

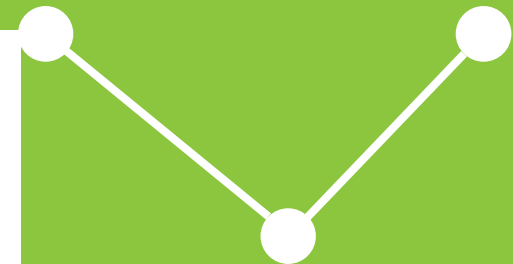


## Renewable penetration levered by Efficient Low Voltage Distribution grids



### Pitch 2: Real-time observability of the distribution grid

**Miha Smolnikar**  
ComSensus



## Profile

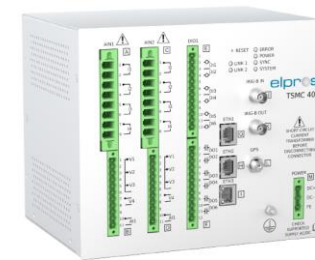
Technology and innovation SME applying the IoT, CPS and AI concepts to the energy domain.

The mission of our young and vibrant team is to work with partners in the design, certification and market offering of disruptive solutions.



## Products

- **Power Quality Monitor (PQM)**
- **Phasor Measurement Unit (PMU)**
- **Distributed Energy Resource Gateway (DER-GW)**
- Smart Meter Gateway (SM-GW)
- Motorhome control system (MACH)
- Embedded system prototyping platform (VESNA)



# ComSensus

## Team

- Embedded HW & SW
- Data analytics
- Power systems

10+



Proof-of-Concept · Pilot · Industrialization ·  
Certification · Production · Support

**Miha Smolnikar, CEO**

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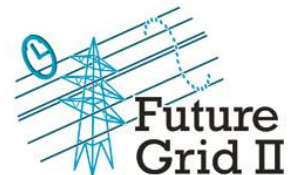
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## Projects

- **H2020 RESOLVD**
- H2020 PHOENIX
- H2020 PLATOON
- EMPIR Future Grid II
- (H2020 BRIGHT)
- (H2020 MATRYCS)



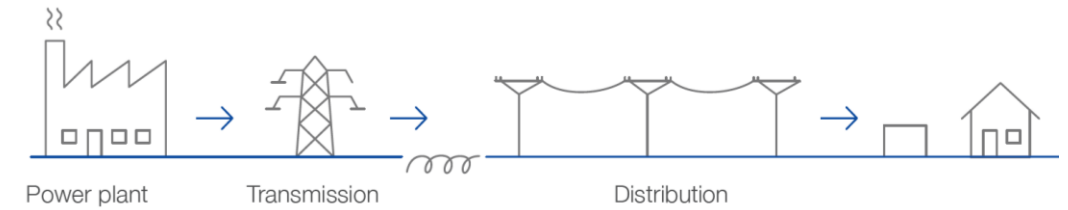
**PLATOON**  
Digital platform and analytic tools for energy



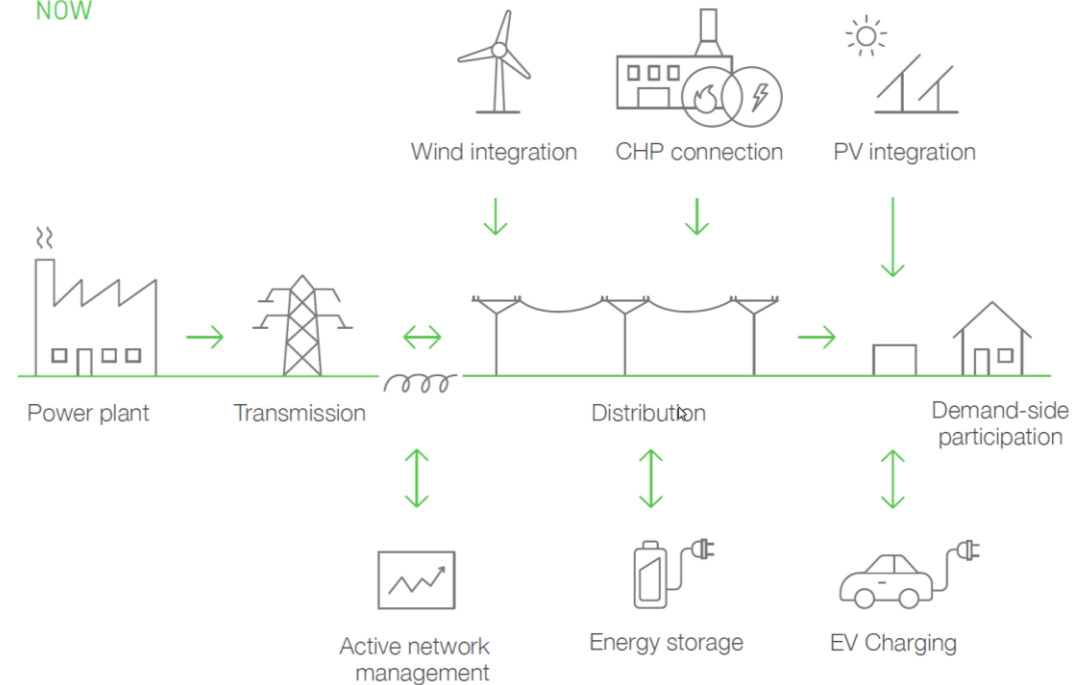
# Problem – active grid and assets management

