Project Title:

Innovative compact HYbrid electrical/thermal storage systems for low energy BUILDings

Project Acronym:

HYBUILD

Grant Agreement Nº: 768824

Collaborative Project

Deliverable Report

Deliverable number:

D7.2

Deliverable title:

Report on Dissemination Activities

Related task:	7.2
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Authors and institutions:	R2M – Régis Decorme, Cécile Barrere
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PU	Public, fully open, e.g. web	X
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC.	

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Publishable executive summary

HYBUILD dissemination activities contributed to demonstrate that hybrid energy storage solutions are a key component in providing flexibility and supporting renewable energy integration in the energy system and can efficiently contribute to the decarbonisation of buildings.

During the 54 months of the project, HYBUILD project partners published a total of 21 journal papers and 17 conference papers. They also organized and/or contributed to 15 dissemination workshops; several of them were run in cooperation with other R&D projects addressing similar research topics. These numbers exceed by far the dissemination targets established in the initial dissemination plan: this demonstrates a very high commitment of the project partners to disseminate the outcomes of the project.

Scientific papers and event reports are presented in the HYBUILD project website on the dedicated "Scientific articles" page as well as through short articles on the "News" page. Open Access publications are also available in the OpenAire platform, linked to the HYBUILD project.

1 Introduction

Aims and objectives

This deliverable presents a summary of **dissemination activities** conducted along the 54 months of the HYBUILD project. It highlights the **journal papers**, **conference papers**, and **workshops** organized during the project. For most of these dissemination actions, an event report was completed by its corresponding lead partner, and its content was translated by R2M into an article on the News page of the HYBUILD project website, further promoted on social media. Corresponding links to these articles are included in the summary tables which are presented in the next chapters.

Relations to other activities in the project

The overall Dissemination and Exploitation plan was presented in D7.1 - Dissemination and Exploitation plan. Dissemination activities presented in this report have been implemented according to this plan. Targets established in the initial plan in relation with the above elements have been by far exceeded (it was initially targeted to publish a total of 4 conference papers, 3 journal papers, and to organize 4 dissemination workshops). A complementary deliverable - D8.5 - presents Communication activities: it includes a summary of participation to events with **Posters**, **Exhibitions**, and **oral presentations in events**.

Report structure

Chapter 2 presents a summary of the journal papers. Chapter 3 presents a summary of the conference papers. Chapter 4 presents a summary of the dissemination workshops. The appendix includes event reports for selected events presented in the previous chapters.

Contributions of partners

R2M as WP7 leader is the main editor of this report: R2M ensured the overall planning, support and follow-up of dissemination activities, also making sure that the validation process prior to each publication was respected. All partners contributed to dissemination activities, completed event reports and/or provided content to R2M for post-event promotion on the HYBUILD website.

2 Journal papers

A total of **21 journal papers** were submitted by the consortium. At the time of writing this report, 20 of them have already been published. A specific effort was made to ensure that every paper is visible and properly linked to the HYBUILD project on the OpenAire platform. Also, a blog article was published on the HYBUILD project website for each paper with its executive summary; and this was further promoted through a post on the HYBUILD Twitter channel and by project partners through their own channels. All journal papers are also accessible from the dedicated Scientific Articles page of the HYBUILD project website (Figure 1).

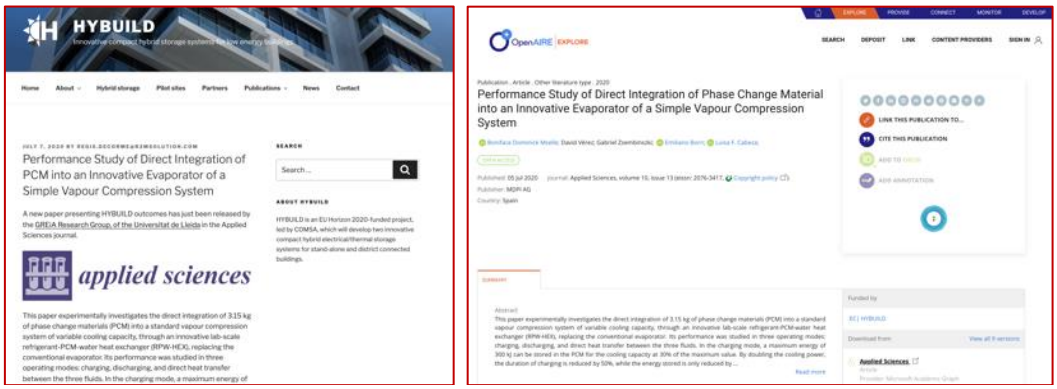


Figure 1. Example of a HYBUILD journal paper visible on the HYBUILD website (left) and on OpenAire (right)

Table 1 provides a summary of all published journal papers, together with links to access their executive summary and full version.

Table 1. List of all published journal papers

#	Authors, Title of the publication, Journal and DOI number	Link to article on HYBUILD project website	Link on OpenAire
1	V. Palomba, E. Varvagiannis, S. Karellas, A. Frazzica, **Hybrid Adsorption-Compression Systems for Air Conditioning in Efficient Buildings: Design through Validated Dynamic Models**. Energies. 12 (2019), doi:10.3390/en12061161.	Link	Link
2	T. Barz, J. Emhofer, K. Marx, G. Zsembinszki, L. F. Cabeza, **Phenomenological modelling of phase transitions with hysteresis in solid/liquid PCM** (2019), Journal of Building Performance Simulation, 12:6, 770-788 doi:10.1080/19401493.2019.1657953.	Link	Link
3	Efstratios Varvagiannis, Antonios Charalampidis, Gabriel Zsembinszki, Sotirios Karellas, Luisa F. Cabeza, **Energy assessment based on semi-dynamic modelling of a photovoltaic driven vapour compression chiller using phase change materials for cold energy storage** (2020), Renewable Energy, Volume 163, 2021, Pages 198-212, ISSN 0960-1481, doi:10.1016/j.renene.2020.08.034.	Link	Link
4	Valeria Palomba, Andrea Frazzica, **Experimental study of a fin-and-tube heat exchanger working as evaporator in subatmospheric conditions**. Applied Thermal Engineering. 175 (2020), doi:10.1016/j.applthermaleng.2020.115336.	Link	Link
5	Palomba, V. & Lombardo, W. & Groβe, A. & Herrmann, R. & Nitsch, B. & Strehlow, A. & Bastian, R. & Sapienza, A. & Frazzica, A., **Evaluation of in-situ coated porous structures for hybrid heat pumps**. Energy. 209 (2020), doi:10.1016/j.energy.2020.118313.	Link	Link
6	Boniface Dominick Mselle, David Vérez, Gabriel Zsembinszki, Emiliano Borri, Luisa F. Cabeza, **Performance Study of Direct Integration of Phase Change Material into an Innovative Evaporator of a Simple Vapour Compression System.** Applied Sciences. 10 (2020), doi:10.3390/app10134649.	Link	Link

