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 April2021

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***

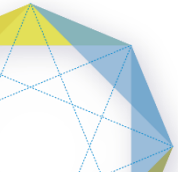
4. ***Part 4: Discussion on Digitalisation Use Cases (and the 12 ETIP SNET FUNCTIONALITIES)***

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



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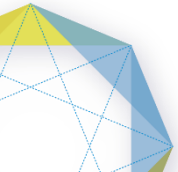
Parallel session 3 - Panellists

Parallel Session 3 Digitalisation: Managing energy data and Cyber security	
MODERATORS	
Rainer Bacher – BACHER Energie	**Maria Laura Trifiletti** - ZABALA
PANELLISTS	
- **Svetoslav Mihaylov**	EC - DG CNECT
- **Elena Boskov-Kovacs** – Blueprint Energy solutions	ETIP SNET WG4
- **Olivier Genest** – Trialog	BRIDGE Data Management WG Chair
- **Antonello Monti** - RWTH Aachen University and Fraunhofer Center for Digital Energy	PLATONE Project
- **Erik Maqueda Moro & Iñaki Angulo** - Tecnalia	PLATOON project
- **Valeria Jana Schwanitz** - HVL	EERA data project
- **Niall Conway** - Spatial Outlook Ltd	REDAP project
- **Friederich Kupzog** - AIT Austrian Institute of Technology GmbH	LARGO project
- **Tasos Tsitsanis** - Suite5 Data Intelligence Solutions	SYNERGY project



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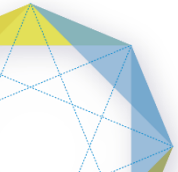
PART 1: Introductory poll

SLIDO www.slido.com

Code: #635722

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?***



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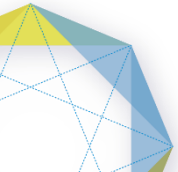
Part 2: Background information and base for discussion

Rainer Bacher

Moderator



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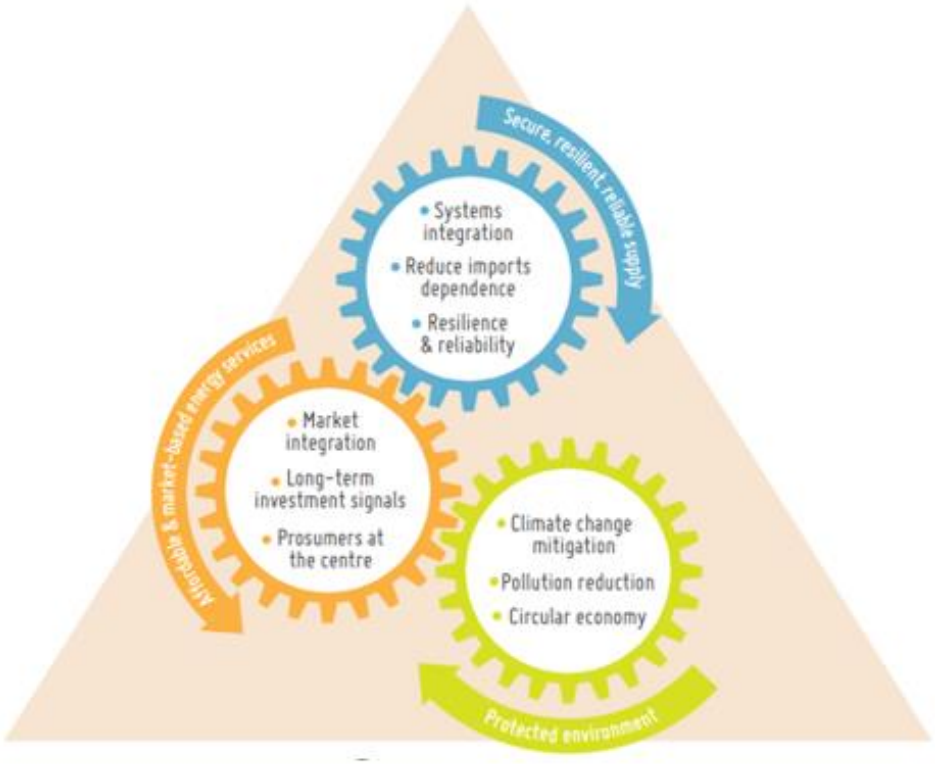
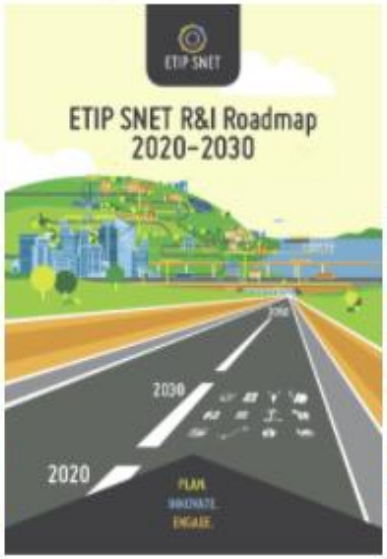
EU Energy Policy Goals



