



D7.4 - Final Project Advertising Materials and Results

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2020-03-16 (v0.6)	Gitte Wad Thybo (ENIIG)	Not approved: <ul style="list-style-type: none"> Missing relation to the S4G project for most of the workshops, conferences, papers and publications.
2020-03-18 (v0.7)	Mihaela Albu (UPB)	Approved.
2020-03-27 (v0.9)	Gitte Wad Thybo (ENIIG)	Approved.

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Executive Summary

D7.4 – “Final Project Advertising Materials and Results” presents the activities carried out by the S4G consortium to increase the project impact and relevance, and to disseminate the achieved results among different stakeholders.

As shown in this document, the S4G partners have participated and organized approximately 130 different actions during the 39-months of the project. These actions included organization of conferences and workshops, participation in conferences and workshops, social media dissemination, newsletters and flyer preparation, peer-reviewed articles, amongst others; and had heterogeneous audience and objectives. Moreover, these activities involved sometimes not only cooperation between the partners of the consortium but also liaisons with other projects and European initiatives, creating new synergies and networking. Additionally, the project Key Performance Indicators (KPIs) purposed in the beginning of the project were achieved.

Moreover, some advertising material were performed, namely:

- Project website
- Project official presentation
- Newsletters
- Flyer
- Poster
- Roll-up
- Video

The S4G consortium will continue to disseminate the project outcomes to relevant stakeholders after the end of the project, to increase its impact and leverage the S4G developed solutions.

1 Introduction

This document describes the materials and dissemination activities performed by the S4G project consortium during the final months of the project (M24-M39), in order to increase its impact and disseminate the achieved project results.

1.1 Scope

This document shows the detailed activities that the partners from the S4G consortium have organized or participated in order to increase the project impact and relevance, and to disseminate the S4G outputs among different stakeholders.

This deliverable documents the results generated by WP7 - "Dissemination, Exploitation and Standardization", and more specifically by Task 7.2 - "Dissemination". It is the updated version of D7.3 [S4G-D7.3] and no further updates of this deliverable are expected.

1.2 Related documents

ID	Title	Reference	Version	Date
D2.2	Final Storage Scenarios and Use Cases	[S4G-D2.2]	1.0	2018-07-31
D7.1	Communication and Dissemination Strategy	[S4G-D7.1]	1.0	2017-03-02
D7.2	Project Website	[S4G-D7.2]	1.0	2017-03-02
D7.3	Initial Project Advertising Material and Results	[S4G-D7.3]	1.0	2018-12-03

2 S4G Dissemination Activities

This chapter details all the S4G dissemination activities performed by the S4G consortium during the last period of the project or not reported in D7.3 [S4G-D7.3], sorted for the oldest to the most recent event.

2.1 Bucharest 2018 Symposium on Microgrids

- **Date:** September 2-6, 2018
- **Location:** Bucharest, Romania
- **Type of dissemination and communication activity:** Participation to a Conference
- **Organisers:** UPB and International Microgrid Symposiums Steering Committee
- **Estimated participants:** 120
- **Website:** <https://microgrid-symposiums.org/bucharest-2018/>
- **S4G participant:** UPB
- **Type of participation:** Co-chair and attendance
- **Objective:** Sharing experiences with LEC and storage
- **Relation to S4G:** Presentation of S4G objectives, scenarios and use cases to the most relevant research community in the microgrids field worldwide (symposium attendance is restricted, participation by invitation-only). Information exchange on regulatory framework worldwide on LVDC connectors.
- **Photo:** Figure 1



Figure 1. UPB participation at Bucharest 2018 Symposium on Microgrids.

2.2 DynPOWER 2018, 2nd International Workshop Dynamic Stability Challenges of the Future Power Grids

- **Date:** September 16-17, 2018
- **Location:** Winterthur, Switzerland
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** Zurich University of Applied Sciences School of Engineering
- **Estimated participants:** 30
- **Website:** <https://www.zhaw.ch/de/engineering/institute-zentren/iefe/international-workshop-dynpower/>
- **S4G participant:** UPB
- **Type of participation:** Presentation

- **Presentation title:** The new role of measurements in emerging power systems
- **Presentation abstract:** The talk has focused on the role of models and measurements in emerging power systems, in the context of disruptive technologies. To this, several game changers are identified (Energy harvesting (DG); microgrids; prosumers; energy communities) which require design of a new control layer and different optimization strategies, especially for storage units. Both are impacted by deriving new models for the energy transfer which defines also the measurement context. Talk has also introduced data aggregation in time and in space, synchronized measurements and smart meters with high reporting rate. The conclusion has underlined the need of definitions for control quantities which have much higher dynamics as in the classical power systems.
- **Relation to S4G:** Dissemination (face-to-face meeting) of S4G objectives. Exchange of information in view of enriching S4G test sites using high reporting rate measurement information (USM and energy router).
- **Photo:** Figure 2



Figure 2. UPB participation at DynPOWER 2018.

2.3 AMPS 2018, 9th International Workshop on Applied Measurements for Power Systems

- **Date:** September 26-28, 2018
- **Location:** Bologna, Italy
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** IEEE Instrumentation and Measurement Society
- **Estimated participants:** 30
- **Website:** <http://amps2018.ieee-ims.org/>
- **S4G participant:** UPB
- **Type of participation:** IEC TC 38 / WG 55 and IEEE TC 39 meeting for work on IEC/IEEE TR 61869-105: Instrument Transformers - Part 105: Uncertainty evaluation in the calibration of Instrument Transformers
- **Relation to S4G:** Contribution to the work of TC39 – “Measurements for Power Systems” of the IEEE Instrumentation and Measurement Society. Exchange of information related to the SoC estimation (discussion during workshop).
- **Photo:** Figure 3

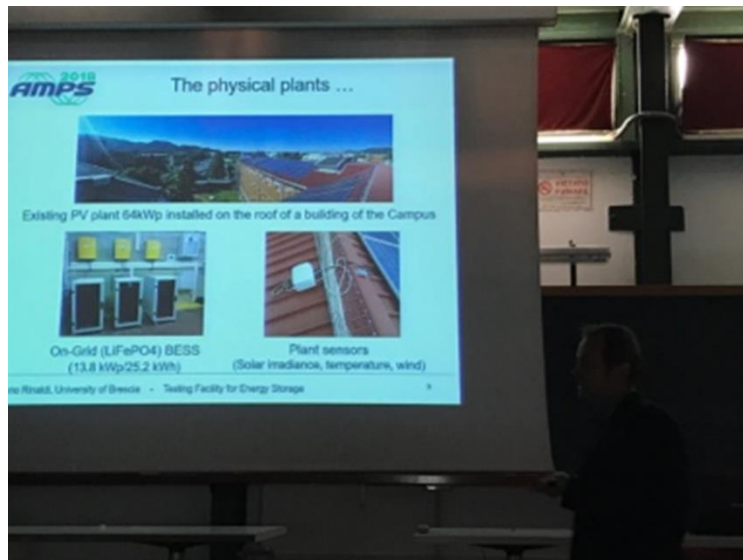


Figure 3. UPB participation at AMPS 2018.

2.4 EPE 2018, 10th International Conference and Exposition on Electrical and Power Engineering

- **Date:** October 18-19, 2018
- **Location:** Iasi, Romania
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Faculty of Electrical Engineering, "Gheorghe Asachi" Technical University of Iasi, and IEEE
- **Estimated participants:** 200
- **Website:** <https://ieeia.tuiasi.ro/epe-2018-conference-october-18-19-2018/>

2.4.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.4.2)
- **Photo:** Figure 4



Figure 4. UPB participation at EPE 2018.

2.4.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Energy storage needs for clean power systems and the potential support from electrical vehicles: A simplified assessment on Romanian case
- **Publication authors:** Mihai Sanduleac

- **Publication abstract:** The last period shown a technology shift trend in both power systems and electrical vehicles, by the increasing use of electrical storage technology. The recent success in both domains shows clearly that energy storage is a significant game changer and that new horizons need to be scrutinized. The paper makes a preliminary assessment on the long-term impact of storage for power systems and for electrical vehicles, in conditions of targeting a 100% CO₂ free energy production, by making an estimation of storage capacity needed for both domains: power system and electrical vehicles, applied as a simplified assessment on the Romanian case. For estimating the storage needs, the paper presents simulations of renewable energy production based on existing patterns in the Romanian Power System, upscaled to fit a 100% CO₂ free energy production on selected weekly intervals compared with week-based consumption profiles. The paper shows that strong or full penetration of electrical vehicles has the potential to be main driver in helping power systems to mitigate stochastic renewable production with the necessary storage means, to pursue 100% clean energy goals. Moreover, the two domains have synergies and reciprocally help each-other in reaching a global goal of clean energy and transportation.
- **DOI:** 10.1109/ICEPE.2018.8559801
- **Green open-access link:** <https://zenodo.org/record/3660209>
- **Relation to S4G:** The paper pursues the high RES penetration aim of the S4G project and the potential of storage means (as main focus of S4G project) of the EVs to fully cover the power system short term needs, by analysing public data from the Romanian power system.

2.5 ISFEE 2018, International Symposium on Fundamentals of Electrical Engineering

- **Date:** November 1-3, 2018
- **Location:** Bucharest, Romania
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** UPB, Association of Romanian Electric Electronics Engineers, Romanian Academy of Technical Sciences, and IEEE
- **Estimated participants:** 100
- **Website:** <http://isfee.elth.pub.ro/isfee2018/>

2.5.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.5.2)

2.5.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Resilience through self-sufficiency in Smart Cities: A preliminary Bucharest use case
- **Publication authors:** Mihai Sanduleac, Mircea Eremia, Irina Picioroaga
- **Publication abstract:** Cities follow new trends towards extreme social and technological development. The Smart City concept includes many innovative aspects, but an essential one is the capability to generate its own clean energy, leading to an increased energy resilience and immunity against major disturbances, as a mitigation of the negative impact of global warming related extreme weather, but also of other blackout inducing events, such as cyber-attacks or evolving faults. The paper presents an assessment for both clean energy production using PVs and resilience, applied for Bucharest city and its neighbour zone Ilfov, showing the conditions for obtaining up to 100% renewable production and high resilience. In this paper, a financial analyse is also performed to check the feasibility of the scenarios, with or without using large storage resources, for achieving different levels of self-sufficiency.

- **DOI:** 10.1109/ISFEE.2018.8742461
- **Green open-access link:** <https://zenodo.org/record/3662478>
- **Relation to S4G:** The paper pursues the resilience aspects highlighted in the S4G project, which have been also considered as essential value in the Romanian use case. Available information from Bucharest has been used to assess the resilience at a higher scale, meaning related to a Smart City approach.

2.6 ETIP SNET WG 1, 5th Meeting

- **Date:** November 5-6, 2018
- **Location:** Vienna, Austria
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** Austrian Institute of Technology
- **Estimated participants:** 20
- **Website:** <https://www.etip-snet.eu/about/working-groups/wg-1/>

2.6.1 Participation to a Workshop

- **S4G participant:** UPB
- **Type of participation:** Contribution to white paper on holistic approach of the energy systems (ETIP roadmap)
- **Relation to S4G:** Contribution to the white papers issued or planned by ETIP SNET WG1 – “Reliable, economic and efficient smart grid system”, highlighting the experience in S4G and the need of storage optimal integration in various use cases.

