



WP4 FI building the Energy Marketplace





Outline

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

Premise

- **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**
- In **FINESCE**, we aim to instantiate a **marketplace for Energy**, enabled by **Future Internet technologies**

MV/LV Grid

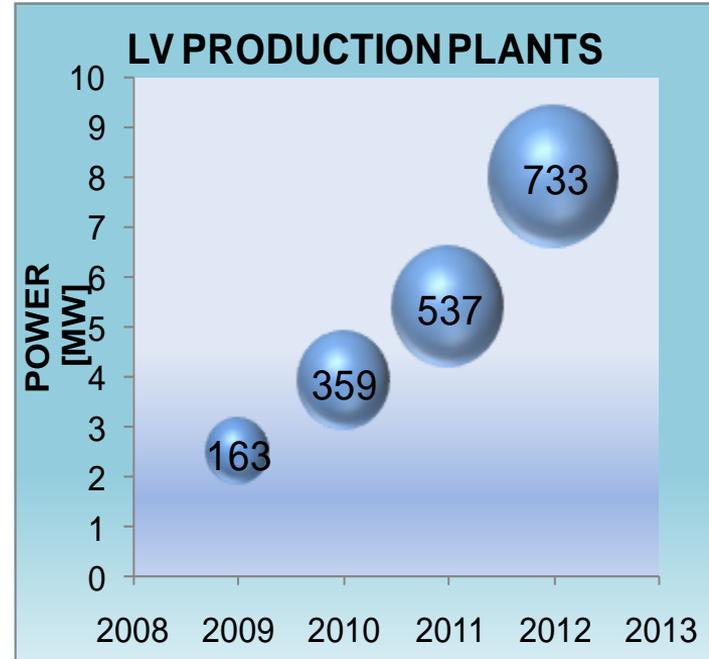
Trial in city of Terni

Context...

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Trial site: Terni (Italy)



Context...

Trial site: Terni (Italy)

GENERAL FEATURES

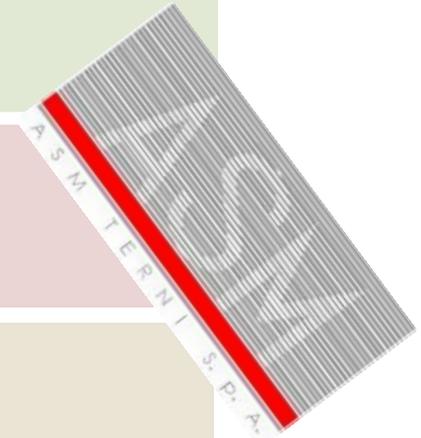
- Served Area: 221 Square kilometers
- Primary Substation (HV/MV): 3

MV Grid

- Grid length : 618 km
- Secondary Substations (MV/LV): 595
- Work Power Users: 54 MW
- Operating Voltage: 10kV and 20kV

LV Grid

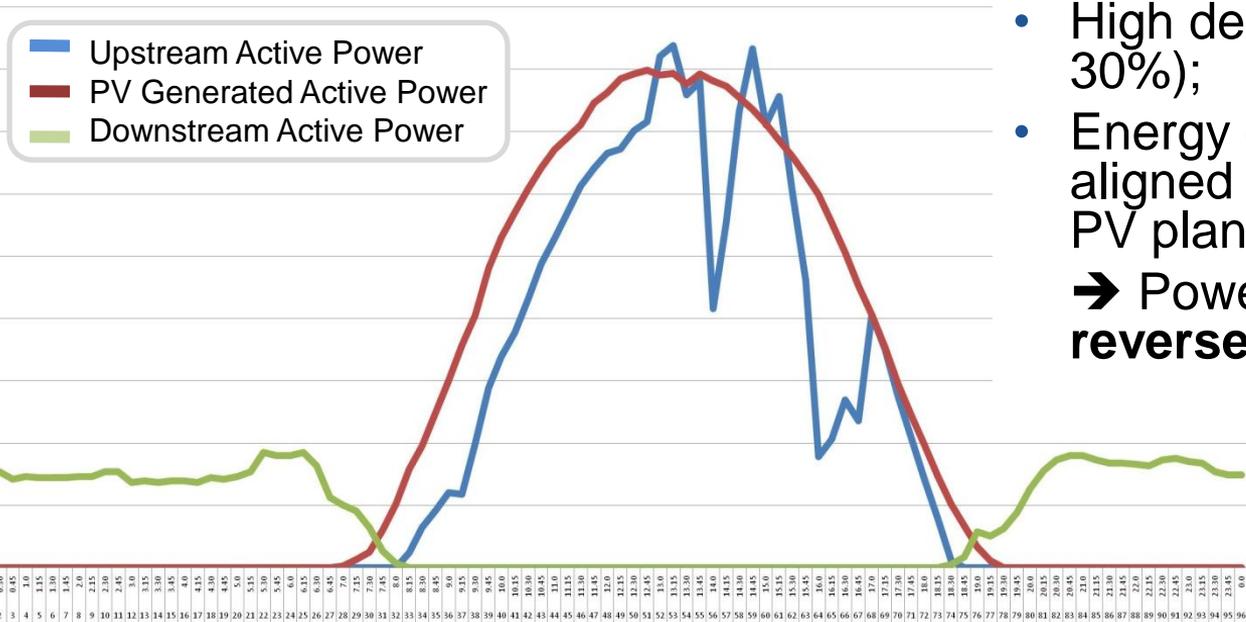
- Grid length : 1410 km
- Users: 64.500
- Work Power Users: 272 MW
- Installed Power of transformation: 132 MVA



