

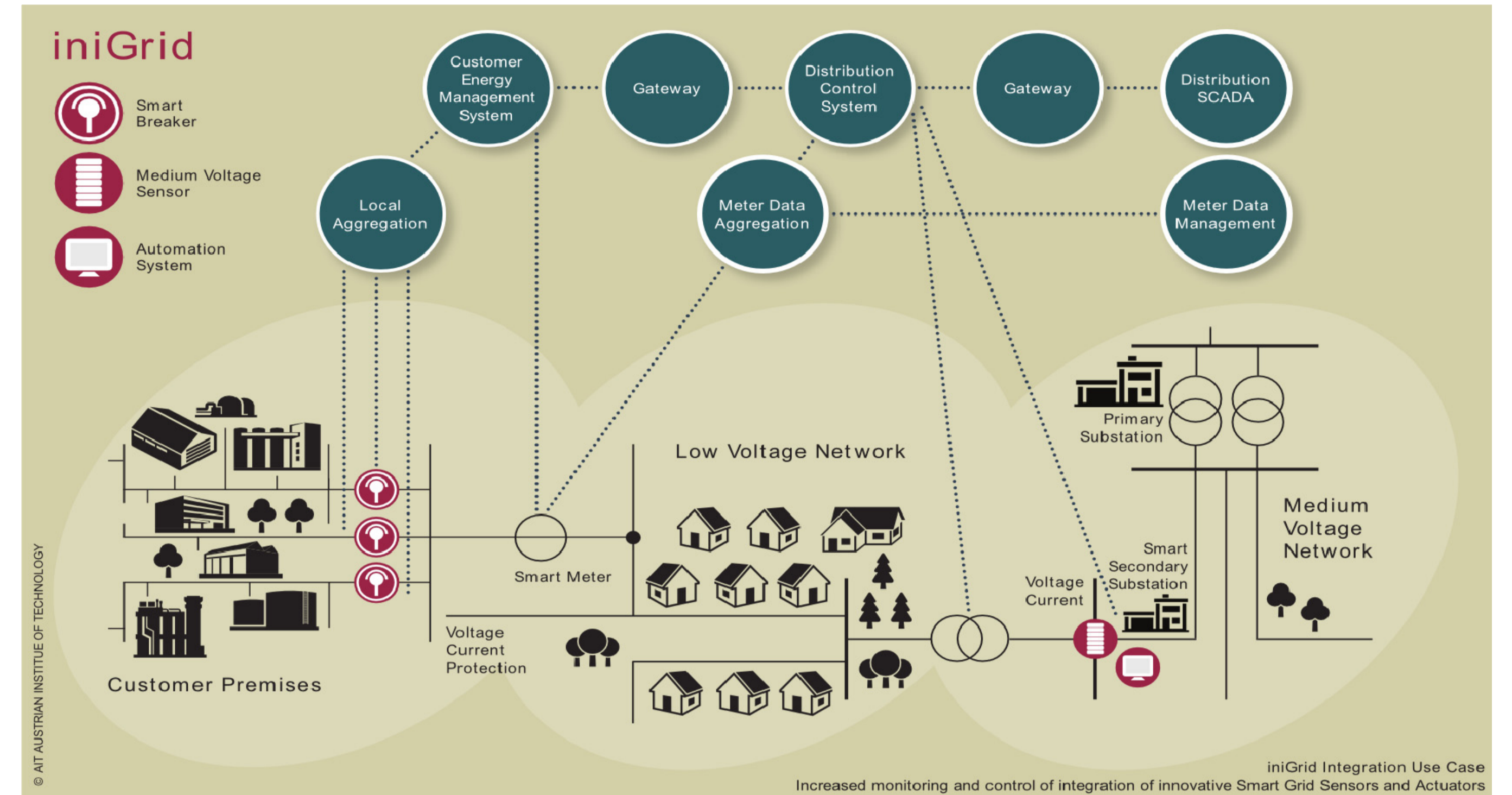
# INIGRID – LOCAL INTELLIGENCE FOR ACTIVE CUSTOMER ENERGY MANAGEMENT SYSTEMS

## AIMS OF INIGRID

1. Develop **innovative Sensors and Actuators** for the customer and distribution grid domain
2. Integrate these with **future-proof automation architecture and protocols**
3. Perform **Cost-Benefit Analysis** for selected grid integration approaches with and without iniGrid technology
4. Ensure flagship character by **interlinked field trials in customer and grid operation domain.**