2.7 POWERCON 2018, 11th International Conference on Power System Technology

- **Date:** November 6-8, 2018
- **Location:** Guangzhou, China
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** South China University of Technology, Guangdong Power Grid, and IEEE
- **Estimated participants:** 450
- **Website:** <http://www.csee.org.cn/pic/u/cms/www/201803/POWERCON2018/>

2.7.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.7.2)

2.7.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Future power systems – The importance and rationale of enforcing and segmenting the electrical energy grid
- **Publication authors:** Mihai Sanduleac
- **Publication abstract:** Most of today power systems are aiming to become a large synchronous system over a region which covers a big nation or union of nations. Europe is known as being a successful one-only synchronous system. India reached the same goal, while countries like USA and Japan are still segmented in more than one TSO controlled systems. The paper investigates the architectures and rationale for a unique power system and analyses a vertically segmentation to allow resiliency and

immunity at prosumer, building, neighbourhood and microgrid level, by using new technologies such as the solid-state transformer, hybrid inverters and DC busses to supply the resilient loads of the prosumers or of other aggregated local entities. For this, the paper presents an architecture which give progressively both advantages of large synchronous systems but also the resiliency needed at the level of end-users against local or general disturbances which can be propagated over the whole system.

- **DOI:** 10.1109/POWERCON.2018.8601854
- **Green open-access link:** <https://zenodo.org/record/3662716>
- **Relation to S4G:** The paper pursues the today grid architectures and finally is analysing aspects related to grid resilience which can be enhanced by grid architecture improvements. It is a vision paper which complements and gives new paths to the resilience values developed in the S4G project (especially HLUC-1), giving a more generalized view of the S4G activity and opening the window for future directions of development.

2.8 IEC TC 38 Plenary Meeting

- **Date:** November 5-6, 2018
- **Location:** Frankfurt, Germany
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** IEC, DKE German Commission for Electrical Electronic & Information Technologies of DIN, and VDE
- **Estimated participants:** 20
- **Website:** https://www.iec.ch/dyn/www/f?p=103:7:0:::FSP_ORG_ID,FSP_LANG_ID:1241,25
- **S4G participant:** UPB
- **Type of participation:** Work on IEC/IEEE TS 61869-105: Instrument Transformers - Part 105: Uncertainty evaluation in the calibration of Instrument Transformers
- **Relation to S4G:** Dissemination of the S4G objectives by face-to-face discussion with the participants, all representing with voting rights their national standardization organization in the TC38 – “Standardisation in the field of AC and/or DC current and/or voltage instrument transformers”, including their subparts like sensing devices, signal treatment, data conversion and analog or digital interfacing. Dissemination and update on standardization of sensors to be used in in the DC layer of prosumers, with potential use the Bucharest use case.
- **Photo:** Figure 5



Figure 5. UPB participation at IEC TC 38 Plenary Meeting.

2.9 IEEE IMS DLP 2018, Distinguished Lecturer Program

- **Date:** November 27, 2018
- **Location:** Kuala Lumpur, Malaysia
- **Type of dissemination and communication activity:** Other
- **Organisers:** Universiti Teknologi Malaysia and IEEE Instrumentation and Measurement Society
- **Estimated participants:** 10
- **Website:** <https://ieeemy.org/mysection/2018/11/5549/>
- **S4G participant:** UPB
- **Type of participation:** Lecturer
- **Lecturer title:** Measurements and models in a time of challenges
- **Relation to S4G:** Dissemination of project objectives and achievements. Information exchange on local grid conditions relevant for S4G.

2.10 ICSIMA 2018, 5th International Conference on Smart Instrumentation, Measurement and Application

- **Date:** November 28-30, 2018
- **Location:** Songkhla, Thailand
- **Type of dissemination and communication activity:** Participation to a Conference
- **Organisers:** IEEE Instrumentation and Measurement Society
- **Estimated participants:** 80
- **Website:** <http://icsima.ieeemy-ims.org/18/>
- **S4G participant:** UPB
- **Type of participation:** Keynote speech
- **Presentation title:** High reporting rate measurements for smart[er] grids
- **Presentation abstract:** Modern control algorithms in the emerging power systems process information delivered mainly by distributed, synchronized measurement systems, and available in data streams with different reporting rates. Multiple measurement approaches are used: on one side, the existing time-aggregation of measurements are offered by currently deployed IEDs (SCADA framework), including smart meters and other emerging units; on the other side, the high-resolution waveform-based monitoring devices like phasor measurement units (PMUs) use high reporting rates (50 frames per second or higher) and can include fault-recorder functionality. The talk addressed the measurement paradigm in power systems; measurements channel quality and models for energy transfer; and application and challenges. The presentation provided an overview of these techniques, with examples from worldwide measurement solutions for smart grids deployment.
- **Relation to S4G:** Dissemination of project objectives and achievements.
- **Photo:** Figure 6



Figure 6. UPB participation at ICSIMA 2018.

2.11 Energies Journal 2018

- **Date:** December 2018
- **Type of dissemination and communication activity:** Other
- **Publisher:** Multidisciplinary Digital Publishing Institute
- **ISSN:** 19961073
- **Impact Factor (2017):** 2.676
- **5-Year Impact Factor (2017):** 3.045
- **Website:** <https://www.mdpi.com/journal/energies>
- **Type:** Journal scientific peer-reviewed publication
- **S4G participants:** UPB and UNINOVA
- **Publication title:** Resilient and immune by design microgrids using solid state transformers
- **Publication authors:** Mihai Sanduleac, João F. Martins, Irina Ciornei, Mihaela Albu, Lucian Toma, Vitor Fernão Pires, Lenos Hadjidemetriou, Rooktabir Sauba
- **Publication abstract:** Solid State Transformers (SST) may become, in the near future, key technological enablers for decentralized energy supply systems. They have the potential to unleash new technologies and operation strategies of microgrids and prosumers to move faster towards a low carbon-based economy. This work proposes a paradigm change in the hierarchically and distributed operated power systems where SSTs are used to asynchronously connect the many small low voltage (LV) distribution networks, such as clusters of prosumers or LV microgrids, to the bulk power system. The need for asynchronously coupled microgrids requires a design that allows the LV system to operate independently from the bulk grid and to rely on its own control systems. The purpose of this new approach is to achieve immune and resilient by design configurations that allow maximizing the integration of Local Renewable Energy Resources (L-RES). The paper analyses from the stability point of view, through simplified numerical simulations, the way in which SST-interconnected microgrids can

become immune to disturbances that occur in the bulk power system and how sudden changes in the microgrid can damp out at the Point of Common Coupling (PCC), thus achieving better reliability and predictability in both systems and enabling strong and healthy distributed energy storage systems (DESSs). Moreover, it is shown that in a fully inverter-based microgrid there is no need for mechanical or synthetic inertia to stabilize the microgrid during power unbalances. This happens because the electrostatic energy stored in the capacitors connected behind the SST inverter can be used for a brief time interval, until automation is activated to address the power unbalance for a longer term.

- **DOI:** 10.3390/en1123377
- **Open-access link:** <https://www.mdpi.com/1996-1073/11/12/3377>
- **Views:** 1200
- **Relation to S4G:** The paper pursues the resilience aspects highlighted in the S4G project, which have been also considered as essential value in the Romanian use case. It presents a resilience approach for an energy community, which can be supported by the emerging Solid-State Transformer (SST) technology. Moreover, it highlights that in high RES penetration (one aim of the S4G project), SST can have essential role in the power balance on long term.

2.12 IEC Sys LVDC WG 1 LVDC publications for Electricity Access Meeting

- **Date:** January 28 – February 1, 2019
- **Location:** Horgen, Switzerland
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** IEC and Fuller company
- **Estimated participants:** 30
- **Website:** <https://www.iec.ch/dyn/www/f?p=103:7>
- **S4G participant:** UPB
- **Type of participation:** Part of the national committee for LVDC systems standardisation
- **Relation to S4G:** Dissemination of the S4G technical objectives and scenarios (including Bucharest use case) to the only IEC committee dedicated to standardization of LVDC. Input to the committee on PQ issues in LVDC networks (relevant to rated voltage selection for the Bucharest use case).

2.13 ETIP SNET WG 1, 6th Meeting

- **Date:** March 7-8, 2019
- **Location:** Rome, Italy
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** Terna
- **Estimated participants:** 20
- **Website:** <https://www.etip-snet.eu/about/working-groups/wg-1/>
- **S4G participant:** UPB
- **Type of participation:** Contribution to white paper on measurement systems for smart grids (ETIP roadmap)
- **Relation to S4G:** Dissemination of S4G achievements to the members of ETIP SNET WG1 – “Reliable, economic and efficient smart grid system”, highlighting the experience in S4G and the measurement requirements set for USM and energy router.

2.14 ATEE 2019, 11th International Symposium on Advanced Topics in Electrical Engineering

- **Date:** March 28-30, 2019

- **Location:** Bucharest, Romania
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Politehnica University of Bucharest, and IEEE
- **Estimated participants:** 120
- **Website:** <http://atee.upb.ro/atee2019/>

2.14.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.14.2)

2.14.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Solar-based energy resilience in future cities – A preliminary study in the Sub-Sunbelt region
- **Publication authors:** Mihai Sanduleac
- **Publication abstract:** Future smart cities metrics have complex and interdisciplinary targets. Energy portfolio and the ratio of self-consumption / sufficiency are key performance indexes for city long-term sustainability. Targeting 100% renewables production for mitigating climate change threats ask also for challenging solutions. As Europe is not enjoying the Sunbelt climate but still showed clear commitment towards high renewables penetration, the paper addresses the feasibility of a scenario targeting electrical energy production with 100% renewables and complete self-sufficiency in the so-called Sub-Sunbelt region. A preliminary study, for specific cities in the Sub-Sunbelt region, is analysed in terms of key performance indexes related to renewables production and self-sufficiency. For this, selected cities from the Sub-Sunbelt region (from 35° to 50° latitude north) in Greece, Italy, Spain, Portugal, Romania, Austria, Germany and France have been chosen, by also making a comparison with sunny Sunbelt based cities Rabat, Dubai and Cairo. The study suggests that self-sufficiency and resilience with solar based renewables is reachable in Sub-Sunbelt regions, and that important renewables-based H₂ /CH₄ long-term storage and consumption resources are also needed, while the Sunbelt regions can become exporters of renewables-based H₂/CH₄ by using their surplus energy during the summer time.
- **DOI:** 10.1109/ATEE.2019.8724962
- **Green open-access link:** <https://zenodo.org/record/3660246>
- **Relation to S4G:** The paper pursues the high RES penetration aim of S4G by demonstrating the European "Sub-sunbelt" geographical zone as promising for a solar-based CO₂ free general solution, It is an inspiring extension of the S4G work, which had a particular focus on PV-based renewables and their potential of being used at high scale and influenced by latitude conditions.

2.15 The Battery Show Europe 2019

- **Date:** May 7-10, 2019
- **Location:** Stuttgart, Germany
- **Type of dissemination and communication activity:** Trade Fair
- **Organisers:** The Advanced Manufacturing Technology Series
- **Estimated participants:** 10.000
- **Website:** <https://www.thebatteryshow.eu/en/Home.html>
- **S4G participant:** LiBal
- **Relation to S4G:** Face-to-face dissemination of the S4G project

2.16 Round Table on Education about Standardisation

- **Date:** May 10, 2019
- **Location:** Bucharest, Romania
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** ASRO and EU
- **Estimated participants:** 20
- **Website:** <https://www.asro.ro/en/educatie-despre-standardizare/> (in Romanian)
- **S4G participant:** UPB
- **Type of participation:** Contribution to the workshop, collecting information regarding the process to for the introduction of the S4G results in the CEN/CENELEC standardisation. Discussion on the European Market Needs for Education report.
- **Relation to S4G:** Input to the standardization work (WP7 and D7.6) in S4G.

