

InnoGrid 2020+

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IDE4L

ideal grid for all



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the Project at a glance

- FP7 demonstration project (9/2013 – 8/2016)
- Scope: Active distribution network management
 - From the planning to the real-time operation
 - From the MV up to LV single customer
 - DSO interaction with TSO, DER, μ Grid and Aggregator



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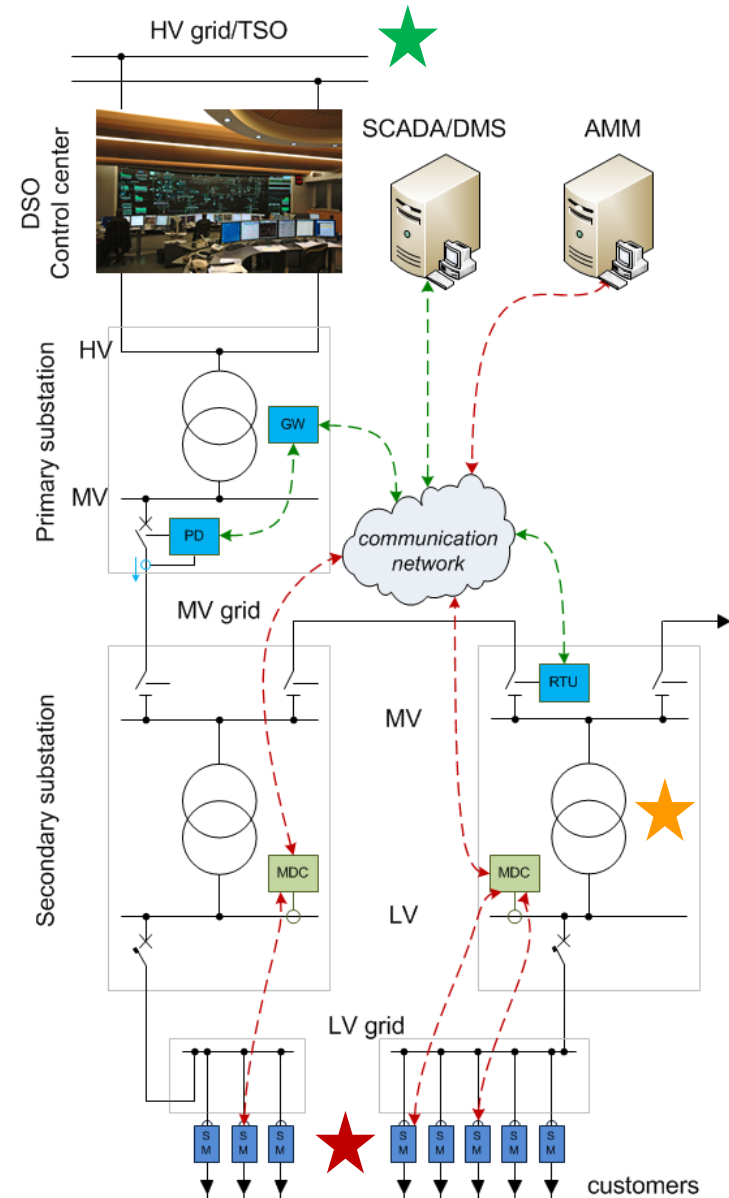
Motivation

• Background

- Little monitoring penetration in the distribution grid:
 - primary substations
 - secondary substation remote control
 - average values only
- Electronic meters deployment mainly for billing and CRM

• Needs to be developed

- ★ LV grid: EV, PV, HP and demand-response schemes mainly affect the LV grid
- ★ Secondary substations: Improve the monitoring, protection and control of secondary substations
- ★ TSO-DSO: Need of dynamic information from DSO grid





