Alliance for IoT and Edge Computing Innovation

Workshop • 31 January 2024

Accelerating standardisation in the nexus of mobility, buildings and energy

AIOTI

Agenda

Agenda

13.00h	**Opening and welcome**
	Rolf Riemenschneider, Head of Sector IoT at European Commission
13.05h	**Policy context**
	Moderator: Natalie Samovich, AIOTI WG Energy Chair, Enercoutim
	Heinz Wilkening, JRC
	Ondrej Cerny, E.DSO
	Georgios Takoudis, European Commission, DG Energy, Buildings and Product
	Dune Sebilleau, BRIDGE (Trialog)
13.50h	**Networking break**
14.15h	**Stakeholder and solution presentations:**
	EV and charging; Grids TSO – DSO – DER; Buildings flexibility, consumer edge, enabling infra for charging
	Panel on means for up-scaling, role of an open ecosystem
	Moderator: Rolf Riemenschneider, Head of Sector IoT at European Commission
	Sebastiaan Coppenholle, Elia/50Herz
	Robert Boehm, EEBUS
	Adriaan van Eck, Flexiblepower Alliance Network – FAN
	Laurent Schmitt, Digital4Grids, IEC TC57 Working Group 21 convenor

Agenda

15.00h **Networking break**

15.30h **Driving standardisation**

Panel: de-facto standards, normative, formal standards

Moderator: Silvana Muscella, Stand.ICT.eu 2026 Project Coordinator, CEO Trust-IT

Eusebiu Catana, Senior manager innovation and deployment, ERTICO-ITS Europe, involved in ISO TC204, StandICT.eu fellow

Marga Martin Sanchez, HSbooster.eu expert

Dr. Aikaterini POUSTOURLI, Independent Standardisation Expert of R&I Projects, IHU, HSbooster.eu expert

Reyna Ubeda, ITU Standardisation Bureau, Study Group Engineer in the Study Group Department

Tanya Suarez, AIOTI Management Board Member, INSTAR project, (BluSpecs)

16.15h **Fireside chat**

Moderator: Tanya Suarez, AIOTI Management Board Member, INSTAR project, (BluSpecs)

Sebastiaan Coppenholle, Elia/50Herz

Eusebiu Catana, Senior manager innovation and deployment, ERTICO-ITS Europe

Ovidiu Vermesan, Chief Scientist, SINTEF

16.45h **Get together and networking cocktail**

Opening and Welcome

Rolf Riemenschneider, Head of Sector IoT at European Commission

"Accelerating standardisation in the nexus of mobility, buildings and energy"

Rolf Riemenschneider, Head of Sector IoT
DG CONNECT/E4
European Commission

Digital Decade to spur Digitalisation across different Commission policy streams t

- Integration of renewables (REPowerEU)
- GRID infrastructures investments (EU Grid Action Plan)
- Transition towards e-mobility (Alternative Fuel Infrastructure Regulation (AFIR))
- Digital targets 2030 (Digital Decade)
- Digitalisation of the Energy Sector (DoEAP)

European Commission

Energy at the nexus of mobility, buildings and energy:

Renewable Energy

Sector-Coupling

Optimisation of renewable energy production and usage

Bi-directional EV-charging

Smart Home and Buildings

What is at stake ?

- Efficient integration of renewables
- Consumer confronted with high energy prices
- **Agile consumers** to reduce energy consumption in buildings and ‚jump' on renewable sources
- Seamless charging experience
- Carbon footprint of building operations
- Farmer's demand for diesel subsidies

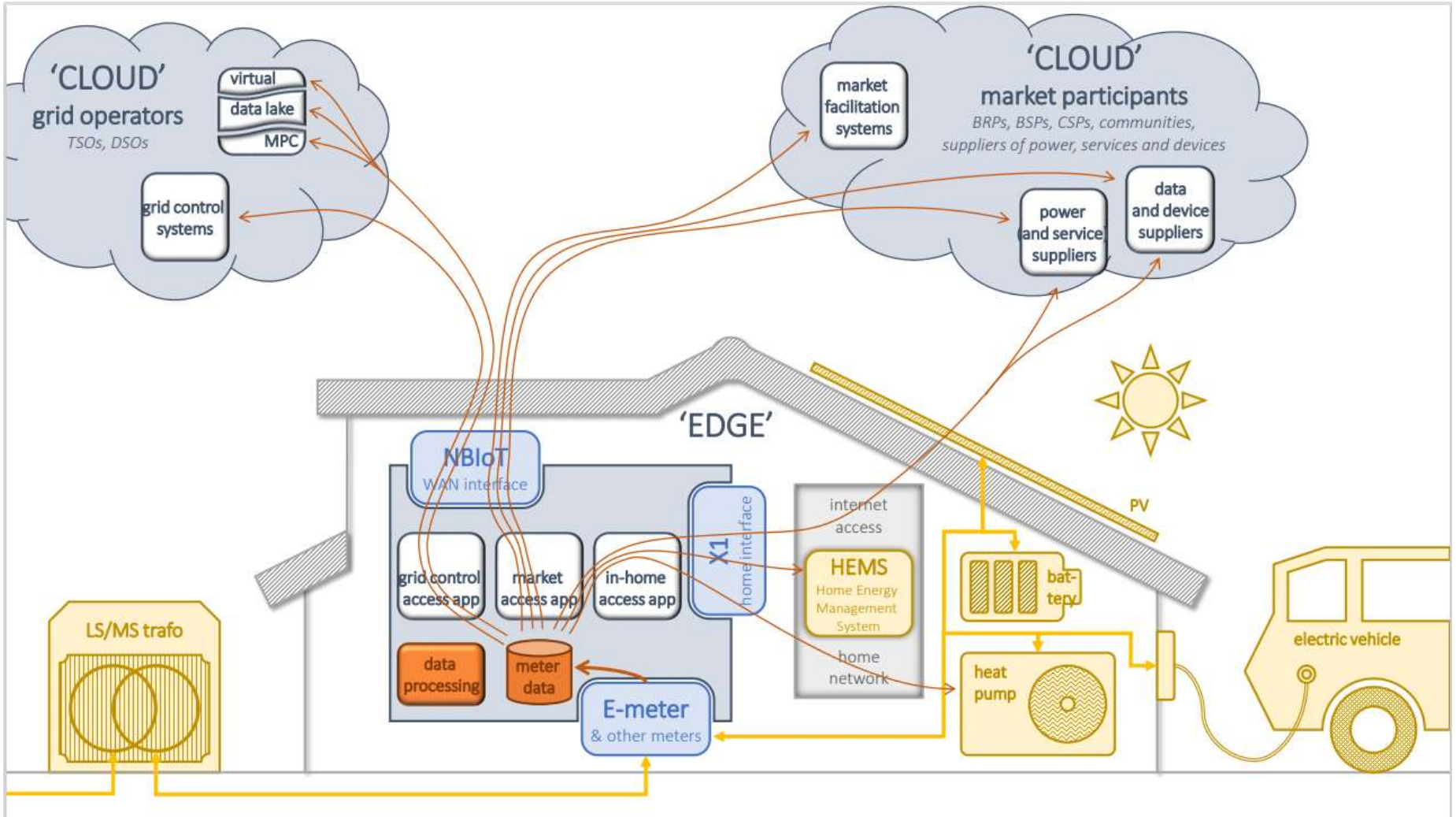
- **Connected and interoperable x-sector services**
- Support of multi-standard interfaces
- Data flow across diverse energy assets
- Consensus across different eco-systems
- Avoid deployment of stranded assets

European Commission

Evolving ecosystems

→ *decentralised orchestration at the edge*

- Mix between cloud – edge operations – control + service data



- **HE WP2024 Call for Pilot Actions**
  - Deadline 19 March 2024

Courtesy: TECHNOLUTION

European Commission

Discussion points for today?

- **What are emerging norms and standards**, - do not reinvent the wheel

- **Which ecosystem or which energy asset would consider to have the largest orchestration potential at the home/building scenario?**

- **How to seek (industrial) agreements on a common understanding for flexibility management across different**

THANK YOU

Useful links:

- **European Data Strategy**:
  https://ec.europa.eu/digital-single-market/en/policies/building-european-data-economy

- **BRIDGE Framework**:
  https://www.h2020-bridge.eu/

- **GAIA-X Initiative**:
  https://www.data-infrastructure.eu/GAIAX/

- Coordination & Support Action OPEN DEI
  → **https://www.opendei.eu/**

- The Alliance of Internet of Things Innovation AIOTI
  https://aioti.eu/news/

Policy Context

Natalie Samovich

Co-Founder Resilient Group,

Enercoutim, AIOTI Chair WG Energy,

Honorary Chair WG Smart Grids ETIP-SNET

How we work

Horizontal WG

- Research & Innovation
  - Early Innovation Champions
  - Innovation Ecosystems
  - SCoDIHNet
- Standardisation
  - High-Level Architectures & Digital Twins
  - Landscape, Gaps,Continuum, IoT relation to 5G
  - Security & Privacy
  - Semantic Interoperability
- Testbeds
  - DLT &Web3
- Policy
- ICT for CO2 reduction methodologies

Vertical WG

- Agriculture
- Energy
  - Buildings & Communities
- Health
- Manufacturing
- Mobility

AIOTI

AIOTI WG Standardisation: Scope

Sub-Group	Lead	Deliverable
IoT Landscape	Georgios Karagiannis (Huawei)	
IoT Landscape maintenance	Georgios Karagiannis (Huawei), Z. Kopertowski (Orange)	report published in February and December 2023
Gap Analysis and recommendations	Georgios Karagiannis (Huawei), A. Rennoch (Fraunhofer)	report published in April 2022, next in January 2024
IoT relation and impact on 5G	Georgios Karagiannis (Huawei)	report published in April and November 2023
Computing Continuum	Ronald Freund (Fraunhofer)	report published in April 2022
High Level Architecture for IoT, Edge Computing and Digital Twins	Marco Carugi (Huawei), Antonio Kung (Trialog)	
IoT and Edge Computing Reference Architecture	Marco Carugi (Huawei)	report published in December 2020
Guidance for the Integration of IoT and Edge in Data Spaces	Antonio Kung (Trialog)	report published in September 2022
Report on IoT and Edge computing architecture in context of Computing Continuum	Antonio Kung (Trialog)	work ongoing
Report on IoT and Edge computing architecture in context of Digital Twins	Antonio Kung (Trialog)	work ongoing
Semantic Interoperability	Martin Bauer (NEC Lab), Laura Daniele (TNO)	
Ontology Landscape Report		report published in December 2021
Ontology Landscape Online		published in March 2023
Security and Privacy	Asbjorn Hovsto	Policy recommendation on relevant ICT standardisation in security and privacy related to IoT, Edge, AI and business opportunities – by June 2024

Leveraging IoT and Edge Computing Infrastructures to foster Energy Flexibilities through next energy sectorial integration

AIOTI WG Energy

AIOTI

Alliance for IoT and Edge Computing Innovation

Leveraging IoT and Edge Computing Infrastructures to foster Energy Flexibilities through next energy sectorial integration

Release 1.0

AIOTI WG Energy

19 December 2022

Edge driven Digital Twins in distributed energy systems: Role and opportunities for hybrid data driven solutions. AIOTI WG Energy

The integration of Digital Twins at the grid edge is positioned as a key enabler for developing a more efficient energy ecosystem with evolving business models. The devices at the edges of electricity grids serve as physical infrastructure for sector integration, connecting with transport sector (electromobility) and heating & cooling along with dynamic buildings components. Digital Twins driven by edge computing are also expected to provide essential data for infrastructure planning across sectors, fostering the development of cross-sectoral business use cases. The need for data interoperability between different sectors is emphasised as demonstrated in a number of the ongoing research and innovation projects and within the evolving business models.

“

Standardisation requires a lot of coordination and facilitation. This community would need support and facilitation if it aims at providing adoption support and fast tracking.
AIOTI can play an active role

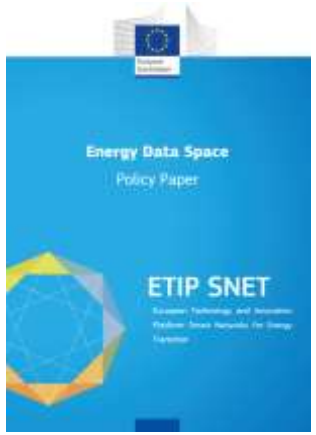
Policy Context: Speakers

High Priority IoT Standardisation Gaps and Relevant SDOs R3

AIOTI WG Standardisation has published High Priority IoT Standardisation Gaps and Relevant SDOs Release 3.0. This report introduces an approach for the definition and identification of key IoT gaps in several initiatives.

