



InduStry-acadeMia pArtnership for the design and implementation of an efficient, Reliable and secure smarT eNeRgY network

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Project partners:



Newsletter
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Issue Number 7

Issue highlights

SMART-NRG has been very active for the past six months, finalizing its technical contributions in terms of deliverables in WP5 and WP6 as well as in publishing high-quality scientific papers with the project results in top-level journals.

In this issue, find details about the public events that each partner has organized for 2017 (pages 2-3). In brief, UOA and WEST have presented the project's outcomes during the European Researchers' Night mega event in Athens and L'Aquila, respectively. UOA has participated in some additional public events, including participation to workshops of other Eu-funded projects with relevant context. Also, Dr. Nikos Passas has been keynote speaker for ongoing Marie Curie

Actions coordinated by Greek institutions at the prestigious special session for the celebration of 20 years of MSCA actions organized by the National Documentation Center of Greece in March 14, 2017. LINK has organized its 2017 public event together with the 13th multi-event conference "Innovation and Development", providing useful insights to other companies on potential benefits under the MSCA funding scheme. The researchers from each institute as well as the seconded fellows took part in these events, and had the opportunity to discuss their activities and the project's main results.

The SMART-NRG fellow MR. Prodromos Mekikis has also participated in the IoT Solutions World Congress in Barcelona (Oct.

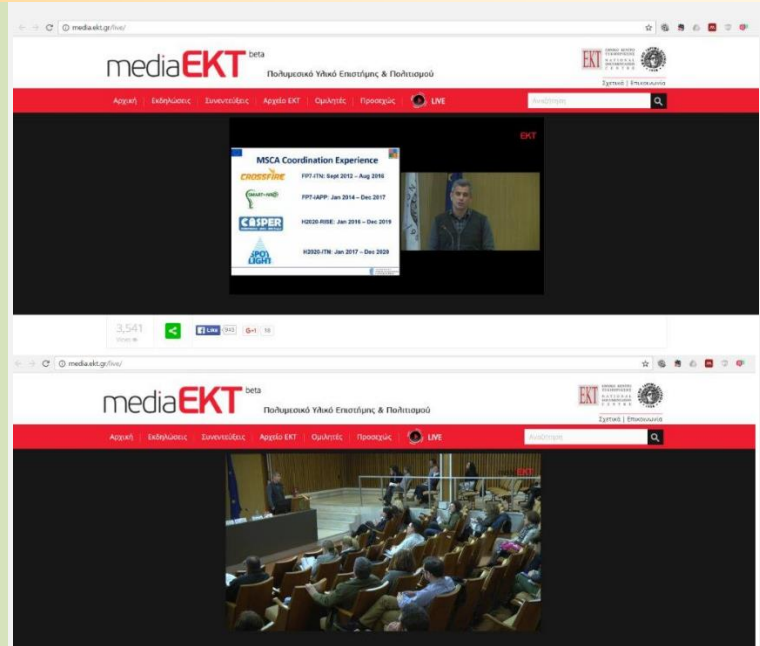
2017) presenting the energy management solutions developed under SMART-NRG programme (Page 4).

The end of this issue provides information on the first successful deployment of the SMART-NRG architecture in a smart energy management system that controls urban lighting around a Greek Orthodox Church in West Thessaloniki. The system has been connected to 52 interconnected street lamps, which are of a composite load / inductive loads. An overview of the special software developed to provide measurement and distant control of the hourly, daily, monthly and yearly consumption of the lightning system is also provided (Page 5).

SMART-NRG public events 2017

UOA has participated in different public events discussing the main scope and key findings of the SMART-NRG project and the Marie Curie Actions it participates in general. Dr. Passas has been a keynote speaker for ongoing Marie Curie Actions coordinated by Greek institutions at a special session for the celebration of 20 years of MSCA actions organized by the National Documentation Center of Greece in March 14, 2017. In this session, Dr. Passas shared his experience in the management and coordination of the FP7 IAPP SMART-NRG project presenting also the technical structure and main findings of the SMART-NRG programme. The session has been livestreamed through the Internet and received notable interest from both the local industry and academia that was interested in acquiring more information on the funding opportunities and ongoing projects under the MSCA scheme.

