Innovation type:
Test framework

TRL: 5-6

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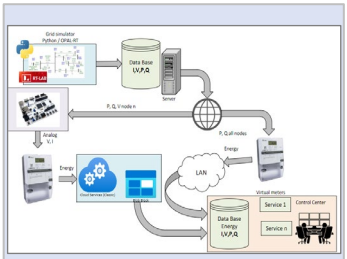
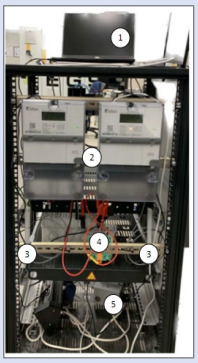
Target group:

Actor/ purpose	x
DSO, TSO	
Technology provider	X
Member organisation	
Market operator	
Research/ Consultancy	X
Teaching	



Platform configuration



Cyber-physical laboratory setup

HIL platform based on Smart Meters for ADMS

Challenge

To integrate smart meters in new Control Centre (CC) tasks. Currently the main use of smart meters is only in the billing task of DSOs. Smart meters are used to prepare the invoice to the distribution system customers. The aim is to study how smart meters can be used on advance distribution management systems (ADMS) at the DSO's control centre.

Solution

To develop of a hardware-in-the-loop (HIL) laboratory setup with the smart meters. The smart meters have been customized to get sinusoidal signals from a custom-made signal generator. The signal generator is based on System on Chip (SOC) and Field Programmable Gate Array (FPGA) board. This solution enables long term tests in the setup. It is possible to develop test of weeks or months in the setup. Data from smart meters is collected with time-stamp at Aidon's cloud service. This data can be downloaded by the DSO's CC. The initial tests have been demonstrated how data from the setup is applied on topology identification of distribution electric power grids.

Potential

This setup can be used to demonstrate the impact and benefits of introducing the measurements of smart meters in the operator's control centre.
The platform can be used to generate training data for ADMS to support distribution system operators for improving distribution power systems monitoring and control.

Reference in CINELDI

- CINELDI WP2 Task 2.20
- S. Sanchez-Acevedo, R. E. Torres-Olguin, K. Ljøkelsøy and T. Gundersen: "Hardware-in-the-Loop platform based on Smart Meters for Demonstrating Advanced Distribution Management Systems", 2024 6th Global Power, Energy and Communication Conference (GPECOM), Budapest, Hungary, 2024, pp. 606-611.