, the positive experiences from those buildings were transferred to the owners of non-renovated buildings, so the interest in renovation increased. In 2015, Labin Stan applied for 24 buildings and all of them achieved the right to co-financing in the amount of 40% of eligible costs. In 2016, Labin Stan applied for 32 buildings and all of them once again achieved the right to cofinancing in the amount of 60%.

Today in Labin, there are 83 energy-renovated buildings, which amounts to 15% of the housing stock under Labin Stan management and ranks the company among the most successful managers in lstria and in Croatia. Throughout the entire application process and building renovation process, we had the support of the City of Labin, which renovated public buildings in parallel and in the unity and synergy of all stakeholders of energy renovation - co-owners, managers, the City of Labin, designers and contractors we have contributed to a beautiful story that we call today "The New Look of the City of Labin".





Empowering consumers through renewable energy self-consumption and energy communities

Diane Cassar

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Community energy initiatives are offering new opportunities for citizens to get actively involved in the energy scenario. The engagement of citizens through collective energy actions supports green transition of European urban areas and empowers consumers by fostering their participation and control over decision-making in relation to clean energy generation through renewable sources.

Community energy is a relatively "new" concept that has been introduced globally and is gaining popularity among European countries. Energy communities can be understood as a way to 'organise' collective energy actions around open, democratic participation and governance and the provision of benefits for the members or the local community. In an energy community, a legal entity such as a cooperative, is set up which can interact as a single prosumer with the utility grid. The setting up of an energy community allows the members to share energy that is generated locally through renewable energy sources within the community itself. This can help to better match the demand and renewable energy supply when taking into consideration a group of buildings, allowing for collective self-consumption.

The European Union officially introduced the concept of energy communities as part of the Clean Energy for all Europeans Package. The final Clean Energy Package contains two definitions of energy community: Citizen Energy Community and Renewable Energy Community. According to the Renewables Directive, a renewable energy community is a legal entity which is based on open and voluntary participation, is autonomous and controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned by the legal entity.

Shareholders or members can be natural persons, SMEs or local authorities. The primary purpose of the entity is to provide environmental, economic or social community benefits for its members or for the local areas, rather than financial profits. Renewable energy communities are entitled to produce, consume, store and sell renewable energy, and share renewable energy within the community itself.

The Electricity Directive defines a Citizen Energy Community in a very similar way as the Renewable Energy community, which is also a legal entity based on open and voluntary participation and is controlled by its members or shareholders. Its primary purpose is also to provide environmental, economic or social community benefits to its members or shareholders rather than to generate financial profits. The main difference is that this directive does not make it obligatory for the citizen energy community to generate energy only through renewable sources.

Micro-grid systems can support energy communities and enable their autonomous operation. A microgrid can be defined as an energy system that serves a specific geographic area, such as a hospital complex, a business centre, a university campus or a neighbourhood. Distributed energy generation systems such as solar panels, wind turbines and combined heat and power plants are installed within the micro-grid to provide the energy supply. In addition, microgrids can include energy storage, typically from batteries, as well as electric vehicle charging stations.

Energy communities and urban micro-grids have several advantages, including ensuring a more reliable energy supply and lower energy costs for





the citizens through collective energy selfconsumption. Additionally, community energy projects are also advantageous from the utility grid point of view since they can provide services to reduce the stress on the grid infrastructure. Engaging citizens through collective energy actions

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Biography:

Diane Cassar is an Electrical Engineering by profession, specializing in the field of energy. She obtained her Bachelor's in Engineering (Hons) and Master of Science in Engineering from the University of Malta. Her main interests concern renewable energy technologies, energy efficiency in buildings, energy management and e-mobility. Diane joined MIEMA in 2010 and presently leads the Projects Department within the agency and serves as Secretary to the Management Board. can reinforce positive social norms and foster social innovation potential by integrating consumers within the energy system independently of their income and access to capital and ensuring that the benefits of decentralisation are also shared with those that cannot participate.