Pillars

● Amount of data increases

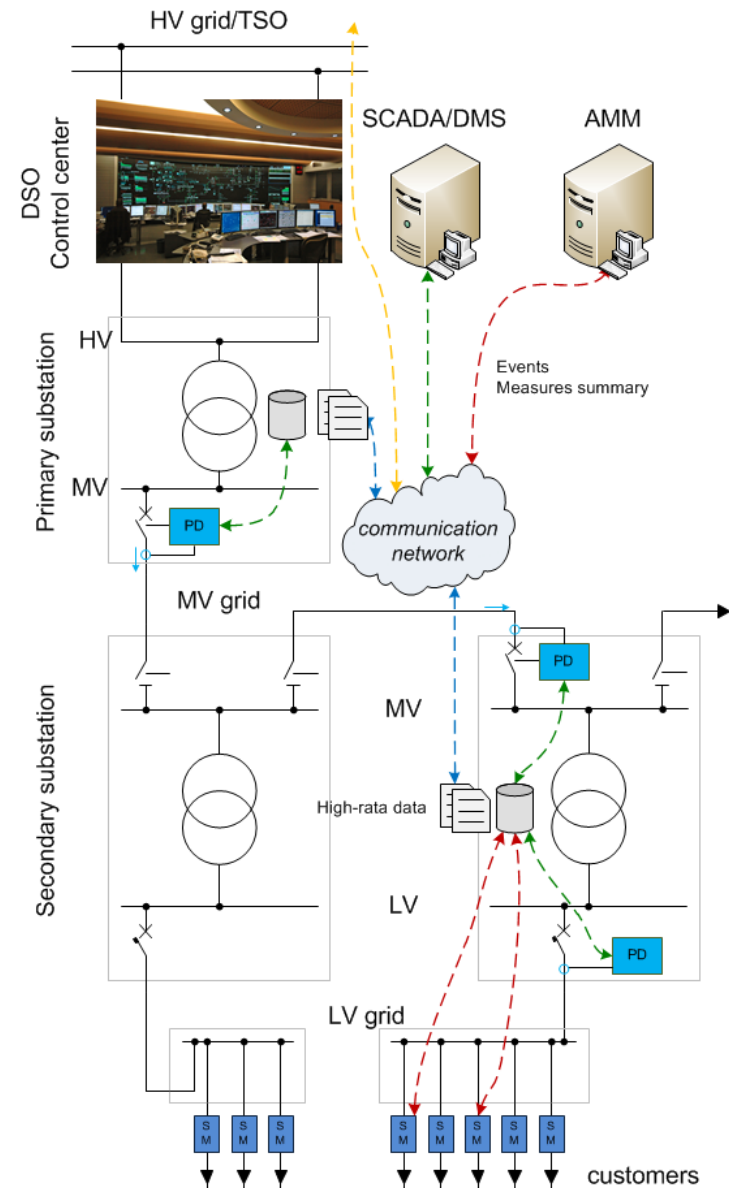
- 10 of PSs -> 10⁶ customers
- averages only -> high-frequency measurements

● Decentralized approach

- Data is collected/processed locally (LV data -> in SS; MV data -> in PS)
- Only summary/alarms are reported to upper levels

● Benefit: impact on CAPEX (scalability / modularity)

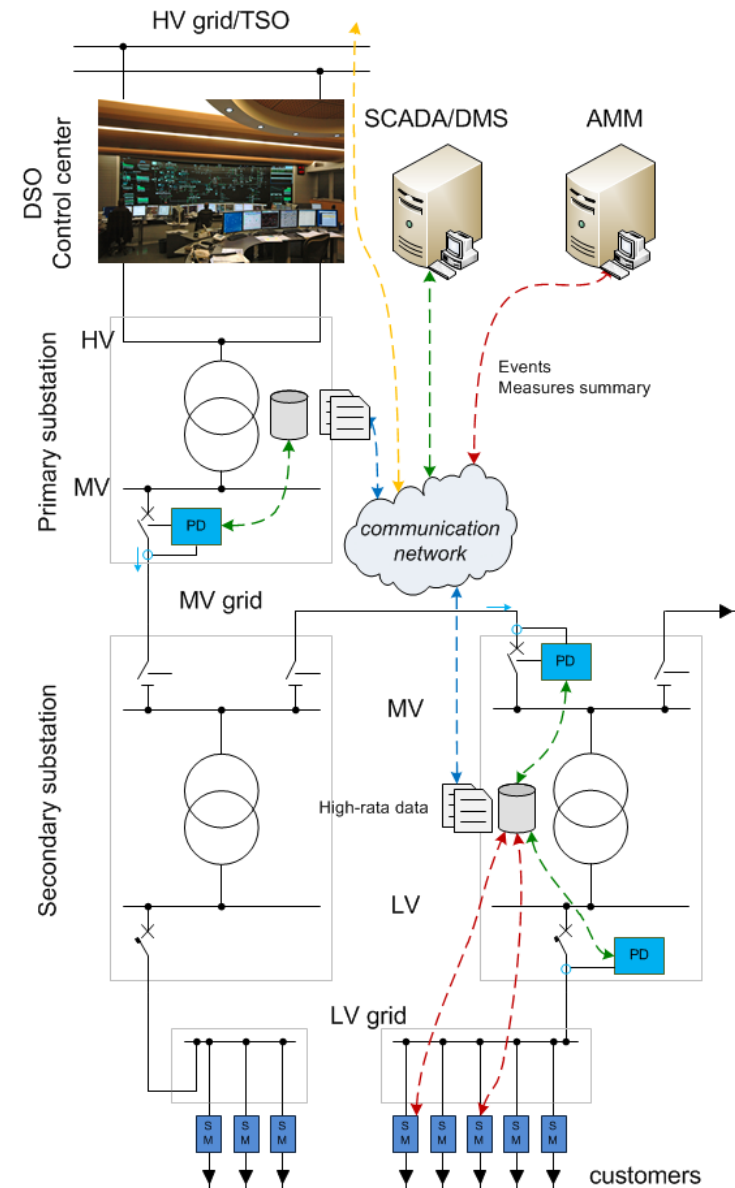
- Less-demanding communication is required
- Faster response
- reuse of existing automation components





