



bridge

ENLIT - Session 5

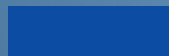
1st December 2021

14:00 – 16:00

Moderated by Olivier Genest – BRIDGE Data
Management WG Chair



Interoperability and data exchange to support the
digitalisation of smart energy systems



Agenda

Time	Topic	Speaker
14:00 – 14.05	Introduction – scope of the session	Olivier Genest – Moderator
14.05 – 14.20	Introduction about the Digitalising the energy sector – EU action plan	Mark Van Stiphout (European Commission DG ENERGY)
14.20 – 14.50	Panel Topic 1: Big data and data spaces <ul style="list-style-type: none">Projects presentation: OPEN-DEI, PLATOON, SYNERGY, BD4OPEM (4' each)PANEL DISCUSSION	All Panelists and project representatives
14.50 – 15.20	Panel Topic 2: Supporting data exchanges and cooperation between stakeholders <ul style="list-style-type: none">Projects presentation: INTERRFACE, PlatOne, Euniversal (4' each)PANEL DISCUSSION	All Panelists and project representatives
15.20 – 15.45	Panel Topic 3: Tools for smarter and more resilient grids <ul style="list-style-type: none">Projects presentation: GridVis, XFLEX, PHOENIXPANEL DISCUSSION	All Panelists and project representatives
15.45 – 16.00	Conclusions	Olivier Genest – Moderator

- ***SCOPE OF THE SESSION***

- Data sharing to enable flexibility markets: interoperability across projects (with the Bridge data mgt WG?)
- IoT, interoperability and cybersecurity of appliances (idem).
- What are the R&I priorities based on projects experience.

- ***PANEL TOPICS***

- PANEL 1: Big data and data spaces
- PANEL 2: Supporting data exchanges and cooperation between stakeholders
- PANEL 3: Tools for smarter and more resilient grids

Panellists



Mark Van Stipout
(European
Commission DG
ENERGY)



Maher Chebbo
(ETIP SNET WG4
Co-chair)



Esteban Pastor
ETRA and IANOS
project
Representative

Opening Speech (video recorded TBC)

Introduction about the Digitalising the energy sector – EU action plan



Mark Van Stiphout (European Commission DG
ENERGY)

PANEL 1: Big data and data spaces

Project Presented and speakers:



OPEN-DEI
Alberto Dognini



PLATOON
Philippe Calvez

SYNERGY



BD4OPEM
Mònica
Aragüés
Peñalba

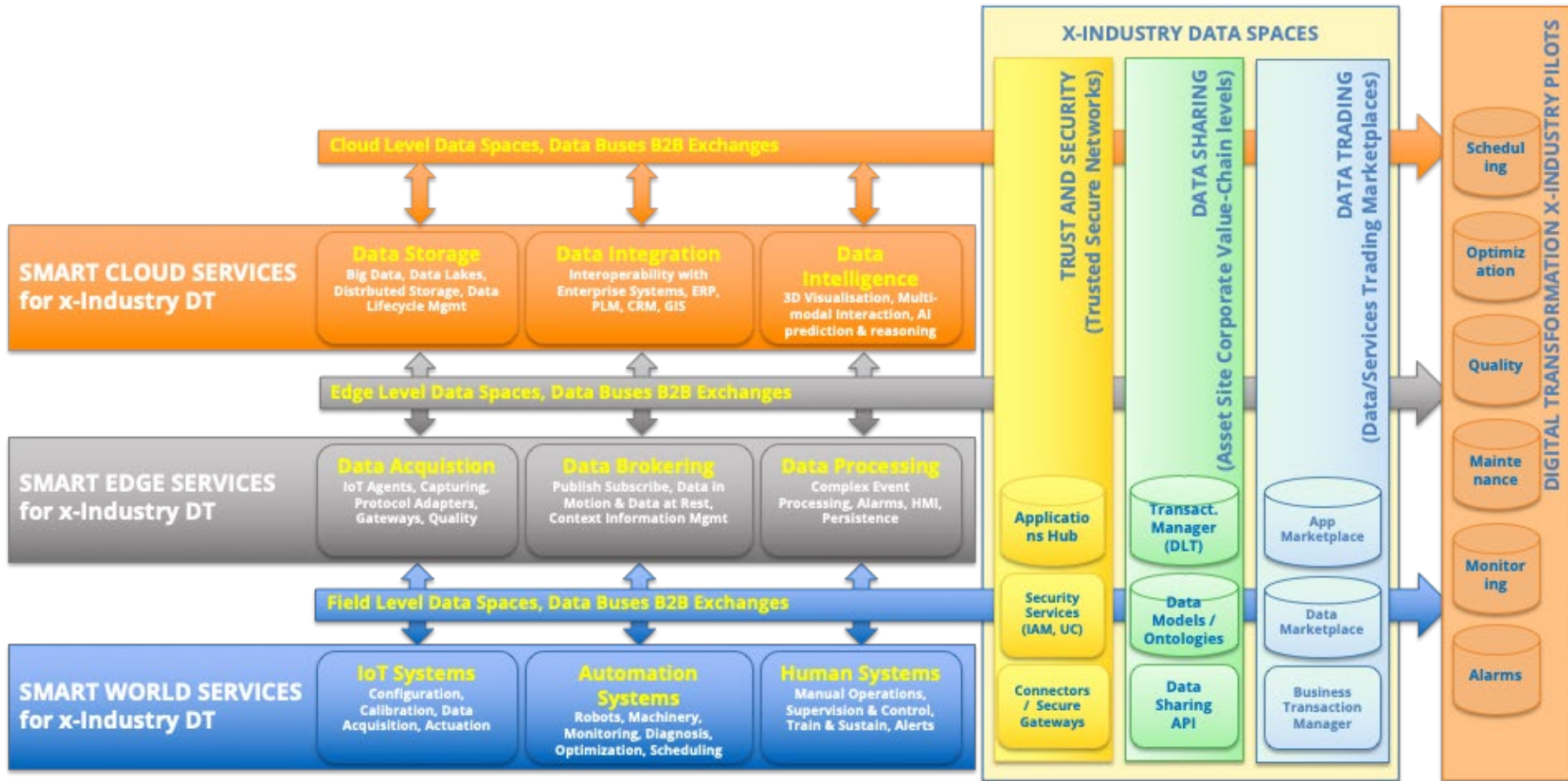


OPEN DEI Project

Alberto Dognini



OPEN DEI Reference Architecture Model

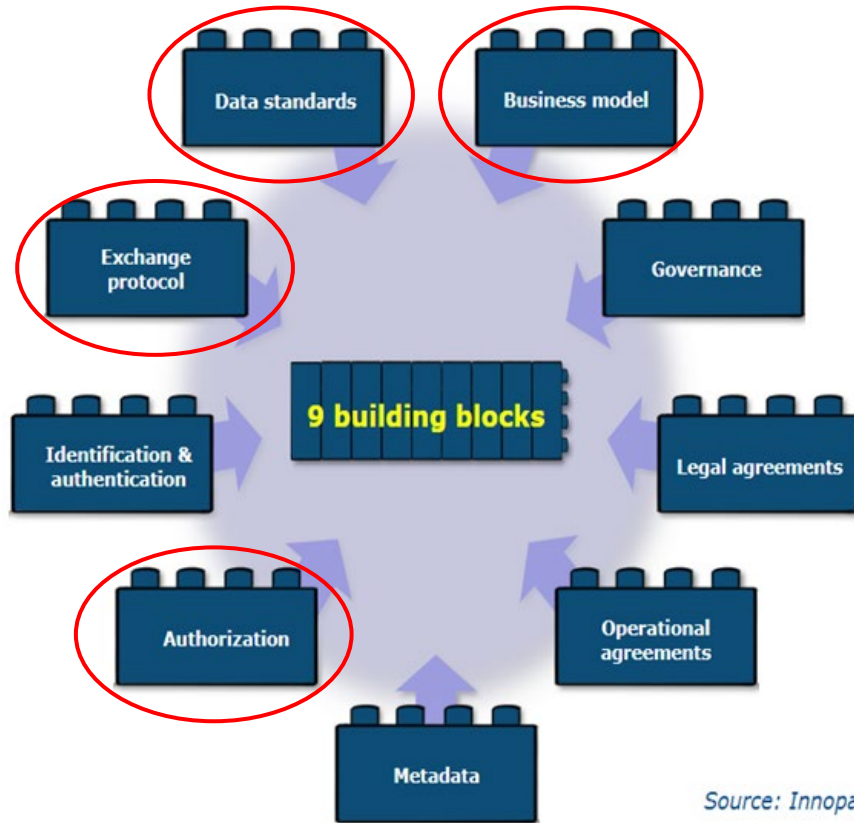


Some OPEN DEI lesson learned

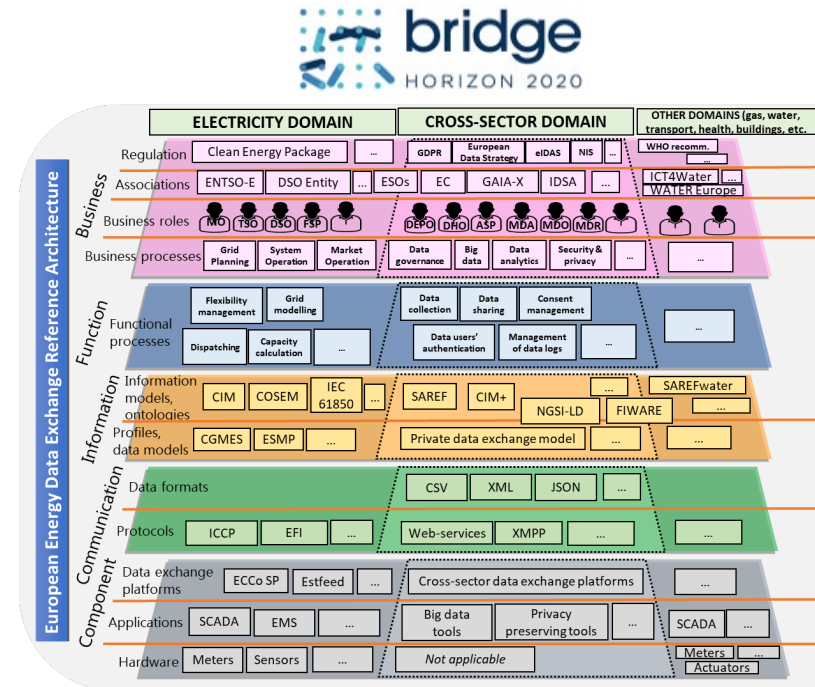
- In setting a **domain ecosystem**, it is particularly important to:
 - Analyze the critical difficulties that are common to multiple projects
 - Focus on the valuable and attracting aspects, starting from existing references
 - Identify reusable tools and methodologies
- The **new use cases** lead the renovation and enhancement of traditional reference models:
 - New components (communication, information, function...)
 - Different role of building blocks
 - Cross-domain data exchange
- The implementation of effective **data spaces** opens new business models, anyway it must be founded on data sovereignty, trust and governance



OPEN DEI Energy WG2 „Architectures in Data Exchange Frameworks“

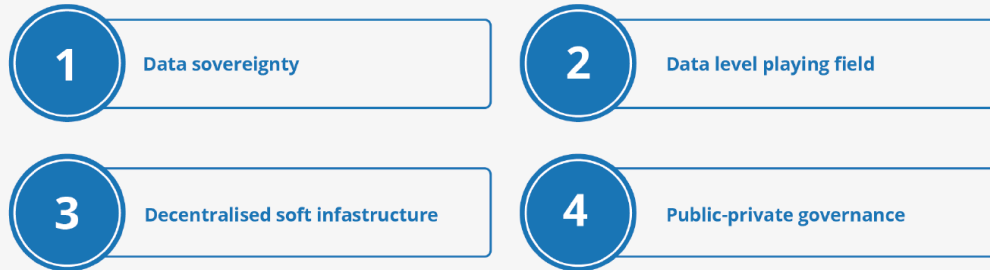


Source: Innopay



Source: BRIDGE H2020: European Energy Data Exchange Reference Architecture

Design Principles for Data Spaces



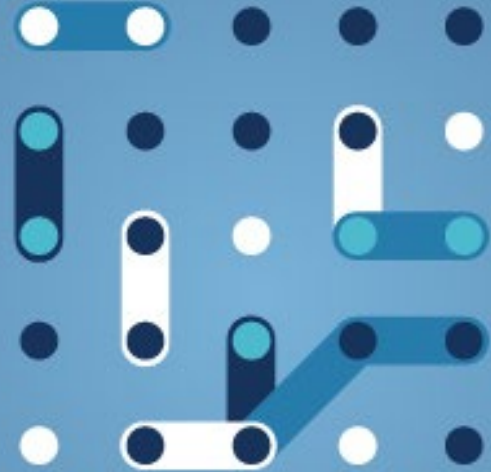
 Technical Building Blocks

 Governance Building Blocks



PLATOON

Philippe Calvez





PLATOON

Digital platform and analytic tools for energy

End to End Interoperable, Sovereign & Secure Ecosystem for Data driven Services for Energy Value Chain