1. ***Secure, resilient, reliable supply***
2. ***Affordable & market-based energy services***
3. ***Protected environment***

ETIP SNET: Main outcomes

May 2020	Jan/June 2020	June 2018
		
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

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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

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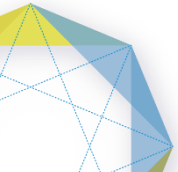
Part 3: 99sec projects pitches

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*



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Platone

PLATFORM FOR OPERATION
OF DISTRIBUTION NETWORKS

Platone – A blockchain based platform

Linking users, aggregators and operators

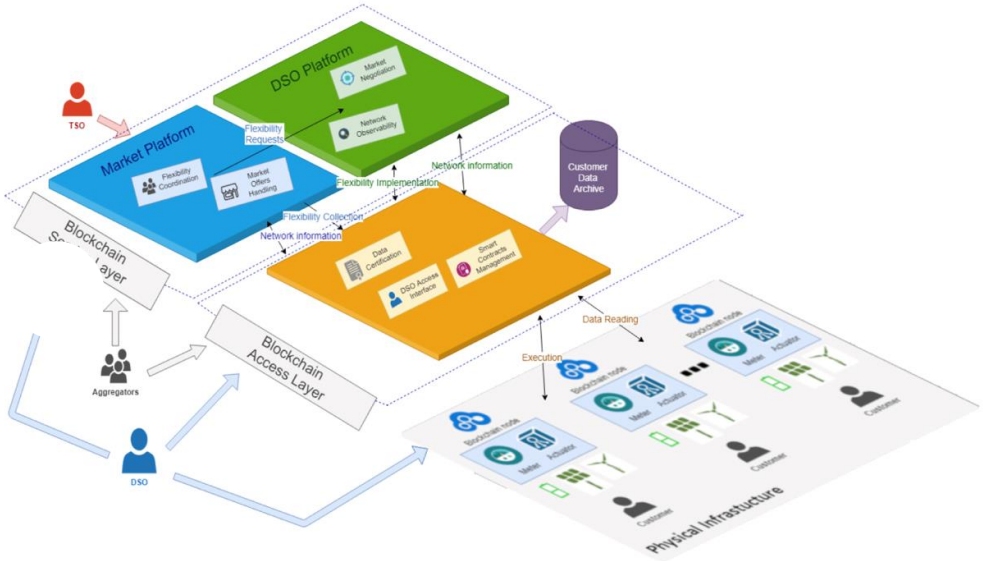
Antonello Monti | RWTH Aachen

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

Topic: DT-ICT-11-2019 (Innovation Action) Big Data For Energy

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)

Horizon 2020 Programme

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.