The full report can be found here.

Authors and key contributors: Nikolaos Giannakakos ; Damir Filipovic ; Sascha Hacke ; Asbjørn Hovstø ; Georgios Karagiannis ; Vasileios Karagiannis ; Artur Krukowski ; Antonio Kung ; Zbigniew Kopertowski ; Ana Lavinia Petrache ; Dave Raggett ; Axel Rennoch ; Jorgo Risto ; Mari-Anais Sachian ; Philippe Sayegh ; Erwin Schoitsch ; Orfeas Voutyras.



Energy Data Space policy paper

Goal of this policy paper is to give a short technical introduction to the topic, providing references for a deeper analysis, and then to focus on the identified opportunities, challenges and necessary actions for a quick deployment of a common European energy data space.

Energy Data Spaces

Corporate author(s): Directorate-General for Energy (European Commission)

Personal author(s): Monti, Antonello ; Schmitt, Laurent ; Dognini, Alberto ; Bessa, Ricardo ; Boskov-Kovacs, Elena ; Hartner, Georg ; Tsitsanis, Tasos ; Diakakis, Stamatis ; Gallego Amores, Santiago ; Damas Silva, Carlos ; Samovich, Natalie

AIOTI WG Standardisation: Highlights

Relevant facts

123 member organisations

232 participants

Main achievements

Deliverables	Collaborations	Events
▪ IoT Landscape Reports ▪ High priority gaps Reports ▪ IoT relation and impact on (beyond) 5G Reports ▪ High Level Architecture and IoT Identifier Reports ▪ Semantic Interoperability Joint White Papers ▪ Ontology Landscape ▪ Guidance for the Integration of IoT and Edge in Data Spaces	▪ Cooperation with SDOs/Alliances to foster co-creation and interworking (MoUs and Liaisons) ▪ SNS Partnership ▪ Trans Continuum Initiative ▪ Stand.ICT - EU OS ▪ HLF on European Standardisation ▪ ICT MSP ▪ EGDC ▪ one6G	• AIOTI signature event • IoT Week – lead standards track • IoT and Edge computing workshops • Chariot project webinar • Navigating IoT Architectures and Standards Days Event • Edge Computing Forum • ETSI IoT Week • Policies to support Data Markets • EUCnC • IEEE IoT World Forum

Policy Context: Relevant papers

Moderator: Natalie Samovich, AIOTI WG Energy Chair, Enercoutim

Panellists:

- Heinz Wilkening, JRC
- Georgios Takoudis, European Commission, DG Energy, Buildings and Product
- Ondrej Cerny, E.DSO
- Dune Sebilleau, BRIDGE (Trialog)

DG JRC contributions to interoperability and the way forward to a Code of Conduct for better interoperability in support to DG Ener

Heinz Wilkening

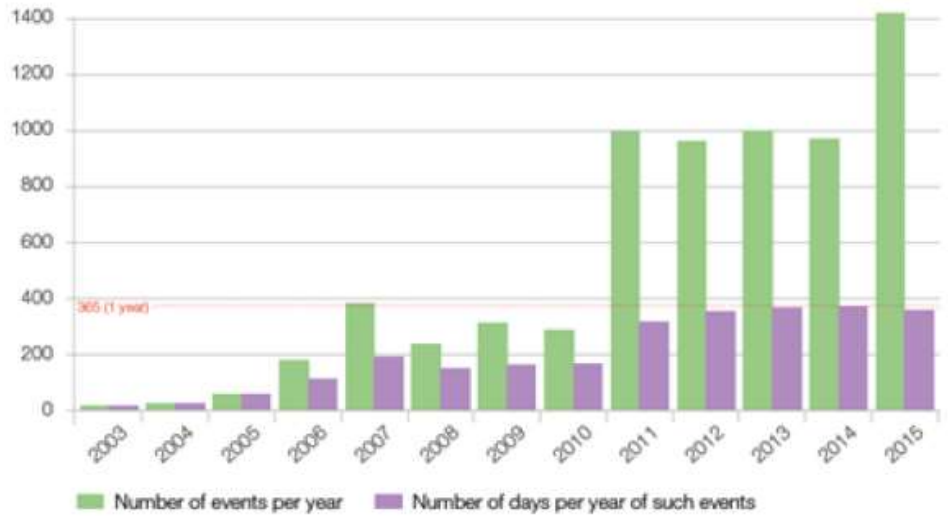
Brussels, 26-01-2024

European Commission

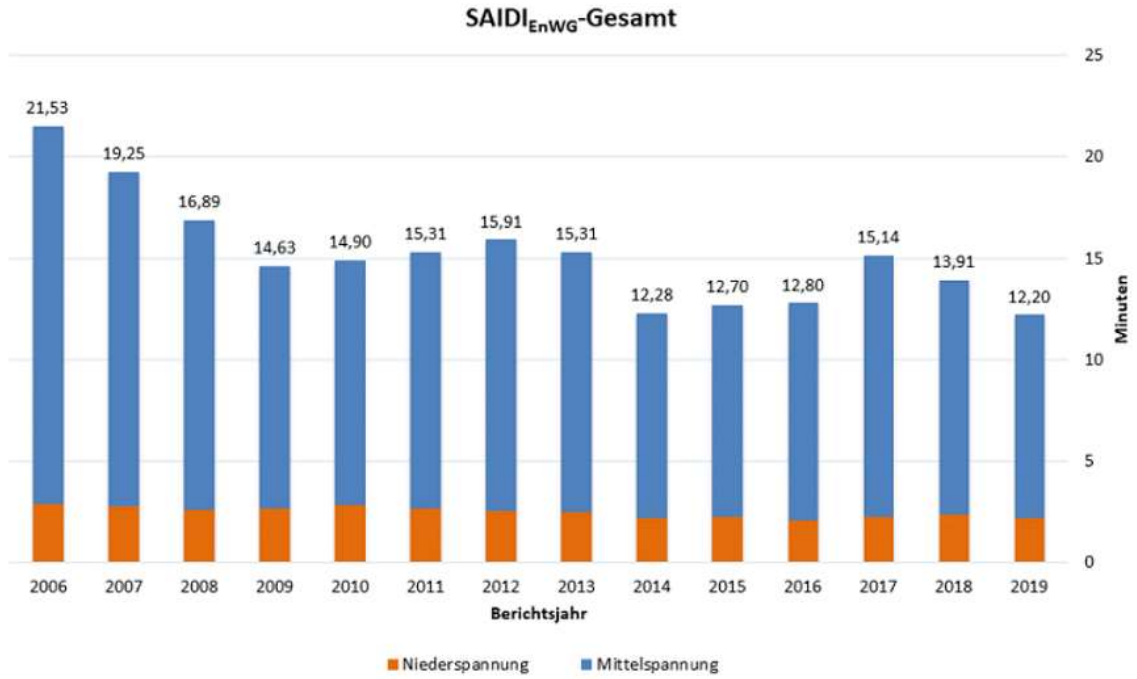
Some of the challenges ahead in the energy transition where interoperability is essential for a stable grid

Redispatch at TenneT Germany

(within its own control area)



Bundesweite Entwicklung 2006-2019



European Commission

Congestion situation in the Netherlands

Rapid developments in the energy market due to high gas prices, the war in Ukraine and the ensuing energy uncertainty have led to a number of new congestion areas on the electricity grid in the Netherlands in 2022. In June, a temporary stop on new grid connections for businesses was announced in the provinces of Noord-Brabant and Limburg. The number of connection requests from new solar parks, companies wanting to electrify and the growing number of heat pumps and charging stations grew faster than the grid can be expanded.

Immediately after the announcement, the Minister of Climate and Energy set up a task force with all stakeholders such as governments, interest groups and grid operators to find solutions to grid scarcity and also develop a national action programme.

This national action programme was published in December. It includes measures to speed up grid expansions, flexible contract forms, better programming and also to make 'smarter' use of the existing grid by focusing on flexibility.

In Noord-Brabant and Limburg, TenneT created extra capacity by focusing on congestion management measures, similar to traffic congestion avoidance. This involves paying users a fee to relieve the grid at busy times. The possibility of applying this to other areas in 2023 is also being investigated. Network congestion will remain a part of the transition in the coming years. Through co-operation between government, grid operators and industry, we can take the right steps towards a climate-neutral energy supply.

Challenges in the Distribution Grid
Castele Alley Problem

Herausforderung für den Netzbetreiber
Lastbetrachtung für normale Haushalte

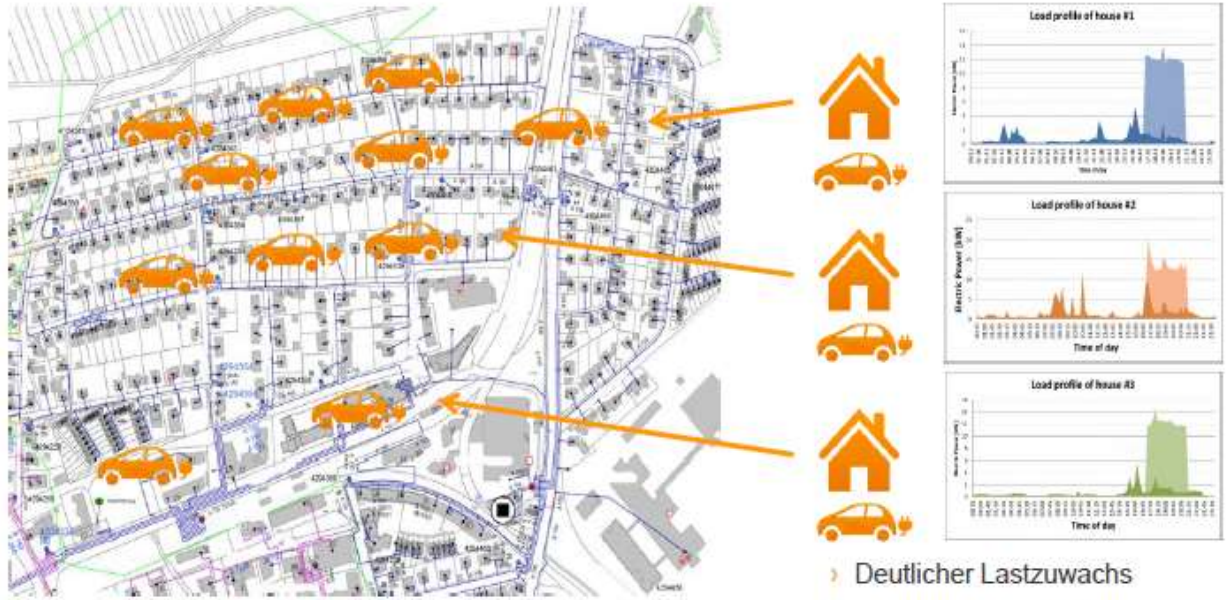
Netze BW

- Sehr individuelle Lastprofile
- Kurze Spitzenlasten ~14 kW

Das Netz ist nicht auf das theoretische Maximum ausgelegt
→Planung geht von realistischer Gleichzeitigkeit aus

Herausforderung für den Netzbetreiber
Einfluss von E-Fahrzeugen auf das Stromnetz

Netze BW



- Deutlicher Lastzuwachs
- Relativ lange Ladedauer

Ein Fahrzeug verändert die Situation nicht… aber viele Fahrzeuge in einer Nachbarschaft erfordern Netzanpassungen

