



Cross border seminar: Accelerating energy retrofitting investments in Mediterranean university buildings

Local workshop - Italy

Workshop Report

Date: 15th June 2021



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Med-EcoSuRe



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Med-EcoSuRe Project

Project Title	Mediterranean University as Catalyst for Eco-Sustainable Renovation
Project acronym	Med-EcoSuRe
Funding scheme	European Union under the ENI CBC Mediterranean Sea Basin Programme 2014-2020
Start date	September 1st, 2019
Duration	36 months

Med-EcoSuRe is a project funded by the European Union, under the ENI CBC MED programme 2014-2020. The programme is managed by the Autonomous Region of Sardinia (Italy) and aims to promote cross-border cooperation in the Mediterranean region.

The main objective of the project is to propose and implement innovative and eco-sustainable energy renovation solutions for Mediterranean university buildings and introduce an active collaborating approach for decision support, among key actors involved, in the framework of a Living Laboratory: MED beX.Live (Live the eXperience of university building environment).

Scope of the Event

In the framework of Med-EcoSuRe, a cross order seminar was organized with the aim to propose innovative financing schemes, business models, organizational structures and partnerships to accelerate the energy retrofitting of the university building stock in the Mediterranean.

The seminar included:

- **National workshops** organized to investigate opportunities, innovative tools and financing schemes in Tunisia, Palestine, Italy and Spain. These workshops targeted local and regional authorities, national energy agencies, ministries and fund managers, organisations providing training to cities and regions, banks and financing institutions.
- **A cross border conference** in which each partner of the project presented the outputs of the local workshops, with the aim to trigger a debate about local specificities on existing financing schemes and opportunities to accelerate the energy renovation of universities buildings.

This report summarizes the outputs of the local workshop organized online on the 15th of June 2021, by:

Agenzia Napoletana per l'Energia e l'Ambiente-ANEA

Università di Firenze Dipartimento di Architetture - DIDA



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Med-EcoSuRe



Università degli Studi della Campania "L. Vanvitelli" – Dipartimento Architettura e Disegno Industriale – DADI

Università degli Studi di Napoli "Federico II" – Dipartimento Ingegneria Industriale - DII

I. Welcome and introduction of Med-EcoSuRe project

Speakers: Michele Macaluso & Nicola Barbato

The workshop was held virtually due to the restrictive measures adopted by the Italian government to deal with the COVID-19 epidemic that prohibit gatherings and physical meetings. The workshop started with the institutional welcome of **Michele Macaluso**, ANEA director and involved in the technical activities foreseen within Med-EcoSuRe project. He thanked all the participants and underlined the importance of similar events, organized, even online, in the framework of European projects, which allow the comparison and exchange of ideas and solutions between technicians and experts in the sector, academic staff and representatives of public bodies on very important and topical issues such as the energy renovation of university buildings.

He concluded his welcome speech wishing all the participants a good job and hoping for a soon return to normality to allow other in-person meeting opportunities for comparison and discussion.

Following Michele Macaluso, the ANEA project manager **Nicola Barbato** illustrated the agenda and objectives of the workshop, explaining that this local appointment is part of a series of webinars that each country involved in the project organized; the main results will be then illustrated during the cross-border seminar on 29 June 2021.

Then, he moved on to the presentation of the Med-EcoSuRe project, of the objectives and expected results, to favor the contextualization of the topics foreseen in the agenda.

II. Energy efficiency and renewable sources: incentives for universities and the public administration

Speaker: Massimo Dentice d'Accadia

The first speaker after the welcome and introduction of the ANEA representatives, was Professor **Massimo Dentice D'Accadia**, engineer and full professor of Industrial Technical Physics and Energy at the Department of Industrial Engineering of the University of Naples Federico II and associated partner of ANEA within the Med-EcoSuRe project. He illustrated the



current incentive schemes in force in Italy for the energy efficiency of both private and public buildings. The main four mechanisms are: (a) thermal account, (b) white certificates (Whc), (c) fiscal credits and deductions, (d) National Rotation Fund for Energy Efficiency.