...& Problem

- 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** reverse power flows

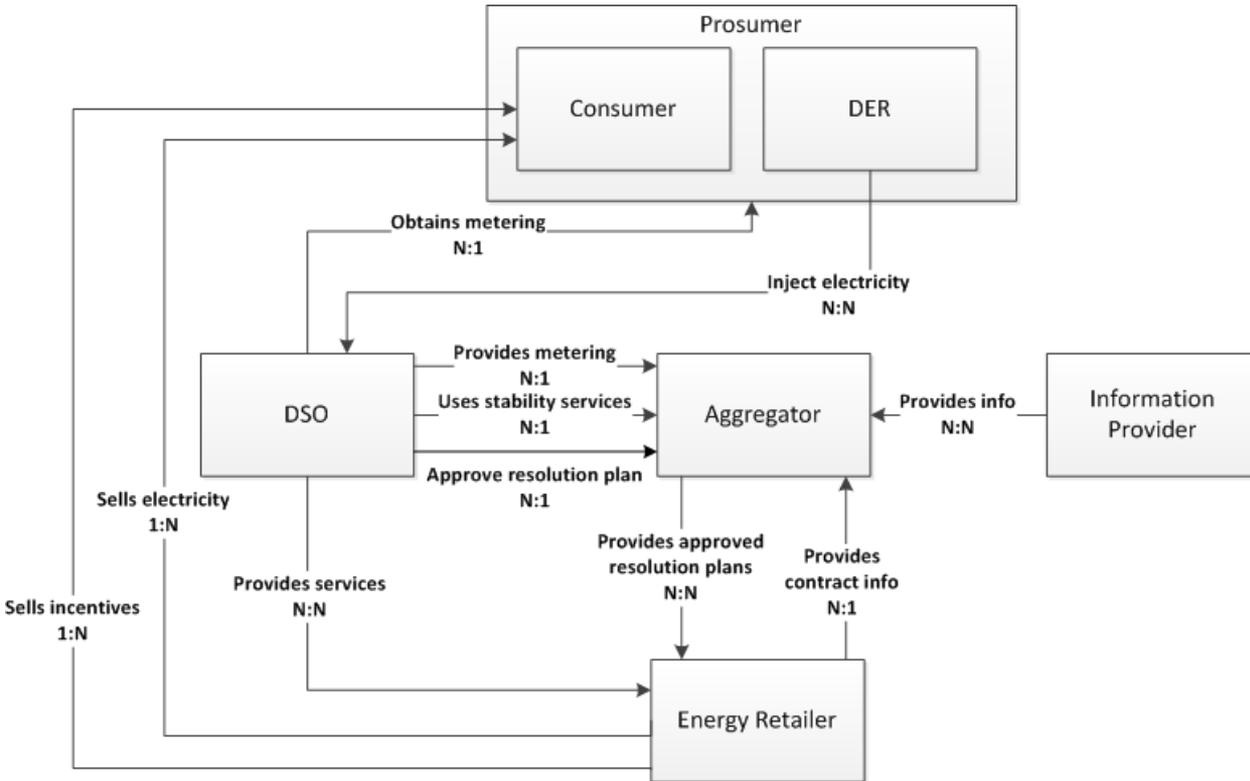


24-hours sample Load Profile

Proposed Solution: Actors

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- **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

«resolution plans» in the energy market for «optimisation»