European Commission

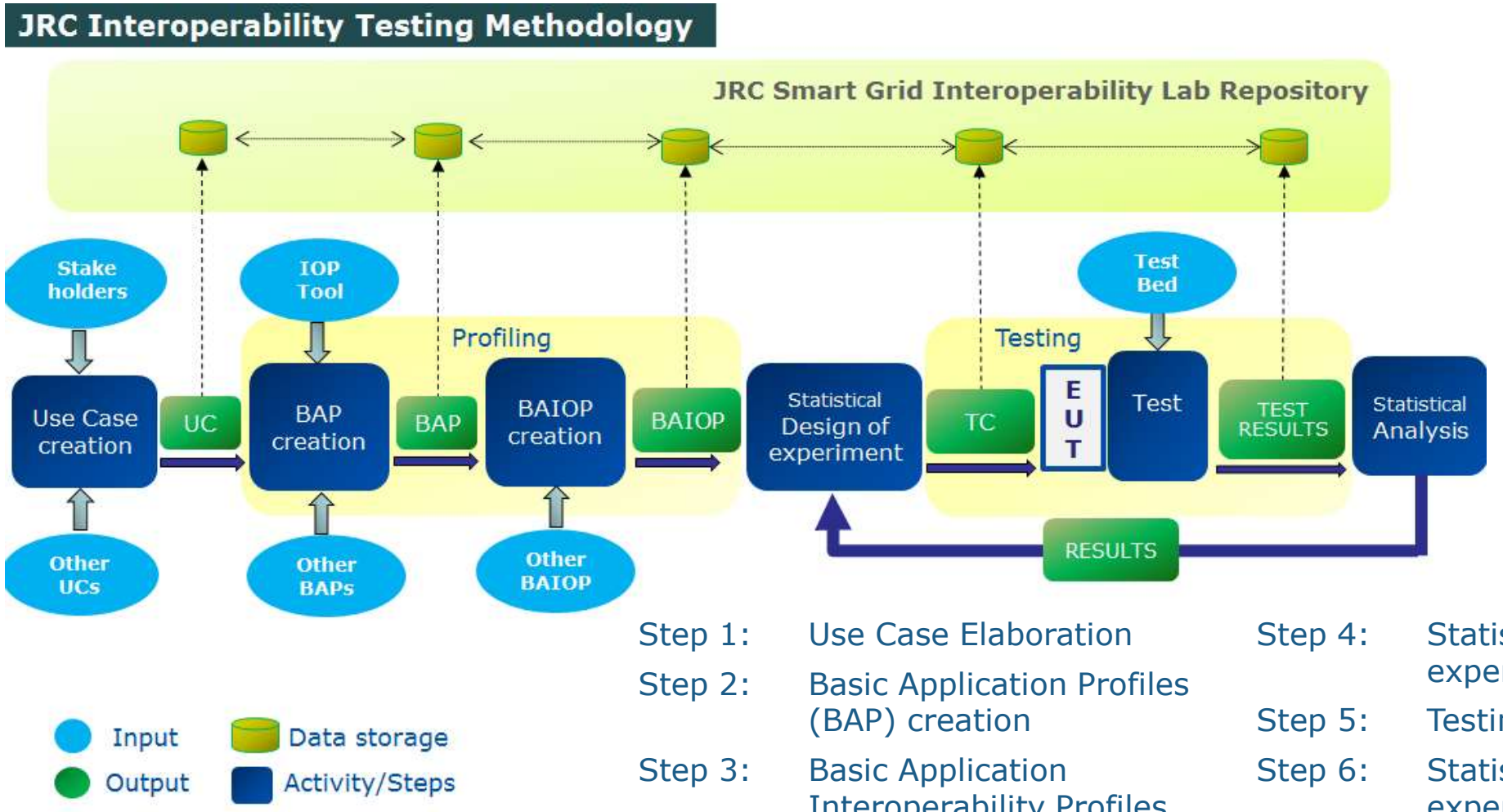
That is the Motivation for Interoperability

Today Distribution Grid Operators don’t know much what is going on their Medium Voltage level and in particular Low Voltage Level, which increases the risk for overloads in the grid. Therefore operators have to monitor their grids better and need means for intervention.

For this reason *INTEROPERABILITY* is a key element of the Smart Grid of the future.

Interoperability: Need for Speed

JRC Smart Grid Interoperability Methodology



Step 1: Use Case Elaboration

Step 2: Basic Application Profiles (BAP) creation

Step 3: Basic Application Interoperability Profiles (BAIOP) creation

Step 4: Statistical Design of experiments (DoE)

Step 5: Testing

Step 6: Statistical Analysis of experiments

European Commission

Project: Achieving interoperability among Energy Smart Appliances

Project Website

Energy Smart Appliances (ESA) *are products that provide energy flexibility being capable of automatically (by means of machine-to-machine communication) optimising their consumption patterns (e.g. time or profile) in response to external stimuli, based on user permission.*

DG ENER ➡ DG JRC

Energy Smart Appliances manufacturers and other actors in the industry.

Achieving Interoperability among all smart home actors related to **Energy Smart Appliances.**

Development of the Project

Roundtable meetings

Dec 22
Feb 23
Apr 23

Workshops

Nov 22
Mar 23
Jun 23

Surveys

Sep 22
Feb 23
Apr 23
Jul 23

Technical Reports

Jul 22

May 23

Code of Conduct on energy management related Interoperability of Energy Smart Appliances (V.1.0)

Signature

Nov 23

Under Legal Review

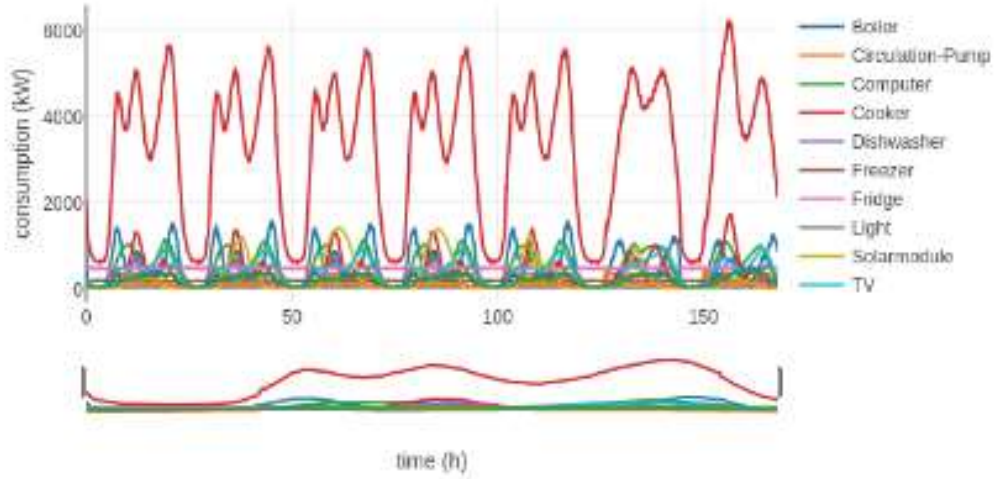
Testing methodology

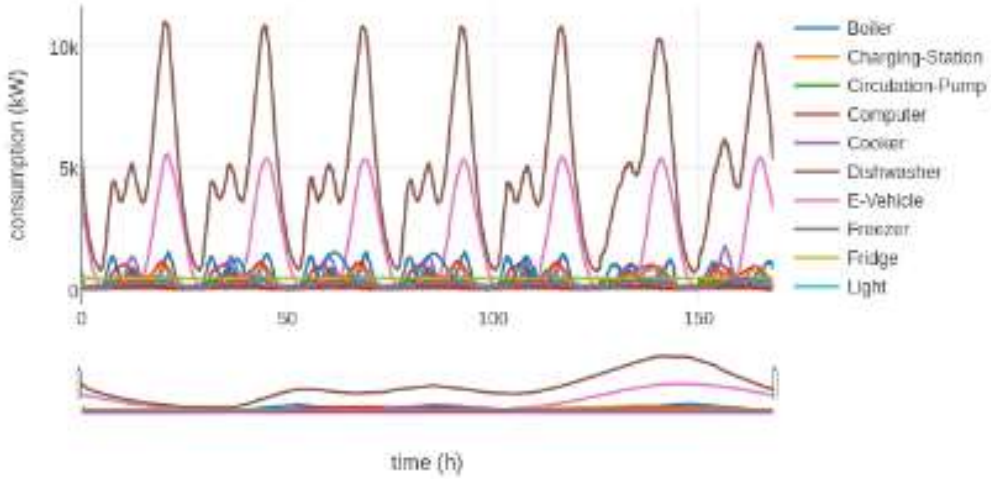
European Commission

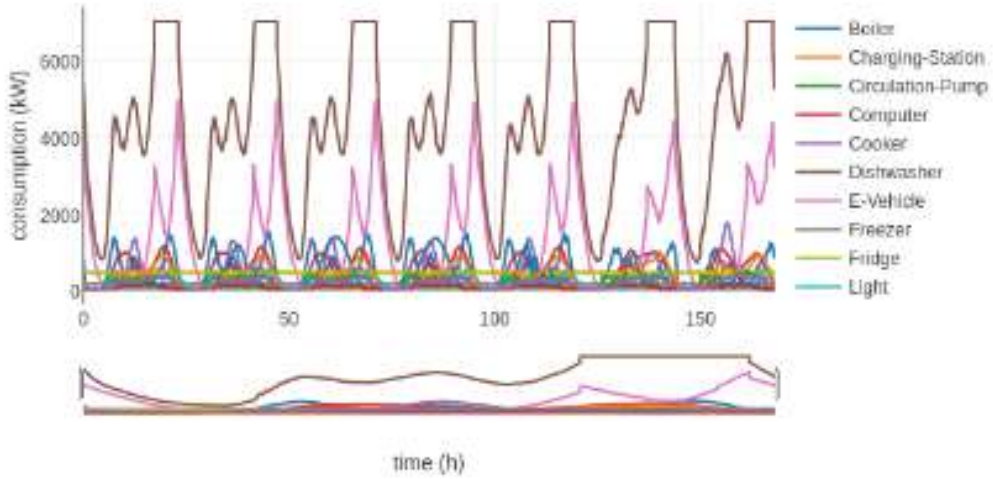
Smart Home Interoperability Mock-up

A test stand for Smart Home Interoperability testing is in preparation so we will be able to test interoperability allowing to use various energy management systems and smart meters. For the smart meter we will also have a proper backend

resLoadSIM live Demo with EV-Charging and Demand Response in the breaks







Get inspired by the past: Innovative battery driven tram in Hannover (1890)

Sometimes it can be useful to get inspired by the past:

A battery tender was put after the tram in the city centre to avoid overhead lines, outside the centre overhead lines were used.

Thank You!!!
But keep an Eye on the Poor as well!

Presentation will continue with my colleague Georgios Takoudis from DG ENER, who will also provide some final conclusions

