

20/12/2019

Newsletter #12

The latest news from the InterFlex project

Editorial - A look back and a glimpse into the future	Introductory words from Christian Dumbs, Enedis, InterFlex Project Coordinator
A final chapter and a new beginning	The InterFlex Closing event took place on 28 Nov. 2019 in Paris, reuniting the InterFlex community once again
The German Demo - Empowering customers through the Smart Meter	Looking back at the German demo: What sources does flexibility come from, what benefit can we expect from it, how do customers appreciate the concept?
The Czech Demo - Increase of the DER hosting capacity	The Czech demo and the Czech DSO's preparations for the future expected development of renewables and EV charging stations in the Czech Republic
The French Demo: Taking the e-mobility turn	As part of the French demo, the company NICE MATIN operates electric vehicles that can adapt to the needs of the electric power system



EDITORIAL

A look back and a glimpse into the future

As the year comes to an end, it is time to look back on the work that has been carried out so far, and to look ahead in order to see what is yet to come. This applies particularly to InterFlex as a whole, as the project is heading towards its conclusion after three years full of lively discussions, exciting works and remarkable achievements.

The energy sector is looking at a historic opportunity.

Decentralization, decarbonisation and digitalisation can help us build a cross-sectoral energy system that empowers customers and reduces geopolitical dependencies. By seizing this opportunity, the energy industry can reinvent its business models and operational practices and stay on top of tomorrow's challenges.



Meanwhile, we are facing a number of hurdles, such as regulatory instability, operational inertia, lack of coordination or insufficient policy updates. Those obstacles could lead to sub-optimal developments or even block the potential of new business ideas or technical innovations.

That is why it is so important to keep up the dialogue among regulation, technology and business players - and to disseminate new insights and innovations. In order to address these challenges, the InterFlex project consortium investigated a wide range of innovations to procure and use flexibilities for the local benefit of the distribution grid.

But InterFlex did not only provide technical achievements and new solutions. It also showed that fruitful cooperation between different players across Europe can be a significant boost for innovation, and a powerful means for sharing experiences and building long-lasting partnerships.

The end of InterFlex is only the end of one chapter. It's the moment to acknowledge once more the EU support and to say thank you to a great project consortium!

By Christian Dumbs, Enedis InterFlex Project Coordinator

INTERFLEX CLOSING EVENT: A FINAL CHAPTER AND A NEW BEGINNING

The closing ceremony of the InterFlex project took place in Paris on the 28th of November, 2019. It was an opportunity for the InterFlex community and all partners to get together and share the results achieved during the 3 year project duration.

The event gathered more than 100 participants from across the European energy sector. Stakeholders from various backgrounds, including the European Commission, European DSOs, regulators, aggregators, equipment manufacturers and research institutions shared their thoughts and experiences. They had a vivid discussion on the innovations that may lead the way towards tomorrow's energy system.

For a glimpse of the atmosphere, take a look at the video captured during the closing event: <u>https://vimeo.com/378267731</u>

"InterFlex is one of the most important European projects Enedis has been involved in. The project's works will provide a significant contribution to the evolving energy sector in Europe" said Philippe Monloubou, CEO of Enedis.

During the ceremony, the InterFlex consortium also released its Project Summary brochure, with a focus on the project's five innovation streams:

- Local Flexibility Markets
- Demand Response & Customer Empowerment
- Smart Functions & Grid Automation
- Cross Energy Carrier Synergies
- Multi-Service Storage & Islanding

The brochure presents the main achievements, challenges and recommendations formulated by the project members. It can be downloaded from the InterFlex website, <u>https://interflex-h2020.com.</u>

Two complementary videos show the work of the different demonstrators and work packages in more detail: <u>https://interflex-h2020.com/interflex/context-objectives/</u>

As agreed by many of the participants at the event, the outcomes of InterFlex are encouraging and will be a very useful input for the next steps towards the energy system of the future.



THE GERMAN DEMO - EMPOWERING CUSTOMERS THROUGH THE SMART METER

When we designed the German Demonstrator of InterFlex, we were curious about flexibility. Where does it come from, what benefit can we expect from it, how do customers appreciate the concept? We made it our mission to create a concept that builds upon the latest developments in the German energy market, namely the Smart Meter.

Looking at our networks we realized early that there was tremendous potential for flexibility in the low voltage network. Customers had rooftop-PV at their disposal, were operating heat pumps and electric storage heaters, some even had a battery or electric vehicle. We were not only surprised by the variety of potential flexibility but also by the encouraging level of interest from potential pilot customers. Our ambition was to connect up to 200 customers, more than 360 potential candidates responded to our invitation to participate. In the end,

only about 80 of those could be connected, while we had to turn down the rest for one reason or another. A key learning here was that coverage with 4G mobile data network, our communication channel to customers, was hardly sufficient in rural Germany.

Before we could onboard our pilot customers, we first had to figure out what no one else had done before in Germany: to build a system that could interact with the national Smart Meter framework on one side and be part of a DSO's grid operation on the other.



The result is what we now call the Smart Grid Hub, which sits firmly in the SCADA / ADMSenvironment but is fully compliant with the cyber security guidelines to operate on the certified smart meter. It allows the DSO to directly pull data from the customer's meter and steer flexible devices behind the meter, through the meter. Once the smart meter rollout is underway, this technology will enable the DSO to seamlessly scale novel grid control strategies along with the penetration of smart meters.