2.17 MPS 2019, 8th International Conference on Modern Power Systems

- **Date:** May 21-23, 2019
- **Location:** Cluj Napoca, Romania
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Cluj Napoca Faculty of Electrical Engineering, Transilvania Nord Electricity Distribution Company, and IEEE
- **Estimated participants:** 150
- **Website:** <https://et.utcluj.ro/mps/index.html>

2.17.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.17.2)

2.17.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Prosumers optimally adapted to local load. Rationale and benefits for the grid
- **Publication authors:** Mihai Sanduleac, Mihaela Albu, Dorel Stanescu, Carmen Stanescu
- **Publication abstract:** Prosumers are entities with a key role in the new smart grid paradigm, having enabled two ways active power exchange. The usual approach is to send excess energy to the main grid, with a cost of unpredictability of the reverse power flow. In order to achieve a high penetration of renewables in the distribution grid, with added contribution from prosumers, traditional grids need to be operated in states corresponding to active grids for which they have not been designed. Recently deployed solutions allow advanced prosumers to benefit from advancements in both storage and renewables technologies, changing the behaviour of prosumers into controlled unidirectional power exchange (no-back generation), which translates into consumer-only behaviour from the grid side. With this no-back generation paradigm, in this paper a number of comprehensive scenarios have been simulated and analysed on a daily basis, based on real local production and consumption profiles and using key performance indexes. The paper shows the benefits of operating and customers with prosumers potential, which can bring substantial openings for a high renewables penetration agenda to address climate change related issues.
- **DOI:** 10.1109/MPS.2019.8759678

- **Green open-access link:** <https://zenodo.org/record/3661608>
- **Relation to S4G:** The paper is analysing the impact on the low voltage grid of the prosumer with consumer-only behaviour, which is developed in Bucharest use case. It gives an additional view of the benefits for both prosumer and grid, when such behaviour is implemented, complementing the S4G project work.

2.18 IEC TC 8 / JWG 12

- **Date:** June 19-20, 2019
- **Location:** Paris, France
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** IEC
- **Estimated participants:** 20
- **Website:**
https://www.iec.ch/dyn/www/f?p=103:14:6678686343742:::FSP_ORG_ID,FSP_LANG_ID:23040,25
- **S4G participant:** UPB
- **Type of participation:** Work on the standard for measurement in electrical installations. Technical Specification: Distributed Energy Resources Connection with the Grid – Part 41: Requirements for frequency measurement used to control Distributed Energy Resources (DER)
- **Relation to S4G:** Presentation of S4G scenarios and use cases in order to gather valuable input regarding frequency measurement and estimation to comply with future requirements derived from the JWG12 work (first IEC standardization attempt on frequency definition and measurement for DER control).

2.19 PowerTech Milano 2019

- **Date:** June 23-27, 2019
- **Location:** Milano, Italy
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Polytechnic University of Milan, and IEEE
- **Estimated participants:** 300
- **Website:** <https://attend.ieee.org/powertech-2019/>

2.19.1 Participation to a Conference

- **S4G participant:** Fraunhofer FIT, UPB
- **Type of participation:** Paper presentation (section 2.19.2, section 2.19.3, and section 2.19.4)
- **Photo:** Figure 7

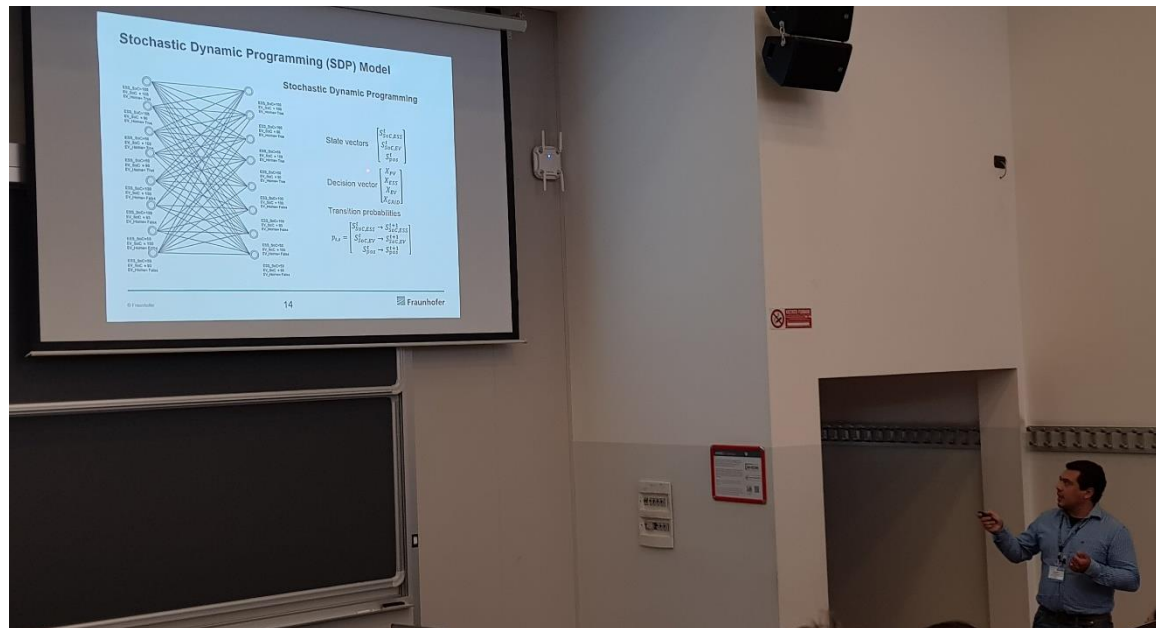


Figure 7. Fraunhofer FIT participation at PowerTech Milano 2019.

2.19.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** Fraunhofer FIT
- **Publication title:** Stochastic optimization framework for online scheduling of an EV charging station in a residential place with photovoltaics and energy storage system
- **Publication authors:** Gustavo Aragón, Otilia Werner-Kytölä, Erdem Gümrükcü
- **Publication abstract:** House and building energy management systems (HEMS) are becoming key when it comes to assure grid stability and to offer flexibility. At the same time, energy systems technology has evolved to enable energy storage systems and electric vehicles to be managed together with local generated energy taking into consideration the preferences of the household owner. Contributing to this tendency, this work presents a stochastic optimization platform (SOFW) for optimal control using dynamic programming and stochastic optimization models. A stochastic optimization model involving a household composed of photovoltaics, energy storage system and an electric vehicle is designed and tested within SOFW. The uncertainties of the plug-in time and state of charge of the battery of the electric vehicle are modelled using a Markovian process and a Monte-Carlo simulation. The results showed that the proposed stochastic optimization model can be solved using dynamic programming and deployed as a continuous optimal control within SOFW. The system will be deployed shortly in Italy within one use case of the Storage 4 Grid (S4G) project.
- **DOI:** 10.1109/PTC.2019.8810912
- **Green open-access link:** <https://zenodo.org/record/3386445>
- **Relation to S4G:** This paper describes the PROFEV framework and the stochastic optimization algorithm for a residential place with one electric vehicle working inside it, as in the S4G Bolzano residential test site. The uncertainty was modelled using Markov models and introduced it into the stochastic dynamic programming framework.

2.19.3 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** Fraunhofer FIT

- **Publication title:** Incremental deep learning for continuous load prediction in energy management systems
- **Publication authors:** Gustavo Aragón, Harsh Puri, Alexander Grass, Sisay Chala, Christian Beecks
- **Publication abstract:** In this work, we introduce load prediction as continuous input for optimization models within an optimization framework for short-term control of complex energy systems. In this context, we investigated long short-term memory (LSTM) algorithms for load prediction, because they allow incremental training in an application with continuous real-time data and have not been used in other works for continuous load prediction to our knowledge. The test and evaluation were realized using data sets of real residential data from different locations in different time resolution, hourly and minutely. Accordingly, we tested different recurrent neural network (RNN) parameters of the model such as the number of layers, the number of hidden nodes, the inclusion of regularization, etc., in order to find the optimal LSTM configuration for our continuous load prediction application. Besides, we analysed the quality of the LSTM algorithm comparing it in continuous mode with the baseline model and in batch mode with the statistical model ARIMA. Training and prediction time, as well as the error stabilization time were parameter used for the evaluation. The results showed that LSTM algorithms are highly promising for integrating continuous load prediction with incremental learning.
- **DOI:** 10.1109/PTC.2019.8810793
- **Green open-access link:** <https://zenodo.org/record/3386447>
- **Relation to S4G:** This paper describes the development of the deep learning algorithm running in real-time inside the PROFESS and PROFEV. For this we used a long short-term memory algorithm with the capacity of incremental learning, meaning that the algorithm learns continuously from the real-time data from the test sites.

2.19.4 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Optimal BESS scheduling strategy in microgrids based on genetic algorithms
- **Publication authors:** Dorian-Octavian Sidea, Lucian Toma, Mihai Sanduleac, Irina Picioroaga, Valentin-Adrian Boicea
- **Publication abstract:** Microgrids represent a promising concept able to solve numerous problems of traditional power systems, such as reliability and environmental issues, through a multi-sources coordination, including renewable energy integration and storage devices. In order to overcome the challenges of variation in load and generation, microgrids need efficient operation and control. The paper proposes a scheduling framework for the microgrid operation considering renewable sources generation and battery energy storage system (BESS), using a modified genetic algorithm. For a better understanding of the microgrid operation, numerous generation and storage scenarios were investigated in this paper, in order to minimize the energy imbalance in the analysed system.
- **DOI:** 10.1109/PTC.2019.8810633
- **Green open-access link:** <https://zenodo.org/record/3662684>
- **Relation to S4G:** The paper analyses the benefits of using BESS at grid level through a modified genetic algorithm. It is an extension of the project activity related to grid-side batteries

2.20 IEC TC 8 / JWG 12

- **Date:** June 25-26, 2019
- **Location:** Wohlen, Sweden
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** IEC
- **Estimated participants:** 20

- **Website:**
https://www.iec.ch/dyn/www/f?p=103:14:6678686343742:::FSP_ORG_ID,FSP_LANG_ID:23040,25
- **S4G participant:** UPB
- **Type of participation:** Work on SC 77A: EMC - Low frequency phenomena WG 9: Power quality measurement methods
- **Relation to S4G:** Presentation of S4G scenarios and use cases in order to gather valuable input regarding frequency measurement and estimation to comply with future requirements derived from the JWG12 work.