Stay in touch

E-Mail: ***Heinz.Wilkening@ec.europa.eu***

SESI webpage: ***https://ses.jrc.ec.europa.eu***

EU Science Hub: ***ec.europa.eu/jrc***

Twitter: ***@EU_ScienceHub***

Facebook: ***EU Science Hub - Joint Research Centre***

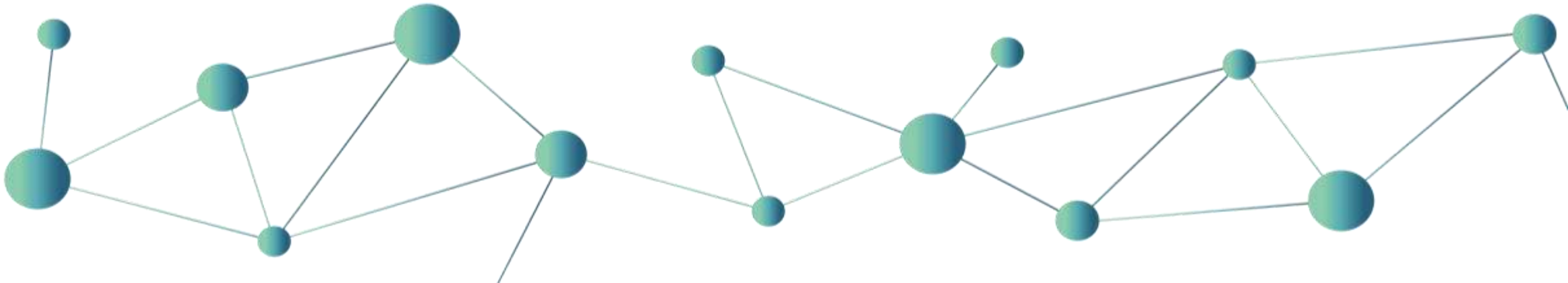
LinkedIn: ***Joint Research Centre***

YouTube: ***EU Science Hub***

Accelerating standardisation in the nexus of mobility, buildings and energy

E.DSO contribution

Ondrej Cerny



Current status

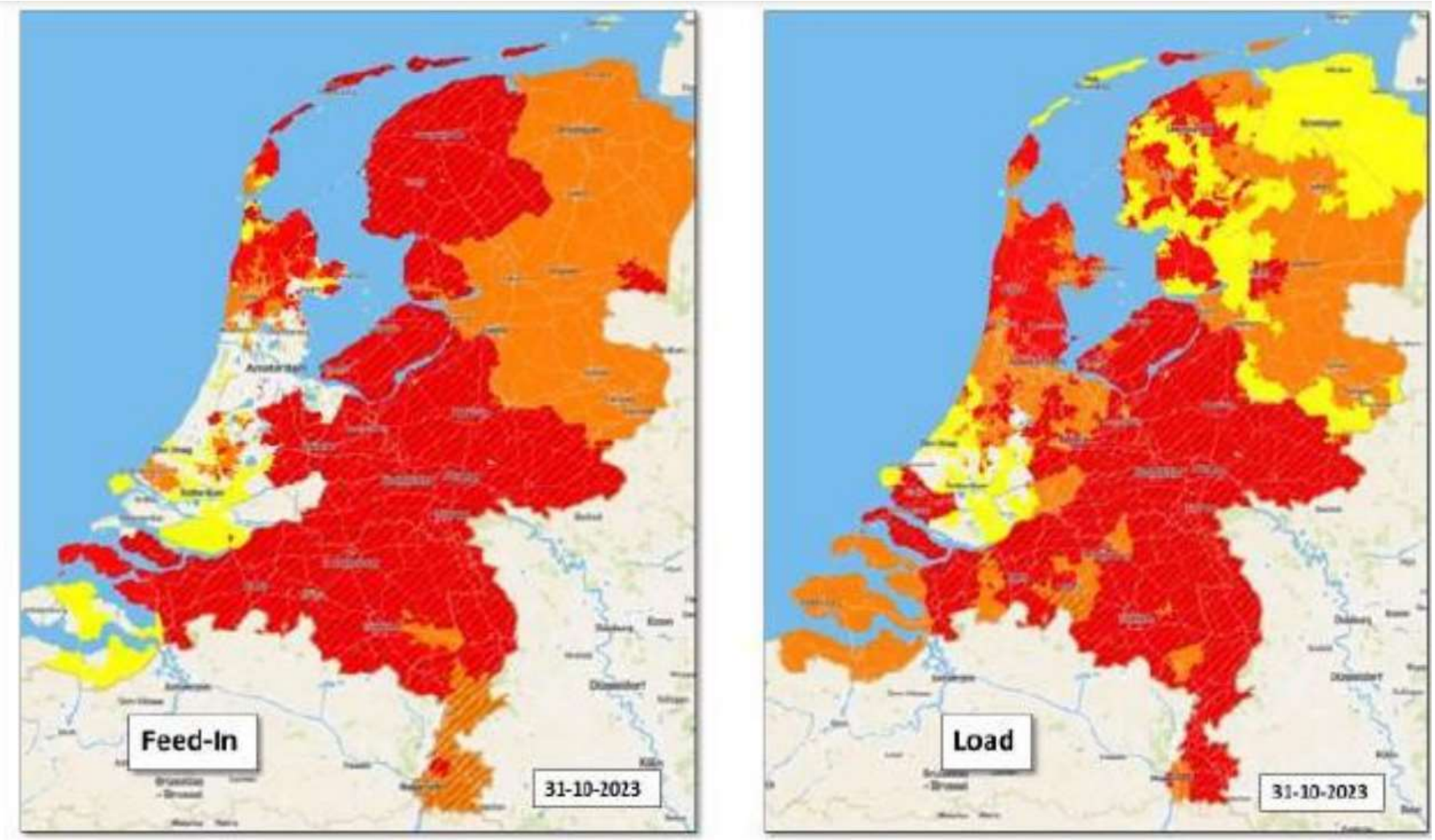


Figure 1: Dutch grid capacity challenges

Sector integration challenges

- Need to achieve harmonisation not only on technical level, but also defining common market products, level of harmonisation in market processes (for flexibility services)
- Are market actors always behaving efficiently from the system perspective?
- Who is ultimately responsible for optimalisation of the system operation?
- Are consumers willing to change their behaviour & participate?

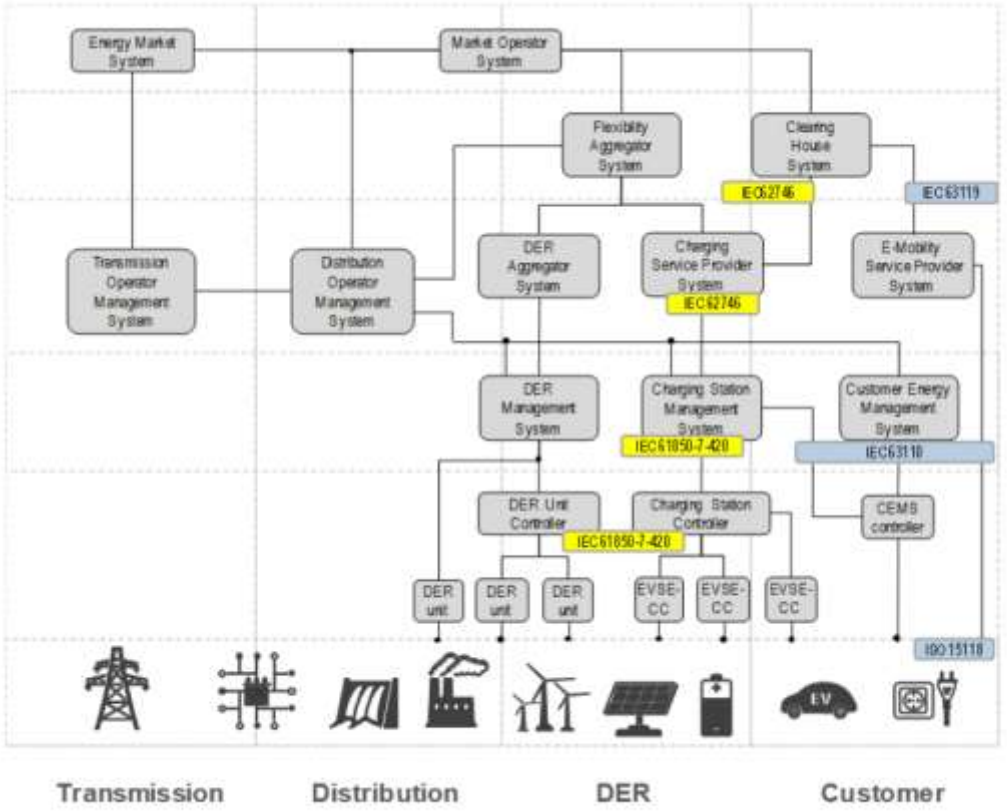


Figure 3. IEC TC57 Working Group 21: Grid – behind the meter data interactions.

Source: ETIP SNET Energy Data Space Policy Paper

Standards environment

Necessary to accept variety, even existence of proprietary systems

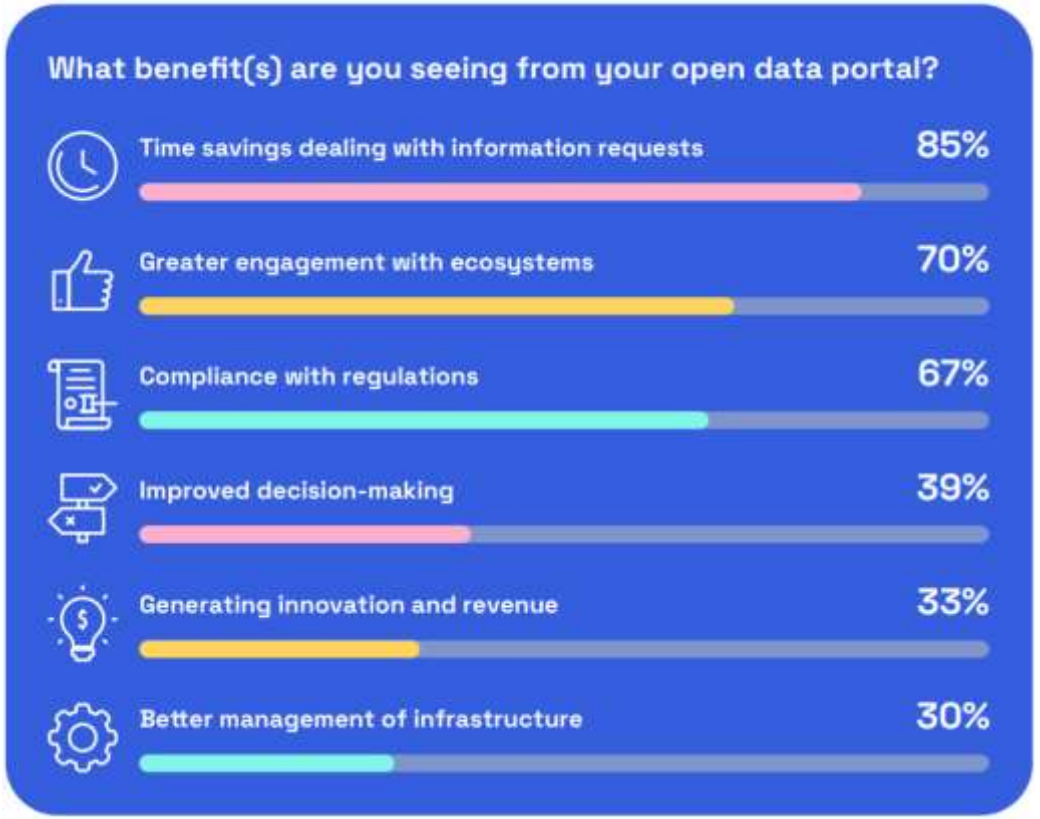
A single standard probably too complicated, we need simplified applications for smaller actors and for applications closer to the end uses

Harmonisation across different standards needed

Standards need to catch up with the use cases on grid edge

Focus on data

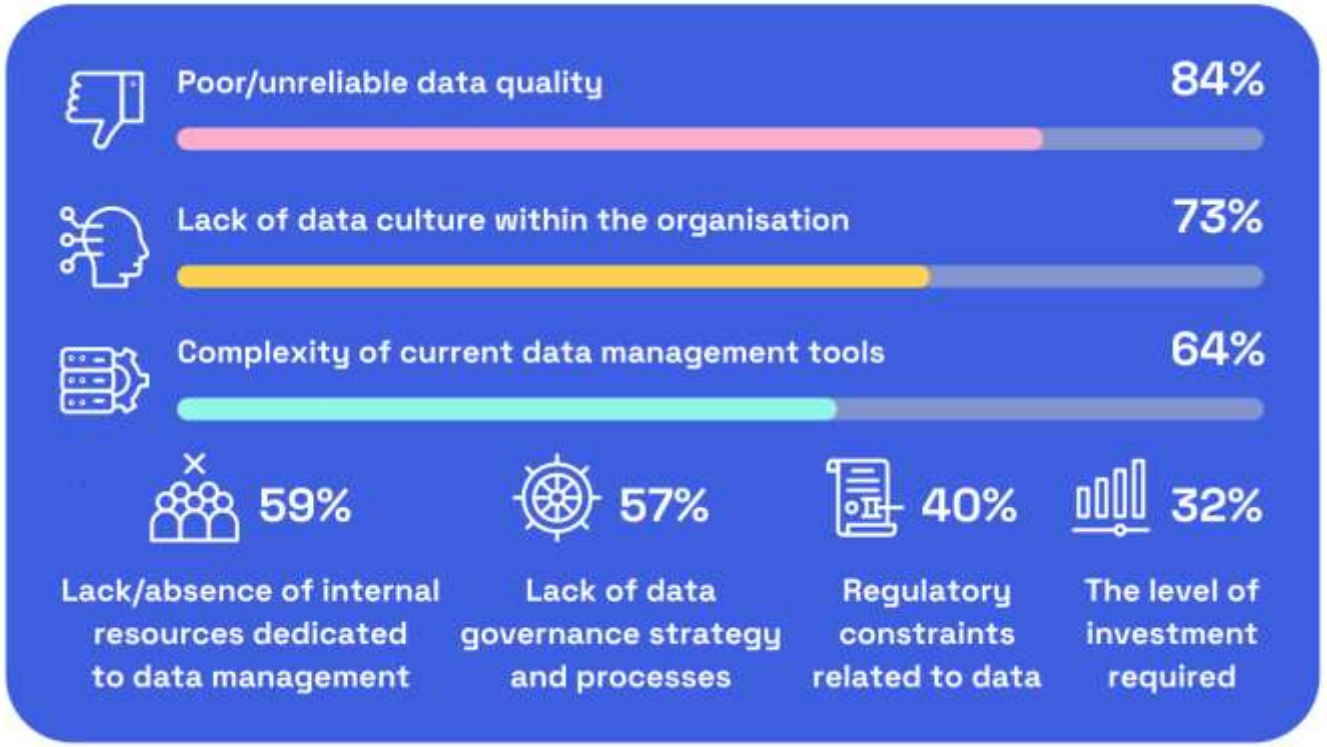
1. What kind of data should be collected, and what use cases prioritised?
2. Ensuring grid operation security – metering data quality needs to be upheld
3. Privacy & cybersecurity will be a growing concern



