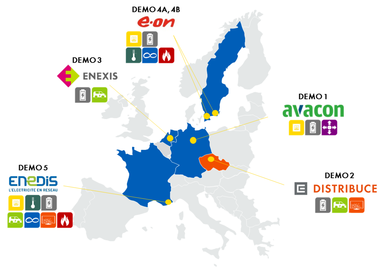
DEMO 2 – CZECH REPUBLIC

INTERACTIONS BETWEEN AUTOMATED ENERGY SYSTEMS AND FLEXIBILITIES BROUGHT BY ENERGY MARKET PLAYERS

2017 – 2019

Co-funded by the Horizon 2020 Framework Programme of the European Union



PROJECT TEAM

DISTRIBUCE

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY · Fronius · SIEMENS · Life Is On Schneider Electric · ČEZ SOLÁRNÍ

GOALS

- **Integration of PVs** with smart inverters: volt-var and volt-watt control functions
- **Volt-var control of DER** in MV network: PV, Wind, CHP, hydro
- Development of **smart EV charging stations**
- Integration of **PVs with energy storage** (batteries)

TASKS

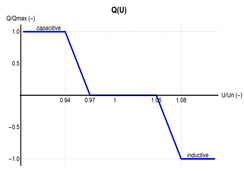
- The project aims to **demonstrate functions** before those become business as usual
- The overall goal is to **increase DER hosting capacity** and integrate **EVs** smoothly

InterFlex, Demo 2 areas in the Czech Republic

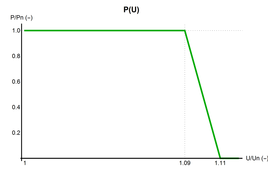
DEMO 2 USE CASES

USE CASE 1: INCREASE DER HOSTING CAPACITY OF LV DISTRIBUTION NETWORKS BY SMART PV INVERTERS

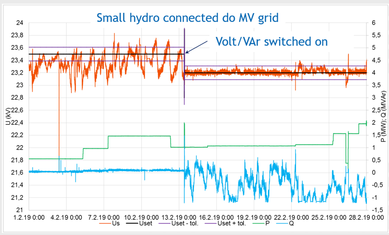
- **Smart PV inverters** equipped with Q(U) and P(U) functions allow increasing of DER hosting capacity
- **Q(U) and P(U) functions** work autonomously without the need of communication towards DSO
- **CEZ Distribuce** allows connection of more PVs in **2 areas**
- Based on results, CEZ Distribuce proposed **grid code update** (calculation for DER hosting capacity in LV grids) in order to allow more connections of DER which are equipped with **Q(U) and P(U) functions**



Use Case1: Example of Q(U) function



Use Case1: Example of P(U) function



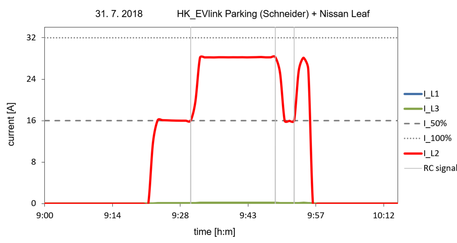
Use Case 2: Example of volt-var control function of DER in MV grid

USE CASE 2: INCREASE DER HOSTING CAPACITY IN MV NETWORKS BY VOLT-VAR CONTROL

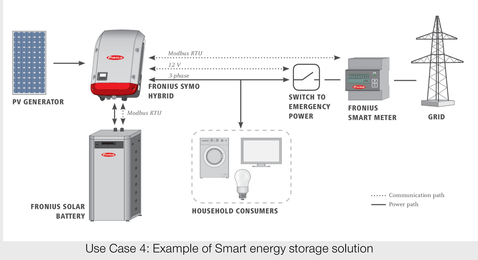
- **Existing DERs** (PV 1,1 MW, Wind 4,6 MW, CHP 4,0 MW and small hydro 6,4 MW and 3,1 MW) connected to the MV grid were retrofitted with **volt-var control system**
- DERs receives **voltage set points** from DSO's DMS and regulate reactive power generation in order to stabilize the voltage
- Based on results, CEZ Distribuce proposed **grid code update** (calculation for DER hosting capacity in MV grids) in order to allow **more connection of DER with volt-var control system**

USE CASE 3: SMART EV CHARGING

- **EV charging stations** equipped with smart functions for securing smoother integration into the existing d\istribution networks
- Charging stations power output is **limited to 50%** in case of **under frequency, under voltage or in case of receiving signal** from CEZ Distribuce (through one way simple PLC communication)
- **Power quality** during EV charging was investigated (some of existing EVs could be equipped with **single phase AC chargers** with power over 3,7kW = risk of voltage unbalance). Proposals for **EN 61851 standard** modification are expected at CENELEC level



Use Case 3: Example of EV charging power control via one way simple PLC communication



Use Case 4: Example of Smart energy storage solution

USE CASE 4: SMART ENERGY STORAGE

- **Smart hybrid PV inverters + home energy storage** (batteries) allow increasing of DER hosting capacity
- **Energy storage** provides power to the distribution network in case of **under frequency, under voltage or in case of receiving signal** from CEZ Distribuce (through one way simple PLC)
- **Limitation of PV feed-in power** into the distribution network to 50% of PV installed capacity thanks to the external meter and **home energy storage**

DEMO 2: INCREASED DER HOSTING CAPACITY