During the past 12 years, Diane was responsible for project and financial management of EU funded projects under different programmes including Horizon 2020, Interreg Europe, Interreg MED, Erasmus+ and Italia-Malta. In particular, she was responsible for the coordination of the first pilot projects in Malta in relation to micro-grids and energy communities as part of the EMPOWER (H2020) and PEGASUS (Interreg MED) projects which were implemented between 2015 and 2019.





Apsyrtides energy cooperative – an energy community initiative on the Cres-Lošinj archipelago

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The Cres-Lošinj archipelago consists of 2 bigger and several smaller inhabited islands, with total surface area of 514 km² and 10.253 inhabitants, who triple in the summer tourist season. More than 80% of inhabitants live in two towns (Cres and Mali Lošinj) which cannot be considered as real urban settlements. Another peculiarity of the area and its communities is the insularity, which conditions its economy, public and private transport, energy and water supply, and many other aspects of life. Therefore, the path to decarbonisation and chosen solutions slightly differs from those that are implemented in urban areas.

The systematic work on energy transition of the Cres-Lošinj archipelago started only in 2019 when a group of main stakeholders, coordinated by the Island Development Agency (OTRA) initiated the cooperation with the Clean Energy for EU Islands Secretariat set up by the European Commission. Very soon, the initiative gathered more than 40 stakeholders from local and regional level which signed the "Clean energy for EU Island Pledge". The act of pledge signing underlined the very strong cohesion of the island community around the energy transition issue.

The analysis of the energy sector on the archipelago was carried out, and on the bases of the baseline emission inventory, the Clean Energy Transition Agenda for the Cres-Lošinj archipelago was elaborated. The baseline emission inventory revealed that almost 60% of the CO2 emissions is generated by either road or maritime transport – sectors that are beyond the domain of influence of the local stakeholders. The mobilization of the local community and its active involvement in the energy transition through smaller actions was therefore identified as a priority, which is also reflected in the vision of the Transition Agenda: "The Cres-Lošinj archipelago is smart and energy self-sufficient, and the local community is energy literate and actively involved in the energy transition, which will enable reaching carbon neutrality (complete decarbonization) by 2040".

The energy transition is a long lasting and very complex, structured process, which in many cases does not depend on the development of new technologies or innovative solutions but on their adoption. In other words, the energy transition process is strongly influenced by the behavioural changes across personal and social dimensions. Therefore, the local facilitators and promotors of energy transition have to: a) orient their activities on groups and grassroots processes, b) create a good environment that supports an active interaction with a new technology or service and develop a sense of ownership, and c) take account of the long-term decision making process among the community members involved.

Considering that the energy transition is not a technological process alien to society, but a process that is strongly influenced by social and behavioural factors, from the very beginning OTRA has promoted a pro-energy transition practices and other engagements in energy transition-related activities. In 2021, it supported the establishment of the Energy Cooperative Apsyrtides by 29 funding members, including the town of Cres and Mali Lošinj, several companies and citizens. Taking advantage of the positive atmosphere among the cooperative members and the whole island community, in September 2022 the cooperative launched the first round of the crowdfunding campaign aiming to collect the initial funds for the construction of a solar power plant (500 kW).





Thanks to the fact that the island stakeholders were involved in the energy transition initiative from the very beginning, as well as the mutual trust and community cohesion that was crated, the cooperative managed to collect among local

Biography:

Ugo Toić has been Director of the Island Development Agency (OTRA) since 2011. and manager of many different projects dealing with issues on the Cres-Lošinj archipelago. In the last years OTRA is mainly focused on projects regarding sustainable tourism and energy transition. In 2019, community more than 100.000 euro in only three weeks of the crowdfunding campaign. That was evidence that the cooperative management is doing a good job regarding local community mobilisation

Mr Toić coordinated the elaboration of the Energy Transition Agenda of the Cres-Lošinj archipelago. He is also president of the assembly of the energy cooperative Apsyrtieds and is strongly committed to sustainable development and green transition of the archipelago.