1st December 2021 | ENLIT EUROPE 2021, Milan



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No 872592



Dr. Philippe Calvez

PLATOON Coordinator
Head of Lab CSAI
@ Engie Lab Crigen



<https://www.h2020-bridge.eu/>



PLATOON

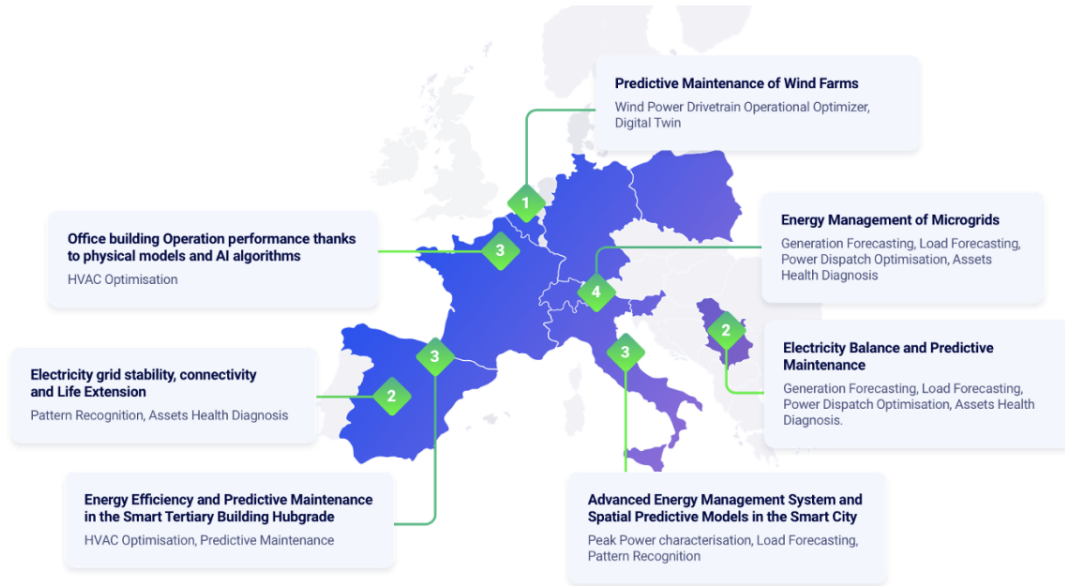
Digital platform and analytics tools for energy

Call: H2020-DT-2018-2020

Digitising and transforming European industry and services: digital innovation hubs and platforms

Topic: DT-ICT-11-2019 (Innovation Action)

Duration: 36 months, start date 01/01/2020



◆ Partners ◆ Pilots



Interoperability

Enabling data exchange and integrated value chains between platforms using a wide spectrum of heterogeneous data sources, formats and interfaces.

Data Governance & Security

Addressing digital sovereignty challenges of multiple data owners and providers for multi-party data exchange along the energy value chain via IDS-based connectors.

Data Analytics Toolbox & Edge Computing

Deploying technologies for data processing and analysis in batch and real-time to optimise the energy system management for the energy domain experts.

7

European Pilots

25

Use Cases linked Energy Value Chain

19

Ontologies considered and extended

650

New concepts

54

Number of data analytics tools

49 Energy Specific

5 Generic

49 Proprietary

5 Open Source

50 Batch

4 Realtime

48 Cloud-Premise

6 Edge

3 Big Data (5Vs)

3 Semantic Analytics

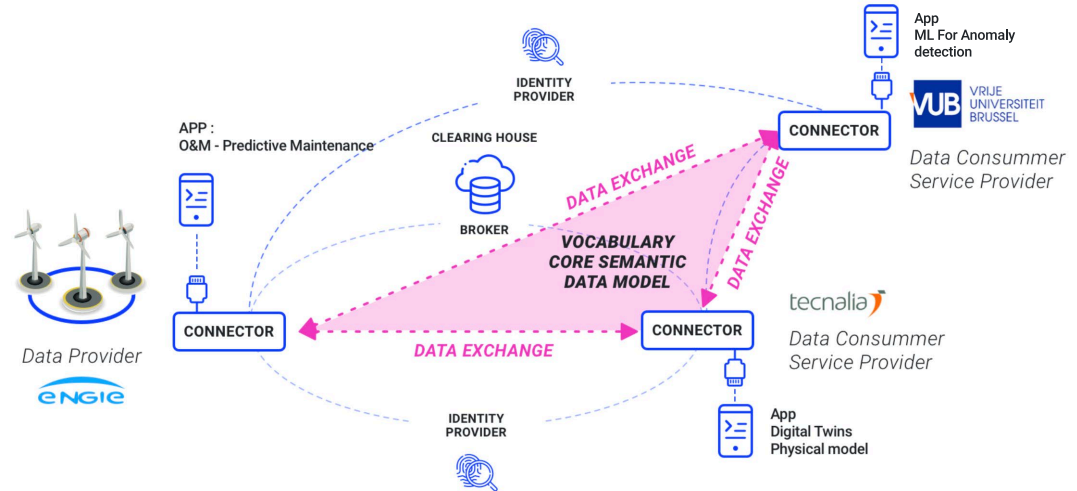




PLATOON

Digital platform and analytics tools for energy

PLATOON shows, in the implementation of use cases leveraging the three main pillars, the need to set up not platforms but ecosystem with functional blocks that can be declined into interoperable solutions / technical blocks that able these connected digital ecosystems to share data, representations and services with a cross sector focus (energy and Beyond, business/customer centric approach).



One of the challenges when talking about data driven services with Big Data approaches, as it can be the case for example in use cases dealing with high frequency data of renewable assets (wind turbine), is to be able to process semantically represented data in an end to end "Big Data" mode.

PLATOON by its ability to process the three pillars is positioned as a "beta implementation" of the notions of DATA SPACE for ENERGY notably by using interoperability and standards approaches (Semantic Data Model) but also secure data transfer (IDS Connector).

PLATOON is part of initiatives such as OPEN DEI / BRIDGE / GAIAX / BDVA (TF Energy) / IDSA