7	Tilman Barz, Johannes Krämer, Johann Emhofer, **Identification of Phase Fraction–Temperature Curves from Heat Capacity Data for Numerical Modeling of Heat Transfer in Commercial Paraffin Waxes**. Energies. 13 (2020), doi:10.3390/en13195149.	Link	Link
8	Zsembinszki, Gabriel, Christian Orozco, Jaume Gasia, Tilman Barz, Johann Emhofer, and Luisa F. Cabeza, **Evaluation of the State of Charge of a Solid/Liquid Phase Change Material in a Thermal Energy Storage Tank.** Energies. 13 (2020), doi:10.3390/en13061425.	Link	Link
9	Gabriel Zsembinszki, Angel G. Fernández, Luisa F. Cabeza, **Selection of the Appropriate Phase Change Material for Two Innovative Compact Energy Storage Systems in Residential Buildings.** Applied Sciences. 10 (2020), doi:10.3390/app10062116.	Link	Link
10	Tilman Barz, Johann Emhofer, **Paraffins as phase change material in a compact plate-fin heat exchanger - Part I: Experimental analysis and modeling of complete phase transitions**. Journal of Energy Storage. 33 (2020), doi:10.1016/j.est.2020.102128.	Link	Link
11	Tilman Barz, **Paraffins as phase change material in a compact plate-fin heat exchanger - Part II: Validation of the "curve scale" hysteresis model for incomplete phase transitions.** Journal of Energy Storage. 34 (2020), doi:10.1016/j.est.2020.102164.	Link	Link
12	Emhofer, Johann, Klemens Marx, Tilman Barz, Felix Hochwallner, Luisa F. Cabeza, Gabriel Zsembinszki, Andreas Strehlow, Birgo Nitsch, Michael Wiesflecker, and Werner Pink, **Techno-Economic Analysis of a Heat Pump Cycle Including a Three-Media Refrigerant/Phase Change Material/Water Heat Exchanger in the Hot Superheated Section for Efficient Domestic Hot Water Generation**. Applied Sciences. 10 (2020), doi:10.3390/app10217873.	Link	Link
13	Gabriel Zsembinszki, Cèsar Fernández, David Vérez, Luisa F. Cabeza, **Deep learning optimal control for a complex hybrid energy storage system** (2021), Buildings, 11, 194 , doi:10.3390/buildings11050194.	Link	Link
14	Palomba, Valeria, Antonino Bonanno, Giovanni Brunaccini, Davide Aloisio, Francesco Sergi, Giuseppe E. Dino, Efstratios Varvaggiannis, Sotirios Karellas, Birgo Nitsch, Andreas Strehlow, André Groβe, Ralph Herrmann, Nikolaos Barmparitsas, Nelson Koch, David Vérez, Luisa F. Cabeza, Gabriel Zsembinszki, and Andrea Frazzica. 2021. **Hybrid Cascade Heat Pump and Thermal-Electric Energy Storage System for Residential Buildings: Experimental Testing and Performance Analysis** Energies 14, no. 9: 2580. https://doi.org/10.3390/en14092580	Link	Link
15	Emhofer, Johann & Marx, Klemens & Sporr, Andreas & Barz, Tilman & Nitsch, Birgo & Wiesflecker, Michael & Pink, Werner, **Experimental demonstration of an air-source heat pump application using an integrated phase change material**	Link	Link

	storage as a desuperheater for domestic hot water generation. Applied Energy. 305 (2021), doi:10.1016/j.apenergy.2021.117890.		
16	Llantoy, Noelia, Gabriel Zsembinszki, Valeria Palomba, Andrea Frazzica, Mattia Dallapiccola, Federico Trentin, and Luisa F. Cabeza, **Life Cycle Assessment of an Innovative Hybrid Energy Storage System for Residential Buildings in Continental Climates**. Applied Sciences. 11 (2021), doi:10.3390/app11093820.	Link	Link
17	Zsembinszki, Gabriel, Noelia Llantoy, Valeria Palomba, Andrea Frazzica, Mattia Dallapiccola, Federico Trentin, and Luisa F. Cabeza., **Life Cycle Assessment (LCA) of an Innovative Compact Hybrid Electrical-Thermal Storage System for Residential Buildings in Mediterranean Climate** (2021), Sustainability 13, no. 9: 5322, doi:10.3390/su13095322.	Link	Link
18	ANDREA FRAZZICA, Valeria Palomba, **A Fast-Reduced Model for an Innovative Latent Thermal Energy Storage for Direct Integration in Heat Pumps**. Applied Sciences. 11 (2021), doi:10.3390/app11198972.	Link	Link
19	Zsembinszki, Gabriel, Boniface D. Mselle, David Vérez, Emiliano Borri, Andreas Strehlow, Birgo Nitsch, Andrea Frazzica, Valeria Palomba, and Luisa F. Cabeza. 2021. **A New Methodological Approach for the Evaluation of Scaling Up a Latent Storage Module for Integration in Heat Pumps** Energies 14, no. 22: 7470. https://doi.org/10.3390/en14227470	Link	Link
20	del Arco, Isabel, Anabel Ramos-Pla, Gabriel Zsembinszki, Alvaro de Gracia, and Luisa F. Cabeza. 2021. **Implementing SDGs to a Sustainable Rural Village Development from Community Empowerment: Linking Energy, Education, Innovation, and Research** Sustainability 13, no. 23: 12946. https://doi.org/10.3390/su132312946	Link	N.A. at the time of submitting this report.
21	Boniface Dominick Mselle, Gabriel Zsembinszki, David Veréz, Emiliano Borri, Andreas Strehlow, Birgo Nitsch, and Luisa F. Cabeza **Experimental assessment of the influence of the design on the performance of novel evaporators with latent energy storage ability,** Applied Sciences	N.A. at the time of submitting this report.	N.A. at the time of submitting this report.

3 Conference papers

A total of **17 conference papers** were submitted by the consortium. Similarly to journal papers presented in the previous section, a specific effort was made to ensure that every paper is visible and properly linked to the HYBUILD project on the OpenAire platform. Also, a blog article was published on the HYBUILD project website for each paper with its executive summary; and this was further promoted through a post on the HYBUILD Twitter channel. All conference papers are also accessible from the dedicated Scientific Articles page of the HYBUILD project website (Figure 2).

