ETIP SNET
European Technology and Innovation Platform
Smart Networks for Energy Transition

11th ETIP SNET Regional Workshop
Parallel Session 3 - Digitalisation: Managing energy data and Cyber security
21 April 2021
Parallel Session 3: Structure

1. Part 1: Welcoming and Parallel session 3 Goal, structure and Audience Polling on highest and lowest priority of 6 ETIP SNET Research Areas

   **Goal of the session:** Better understanding Session 3 topic related to R&I State of the Art; Needs, Gaps, Use Cases by discussion with R&I Project, BRIDGE and ETIP SNET experts and the EC

2. Part 2: Background information and base for discussion

3. Part 3: Six 99sec projects pitches with short discussion after each pitch

4. Part 4: Discussion on Digitalisation Use Cases (and the 12 ETIP SNET FUNCTIONALITIES)

5. Part 5: Discussion on Digitalisation R&I Needs (and 5 ETIP SNET Digitalisation Research TOPICS)
PART 1 – Welcoming, Panel structure and topics presentation

Rainer Bacher

Moderator
# Parallel Session 3 - Panellists

**Parallel Session 3**  
**Digitalisation: Managing energy data and Cyber security**

**Moderators**
- Rainer Bacher – BACHER Energie  
- Maria Laura Trifiletti – ZABALA

**Panellists**
- Svetoslav Mihaylov
- **Elena Boskov-Kovacs** – Blueprint Energy solutions
- Olivier Genest – Trialog
- Antonello Monti – RWTH Aachen University and Fraunhofer Center for Digital Energy
- Erik Maqueda Moro & Iñaki Angulo – Tecnalia
- Valeria Jana Schwanitz – HVL
- Niall Conway – Spatial Outlook Ltd
- Friederich Kupzog – AIT Austrian Institute of Technology GmbH
- Tasos Tsitsanis – Suite5 Data Intelligence Solutions

EC – DG CNECT  
ETIP SNET WG4  
BRIDGE Data Management WG Chair  
PLATONE Project  
PLATOON project  
EERA data project  
REDAP project  
LARGO project  
SYNERGY project
PART 1: Introductory poll

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Questions:
- Which sector are you from? [only 1 answer]
- In which country is your company located? [no abbreviations, full country Name in English]
- Which of the following is currently your primary research area?
Part 2: Background information and base for discussion

Rainer Bacher

Moderator
EU Energy Policy Goals

1. Secure, resilient, reliable supply

2. Affordable & market-based energy services

3. Protected environment
ETIP SNET: Main outcomes

May 2020
ETIP SNET R&I IMPLEMENTATION PLAN 2021-2024

Jan/June 2020
ETIP SNET R&I Roadmap 2020-2030

June 2018
VISION 2050
Integrating Smart Networks for the Energy Transition, Serving Society and Protecting the Environment

ETIP SNET
R&I Implementation Plan 2021-2024

ETIP SNET R&I Roadmap 2020-2030

ETIP SNET Vision 2050
R&I Project Demos build up the 5 ETIP SNET R&I Building Blocks

• BB 1: The efficient organisation of energy systems
• BB 2: Markets as key enablers of the energy transition
• BB 3: Digitalisation enables new services for Integrated Energy Systems
• BB 4: Infrastructure for Integrated Energy Systems as key enablers of the energy transition
• BB 5: Efficient energy use
R&I Project Researchers solve the R&I challenges of the 6 ETIP SNET Research Areas

• RA1: Consumer, Prosumer and citizen energy community
• RA2: System Economics
• RA3: Digitalisation
• RA4: Planning – Holistic Architectures and Assets
• RA5: Flexibility enablers and system flexibility
• RA6: System Operation
Part 3: *99sec projects pitches*

1. **PLATONE project** - Antonello Monti
2. **PLATOON Project** - Erik Maqueda Moro & Iñaki Angulo
3. **EERA data project** - Valeria Jana Schwanitz
4. **REDAP Project** - Niall Conway
5. **LARGO project** - Friederich Kupzog
6. **SYNERGY Project** - Tasos Tsitsanis
Platone – A blockchain based platform
Linking users, aggregators and operators

Antonello Monti | RWTH Aachen
A Glance at Platone Vision

1. Unlock flexibility to address local congestion and voltage stability
2. Improve grid operation through advanced observability approach
3. Improve customers engagement and facilitate their fair participation in the market
4. Support cooperation with the TSO
5. Ensure reliable and secure power supplies in the context of increasing DER penetration
Architectural proposal of H2020 PlatOne

- **A cost effective two-layer platform** for easy and secure access to customer-level data for operation and flexibility markets.