Source: The State of European Energy Data Maturity

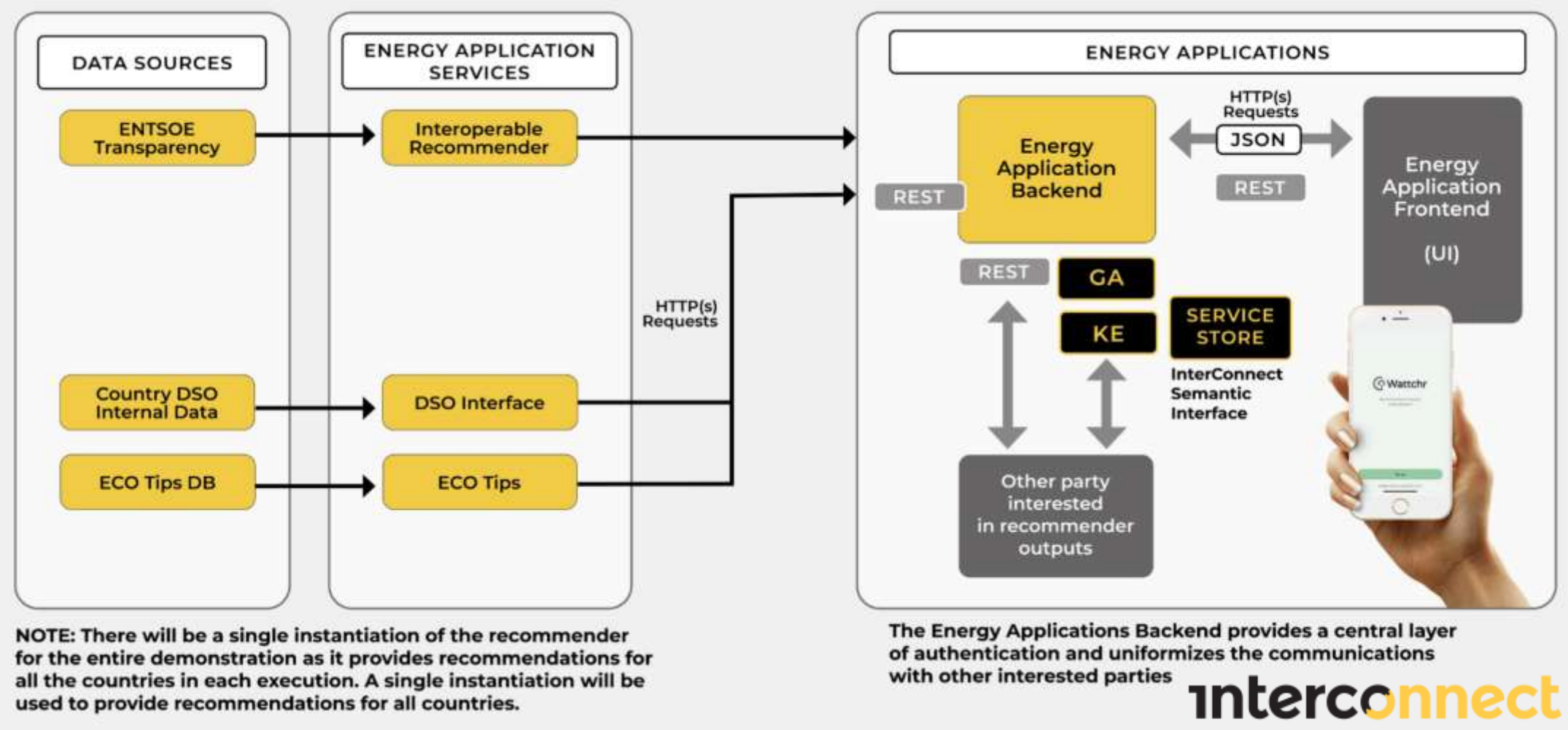
Institutional capabilities

- Path dependence, long investment cycles
- DSOs of various sizes, different size of human resources
- Expertise differs between actors
- Need to foster digital skills among many actors, not only grid operators



Source: The State of European Energy Data Maturity

DSO contribution – Citizen Energy Applications



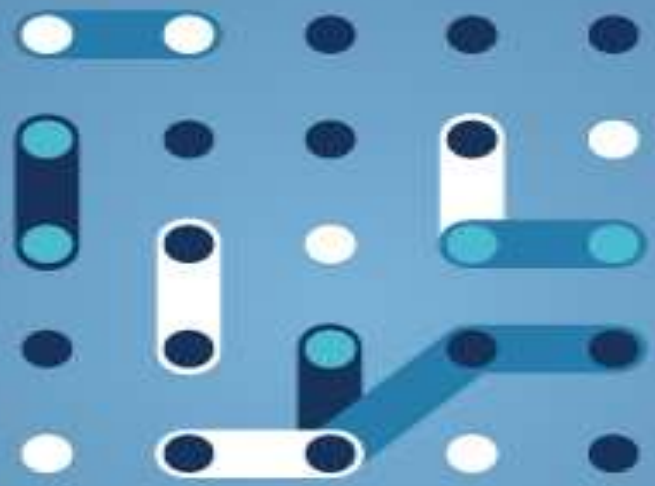
Source: Interconnect project

DSO contribution – Grid Digital Twins

Source: TwinEU project

Standards in Bridge Data Management WG

Standards User Group



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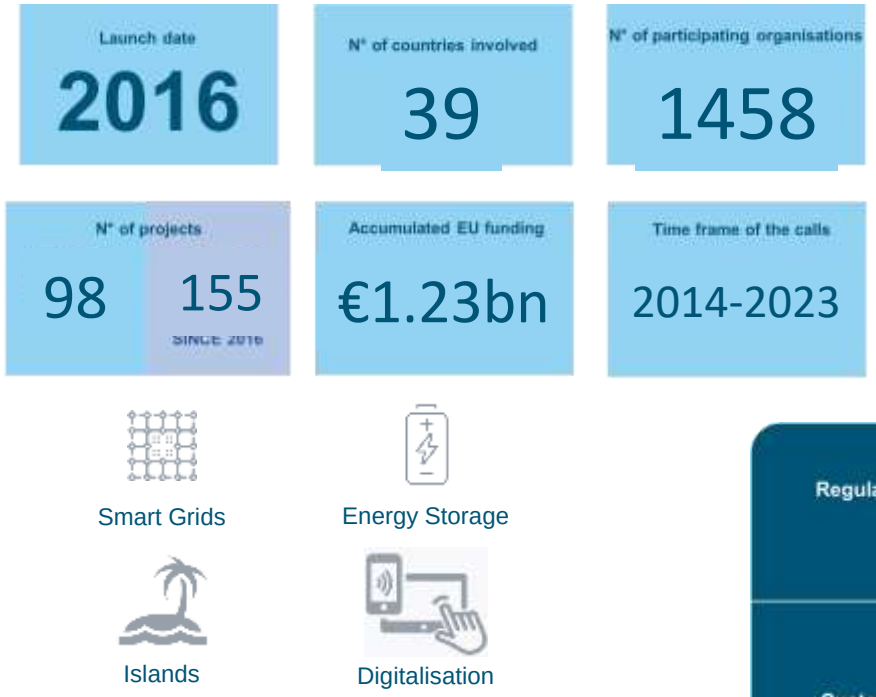
2024 January 31

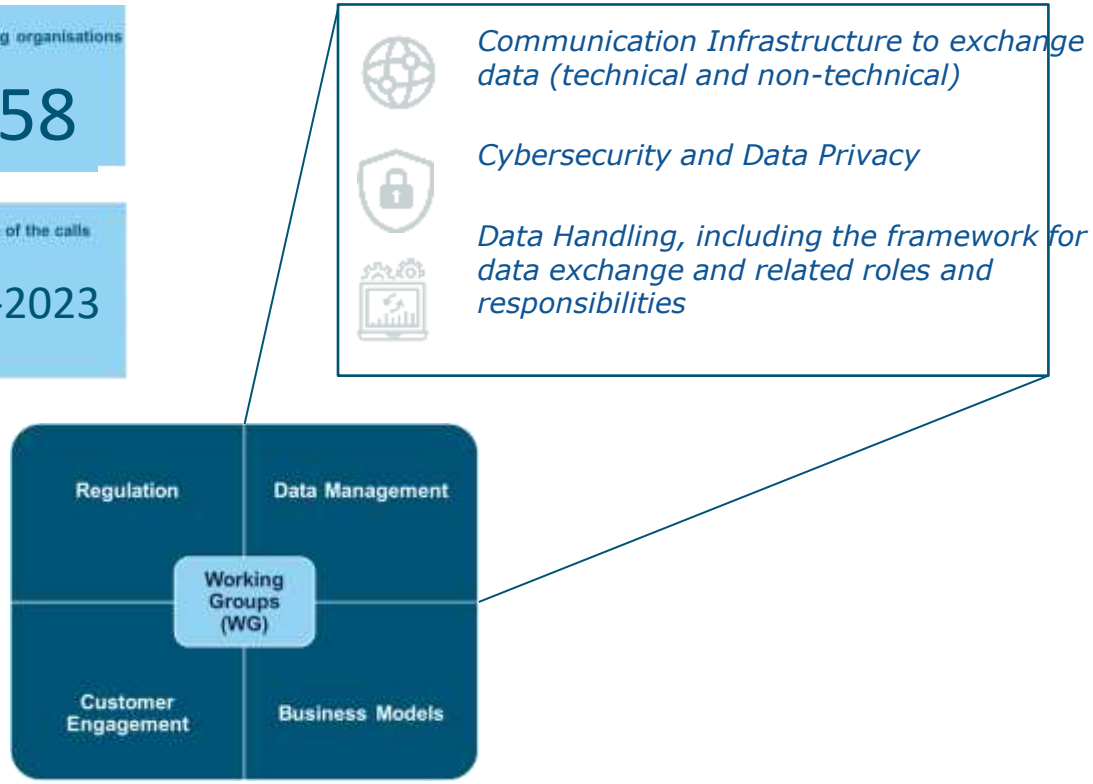
Agenda

- *Bridge data management WG activities*
- *Bridge standards user group*
- *Contributions from Bridge projects to standardization*
  - **Repository of code components**
  - **Knowledge diffusion**
- *Liaison with other working groups*