EERA data

TOWARDS A FAIR AND OPEN DATA ECOSYSTEM IN THE LOW-CARBON ENERGY RESEARCH COMMUNITY

Prof. Dr. Valeria Jana Schwanitz
Western Norway University of Applied Sciences
https://www.eeradata.eu/, valerias@hvl.no

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

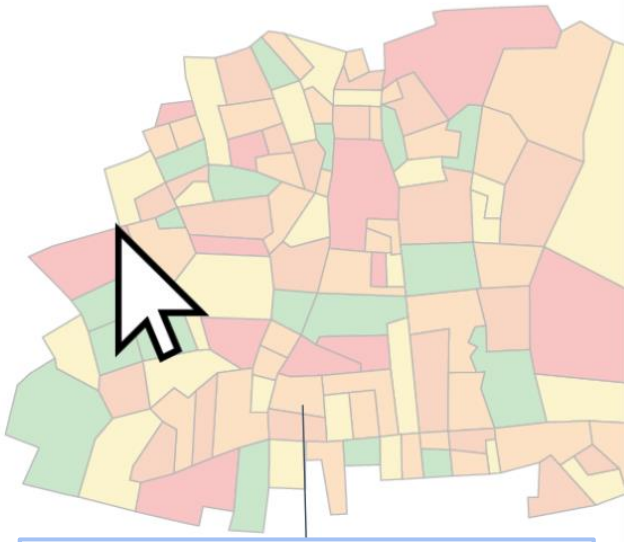
Open Geospatial Consortium (OGC): interoperable, opensource.

Data translation & normalisation

Limitations: differing national data availability & structures.

Collate/integrate existing data

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



Demand Intensity Estimates:

Emissions, Fuel Type, Energy Carrier

Consumer Profile, Expenditure

REDAP - Digitalisation for Energy System Integration

- **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.

FLEXIBILITY, INTEROPERABILITY, SECURITY, SUSTAINABILITY, EFFICIENCY, INCLUSIVITY, PROSPERITY

Predictable by nature	Flexible by nature	Unpredictable by nature
Supply (mechanical)	**Digitalisation** (hybrid)	**Demand** (human)
Physical Infrastructure	Taxonomy	Interests
Energy Network	Epistemology	Policy
Generation	Digital standards	Knowledge
Storage	Interoperability	Sentiments
		Lifestyle & Behaviour

LarGo! – Large-Scale Smart Grid Application Roll-Out

Challenges

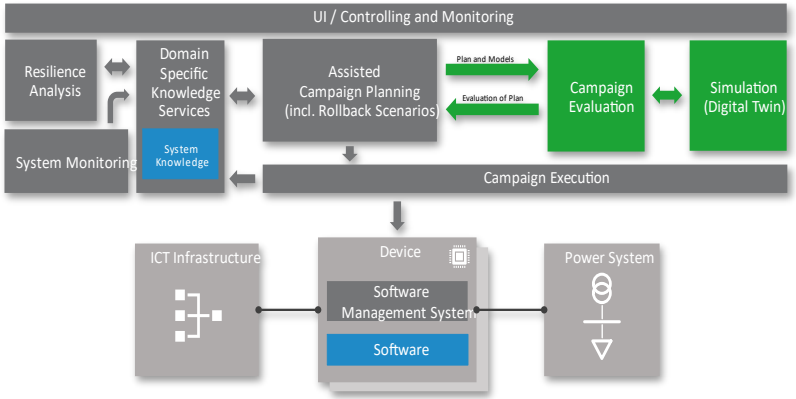
- *Power system and ICT are becoming **co-dependent***
  - **Mutual effects due to failures**
- ***ICT infrastructure** used in the smart grid for both*
  - **Runtime operation**
  - **Application maintenance**
- ***Increased complexity** of software deployment/updates*
  - **Interdependencies between 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

