Newsletter #4 – April 2021

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 824392.

Editorial

Hungarian demonstrations

Adam Toth
Leader of Hungarian Demonstrations (EON EED)

Welcome to IElectrix 4th newsletter.

Hungarian demonstrations are part of the well-designed IElectrix project's technical conpect. With 2 demonstration sites, 2 DSOs, E.ON EED and EDE are piloting a battery energy stoage system (BESS) and advanced direct load control (DLC) to test new innovative solutions and challenge the conventional network reinforcment.

IElectrix has 5 demonstrations in 4 countries, 1 demonstration in Germany led by E.DIS, 1 demo in Austria led by Energie Güssing, 1 demo in India led by the consortium leader Enedis in cooperation with Tata Power DD and we are responsible for 2 demonstrations in Hungary.

In order to proactively react and increase renewable hosting capacity and reduce voltage drop at the end of long overhead lines, we introduce these 2 innovative solutions. During high demand periods, BESS will be able to serve the grid, when it does not benefit from the positive effect of renewable generation, e.g.: in late afternoons.

Advanced DLC with appropriate control can contribute to grid operation by shifting the aggregated consumption from high demand periods to DLC and BESS strengthen each others positive effect.

We are proud to be part of IElectrix as we are developing solutions for the future to reduce GHG emission by allowing the connection of more renewable generation and having a more effective usage of the existing equipments and solution.

Our work package activities also involve to understand and know the customer behaviour on a new level towards innovative and sustainable solutions.It is important to have a common goal in the direction of a sustainable future.

With successful implementation of the new technology and with new on-field experience on operation and KPI measurements, this project results can be the foundation of future solution in Hungarian or I belive on European level.

I would like to say a big thank you for all the partners in IElectrix consortium and to everyone who supported our demonstration and all the activities in IElectrix, which gave us the chance to perform our tasks even in these difficult times.

Take care and stay healthy!

India Smart Utility Week (ISUW) 2021

02 – 05 March 2021

Online event

India SMART UTILITY Week 2021

Since 2015, the **India Smart Grid Forum** (ISGF) has been organising its flagship event, the **India Smart Utility Week** (ISUW). This annual event brings together India's leading Electricity, Gas and Water Utilities, Policy Makers, Regulators, Investors and world's top-notch Smart Energy Experts and Researchers to discuss trends, share best practices and showcase next generation technologies and products in smart energy and smart cities areas.

IElectrix's online booth

Despite the Covid-19 situation, the 2021 edition was maintained and conducted on a digital platform.
IElectrix, as an EU-Indian cooperation project, participated once again to ISUW with:

- An **online booth**, where visitors could discover the project through videos, flyers and posters.
- The presentation of a **technical paper** on Demand Response by Tanguy Choné.
- The participation to the **10th EU-India Workshop**, with a presentation by Pierre-Jacques Le Quellec

Tanguy CHONE (Odit-e) presenting a technical paper on demand response

BRIDGE General Assembly

02 – 04 March 2021

Online event

BRIDGE is a European Commission initiative, which unites Horizon 2020 Smart Grid, Energy Storage, Islands, and Digitalisation Projects to create a structured view of crosscutting issues, which are encountered in the demonstration projects and may constitute an obstacle to innovation.

The BRIDGE process fosters continuous knowledge sharing amongst projects thus allowing them to deliver conclusions and recommendations about the future exploitation of the project results. Four different Working Groups are organised around the main areas of interest and a project's representative is involved in each one of them:

- Data Management (RWTH Achen)
- Business Models (Enedis)
- Regulations (E.ON)
- Customer Engagement (EEE)

The 2021 BRIDGE General Assembly was held online from the 2nd to the 4th of March.

It was the occasion to present the latest activities by the BRIDGE Working Groups and Task Forces during the last period, discover the new BRIDGE projects and hear about the results and lessons learned from ended projects. Several parallel session were organised to strengthen the collaboration between projects and discuss about future BRIDGE topics in 2021. The IElectrix project took part to those parallel sessions to share its experience, achievements and perspectives on the different topics of the Working Groups.

The event attracted over 200 participants at the plenary session and around 70 participants at each parallel session that gathered the 59 ongoing BRIDGE projects. 23 new projects were presented and 3 finalised explained the lessons learned from their experience. The sessions covered the work made by the BRIDGE Task Forces and Working Groups on topics such as data management, regulation, consumer and citizen engagement and business models.