UOA has also given public talk on its main findings in a workshop organized by the EU-funded VIMSEN project, with relevant context on virtual microgrids for smart grid networks. Besides, the UOA team participated for the 3rd year in a row in the European Researcher's Night organized in Athens during September the 29th, 2017 at the National Technical University of Athens (NTUA).



Snapshots from Dr. Passas public talk for MSCA actions and SMART-NRG in the National Documentation Center of Greece



Public talk in the workshop organized by the EU-funded VIMSEN project



Dr. Xenakis (right) at the Marie Curie Researcher's Night 2017 in the SMART-NRG project desk



ΠΑΡΑΣΚΕΥΗ 29 ΣΕΠΤΕΜΒΡΙΟΥ 2017

SMART-NRG public events 2017

On the same day, **WEST** has organized its public event together with the Marie Curie Researcher's Night 2017 in L'Aquila (Sharper 2017), organized in September 29th of 2017. **WEST** has presented a poster at the Pop-Up of Research held in the Palazzo Camponeschi. 38 desks have been showcased by the UnivAQ researchers: bio-physicians, engineers, informatics, mathematicians and humanists, having offered scientific courses aimed both at an adult audience and at the youngest. In this event, the students of the High Schools winners of the "Researchers for a day" competition in the Abruzzo region were also present.



Dr. Tennina at the Sharper event 2017 in L'Aquila

LINK has organized its 2017 public event together with the 13th multi-event conference "Innovation and Development", presenting its plan for funding small startup companies in the broader area of Balkans and detailing the opportunities opened up for new companies under MSCA funding schemes such as the one of the SMART-NRG projects. A discussion on LINK's experience and expertise gained under the SMART-NRG project has also taken place, providing additional information on the upgrading of its equipment based on the research done under the SMART-NRG project. With more than 2,000 delegates throughout the day and 13,800 readers of the online issue of the conference, who watched live streaming, the 13th INNOVATION AND DEVELOPMENT multi-event conference organized the unique online channel for innovation, development and entrepreneurship on 4 November in Thessaloniki, Greece. More than 40 speakers, university professors, institutional actors, politicians, academics, students, entrepreneurs and start-ups participated in the public debate on the future of digital entrepreneurship.



LINK's 2017 public talk in the 13th multi-conference "Innovation and Development" in Thessaloniki

New publications

Journals

- G. Karopoulos, C. Ntantogian, C. Xenakis, MASKER: Masking for privacy-preserving aggregation in the smart grid ecosystem, In Computers & Security, Volume 73, March 2018, Pages 307-325, ISSN 0167-4048.
- P. V. Mekikis, A. Antonopoulos, E. Kartsakli, L. Alonso and C. Verikoukis, "Communication recovery with emergency aerial networks," in IEEE Transactions on Consumer Electronics, vol. 63, no. 3, pp. 291-299, Aug 2017.