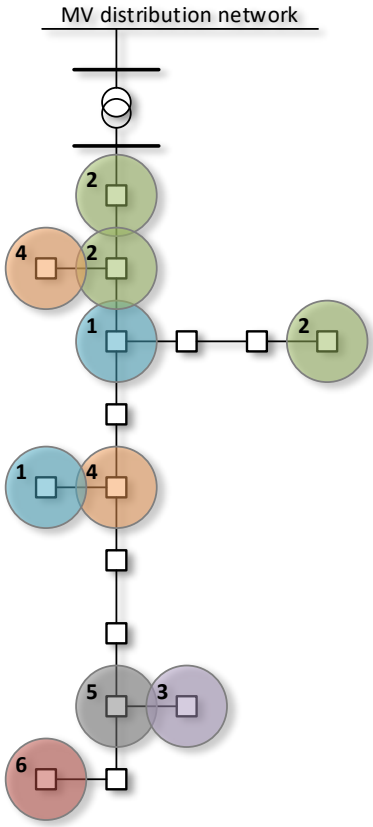
- *Prepare **mass rollout of Smart Grid software applications***
  - **Deployment services for Building Energy Management Systems**
  - **Support integration of renewables**
- *Analyse **technical side-effects of rollouts on ICT and power system infrastructure***
  - **Large-scale and highly accurate 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*



Unified deployment process



Optimal software rollout scheduling

More Information: http://www.largo-project.eu/
Whitepaper Large-Scale Smart Grid Application Roll-Out.", 2020, http://www.largo-project.eu/resources/D1_1_Whitepaper.pdf.

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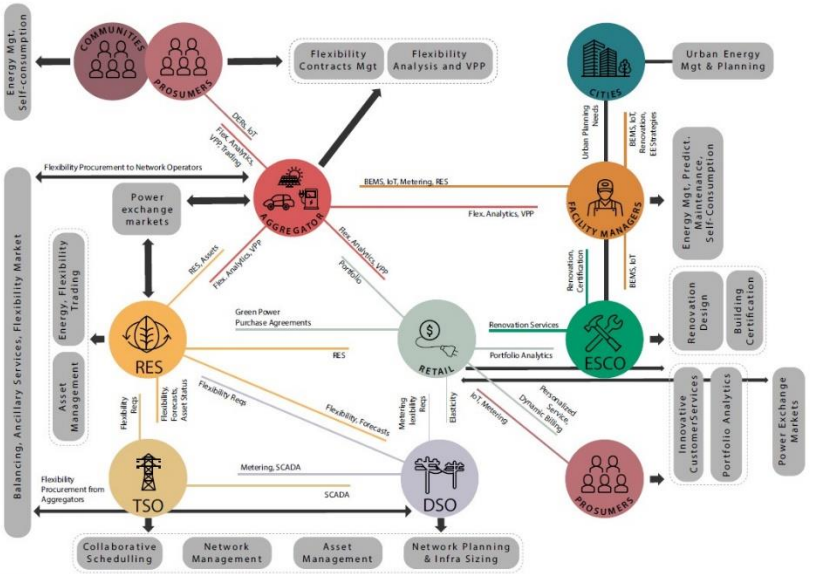
SYNERGY

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	24 Partners
42 Months	10 Countries
Innovation Action	5 Demo Sites