Pillars

- **The number/type of monitoring devices are increasing**
 - Smart meters
 - Fault detectors / protections
 - Power quality meters / PMU
- **Standards are needed to:**
 - Limit the integration time
 - Limit the maintenance time
- **Main standards:**
 - CIM for grid assets
 - 61850 for data about the grid
 - DLMS/COSEM for metering data
- **Benefit: Positive impact on CAPEX and OPEX (interoperability)**





Demonstration



- Development site
- Lab. demo site
- Field demo Site



Use cases

1. Monitoring

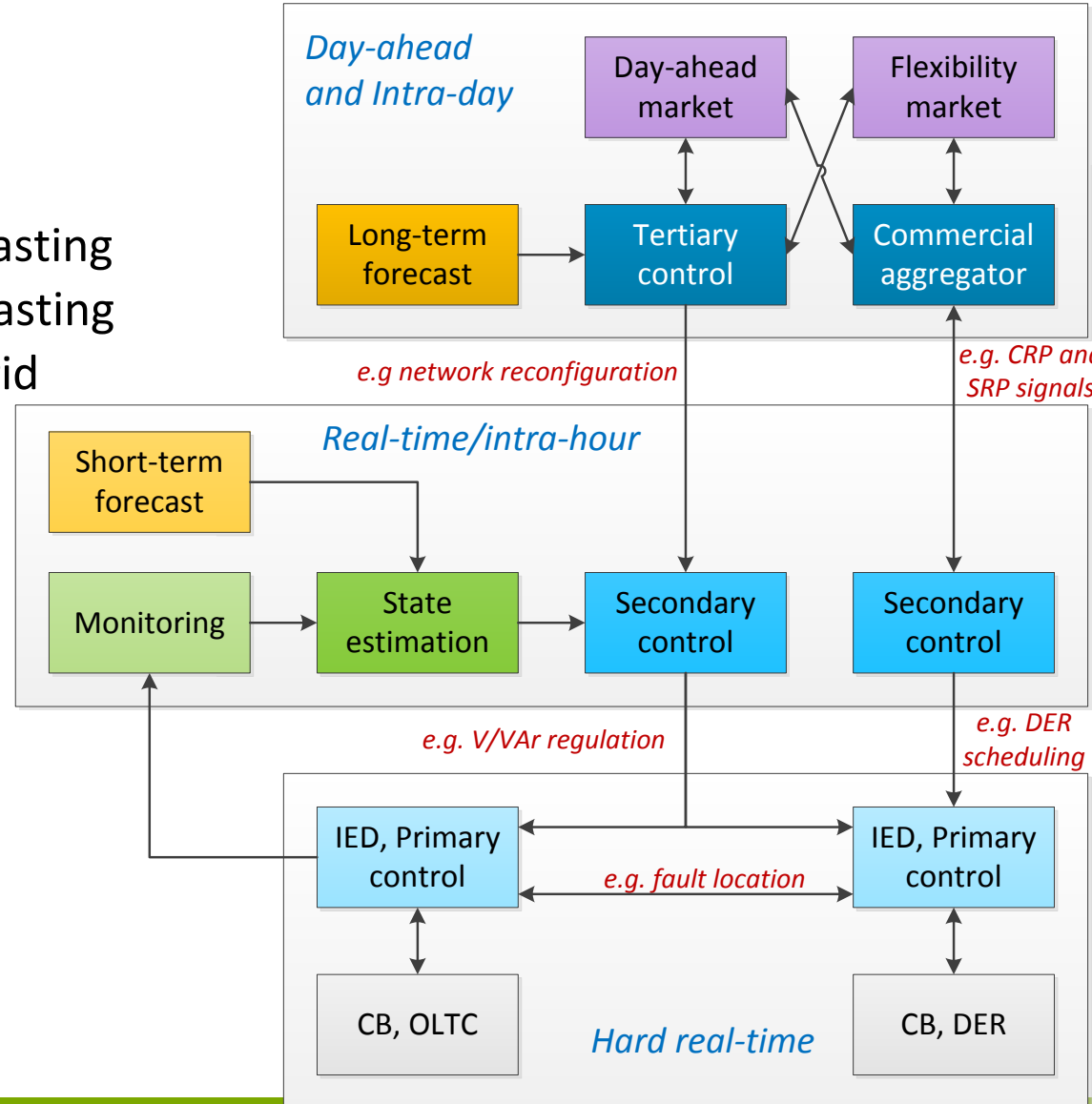
- Real-time monitoring
- Load and production forecasting
- State estimation and forecasting
- Dynamics of distribution grid

2. Protection

- Logic selectivity
- FLISR with DERs and μ Grid

3. Control

- Congestion management
- Optimal scheduling
- μ Grid voltage control
- Dynamic grid tariff





Results

1. Active network management concept
2. Hierarchical and decentralized automation architecture
3. Distribution grid and DER management functionalities
4. Benefits and impacts of functionalities for DSO
5. Demonstrations of concept, architecture and functionalities in three field demonstrations (running)
6. Recommendations and roadmap (after demonstrations)

Thank you for your attention!

<http://ide4l.eu/>

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