SMART-NRG in IoT Solutions World Congress 2017

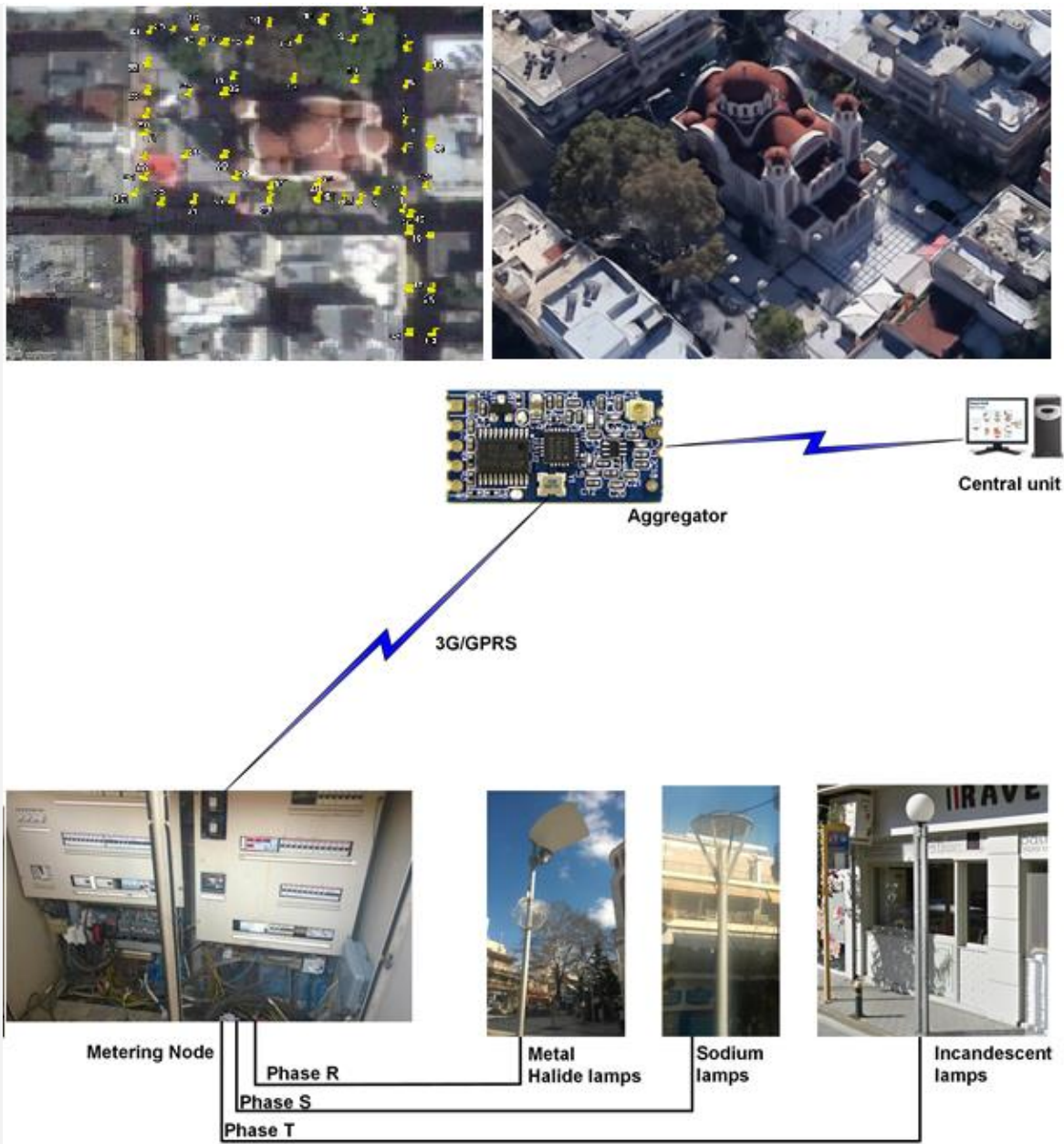
Prodromos-Vasileios Mekikis has participated in IoT Solutions World Congress Barcelona Spain 2017, which was held in 3rd October 2017 to 5th October 2017. The IoT Solutions World Congress is the leading international event that links the Internet of Things with industry. On its second edition (2017), the event has doubled the figures registered on its inaugural one, with 172 exhibiting companies and over 8,000 attendees from 70 countries. The intense activity registered during the three-day conference positions the IOTSWC16 as one of the major international platforms promoting this new technology in sectors such as Manufacturing, Healthcare, Energy & Utilities, Transportation & Logistics, and Innovation and Technology. The event was organized by Fira de Barcelona in partnership with the Industrial Internet Consortium, the Industrial IoT organization founded by AT&T, Cisco, General Electric, IBM, and Intel to bring together organizations and technology with the goal of accelerating the growth, adoption, and widespread use of industrial IoT. Mr. Mekikis has had the opportunity to present key results of the SMART-NRG project on energy management algorithms and results.