European Commission

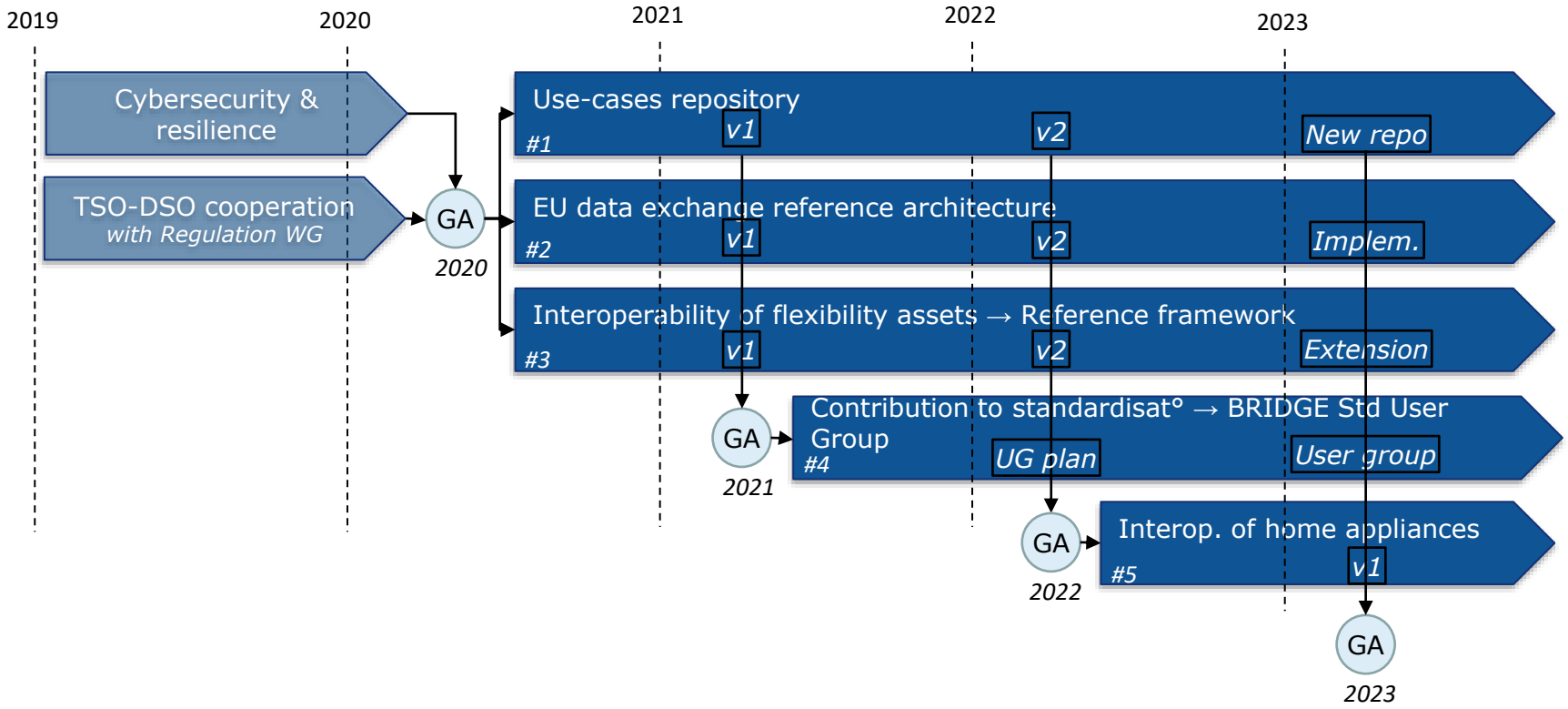
BRIDGE initiative & Data Management WG





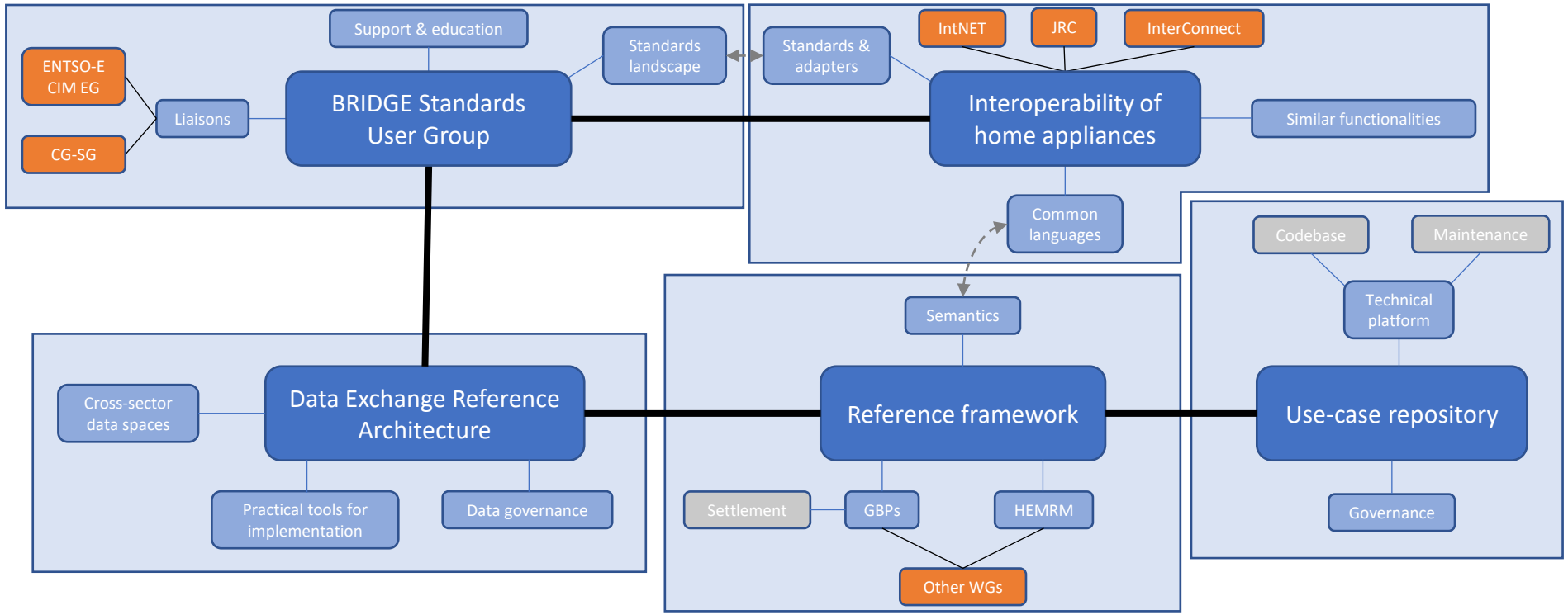
These initiatives are funded by

On-going actions since 2019



These initiatives are funded by

Five actions following BRIDGE General Assembly 2022



These initiatives are funded by

Bridge data management WG

- *Action #1: Bridge use-case repository*
- *Action #2: Data Exchange Reference Architecture*
  - **European (energy) data exchange reference architecture 3.0**
- *Action #3: Reference Framework*
  - **Reference Framework 1.0**
- *Action #4: Standards User Group*
- *Action #5: Interoperability of home appliances*
  - **Interoperability of home appliance Report 2022-2023**

European Commission

Bridge data management WG

- *Regulation :*
  - Role models
  - Data spaces
- *Business models:*
  - Flexibility
- *Projects involved in different WGs*

European Commission

Bridge Standards User Group

- *Educate users, share knowledge and provide support on the use of standards*
  - Diffusion of webinars
- *Cover "Smart Energy Standards"*
  - Examples: IEC CIM, SGAM, IEC 62559, IEC 63097…
- *Collect feedback and proposed contributions*
  - Repository of code components
- *Establish official liaisons with CEN/CLC/ETSO CG-SG and ENTSO-E CIM Expert Group*

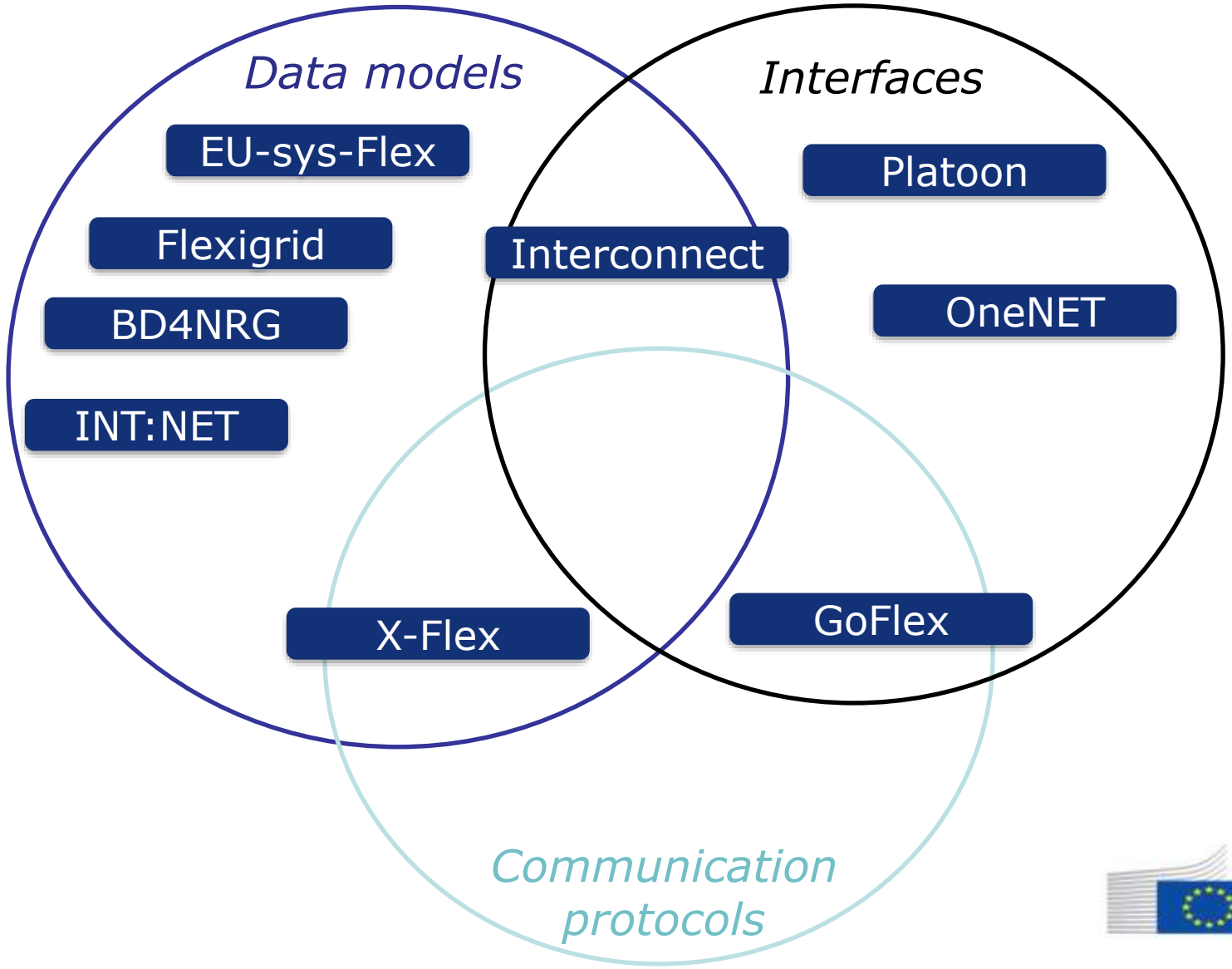
Knowledge diffusion

- *Diffusion of standards and frameworks*
  - Repository
- *Dissemination of webinars*
  - Playlist of webinars: https://t.ly/n9aiQ
  - IEC 63097 standardisation roadmap
  - Omega-x profiling workshops
  - Datacellar
  - EUMED metering & market
  - OneNET

Repository of code components

- *Collect feedback on standards from Bridge projects*
  - Focuss on dataspace and flexibility projects
  - Identify standards used by each project
- *Gather contributions to standards*
  - Descriptions of data models, communication protocols
  - Open-source implementations
  - Extensions of existing standards

Identification of code components



European Commission

Liaison with other initiatives

- *Cooperation with different initiatives*
  - CEN-CENELEC-ETSI CG-SG
  - ENTSO-E
- *Review documents*
- *Common activities*
  - Harmonization of generic roles
  - Use-cases repositories
  - Reference architectures

European Commission

Networking break (25')

Stakeholder and solution panel

Panel on means for up-scaling, role of an open ecosystem

<< Stakeholder and solution panel >>

→ Panel on means for up-scaling, role of an open ecosystem

- *Moderator*: **Rolf Riemenschneider**, DG CONNECT
- *Panellists*:
  - **Sebastiaan Coppenholle**, Elia/50Herz
  - **Robert Böhm**, EEBUS
  - **Adriaan van Eck**, Flexiblepower Alliance Network – FAN
  - **Laurent Schmitt**, Digital4Grids, IEC TC57 Working Group 21 convenor

European Commission

Evolving Mobility Ecosystem

- **EV Charging & Parking**
  - Find parking with charging facility
    - Charging is a sub-property of parking
    - Parking is a sub-property of Mobility
  - Authenticate and enable charging

- **Extend ecosystem** with individually owned chargers and/or parking places / service brokers
  - Shared infrastructure management
    - Contextualise charging
    - Load balancing / Peak shaving
  - Towards 'Green Charging'

Report : AIOTI – EV Charging Use Cases (2021)