Student experience with CITY MINDED: The City Decarbonisation Itinerant Workshop experience during the Students' Workshop in Valletta, Malta







UNISI student experience with CITY MINDED

Francesca Gaspari UNISI-University of Siena, Italy

I would argue that City Minded represented a great chance for me to engage in something concrete that goes beyond classrooms and books. This project gave me the possibility to connect to an international and multidisciplinary environment, enhance my university education and broaden my views. The topic of Decarbonization is of great interest to me. That said - as a student of Economics - my field of competence focuses only on the Carbon Footprint Calculation and the Greenhouse Gases Inventory (GHG), as accounting and mitigation methodologies.

My perspective has always been strictly socioeconomical. Nevertheless, I have always been also very curious to approach other disciplines since I am conscious that the key in the field of sustainability is cross-cutting and integration of expertise: working together by pursuing common goals and developing converging strategies.

This workshop gave me the opportunity to get in touch with other interesting frameworks and assessments which can be implemented in the attempt to evaluate and communicate the anthropogenic contribution to climate change.

The most inspiring for me was the co-working session about place-making - held by the University of Roma Tre - to the extent that I decided to integrate this more qualitative perspective into my dissertation project.

I really enjoyed the city tour we had in the morning. A walk around Valletta was very useful to start to get to know the city and the main points of interest. We were asked to take pictures, and this is something I did with excitement.

I had never considered the added value of urban mapping before, which can provide a visual analysis of the target area. This preliminary study enables us to understand immediately weaknesses and strengths, what could be improved or enhanced, and which objectives could be designated, having as the ultimate goal the welfare of local citizens and tourists, as well as environmental preservation.

Since Carbon Footprint Calculation and GHG Inventory focus on emissions due to human activities aiming at reducing impacts from an environmental-centered perspective, it was quite interesting to see how the lack of sidewalks could be a weakness that students from the University of Roma Tre took into consideration while designing ameliorative measures, to improve pedestrians' viability.

Quite impressive was also the activity carried out by a girl joining my group. Looking at the city map and doing some brief research, she was able - in a very little time - to identify a disused parking area for the installation of a solar panel farm and estimate the surface area that would be available for the implementation of one of the defined measures (Renewable Energy Sources reliability, for instance).

I learned that the greatest asset of working in heterogeneous groups is the possibility to share knowledge and expertise in a complementary way: reaching where others cannot reach and being completed where one cannot reach.

I was also quite impressed by the location where the workshop took place. Valletta is a historical urban context that presents a lot of rundown and abandoned buildings to which a new and sustainable usage should be given. Valletta Design Cluster is a great hub for innovation. It enters an existing and wider project of urban renovation that already involves the southern part of Valletta. It may - and already does - function as a model for the Maltese population and local authorities as it



provides evidence that requalification is not only needed but also possible. What I liked the most about this project is that it put together different approaches and methods of analysis which provided in only two weeks a picture of the target area leading to a final strategic plan based on a factual study.

Presentations at the end of each co-working session made me acquire confidence. I used to be very anxious and nervous when it came to presenting something to an audience. But in that room, we were able to create a very intimate atmosphere that made me feel safe and not judged by anyone. I

Biography:

Francesca Gaspari, student in master Environmental Economics and Sustainability, Department of Economy and Statistics, University of Siena. Born and raises in Verona, but when was 19 years old, moves to undertake a university education. In 2020 receives a bachelor's degree in Political, Social, and International Sciences at the University of Bologna. Over the past two years develops a strong interest in environmental issues, driven by a more affirmed awareness of the urgency of addressing the climate crisis. Therefore, decides to pursue her career in the direction of sustainability and environmental economics. During the studies participates in a course about emissions accountability, Life Cycle Assessment (LCA), Carbon Footprint Calculation, and Greenhouse Gases (GHG) Inventory. Studies the impact that the anthropic system has on the environment. In July 2022 participates in the Intensive Course in Malta within the Erasmus+ City Minded experience on which will write the master thesis.



was very passionate about joining the sessions and I felt to be in them with 100% of myself.