2.21 Efs 2019, 4th Energy for Sustainability International Conference

- **Date:** July 24-26, 2019
- **Location:** Turin, Italy
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Itecons, Energy for Sustainability Initiative of the University of Coimbra, and Energy Center, Polytechnic University of Turin
- **Estimated participants:** 100
- **Website:** <https://www.efs2019.uc.pt/projectos/efs2019/>

2.21.1 Participation to a Conference

- **S4G participant:** LINKS
- **Type of participation:** Paper presentation (section 2.21.2)

2.21.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** LINKS
- **Conference proceedings:** 4th Energy for Sustainability International Conference - Designing a Sustainable Future (ISBN: 978-989-54499-0-3)
- **Publication title:** Novel model for integration of battery storage systems into the electricity grid as support for the green energy mix
- **Publication authors:** Hamidreza Mirtaheri, Orlando Tovar, Michele Ligios, Stefano Fava, Matteo Ferraris, Maurizio Fantino, Claudio Pastrone, Maurizio Spirito
- **Publication abstract:** Electricity network is being increasingly pushed towards mixing more renewable energy sources' share in total energy chain while at the same time keeping acceptable power quality margins. However, relying more on intermittent renewables in electricity network raises the question of reliability and the huge expenses caused by existing infrastructure reinforcement. Hence, main targets come in conflict, where grid decarbonization in turn causes relative uncertainties ending up with high penalty costs for system operators. Besides that, trends in private owned photovoltaics panel installation, expected propensity of electric vehicles usage and consequently emerging fast charger stations, alarms distribution system stability. These have fuelled wide range of research projects for renewable energy integration to the energy grid. In the present paper the European H2020 Storage4Grid project is introduced. It aims to accommodate battery systems where electricity grid is subject to critical problems, by the means of innovative and interoperable ICT system. It investigates how the union of the mentioned conflicting targets opens a promising market for storage systems. the present paper reports briefly the studies orienting on lithium-ion batteries and discusses first, how that can be served as a highly efficient flexibility method. Then we address the S4G system's solutions to settle cost of investment, through optimal planning and operating instruction, thanks to its centralized

intelligence, distributed functionalities and effective interoperation by novel communication platform. S4G analyses the need of various entities in the Smart Grid multi-agent operation picture, as well as private residential prosumers. The designed system incorporates all ICT services as well as intuitive user-interface for various actors, aiming at maximizing benefits for the electricity system operators and end-users. The advanced control and prediction methods used within the project will be discussed too.

- **Relation to S4G:** The presented paper discusses the importance of electrochemical storage in provision of incremental renewable energy resources into energy mix chain, then highlights the real techno-economic barriers for efficient integration of the battery storage system and finally introduces how those issues are dealt with in the S4G Decision Support Framework (DSF), thanks to wise design and deployment of a holistic ICT support.

2.22 Energies Journal 2019

- **Date:** August 2019
- **Type of dissemination and communication activity:** Other
- **Publisher:** Multidisciplinary Digital Publishing Institute
- **ISSN:** 19961073
- **Impact Factor (2018):** 2.707
- **5-Year Impact Factor (2018):** 2.990
- **Website:** <https://www.mdpi.com/journal/energies>
- **Type:** Journal scientific peer-reviewed publication
- **S4G participants:** UPB and UNINOVA
- **Publication title:** On the electrostatic inertia in Microgrids with inverter-based generation only – An analysis on dynamic stability
- **Publication authors:** Mihai Sanduleac, Lucian Toma, Mircea Eremia, Irina Ciornei, Ion Trîstiu, Andreea Iantoc, João F. Martins, Vitor F. Pires
- **Publication abstract:** Microgrids are about to change the architecture and the operation principles of the future power systems towards smartness and resiliency. Power electronics technologies are key enablers for novel solutions. In this paper we analyse the benefits of a “microgrid by design” architecture (MDA), using a solid-state transformer (SST) as a low-voltage grid-former and inverter-based generation only. In this context, the microgrid stability is maintained with the help of “electrostatic energy inertia” that can be provided by the capacitor connected to the DC busbar behind the SST inverter topology. This happens in a natural way, alike the mechanical inertia in power systems with synchronous machines, however without depending on frequency and without the need of a rotational inertia. This type of microgrid always operates (both fully connected to the main grid or in islanding mode) with all the necessary mechanisms needed to maintain the microgrid stable—no matter of the perturbations in the upstream of the point of common coupling (PCC). In the case of microgrids with inverter-based generation only (including the energy storage systems), there is no mechanical inertia and different stability mechanisms need to be applied compared to the stability principle of the classical power systems. Our proposed mechanism differentiates from the recently proposed stability assessments of microgrids based on virtual synchronous generators from the control theory perspective. This paper is a continuation of our previous work where the MDA was first introduced. The use-cases and scenarios are based on realistic and yet reasonable complexities, by coupling the disturbance magnitude with the voltage stability limit in power grids. The paper finds meaningful disturbances to test the electrostatic energy inertia at the boundaries of grid stability, as guidance to understand the range of voltage variation for extreme conditions. The results show that in microgrids with inverter-based generation only and passive loads (RLC type) the operation is no longer frequency dependent. The energy of the DC busbar capacitor as electrostatic energy inertia of the MDA has a role similar to that of the rotational machines in classical grids in terms of maintaining dynamic stability, however impacting two different types of stability

- **DOI:** 10.3390/en12173274
- **Open-access link:** <https://www.mdpi.com/1996-1073/12/17/3274>
- **Views:** 700
- **Relation to S4G:** The paper is a continuation of the work done in the peer-review paper presented at the Energies Journal 2018 (section 2.11), which goes beyond the already reported findings by providing extensive simulations on a microgrid by design, using the Solid State transformer as grid former and grid stability provider. The paper consolidates an essential finding for the microgrid by design, the fact that the grid stability in inverter-based only networks does not need any more mechanical inertia, but relies solely on an electrostatic-based energy inertia provided by capacitors on the DC bus-bar behind the inverters. This systematisation of the stability theory is one of the most important contribution of UPB in the S4G environment, fully inspired by the project activity, with the potential to have an important impact on future microgrids design.

2.23 UPEC 2019, 54th International Universities Power Engineering Conference

- **Date:** September 3-6, 2019
- **Location:** Bucharest, Romania
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Politehnica University of Bucharest, and IEEE
- **Estimated participants:** 200
- **Website:** <http://upec2019.com/>

2.23.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.23.2)

2.23.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Economic benefits of energy storage and price-aware demand response for future smart cities
- **Publication authors:** Irina Ioana Picioroagă, Mircea Eremia, Mihai Sănduleac
- **Publication abstract:** As new goals were set in terms of reliability and sustainability in urban power grids, demand response (DR) programs have gained remarkable attention for their benefits offered to both grid and customers. However, given the limited possibilities of implementing these services, the energy storage systems (ESSs) can be important tools for increasing the flexibility of electrical systems, allowing also the high penetration of renewable sources. The scope of this work is to analyse the impact of optimal operation of ESS together with the deployment of different types of demand side management (DSM) in Smart City context, considering the presence of local renewable energy sources (RESs). In this paper, a scheduling optimization scheme for an urban distribution network is presented, aiming to reduce the total operation cost. In this regard, a bi-objective model has been developed, that determines the balance between the global operational cost and the total load curtailment provided by the DR programs, while satisfying the technological constraints of the ESS and the power grid.
- **DOI:** 10.1109/UPEC.2019.8893590
- **Green open-access link:** <https://zenodo.org/record/3662505>
- **Relation to S4G:** The paper analyses the benefits of using BESS at grid level in a situation based on price-aware demand response. The paper extends the project focus on using grid-side batteries with simulations of demand side management (DSM) applicable to Smart Cities.

2.24 Energidag 2019, Energy Day

- **Date:** September 4, 2019
- **Location:** Aalborg, Denmark
- **Type of dissemination and communication activity:** Participation to a Conference
- **Organisers:** House of Energy – Energy Cluster Denmark
- **Estimated participants:** 250
- **Website:** <https://house-of-energy.dk/energidag/>
- **S4G participant:** LiBal
- **Type of participation:** Presentation
- **Presentation title:** Intelligent use of batteries
- **Presentation abstract:** The presentation focused on the battery integration in the grid and buildings to mitigate the RES production effects.
- **Relation to S4G:** The S4G Fur/Skive and Bolzano test sites and use cases were presented.

2.25 ETIP SNET WG 2 Meeting

- **Date:** September 17, 2019
- **Location:** Brussels, Belgium
- **Type of dissemination and communication activity:** Participation to a Workshop
- **Organisers:** EDF
- **Estimated participants:** 20
- **Website:** <https://www.etip-snet.eu/about/working-groups/wg-2/>
- **S4G participant:** UPB
- **Type of participation:** Contribution to new subjects in Horizon Europe related to storage (ETIP roadmap)
- **Relation to S4G:** Dissemination of the S4G technical objectives and findings to relevant stakeholders participating in the event, fostering the role of intelligent control of storage in modern grids (ETIP roadmap).

2.26 1st Energy & Environment Clustering Event

- **Date:** September 23-24, 2019
- **Location:** Durham, United Kingdom
- **Type of dissemination and communication activity:** Participation to a Conference
- **Organisers:** Durham Energy Institute and EUA Energy & Environment Platform
- **Estimated participants:** 20
- **Website:** <https://eua.eu/events/90-1st-energy-environment-clustering-event.html>
- **S4G participant:** UPB
- **Type of participation:** Session chair
- **Objective:** Sharing of experiences from institutional initiatives supporting and developing energy research and education activities relating to the integration of renewable technologies and solutions and resulting in significant steps towards the required energy and environmental transition
- **Relation to S4G:** Dissemination of the S4G technical objectives and achievements to relevant academic community in Europe (EUA: European Universities Association) participating in the event.

2.27 H2020 Low TRL Smart Grids and Storage Projects Clustering Event 2019

- **Date:** October 3, 2019
- **Location:** Brussels, Belgium
- **Type of dissemination and communication activity:** Participation in activities organized jointly with other H2020 projects
- **Organisers:** INEA
- **Estimated participants:** 50
- **Website:** <https://ec.europa.eu/inea/>
- **S4G participants:** LINKS, UPB, and UNINOVA
- **Relation to S4G:**
 - Leading project of the “New compatible architectures for the grid” cluster (Mihai Sanduleac, UPB).
 - One of leading projects of the “Business models for exploitation” cluster (Maurizio Spirito, LINKS).
 - Participating project of the “Data management and interoperability” cluster (Vasco Delgado-Gomes, UNINOVA).
- **Photo:** Figure 8 and Figure 9



Figure 8. LINKS presenting the “Business models for exploitation” cluster results at H2020 Low TRL Smart Grids and Storage Projects Clustering Event 2019.



Figure 9. UPB presenting the “New compatible architectures for the grid” cluster results at H2020 Low TRL Smart Grids and Storage Projects Clustering Event 2019.

2.28 European Association of National Metrology

- **Date:** October 8-9, 2019
- **Location:** Bucharest, Romania
- **Type of dissemination and communication activity:** Participation to a Conference
- **Organisers:** INM – National Metrology Institute
- **Estimated participants:** 150
- **Website:** <https://www.euramet.org/publications-media-centre/event/tc-electricity-and-magnetism-tc-em-annual-meeting-2019/>
- **S4G participant:** UPB
- **Type of participation:** Presentation
- **Presentation title:** Measurement for Smart[er] Grids
- **Presentation abstract:** Teaching and researching at UPB in the field covered by EURAMET. Advertising knowledge obtained in S4G for further inclusion in consortia targeting storage modelling and optimal use in smart grids.
- **Relation to S4G:** Dissemination of the S4G technical objectives and the measurement layer used in the S4G control applications to the relevant research community in Europe, active in electrical storage metrological characterization.