Measures for Energy Efficiency (including Thermal RES, CHP and small PV)

	Thermal account («Conto termico»)	White Certificates, WhC	Fiscal credits and deductions	National Rotation Fund for Energy Efficiency
Remuneration mechanism	Capital subsidies (up to 65% of the CapEx)	Obligation quota for DSO + cap and trade (≈250 €/tep)	Tax relief (up to 65% of the CapEx)	Subsidized loans (70%), guarantees (30%)
Lifetime	From 1 year (P.A. + small RES plants) to 5 years	7÷10 years	10 years	Up to 15 years
Energy saving evaluation	Estimated	Measured	Estimated	Estimated
Suitability for P.A.	✓	✓	No	✓
Funding source	Natural Gas bills	Natural Gas and Electric Energy bills	National Budget (reduction of tax incomes)	National Budget
Estimated public cost, year 2020 (M€)	≈ 300 (max.: 900, 200 only for P.A.)	≈ 800	≈ 2000	N.A. [Availability: 310]
Mean cost of energy savings (€/toe)	≈200	≈200	≈1000	N.A.
Mean cost of avoided GHG (€/t CO ₂)	≈60	≈60	≈450	N.A.

N.B. (1): PV systems up to 20 kW can benefit of a fiscal deduction (50% of the CapEx).

N.B. (2): for "Central P.A." buildings (i.e., Ministries, National Agencies and Institutes, etc.), a 100% capital subsidy for building refurbishment is also available (PREPAC program). Other options ("Elena", "Jessica", regional and local funds) are not included, for brevity.

Source: www.gse.it

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- Starting from the Thermal Account (ContoTermico), he illustrated the list of possible interventions, the details for some categories (Solar Heating and Cooling, Condensing heat generators, Transformation of buildings into nZEB, etc...) and gave some examples of possible renovation actions (Electric Heat Pumps – EHP, Solar Thermal Collectors).
- The second one is the White Certificates (Whc), named in Italian Certificati Bianchi. Also in this case, professor Dentice illustrated the characteristics of the White Certificates, one of the most relevant tools to promote energy efficiency measures in Italy, introduced in 2004 and subsequently improved ever since.

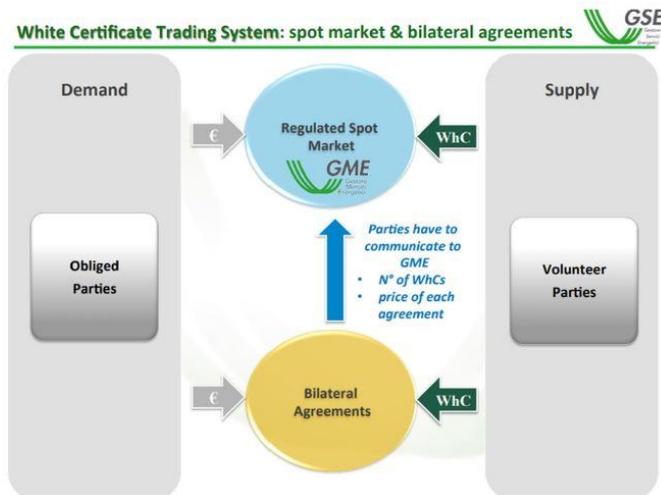
Measures for Energy Efficiency: White Certificates

- ✓ White Certificates, WhCs (in Italian: “Titoli di Efficienza Energetica”, TEE) are one of the most relevant tools to promote energy efficiency interventions in Italy.
- ✓ The mechanism (introduced in 2004 and subsequently improved) operates as follows:
 - electricity and natural-gas distributors with more than 50000 costumers are required to achieve yearly quantitative primary-energy saving targets, expressed in tonnes of oil equivalent (toe);
 - WhCs are tradable instruments, proving the achievement of such savings;
 - WhCs are issued for a period (“conventional lifetime”) depending on the type on intervention (usually ranging from 7 to 10 years).
- ✓ Parties eligible to submit projects are:
 - **obliged parties:** electricity and gas distributors with more than 50,000 final customers;
 - **volunteer parties:**
 - non-obliged distributors;
 - Energy Services Companies (ESCOs), authorized by the Italian Regulatory Authority for Energy, Networks and Environment (ARERA);
 - companies or organizations having an energy manager or owning an ISO 50001 certified energy management system.