Interoperability is key for future Energy Systems

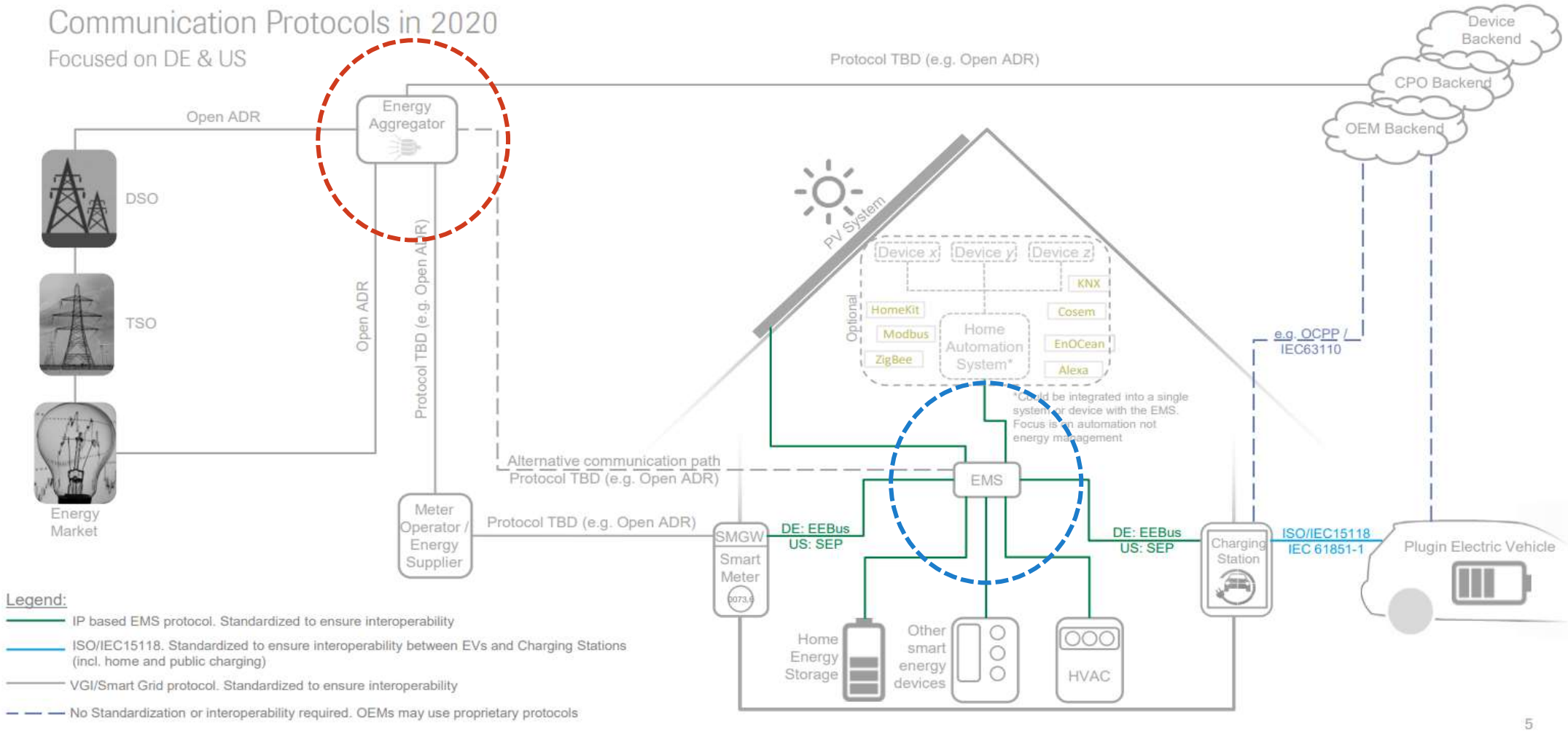
- Standardise
- APIs
- Aggregate
- Share Data
- Partnership model
- Apps

Smart charging ranks among the main use cases in fast rising cross-industry IoT use cases

Landscape Report (2023):
Energy and flexibility data models and interoperability across the sectors energy, mobility and buildings

VDA – Reference Architecture

- Local Control operations // Cloud data services



Discussion points for the panel

- • **What do you think is the key orchestrator for energy management in a home environment ?**
  - ➢ In particular, which edge trends do you see considering the role of up-and-coming technologies?
- ● Peering into a future decarbonisation roadmap,
  - ➢ **what will be the key incentives to unlock major investments into an intelligent energy management?**
- ● **Who/what do you think will drive convergence of standardisation**
  - ➢ *what role of de-facto standards / pre-normative / formal standardisation?*
- *[Slido – Results]*

European Commission

Elia Group

solutions to unlock decentralized flexibility

Elia Group – Sebastiaan Coppenholle

What should the future look like?

1

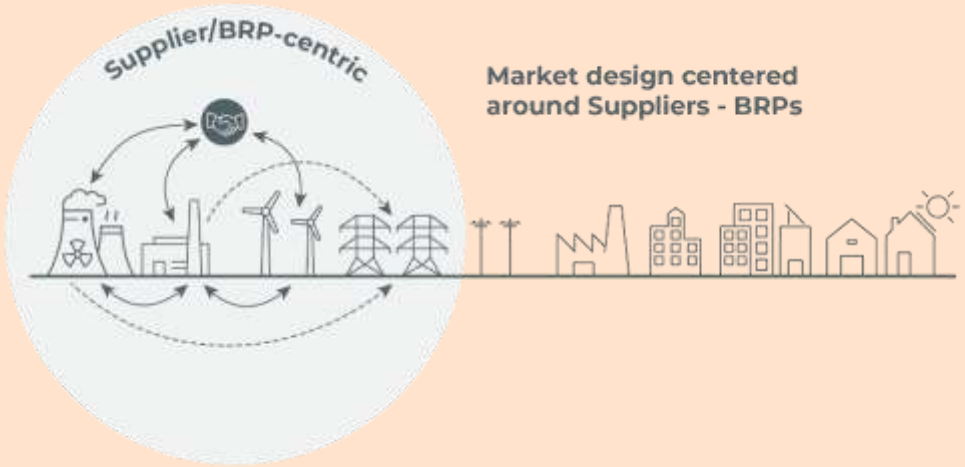
2

3

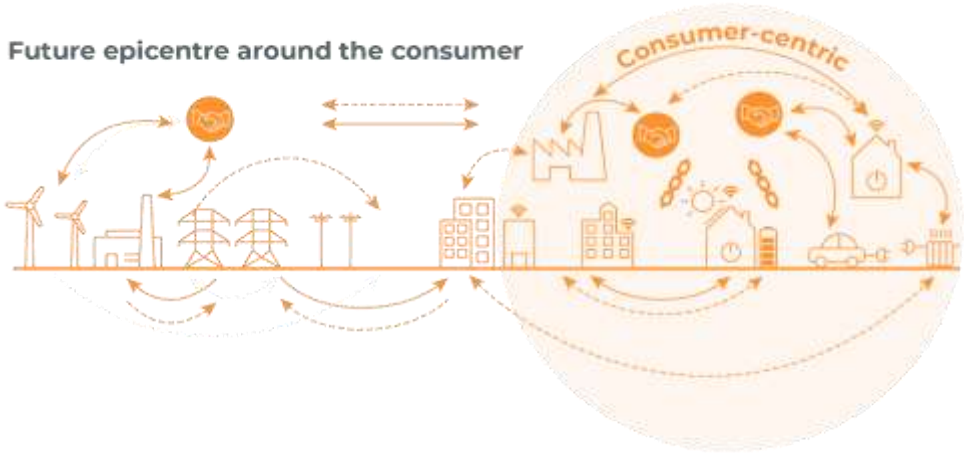
4

New challenges require a more consumer centric approach

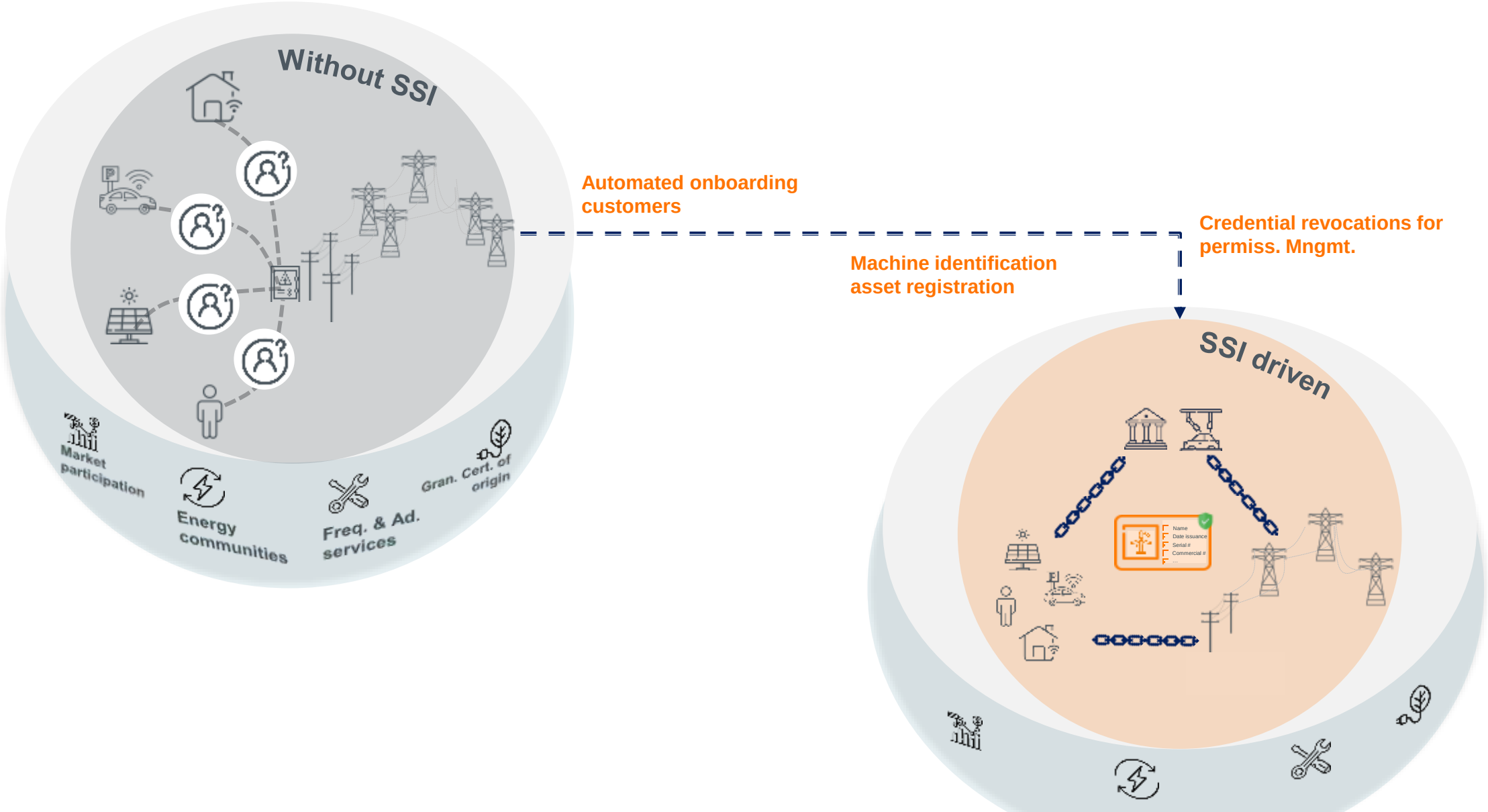
From generation following inflexible demand



To demand following intermittent generation



Tech such as SSI holds the power to enable efficient, reliable and trustable uptake of DER´s into the gríd.