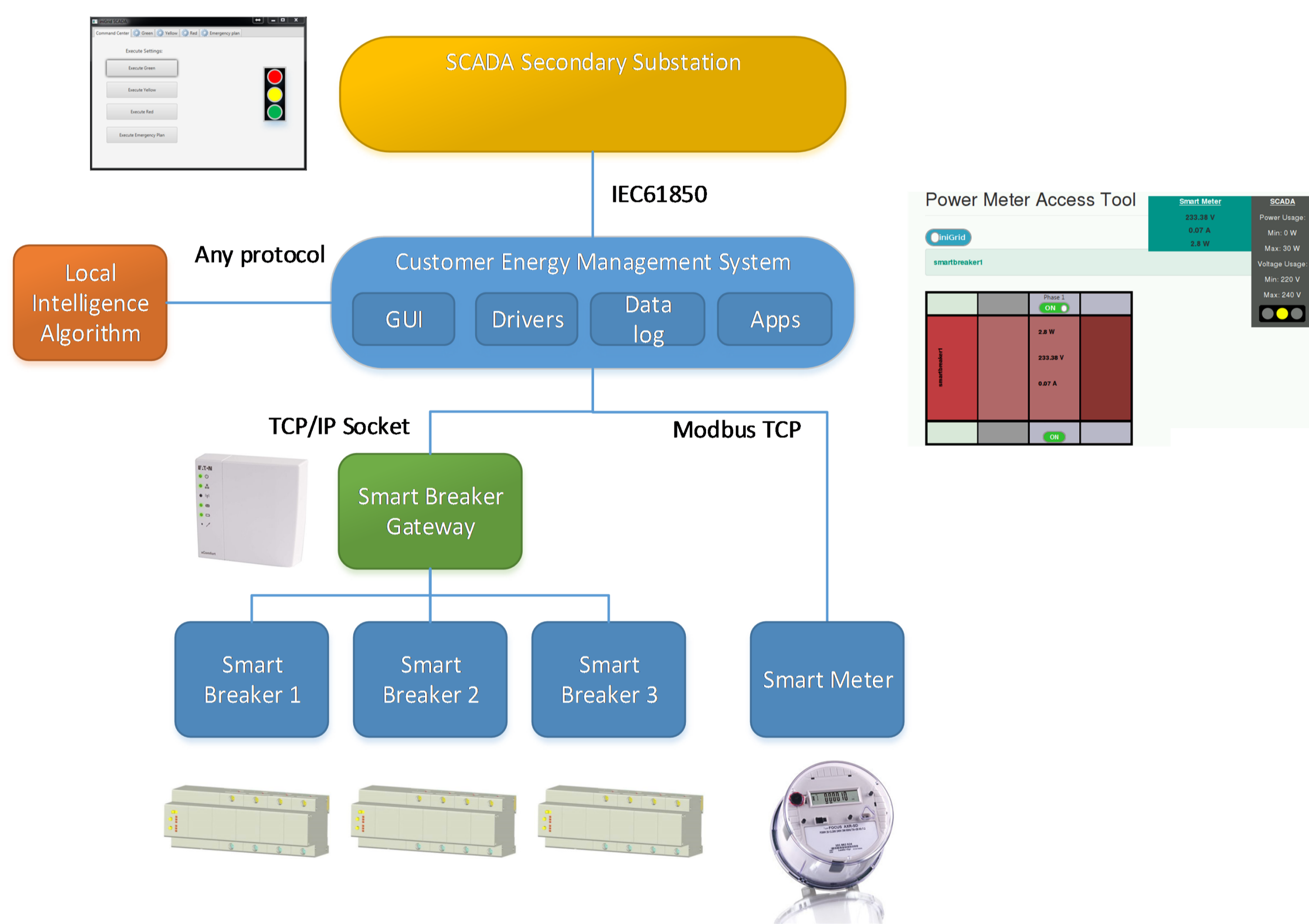


## USE CASES



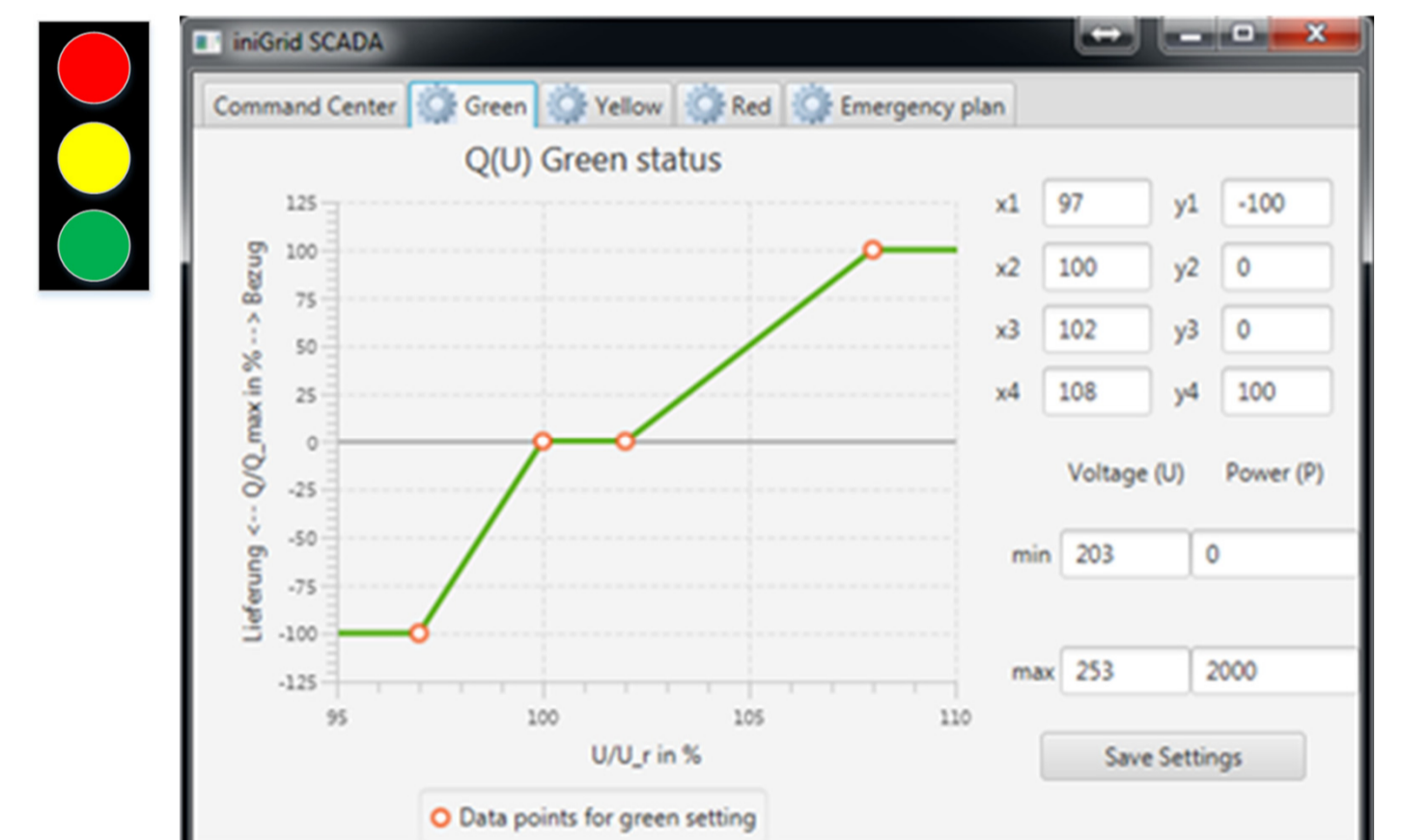
- **Energy Management on Prosumer Level / Electric Mobility**
- **Low Voltage Network Optimization**
- Medium Voltage Network Optimization on Substation Level
- Medium Voltage Network Optimization on Management System Level
- Distribution Optimization across Voltage Levels

