



COST-EFFECTIVE REHABILITATION OF PUBLIC BUILDINGS INTO SMART AND RESILIENT NANO-GRIDS USING STORAGE

DEAR READERS,

It is our pleasure to welcome you to the fourth edition of the BERLIN Newsletter!

"BERLIN Cost-effective rehabilitation of public buildings into smart and resilient nano-grids using storage" is an ambitious project funded by the European Union under the ENI CBC Med Programme that brings together seven organizations from four Mediterranean countries, Cyprus, Greece, Israel and Italy."

In this newsletter, we present information on all the latest developments of the project pilot activities, the new smart online tool, the 2nd IUPVMED Hub meeting and many more.

If you would like to keep up with all the latest developments of our project, follow us on Facebook and Twitter.

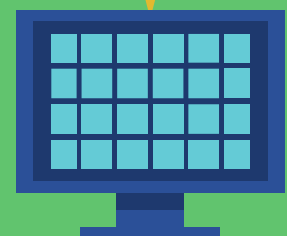
Kind Regards,
The BERLIN Consortium

PROJECT DURATION

02 September 2019

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01 September 2023



ABOUT BERLIN

BERLIN focuses on increasing photovoltaics (PV) grid penetration, combined with energy storage systems (ESS) and demand side management (DSM), along with enhancement of energy efficiency in buildings. BERLIN will implement six pilots in Cyprus, Greece, Italy and Israel. The pilots will optimally integrate PV/ESS/DSM in an innovative way and transform each pilot into a self-sufficient nanogrid, as an energy rehabilitation solution in a range of climatic zones. Such a solution can contribute to alleviating the regional and global problem of high-energy consumption in buildings - 1/3 of energy consumption in Mediterranean Partner Countries, 40% in EU- and of resulting CO₂ emissions increase. Equally important is the need to support weak grids that are particularly common in MENA region and rural areas, with low reliability and frequent outages.

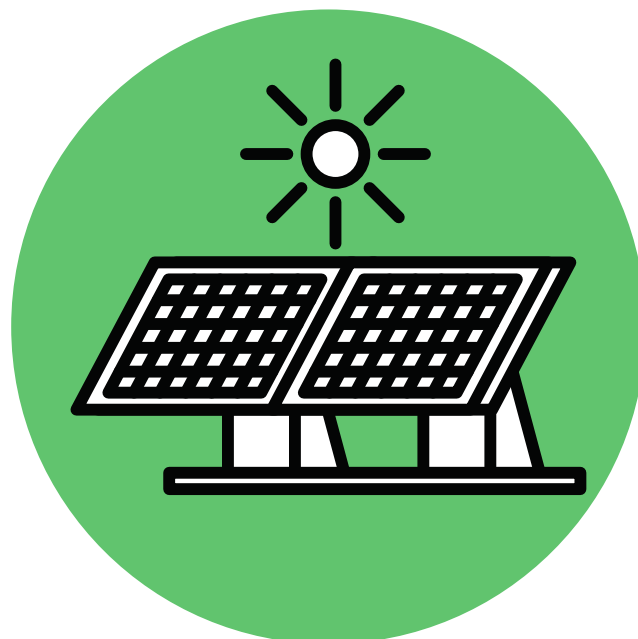
To this end, BERLIN will provide knowledge on achieving high levels of building energy self-resilience using smart nanogrids and design the solution as a cost-effective renovation. In addition, MED countries, despite their excellent solar potential, face the problem of its low grid penetration. BERLIN through onsite PV/ESS/DSM, will contribute to achieving higher levels of PV entering the grid whilst ensuring grid stability and power quality. Through these interventions, MED countries will benefit greatly from project's learning curves.

AIM OF THE PROJECT

BERLIN aims to implement cross-border pilot measures to support innovative and cost-effective energy rehabilitations in public buildings based on the nanogrid concept, the building block for smart microgrids.

The motivation is multi-fold:

- to **address** high energy consumption in building sector that is primarily fossil-fuel based,
- to **support** areas of weak grids, common in MENA region & rural areas, as high energy consumption in buildings can compromise electric service reliability,
- to **achieve** higher grid penetration of RES whilst ensuring grid stability and power quality.



€2.5 MILLION
EU
CONTRIBUTION

€2.8 MILLION
TOTAL BUDGET



PROJECT IN NUMBERS



7

PARTNERS



4

COUNTRIES



6

TECHNICAL OUTPUTS

WHAT WILL BE IMPROVED

- **Reduction of energy consumption** and CO₂ emissions at the level of pilot buildings.
- **Replication in other Mediterranean/EU regions** and enhanced interest and capacity of public authorities in building energy retrofits.
- **Encourage a widespread policy adoption** for high photovoltaic grid penetration and high levels of self-sufficiency in buildings.
- **Boost SMEs competitiveness, R&D growth, investments** in photovoltaic grid integration, interest from local building professionals to train in new innovations for high efficient buildings, and business and job opportunities in building retrofitting.

