Newsletter #7 – March 2022

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Performance and Profitability Analysis of the Use Cases

Welcome to IElectrix 7th Newsletter!

IElectrix project is on its final straight and results are already showing that the studied assets are defining a new energy concept and market, especially for Local Energy Communities, since they are the perfect partner for DER, allowing to reduce grid failures locally, generation costs and to create new business models related to flexibility, where local energy prosumers can participate.

CIRCE, as work package leader, has been performing simulations for each demo site in order to study different use cases. This research takes advantage of the assets, allowing to improve grid stability, reduce voltage deviations and increase the share of renewable energy, and compares it to business-as-usual scenarios. The objective of the Cost-Benefit Analysis is to quantify if it is technical and economically feasible to implement innovative flexibility assets to defer planned grid reinforcements and obtain other revenue streams. The output is a decision maker instrument for DSOs that can help them to identify the best grid activities.

Luis Luengo
Impact and deployment analysis of the innovative solutions work package leader (CIRCE)

Distributed Generation is in constant growth and lately it has become hard to find electrical nodes to connect new power. Along with E.dis (German DSO), an Investment Planning Tool has been developed. This tool helps to evaluate, by a set of simulations, different points of the grid to find out the most suitable location to place Battery Energy Storage Systems to enable the addition of new generation plants, increasing the so-called Hosting Capacity. This will allow DSOs to have a better understanding of the grid and the potential of their assets, promoting the integration of renewable energy.

It is very exciting to see that after over 20 months of intensive work, results show that technical innovations as storage systems or demand load control strategies are feasible. They contribute to electrical systems' flexibility, representing real local solutions to centralized energy model problems, as well as new business models for DSOs and prosumers.

Enjoy your reading!

IElectrix presentation - St. Xavier's School

18 November 2021

Delhi - India

On Thursday 18th of November 2021, Abhinav Pal (Tata Power-DDL CEO technical assistant) and Robin Croutz, (Enedis local project coordinator) presented the IElectrix project to the students of St. Xavier School in Delhi, the location of the Indian smart grid demonstration.

Completed by a presentation of the Tata Power-DDL's activities, this event was an opportunity for the students to understand the role of solar panels in the energy transition and the related importance of bringing flexibilities to the electricity grid.

16th Technical Committee

10-11 November 2021

Physical Event – Güssing, Austria

After a successful Hungarian demo inauguration event in summer 2021, IElectrix face-to-face meetings took over again.

From the 10th to the 11th of November a part of the Technical Committee members travelled to the municipality of Güssing in Austria, where the STROM Güssing pilot is being implemented.

As usual during the Technical Committee no 16 the partners presented the progress of each project work package. Moreover, this was a great occasion to visit the STROM Güssing pilot site as well as to discover the several energy transition initiatives already implemented in the municipality which is recognized as a European reference in terms of energy self-sufficiency.

Some key projects worth mentioning are:

- The implementation of a biomass power plant and district heating infrastructure.
- The construction of a bio-diesel site based on rapeseed oil has been constructed.

IElectrix STROM Güssing demonstration project contributes actively to the municipality energy engagements by testing an innovative solution based on a battery storage system that will add resilience to the electric network in a context of high renewable energy penetration.

Enlit Europe 2021

30 November – 1st and 2nd December 2021

Hybrid event – Milan, Italy

IElectrix was present at Enlit Europe 2021, the new unifying brand for the European Utility Week & Powergen Europe, which took place in Milan from the 30th of November to the 2nd of December 2021. Enlit is a major event for the smart utility sector to showcase expert knowledge and innovative solutions to achieve a low carbon energy transition. During these intensive three days, the project team actively acted to promote IElectrix objectives and solutions.

Despite the complicated sanitary situation, the 2021 edition of Enlit was held in Milan under very good conditions: IElectrix had its own booth in the "EU projects zone" endorsed by the European Commission. People from all over the world (both professional and institutional actors) showed a wide interest in IElectrix and in the business model the project could lead to.

Gemira Martinez, IElectrix Project Management Officer, was there to present the project and to answer questions and requests from visitors.