## COMMUNICATION INFRASTRUCTURE



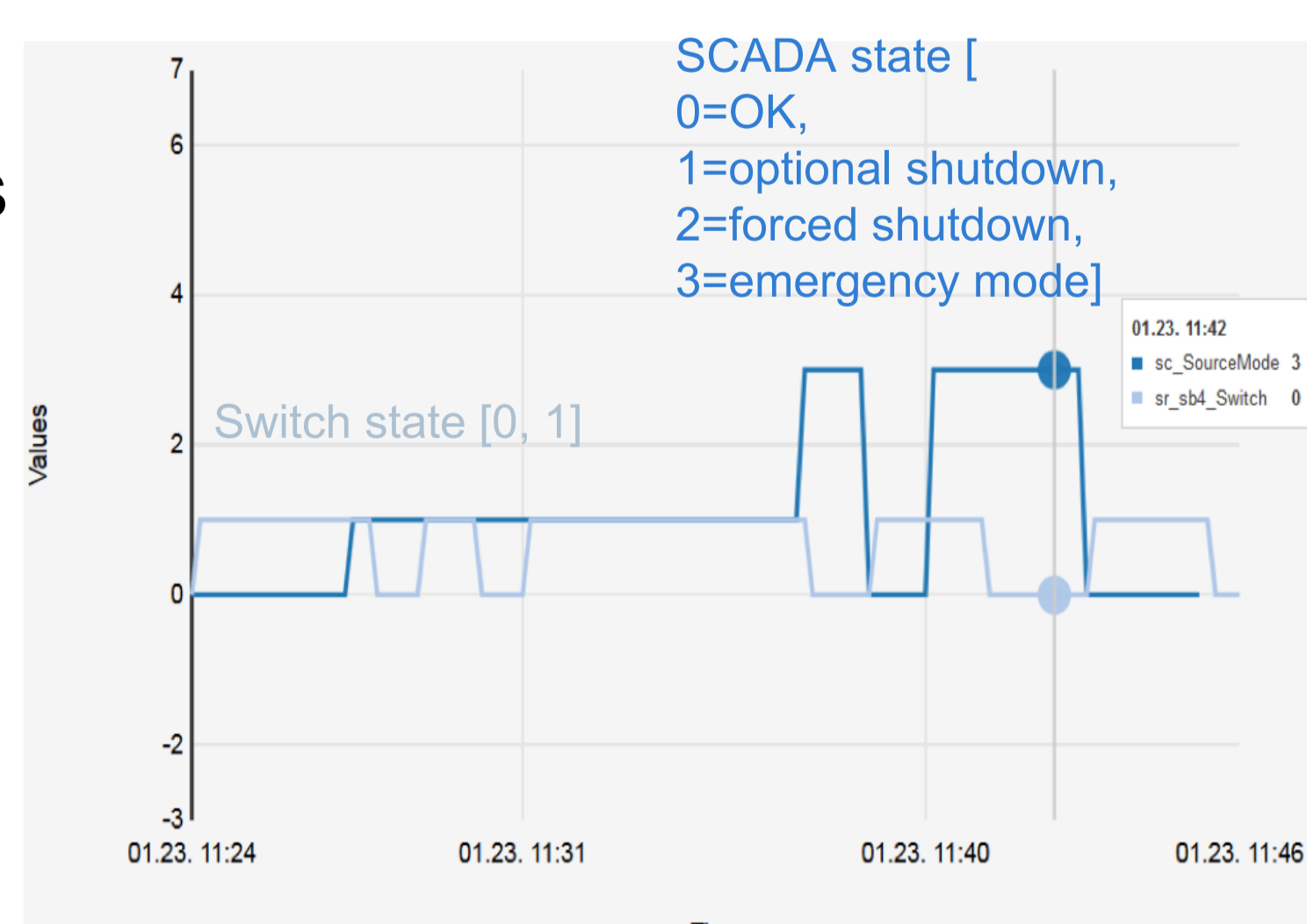
## SCADA DIRECTIVES

- SCADA provides directives for sub grid with traffic light system
- $U_{min}$ ,  $U_{max}$ ,  $P_{min}$ ,  $P_{max}$  provided
- Possibility to provide  $Q(U)$  controlling of tap changer
- Traffic light system:
  - **Green:** No restrictions on the CEMS
  - **Yellow:** Turn on/off optional loads if  $P_{max}$  is violated
  - **Red:** CEMS is forced to keep its total  $P$  within  $P_{min}$  and  $P_{max}$
  - **Black:** Local intelligence emergency mode in case of blackout