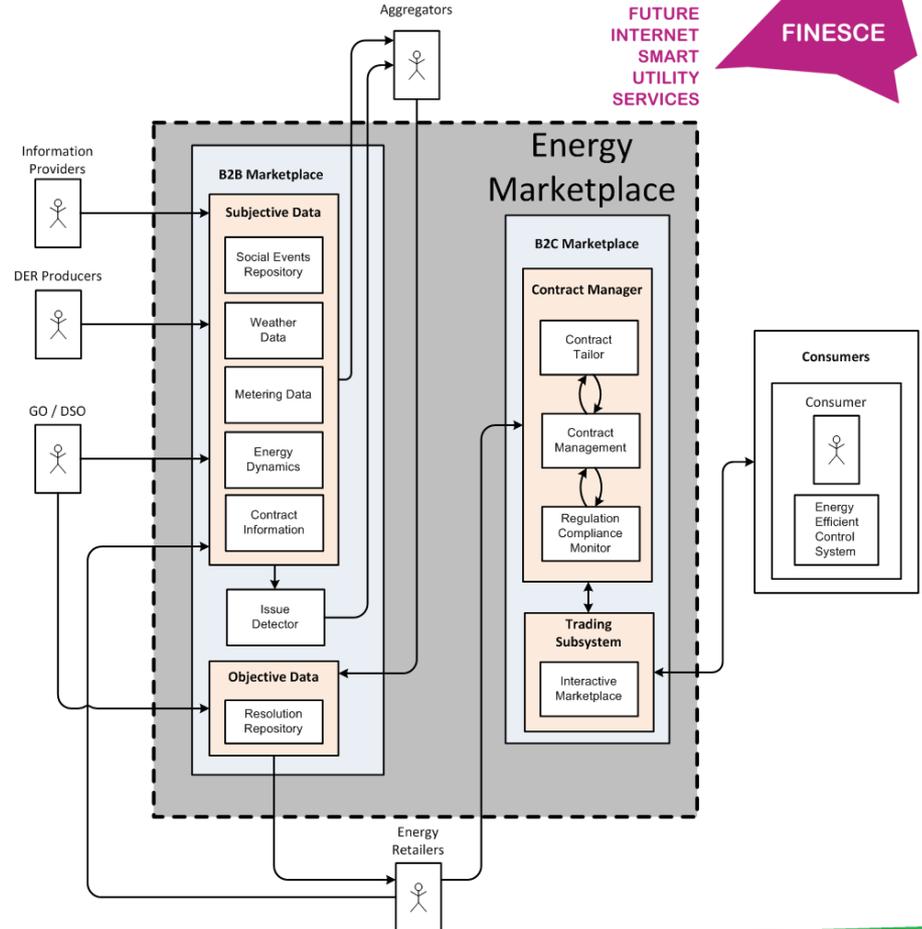
- **DSOs** to improve grid operation and minimise reverse power flow
- **Energy Retailers** to maximise incomes from energy selling