Topic: DT-ICT-11-2019 Big data solutions for energy

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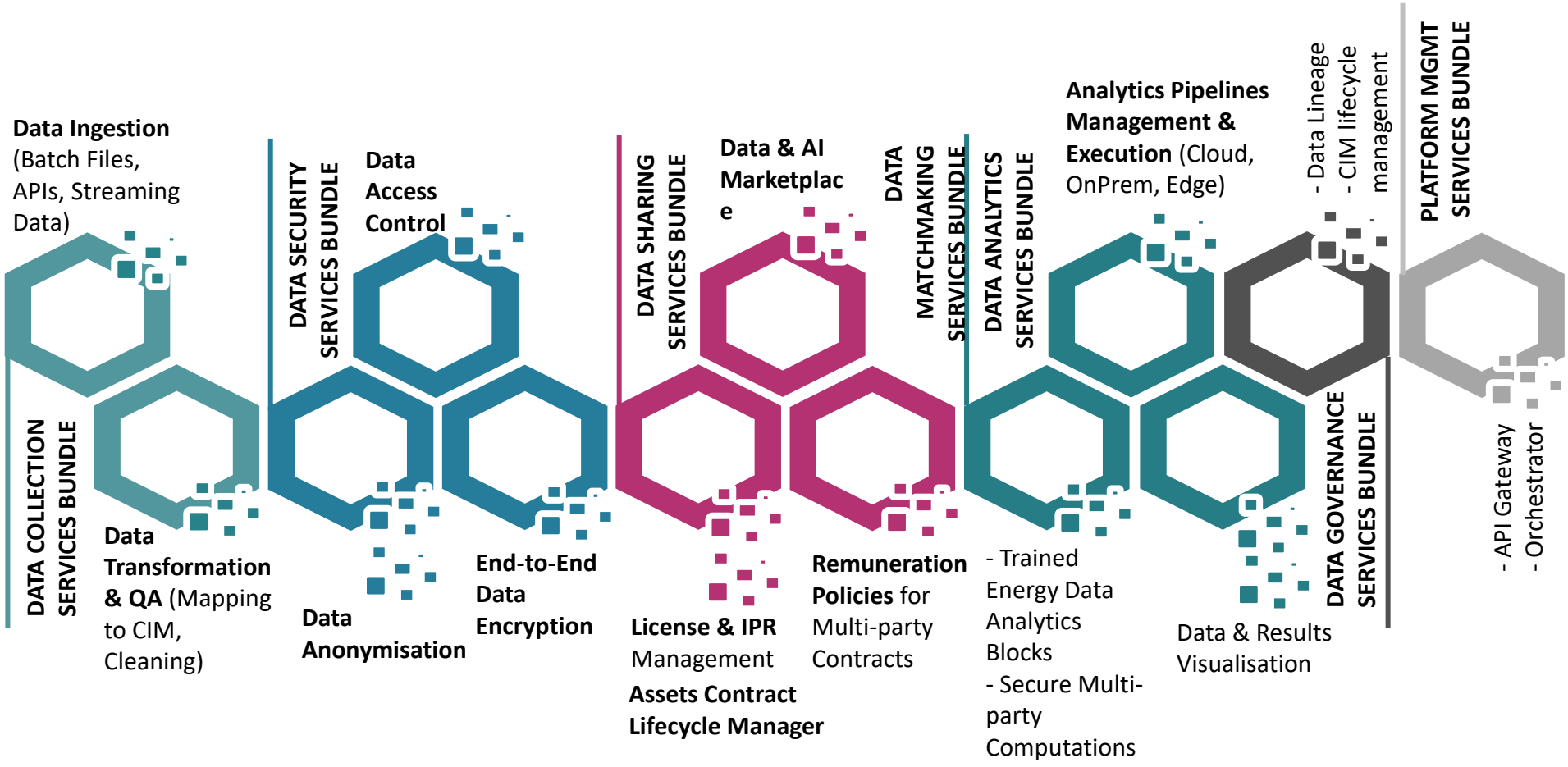
SYNERGY Building Blocks towards an Energy Data Space



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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

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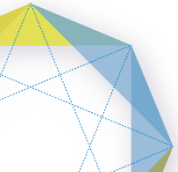
Part 4: *Discussion on Digitalisation Use Cases (and the 12 ETIP SNET FUNCTIONALITIES)*