SYNERGY





BD4OPEM

Mònica Aragüés
Peñalba

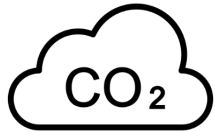


BD4OPEM H2020

Big data for Open Innovation Energy Marketplace



BD4OPEM



DECARBONISATION

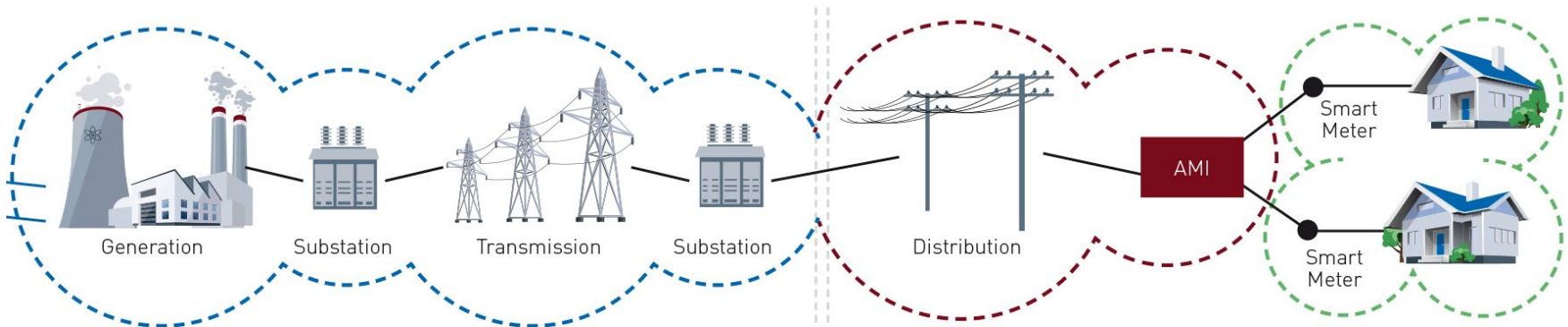


DECENTRALISATION

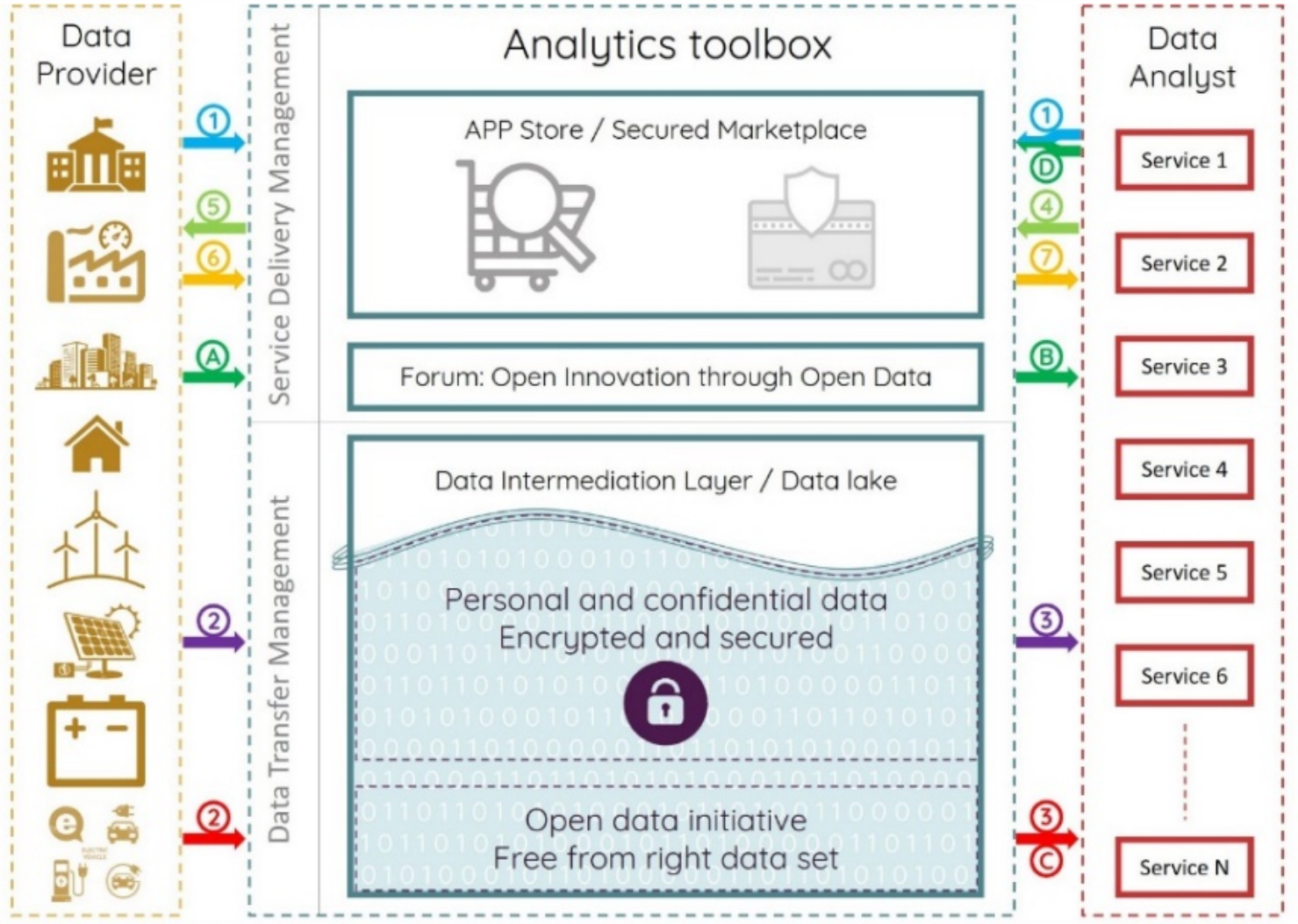


DIGITALISATION

The smart meter is at the heart of the transformation of the electricity grid into a smart grid



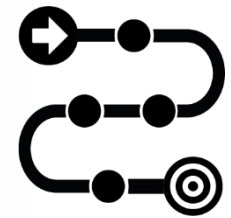
micro vs MEGA: trends influencing the development of the power system. Source: ISGAN



Monitoring



Operation and maintenance



Planning



 Service Demand
  Free from right data
  € Transaction
  New Service Demand
 Service Offer
  Confidential Data flow
  Data analysis
  New Service Offer

Open Source

PANEL 2: Supporting data exchanges and cooperation between stakeholders

Project Presented and speakers:



INTERFACE
Nikolaos Bilidis



PlatOne
Ferdinando Bosco



Euniversal
Susete
Albuquerque



INTERFACE

Nikolaos Bilidis



About INTERFACE



INTERFACE

LC-SC3-ES-5-2018-2020: TSO-DSO-Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation

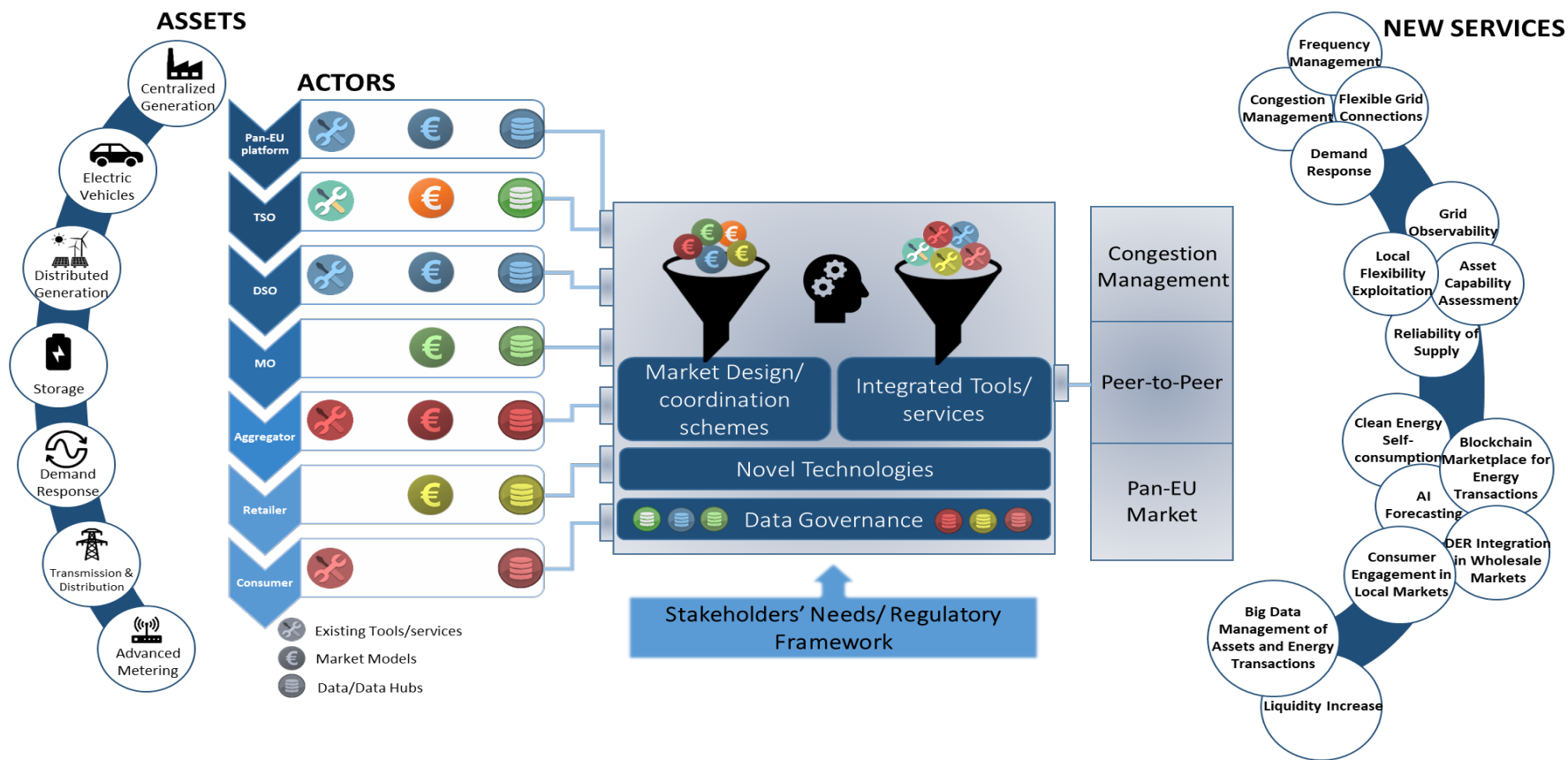
Title: TSO-DSO-Consumer *INTERFACE* aRchitecture to provide innovative grid services for an efficient power system

- *Project Grant Agreement No. 824330*
- *Budget: 20.9 M Euro*
- *Grant: 16.8 M Euro*
- *Duration: 4 Years*