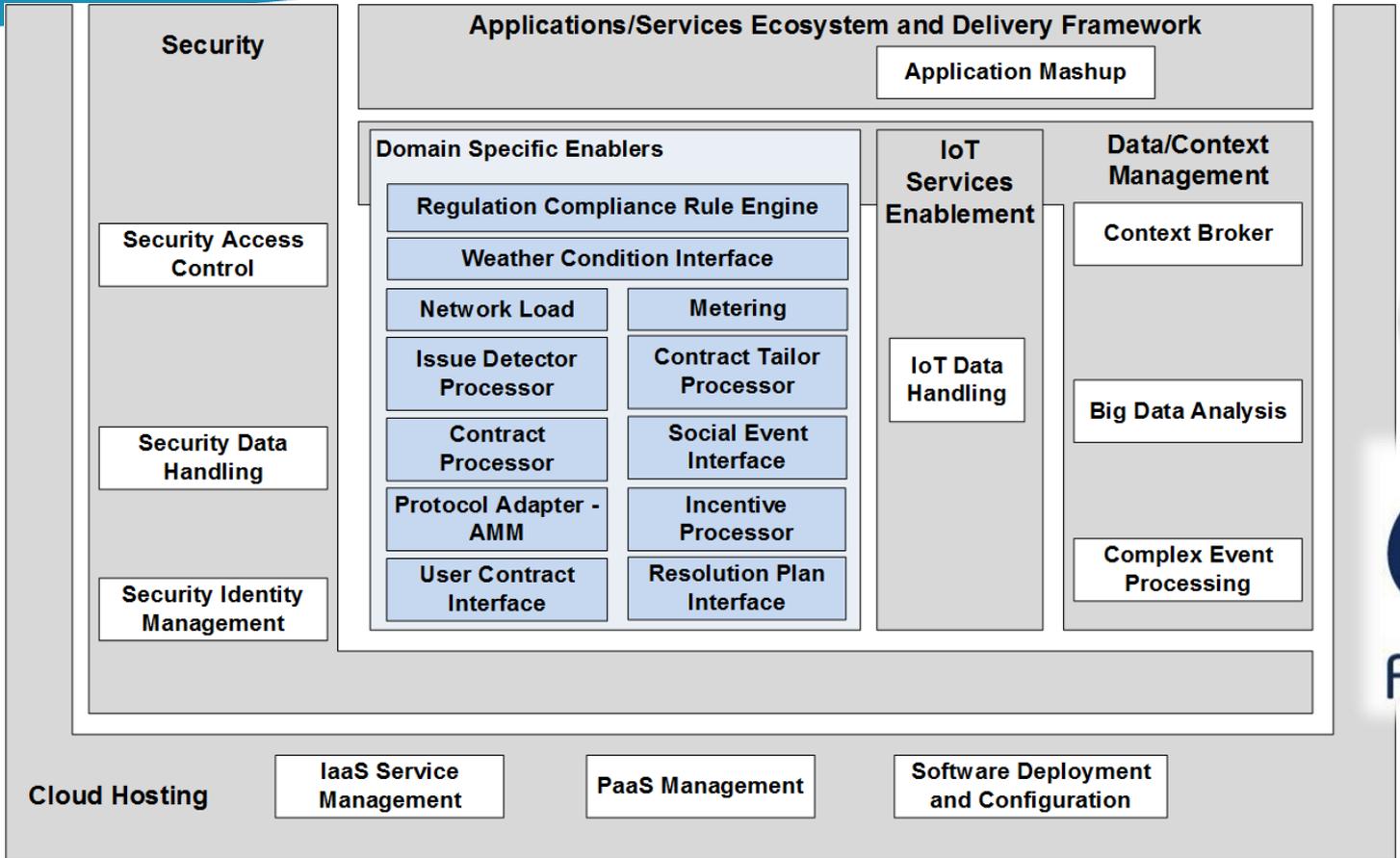
Input Information

EnergyDynamics

Regulation
Social Events
 Weather
 Contract
 Metering Data

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Marketplace
enabled by Future
Internet solutions



FI-WARE



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 **reverse power flow** 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
 - Participate to next Innovation Events

Save the date!

5th Innovation Event
Terni, Oct 17th 2013

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THANKS FOR YOUR KIND ATTENTION