WHO WILL BENEFIT

The main target groups and final beneficiaries are:

1. **Energy stakeholders** (e.g. policy-makers, investors, distribution system operators, regulatory authorities, energy consultants, photovoltaic installers).
2. **Local/regional/national authorities** & their employees and building users.
3. The **scientific community**.
4. **Project consortium**.
5. **General public**.

EXPECTED ACHIEVEMENTS

- **6 case studies** on the photovoltaic, energy storage solutions and demand side management hybrid technology.
- **Country-specific recommendations** to stimulate the uptake of photovoltaic, energy storage solutions and demand-side management.
- **2 tools** developed for renovating public buildings using photovoltaic, demand-side management and energy storage systems.
- **6 pilot actions** in buildings in 4 countries.
- **3 cost-effective technologies** in public buildings optimally integrated.
- **5 public institutions supported** towards the adoption of cost-effective policies to increase the use and local consumption of photovoltaic energy.





PROGRESS SO FAR

Despite the escalating COVID-19 situation affecting to some extent the progress of the project activities, BERLIN partners continued to work collaboratively towards achieving the objectives of the project. Partners met online on a monthly basis to discuss and coordinate on all project activities and running tasks.

The **technical preparation of the pilots** in the four countries needed to launch the public procurement processes in relation to the purchase and installation of all the necessary equipment and turnkey solutions **was completed**. The public procurements in Italy and Greece were completed and the installation of the equipment is almost done. In Cyprus the procurement is closed, and the selection of the tenderer is on-going, while in Israel the procurement announcements are also under way.

In addition to the pilot phase, the **smart online tool for integrated energy systems** in buildings is completed. The tool helps building owners or managers to achieve energy self-sufficiency of buildings exploiting photovoltaics, energy storage and demand-side management.

Lastly, the **2nd IUPVMED Hub meeting** took place in February 2022. The overall impression of the meeting was positive, and partners are going to work on the position paper, while at the same time continue the collaboration between the Hub members and consortium members.



PILOT PHASE DEVELOPMENTS

BERLIN project aims at the implementation of cross border pilots that will support innovative and cost-effective energy rehabilitation in public buildings based on the nanogrid concept. The project focuses on the increase of PV penetration, which coupled with energy storage and DSM will increase the energy efficiency EE of the buildings. The implementation of these technologies in a cost-effective way will result in a high level of self-resilient public buildings that are green, smart, innovative, and sustainable. There are four pilots which will test these technologies.



CYPRUS

In Cyprus the tender process was launched by late November 2021 and several pilot sites visits took place in December 2021 and January 2022. The deadline of the interested parties to submit their offers was on the 15th of February 2022 and at this moment the offers are under evaluation process.



ISRAEL

The Ben Gurion University team continues with the installation of the microgrid monitoring system in both Israeli elementary schools being the pilots of BERLIN project, the Yeelim school in the city of Eilat and Nof Edom school in Eilat regional council. Eilat and Eilat municipalities moved forward with the publication of the procurements.



GREECE

The two pilot buildings in Greece are the student dormitory of the University of Western Macedonia and a municipal building in Koilada, Kozani. Both the procurement and the installation processes are completed.



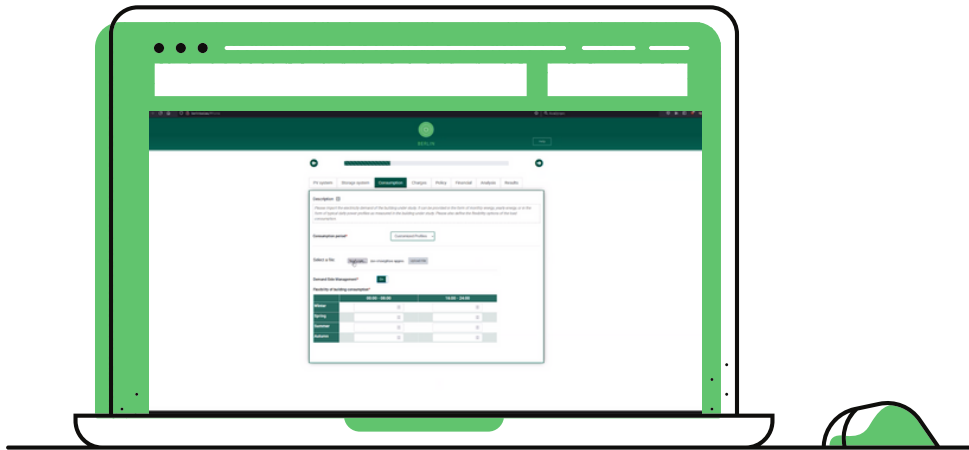
ITALY

In Italy both the procurement and installation processes have been completed. The Italian nanogrid pilot of the BERLIN project will be functional within the campus of the University of Cagliari. The pilot involves an existing building that hosts a public library, classrooms and offices, and the demonstrative installation will include a rooftop PV plant, a Battery Energy Storage System (BESS) and a Building Management System (BMS).



