WP4 FI building the Energy Marketplace

Overview

Outline

- Premise
- Context & Problem
- Proposed Solution
- Open Call: Proposed Topics
- Conclusion

Premise

FUTURE INTERNET SMART UTILITY SERVICES FINESCE

- **Energy scenario** is characterised by a growing density of **DER**

Electricity injected in grid has **high deviation** in Voltage/Current, due to weather conditions

→ **reverse power flow** and **power losses** and **critical conditions** for electrical components that may reduce their **operational lifecycle**

- In **FINSENY**, we analysed a new promising approach as a combination of:
  - **new Market mechanisms**
  - **Demand Side Management**

MV/LV Grid

- In **FINESCE**, we aim to instantiate a **marketplace for Energy**, enabled by **Future Internet technologies**
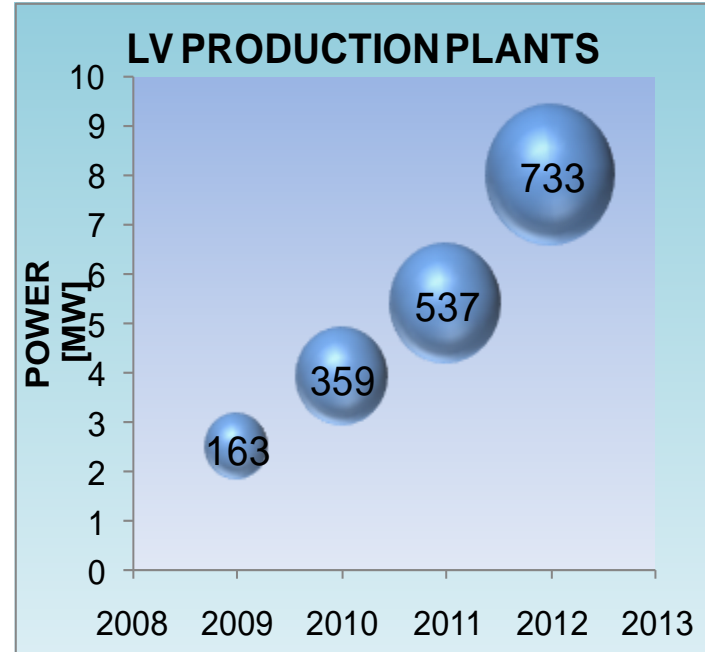
Trial in city of Terni

Context…

Trial site: Terni (Italy)

Context…
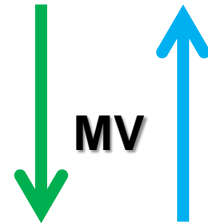
MV

LV

Upstream Active Power
PV Generated Active Power
Downstream Active Power

L   **L**   **L**
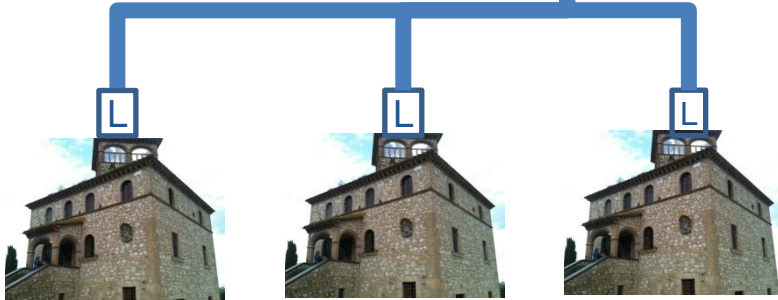
Residential   **Commercial**   **Industrial**

FUTURE
INTERNET
SMART
UTILITY
SERVICES

FINESCE

…& Problem

Legend:
- Upstream Active Power
- PV Generated Active Power
- Downstream Active Power