Mr. Mekikis presenting SMART-NRG solutions in the IoT Solutions World Congress 2017 in Barcelona

First SMART-NRG system deployment

The first SMART-NRG system deployment is a fact! During the second half of the project, partner LINK has installed a smart energy management system that controls urban lighting around the Greek Orthodox Church of Aghia Paraskeyi church in the municipality of Ampelokipoi-Menemeni (West Thessaloniki). The system aims to serve the need for more efficient and more structured management of the electricity network of Municipalities and Regions and need for improving the lighting quality of the communal areas and the economic efficiency for the benefit of the Region, the reduction of the expenses and the saving of resources for the respective Municipality - Region, the energy saving as well as the improvement of the ecological footprint of the respective area Municipality - Region. Among others, the system incorporates part of the advanced solutions developed in under the SMART-NRG project and provides real-life testing of the software and hardware equipment developed under the programme.

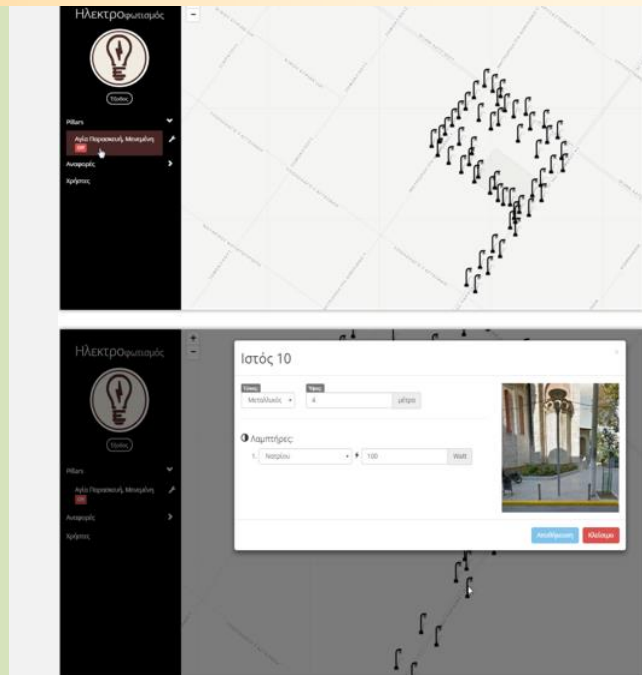


Lightning fixtures (Upper left), Aerial photo of the lightning layout (Upper right)
Schematic Diagram of the system setup (bottom)

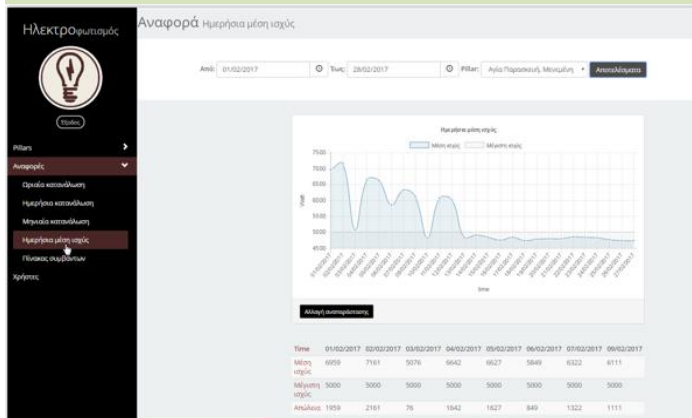
First SMART-NRG system deployment

The system has been connected to 52 interconnected street lamps, which are of a composite load / inductive load due to the presence of an electronic driver circuit. Two different types of street lamps were used, i.e. metallic light body, sodium light body. All street lamps were inventoried in terms of lamp type, power, and geographic location. The measurement node monitors the functionality of the street lamps (consumption, condition, electrical quantities) and sends all the data to the aggregator. The data is then checked, stored locally and forwarded to the central unit for further processing. The equipment has been installed in the power supply pylon where the system was connected to the electrical circuit.

The system allows the control of each street lamp individually, street light groups, or the entire network according to the requirements of the customer. Activation of the system can be done by a light sensor, or a calendar-based schedule, or based on more advanced algorithms such as the ones proposed by SMART-NRG.