BERLIN'S SMART ONLINE TOOL FOR INTEGRATED ENERGY SYSTEMS IN BUILDINGS

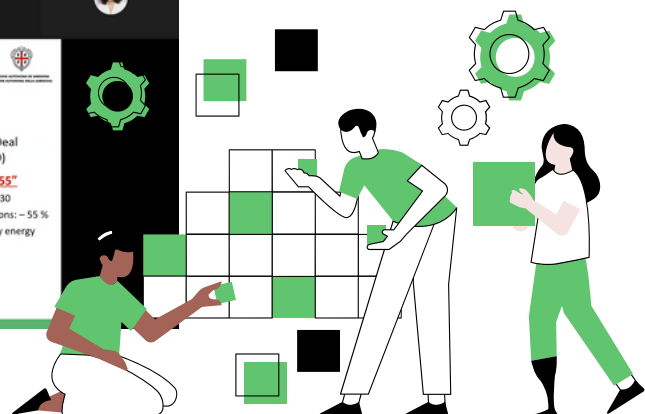
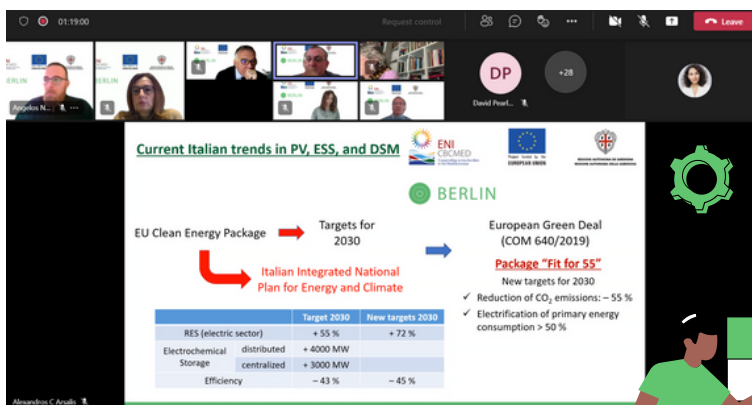
The University of Western Macedonia in Greece developed an online tool which aims to **promote self-sufficiency in buildings** with flexible loads, by properly sizing the photovoltaic and battery storage systems to be installed in a building and providing an efficient schedule for the flexible loads. The tool helps building owners or managers to achieve energy self-sufficiency of buildings exploiting **photovoltaics**, **energy storage**, and **demand-side management**. The tool will be available for the wider public soon, so stay tuned!



2ND IUPVMED HUB MEETING

The second IUPVMED (Intelligent Utilization of Photovoltaic Technology Hub in the Mediterranean region) meeting took place online on the 14th of February 2022. The meeting was a continuation of the previous meeting, which was held last year, with the aim to **investigate the integration of PV, ESS and DSM, under the concept of a hybrid nanogrid system**. The goal is to draft a position paper on the main conclusions by the end of the project.

The focus of the meeting though was on the three round table discussions regarding the role of PV+ESS+DSM towards full decarbonization of Mediterranean region, residents' awareness to energy Green Deal efficiency and the funding opportunities for innovative projects related to PV+ESS+DSM in the MED region.



PARTNERS' PARTICIPATION IN EVENTS

Prof. Erez Gal of Ben Gurion University was invited by the EU Delegation to Israel, to speak about the project before the Ministry of Environmental Protection of the State of Israel on the 31st of May 2021. The aim of the event was to present **EU-funded projects which have positive environmental impact.**



The University of Western Macedonia participated in the **9th International Conference on Modern Power Systems**, which took place online in the 16-17 of June 2021. They presented the **paper which relates to the pilot installations in the framework of BERLIN project.** The scope of the paper was to investigate the potential for achieving high level of building self-sufficiency using hybrid PV - ESS - DSM.

Eilat Municipality participated at the **CTalk Conference** on the 22nd of June 2021. CTalk served as a platform for leaders and decision-makers from public and private sectors to share insights and exchange ideas. The discussions were focused on "How Innovations Lead the Way in Building Smarter Cities?".