Potenza [kW] — y-axis

24-hours Load Profile

- High density of DERs (15-30%);
- Energy consumption not aligned w.r.t. production from PV plant
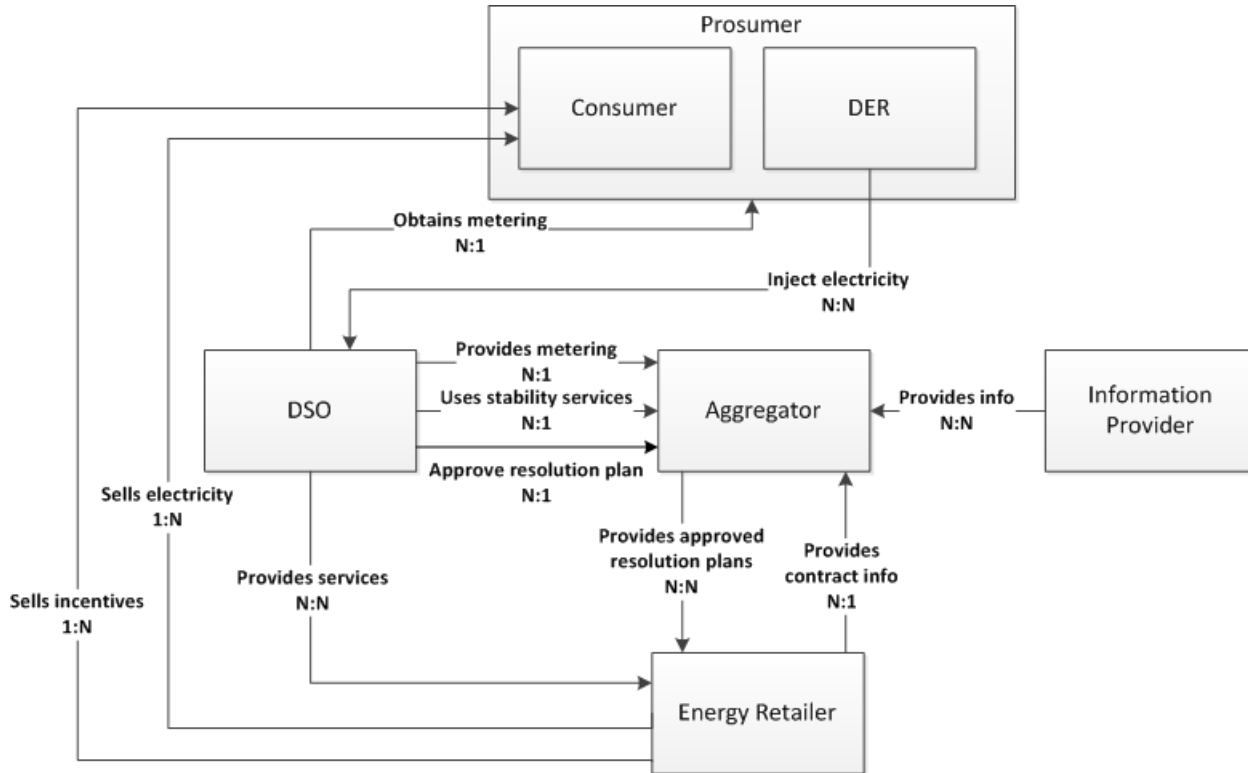- ➔ Power losses due to reverse **power flows**

Energy Consumption needs to be shifted in order to **maximise** usage from local PV plants and **minimise** power flows

FUTURE INTERNET SMART UTILITY SERVICES
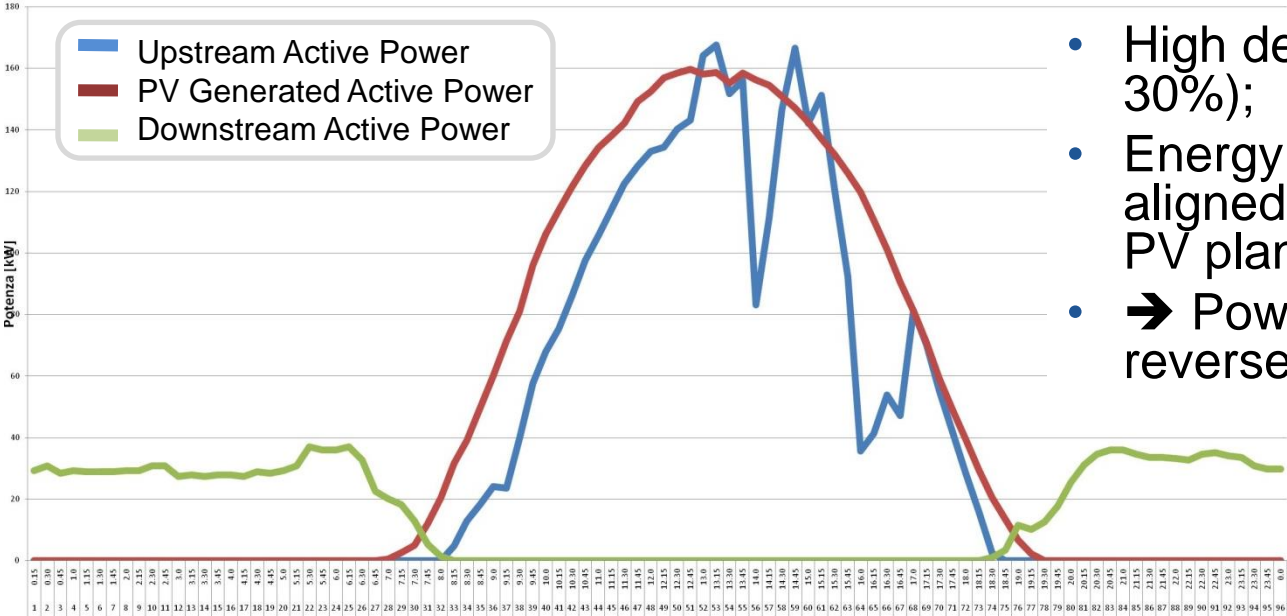
FINESCE