IElectrix demonstrators

HELGA

Demo in Hungary led by E.on EED

The energy storage operational experience at Zánka and Dúzs are continually growing, giving us the necessary feedback on the key performance indicator of the project demonstration pilots. Relentlessly testing how to create more effective day-to-day operation, the team is developing a new control algorithm which would assure the smoothest run of the sites. All the use cases are running since last year, which also means that the advanced Direct Load Control system operates in the connected regions. As the next step we are working on to refine the control system, driving the whole project to a higher level. Moreover as planned, we are going to provide a public monitoring platform to connect all of you with the results, making an impact that matters for everybody.

Strom Güssing

Demo in Austria led by FIB (Wirtschaftsagentur Burgenland Forschungs und Innovations GmbH)

Important progress was achieved by the Austrian Demonstration STROM Güssing for the implementation of the Demand Response program.

The installation and commissioning of smart home measuring and control edge devices for the collection and transmission of data used for the development of context-aware flexibility profiles and the execution of DR requests was finalised at the participant households.

Moew.e

Demo in Germany led by E.DIS

E.DIS performed several field tests in winter to compare the results with those from the summer. The goal of these tests is to investigate the effectiveness of the battery on the grid in different conditions.
The development of the Investment Planning (IP) tool is now at an advanced stage. CIRCE is developing this tool to demonstrate the usefulness of the battery in increasing the hosting capacity in various grid nodes, which supports DSOs in finding the best location for a BESS. For more information please read the 4th IElectrix newsletter.

SHAKTI

Demo in India led by Enedis

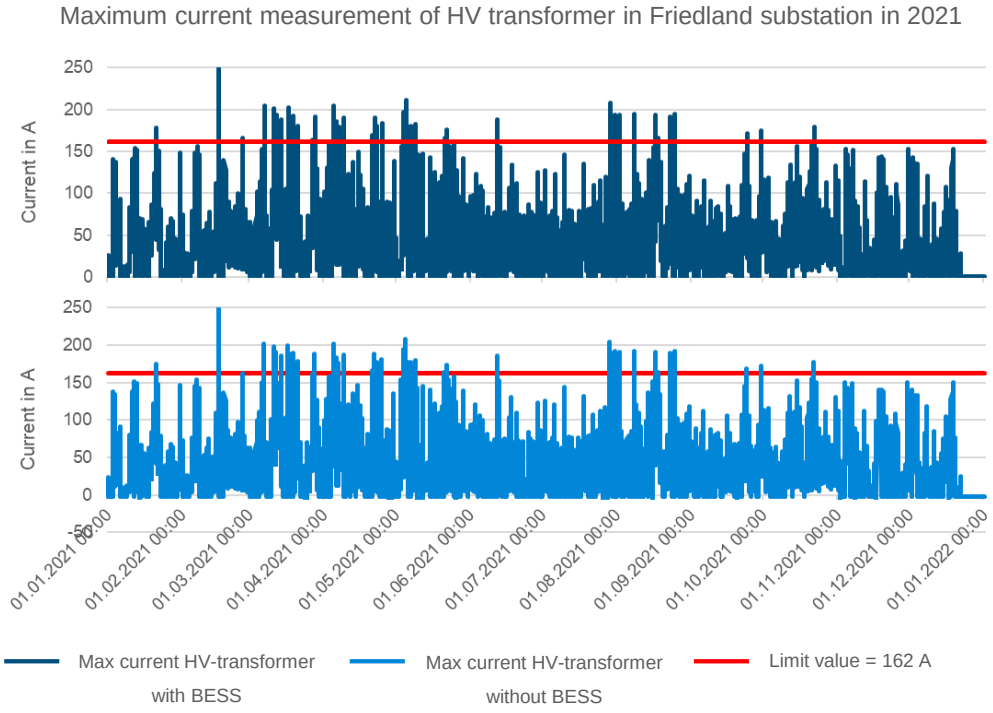
Following the improvement of the Covid-19 situation in India, European partners of the Shakti Demo were able to flight to Delhi in November 2021 for a two week on site mission.

During this trip Schneider Electric, Enedis and Tata Power-DDL were able to finalise the installation of the pilot equipment, namely the MV/LV OLTC smart transformer, the BESS and the LV ECC switchboard.Next step will be the commissioning phase which aims at assuring that all systems and components are designed, installed and tested according to the operational requirements defined at the beginning of the project.