Unfortunately, on the very last day - when we had the final presentations of the workshop - the stakeholders were absent and couldn't hear our proposals. I had been waiting for that moment for the entire week because I saw it as a way to expand our work out of the partners. This is the only aspect I am disappointed about. It was a great experience and I'm looking forward to joining the next.





UPO student experience with CITY MINDED

Troyee Anupoma, Andres Morillo Najarro, Nuria Pilar Plaza Martín UPO-University Pablo de Olavide, Spain

Introduction

Decarbonization represents one of the solutions in the roadmap towards a less vulnerable urban environment. Decarbonization comprises all measures leading to a reduction of greenhouse gases and thus of the city's carbon footprint. The CITY MINDED workshop has given us the opportunity to learn the current tools that could be applied in cities to achieve decarbonization. In other words, it has taught us how we can, from the local level, successfully address this process. To this end, a multidisciplinary approach has been shown to be essential, where design, science and the humanities work as allies.

A first contact with decarbonization: the online course

The first part of the CITY Minded workshop consisted in presenting the tools to be applied in our hometowns. In our case, the target city was Sevilla, which is one of the cities of Spain with largest exposure to climate change. As it was explained during the first season of the workshop, this is due to the extreme temperatures present in summer that drives an increase in mortality and heat-stress related problems. Besides, it is in danger of experiencing profound droughts due to the expected reduction of precipitation in next decades, according to [IPCC, Atlas regional]. Thus, it is likely to undergo desertification, as many other areas in South Europe. Therefore, it is crucial for the city to adapt and mitigate the impact of climate change.

The City Decarbonisation Itinerant Workshop experience in Malta

We finally experienced a learning-by-doing workshop session in the beautiful country of Malta

after Covid restricted online-based courses. City Minded created a one-week itinerary for us that included a face-to-face gathering for all students who had participated in city-based online workshops. The Malta week had become more interesting not only because of the beautiful sea view, but also because of the opportunity to work with and learn from people with diverse experience and academic backgrounds. As we had all been seeing each other's faces behind a screen for the better part of two years, we, three UPO students, were ecstatic to embark on our journey from Sevilla learn numerous aspects of to urban decarbonization.

From the first to the last day of the week, we had a jam-packed schedule in the aptly named "intensive course." The first day began with a presentation of the City Minded project's partners, during which we learned about the work and progress that the stakeholders have been making to build the project. We explored the incredible fortified city of Valletta, learning about its history and observing its people and culture. It was followed by amazing presentations that included introduction to Valletta, its neighbourhood, and case study of bridging the tangible with the intangible - green communities at the Valletta Design cluster. On the first day, we all immersed ourselves in the history, design, and philosophy of the location where we would spend the rest of the week gathering knowledge and planning urban decarbonisation roadmaps through a 'learning-by-doing' method.

Students from three universities (UPO, UNISI, ROMA TRE) with diverse academic backgrounds were grouped together to work as a team beginning the following day. Our diverse academic backgrounds in city planning, architecture, and environmental sciences not only helped us in





developing shared ideas and concepts, but also in broadening our thinking process and addressing city carbonization issues through different lenses. Eight students from three institutions were divided into two teams and assigned to work in two specific areas to identify impact mitigation solutions and best practices for city decarbonization. After identifying the challenges of our target areas, we tested UNISI-prepared carbon accounting and footprint mitigation strategies with real data from Malta. We worked on methodologies for assessing resource use, greenhouse gas emissions, and other environmental impacts, as well as mobility systems, waste and water management.