Source: www.gse.it

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Measures for Energy Efficiency: White Certificates

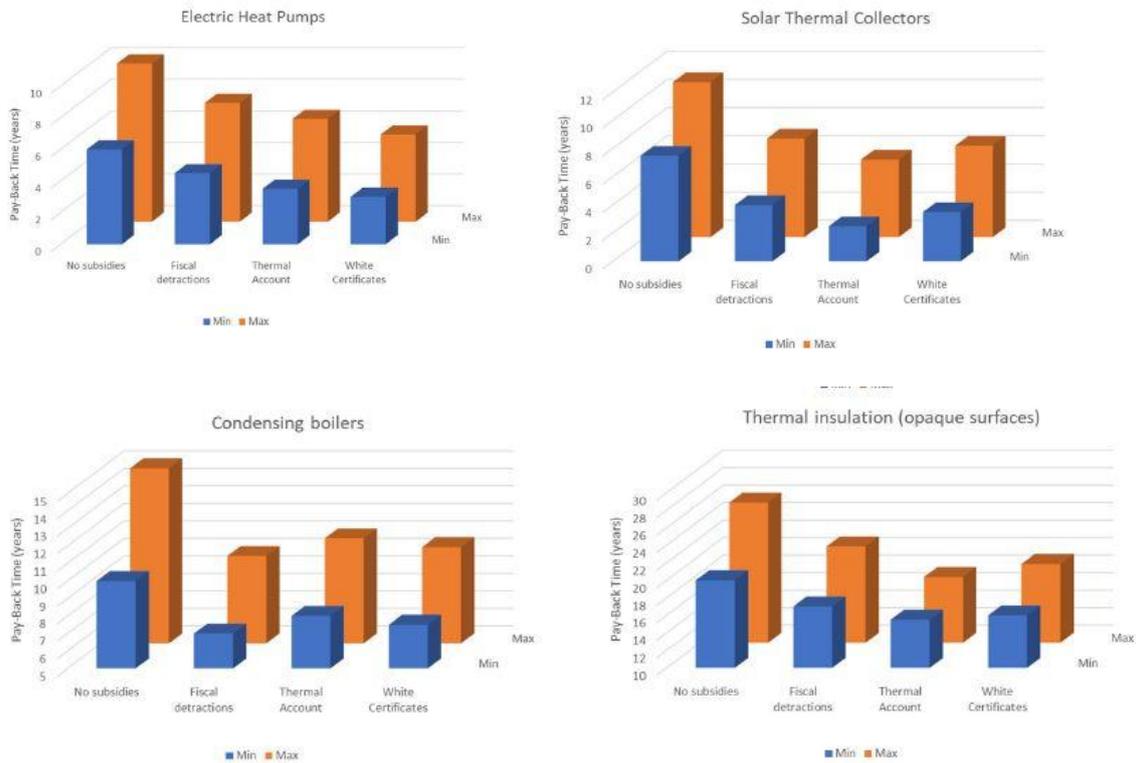


Source: www.gse.it

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With reference to others energy efficiency measures and financing schemes available in Italy, the following table illustrates the differences when addressing different renovation actions:

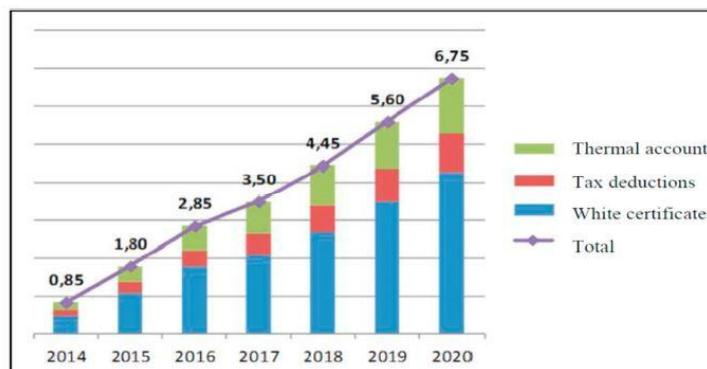
Comparison among different financing schemes



In conclusion, professor Dentice illustrated a slide containing the overall results taking into account the different measures and financing schemes:

Measures for Energy Efficiency: overall results

(N.B.: for 2019 and 2020, the expected values are shown; consumptive data are not yet available)





Following the main results and remarks:

- ✓ Despite the important progresses of the last decade (mainly the Renewable Energy Sources sector, energy efficiency and transports are late!), huge efforts are still required on our road toward the UE 2030 targets: the challenge regards technologies, finance, but also public policies and bureaucracy: permitting procedures are too slow and complicated.
- ✓ In the Italian PNIEC (Integrated National Plan for Energy and Climate 2030), investments for more than € 1000 Bln were planned (mainly for transports, € 759 Bln), followed by residential buildings (€ 180 Bln), but further efforts are necessary: the current trend is largely insufficient to get the 2030 targets.
- ✓ In addition, the new European targets on GHG emission (-55% by 2030) requires further increase in both renewable energy sources and energy efficiency sectors (e.g.: +95 GW of renewable electric energy, vs. the current +70 GW target); so, enormous additional efforts are required.
- ✓ Thanks to the national Recovery Plan, enormous additional public resources will be available: an effective use of such resources will be crucial. Unfortunately, few details are available, at this moment.
- ✓ The Public Administration should play an important role, not only as the subject in charge of providing financing, authorizations, policies, etc., but also acting as an example of best practices. However, from this point of view, the Italian Public Administration is very late: for example, in 2020, incentives for only € 50 million have been granted to Public Administration bodies under the Thermal Account program, over an availability equal to € 200 millions.
- ✓ From a technological point of view, the main challenge is represented by the flexibilization of the energy systems: in this framework, it will become crucial integrating power grids, thermal demand (for heating, cooling and industrial processes) and transports ("Sector Coupling").

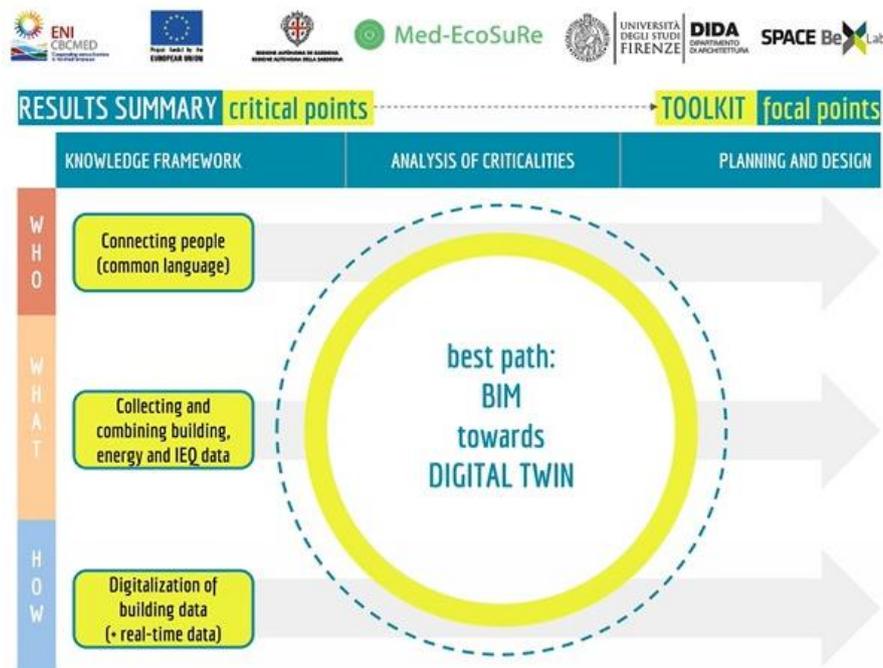
III. Presentation of survey results “challenging energy efficiency in university buildings”

speaker: Antonella Trombadore

Antonella Trombadore, professor of Architecture Technology at the Department of Architecture of the University of Florence and partner of Med-EcoSuRe project, presented the results of the survey *Challenging Energy Efficiency in University Buildings*, developed by the University of Florence as part of Med-EcoSuRe project under WP3 - Mediterranean Cross-Border Living Lab. The Living lab is an intermediate entity for collaboration between academics, decision-makers and stakeholders, in order to support university managers in planning and implementing energy retrofit measures innovative and sustainable. The survey has been addressed to University Managers and decision makers with the aim to understand the dynamics of the decision-making process related to the retrofit processes of the university building. The survey has been organized into sections covering both general information and the three focal phases of the decision-making process relating to energy retrofit measures: Knowledge framework, Criticality Analysis and Planning and Project.