Panel Discussion

All Panelists



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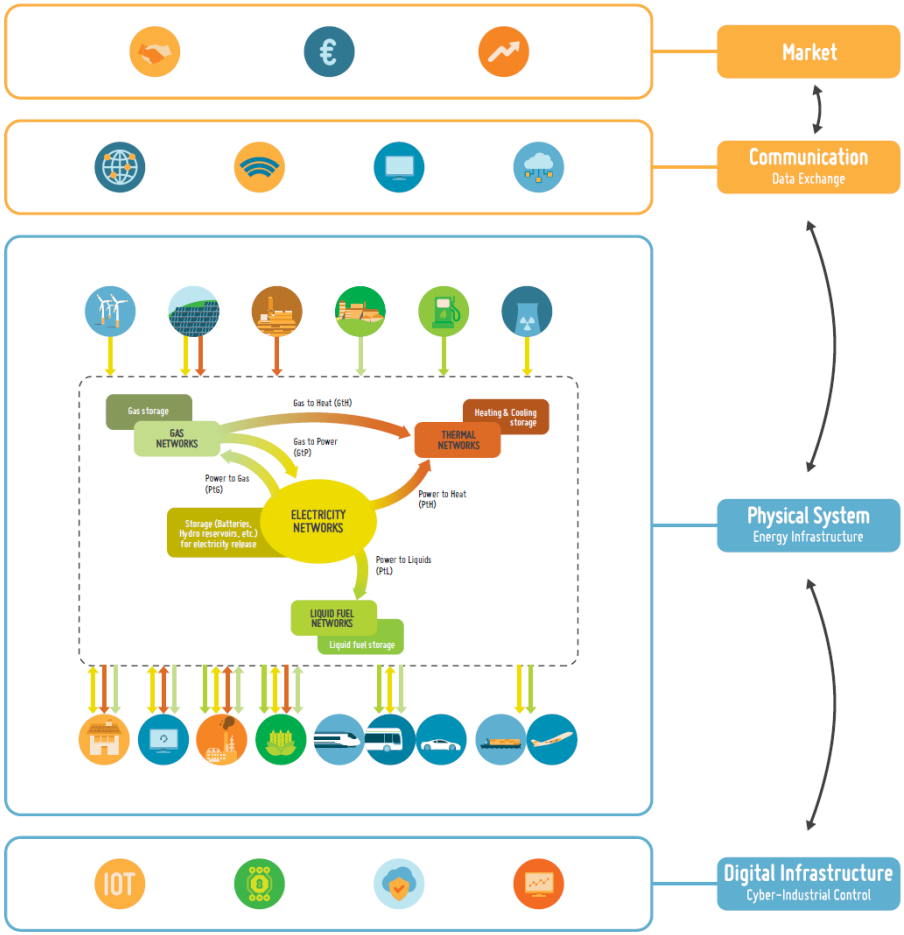
Use Cases of Digitalisation



- **Energy data + cyber security**
- **Contributing to EU Energy policy goals**

PART 4: Audience Poll

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Code: #635722

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?***

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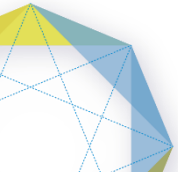
Part 5: *Discussion on Digitalisation R&I Needs (and 5 ETIP SNET Digitalisation Research TOPICS)*

Panel Discussion

All Panelists



Development of Digitalisation Technologies for energy system integration

Topics identified in the ETIP SNET Implementation Plan 2021 - 2024

DIGITALISATION	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 acquisitio digital twin, end-users)

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PART 5: Audience Poll (1/2)

SLIDO www.slido.com

Code: #635722

Question:

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

DIGITALISATION	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 acquisitio digital twin, end-users)