- **Edge cloud technology supported by blockchain mechanisms.**

- **Advanced monitoring with data-driven algorithms and low-cost Phasor Measurement Units (PMUs).**

- **Scalable solution for DSO as a turnkey service.**
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


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

Participants: 20 partners from 9 European countries (Belgium, France, Germany, Italy, Poland, Serbia, Slovenia, Spain, and Switzerland)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 872592
PLATOON: Main Investigation Areas

- **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.
Towards FAIR and open energy data for the low carbon transition
Prerequisite for digitization: FAIR and open data

**Community project (03/20-02/23):** Develop joined understanding on operationalization of FAIR/O low carbon energy data. Test FAIR ecosystem. Approach - go where the data are, organize community workshops to:

- standardize data governance,
- enable (meta-)data sharing and interoperability (incl. data hub as federated database),
- review & develop **technologies** to implement FAIR principles and related workflows (incl. testing of web standards, semantic web technologies, and multilingual data governance),
- define and implement (meta-)data standards at different levels of granularity,
- application to **use cases** (see below), add to EOSC best practices,
- FAIR licensing as the mean to handle public and private data.

**Use cases** 1) Building efficiency, 2) Power transmission and & distribution networks, 3) Energy materials, 4) Energy policies
Regional Energy Demand Analysis Portal (www.redap.eu)

Partners:  
**Ireland:** Codema (Dublin’s Energy Agency), Irish centre for High End Computing (NUIG), Spatial Outlook Ltd. - *Energy Demand Insights*  
**Austria:** Austrian Institute of Technology (Energy & Mobility Depts)  
**Sweden:** Chalmers University of Technology, Gothenburg

Timeline:  
11 Nov 2019 - 11 Nov/Dec 2021

Budget:  
€1.2m approx

Objectives:  
Automate an established process for building analysis.  
Add a transport analysis methodology.  
Augmented reporting for actionable data insights.  
Secure, online, database-driven, extendable system.  
Partnerships, exploitation, knowledge transfer.

Enable regional stakeholders to  
‘Prospect’ for Decarbonisation Opportunities  
(Synergies & Efficiencies)
REDAP - Mapping & Analysing Energy Demand

Digitalisation Use Cases

A living digital map

**Geospatial** - mapping & classification of (sub)regional demand.

Established digital standards

**Open Geospatial Consortium (OGC)**: interoperable, opensource.

Data translation & normalisation

**Limitations**: differing national data availability & structures.

Collate/integrate existing data

**Data sources**: Most is publicly available data, inhouse govt data.

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**Demand Intensity Estimates:**

- Emissions, Fuel Type, Energy Carrier
- Consumer Profile, Expenditure
Spatial Data Infrastructure (SDI) to manage/analyse national datasets.
Data model can be structured/aligned with EC INSPIRE geospatial metadata standards.
Secure system out of the box - can be deployed with further security.

Future integration potential:
- CIM network, SGAM datasets can be translated into REDAP and vice-versa.
- REDAP data: potential backdrop to ENTSOE HERM models.
LarGo! – Large-Scale Smart Grid Application Roll-Out

Challenges

- **Power system and ICT are becoming co-dependent**
  - Mutual effects due to failures
- **ICT infrastructure** used in the smart grid for both
  - Runtime operation
  - Application maintenance
- **Increased complexity** of software deployment/updates
  - Interdependencies between software components and power system components
- **How to assure system stability** when new software is deployed
  - What effects does erroneous software have on the power system?

Objectives

- Prepare **mass rollout of Smart Grid software applications**
  - Deployment services for Building Energy Management Systems
  - Support integration of renewables
- Analyse **technical side-effects of rollouts on ICT and power system infrastructure**
  - Large-scale and highly accurate system emulation
  - Controller- & Power-Hardware-in-the-Loop (C/P-HIL) methods
- Design of **secure infrastructure & robust applications** for fail-safe and resilient system operation
Main Outcomes

- **LarGo!** shows how *poorly managed ICT* and software rollouts can lead to *critical power system failures*.

- **LarGo!** *enables the mass rollout* of smart grid applications by defining a seamless, safe and secure *application deployment process*.

- The output of **LarGo!** *will have a strong impact on the efficiency* of smart grid rollouts and the adoption potential of new smart grid solutions.