	RESULTS SUMMARY critical points	TOOLKIT focal points	
	KNOWLEDGE FRAMEWORK	ANALYSIS OF CRITICALITIES	PLANNING AND DESIGN
WHO	<ul style="list-style-type: none"> Responsibility: University Technical Office Decision making: various (no competencies) Make knowledge framework a common base - intelligible for decision makers 	<ul style="list-style-type: none"> Dedicated person/office for detecting criticalities: building > energy > IEQ Define collaborative ways for a collective assessment of criticalities 	<ul style="list-style-type: none"> Planning responsible: Internal - external Project development: Internal - external Define clear standards for externals, in line with the adopted standardization system
WHAT	<ul style="list-style-type: none"> Building: > n. of buildings > territorial distribution > historical constraints Energy: lack of energy audit - energy data IEQ: high consideration VS poor evaluation (subjective) Define a consistent knowledge framework = combined knowledge of building/energy/IEQ behaviors 	<ul style="list-style-type: none"> Awareness of criticalities but lack of quantitative and continuous data Combine building/energy/IEQ criticalities 	<ul style="list-style-type: none"> Planning activity: lack of planning for energy efficiency Support the definition of scenarios combining EE with IEQ and building aesthetic quality
HOW	<ul style="list-style-type: none"> Digital data ≠ availability ≠ accessibility No standardization of data - no plans to standardize No BIM adoption Provide standards for data management to ensure availability and accessibility 	<ul style="list-style-type: none"> Not satisfying monitoring systems and not referring to all the university spaces Define procedures for a more effective monitoring - combining qualitative and quantitative data 	<ul style="list-style-type: none"> Presence of EE national financing plans Vs poor attention to energy certifications Guide to cost-effective and reliable EE plans and projects able to intercept funds



IV. Energy efficiency and consumption management interventions for the L. Vanvitelli university offices

Speakers: Amedeo Lepore & Antonella Violano

Amedeo Lepore, energy manager of the University of Campania “L. Vanvitelli”, and **Antonella Violano**, professor of Architecture Technology at the Department of Architecture and Industrial Design of the University of Campania “L. Vanvitelli”, illustrated the energy efficiency and consumption management interventions for the L. Vanvitelli university offices.

A brief introduction was provided about the history of the University, its structures (Faculties, Department, Courses of study) and the numerous buildings of which the university is composed, mainly located in the provinces of Naples and Caserta.

Then, the speakers illustrated the methodological approach to the selection of university buildings to be retrofitted: highly dispersing buildings (low energy performance); buildings lacking from an aesthetic, functional, maintenance point of view; buildings for which energy redevelopment interventions can represent an opportunity to renew the image of the buildings (perceptive and representative) located in a central and representative position.

The final part of the speech was dedicated to present the main retrofitting interventions realized to some University buildings.

Interventi attuati

Centrali con caldaia a condensazione e gruppi frigo di nuova generazione con COP>3

- *Complesso di S. Andrea delle Dame*
- *Complesso di Santa Patrizia*

Interventi di Relamping, con rilevazione di presenza in aule e uffici

- *Aulario di Giurisprudenza e Lettere e BB.CC. - Santa Maria Capua Vetere*
- *Aulario di Ingegneria - Aversa*

Impianti Fotovoltaici

- *Aulario di Giurisprudenza e Lettere e BB.CC. - Santa Maria Capua Vetere*
- *Edifici Viale Ellittico - Caserta*
- *Edifici universitari Viale Lincoln - Caserta*