2.29 CEE 2019, Quality of Electrical Energy (Calitatea Energiei Electrice)

- **Date:** October 9-11, 2019
- **Location:** Targoviste, Romania
- **Type of dissemination and communication activity:** Participation to a Conference
- **Organisers:** University of Valahia
- **Estimated participants:** 150

- **Website:** <https://ripostapenet.ro/2019/10/09/simpozionului-national-calitatea-energiei-electrice-2019/> (in Romanian)
- **S4G participant:** UPB
- **Type of participation:** Attendance, session moderator, and speech
- **Relation to S4G:** Dissemination of the S4G technical objectives to relevant stakeholders in Romania (e.g., prosumers, energy communities, energy distribution companies) participating in the event.
- **Photo:** Figure 10



Figure 10. UPB participation at CEE 2019.

2.30 SIEMEN 2019, 12th International Conference and Exhibition on Electromechanical and Energy Systems

- **Date:** October 10-11, 2019
- **Location:** Chisinau, Republic of Moldova
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** Faculty of Power and Electrical Engineering, Moldovan Technical University of Chisinau, and IEEE
- **Estimated participants:** 100
- **Website:** <http://siemen.ucv.ro/>

2.30.1 Participation to a Conference

- **S4G participant:** UPB
- **Type of participation:** Paper presentation (section 2.30.2)

2.30.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** UPB
- **Publication title:** Grid storage in LV networks – An appropriate solution to avoid network limitations in high RES scenarios
- **Publication authors:** Mihai Sanduleac, Mihaela Albu, Dorel Stanescu, Carmen Stanescu
- **Publication abstract:** Low voltage networks are poised to see huge transformations in the next decades. The aim for a carbon neutral economy asks for high level penetration of renewables, where PV production in LV networks is part of the general solution. The RES high penetration becomes however a threat for grid operation, through challenges such as keeping voltage level in the accepted band, avoiding grid congestion and reverse power flow or ensuring low level of energy losses. The paper analyses specific scenarios and suggests measures to address these limitations, by comparing business as usual operation with more advanced microgrid operation and the use of grid-side storage.
- **DOI:** 10.1109/SIELMEN.2019.8905803
- **Green open-access link:** <https://zenodo.org/record/3660151>
- **Relation to S4G:** The paper analyses the grid-side BESS used in a high RES scenario, by using BESS for avoiding grid constraints and for reducing low voltage grid losses. The paper complements the project interest in using grid-side batteries, with simulations in a high RES penetration scenario.

2.31 IECON 2019, 45th Annual Conference of the Industrial Electronics Society

- **Date:** October 14-17, 2019
- **Location:** Lisbon, Portugal
- **Type of dissemination and communication activity:** Participation to a Conference and Other
- **Organisers:** NOVA University of Lisbon, and IEEE
- **Estimated participants:** 1.100
- **Website:** <https://iecon2019.org/>

2.31.1 Participation to a Conference

- **S4G participant:** Fraunhofer FIT
- **Type of participation:** Paper presentation (section 2.31.2)

2.31.2 Other

- **Type:** Conference scientific peer-reviewed publication
- **S4G participant:** Fraunhofer FIT
- **Publication title:** Cooperative control of charging stations for an EV park with stochastic dynamic programming
- **Publication authors:** Gustavo Aragón, Erdem Gümrükcü, Vinoth Pandian, Otilia Werner-Kytölä
- **Publication abstract:** An increasing penetration of EVs and their charging impose challenges to the energy grid stability. As a consequence, an optimal management of EV charging in parking lots becomes essential. This work presents an approach of a cooperative control of charging stations based on a stochastic optimization model for the energy management of a group of charging stations. Uncertainties regarding the number of charging EVs at each time step were modelled using a Markovian process, while the probability mass function was generated using a Monte Carlo simulation. Furthermore, the concept prioritizes the exploitation of local renewable resources and energy storage for EV charging. The stochastic optimization model was integrated into our own developed Stochastic Optimization Software Framework (SOFW), which deploys the application as Model Predictive Control

(MPC) in the real-time scenario using dynamic programming. The cooperative control of charging stations presented in this work was evaluated successfully with a variety of EV driving scenarios. The approach will be validated in the future on the field in a car park of a DSO company including renewable generation and energy storage system.

- **DOI:** 10.1109/IECON.2019.8927825
- **Green open-access link:** <https://zenodo.org/record/3600894>
- **Relation to S4G:** This paper describes the PROFEV framework and the stochastic optimization algorithm working inside it. A definition for aggregated virtual capacity was proposed, as well for disaggregation of energy for the charging stations in the Bolzano commercial test site.

2.32 Batteries Europe, General Assembly Meeting

- **Date:** October 22, 2019
- **Location:** Brussels, Belgium
- **Type of dissemination and communication activity:** Participation in activities organized jointly with other EU projects
- **Organisers:** EC
- **Estimated participants:** 80
- **Website:** https://ec.europa.eu/info/events/general-assembly-batteries-europe-2019-oct-22_en
- **S4G participants:** UNINOVA
- **Type of participation:** Member of the WG 6: Application and Integration – Stationary, addressing its challenges and roadmap.
- **Relation to S4G:** The participation in this activity allowed the discussion with all relevant stockholders in the European batteries research and innovation ecosystem, understanding the relevant R&I priorities for the S4G project.
- **Photo:** Figure 11



Figure 11. UNINOVA participation at Batteries Europe General Assembly 2019.

2.33 S4G | SHAR-Q joint final event

- **Date:** October 24, 2019
- **Location:** Brussels, Belgium
- **Type of dissemination and communication activity:** Participation in activities organized jointly with other EU projects
- **Organisers:** S4G and SHAR-Q projects
- **Estimated participants:** 40
- **Website:** http://www.storage4grid.eu/img/SHAR-Q_Storage4Grid_Final_Event-save_the_date_agreed.pdf
- **S4G participants:** all consortium
- **Relation to S4G:**
 - Dissemination of S4G and SHAR-Q projects, describing their innovations, outcomes, and business models.
 - Discussion of the associations role to boost technical, technological and social cooperation towards the energy grids of the future.
 - Discussion of the business models for exploitation.
- **Photo:** Figure 12



Figure 12. S4G participation at S4G | SHAR-Q joint final event.

2.34 Building Green 2019

- **Date:** October 30-31, 2019
- **Location:** Copenhagen, Denmark
- **Type of dissemination and communication activity:** Participation to a Workshop and Trade Fair
- **Organisers:** Building Green
- **Estimated participants:** 8.000
- **Website:** <https://house-of-energy.dk/energidag/>

2.34.1 Participation to a Workshop

- **S4G participant:** LiBal
- **Type of participation:** Presentation
- **Presentation title:** Practical Implementation of Joint Battery Solution
- **Presentation abstract:** Intelligent management of battery storage to optimise the solar system's economy.
- **Relation to S4G:** Presentation of battery storage management algorithm developed during the S4G project and incorporated in the GESSCon component.

2.34.2 Trade Fair

- **S4G participant:** LiBal
- **Type of participation:** Dissemination of the S4G project, focusing on the Fur/Skive and Bolzano test sites and use cases.
- **Relation to S4G:** Business exploitation of the GESSCon component developed during the S4G project and deployed in the Bolzano commercial and Fur/Skive grid test sites.

2.35 Innovation and Networking Days 2019

- **Date:** November 6-7, 2019
- **Location:** Sankt Augustin, Bonn, Germany
- **Type of dissemination and communication activity:** Organisation of a Workshop and Participation to a Workshop
- **Organisers:** Fraunhofer FIT, LINKS, and CERTH
- **Estimated participants:** 50
- **Website:** <https://www.fit.fraunhofer.de/en/events/fraunhofer-iot-innovation-and-networking-days-2019.html>

2.35.1 Organisation of a Workshop

- **S4G participants:** Fraunhofer FIT and LINKS
- **Objective:** The Innovation and Networking Days allow innovators from industry, research and public administrations to meet, share, network and discuss different facets of a broad topics, namely Smart City and Energy as well as Intelligent Processes.
The event was organized around inspirational speeches and technical presentations, informal discussions at World Cafés and networking opportunities.
- **Target attendees:** Research and industry community
- **Relation to S4G:** Dissemination of the S4G project to relevant stakeholders.

2.35.2 Participation to a Workshop

- **S4G participant:** Fraunhofer FIT

- **Type of participation:** Poster presentation (Appendix D)
- **Relation to S4G:** Dissemination of the S4G technical objectives to relevant stakeholders participating in the event.

2.36 IET Renewable Power Generation Journal 2019

- **Type of dissemination and communication activity:** Other (section 2.36.1 and section 2.36.2)
- **Publisher:** Institution of Engineering and Technology
- **ISSN:** 1752-1424 (Online) and 1752-1416 (Print)
- **Impact Factor (2018):** 3.605
- **5-Year Impact Factor (2018):** 3.649
- **Website:** <https://digital-library.theiet.org/content/journals/iet-rpg>

2.36.1 Other

- **Date:** December 2019
- **Type:** Journal scientific peer-reviewed publication on a Special Issue: *Challenges in Future Grid-Interactive Power Converters: Control Strategies, Optimal Operation, and Corrective Actions*
- **S4G participant:** UNINOVA
- **Publication title:** Energy router for SC: GC, SA and transition mode controls
- **Publication authors:** Nuno Vilhena, Carlos Roncero-Clemente, Vasco Delgado-Gomes, Vitor Fernão Pires, João F. Martins
- **Publication abstract:** The smart grid (SG) management and the operation of the so-called smart communities (SC) requires a unified control from the distributed energy resources (DER) and the micro-storage systems both in grid-connected (GC) mode and in stand-alone (SA) mode. In this context, the SC energy management system (SCEMS) acts as aggregator of these resources, aiming to assure benefits for every community stakeholder based on the SC goals, by setting the proper reference values. This trend towards the SC concept leads to the energy router (ER). This paper proposes a control strategy and the operation modes for a single-phase ER, which is able to operate within a SC with a flexible active and reactive power control both in GC and in SA modes, providing a seamless transition between them without undesired transients. At the same time, if a general blackout occurs, the ER operates in SA mode in order to exploit the local energy resources, as a way to help in the power restoration before a grid resynchronization once the grid becomes available. The proposed control strategy was implemented and tested through simulations and experiments.
- **DOI:** 10.1049/iet-rpg.2019.0500
- **Open-access link:** <https://zenodo.org/record/3701556>
- **Relation to S4G:** This paper presents the single-phase ER prototype developed during the S4G project and deployed in the Bucharest test site.

2.36.2 Other

- **Date:** March 2020
- **Type:** Journal scientific peer-reviewed publication
- **S4G participant:** UNINOVA
- **Publication title:** Control and operation of a three-phase local energy router for prosumers in a smart community
- **Publication authors:** Carlos Roncero-Clemente, Nuno Vilhena, Vasco Delgado-Gomes, Enrique Romero-Cadaval, João F. Martins
- **Publication abstract:** From the electrical energy point of view, the smart community (SC) concept is meant to be as a sustainable and environmentally friendly alternative to the classical configuration.

The SC includes small-scale renewable energy sources (RES) and small-scale energy storage system (ESS). The SC energy management system (SCEMS) acts as aggregator, aiming to assure benefits for community stakeholders. These trends led to the energy routers (ER) concept. This paper proposes and describes the control strategies for these ERs to contribute to the SC goals. The approach of these strategies increases the RES adjustability, contributing to maintain the ESS state of health (SoH). The ER is able to operate simultaneously with active, and reactive power control, besides compensating SC grid voltage imbalances, and providing ancillary services to the SC. The proposed control strategies are validated by simulations and experiments.