Big Energy Data Value Creation within SYnergetic enERGY-as-a-service Applications through trusted multi-party data sharing over an AI big data analytics marketplace

Start Date
01/01/2020

42 Months

24 Partners

10 Countries

5 Demo Sites

Topic: DT-ICT-11-2019 Big data solutions for energy
SYNERGY Building Blocks towards an Energy Data Space

Data Ingestion (Batch Files, APIs, Streaming Data)

Data Collection Services Bundle
- Data Ingestion
- Data Transformation & QA (Mapping to CIM, Cleaning)

Data Security Services Bundle
- Data Access Control
- Data Anonymisation
- End-to-End Data Encryption

Data Sharing Services Bundle
- Data & AI Marketplace
- License & IPR Management
- Assets Contract Lifecycle Manager

Data Analytics Services Bundle
- Remuneration Policies for Multi-party Contracts
- Trained Energy Data Analytics Blocks
- Secure Multi-party Computations

Data Governance Services Bundle
- Data Lineage - CIM lifecycle management
- Data & Results Visualisation

Platform Mgmt Services Bundle
- API Gateway
- Orchestrator

DATA COLLECTION SERVICES BUNDLE

DATA SECURITY SERVICES BUNDLE

DATA SHARING SERVICES BUNDLE

DATA ANALYTICS SERVICES BUNDLE

DATA GOVERNANCE SERVICES BUNDLE

PLATFORM MGMT SERVICES BUNDLE
Interoperability and Standardisation in SYNERGY

**SYNERGY Common Information Model** based on state-of-the-art energy data modelling landscape: (a) evaluation of a large number of standards on their perceived relevance for SYNERGY, (b) mapping of CIM concepts to IEC CIM: IEC 61968/61970/62325, IEC 61850, OpenADR2.0b, USEF, SAREF, SAREF4ENER, SAREF4BLDG, CityGML

**Metadata Standards in SYNERGY:** DCMI, DCAT-AP, ISO 19115

**Data Formats in SYNERGY:** Parquet, JSON, XML, CSV/TSV, PNG/JPEG/any...

**Protocols in SYNERGY:** HTTP/HTTPS (RESTful API), TCP, AMQP, RPC
Part 4: Discussion on Digitalisation Use Cases (and the 12 ETIP SNET FUNCTIONALITIES)

Panel Discussion

All Panelists
Use Cases of Digitalisation

- Energy data + cyber security
- Contributing to EU Energy policy goals
PART 4: Audience Poll

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Questions:

1. Which three FUNCTIONALITIES (of the total of 12) are TOP priority in your [Digitalisation] Use Cases?

2. Which three FUNCTIONALITIES (of the total of 12) are LOWEST priority in your [Digitalisation] Use Cases?
Part 5: Discussion on Digitalisation R&I Needs (and 5 ETIP SNET Digitalisation Research TOPICS)

Panel Discussion

All Panelists
Development of Digitalisation Technologies for energy system integration

Topics identified in the ETIP SNET Implementation Plan 2021 - 2024

| 3.1 | Protocols, standardisation and interoperability (IEC, CIM, Information models) |
| 3.2 | Data Acquisition and Communication (ICT) (Data acquisition, Smart Meter, Sensors (monitoring), AMR, AMM, smart devices) |
| 3.3 | Data and Information Management (Platforms, Big Data, Software, IoT) |
| 3.4 | Cybersecurity (vulnerabilities, failures, risks) and privacy |
| 3.5 | End-to-end architecture (integrating market, automation, control, data acquisition, digital twin, end-users) |
PART 5: Audience Poll (1/2)

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**Question:**

1. Indicate the currently reached TRL (maturity level) for each of the following ETIP SNET R&I Digitalisation TOPICS

<table>
<thead>
<tr>
<th>Digitalisation</th>
<th>Description</th>
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<tbody>
<tr>
<td>3.1</td>
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R&I-related Digitalisation Steps (RHS-GREY BOXES)

Proposal for cross-sector data exchange reference architecture
PART 5: Audience Poll (2/2)

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**Question:**

1. Indicate up to three most important R&I-related Digitalisation Steps (RHS-GREY BOXES)
Do you have any ...

You would like to share?

Please write them on the chat and we will keep them in the proceedings!
Thank for your participation and attention!
Key conclusions
Session “3 Digitalisation: Managing energy data and Cyber security”

➢ Key statement 1
➢ Key statement 2
➢ ...

To panel members: Could you indicate ahead of meeting possible proposals for key session conclusions / statements from your side? Please, write them (as suggestions) in the dot list below and send them to rainer.bacher@bacherenergie.ch and mtrifiletti@zabala.eu