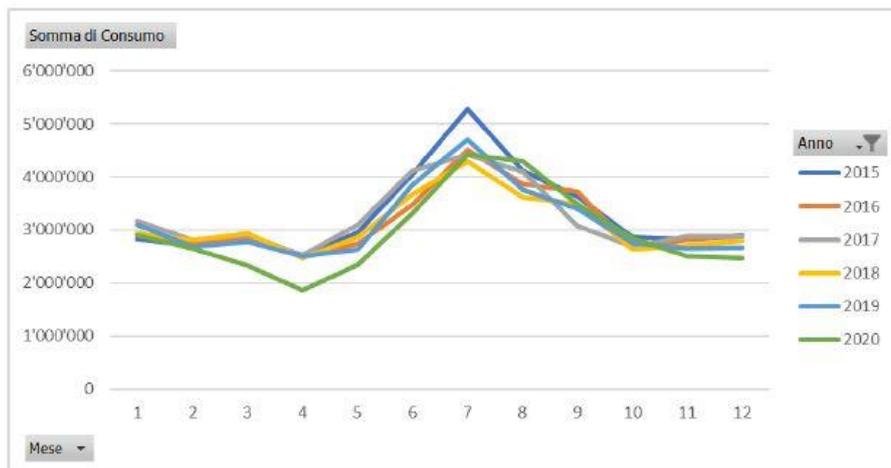
Edifici Viale Ellittico - Caserta



V. Energy management of university buildings: the experience of the university of Florence

Speakers: Marco Quarta & Alessandro Malvezzi

Alessandro Malvezzi, representative of the Tuscany Energy Consortium Company (CET), and **Marco Quarta**, head of the Building Plan Process Unit of the Technical Office of the University of Florence, illustrated the experience of the University of Florence in the energy management of the university buildings. They started presenting a brief overview of electricity consumption evolution in recent years.



They also illustrated the main energy efficiency actions implemented within some university buildings:

- LED lighting which has made it possible to reduce energy consumption relating to the lighting service by approximately 50%;
- Trigeration plant capable of producing combined electrical, thermal and cooling energy to satisfy part of the energy needs of the Scientific Pole of the University of Florence. The plant will allow to increase the overall production yield compared to the current traditional systems with the consequent saving of primary energy;
- construction of 10 buildings with nZEB qualification according to Directive 2010/31/EU at the Department of Agricultural, Food, Environmental and Forestry Sciences and Technologies of the University of Florence, for an amount of € 80 million;

public and private sector in multiple reference markets: Public Administrations, industrial, health and residential.

The plant allows the simultaneous production of mechanical or electrical energy and thermal and/or cooling energy, allowing energy saving, and therefore economic advantage, by the reduction of transformation and transmission losses in the grid.





Conclusions and recommendations

Following the speakers intervention, a discussion, moderated by prof.ssa Antonella Violano from UNICAMPANIA and prof.ssa Antonella TROMBADORE from UNIFI, was held with the aim to draw the main conclusions of the local meeting, starting from the state-of-the-art of Italian context, the main barriers that hinder the development of the implementation of energy efficiency measures in public buildings, including university buildings.

State of the art:

- There are 4 main current incentive measures in force in Italy for promoting energy efficiency of both private and public buildings: thermal account, white certificates (Whc), fiscal credits and deductions, National Rotation Fund for Energy Efficiency;
- In the 2020, Italy adopted the PNIEC (Integrated National Plan for Energy and Climate 2030) a fundamental tool for changing the energy and environmental policy of our country towards decarbonisation. In the PNIEC, the national objectives for 2030 on energy efficiency, renewable sources and the reduction of CO₂ emissions are established, as well as the objectives in terms of energy security, interconnections, single energy market and competitiveness, development and sustainable mobility, outlining, for each of them, the measures that will be implemented to ensure their achievement.

Main findings:

- **WHO?**
The central role of energy managers and ESCOs is obvious to monitor, analyze and manage the university buildings stock.
- **WHAT?**
Based on the different needs of energy efficiency interventions: either in university buildings (as in the case of Federico II and UNIFI) or in hospitals (as in the case of the GRADED company with the cogeneration plant at the Hospital Federico II University).
- **HOW?**
It refers to the various implementations of the interventions carried out by the various universities, always keeping in mind the Italian legal and procedural framework