- **DOI:** 10.1049/iet-rpg.2019.0589
- **Open-access link:** <https://zenodo.org/record/3701554>
- **Relation to S4G:** This paper presents the three-phase ER prototype developed during the S4G project and deployed in the Fur/Skive test site.

2.37 Optimal Control Applications and Methods Journal 2020

- **Type of dissemination and communication activity:** Other
- **Publisher:** John Wiley & Sons Inc.
- **ISSN:** 1099-1514 (Online) and 0143-2087 (Print)
- **Impact Factor (2018):** 1.452
- **5-Year Impact Factor (2018):** 1.790
- **Website:** <https://onlinelibrary.wiley.com/journal/10991514>
- **Date:** January 2020
- **Type:** Journal scientific peer-reviewed publication on a Special Issue: *MPC for Energy Systems: Economic and Distributed Approaches*
- **S4G participant:** FRAUNHOFER
- **Publication title:** Distributed model predictive control strategies for coordination of electro-thermal devices in a cooperative energy management concept
- **Publication authors:** Ivelina Stoyanova, Erdem Gümrükcü, Gustavo Aragon, Diego I. Hidalgo-Rodriguez, Antonello Monti, Johanna Myrzik
- **Publication abstract:** This work discusses three promising strategies for the compensation of deviations within the online phase of a cooperative energy management concept. Whereas in the planning phase, hourly schedules for the active electro-thermal devices are negotiated on a daily basis, the second phase tracks the schedule, including forecast updates, and compensates the deviations. The latter online compensation is realized with a distributed and hierarchical-distributed model predictive control strategies, which are compared with continuous rescheduling with receding horizon and evaluated in terms of computational and optimization performance and scalability. The optimization is implemented and deployed using an open-source optimization framework, which automatically manages optimization control, integration of renewable generation and load forecasts, multi-instantiation and communication over an internet of things communication protocol. We address the case of significant deviations from the day-ahead forecast and the tracking of an obsolete schedule and suggest a combined method, which combines the advantages of rescheduling and a distributed MPC strategy. The method applies a dynamic threshold to evaluate the deviation trend over time and to decide if compensation is still feasible or if a rescheduling should be triggered. The methods are evaluated based on several performance indicators such as residual deviation, number of switching events and computation and communication requirements and scalability and offer a methodology for the control design of systems of different dimensions.
- **DOI:** 10.1002/oca.2528
- **Open-access link:** <https://onlinelibrary.wiley.com/doi/10.1002/oca.2528>
- **Relation to S4G:** This paper described the use of the PROFESS framework, developed under the context of the S4G project, to run a distributed model predictive control strategy in a multi-modal

energy management concept composing of a number of buildings. PROFESS reads energy inputs from simulated buildings as well as energy flexibilities from each building and calculates the model predictive control in a distributed way using the profess instances of all buildings.

3 S4G Advertising Materials

Several S4G advertising materials were prepared to disseminate the S4G project amongst the different stakeholders. The main dissemination channel is the S4G project website (Appendix A). The project presentation is also available for the partners which present the S4G project in the events that they attend (Appendix B), where they can also distribute the project flyer (Appendix C). The S4G poster can also be show and presented in dedicated events (Appendix D). Moreover, a biannual newsletter was prepared and are available in the S4G website.

4 Summary of the S4G consortium achievements

Table 1 summarises the S4G dissemination activities and advertising material during the entire project (M01-M39). Table 2 shows the reached stakeholders during the dissemination activities and communication activities.

Table 1. S4G Dissemination and communication activities.

	Total
<i>Organization of a conference</i>	2
<i>Organization of a workshop</i>	6
<i>Press Release</i>	2
<i>Non-scientific and non-peer-reviewed publication (popularised publication)</i>	14
<i>Exhibition</i>	0
<i>Flyer</i>	4
<i>Training</i>	0
<i>Social Media</i>	2
<i>Website</i>	1
<i>Communication Campaign (e.g. Radio, TV)</i>	0
<i>Participation to a Conference</i>	31
<i>Participation to a Workshop</i>	15
<i>Participation to an Event other than a Conference or a Workshop</i>	3
<i>Video/Film</i>	1
<i>Brokerage Event</i>	1
<i>Pitch Event</i>	2
<i>Trade Fair</i>	2
<i>Participation in activities organized jointly with other H2020 projects</i>	5
<i>Other</i>	35
Total	126

Table 2. Estimation of persons reached in the dissemination and communication activities.

Stakeholders	Number of persons
<i>Scientific Community (Higher Education, Research)</i>	8200
<i>Industry</i>	900
<i>Civil Society</i>	40300
<i>General Public</i>	8500
<i>Policy Makers</i>	30
<i>Media</i>	100
<i>Investors</i>	30
<i>Customers</i>	170
<i>Other</i>	440
Total	58670

Additionally, Appendix F and Appendix G respectively details the dissemination and communication Key Performance Indicators (KPIs) achieved during the entire project.

5 Conclusions

As shown in this document, the S4G partners have participated and organized approximately 130 different actions during the entire project. These actions included organization of conferences and workshops, participation in conferences and workshops, social media dissemination, newsletters and flyer preparation, peer-reviewed articles, amongst others; and had heterogeneous audience and objectives. Whenever possible, leveraging on synergies with other initiatives to increase outreach and reduce financial impact on S4G budget.

Moreover, some advertising material were performed, namely:

- Project website (Appendix A)
- Project official presentation (Appendix B)
- Flyer (Appendix C)
- Poster (Appendix D)
- Roll-up (Appendix E)
- Newsletters
- Video

The main dissemination channel is the S4G project website (Appendix A) where the biannual newsletters were made available. The project presentation is also available for the partners which present the S4G project in the events that they attend (Appendix B), where they can also distribute the project flyer (Appendix C). The S4G poster (Appendix D) and a roll-up (Appendix E) were also prepared and presented in dedicated events.

The S4G consortium will continue to disseminate the project outcomes to relevant stakeholders after the end of the project, to increase its impact and leverage the S4G developed solutions.

Acronyms

Acronym	Explanation
ASRO	Asociația de Standardizare din România / Romanian Standards Association
BESS	Battery Energy Management System
CO2	Carbon dioxide
DER	Distributed Energy Resources
DG	Distribution Generation
DOI	Digital Object Identifier
DSM	Demand Side Management
DSO	Distribution System Operator
EMC	Electromagnetic Compatibility
EMS	Energy Management System
ER	Energy Router
ESS	Energy Storage System
ETIP	European Technology and Innovation Platform
EU	European Union
EV	Electric Vehicle
EV	Electric Vehicle
GC	Grid-Connected
HEMS	House and building Energy Management Systems
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Device
IEEE	Institute of Electrical and Electronics Engineers
IET	Institution of Engineering and Technology
INEA	Innovation & Networks Executive Agency
ISSN	International Standard Serial Number
JWG	Joint Working Group
KPI	Key Performance Indicators
LEC	Levelized Electricity Costs
L-RES	Local Renewable Energy Resources
LV	Low Voltage

Acronym	Explanation
LVDC	Low Voltage Direct Current
MDA	Microgrid by Design Architecture
MPC	Model Predictive Control
PCC	Point of Common Coupling
PMU	Phasor Measurement Unit
PV	Photovoltaic
RES	Renewable Energy Sources
S4G	Storage4Grid
SA	Stand-Alone
SC	Subcommittee
SC	Smart Community
SCADA	Supervisory Control and Data Acquisition i
SCEMS	Smart Community Energy Management System
SG	Smart Grid
SNET	Smart Networks for Energy Transition
SoC	State of Charge
SOFW	Stochastic Optimization Software Framework
SoH	State of Health
SST	Solid State Transformers
TC	Technical Committee
TR	Technical Report
TRL	Technology Readiness Level
TSO	Transmission System Operator
USA	United States of America
WG	Working Group
WP	Work Package

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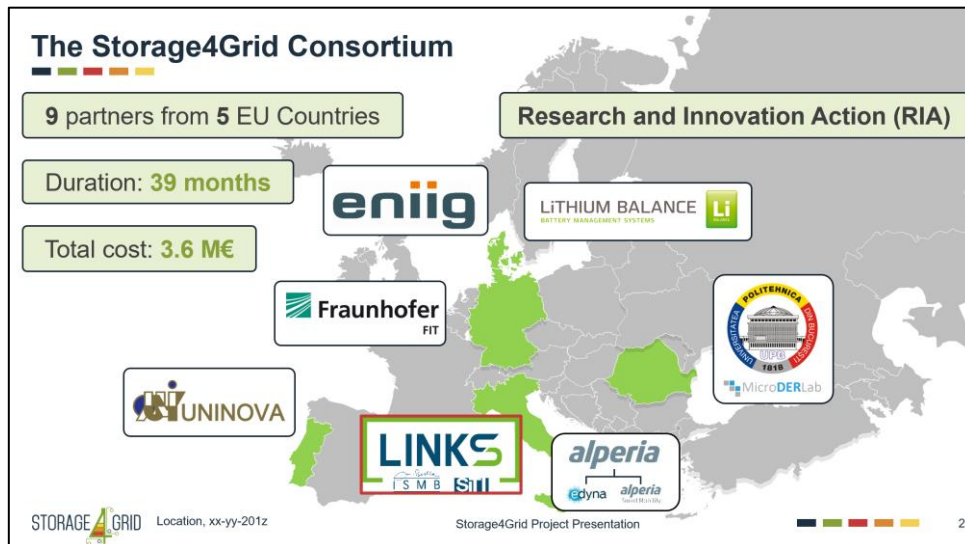
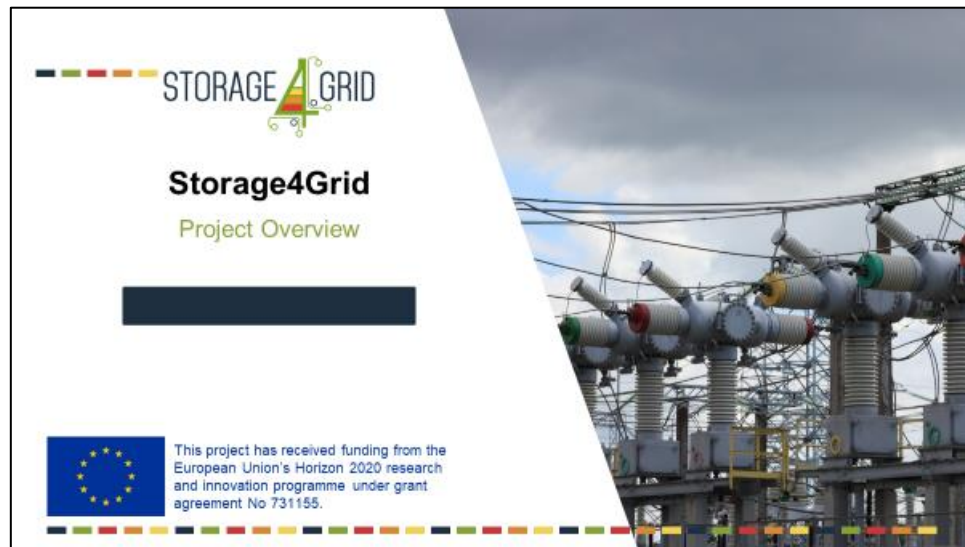
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Appendix A Project website (www.storage4grid.eu)



Appendix B Project official presentation



Storage4Grid at a glance

Aim: avoid or reduce network reinforcement:

- by enabling the coordination of local, grid-connected and mixed Energy Storage Systems (ESS)
- by providing a new ICT framework for planning and optimizing ESS-based services

Scope: distribution grid level (ESS at substation level), end-user level (ESS at user premises) coordinated in conjunction with Electrical Vehicles (EVs) charging, innovative energy metering systems and energy routing systems.