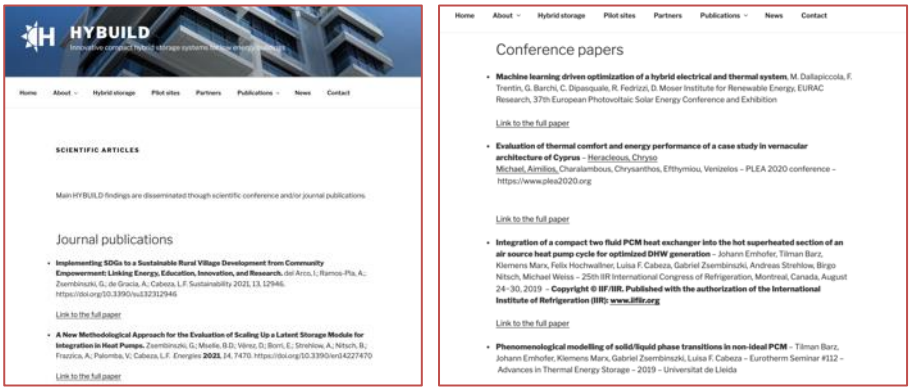


Figure 2. Scientific articles dedicated page on the HYBUILD project website

Table 2 provides a summary of all published conference papers, together with links to access their executive summary and full version.

Table 2. List of all published conference papers

#	Conference	Title of the publication and authors	Link to article on HYBUILD project website	Link on OpenAire
1	Eurosun 2018, 10-13 Sept. 2018, Rapperswil, Switzerland	**Dynamic Modelling of a Hybrid Solar Thermal/Electric Storage System for Application in Residential Buildings** Frazzica, A.; Barz, T.; Cabeza, L.F.; Emhofer, J.; Ferraro, M.; Karellas, S.; Orò, E.; Palomba, V.; Sergi, F.; Varvagiannis, S.; Zsembinszki, G.	Link	Link
2	CATE conference 2019 – Comfort at the Extremes: Energy, Economy and Climate - 10-11 April 2019	**Development of an innovative compact hybrid electrical-thermal storage system for historic building integrated applications in the Mediterranean climate** Heracleous, C.; Charalambous, C.; Michael, A.; Yiannaka, A.; Efthymiou, V.; Heracleous, C.; Charalambous, C.; Michael, A.; Yiannaka, A.; Efthymiou, V.	Link	Link
3	Eurotherm Seminar #112 – Advances in thermal energy storage, 15-17 May 2019, Lleida, Spain	**Phenomenological modelling of solid/liquid phase transitions in non-ideal PCM** Barz, T.; Emhofer, J.; Marx, K.; Zsembinszki, G.; Cabeza, L.F.	Link	Link
4	Eurotherm Seminar #112 – Advances in thermal energy storage, 15-17 May 2019, Lleida, Spain	**Heat transfer and dynamics characterization of porous structures for high-density adsorption storages** Palomba, V.; Costa, F.; Frazzica, A.; Grosse, A.; Hermann, R.	Link	Link
5	CNIT 2019 (XI National and II International Engineering	**Phase change material selection for two innovative compact energy storage systems in residential buildings**	Link	Link

	Thermodynamics Congress), 12-14 June 2019, Albacete, Spain	Zsembinszki, G.; Gasia, J.; Oró Prim, E.; Cabeza, L.F.		
6	ICR 2019 - The 25th IIR International Congress of Refrigeration Montreal, Canada	**Integration of a compact two fluid PCM heat exchanger into the hot superheated section of an air source heat pump cycle for optimized DHW generation** Emhofer, J.; Barz, Tilman; M., Klemens; Hochwallner, F.; Cabeza, L.F.; Zsembinszki, G.; Strehlow, A.; Nitsch, B.; Weiss, M.	Link	Link
7	IMPRES 2019, Japan	**Evaluation of in-situ coated foam structures for adsorption heat storage and heat pumping** Palomba, V.; Groβe, A., Herrmann, R., Nitsch, B.; Strehlow, A.; Bastian, R.; Sapienza, A.; Lombardo, W.; Frazzica, A.	Link	N.A.
8	IEA Heat Pump Conference 2021	**Dynamic performance tests of a heat pump cycle integrated latent heat thermal energy storage for optimized DHW generation** Marx, K.; Emhofer, J.; Barz, T.; Krämer, J.; Cabeza, L.F.; Zsembinszki, G.; Strehlow, A.; Nitsch, B.; Wiesflecker, M.; Zitzenbacher, R.; Weiss, M.	N.A.	N.A.
9	35th PLEA CONFERENCE SUSTAINABLE ARCHITECTURE AND URBAN DESIGN Planning Post Carbon Cities	**Evaluation of thermal comfort and energy performance of a case study in vernacular architecture of Cyprus** Heracleous, C.; Michael, A.; Charalambous, C.; Efthymiou, V.; Heracleous, C.; Michael, A.; Charalambous, C.; Efthymiou, V.	Link	Link
10	EUPVSEC 2020	**Machine learning driven optimization of a hybrid electrical and thermal system** Mattia Dallapiccola, M.; Trentin, F.; Moser, D.	Link	Link
11	11th International Congress and Exhibition on Aluminium Brazing // 7th International Congress and Exhibition on Aluminium Heat Exchanger Technologies for HVAC&R - Dusseldorf - Germany	**Multifunctional Heat Exchangers for Thermal Energy Storage** Nitsch, B.; Strehlow, A.	N.A.	N.A.
12	EnerSTOCK 2021 - 15th International Virtual Conference	**Experimental study of a novel three-fluids heat exchanger embedded with phase change materials for cooling applications**	Link	Link

	on Energy Storage, 9-11 June 2021, Ljubljana, Slovenia	Dominick Mselle, B.; Zsembinszki, G.; Vérez, D.; Cabeza, L.F.		
13	EnerSTOCK 2021 - 15th International Virtual Conference on Energy Storage, 9-11 June 2021, Ljubljana, Slovenia	**Methods for the determination of the state-of-charge of a thermal energy storage device** Zsembinszki, G.; Vérez, D.; Dominick Mselle, B.; Borri, E.; Cabeza, L.F.	Link	Link
14	EnerSTOCK 2021 - 15th International Virtual Conference on Energy Storage, 9-11 June 2021, Ljubljana, Slovenia	**Life cycle assessment of an innovative hybrid energy storage system for residential buildings** Llantoy, N.; Chàfer, M.; Zsembinszki, G.; Cabeza, L.F.	Link	Link
15	EnerSTOCK 2021 - 15th International Virtual Conference on Energy Storage, 9-11 June 2021, Ljubljana, Slovenia	**Experimental comparison of small-scale and full-scale latent storage for integration in efficient heat pumps** Palomba, V.; Dominick Mselle, B.; Vérez, D.; Zsembinszki, G.; Borri, E.; Cabeza, L.F.; Varvagiannis, S.; Nitsch, B.; Strehlow, A.; Barmparitsas, N.; Leontaritis, A.; Bonanno, A.; E. Dino, G.; Karellas, S.; Frazzica, A.	Link	Link
16	EnerSTOCK 2021 - 15th International Virtual Conference on Energy Storage, 9-11 June 2021, Ljubljana, Slovenia	**Experimental evaluation of a heat pump-latent storage system for increasing renewable share of the residential stock** Palomba, V.; Varvaggiannis, S.; Monokrousou, E.; Nitsch, B.; Barmparitsas, N.; Bonanno, A.; Dino, G.; Leontaritis, A.; Strehlow, A.; Karellas, S.; Frazzica, A.; Cabeza, L.F.	Link	Link
17	PCM2021 (IIR Conference on PCMs and slurries for refrigeration and air conditioning) Vicenza (or virtually) in September 2021	**Experimental evaluation of a heat pump-latent storage system for increasing renewable share of the residential stock** Palomba, V.; Varvagiannis, S.; Monokrousou, E.; Nitsch, B.; Barmparitsas, N.; Bonanno, A.; Dino, G.E.; Leontaritis, A.; Strehlow, A.; Karellas, S.; Frazzica, A.; Cabeza, L.F.	Link	Link