The next day, we had an interesting and thoughtprovoking session by UPO on the assessment and analysis of vulnerability associated with climate change. We learned to use the indexes to analyse vulnerability and resilience associated with the effects of climate change. Every student performed hands-on analysis for Valletta zones and learned about various resources (e.g., websites, city hall information etc.) that we used to collect data for calculating and plotting indexes. This exercise helped us understand the theories in practice, and we could see how we should quantitatively use different indexes to understand any target area's vulnerability to climate change.

On Day 4, we applied knowledge from IRENA and MIEMA to identify existing energy efficiency and renewable energy technologies on our target building or neighbourhood. We also put our heads together to propose additional measures to maximize energy performance, and we brainstormed about non-cost measures that maintain efficiency. Finally, we proposed a timeline for implementation (short, medium, and long term) to put into practice activities that would be carried out in a real-life scenario of city decarbonization processes. We concluded our meeting by compiling the results of the co-working sessions in which we had participated throughout the week.

Day 5 was all about presenting the results of working groups, and it ended with a lot of introspection, moderated by MIEMA. We talked about what we learned and perceived from this one-of-a-kind experience in summer of 2022. This City Minded journey not only included good food and company, but it also trained us how to work in multidisciplinary groups and helped to build capacity that could be useful in managing the urgent and necessary transition to carbon neutrality.

Final discussion and conclusion

The online sessions and work on Malta were challenging insofar as the multifaceted and multidisciplinary nature of the challenges that were posed to us meant that each one of us on our own could not cover the necessary skills, and it was only from joint work that solutions would emerge, providing different perspectives of interpretation to the system, until reaching a holistic perspective of it.

Having worked on different city cases on the map, and a real field experience in Malta, we have learned that weaknesses can be turned into strengths, and threats into opportunities. This was not always possible in the way we would have liked. But as the workshops and activities developed, we were able to realize that the limitations were more a problem of perspective. That's why we've been challenged to think outside the box.

In a first movement we allowed ourselves to approach the problems as if there were no real restrictions. Thinking as if money or resources were not a limitation, or as if citizens were going to willingly accept losing the space to circulate by car, occupying their spaces to take advantage of the sun's energy, or simply as if transforming the landscape be a hindrance to anyone. But all these obstacles, when included, far from being a problem, became a reason to put more creativity into each proposal. We cannot say that we have achieved it, but we have reached horizons of possibility that we would never have imagined. So much so that today we are more optimistic than when we embarked on this adventure. Recalling the famous Spanish poet Antonio Machado, "caminante, no hay camino/se hace camino al andar" (walker, there is no path/the path is made by walking).

Being so hopeful to learn the number of creative possibilities that can help us achieve the objectives of sustainable development and the neutralisation of emissions, we also find a series of obstacles known to all. On the one hand, the inertia of today's





world: the consumption and pollution machine are a train that is difficult to stop, and no matter how hard we work, if no one hits the brakes on the locomotive, we will continue swimming against the current. On the other hand, we have the conflict of interest between heritage conservation and

Biography:

Troyee Anupoma is a Marie Curie fellow, currently working in Doñana Biological Station (CSIC) and pursuing a PhD in Environment and Society at University Pablo de Olavide. Along with her aspiration of pursuing a career in research with a focus on environment and climate change, she takes an incredible interest in social, climate policies, and their social application. She also worked on multiple projects for addressing Sustainable Development Goals in South Asia and participated in international forums in Germany, US, Australia and EU. In 2016, I co-founded Gen Lab, a youth-led social enterprise that works with youth climate networks in the global South and has received several national and international recognitions.

Andres Morillo Najarro is an anthropologist and has a master's degree in criminology, criminal policy and legal-criminal sociology, where he received training on environmental crimes and forms of social and environmental damage not contemplated in current legislation. Currently, a innovation, which in practice limits the room for manoeuvre. Fortunately, the latter can be solved through a strong dose of creativity, and this appears when you put together teams like the ones, we have had the opportunity to work with.