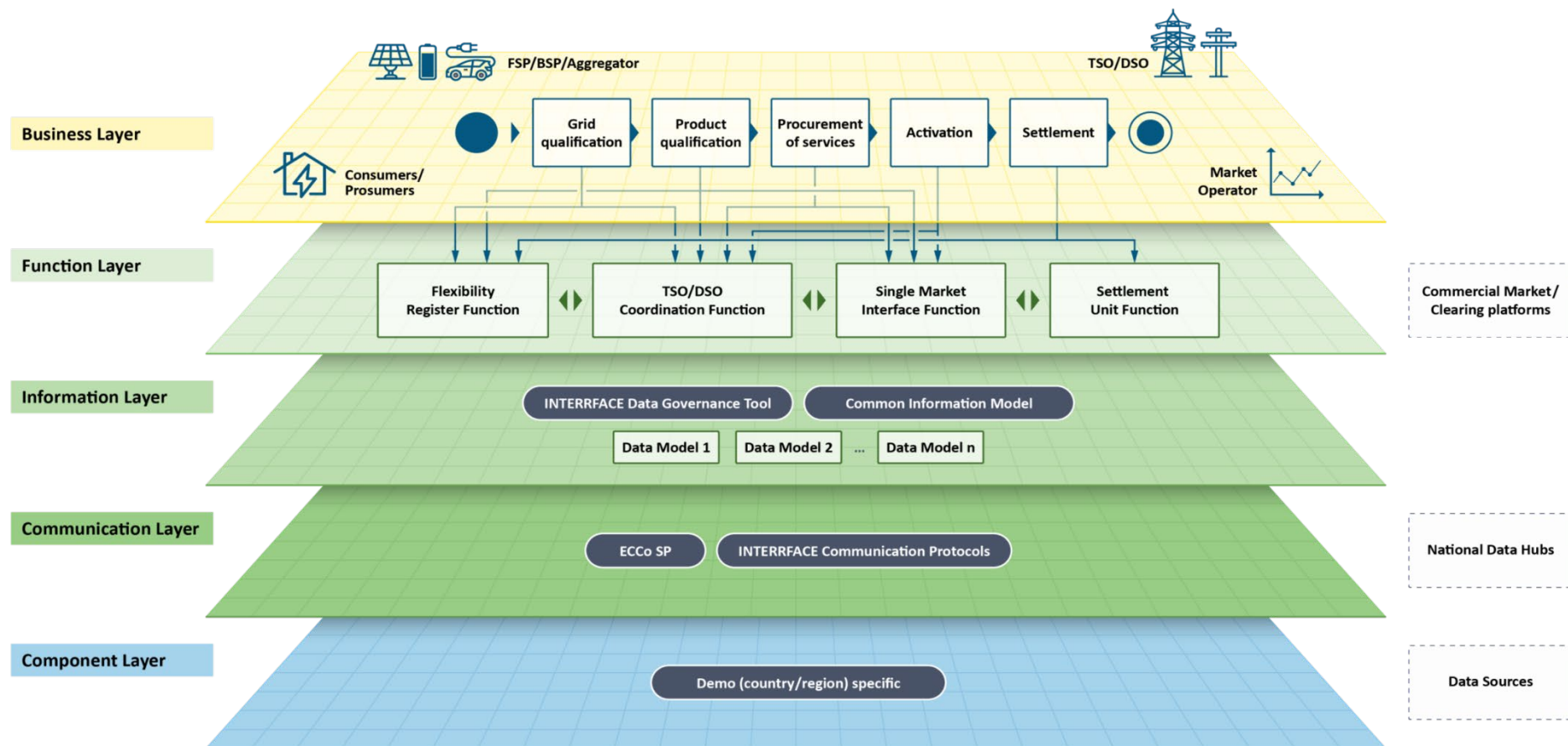


 **This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824330**

INTERFACE - IEGSA



INTERFACE - IEGSA





Platone

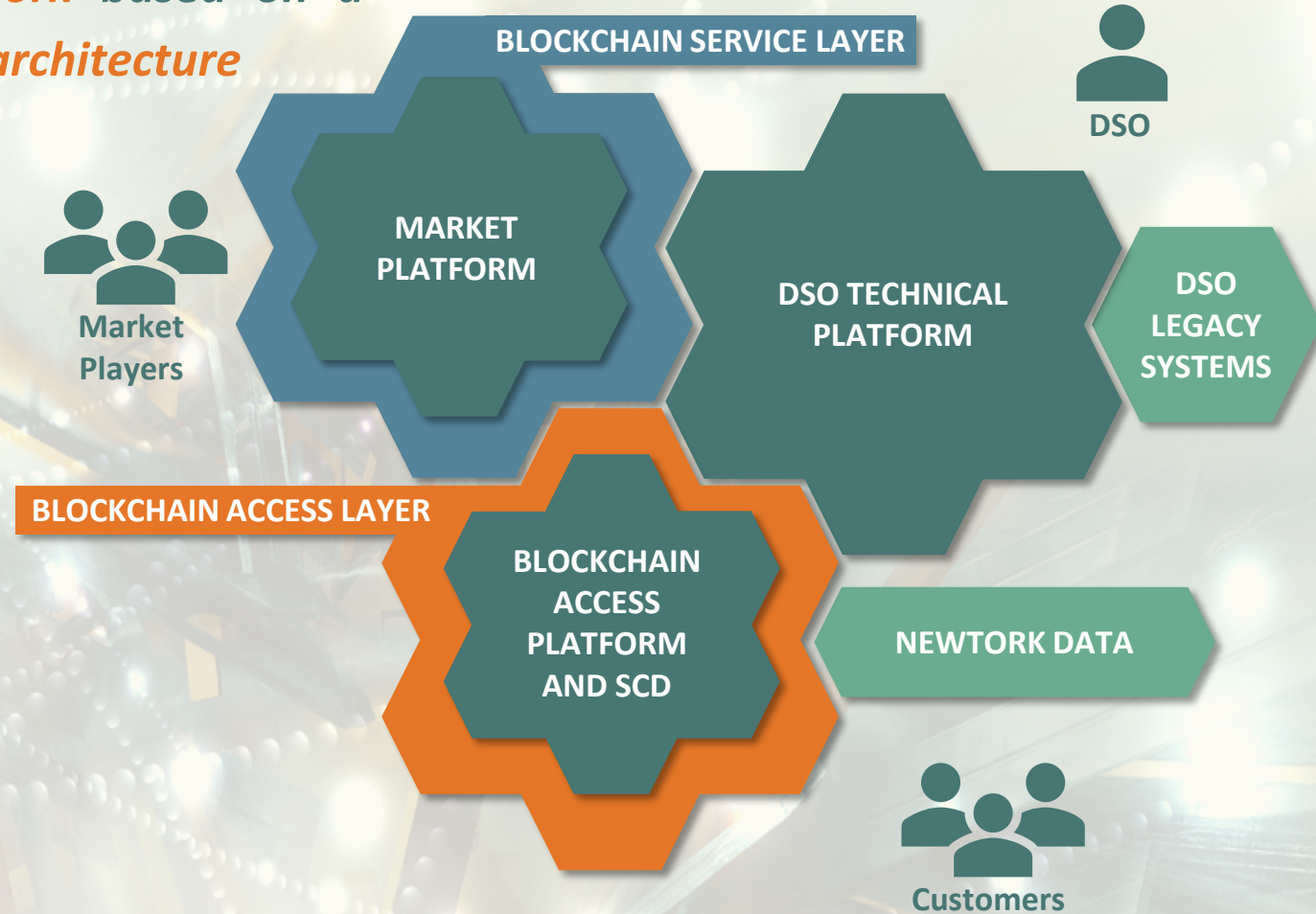
Ferdinando Bosco



The Platone Open Framework



Open source framework based on a two-layer blockchain architecture



3 Key Objectives

- Enable a **secure and shared energy data management**
- Allow **standard and flexible integration of external solutions** (e.g. legacy systems)
- Open to **integration of external services through standardized APIs**

Main results



Platone Market Platform enables an **open and fair flexibility market** involving any possible market participant (DSOs, TSOs, aggregators, customers...) All the **market operations are registered and certified within the blockchain** service layer, ensuring transparency, security and trustworthiness among all the market participants.

Platone DSO Technical Platform is an **open-source extensible microservices platform** and it allows DSOs to manage the distribution grid in a **secure, efficient and stable manner**. It is an evolution of the H2020 SOGNO platform that has been accepted in the well-recognised, international **Linux Foundation Energy (LFE)**.

Data Bus layer of the **DSO Technical Platform** allows **integration both of other components of Platone framework** and of **external components** using standard protocols and interoperable interfaces. It also allows the integration of the network data.

Platone Blockchain Access Layer provides a standard interface for the **integration of the energy data coming from meter devices** and offers a common data source (**Shared Customer Databases**) for allowing the access of all the energy data to any **energy stakeholder** in an easy and shared way without compromising **security and privacy**.

Platone Open Framework tested and validated in 3 real field test (Italy, Greece and Germany)



EUniversal

Susete
Albuquerque



PANEL 3: Tools for smarter and more resilient grids

Project Presented and speakers:



GridVis
Conor Murphy



XFLEX
Chloé Fournely



PHOENIX
Ganesh Sauba

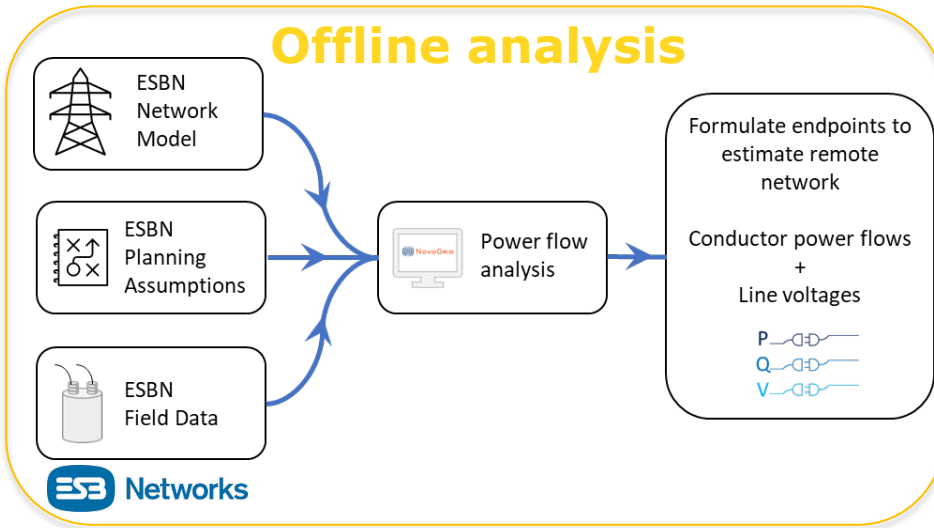


GridVis

Conor Murphy

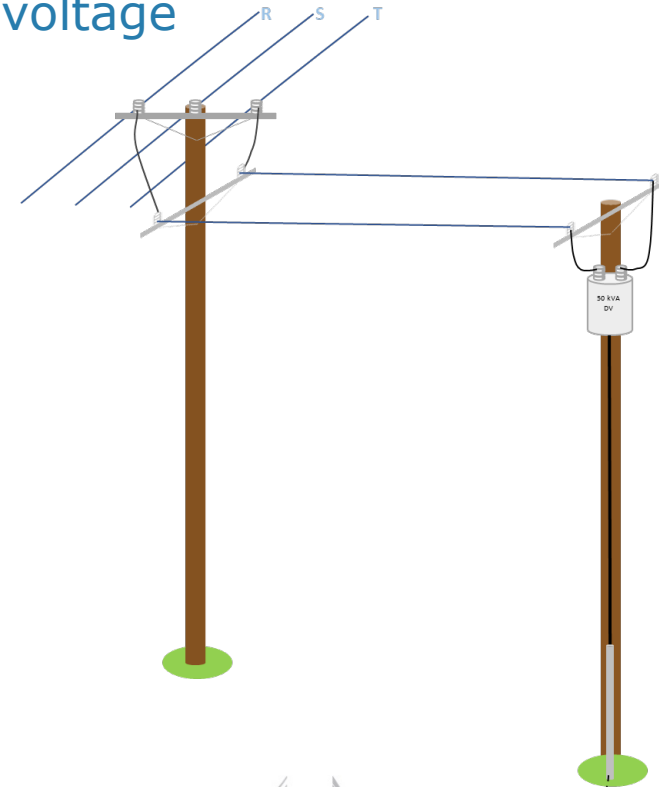


GridVis



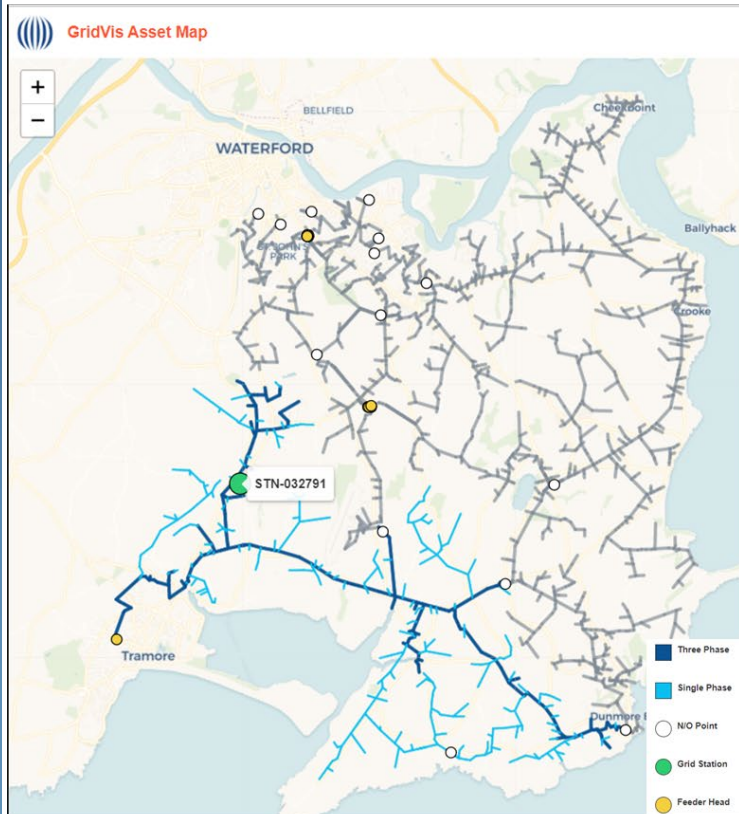
Live estimation of

- Power flows: $\{S, P, Q\}$
- Currents & % loading
- Line voltage



Measurement site and values

gridvismap.novogrid.com



∫ 100 measurements from MV/LV transformers from locations all over Ireland

Live estimations

GridVis Asset Map



gridvismap.novogrid.com

Uses in planning + operation

- Performance monitoring
- Future aggregators
- Shows headroom for new connections
- Inform operation of switchable asset

 @conoromurchu
 [linkedin.com/in/conoromurchu](https://www.linkedin.com/in/conoromurchu)
www.novogrid.com





X-FLEX

Chloé Fournely



X-FLEX

PROJECT OBJECTIVE:

Develop complementary products offering flexibility services to all the energy stakeholders



	SERVIFLEX	MARKETFLEX	GRIDFLEX
User	Flexibility managers	Market operator, Flexibility Service Providers, DSO	DSO and microgrid operators
Added value	<ul style="list-style-type: none"> - Holistic framework - Flexibility extraction, profiling, forecasting, classification, clustering and management - Serve market and grid needs 	Enable small-scale flexible sources to participate on wholesale and local energy markets	<ul style="list-style-type: none"> - Automatic grid observability and control, - Prevent congestion and power quality problems - Enhance resilience for extreme climate event - Use flex. As an alternative to network reinforcement

X-FLEX

4 PILOT LOCATIONS

- ❖ *RAVNE NA KOROŠKEM, Slovenia*
Flexibility of the Power to heat on an industrial site
- ❖ *LUČE, Slovenia*
Flexibility of local energy community
- ❖ *ALBENA, Bulgaria*
Flexibility on a commercial site and microgrid/TSO cooperation
- ❖ *XANTHI, Greece*
Green flexibility for network resilience



X-FLEX

MODULES FOR SMART AND RESILIENT GRID



SERVIFLEX

- 💡 DER profiling (EV, battery, generation)
- 💡 P2X profiling
- 💡 Demand Side profiling (HVAC, Lighting)
- 💡 Flexibility clustering
- 💡 Flexibility aggregation
- 💡 VPP configuration
- 💡 Intra-portfolio optimization

MARKETFLEX

- 💡 Activation optimisation function (local market clearing)
- 💡 Connection to existing wholesale markets
- 💡 Distribution Grid Cooperation Module (DSO/TSO)

GRIDFLEX

- 💡 Demand and Production forecast
- 💡 Topology management
- 💡 Power flow simulation
- 💡 Congestion forecast
- 💡 State estimation
- 💡 Congestion detection
- 💡 Demand Side management
- 💡 Extreme weather resilience (reconfiguration)



PHOENIX

Ganesh Sauba



Electrical Power System's Shield against complex incidents and extensive cyber and privacy attacks



Enlit Europe 2021
Milan

30th November – 2nd December 2021

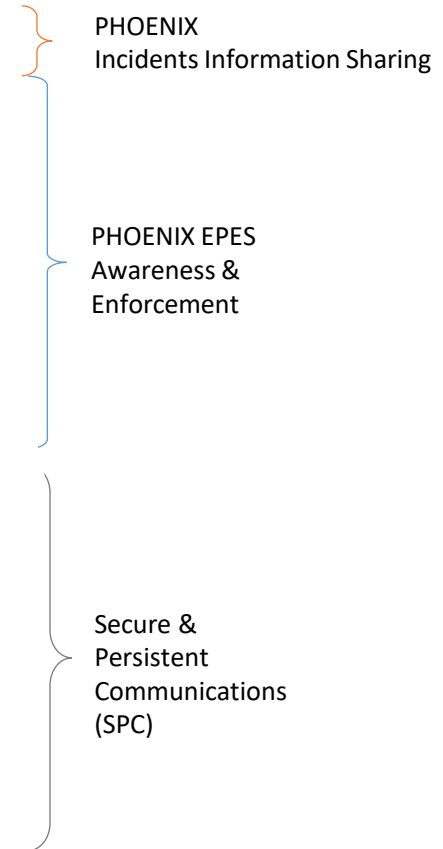
Ganesh Sauba
DNV-Netherlands

Vision and Scope

- **Strengthen EPES cybersecurity preparedness**
 - ❖ Cybersecurity Preparedness/Privacy by Design & Cybersecurity by Innovation
- **Coordinate EPES cyber incident discovery, response and recovery**
 - ❖ Facilitate cyber threat intelligence (CTI) sharing among authorized utilities, CERTs, CSIRTs, ISACs, NRAs and the NIS cooperation group
 - ❖ Accelerate Directive on Security of Network and Information Systems
- **Accelerate research and innovation in EPES cybersecurity**
 - ❖ DevSecOps mechanism to ensure code security during its lifetime
 - ❖ Applied privacy preserving (federated) Machine Learning
 - ❖ Definition of certification methodologies and procedures



