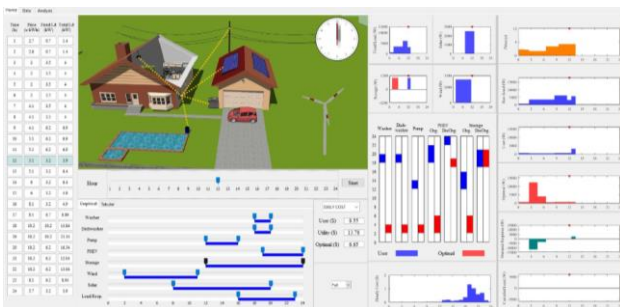# SMART-MLA

Multi-Layer Aggregator Solutions to Facilitate Optimum Demand Response and Grid Flexibility

A Layer-based solution for enhacing flexibility, from enlightening the costumer to becoming a role player in flexibility market

Main scope of SMART-MLA is to develop cloud-based multi-layer aggregator ICT solutions to facilitate optimum demand response (DR) and grid flexibility to energy systems to utilize up to 100% renewable energy. It is aimed to increase the awareness/involvement of consumers/communities on DR aggregating mechanisms in countries even where relevant legislation is still in process. SMART-MLA will demonstrate that at least one layer is applicable to any country regardless of the market structure. Integration of high volumes of intermittent generation and IoT appliances necessitates implementation of ICT based new technologies such as cloud computing, big data and block-chain to add value to DR and improve the grid flexibility (Energy Package 2015). According to the EC proposal for directive on common rules for the IEM, the community aggregators play an important role regarding DR. Therefore, the ICT solutions developed in SMART-MLA will allow customers to take advantages of aggregation.

Project Duration

01.11.2019-31.10.2021

Project Budget

Total Budget: € 2,012,359.00
Funding: € 1.398.449.00

Project Coordinator

EPRA (Turkey)

Project Partners

- EPRA (Turkey)
- AKEDAS DSO (Turkey)
- DTU (Denmark)
- KTH (Sweden)
- BUES (Romania)
- USN (Norway)
- Stima Soft (Romania)

Project Website

https://smart-mla.stimasoft.com/

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ERA-Net Smart Energy Systems

Main Objectives

Main objective of the project is to develop multi-layer aggregator solutions integrated into an informatics prototype in order to facilitate optimum DR and grid flexibility and contribute to 100% renewable source integration. Final goal is to enable all types of electricity consumers to have access to the energy markets to trade based on their flexibility. Objectives of the CA layers include: aggregating the flexibility from distributed energy assets; utilizing block-chain based smart contracts to enable interaction between internal energy assets and external flexibility markets; implementing of scheduling optimization to make e-mobility; to support real-time MLA concept. Objective of the Layer 3 is to develop a price-based self-scheduling optimization solution to determine optimal DR schedules for participants in day-ahead energy markets, integrating customer DR preferences and characteristics in the DSOs market clearing process. Testing and validating the prototype in TRL6 are among the objectives of the project. The feasibility of the project is facilitated mainly by our experience in interdisciplinary projects (ICT & energy), by the cohesion of the consortium members and the partnership with an aggregator and a DSO.

Main Results

The project will have a long-term impact for most stakeholders. Thus, prosumers will have increased incentives for a more active participation in the electricity market by trading local generation and flexibility, gaining an income and a lower bill through market mechanisms. Moreover, consumers will be encouraged economically to install local controllers to add flexibility to their current assets like water boilers, heat pumps and EV. SMART-MLA impacts for electricity consumers are also monetary savings, simply through shifting parts of consumption to low-tariff periods using flexible loads. The aforementioned savings come along with a supportive mechanism to reach EU climate objectives. Thus, on short term, SMART-MLA targets to reduce such discrepancies among countries based on adaptive DR mechanisms and replicate its benefits. For aggregators, the impact consists in new business models for DR and trading that can bring a competitive advantage over the shared market. Another stakeholder is DSO, which has to shift their passive to active operation model interacting with other stakeholders. TSO will also be influenced by Multi-layer aggregator because they improve overall system operation and increase the integration of intermittent RES. The consortium expects that the SMART-MLA implementation will result at least in 10% peak load reduction during the pilot phase. Finally, regulatory bodies and electricity exchanges will be impacted by the SMART-MLA. Regulatory entities will be informed by the insights gained on the emerging regulatory frameworks on market designs. New rules/legislation for stimulation and integration of storage device are needed. The export and replicability potential of SMART-MLA can be derived from the expected, massive impact of smart grid technologies in the United States.