PhD student in environment and society, working on the impact of tourism in the provision of waste collection services. He also works as a researcher in an urban resilience project and as a collaborator at the UPO master's school.

Nuria Pilar Plaza Martín is a physicist currently working at the Research Desertification's Centre (CIDE-CSIC) in Valencia, pursuing a PhD in Environment and Society at University Pablo de Olavide. Her main research area has been the transport of water vapor linked to monsoon regions. Besides, she participated in research studies about early warning systems and heat health policies. Apart from this, her interest in the analysis of climate change and its impacts in a diversity of sectors has moved her to enrol herself in different projects related to climate mitigation and adaptation. She participated as a volunteer in the implementation of Nature Based Solutions in Oaxaca (Mexico), as well as in projects pursuing food sovereignty in Seville and Germany.





UNIROMA3 student experience with CITY MINDED

Ana Luiza Milanese

UNIROMA3-University of Roma Tre, Italy

The workshop in City Decarbonisation at Valletta was a great experience academically and personally, in both fields it gave me the possibility to address other realities and grow. Three main aspects of the workshop that made these confrontations achievable were: transnationality, multidisciplinarity, and group work.

The groups came from Roma, Siena, Sevilla, and Malta, each one with different, yet complementary, backgrounds and approaches. In that frame we developed different readings and responses to the decarbonization issue in la Valletta. The responses are, of course, designed for a specific city, but the methodology of the readings are certainly something to replicate in other places. Furthermore, Valletta has characteristics that a lot of other cities have, such as the great amount of space dedicated to tourism, the unpopulated center, lack of green areas, and abandoned houses. Those contribute directly or indirectly to the climate matter. This scene repeats itself around the globe and reinforces the urgency in city decarbonization studies and practices.

Nowadays the decarbonization of urban centers is a constant subject of urban planners' and designers' studies, but the occasion to work with stakeholders and other disciplines in a practical context is not common. The first practical exercise was part of the Università degli Studi di Roma Tre proposal: build a place-making framework that allowed us to have a holistic approach to the planning, design and management of the public spaces. We started this phase walking through Valletta, then developing a community map, and identifying strengths, weaknesses, opportunities and threats related to: the community, the environment and the public space. Once we finished all this analysis, we set the urban goals and activities to pursue in the city. Those goals were setted on an integrated method called "green infrastructure", to make sure that community,

environment, cultural and social issues received a combined solution.

After the work with Roma Tre the work with the other universities began, they notably regard the measurement phases. It's common in urban design to propose ways to reduce the carbonisation issue, but the approaches of Universidad Pablo de Olavide and Università di Siena bring the possibility to measure the efficiency of those proposals and the impact that they have in the amount of vulnerability of the cities. This "measurement" capacity is a turning point in the academic framework, a major way to reinforce the effectiveness of the propositions and adequate actions to every city.

While the urban design point of view concentrate the attention in the constructed territory and its characteristics (socio-cultural, ecological. economical), the measurement processes - Carbon Footprint Calculation and the Greenhouse Gases Inventory (GHG) and Vulnerability Index - focus on data collection and processing regarding urban carbon accounting, adaptation, risk, and vulnerability. As a result of these three perspectives working simultaneously, not only we obtained the proposal of concrete operations (installation of PV panels and eolic turbines, insertion of green areas and only pedestrian areas, reutilization of dismissed buildings, etc.), but we were also able to evaluate to what extent those measures are capable of reducing the carbon footprint in Valletta.

As said before, transnationality, multidisciplinarity, and group work were the keys to finding new alternatives to the cities when it comes to climate change.

Said that, I delineate the only two low points of the project for me: a poor participation of the stakeholders; and no involvement of the local community. The stakeholders helped the groups to understand the Valletta background and main





concerns, as well as one of them (Valletta design cluster) provided the work space to the workshop. Unfortunately, in the final stage they were not present to give feedback from the workshop results, and none of them seemed open to performing with the community.