Flex 2.1 Webinar

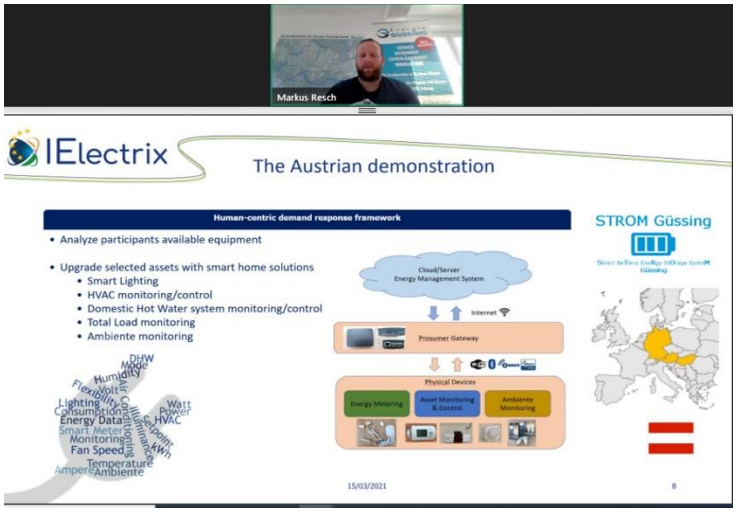
15 March 2021

Online event

As a follow-up to the workshop "*Flexibility 2.0*" that took place during the Sustainable Places 2020 event, a webinar entitled "*Flexibility 2.1: From Single-Building Demand Response to Local Energy Communities*" was organized on the 15th March. IElectrix participated alongside 14 other H2020 projects.

This public free live event aimed to bring together a wide range of H2020 projects that deal with Demand Response issues at different levels, in order to share each other's perspective and approach to the topic.

Each project had 10 minutes to present itself. Pierre-Jacques Le Quellec (Enedis) gave a general overview on IElectrix and Markus Resch (Energie Güssing) focused on STROM Güssing, the Austrian demonstration, and its Human-centric Demand Response Framework.



Markus RESCH presenting the Austrian demonstration

In Güssing, while there were no demand response framework, the STROM Güssing Team imagined and implemented all the process to involve the consumer in the project and provide flexibility to the system. Smartness of the network and tools are fundamental to ensure this challenge. This approach is fully aligned with the will to turn the consumer into prosumer and sensibilise them to the energy transition.

Helga - Progress on the DLC

Progress on the DLC subproject in the Hungarian demonstration site

The Hungarian demonstration (HELGA) has two locations each with similar direct load control related subprojects. Their main purpose is to improve customer comfort and consist of three phases. The 1st and the 2nd phase had been implemented by the end of 2020. The 3rd phase will have been finished until the end of April 2021.

In the **1st phase** the already existing, selected and controlled consumers have been devided into new control groups, which were created for the IElectrix project.
We also added a new control table optimized for the medium voltage line.
We were able to execute these tasks with a high percentage at the involved customers. In some cases the old type of devices had to be replaced.
The ratio of the successfully executed tasks among the selected consumers was 95 % in case of Zánka and 97 % in case of Dúzs.

In the **2nd phase** beside reprogramming the long wave radio control system recievers for the selected customers, both controlled and daily consumption meters were replaced by smart meters. Owing to the new meters it will be possible to analyze consumer habits.

By analyzing those, a more optimal control panel can be created which will benefit both the network operator and the consumer. We have been collecting data in quarter-hour breakdown from the installed meters since 1st January 2021.

The ratio of the successfully executed tasks among the selected consumers in Phase 2 was 95 % in case of Zánka and 92 % in case of Dúzs.

In the **3rd phase** we were able to control via a magnetic switch with a Smart meter equipped on the controlled circuit instead of the obsolate control devices (switchclock, ripple control reciever). Similar to Phase 2 the traditional consumption meters were replaced with Smart meters. In the concept, the controlled consumers can be operated with the help of a programmed tariff table inserted into the smart meter. This tariff table will be optimized and updated at regular intervals using a module, which is currently in design phase. Until the module is ready, the tariff table can be updated manually via Measurement Center. So any consumer complaints can be dealt quickly. Since this phase is in progress, we haven't had the final ratio of successfully executed tasks. We may declare it however, that 66 % of the selected consumers are alread involved in case of Zánka and 79 % in case of Dúzs.