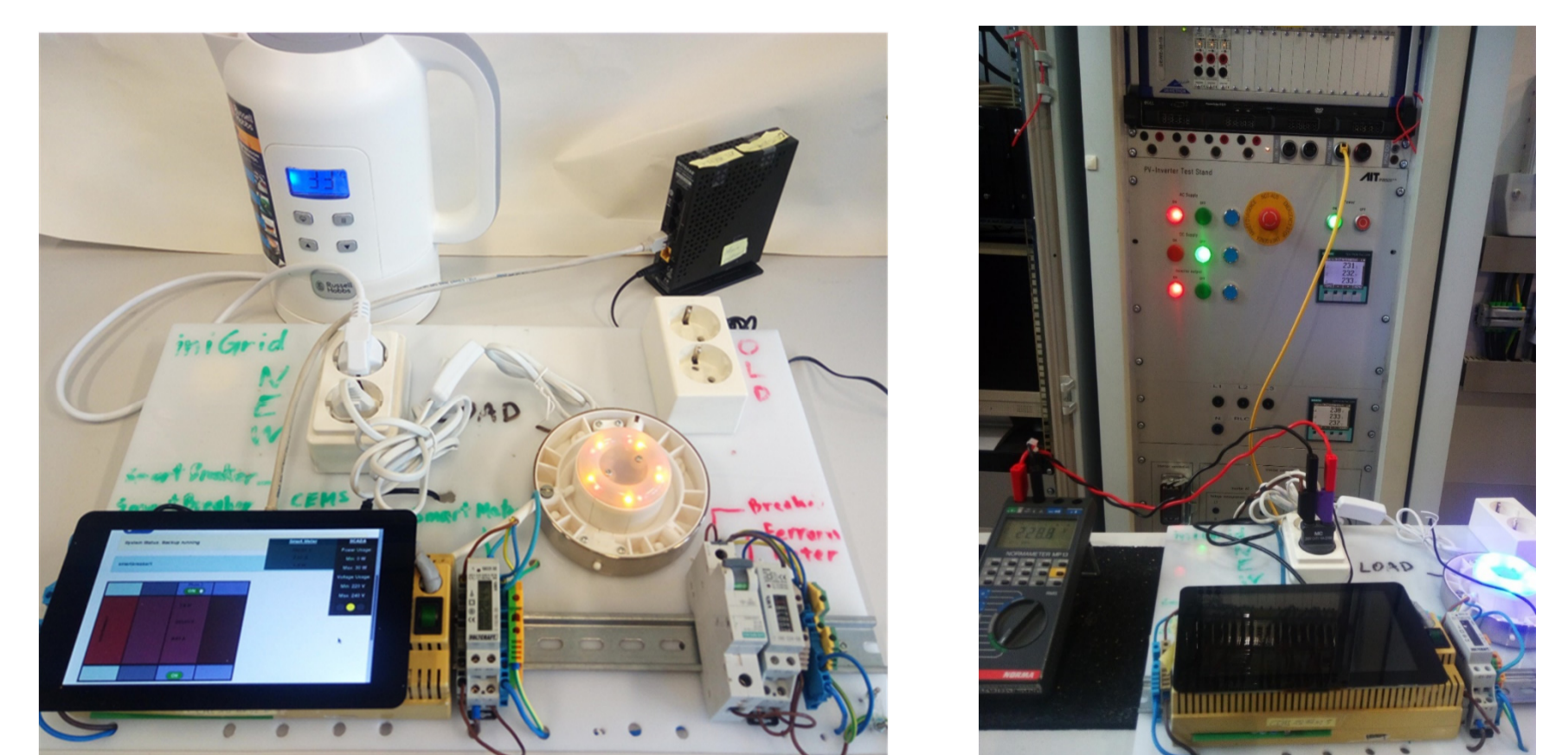
## LOCAL INTELLIGENCE

- Smart Breaker priority list to turn on/off devices based on defined grid state by SCADA
- Fallback methods in case of communication failure, e.g. default values, redundant sensors
- Self consumption optimization by evaluating effects of states of Smart Breakers
- Integration in field validation to control various loads



## DEMONSTRATOR

- Test setup with grid emulator in AIT's SmartEST laboratory
- SCADA system mocked with a software app
- Customer Energy Management System based on OpenMUC as middleware to connect drivers with applications



This work is based on findings of the project Integration of Innovative Distributed Sensors and Actuators in Smart Grids – Project iniGrid (Project no. 845018), commissioned as flagship project by Österreichische Forschungsförderungsgesellschaft mbH (FFG) as part of e!MISSION.at 4th call for proposals.