4 Workshops

A total of **15 workshops** were organized by HYBUILD, many of them in cooperation with several other research projects (see also deliverable D9.3 for a summary of synergies established between HYBUILD and other initiatives). Table 3 provides relevant links to the executive summary of these workshops on the HYBUILD website, and/or links to the papers which were produced as an outcome of these workshops. Two of the workshops led to **2 Open Access papers published in MDPI Proceedings**: they are both visible in OpenAire.

Table 3. List of workshops organized by HYBUILD and relevant links

#	Date, place, lead partner (underlined), contributing partner	Workshop title/description	Relevant links
1	25 April 2018 (M7), Aglantzia, AGL	Presentation of the HYBUILD project to the inhabitants of Aglantzia Municipality as well as to the community council and poster presentation.	See Event Report in Appendix
2	06 November 2018 (M14), Nicosia, UCY, AGL	Overall presentation of the HYBUILD project. This one-day workshop was an opportunity to benchmark the progress of several projects.	See Event Report in Appendix
3	27-29 June 2018 (M9), Aix-les-Bains, R2M, CNR-ITAE	**The Future of Energy Storage Workshop at Sustainable Places 2018**. Energy storage can support the EU's plans for the Energy Union by helping to ensure energy security and a well-functioning internal market and helping to bring more carbon-cutting renewables online. By using more energy storage, the EU can decrease its energy imports, improve the efficiency of the energy system, and keep prices low by better integrating variable renewable energy sources. This workshop has permitted to benchmark the progress of several projects supported by the European Commission which are focused on the development of innovative energy storage solutions including **HYBUILD**, **SCORES**, **TESSe2b**, **CREATE**, **E2VENT** and **STORY.**	Workshop report
4	3 November 2018 (M14), Athens, NTUA	**Thermal Energy Storage Systems for Energy Efficient Buildings**. An integrated solution for residential building energy storage by solar and geothermal resources – workshop with sister projects **TESSe2b**, **CREATE**, **SCORES**, **STORY** and **E2VENT**.	See Event Report in Appendix
5	18 December 2018 (M15), Barcelona, COMSA	**Future of Hybrid System Applications – A Real Case Solving with COMSA Corporación**. The HYBUILD coordinator, COMSA, participated in a "Case Solving" event on 18 December 2018 in Barcelona (Spain) with the InnoEnergy CommUnity. The bulk of attendees were current Energy Engineering Master's students, with some entrepreneurs and academic alumni participating as well. The HYBUILD project was presented, and attendees were asked to vision how they would market the HYBUILD solution. See case study presentation here. The attendees helped define ideas and a value proposition canvas for three distinct market scenarios for applying the HYBUILD solution. A unique idea specific to farming applications was presented as a possible business model.	Workshop report
6	Feb-March 2019 (M17), Wels, AIT, UDL, FRESNEX, OCHSNER, R2M	**World Sustainable Energy Days 2019 – Innovation Workshops Energy and Buildings**. Six H2020 research and innovation projects – **HYBUILD**, **CREATE**, **SCORES**, **TESSE2B**, **THERMOSS**, and **SUNHORIZON** – organised the "Save today, use tomorrow" workshop at WSED, Wels, Austria. Each project introduced its results and led	Workshop report

		interactive discussions related to storage innovations for tomorrow' smart buildings and cities.	
7	5-7 June 2019 (M21), Cagliari, R2M, CNR-ITAE	**Sun and Thermal Energy: Europe's Precious Energy Sources for Efficient Industries and Buildings. Sustainable Places 2019 - Innovation workshop for the EU building research community** In this workshop, we discussed the progress of five Horizon 2020 projects – **HYCOOL**, **SHIP2FAIR**, **THERMOSS**, **SUNHORIZON** and **HYBUILD** – all implementing solar thermal and renewable technologies for buildings and for the industrial sector. The discussion offered opportunities to identify and benchmark key challenges being faced by the projects, both technical and non-technical, and allowed to identify cooperation opportunities.	Workshop report Workshop paper in MDPI Proceedings (Link in OpenAire)
8	24 June 2019 (M21), Aglantzia, AGL, UCY	**Workshop on Promoting Effective Generation and Sustainable USes of electricity (Pegasus)** This workshop was attended by around 50 Professionals (designers, ICT installers, energy advisors), Construction and engineering companies, Academia, Scientific community, and General Public. Participants have shown interest for the HYBUILD project and they discussed the idea to apply it in other buildings.	See Event Report in Appendix
9	25 November 2019 (M26), Aglantzia, AGL, UCY	**Energy Technologies and Restoration of Vernacular Architecture** This one-day symposium was organised by Aglantzia municipality and the University of Cyprus, with the aim to benchmark the progress of the HYBUILD project, to highlight the environmental aspect of vernacular architecture and to demonstrate ways of restoration using energy technologies. 30 persons attended the event, both professionals (designers, ICT installers, energy advisors), municipal councils representatives, construction and engineering companies, academia, scientific community, and general public.	Workshop report
10	December 2019 (M27), Athens, NTUA	**Graeducation / Greening Seminar, Digitization and Entrepreneurship: Empowering Greek Vocational Education** Both the German and Greek vocational education systems face the challenge of adapting the necessary skills to modern labor markets. Climate protection is one of the aspects that leads to new skills requirements, especially in the technical professions. Modern employment biographies require personal skills, which can be described as "business skills". Digitization is seen as an issue, which is causing changes in many technologies and modifying to a certain extent the teaching and learning processes, in such a way as to require both teachers and students digital skills and a different view of their roles, teacher and trainee. As part of the GRÆDUCATION project, a seminar idea was developed that takes into account these new requirements and was tested in Athens in the first week of December 2019.	Workshop report