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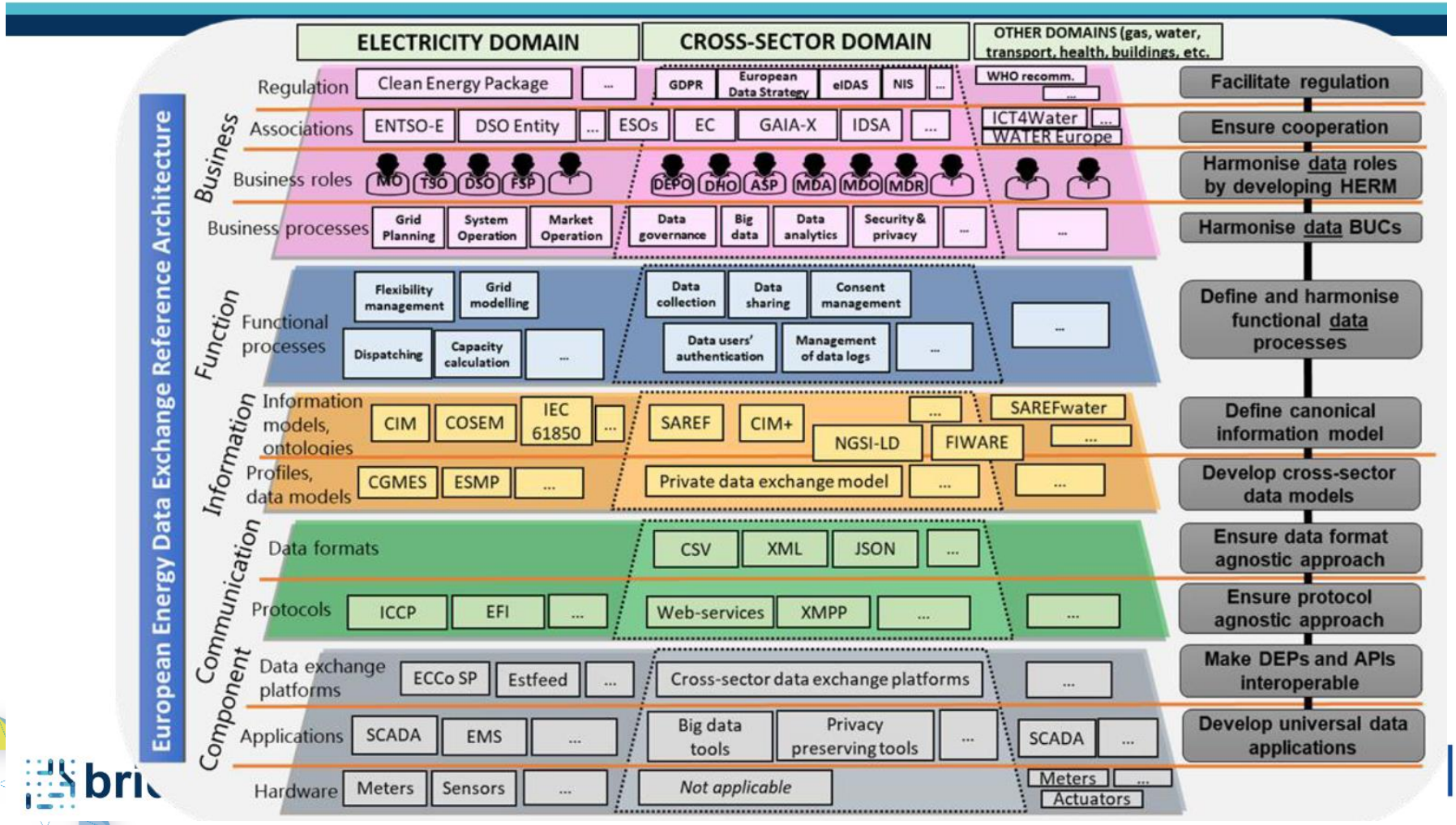
R&I-related Digitalisation Steps (RHS-GREY BOXES)

Source. BRIDGE WG "Data Management"

Proposal for cross-sector data exchange reference architecture



PART 5: Audience Poll (2/2)

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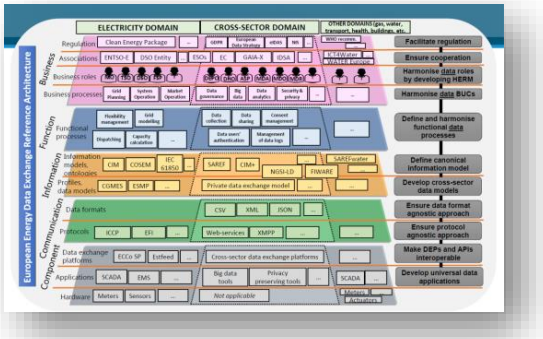
Code: #635722

Question:

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



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Do you have any ...

You would like to share?

Please write them on the chat and we will keep them in the proceedings!

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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

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