Proposed Solution: Actors

- **Aggregator**
  - identifies **imbalances** in power demand and supply
  - proposes a **resolution plan** to address them

- **DSO**
  - has the control of **distribution grid**
  - **approves** resolution plans

- **Energy Retailer**
  - transforms the resolution plans to specific **incentives** tailored to the consumer

Proposed Solution

- Introduction of «**resolution plans**» in the energy market for «optimisation»:
  - **DSOs** to achieve grid stability and minimise power flows/losses;
  - **Energy Retailers** to maximise incomes from energy selling.

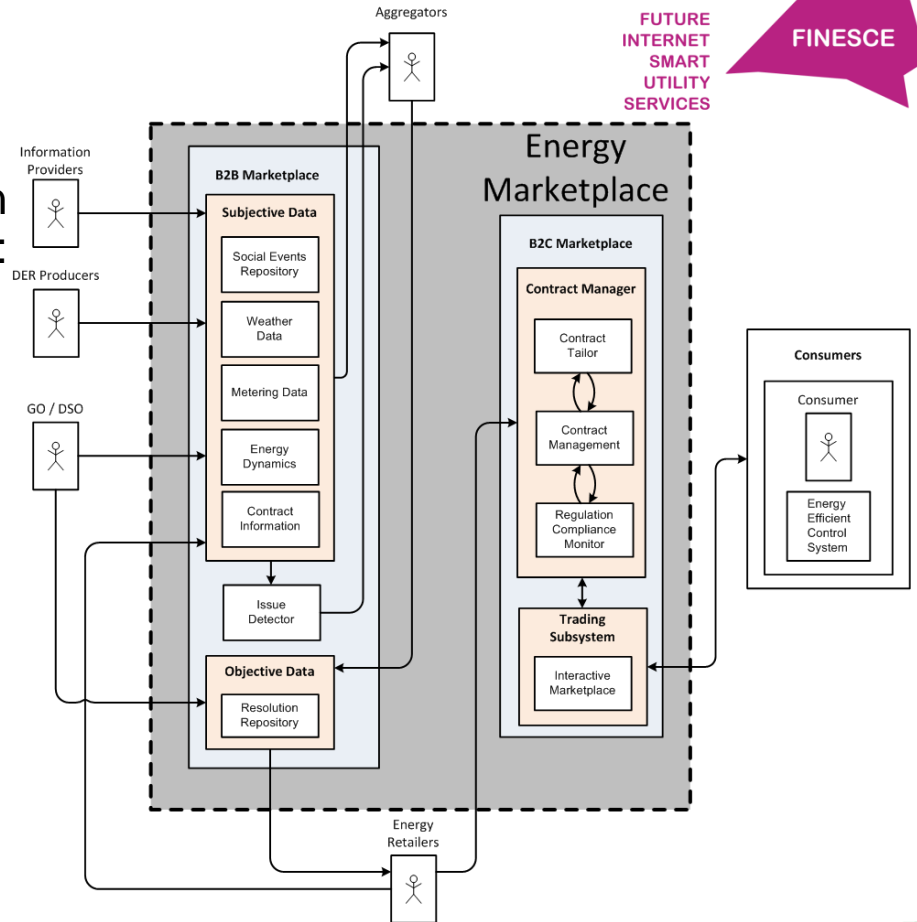# Proposed Solution: System & API
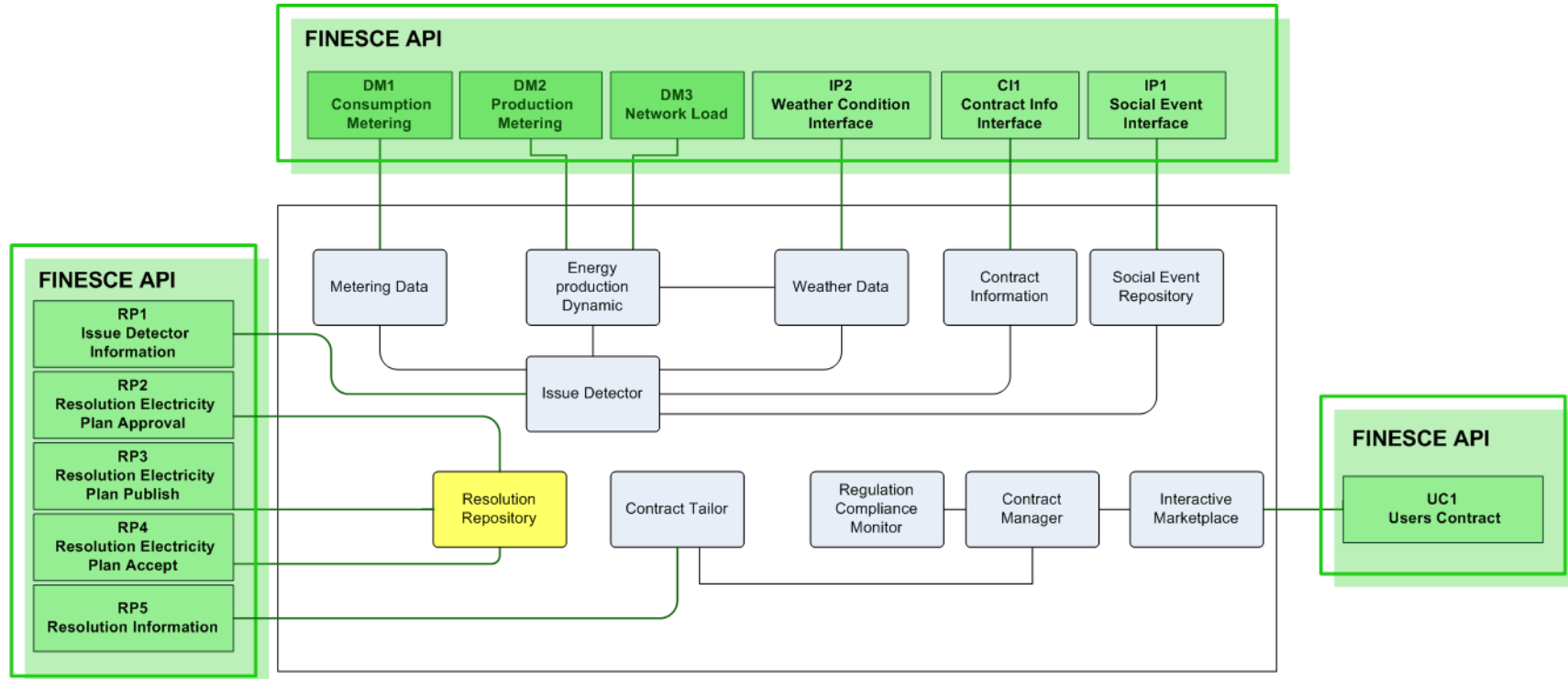
Open Call: Proposed Topics

- A new Automatic Meter Reading (**AMR**) by deploying sensors based on **DLMS/COSEM protocol** (Device Language Message Specification), compliant to **IEC 62056** for data readout, service functions and parameterisation;

- DLMS-based AMR will be **integrated** in the Terni trial site, by using a set of **FI-WARE Generic Enablers** (e.g. IoT chapter).

Conclusion

- Proposed a **market-mechanism** approach for addressing **instability** in a grid characterised by high density of **DERs**;

- Identified actors, system and API, as well as enhancements for the AMR based on open protocol sensors (topic for Open Call);

- If you are interested to our activity, please, don't hesitate to:

  - Contact **contact@finesce.eu**
  - Ask for further details during Table Session

THANKS FOR YOUR KIND ATTENTION