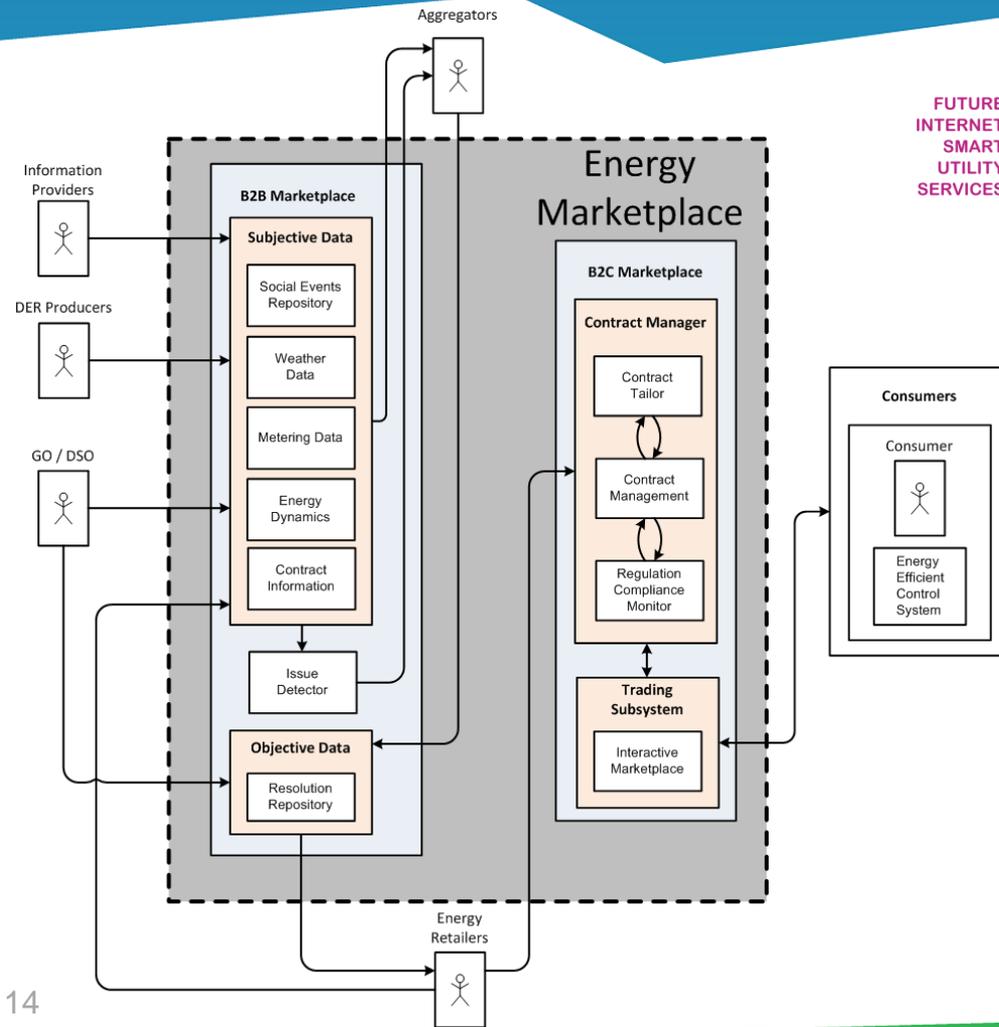
SYNELIXIS





BACKUP SLIDES

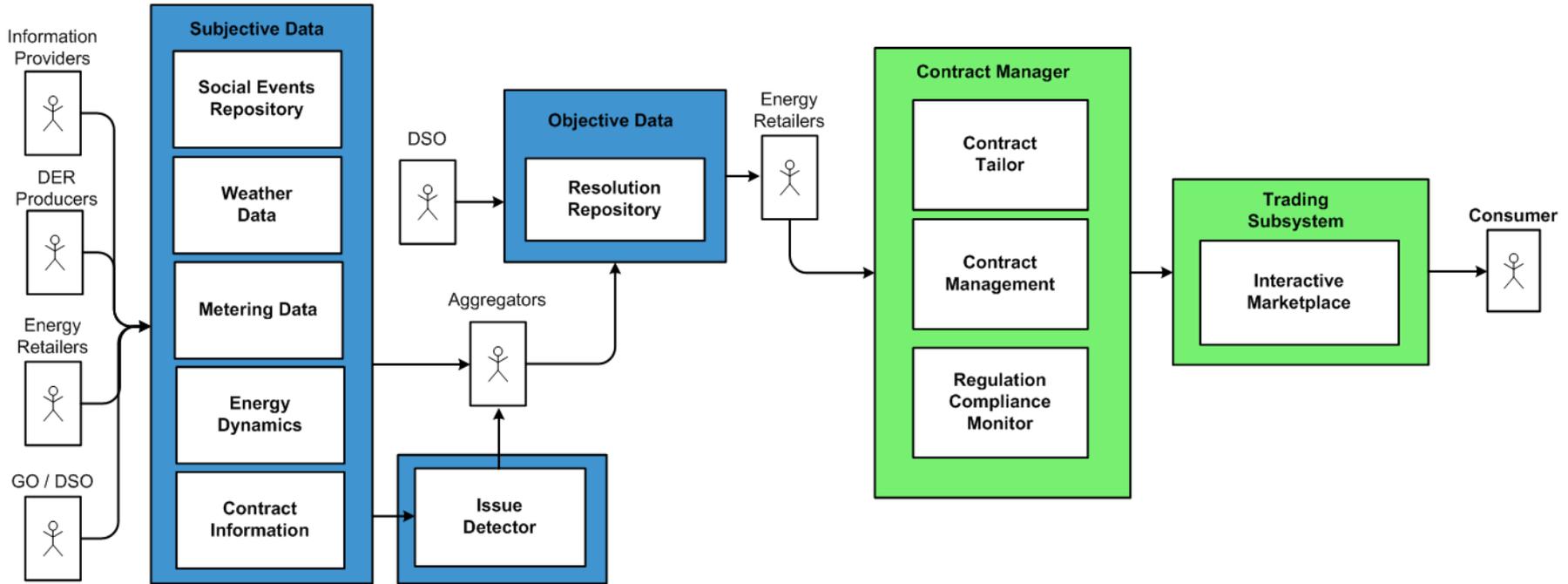
Architecture



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Architecture



Proposed Solution: System & FINESCE API

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