- **BEFORE:** infrastructure over-dimensioning to withstand worst case energy provision requirements
- **NOW:** due to escalating complexity, necessitates data-driven transformation to instantiate situational awareness, allow the operation closer to the margin, and react on network disturbances

BEFORE



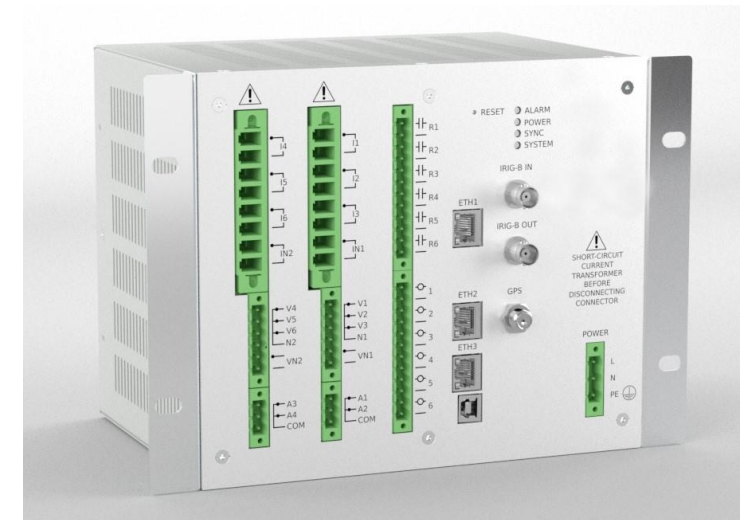
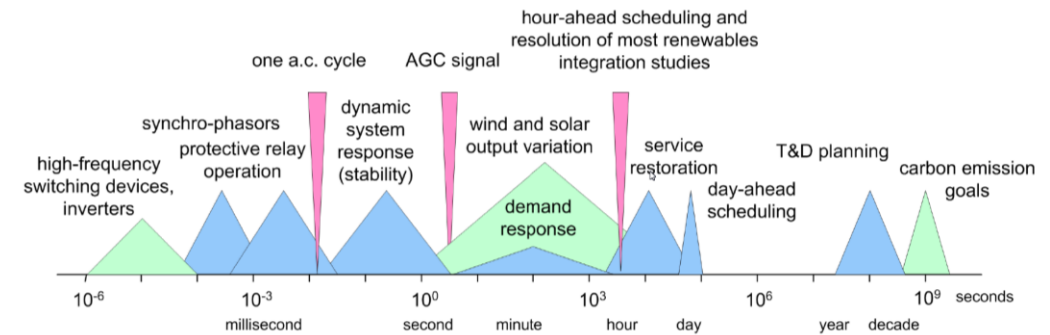
NOW



# Solution – real-time situation awareness and control

- Key enablement towards ‘doing more with less’
  - **online monitoring and knowledge management systems**
    - present information faster and more reliably
  - **distributed, autonomous, dynamic control capability**
    - transition from preventive (quasi-stationary) to corrective (real-time) control

## Time scales in electric grid operation



# Product – PMU+PQM+GW

- **RESOLVD technologies**

- Phasor Measurement Unit (PMU)
- Power Quality Measurement Device (PQM)
- Gateway (GW)

- **A unified platform for real-time monitoring, protection and control of power grid**

- **RESOLVD pilot**

- Estabanell, Spain (DSO)
  - Disturbance detection, classification, localization, mitigation



# Competitive advantage and market opportunity

- **Accuracy**

- High analog-to-digital resolution over a wide range of operating conditions
- Sub-microsecond (100 ns) time resolution

- **Speed**

- Reduced measurement reporting latency
- Raw sampled values snapshots

- **Edge and connectivity**

- Data pre-processing and features extraction
- Cellular network connectivity

- **Low cost**

## Market (EU)

- Customer base
  - Around 2000 distribution system operators
- Infrastructure
  - 4 million MV secondary substations
  - 10x million of DER
- Opportunity
  - 1 PMU per substations
  - 1 GW per real-time controllable DER

# Exploitation pathway

- **Research and Development**

- Replication and advancement in new pilots
  - DSO, Italy (2019) – dynamic relocation of observability services
  - TSO+DSO, Slovenia (2020) – active grid management and protection
- Integration and interoperability with controllable assets
  - Charging station, heat pump, inverter gateway

- **Market entrance**

- Partnering with industry and system integrators in offering turnkey solutions



# Thank you!

**Miha Smolnikar**

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# Demo

## Laboratory testing setup



- PMU
  - 3 phase voltage, frequency, rate-of-change-of-frequency
  - 50 Hz reporting rate
- PDC
  - Time series data base
- Grafana
  - Visualization