STORAGE GRID Location, xx-yy-201z

Storage4Grid: driving challenges



EU is reaching (and exceeding) its ambitious goal of reaching **high share of RES** (27% by 2030), but we need to do more to exploit RES in **more efficient and cost-effective way**.



Large predictable loads (e.g. from high-consuming, heavy industry) is globally decreasing. **More distributed, less predictable loads** (e.g. EV fast-charging stations) are taking their place.



Energy Storage Systems (ESS) are quickly emerging as a valuable solution, but **reliable forecast and evaluation is needed** for properly planning ESS investments.

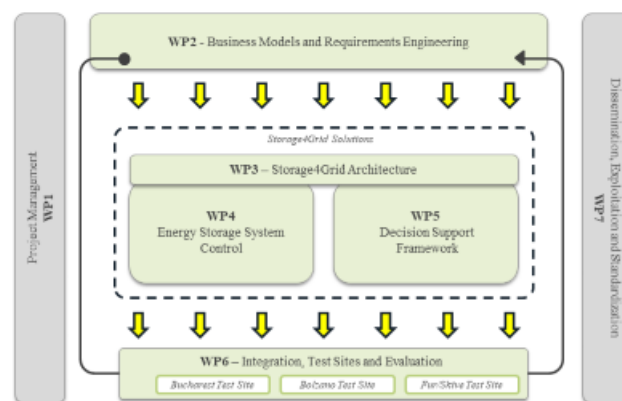


In order to draw all the benefits of controllable ESS, their deployment in Distribution Grids must be **interoperable with open Smart Grid models and standards**.

STORAGE GRID Location, xi-yy-2012

Storage4Grid Project Presentation

Storage4Grid Work Breakdown Structure

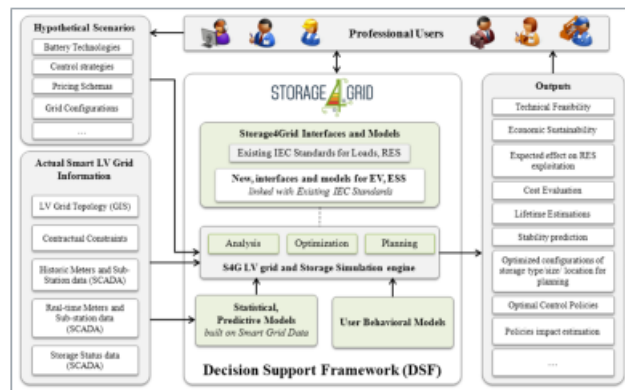


STORAGE GRID Location, xx-yy-201z

Storage4Grid Project Presentation

The Storage4Grid Decision Support (DS) concept

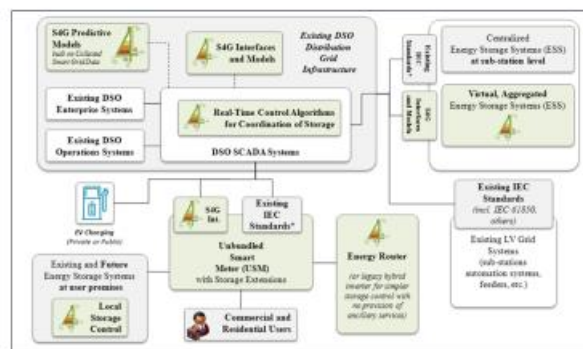
- The Decision Support concept looks at **Feasibility Evaluation and Planning** aspects.
- It aims at answering questions such as:
 - Is it convenient to deploy ESSs in this scenario?
 - Which type?
 - Which size?
 -



The Storage4Grid Operations concept

- The Storage4Grid Operations concept looks at **Control** aspects.
- It aims at answering to questions such as:

- How should we control storage to maximize investment, RES utilization, etc.?
- What is the best technical infrastructure for ESS control?
 - (best = most reliable, most convenient, more efficient, etc.)
- How can we ensure interoperable operations despite all the different types of storage available?
-



Tangible Outcomes (1/2)



Tangible Outcome #1

Pre-design the **S4G interfaces**, namely a set of interfaces and a joint Common Information Model (CIM) suitable for monitoring and control of heterogeneous storage systems.



Tangible Outcome #2

Develop a set of **predictive control algorithms** suitable to perform real-time optimization of distributed storage system in existing low and medium voltage grids.



Tangible Outcome #3

Establish an **Unbundled Smart Meter (USM)** extending existing AMI standards in open fashion to allow local "plug-in" integration of interfaces providing information about storage control, EV charging and local user interfaces to enable interaction with user.

Tangible Outcomes (2/2)



Tangible Outcome #4

Establish a fully integrated **Energy Router** allowing an easier integration of DC home grid, renewables and EVs in a Smart Grid ready approach.



Tangible Outcome #5

Develop a **decision-support framework** for analysing, planning, forecasting and optimizing the use of distributed storage in the low and medium voltage grid.



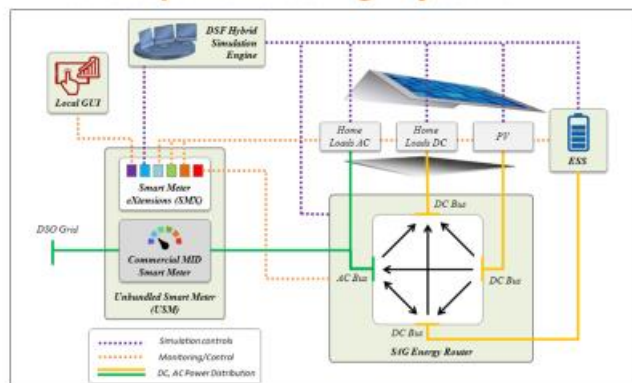
Tangible Outcome #6

To **propose and apply an evaluation methodology** that assesses the technical feasibility of the developed technologies & solutions and as well as evaluates the user acceptance while considering the multiple actors and stakeholders within a Smart Grid.

S4G Test Sites: Advanced Cooperative Storage Systems

Test-site:
Bucharest (Romania)

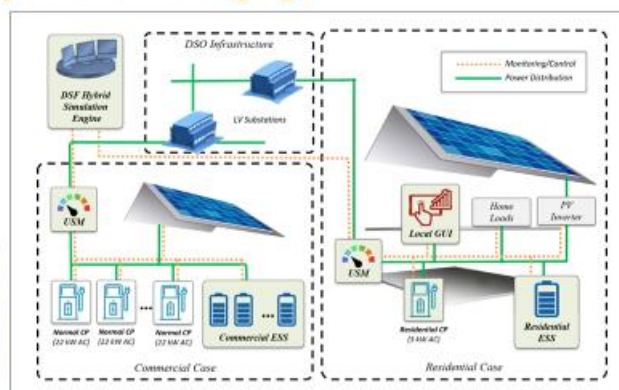
Scope:
Low-TRL technologies, analyzed in controlled conditions



S4G Test Sites: Cooperative EV charging

Test-site:
Bolzano (Italy)

Scope:
Coordination of ESS with the EV charging infrastructure



S4G Test Sites: **Storage Coordination**

Test-site:

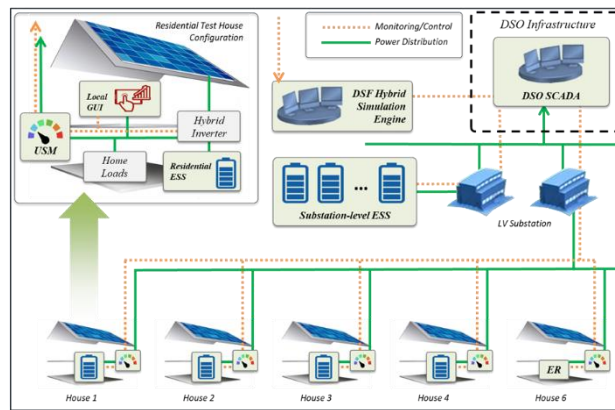
Fur/Skive (Denmark)
(leveraging GreenCom Pilot)

Scope:

Grid-side storage and coordination among ESS at user level



Location, xx-yy-201z



Storage4Grid Project Presentation

12

The Storage4Grid External Stakeholders Group

- The **External Stakeholder Group (ESG)** is a group of external, independent experts of recognized knowledge in different kind of background and area of expertise including market, technological trends and standards.
- ESG established through an open call on project web site
- On-line interviews with each ESG member performed
- First ESG workshop held on August 3rd, 2018



STORAGE4GRID Location, xx-yy-201z

Storage4Grid Project Presentation

13

Thanks for your attention!

Name Surname

Partner Institution



Presenter's email



<http://www.storage4grid.eu/>



@storage4grid_eu



<https://www.linkedin.com/groups/12029575/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731155.



Appendix C Flyer



Storage4Grid at a glance

Storage4Grid is a Research and Innovation Action (RIA) funded by the European Union

AIM
Avoid or reduce network reinforcement by boosting the uptake of Energy Storage Systems (ESS).

SCOPE
Distribution grid level (ESS at substation level), end-user level (ESS at user premises) coordinated in conjunction with Electrical Vehicles (EVs) charging, innovative energy metering systems and energy routing systems.

MAIN EXPECTED OUTCOME
A methodology (and its associated tools) for modeling, planning, integrating, operating and evaluating distributed ESS.

Technical Objectives

T01	T02	T03	T04	T05	T06
Pre-design the S4G interfaces, namely a set of interfaces and a joint Common Information Model (CIM) suitable for monitoring and control of heterogeneous storage systems	Develop a set of predictive control algorithms suitable to perform real-time optimization of distributed storage system in existing low and medium voltage grids	Establish an Unbundled Smart Meter (USM) extending existing AMI standards in open fashion to allow local "plug-in" integration of interfaces providing information about storage control, EV charging and local user interfaces to enable interaction with user	Establish a fully integrated Energy Router allowing an easier integration of DC home grid, renewables and EVs in a Smart Grid ready approach	Develop a decision-support framework for analysing, planning, forecasting and optimizing the use of distributed storage in the low and medium voltage grid	To propose and apply an evaluation methodology that assesses the technical feasibility of the developed technologies & solutions and as well as evaluates the user acceptance while considering the multiple actors and stakeholders within a Smart Grid

Consortium

Fraunhofer RT, eniig, edyna, alperia

LITHIUM BALANCE, UNINOVA, F S M B

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731155.