Main difficulties and barriers



- Despite the important progresses of the last decade (mainly in the renewable energy sources and energy efficiency sector, huge efforts are still required on the road toward the UE 2030 targets: the challenge regards technologies, finance, but also public policies and bureaucracy: permitting procedures are too slow and complicated;
- The new European targets on GHG emission (-55% by 2030) requires further increase in both renewable energy sources and energy efficiency sectors (e.g.: +95 GW of electric RES, vs. the current +70 GW target); so, enormous additional efforts are required;
- The Public Administration should play an important role, not only as the subject in charge of providing financing, authorizations, policies, etc., but also leading by example and disseminating best practices. However, from this point of view, the Italian Public Administration is very late: for example, in 2020, incentives for only € 50 millions have been granted to public bodies under the Thermal Account program, over an availability equal to € 200 millions
- Existence of historic university buildings, bound by the Superintendency for Archaeological Heritage, which prevents the implementation of innovative energy efficiency solutions on the building envelope;
- Even if there is a widespread awareness of climate change issues and the need for actual environmental action, there is still a challenge related to the costs of innovative solutions implementation;
- Problems related to high costs and access to finance: for example, it is difficult for UNI Campania to access financing calls for photovoltaics or energy requalification;
- In the new buildings, it is possible to carry out energy efficiency interventions with the new materials; the problem lies in the renovation of existing buildings which represent a large part of the university building stock;
- It must not be only the economic matrix that dictates and suggests the type of interventions to be carried out.

Challenges and opportunities

- ❖ Work and insist on the wide margins that exist within the “HOW”, given that in the past, we focused more on the part related to infrastructure and equipment, pursuing the idea that the concept of energy efficiency in buildings only concerned plant engineering, above all for reasons of cost-benefit, easier development and of funding that allows you to achieve greater results;



- ❖ Highlight that we are talking not only about energy efficiency, but also about redevelopment of spaces, not only in terms of thermo hygrometric comfort, but also psychological and environmental factors / parameters / aspects;
- ❖ Clearly identify the type of funds and financing available to implement building efficiency interventions (i.e Thermal Account, new financing opportunities within PNRR – Italian National Plan for Recovery; Next Generation EU, etc...);
- ❖ As in the case of the training course organized as part of the project and aimed at university students from different countries, an active and direct involvement of the students (who are the main beneficiaries / users of the university buildings) is necessary to enhance their knowledge about the performance of the envelope, of how buildings behave and raise their awareness about the energy matters;
- ❖ To date, it is possible to evaluate the quantitative part, especially in monetary terms and economic returns, but it is now necessary to face the qualitative part: what kind of environment quality do we want to propose to our university buildings in the next 20 years? How much is the well-being of researchers and university teachers worth in terms of sustainability? Quality is difficult to measure, expect in terms of well-being, since there are still no qualitative parameters;
- ❖ We need to make comfort and well-being as a value, a sensitive and materially consistent and assessable economic data, in addition to the economic data linked to the payback times;
- ❖ Where it is not possible to work directly on the building envelope, also intervene on the contour (the immediate surroundings): gardens, trees, greenery that can help create a favorable microcosm;
- ❖ From a technological point of view, the main challenge is represented by the flexibilization of the energy systems: in this framework, it will become crucial integrating power grids, thermal demand (for heating, cooling and industrial processes) and transports (“Sector Coupling”)



Agenda



Local meeting

Innovative financing schemes, business models, organizational structures and partnerships to accelerate the energy retrofitting of the university building stock

Tuesday 15th June 2021

3pm - 6pm

<https://meet.google.com/kzp-wcvt-maz>

- | | |
|-------------|--|
| 3.00 – 3.10 | Welcome and introduction of Med-EcoSuRe project
Nicola BARBATO – Project manager ANEA |
| 3.10 – 3.30 | Energy efficiency and renewable sources: incentives for universities and the public administration
Massimo DENTICE D'ACCADIA – University of Naples "Federico II" |
| 3.30 – 4.00 | Presentation of survey results "Challenging Energy Efficiency in University Buildings"
Antonella TROMBADORE – University of Florence |
| 4.00 – 4.30 | Energy efficiency and consumption management interventions for the L. Vanvitelli University offices
Amedeo LEPORE – Energy manager University of Campania "L. Vanvitelli"
Antonella VIOLANO – University of Campania "L. Vanvitelli" |
| 4.30 – 4.50 | Energy management of university buildings: the experience of the University of Florence
Marco QUARTA – University Technical Office - Head of the Building Plan Process Unit
Alessandro MALVEZZI – Tuscany Energy Consortium Company (CET) |
| 4.50 – 5.10 | The cogeneration plant of the Federico II Hospital
Michele CECERE – GRADED |
| 5.10 – 5.30 | Potentiality and barriers for the efficiency of public buildings in the Mediterranean
Rovena XHAFFERI – Project manager SOLE - Italian Association of Municipalities (ANCI Tuscany) |
| 5.30 – 6.00 | Conclusions and final debate |