

Erigeneia

Enabling rising penetration and added value of photovoltaic generation by implementation of advanced storage systems

Project duration: from 05.2018 to 10.2021

Report submitted: 11.2021

Publishable Summary

The Erigeneia project targeted to enable the high penetration of PV technology and to utilize its potential value in the energy system by developing a local and central energy management system (EMS) that will combine photovoltaics (PV) with battery energy storage systems (BESS). The project matched the technical requirements imposed by the distribution system operators (DSO) with the upcoming new market regulations, capitalising on the positive effects of PV and BESS combination. In addition, a tool for intra-hour energy forecasting was developed and integrated into the EMS to provide a more accurate and reliable operation plan for the DSO. Finally, a versatile algorithm capable of estimating the optimum size of BESS and PV to meet all the needs of prosumers was also developed. Field trials took place in Cyprus (residential EMS) and Turkey (community EMS) and novel or more effective ancillary services were provided to the network operators (e.g. power smoothing, voltage regulation). Finally, the economic impact of the proposed solutions was quantified.

The proposed work is expected to have significant impact on the further penetration of PV given that the existing grid infrastructure will be utilized in a more efficient way, by increasing the hosting capacity hence deferring grid reinforcement. By promoting grid-friendly self-consumption of PV generation, grid congestion issues will be avoided. Since the EMS will increase the power usage predictability, the current expensive power reserves will be replaced by the local EMS control strategies of the combined PV and BESS EMS. Furthermore, the users will take advantage of the provided flexibility in order to lower their cost of electricity, by gaining from the new upcoming policies of Time of Use (ToU) and dynamic tariffs.

The project was fully in line with the SET plan for effective integration of solar energy technologies in the energy system.

Project consortium

Coordinator and all contact details:

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Participating countries and financing (rounded figures):

Country	Number of organisations involved	Project costs in EUR	Public funding in EUR
Cyprus	2	169'704	169'704
Austria	2	406'782	327'080
United Kingdom	1	-	no funding requested
Turkey	1	87'262	52'989
<i>Total</i>	6	663'748	549'772

Funding agencies involved and contracts

Funding Agency	Contract N° and Title
Research Promotion Foundation	P2P/SOLAR/1216/0003
Österreichische Forschungsgesellschaft mbH	Förderungsvertrag 863516
Innovate UK	File Ref: 620136 - Application number: 58 Enabling rising penetration and added value of photovoltaic generation by implementation PV system integration of advanced storage systems.
Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TUBITAK)	Date: 10 Sep 2018 - N°: 9170023 TÜBİTAK Teknoloji ve Yenilik Destek Programları Çerçevesinde "FOTOVOLTAİK ÜRETİME GELİŞMİŞ DEPOLAMA SİSTEMLERİ ENTEGRASYONU İLE KATMA DEĞER SAĞLANMASI VE YAYGINLIĞININ ARTIRILMASI" Başlıklı ve "9170023"

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