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<http://www.storage4grid.eu/>



Storage4Grid

PROJECT OVERVIEW

STORAGE4GRID

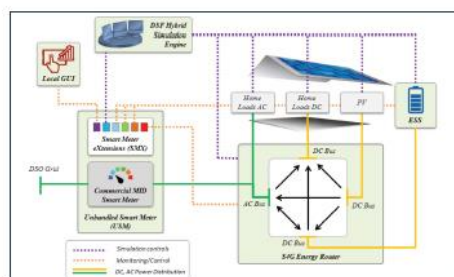
S4G Test Sites



Advanced Cooperative Storage Systems

TEST-SITE
Bucharest (Romania)

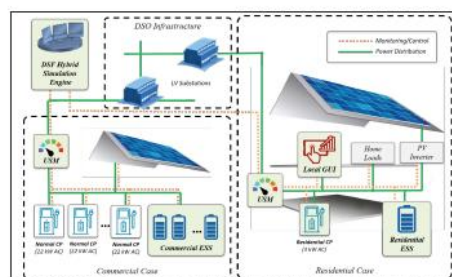
SCOPE
Low-TRL technologies, analyzed in controlled conditions



Cooperative EV charging

TEST-SITE
Bolzano (Italy)

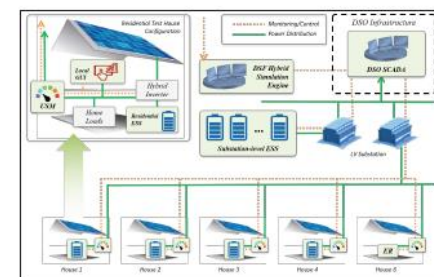
SCOPE
Coordination of ESS with the EV charging infrastructure




Storage Coordination

TEST-SITE
Fur/Skive (Denmark)

SCOPE
Grid-side storage and coordination among ESS at user level




Appendix D Poster



About Storage4Grid

Storage4Grid will provide DSOs and end-users with new tools for optimal grid planning, use and evaluation of storage technologies. It encompasses storage at user premises and at substation level, electric vehicles, innovative energy metering and energy routing technologies.

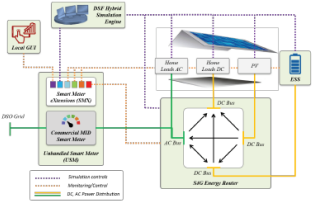
Use Cases and Scenarios for Storage System in future Smart Grid Solutions from the users' perspective



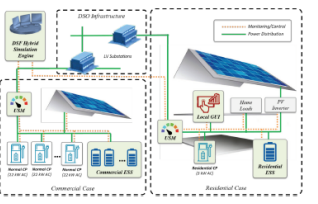
1 Advanced Cooperative Storage systems- Bucharest, Romania

2 Cooperative EV charging- Bolzano, Italy

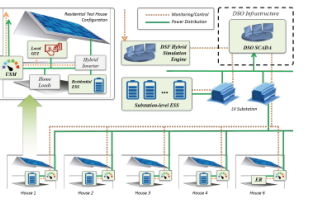
3 Storage Coordination- Fur/Skive, Denmark




- Advanced local hybrid AC/DC networks
- Higher energy efficiency, higher resilience
- Increased prosumer resilience and survivability
- Cooperative energy balancing within smart neighbourhoods




- Cooperative EV charging at high EV penetration, high share on RES
- Minimal or no reinforcement
- Scaling through DSF
- Dealing with congestion, power quality




- Combined ESS at end-user and grid level at highest RES production
- Avoid grid reinforcement when renewables are up to 100% in the LV grid
- Improve end-user efficiency and resilience











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www.storage4grid.eu



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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731155

Appendix E

Roll-up



WWW.STORAGE4GRID.EU

STORAGE4GRID

STORAGE4GRID (S4G) AIMS AT REDUCING ELECTRIC NETWORK REINFORCEMENT BY:

- ENABLING THE COORDINATION OF LOCAL GRID-CONNECTED AND MIXED ESS
- PROVIDING A NEW ICT FRAMEWORK FOR PLANNING AND OPTIMIZING ESS-BASED SERVICES

AIM + SCOPE

S4G PROVIDES METHODOLOGIES AND TOOLS FOR:

- MODELLING**
- PLANNING**
- OPERATING**
- EVALUATING**

distributed Energy Storage Systems (ESS) in conjunction with Innovative Energy Metering and Routing Systems, Renewable Energy Sources (RES), and Electrical Vehicles (EVs) charging

TEST SITES

1. ADVANCED COOPERATIVE STORAGE SYSTEMS [BUCHAREST]

Cooperative energy balancing within smart neighborhoods with advanced local hybrid AC/DC networks

2. COOPERATIVE EV CHARGING [BOLZANO]

Cooperative EV charging management and optimization

3. STORAGE COORDINATION [FUR/SKIVE]

Combined ESS at end-users and grid level management at high RES penetration

TECHNICAL OBJECTIVES

COMMON INFORMATION MODEL

Monitoring and control of heterogeneous ESS

PREDICTIVE CONTROL ALGORITHMS

Performing real-time optimization of distributed ESS and EVs charging

UNBUNDLED SMART METER

Enabling energy flow information and control

ENERGY ROUTER

Allowing AC/DC integration in a Smart Grid approach

DECISION-SUPPORT FRAMEWORK

Analyzing and planning distributed storage in the MV and LV grid

EVALUATION METHODOLOGY

Assessing the feasibility of solutions and the user acceptance

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 751155

CONTACTS

SITE: WWW.STORAGE4GRID.EU
 TWITTER: @STORAGE4GRID_EU

CONSORTIUM

Coordinator: **LINKS**

Fraunhofer **eniig** **edyna**

LITHIUM BALANCE **Li** **UNINOVA**

alperia **NEGY**

Appendix F Dissemination Activities Results

Table 3. S4G dissemination activities results.

Period	Activities	Target audience	Coverage	Objective, target and indicators	Results
By M3	Spread of project objectives awareness	Consortium partners	European	Fixing and tuning of project ideas raised at proposal level, including the long term dissemination plan review and release with a detailed timetable.	<ul style="list-style-type: none"> D7.1 [S4G-D7.1]
Periodical (M3, M18, M30)	ESG meeting	Consortium partners + ESG	European	To spread Storage4Grid vision and results in the ESG group, also involving them in a co-design and early validation of the Storage4Grid components.	<ul style="list-style-type: none"> M9 (D2.2 [S4G-D2.2]) M35 (S4G SharQ joint final event)
From M6 on	Mobilization with partners' associations and networking with other Associations	Stakeholders, Academia, General public	European, National, Local	Professional associations provide direct dissemination channels into the markets. Partners will directly mobilize their contacts at associations. Additional EU and national/local associations will be contacted.	<ul style="list-style-type: none"> Innovation and Networking Days 2018, 2019 Low-TRL clustering 2017, 2018, 2019 Standardisation activities
From M6 on	Dissemination material	Stakeholders, Academia, General public	European, National, Local	Tools and contents to present the project and its results (flyers, presentations, fact sheets). Electronic tools will be preferred to printed materials. The latter will be kept to minimum quantities (500 brochures printed and distributed at events).	<ul style="list-style-type: none"> Flyer (Appendix C) Presentation (Appendix B) Fact sheet
Periodical (M6, M12, M18, M24, M30, M36)	e-Newsletters	Stakeholders, Academia	European	e-Newsletters provide regular update on the Storage4Grid community about its progress. Distribution via email to registered users, the website, the	<ul style="list-style-type: none"> 6 Newsletters available in the S4G website

Period	Activities	Target audience	Coverage	Objective, target and indicators	Results
				partners' networks to a community of min. 200 people.	
M24, M36	Workshops and seminars (or webinars) for presentation of prototypes / Business cases / Demonstrators	Stakeholders, Academia	European, National, Local	The workshops will target a selected audience of stakeholders, including the ESG, highly interested in taking up the Storage4Grid developed solutions. Expected attendees per workshop: min. 20, per webinar: min 10.	<ul style="list-style-type: none"> S4G SharQ joint final event (M35) Dissemination events targeting the developed S4G solutions
M24	Training for professionals	Stakeholders, Academia, End users	European, National, Local	At least 2 training will be organized. Training material and an educational kit will be produced and distributed. Attendees at training sessions: at least 20 each session.	<ul style="list-style-type: none"> USM/SMX training provided by UPB
After M12, when concrete results are available	Participation in external Events	Stakeholders, Academia	European, National, Local	Partners' participation in conferences and fairs to represent the project and network with key players and adopters. At least 5 major events to be attended.	<ul style="list-style-type: none"> Conference: 32 Fairs: 2 Pitch Event: 1
After M12, when concrete results are available sessions:	Publications in technical literature and journals	Academia	Global, European	3 publications in conference proceedings and 3 article publications/papers targeting open access sustainable journal publications. Contributions to world-wide coverage Newsletters (example: IEEE Smart Grid Newsletters, IRENA).	<ul style="list-style-type: none"> Conference: 28 Journals: <ul style="list-style-type: none"> Open Access: 4 Others: 2
In the last period of the project	Organization of a Storage4Grid conference	Stakeholders, Academia	European, National, Local	The event will target the larger audience possibly made by stakeholders, including the ESG. Expected attendees: min. 80.	<ul style="list-style-type: none"> S4G SharQ joint final event (M35)

Period	Activities	Target audience	Coverage	Objective, target and indicators	Results
Throughout the project	Clustering activities	Stakeholders, Academia	European	Storage4Grid will link to other EU projects/initiatives for joint activities. Target: 2 joint events.	<ul style="list-style-type: none"> Low TRL clustering 2017, 2018, and 2019

Appendix G Communications Results

Table 4. S4G communications results.

Period	Activities	Target audience	Coverage	Objective, target and indicators	Results
By M3	Spread of communication needs and plan	Consortium partners	European	Long term communication plan review and release with a detailed timetable.	<ul style="list-style-type: none"> D7.1 [S4G-D7.1]
From M3 on	Social Media	Stakeholders, Academia, General public	Global, European	Storage4Grid presence on LinkedIn Groups and Twitter.	<ul style="list-style-type: none"> LinkedIn Groups: 12029575 Twitter: @storage4grid_eu
From M3 on	Storage4Grid Website lunch and period update	Stakeholders, Academia, General public	Global, European	Major R&D channel, reinforced by pointers in social media and cross-linking with the partners' webpages (with an established visibility towards thousands of users). Total expected visits: 15.000.	<ul style="list-style-type: none"> Number of visits: 15.500
From M3 on	Storage4Grid partners' Networks	Stakeholders, Academia, General public	Global, European, Local	Partners' existing communication channels and networks (such as newsletters, legacy websites and social media accounts) to disseminate Storage4Grid results. Outreach: 10.000.	<ul style="list-style-type: none"> https://linksfoundation.com/en/what-we-do/projects/ http://energy.uninova.pt/ongoingP.html http://microderlab.pub.ro/cercetare/storage4grid/ https://xolta.com/storage4grid/ https://www.fit.fraunhofer.de/en/fb/ucc/projects/storage4grid.html
From M12 on	Journalistic Articles, press releases and interviews	Stakeholders, Academia, General public	Global, European, Local	4 journalistic articles/interviews and to 4 press and news releases, to be distributed to major information multipliers, syndicated online press, and shared through social media. Languages: English,	<ul style="list-style-type: none"> Energi Press Release 2017 Fur Newsletters Alperia Group Annual report

Period	Activities	Target audience	Coverage	Objective, target and indicators	Results
				Danish, Italian, Portuguese and Romanian. Views: 30.000.	
M24	Short action video	Stakeholders, General public	Global, European, Local	Short project video in English to be published on the website and used in workshops, events and training sessions. Views: 5.000.	<ul style="list-style-type: none"> Dissemination video available in the S4G website
M24	Competition	Young professionals	European, Local	Video and infographic in English on the holistic value brought by the use of storage in LV networks.	UPB Competition 2018: Energy storage and its efficient use in systems operating at low voltage