Despite that, it was a great experience. I was able to experience how the working field operates, to

Biography:

Ana Luiza Milanese, PhD student at Università degli Studi di Roma Tre, Architecture Department. Born and raised in Brazil, developed her studies in Brazil, Spain and Italy. She has a bachelor's degree in Architecture and Urban planning from Católica de Santa Catarina University and a master's degree in Urban design from Università degli Studi di Roma Tre. Over the study career she showed a strong interest in social, and environmental thematic, always from the urban design perspective. In 2022, she has the opportunity to work on multidisciplinary fields with a master's thesis about "Land Grabbing" and by joining the Intensive Course in Malta within the Erasmus+ City Minded experience.

share and receive knowledge in a practical situation, to contribute to the change of a real problem, and to gain confidence as an academic researcher and professional. Furthermore, I expanded my professional network and made great friends.





Conclusions

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Andrea Poldrugovac – Istrian Regional Energy Agency







The CITY MINDED results and future perspectives

Andrea Poldrugovac

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The main objective of the City Minded project idea was to develop and test an innovative and creative, European-scaled learning environment in which students, specialists, and stakeholders can collaborate to identify and design the best solutions for decarbonising European urban areas. The project activities started at the beginning of 2020, but unfortunately together with the preliminary activities, the Covid-19 pandemic started to spread across the Europe and project partners had to rearrange planned activities, particularly the one related to the organisation of workshops. In the first semester, the project partners developed the draft version of the output O1-Methodology and guidelines which was the base for developing the Learning-Teaching-Training activities (LTTA), particularly the City Decarbonisation Itinerant Workshops (CDIW), which were the core of the project. In order to prepare the CDIW, in July 2020, partners have organised the first LTTA activity, the Teachers Training Workshop where each partner presented its expertise and modules which will be performed during the CDIW.

The series of CDIW workshop started in November 2020, in an online workshop organised by the University of Siena, then followed by the workshop organised by University of Roma Tre in March 2021, and the third one, also in an online mode was organised by University Pablo de Olavide in March 2022. The workshops were designed to be divided into training activities, co-working sessions, and field visits to the target area. Each of these sessions has involved the trainers of the various participating institutions, the selected students, and, especially for some parts of the workshop, some local stakeholders of the hosting city. The goal of the workshops was to address common on-site challenges and to propose decarbonisation measures which were then compiled in the third project O3-Collection output of the of

decarbonisation roadmaps for target districts/neighbourhoods. Finally, the partnership had the opportunity to test the latest version of the methodology during the 2-week Intensive course organised in Valletta, Malta in July 2022.

The project had also very strong digital component by establishing its web platform as the second-O2 output of the project. The platform contains a set of educational tools, including the fourth output-O4 a modular online course on urban decarbonisation, together with a toolkit for teachers to replicate the CITY MINDED workshops. The web platform contains all the materials produced by the project, and it will remain freely accessible to students and professors beyond the project lifetime.

As the last activity of the project, project partners have organised the CITY MINDED Final Conference "Pathways towards the green transition of European urban areas" in Pula on 22 November 2022. About 80 participants interested in the topics of urban sustainability and decarbonisation of urban areas were welcomed by the CITY MINDED project team. The aim of the conference was to present the CITY MINDED project results and to further disseminate examples of good practices from the partner countries in the fields related to urban planning, energy efficiency, renewable energy sources and adaptation to climate change.

At the end of regular project activities, it can be concluded that the project improved cooperation and provided the exchange of different expertise aiming to manage energy transition and foster the decarbonisation of European urban areas. The teaching experiences implemented and materials available in the project's web platform are therefore expected to allow capacity building of new professional figures able to handle this urgent transition to carbon neutrality.