Péter Papp
Project Owner (EON EED)

IElectrix demonstrators

HELGA

Demo in Hungary led by E.on EED

In April 2021, the second mobile battery energy storage system has been arrived at the Dúzs pilot site.
A new milestone was achieved regarding the Energy Management System as well: testing has been started. We are proud of this system, as not only the control but also the monitoring interface is also reached the next level with good quality.
You could read more about our Direct Load Control subproject and its status in this newsletter. One important highlight is that more than 300 load control devices have already been installed as part of the system.

Strom Güssing

Demo in Austria led by Energie Güssing

The current project period focuses on the implementation of the Use Cases in the Austrian Demo site. It not only represents the time of all ongoing installation work related to the Battery Energy Storage System, but also a phase where feedback on the planned project implementation is received during the Demand Response equipment installation and Smart Meter Roll-out in the power grid. This said, very high expectations are to be met in the upcoming phase of the project resulting in promising outputs to be presented in the next newsletters and project presentations.

Moew.e

Demo in Germany led by E.DIS

In this demo we want investigate the impact of the battery system in two technical use cases, namely congestion and voltage management and network stability. Therefore we operate a battery management algorithm with focus on congestion management, which is developed by our project partner. In the meanwhile we are developing an investment planning tool (IP-tool) in coopartion with spanish project partners to analyse the impact of battery system in postponing investment in network reinforcement measure and simultanously increase in the hosting capacity of renewables in Friedland.

SHAKTI

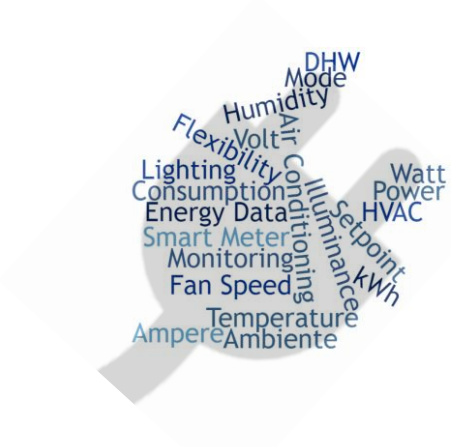
Demo in India led by Enedis

The manufacturing of the Smart Network Application (SNA) and smart devices for the Shakti demo is now over and the Factory Acceptance Tests (FATs) were conducted successfully. Following this important milestone, some of the equipment not tested at Concept Grid Lab was shipped to India and will arrive on site in June. Meanwhile, the testing phase was conducted at Concept Grid Lab, a dedicated facility to carry out physical integration tests on a real electrical network. This phase was crucial to ensure a good interoperability of the equipment and will contribute to a reliable and efficient installation and commissioning phase in India.

Focus: STROM Güssing – Demand response scheme

Introducing the Demand Response scheme in Güssing

As the Austrian demonstration sites main objectives for the IElectrix project implementation not only cover the installation of a large-scale Battery Energy Storage System, but also feature the implementation of a human-centric Demand Response framework, said framework is highlighted in the following.



In the demonstration area of Güssing no Demand Response framework was established prior to the project start. With that in mind, the first step towards the implementation comprised the analysis of potential customers, willing to participate, and the inspection and on-site analysis of potential assets to be included in the DR framework.

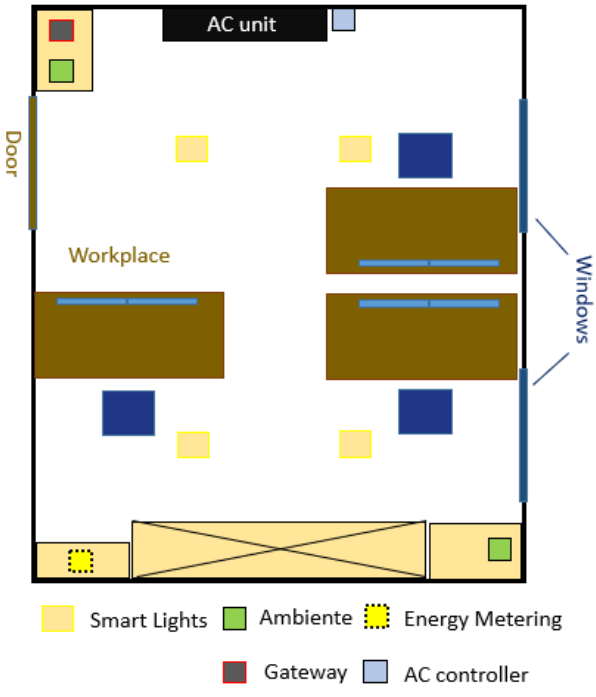
The assets inspected for the integration conclude to the following:

- Smart Lighting systems
- HVAC systems
- Domestic Hot Water systems

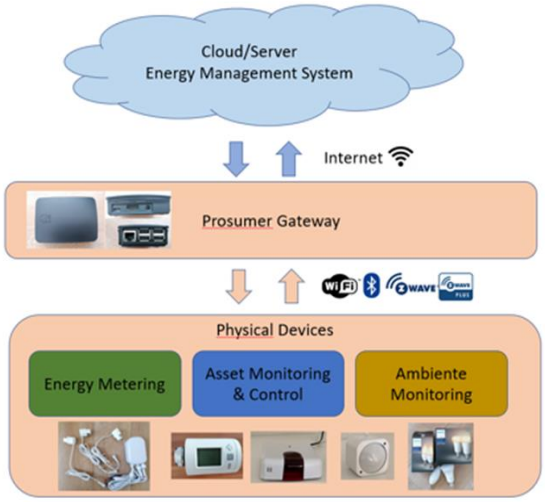
To enable the asset integration, standard light bulbs are upgraded to smart lights, while additional equipment to monitor and control the other assets remotely, is required, based on the specific conditions at the participants' premises.

As an example, on the right the sketch of an office workplace is shown where based on the infrastructure an air conditioning controller and additional smart lights are installed.

The monitoring of the workplace includes both the settings for the AC and the Smart Lights as well as the energy consumption of the same. Furthermore, ambient sensors are commissioned at the premises providing the base for participant specific comfort profile development of the preferred environmental conditions like illuminance and temperature.



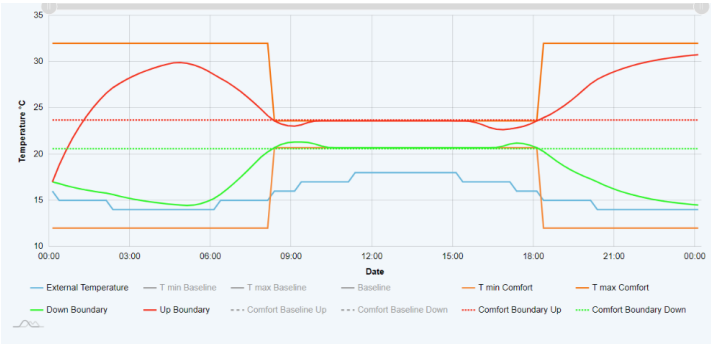
All physical devices are then linked to the so-called prosumer gateway, represented by a Raspberry Pi, and connected to the Energy Management System.



While the connection from the physical devices is set up via communication protocols like Bluetooth, WiFi and Z-Wave (Plus) utilising openHAB, the gateway itself directly connected to the internet and remotely accessible.

In a first step, the measured data from the single participants is gathered and analysed in order to establish flexibility profiles based on the participants behaviour in the initial “learning and analysis” – phase. On the one hand, the electric energy consumption and generation analysis of specific assets is utilised for the estimation of the controllable amount of electrical power. On the other hand, the corresponding ambient conditions are recorded and utilised for the creation of the participants personal comfort profiles, including both the thermal aspect as well as illuminance.

Based on these comfort profiles, boundary conditions for the control of the included smart assets are calculated. In this respect, the goal of the Demand Response framework implemented in the Austrian Demonstration is to utilise the available flexibility of the participants only within their acceptable comfort profile.



This approach increases not only the initial acceptance and willingness to participate in the framework, but also paves the path to long term contracts with the participants and ensuring the availability of a sufficient flexibility amount. Nevertheless, participants feeling uncomfortable with their participation, can pause or exit the framework at any time. The goal of enhancing the Demand Response scheme, in order to become an even more attractive and user friendly one, is supported by the continuous inclusion of the participants feedback on their experience gathered during the project duration. This is considered as one key factor distinguishing the IElectrix Demand Response framework from many other Demand Response applications.

As partners of the Austrian demonstration, all of us are looking forward into presenting the results of the demonstration activities regarding the implementation of Demand Response, performed during the next project year.

Markus Resch

IElectrix

Visit our website
www.ielectrix-h2020.eu

Follow us on Twitter
IElectrix_H2020

Mail us
Ielectrix.h2020@gmail.com

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 824392.