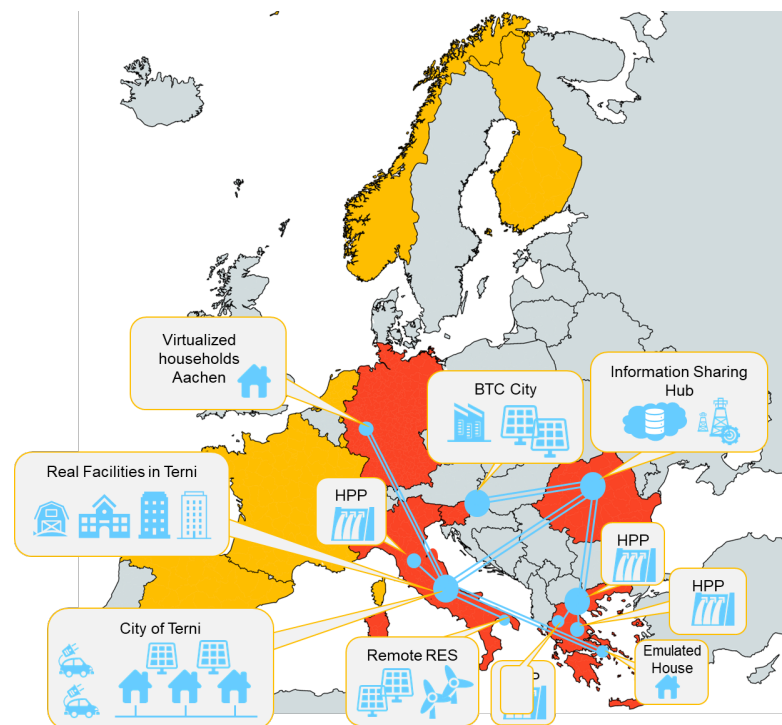
PHOENIX Simplified Architecture



Overview

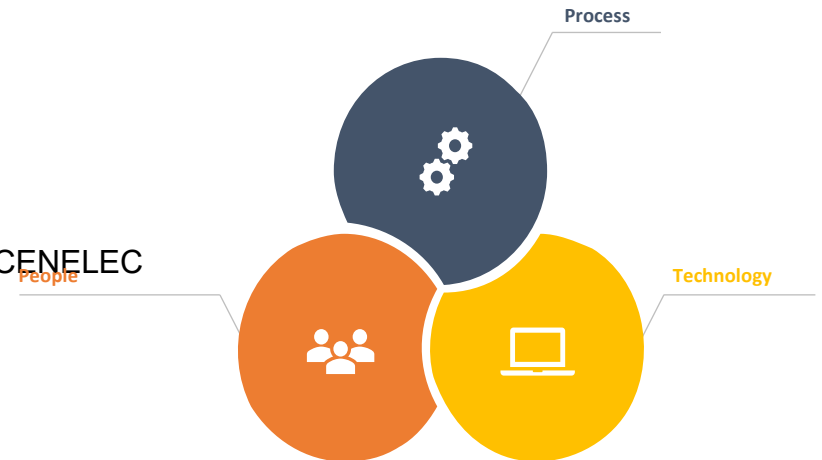
5 diverse Large-Scale Pilots

- ❖ Multi-utility/Multi-owner RES cyberthreats and data breach detection (Italy)
- ❖ National-wide cooperative remotely controlled HPP (Greece)
- ❖ Collaborative Microgrid-enabled cyber risks mitigation (Slovenia)
- ❖ Collaborative / DSO flexibility vs cybersecurity and privacy (Italy, Germany, Greece)
- ❖ National vs Pan-European cooperative cyber threat information sharing (Romania)



Testing, Certification and Standardisation

- A Certification of a RES hybrid facility will be based on requirements from the ISA/IEC 62443 standard series dealing with:
 - ❖ **1. Zones and Conduits Advisory**
 - Assessment and analysis of the current network architecture with respect to zones and conduits
 - ❖ **2. Gap Assessment**
 - Towards IEC 62443-3-3
 - Documentation review and test plan
 - ❖ **3. Attestation of Compliance**
 - DNV will issue Attestation of Compliance to IEC 62443 SL-2 for the type/penetration testing
 - work that is being currently carried out for PHOENIX
 - component(s) and LSPs.
 - ❖ **4. Standardisation Work**
 - Monitoring and contribution activities in the TC205 CEN/CENELEC Committee for PrEN 50491-12-2.



Thank you for your attention



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No: **832989** with the management of the Innovation and Networks Executive Agency (INEA).



<https://phoenix-h2020.eu>



[company/phoenix-h2020/](https://www.linkedin.com/company/phoenix-h2020/)



[@H2020Phoenix](https://twitter.com/H2020Phoenix)

Dr. Ganesh Sauba
Group Research & Development
Energy Systems & Renewables
DNV - Netherlands



Back-up - Large Scale Pilots – Main Goals

- ❖ **LSP1 Multi-utility/Multi-owner RES cyberthreats and data breach detection (Italy)**
 - Securing MV/LV and generation asset and Preventing data breaches
 - Securing collaboration mechanisms among DSO, RES manager, eMobility and other critical infrastructures
- ❖ **LSP2 National-wide cooperative remotely controlled HPP**
 - Preventing data breaches
 - Cybersecurity attack scenarios on HPP generation – transfer power grid
- ❖ **LSP3 Collaborative Microgrid-enabled cyber risks mitigation (Slovenia)**
 - Cybersecurity attacks on MV/LV EPES assets and AMI
 - Demonstration of on how can the microgrid contribute to the resiliency of the DSO network by utilizing the microgrid energy loads via appropriate power flow rerouting patterns.
- ❖ **LSP4 Collaborative / DSO flexibility vs cybersecurity and privacy (Italy, Germany, Greece)**
 - Securing sensing infrastructure and control modules
 - Securing Demand Response system
- ❖ **LSP5 National vs Pan-European cooperative cyber threat information sharing (Romania)**
 - Hosting I2SP platform to be used by all other PHOENIX LSPs .
 - Simulating a standard internet infrastructure of an EPES and getting data from real internet common cyberattacks for Phoenix tools

Conclusions



Olivier Genest – Moderator



bridge