		The seminar included "green" business modules as well as interactive skills modules in the areas of employability and entrepreneurship.	
11	October 2020 (M37), Digital event, R2M, CNR ITAE, UDL	**Sustainable Places 2020 Workshop 1: Renewable Heating and Cooling Solutions for Buildings and Industry** On 29 October 2020, HYBUILD organised and contributed to the largest workshop of Sustainable Places 2020 with 14 other sister-projects. Participating projects : **SWS-Heating** – **HYBUILD** – **CREATE** – **TRI-HP** – **HYCOOL** – **SHIP2FAIR** – **SUNHORIZON** – **Heat4Cool** – **GEOFIT** – **SCORES** – **Innova MicroSolar** – **Hybrid BioVGE** – **RES4BUILD** – **SolBio-Rev** – **FRIENDSHIP** ; Chair of the workshop: Andrea Frazzica (CNR ITAE) ; Participating European Commission representative: Olga RIO-SUAREZ, Policy Officer, DG Research & Innovation.	Workshop report and video recording Workshop paper in MDPI Proceedings (Link in OpenAire)
12		**Sustainable Places 2020 Workshop 2: Integrated Storage systems for Residential buildings** On 29 October 2020, HYBUILD participated to the Integrated Storage Systems for Residential Buildings workshop at Sustainable Places 2020. Participating projects: **MINISTOR**, **HEAT INSYDE**, **HYBUILD**, **InteGRIDy**; Participating European Commission representative: Dominique Planchon, Senior Program Officer, DG Research & Innovation	Workshop report and video recording
13	25 June 2021 (M45), Wels, AIT, R2M, AKG, CSEM, FAHR	**Workshop at World Sustainable Energy Days 2021** HYBUILD organised this workshop entitled 'Innovative Renewable Solutions for European Buildings' in cooperation with **SCORES** & **GEOFIT** projects. The workshop was the opportunity to present key innovative exploitable results from the HYBUILD project including: 1) the Advanced PCM (Phase Change Material) thermal storage modules for direct integration in the refrigerant cycle – presented by AKG; (2) the DC bus controller solution for heat pump market – presented by CSEM; (3) an Innovative adsorber: Adsorption Heat exchanger with high surface area – presented by FAHRENHEIT.	Workshop summary
14	29 Sept-1 Oct 2021 (M48), Roma and online (hybrid event), CNR ITAE, R2M	**Renewable Heating and Cooling Solutions for Buildings and Industry 2.0" workshop at Sustainable Places 2021**. This workshop was a follow up to last year's workshop at SP2020 focused on the same topic which brought together a selection of H2020 EU-funded projects involving experts from the biomass, geothermal, solar thermal and heat pump sectors to discuss a common strategy for increasing the use of renewable energy technologies for heating and cooling for buildings and industry. This year, we expanded this vision to include solutions towards NZEB concepts and solutions addressing the envelope. Projects were again invited to pitch their progress and achievements to date (a pitch presentation template was developed accordingly). Interactive discussion slots allowed identifying possible synergies, cooperation on	Workshop report and video recording

		horizontal issues or potential joint dissemination activities to maximize expected impacts. Following an introductory presentation of the RHC Projects Database by Dan Stefanica of EHPA, the following five clusters of EU projects were presented: RHC for industrial applications (**HYCOOL**, **SHIP2FAIR**, **Friendship**, **ASTEP**); Storage solutions for RHC support in buildings (**HYBUILD**, **SWS Heating**, **SCORES**, **Ministor**); Innovative solutions for RHC deployment in buildings (**Innova MicroSolar**, **SolBio-Rev**, **TriHP**, **RES4BUILD**), Demonstration actions for RHC in buildings (**GEOFIT**, **SunHorizon**, **HybridBioVGE**); Towards NZEB deep renovation with RHC technologies: barriers or challenges (**ENSNARE**, **INFINITE**, **POWERSKIN**, **PLURAL**, **ENVISION**).	
15	17 February 2022 (M53), Digital event, R2M, COMSA, UDL	BUILD-UP workshop in cooperation with **SCORES** (final event) "Hybrid domestic energy systems of the future" final conference in which **SCORES** and **HYBUILD** sister projects shared and discussed their final outcomes.	Workshop report and video recording

Appendix: Event reports

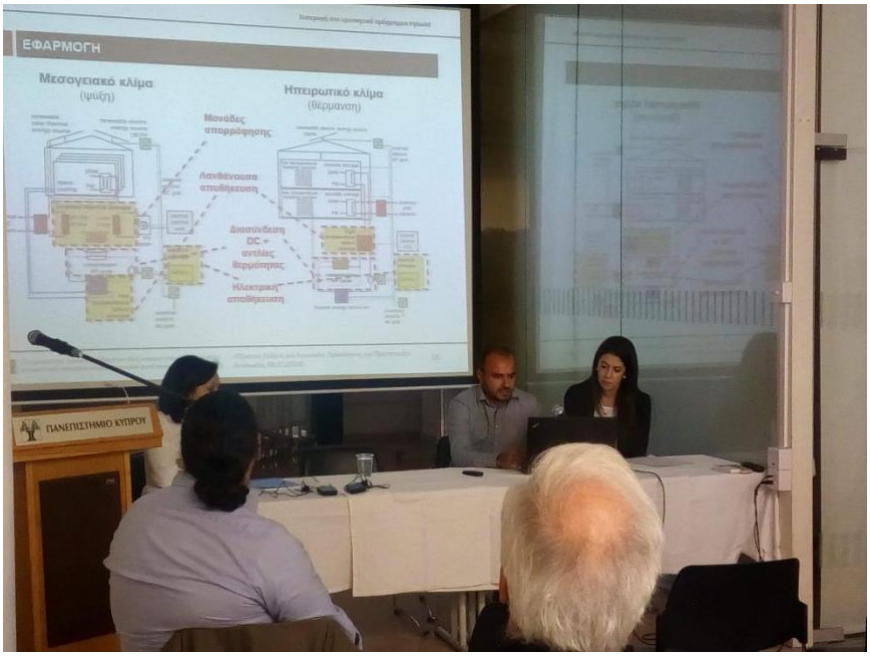
Date	25 April 2018
Event name	Informative meeting for HYBUILD
Event description	A meeting of the representatives with the residences of HYBUILD aiming to give an overall presentation of the HYBUILD project. This one-day workshop intends to benchmark the progress of several projects.
Location	Culture Center of SPE Aglantzias in Aglantzia
HYBUILD participants	Municipality of Aglantzia: Charalambos Petrides, Mayor of Aglantzia Marinos Kleanthous, Evgenia Aletra,Marios Cherides,Elena Landa - Municipal Councillors Athena Yiannaka,Municipal Officer Yiangos Yiangou,Municipal Officer Andri Vitsaidou,Municipal Officer UCY: Aimilios Michael Chrysanthos Charalambous Chryso Heracleous Venizelos Efthymiou
Nature of participation	Professionals (designers, ICT installers, energy advisors), Municipal council, Construction and engineering companies, Academia, Scientific community, General public
Number of attendees	40
Feedback & added-value	**Feedback:** Residences have shown interest for the project and they discussed the idea to apply it in other buildings of Aglantzia or even in private properties. HYBUILD project was considered as a plan of revitalization of the old town area and motivation for Aglantzia's citizens for energy efficiency, as stated by the Mayor Charalambros Petrides. **Added value:** It enhances the day to day association between residences and Municipality but also between the University and the Municipality.