PARTNERS' PARTICIPATION IN EVENTS



Between 7th and 10th of September 2021, the **21st International Conference on Environment and Electrical Engineering (EEEIC)** was held in a hybrid mode. The University of Western Macedonia, participated in the conference presenting the paper entitled **“Enhancing Self-Sufficiency in Buildings with Hybrid PV-Battery Systems and Demand Side Management: A Sizing Tool”**. The paper is based on the work carried out in the framework of Output 4, which concerns tools development for renovating public buildings with PV, ESS, and DSM and more specifically the development of an online tool for sizing and operation of PV+ESS+DSM hybrid.



An interesting discussion on the topic of “Energy Storage and Resilience in Future Cities” raised awareness and increased the interest of more than 1000 participants in the **Eilat-Eilat Renewable Energy Conference**, which took place with the physical presence, between the 15th and 16th of December 2021. The team of Eilat-Eilat Municipalities participated in the conference and worked intensively to promote BERLIN reaching around 60 Israeli companies, while the rest of the audience came from both the private and public sectors and academia. One of the main topics of the roundtable discussion coordinated by Mr. Elad Topel, Eilat Smart City Project Manager as Chair, was the emerging technologies of microgrids, virtual power plants and more.

PROJECT PARTNERS



UNIVERSITY OF CYPRUS COORDINATOR

www.ucy.ac.cy

FOSS Research Centre for Sustainable Energy of the University of Cyprus (UCY) is a research powerhouse in the field of sustainable energy solutions and in particular Photovoltaics. Committed to undertaking high quality research in order to tackle the climate and energy security challenges of today and the future, FOSS has currently over 40 active research projects, mainly funded by European grants, achieving imposing results. Through its research projects, FOSS has substantial experience in pilots where Photovoltaics are integrated with Energy Storage, and this knowledge will be transferred in the BERLIN project.

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UNIVERSITY OF WESTERN MACEDONIA

www.uowm.gr

The Department of Electrical & Computer Engineering of University of Western Macedonia (UoWM) has been involved in several European, regional and national projects with various tasks such as the integration of renewable energy resources, intelligent control of electric power generation and consumption, photovoltaics and storage hybridization and relevant pilot activities, smart grids and cyber security.

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THE MUNICIPALITY OF EILAT

www.eilat.city

The Municipality of Eilat city is a leader in energy efficiency, as 75% of the city's daytime electricity is supplied by renewable energy (RE), and by 2020, the city will become energy independent. As in Eilat region there is more than 1850 sun hours per year, there is an advantage of using PV. The current state and the planned solutions are based on solar PV systems and energy efficiency, mostly in the cooling systems. Eilat is also a member of several H2020 projects in which a planning for a positive energy district is being developed.

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Università degli Studi di Cagliari



UNIVERSITY OF CAGLIARI

www.unica.it

UNICA participates in the BERLIN project through the Department of Electrical and Electronic Engineering (DIEE) that has a long history of participation to EU projects and calls and each year a significant portion of its budget is based on EU projects. The department cooperates with research labs (both industrial and public) and with other academic institutions worldwide.

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BEN GURION UNIVERSITY

www.in.bgu.ac.il

BGU is one of Israel's leading research universities and among the world leaders in many fields. BGU participates in the BERLIN project through the Department of Structural Engineering adding much needed structural/architecture expertise to consortium. Modern structural engineers face a variety of technological developments and challenges.

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Deloitte.

DELOITTE LIMITED

www2.deloitte.com/cy

Deloitte participates in BERLIN through the Innovation and Entrepreneurship Centre (Deloitte IEC). Deloitte has an important role in the project as it has vast experience in managing successful European and local funded projects. The team of Deloitte IEC uses multiple research methods and tools for European Union-funded and ad hoc research for internal or external purposes in a number of areas covering Cyprus and the rest of Europe. Specifically, Deloitte IEC involvement in EU-funded projects is mainly on socio-economic impact studies, cost-benefit analyses, project and financial management, quality management and communication and dissemination.

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HEVEL EILOT REGIONAL COUNCIL

<https://www.eilot.org.il>

Hevel Eilat Regional Council contribution will be on the off-grid applications, policy making at regional level and multi-level governance. Hevel Eilat is at the forefront of RE in Israel. The Eilat region established the Company for Renewable Energy (NGO) that works on the regulation and assimilation of innovation in the region. The regional council was the first one in Israel to build a PV solar farm and its developing new project as well as supporting start-ups.

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ASSOCIATED PARTNERS

	Organization	Country
Associate 1	 MUNICIPALITY OF KOZANI	Greece
Associate 2	 Municipality of Ussaramanna	Italy
Associate 3	 REGIONE AUTONOMA DE SARDIGNA REGIONE AUTONOMA DELLA SARDEGNA	Italy

For more information please contact the project coordinator Prof. George E. Georghiou, Director of FOSS Research Centre for Sustainable Energy, University of Cyprus, Tel. +357 22892272, email: geg@ucy.ac.cy.