Focus: Moew.e demonstration

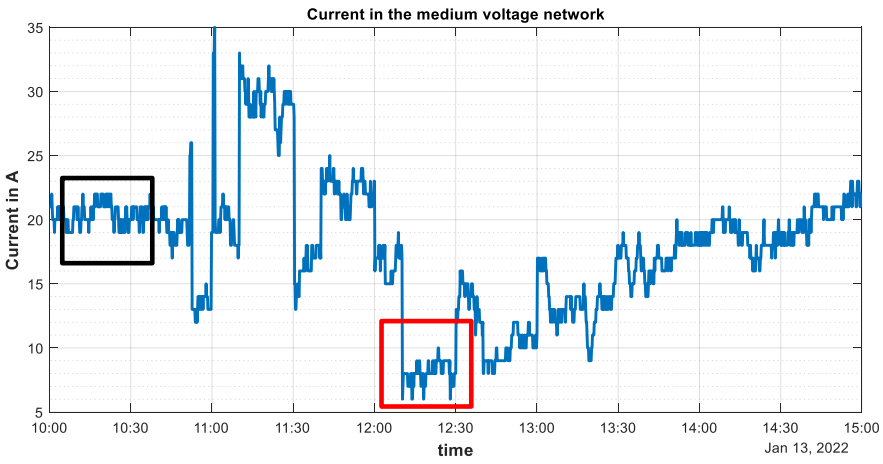
BESS can support the reduction of grid overloads

Friedland is constantly affected by high feed-in capacities due to the high installed capacity of regenerative generator systems (>110 MW).
Due to high volatility of RES temporarily the network equipment, particularly the sub-stations with high summed power, are reaching their limits. Bottlenecks result in damaging and altering grid equipment.
The Friedland substation serves as an intersection for the local medium-voltage and regional high-voltage grid. During the winter test, we noticed the number of overloads can be reduced by approx. 10%. The overload happens when the 162 A limit for HV transformer (40 MVA) is reached. This reduction is due to the current reduction of approximately 10 A in MV and 1.28 A in HV grid based on our winter measurement. In low feed-in situation the number of overloads for the HV-transformer in 2021 could be reduced from 240 (upper plot) to 216 (lower plot). For this reduction BESS must operate with maximum effect to have a demonstrable effect on the bottleneck.

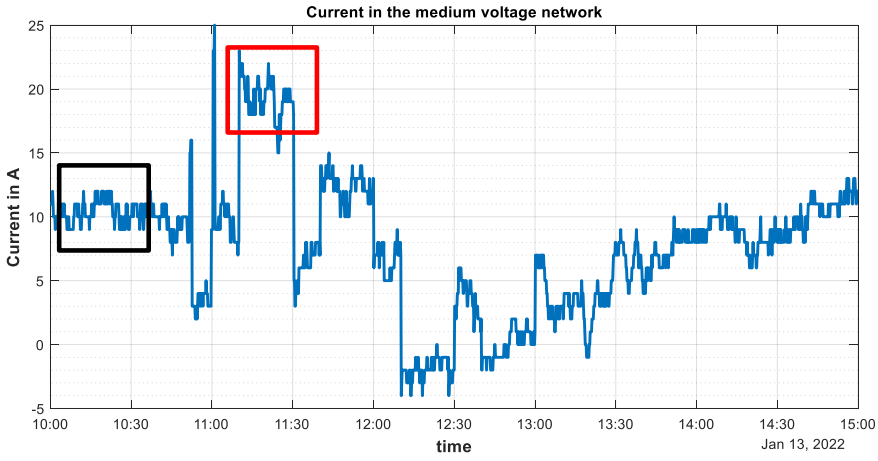


BESS can support the reduction of the network losses in grid.

Ohmics losses in the network are mainly caused by the currents in the network. Through the usage of BESS these losses can be reduced. However, to get the benefit of the BESS regarding the losses the battery has to be operated in certain manner.
In its normal operation, the Moew.e BESS will charge in the morning hours where the feedback current is high, and it will discharge the stored energy in the night when the current is low.
The following plot shows the medium voltage current network during testing phases. Ten minutes interval (the black window shown in the graph) was considered as reference interval to evaluate the influence of the BESS. The BESS would then start its discharging process after a while which is shown by means of the red window in the plot. This will lead to a decrease in the network losses as it obviously decreased the current.



However, the next plot shows the network losses increase as the stored energy has to be released and fed back into the grid. This will occur in a time when the current isn't high, thus, that the additionally generated losses are less than the reduced losses in loading period.
Ultimately, the network losses, when considering the charging and discharging periods, will decrease by 16%.



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