	HYBUILD boosts development at Aglantzia area through a research investment. The inauguration and operation of the building will create positive effects on the revitalization of the area.
Picture(s)	

Date	06 November 2018
Event name	Smart Cities and Society: Challenges and Prospects
Event description	A meeting of the representatives with the Professionals (designers, ICT installers, energy advisors), Construction and Engineering companies, Academia, Scientific community, General public regarding actions using European Research Programmes including Hybuild project. This one-day symposium intends to benchmark the progress of several projects.
Location	Department of Architecture, University of Cyprus

HYBUILD participants	Aimilios Michael, Chrysanthos Charalambous, Chryso Heracleous, Venizelos Efthymiou (UCY) Charalambos Petrides (Mayor of Aglantzia), Municipal council of Aglantzia, Athena Yiannaka
Nature of participation	Professionals (designers, ICT installers, energy advisors), Municipal councils, Construction and engineering companies, Academia, Scientific community, General public
Number of attendees	60
Feedback & added-value	**Feedback:** Participants have shown interest for the project and they discussed the idea to apply it in other buildings. **Added value:** It enhances the information of citizens about the new technologies. Hybuild boosts development at Aglantzia area through a research investment. The inauguration and operation of the building will create positive effects on the revitalization of the area.
Picture(s)	


ΕΦΑΡΜΟΓΗ
Μεσογειακό κλίμα
(ψύξη)
Ηπειρωτικό κλίμα
(θέρμανση)
Μονάδες απορρόφησης
Λανθάνουσα αποθήκευση
Δικατύνδεση DC + αντλίες θερμότητας
Ηλεκτρική αποθήκευση
ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ


HYBUILD


ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ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Nature of participation	Professionals (designers, ICT installers, energy advisors), Municipal councils, Construction and engineering companies, Academia, Scientific community, General public
Number of attendees	60
Feedback & added-value	**Feedback:** Participants have shown interest for the project and they discussed the idea to apply it in other buildings. **Added value:** It enhances the information of citizens about the new technologies. Hybuild boosts development at Aglantzia area through a research investment. The inauguration and operation of the building will create positive effects on the revitalization of the area.
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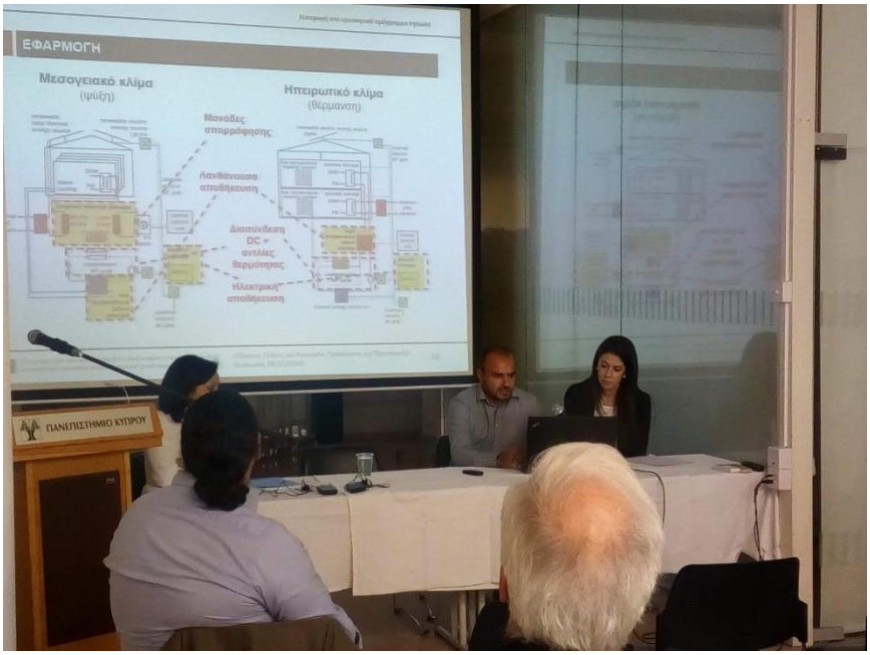
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ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ


HYBUILD

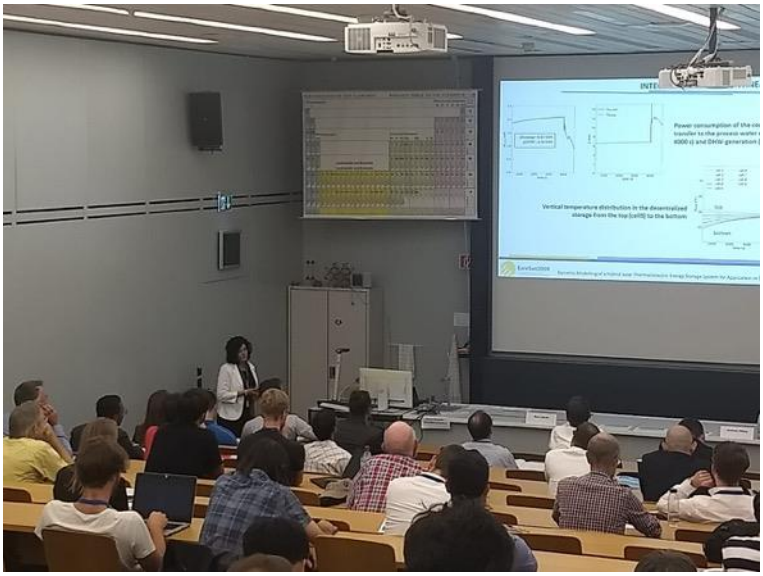

ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ

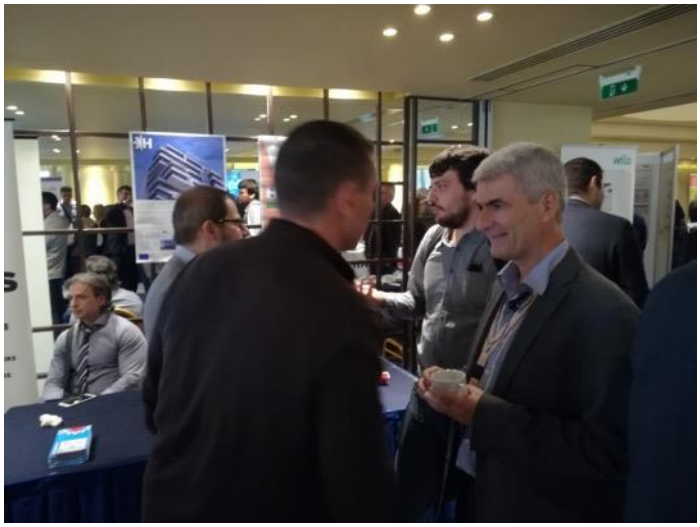
	

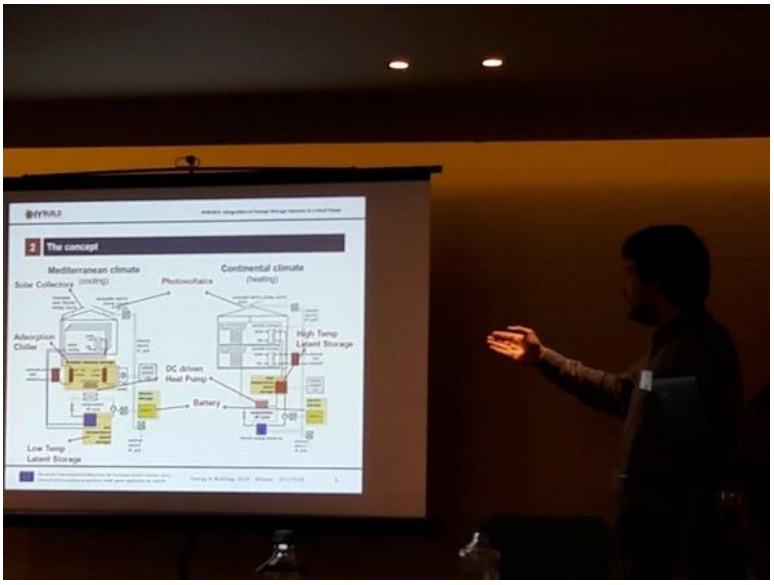
Date	27 June 2018
Event name	Sustainable Places 2018
Event description	**"The future of energy storage" Workshop** at the 6th annual Sustainable Places (SP) international conference series, intends to benchmark the progress of several projects supported by the European Commission which are focused on the development of innovative energy storage solutions. • HYBUILD and SCORES – two projects started in 2017 which are focused on the development of innovative hybrid storage solutions for residential buildings

	• TESSe2b (2015-2019) – a project which ambitions to develop an integrated solution for residential building energy storage through the use of solar and geothermal resources. • CREATE (2015-2019) – which aims to tackle the thermal energy storage challenge for the built environment by developing a compact heat storage. • E2VENT (closing in 2018) – which developed a ventilated façade with SMHRU (smart heat recovery unit), LHTES (latent heat thermal storage system) and BEMS (building energy management system). • STORY (2015-2020) – which aims at showing the added value of storage to the distribution grid through demonstrations or a variety of storage types in a variety of environments, and simulating the effects of large-scale implementation of the small and medium scale storages Each project introduced itself during the workshop and proposed one or two horizontal topics for establishing cooperation to be further implemented after the event (e.g. shared dissemination activities, business models, KPIs reference framework, market studies, etc.)
Location	Aix-les Bains, France
HYBUILD participants	R2M, CNR-ITAE
Nature of participation	Workshop with HYBUILD-sister projects
Picture(s)	

Date	10-13 September 2018
Event name	Eurosun 2018 Conference
Event description	International conference organised by International Solar Energy Society to connect scientist, engineers and professionals linked to solar energy utilization and storage
Location	Rapperswill (CH)
HYBUILD participants	CNR

Nature of participation	Presentation of work of T3.1 on dynamic modelling of Mediterranean and Continental system
Number of attendees	1
Feedback & added-value	The conference counted about 350 attendees, which is a quite big number for thermal energy conferences in Europe, the presentation was attended by around 90 participants.
Picture(s)	
	
	

Date	3 November 2018
Event name	ASHRAE ENERGY in BUILDINGS 2018 – TESSE²B Conference
Event description	Workshop focused on thermal energy storage solutions and research activities, in the context of the EU's H2020 Research Programme "TESSE²B"
Location	Wyndham Grand Hotel, Athens, Greece
HYBUILD participants	NTUA, DAIK
Nature of participation	Presentation of the project's concept and current state.
Number of attendees	25-30 (est.)
Feedback & added-value	Positive feedback from the conference chairman and attendees at the end of the presentation. Discussion with the rest of the conference attendees regarding technical solutions and methods. Special focus was given on similarities with other EU's research projects (especially the CREATE and SCORES projects). Promotion of the HYBUILD concept and methodologies.
Picture(s)	

	 DELPH  2 The concept Mediterranean climate Continental climate Solar Collectors Photovoltaics Adsorption Chiller High Temp Latent Storage DC driven Heat Pump Battery Low Temp Latent Storage

Date	18 December2018
Event name	HYBUILD: Future of Hybrid System Applications - A Real Case Solving with COMSA Corporación
Event description	The bulk of attendees were current Energy Engineering Master's students, with some entrepreneurs and academic alumni

	participating as well. The event was organized and funded by the InnoEnergy CommUnity
Location	Barcelona, Spain
HYBUILD participants	COMSA
Nature of participation	Facilitator, Judge
Number of attendees	18 (40 enrolled)
Feedback & added-value	-At least 4 attendees mentioned they would be interested in more similar events. -Attendees helped define ideas and a value proposition canvas for three distinct market scenarios for applying the HYBUILD solution -Unique idea specific to farming applications presented as a possible business model
Picture(s)	  

Date	24 June 2019
Event name	PEGASUS
Event description	Promoting Effective Generation and Sustainable USes of electricity
Location	Municipal Activities Center, Kiriacou Matsi 4 ,Aglantzia
HYBUILD participants	6 Chrysanthos Charalambous, Venizelos Efthymiou (UCY) Charalambos Petrides (Mayor of Aglantzia), Municipal council of Aglantzia, Athena Yiannaka, Andri Vitsaidou (Aglantzia Municipality)
Nature of participation	Professionals (designers, ICT installers, energy advisors), Construction and engineering companies, Academia, Scientific community, General Public
Number of attendees	50
Feedback & added-value	**Feedback:** Participants have shown interest for the project and they discussed the idea to apply it in other buildings. **Added value:** HYBUILD boosts development at Aglantzia area through a research investment. The inauguration and operation of the building will create positive effects on the revitalization of the area.
Picture(s)	

Date	25 November 2019
Event name	Energy Technologies and Restoration of Vernacular Architecture
Event description	A meeting of the representatives with the Professionals (designers, ICT installers, energy advisors), Construction and Engineering companies, Academia, Scientific community, General public aiming to give an overall presentation of the HYBUILD project. This one-day symposium intended to benchmark the progress of HYBUILD,

	highlight the environmental aspect of vernacular architecture and demonstrate ways of restoration using energy technologies.
Location	Culture Center of SPE Aglantzias in Aglantzia
HYBUILD participants	Aimilios Michael, Chrysanthos Charalambous, Chryso Heracleous, Venizelos Efthymiou (UCY) Marios Chirides (Vice Mayor of Aglantzia), Municipal council of Aglantzia, Athena Yiannaka, Andri Vitsaidou (Aglantzia Municipality)
Nature of participation	Professionals (designers, ICT installers, energy advisors), Municipal councils, Construction and engineering companies, Academia, Scientific community, General public
Number of attendees	30
Feedback & added-value	**Feedback:** Professionals have shown interest for the project and they have discussed extensively the value of restoration of vernacular architecture and the need to put pressure on policy to accept such systems in vernacular architecture. The idea of HYBUILD point the way in that direction. HYBUILD project was considered as a plan of revitalization and motivation on behalf of the Municipal Council. **Added value:** It enhances the information of professional about the new technologies. HYBUILD enhances the rejuvenation of the area, as it will become a reference point in the historical core of Aglantzia through investment in research. The re-use of the building as a multifunctional center and as an exhibition for renewable energy technologies will have a positive impact on society.