LINK's energy management and remote control software



Ημερομηνία	Τύπος	Κατάσταση
08/02/2017 11:44	Χειροκίνητη αλλαγή	ON
08/02/2017 11:44	Χειροκίνητη αλλαγή	ON
08/02/2017 11:45	Χειροκίνητη αλλαγή	ON
08/02/2017 11:45	Χειροκίνητη αλλαγή	ON
08/02/2017 11:47	Χειροκίνητη αλλαγή	ON
08/02/2017 11:47	Χειροκίνητη αλλαγή	ON
08/02/2017 12:01	Χειροκίνητη αλλαγή	ON
08/02/2017 02:02	Χειροκίνητη αλλαγή	ON
08/02/2017 02:02	Χειροκίνητη αλλαγή	ON
08/02/2017 02:03	Χειροκίνητη αλλαγή	ON
08/02/2017 02:05	Χειροκίνητη αλλαγή	ON
08/02/2017 02:06	Χειροκίνητη αλλαγή	ON
08/02/2017 02:08	Χειροκίνητη αλλαγή	ON
08/02/2017 02:09	Χειροκίνητη αλλαγή	ON
08/02/2017 02:12	Χειροκίνητη αλλαγή	ON
08/02/2017 03:02	Χειροκίνητη αλλαγή	ON
10/02/2017 04:12	Χειροκίνητη αλλαγή	ON
10/02/2017 04:12	Χειροκίνητη αλλαγή	ON
13/02/2017 12:56	Χειροκίνητη αλλαγή	ON
13/02/2017 12:56	Χειροκίνητη αλλαγή	ON
13/02/2017 01:23	Χειροκίνητη αλλαγή	ON

Daily average power report and Event table layout

Special software has also been developed to provide measurement results in a user-friendly API on the hourly, daily, monthly and yearly consumption of the lighting system, providing additional flags and indications for potential malfunctioning of the system (i.e. event table). The software records all of the operating features such as hours, power, energy, and generates the following reports:

- 1) Hourly consumption. The "hourly consumption" option displays a graph of the hourly consumption of the day that the user chooses for a specific lighting system.
- 2) Daily consumption. A daily consumption graph is displayed within a selected month.
- 3) Monthly consumption. The system consumption for each month within a selected year.
- 4) Daily **average** power. The daily **average** power consumption for each day of an eligible time period
- 5) Event table. The event table contains the history of the opening / closing (ON / OFF) of the lighting system with information on the type of change, day, time, and change status.

Through the first deployment of the SMART-NRG system we were able to rationalize energy consumption of the street lights and efficiently manage faults and maintenance of all modules of the lighting network remotely.

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**We're on the Web!**

See us at:

<http://www.smart-nrg.net>

Closing of the project

This issue concludes the research and transfer of knowledge activities implemented under the FP7-IAPP SMART-NRG project.

Overall, the project has successfully met its original technical and training objectives, providing a total of 11 managerial and 11 high-quality technical deliverables, 16 conference papers in in top-level international conferences with big participation and international interest from the research/industrial community (e.g. IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, IEEE Global Communications Conference (Globecom), IEEE International Conference on Communications (ICC) and many others) and 7 scientific papers in peer-reviewed journals with very high impact factors, including the IEEE Transactions on Wireless Communications, IEEE Transactions on Consumer Electronics, IEEE Transactions on Communications, Elsevier Computer Networks and Computer Security. Among others, the project has also implemented a total of 21 secondment/recruitments and close to 286 person-months of research activity among the consortium as well as numerous other dissemination, public engagement and outreach activities with a notable impact on both the local and the worldwide scale.

The project coordinator, the project consortium and all the SMART-NRG fellows would like once again to acknowledge the funding received by the European Commission as part of the SMART-NRG project (FP7-PEOPLE-2013-IAPP Grant number 612294).

SMART-NRG in social media

SMART-NRG is present in:



Please follow [@smart_nrg](#) on Twitter and join "SMART-NRG" group in LinkedIn to keep up to date with the project progress!