Following more than a decade of fast growth of renewables, Germany frequently faces grid congestion. DSOs and TSOs alike encounter critical situations that call for the curtailment of generation as a last resort. Smaller generators were previously controlled via a broadcasting technology, that neither offered a backchannel to confirm the signal acceptance nor had the ability to control single units. One signal for all, and hope for the best. Thanks to the Smart Grid Hub and InterFlex, it is possible now to control generators individually and confirm the action via near-realtime meter data. This makes the inevitable curtailment process more precise and effective and it allows the DSO to identify faulty installations and unsuccessful control signals.



In the segment of flexible loads, we found that DSOs do have a significant amount of dormant flexibility at their disposal. Heat pumps and storage heaters today can take advantage of a reduced grid charge in exchange for making their device controllable for the DSO. In reality, DSOs lack the technology to make proper use of this flexibility. Just like the curtailment process, broadcasting and ripple control technology has prevented dynamic switching and active use of this flexibility. The Smart Grid Hub enables novel use cases to discriminate control signals per location, type of device or time of day. It allows the DSO to employ dynamic switching schedules to optimize operations, to increase the share of renewables in the network or to react to critical situations in the network.

As InterFlex comes to an end, we are left with the confirmation that the Smart Meter can be of tremendous benefit for the DSO if it is coupled with a control device that enables DSOs to activate hitherto dormant flexibility. We showed that by embracing the new technology and employing new concepts in grid operation, DSOs can increase the share of renewables, reduce operation costs and empower customers to play a more active role in the energy system.

THE CZECH INTERFLEX DEMONSTRATOR - INCREASE OF THE DER HOSTING CAPACITY

CEZ Distribuce as a European Distribution System Operator (DSO) with more than 3.6 mil. customers has to be prepared for the future expected development of renewables and EV charging stations in the Czech Republic. The official government document called Czech National Action Plan for Smart Grids published in 2015 by the Czech Ministry of Industry and Trade presents a reference scenario of the future expected development of renewables

where PV installations have a major share. In order to find a cost-effective solution for renewables integration, reliability of power supply and power quality for customers, CEZ Distribuce focused during the InterFlex project on testing innovative smart solutions which have a strong potential for large-scale development.

The Czech demonstration project was located in several areas in the northern part of the Czech Republic where CEZ Distribuce operates its distribution grids. The



Interplex

demonstration was not focused only on one area in order to prove replicability and interoperability of the designed solutions, and was divided into 4 use cases:

- 1) UC1: Increase hosting capacity for renewables in LV distribution grids by smart PV inverters equipped with autonomous Q (V) and P (V) function
- 2) UC2: Increase hosting capacity for renewables in MV grids by Volt/VAr control (control of reactive power based on voltage set points)
- 3) UC3: Smart EV charging (autonomous charging power curtailment in case of under voltage or under frequency)
- 4) UC4: Smart energy storage (autonomous discharging of batteries in case of under voltage or under frequency)

The demo focused on the implementation of solutions which are so far not usual in the Czech distribution grids but which have a strong potential for future roll out. Tested solutions covered the most urgent challenges of DSOs - increasing renewables hosting capacity, EV charging stations implementation and energy storage. Beyond the technical developments, the demonstrations also propose grid codes and standards updates in order to secure future smoother integration of selected smart grid solutions. The demonstration confirmed the expectation in terms of increasing of DER hosting capacity in LV and MV grids, and showed the successful implementation of Smart EV charging functions and Smart energy storage concepts, while demonstrating their potential for increasing the flexibility in distribution grids. Based on the project's KPI evaluation, the DER hosting capacity in LV grids in the Czech demonstration areas was increased up to 76 %, and the DER hosting capacity in MV grids was increased up to 92 % with very low costs for the DSO and DER owners.

NICE MATIN: TAKING THE E-MOBILITY TURN

As part of the French InterFlex demonstrator Nice Smart Valley, the company NICE MATIN, supported by the EDF Group, operates a fleet of electric vehicles since October 4th and until the end of the year, while adapting to the needs of the electric power system.

Indeed, NICE MATIN joined Nice Smart Valley and the low-carbon mobility through DREEV, the joint venture between EDF and California start-up Nuvve, when implementing two innovative bi-directional charging stations and two electric vehicles. The goal within the project is to explore how the fleet can become an active asset for the energy system of tomorrow.



Beyond the intelligent charging of electric cars at the most suitable times of the day and according to the customer's itinerary planning, the energy accumulated in the batteries of electric vehicles can also be used to supply energy to the NICE MATIN building, or to the public electric system, when needed. This is called the Vehicle-To-X concept (V2X). What does Vehicle-to-X mean? Indeed, X stands for Grid, Home or Building, depending on the nature of the customer's consumption. The concept is simple: it is about the energy flowing from the electric system to the vehicle as well as from the vehicle to the electric system.

More generally, the electric vehicle, primarily dedicated to mobility needs, becomes, thanks to its battery, an asset that can serve the electric system.

Cost efficient for the customer, low-carbon for the planet and optimal for the electric power system, V2X holds the promise of a technological breakthrough at the crossroads of transportation and energy issues, and it is a real sign of investment into a sustainable future energy system.

Thank you very much for your interest in our project

The entire InterFlex team wishes you a very merry end of the year



This is the end of our 12th Newsletter.

Do not forget to visit our website: http://interflex-h2020.com/

And to stay tuned by following us on twitter: https://twitter.com/InterFlex_H2020

Editor and newsletter manager: Jannis Bürger, Enedis



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n°731289