Picture(s)	 


HYBUILD
HYBUILD


Η Περιβαλλοντική Πτυχή της Παραδοσιακής Αρχιτεκτονικής στη Λευκωσία


BISS Building Integrated Solar Systems

Date	1-3 September 2020
Event name	35th PLEA Conference of Sustainable Architecture and Urban Design, Planning Post Carbon Cities
Event description	PLEA stands for "Passive and Low Energy Architecture", a commitment to the development, documentation and diffusion of the principles of bioclimatic design and the application of natural and innovative techniques for sustainable architecture and urban design.
Location	Online
HYBUILD participants	Chryso Heracleous (UCY)
Nature of participation	Professionals (designers, ICT installers, energy advisors), Construction and engineering companies, Academia, Scientific community
Number of attendees	250 total / 50 in session
Feedback & added-value	**Feedback:** Researchers have shown interest for the project and they asked more details about the performance of vernacular

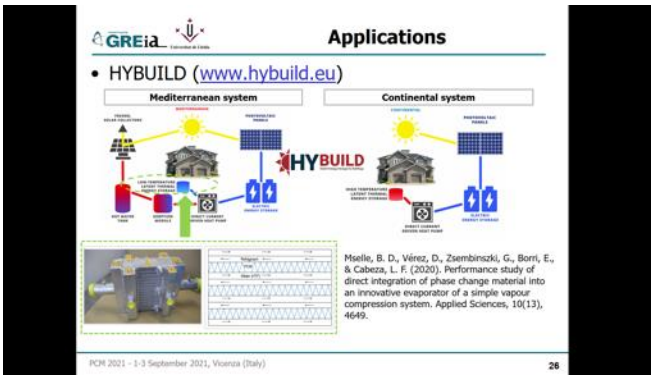
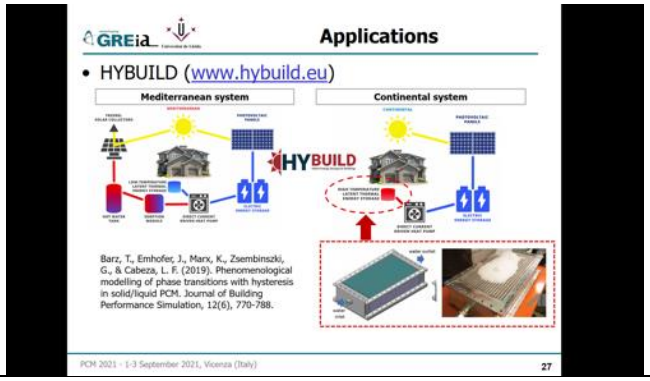
	buildings understanding the lessons learn by these kind of buildings. Some will explore more info through HyBuild website. **Added value:** It enhanced the dissemination of the HYBUILD project in an international conference where people around the world participate. It was great opportunity to network and gain valuable resources for referrals and best practices.

Date	9-11 June 2021
Event name	EnerSTOCK 2021 - 15th International Virtual Conference on Energy Storage
Event description	Enerstock Conference titled ”Towards Smarter Solutions“ was held online between 9 and 11 June 2021 and organized by University of Ljubljana – Faculty of Mechanical Engineering and the National Institute of Chemistry Slovenia. The conference featured an impressive number of distinguished experts presenting the latest scientific and technological achievements, as well as future trends and prospects in thermal and electrical energy storage, materials, applications and systems, climate change, climate policies and other related disciplines. Besides plenary and invited lectures, the participants enjoyed the opportunity to present their work at various oral presentations and poster sessions. Moreover, the program included a range of exhibitions and updates from non-academic partners and the industry.
Location	Online
HYBUILD participants	UDL, NTUA, ITAE, AIT, DAIK, AKG
Nature of participation	Two oral presentations and three posters related to different tasks done in the framework of the HYBUILD process were presented
Number of attendees	-
Feedback & added-value	The oral presentation of the posters and presentations attracted the attention of conference participants working in different areas of thermal energy storage. The curiosity from participants attracted the difficulties encountered for the scale-up of the three-fluid storage module

	tested at UDL and the environmental impact of the two configurations of the HYBUILD system.
Picture(s)	  

Date	1-3 September 2021
Event name	13th IIR Conference on Phase-Change Materials and Slurries for Refrigeration and Air Conditioning
Event description	Phase change materials and slurries are becoming key components in the energy mix of the future. Transitioning from a society relying on carbon-based energy to one relying on renewable energies will require coordinating energy demand with source availability. A viable option to achieve this result is through thermal energy storage, as it is one of the most efficient ways to store energy, and phase change materials can help make thermal energy storage better adapted and more financially competitive. The 13th IIR Conference on Phase-Change Materials and Slurries for Refrigeration and Air Conditioning will provide an open international forum where academics and stakeholders from across the globe will present and discuss the latest research findings, developments and trends in the field. The conference will give scientists and practitioners an opportunity to network and share ideas that will shape PCM research and engineering for years to come.
Location	Vicenza, Italy (online conference)
HYBUILD participants	Prof. Luisa F. Cabeza (UDL)
Nature of participation	Two slides describing the application of latent heat thermal energy storage in the two systems developed within HYBUILD was presented in the keynote speech “State of art of PCM for air conditioning and refrigeration” given by Prof. Luisa F. Cabeza.

Number of attendees	-
Feedback & added-value	The keynote speech allowed the project to gain visibility amongst the participants showing the effective use of phase change materials in the HYBUILD systems to support thermal energy storage integration with electric storage for improving the share of renewables and overall system efficiency.
Picture(s)	 

Date	1-3 September 2021
Event name	PCM2021 Conference
Event description	13th IIR conference on Phase Change Materials and Slurries for refrigeration and air conditioning
Location	Online
HYBUILD participants	CNR
Nature of participation	Oral presentation
Number of attendees	100
Feedback & added-value	Interest in the design of the innovative latent storage was expressed by the participants to the session and also some requests for the presentation file were made.