SSI

2023

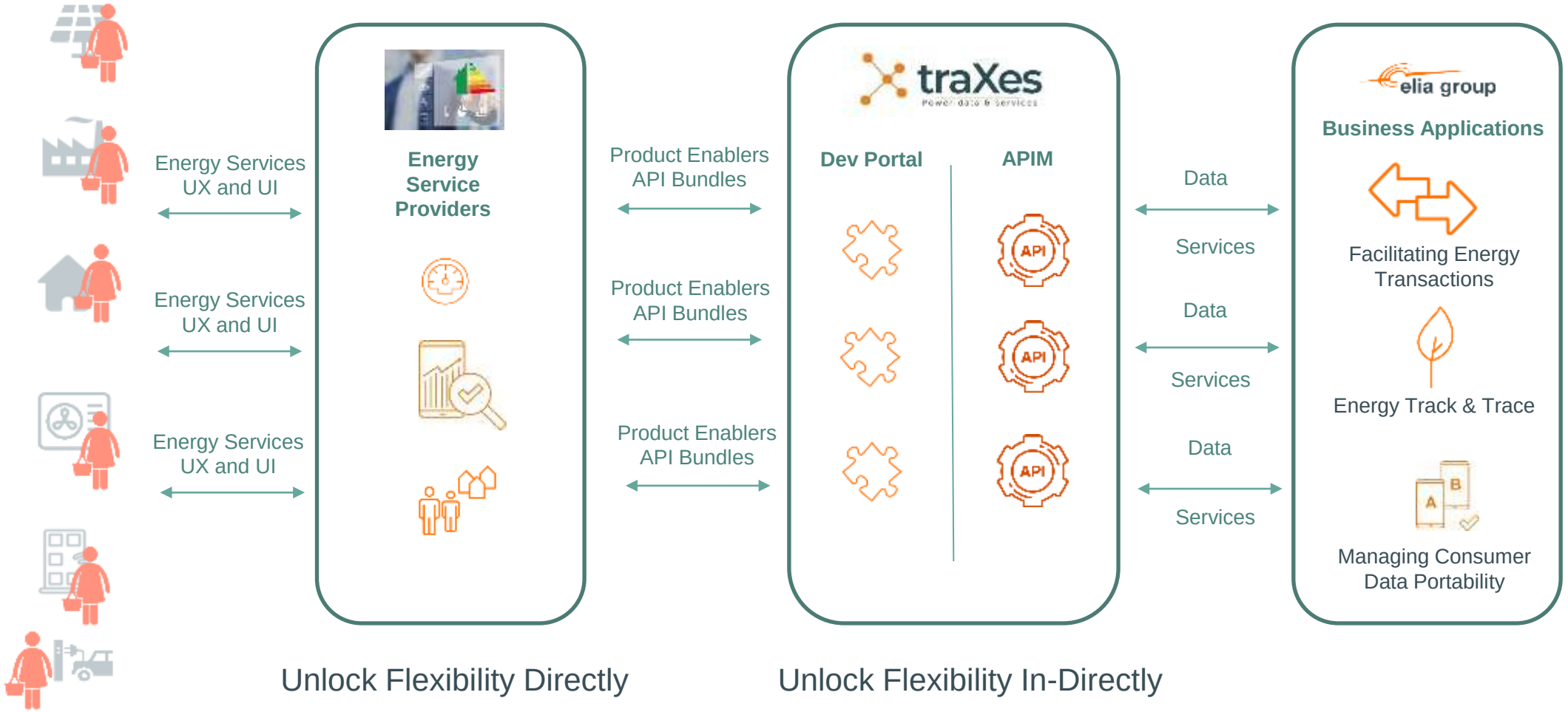
Innovation


elia group

ANNEX

Belgium´s growing capacity needs will develop over the next years but can be mitigated by unlocking of flexibility

TraXes is the ESP's one stop shop to enabling products



DIVERGING INTERESTS AT THE GRID CONNECTION POINT

Requires -> coordinated & standardised use cases which allow all interests to be addressed

Introduction S2

FLEXIBLEPOWER ALLIANCE NETWORK

Mission : Unlock energy flexibility in the best possible way.

Focus : built environment

Not a branche-organisation : FAN members include DSO/TSO, ESCO's, research organization, system integrators and other energy system stakeholders

Open standards : FAN promotes open standards for unlocking energy flexibility.

Introduction S2

S2 Standard

FLEXIBLEPOWER ALLIANCE NETWORK

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Adriaan van Eck
Chairman Flexiblepower Alliance Network

15 years in the Internet Industry

10 years Smart Energy (*and* Internet)

Personal mission

Raise the value of sustainable energy by making it more attractive

adriaan@flexible-energy.eu

S2 Standard

FAN activities

- Flex awareness
- Research
- Position papers / lobby
- Open standards

S2 Standard

FAN activities

- Flex awareness
- Research
- Position papers / lobby
- Open standards

FLEXCON 2024:

- Autumn 2024
- Preparing now
- FLEXCON 2023 presentations online: https://flexcon.energy

FLEXCON
CO-CREATE FLEXIBLE ENERGY

2023 partners :

EATON, elia, epexspot, KNX, Netherlands Enterprise Agency, tki urban energy, aug-e, cleanwatts, haulogy, next, openADR, vito, piclo, SIAPARTNERS, EnergyVille, NODES, ENGIE, csem, bamboo energy, withthegrid, centrica, FLEXCITY, Gemeente Amsterdam, Resourcefully, EQUIGY, LCPDelta, Bright, ReDREAM, fluvius, HUAWEI, ELECTRON

Introduction to S2 standard - EN 50491-12-2

- Focus on “behind the meter”
- No limitiation in technology
  - Wired ✓ Wireless ✓
  - Local ✓ Cloud ✓

- Orchestration of multiple energy flows of Smart Appliances: **comfort!**
- **No** deep and costly **integration with firmware** is needed.
- S2 is device-agnostic, it does focus not on specific (types of) devices

Customer Energy Manager and Resource manager

In S2, there are two entities that communicate with each other:

- The **Customer Energy Manager** (CEM), which orchestrates the flexibility provided by the appliances in the building
- The **Resource Manager** communicates the energy flexibility information of an energy smart appliance
- They communicate via **S2**

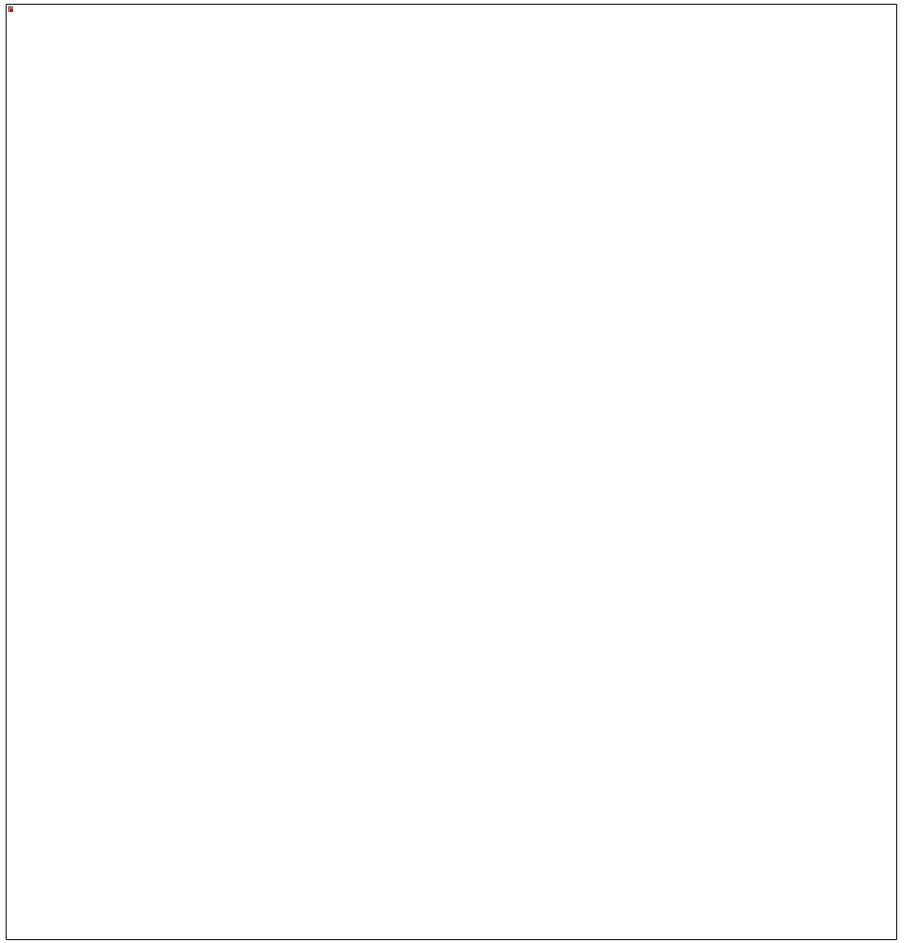
Focus on energy management

S2 focuses on the exchange of **standardised energy flexibility information** between EMS and energy equipment in buildings.

S2 works with eight so-called **'Energy Flexibility Patterns'**, rather than relying on specific use cases for each type of device.

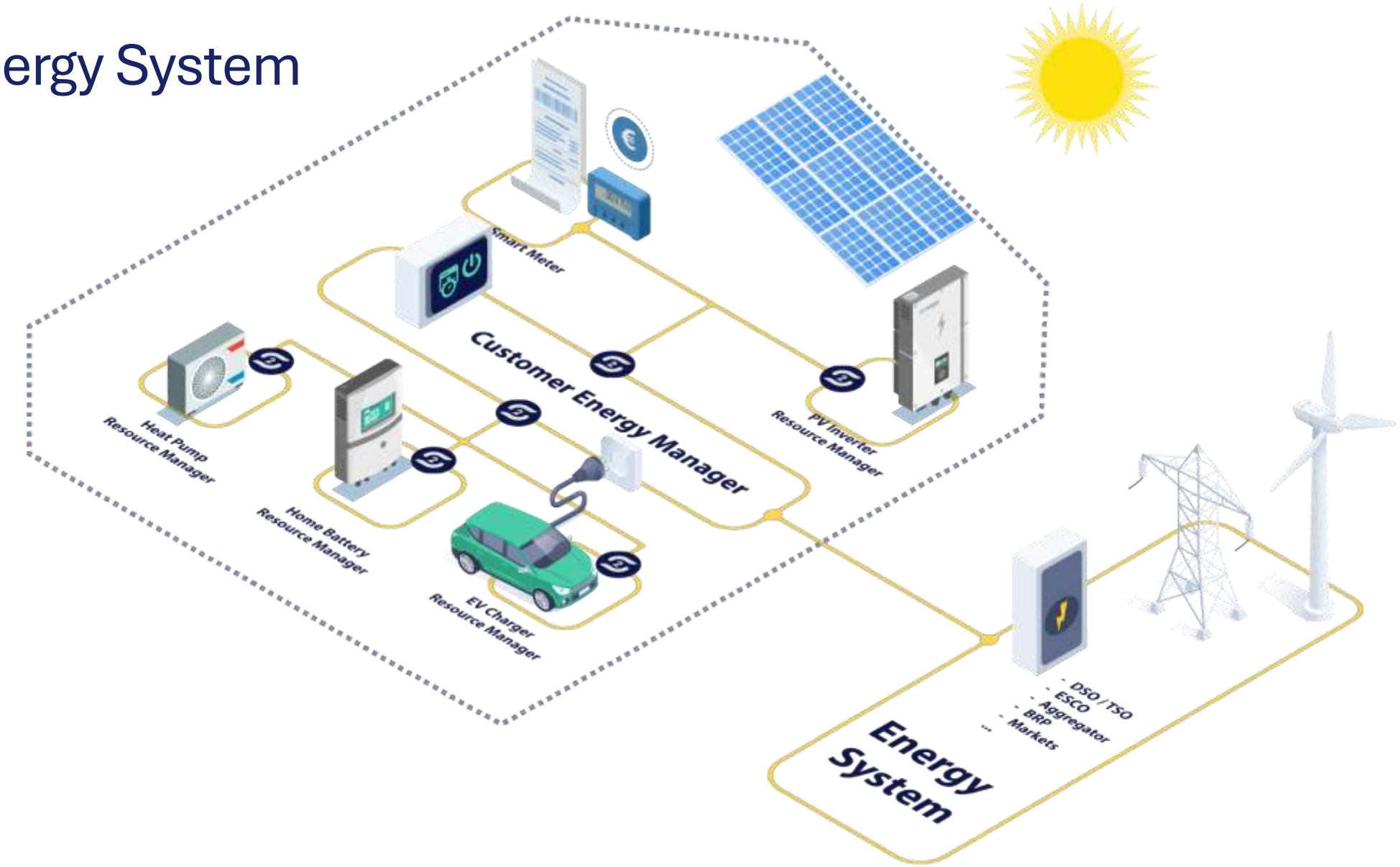
Limiting the scope to energy flexibility makes it **easy to implement** and maintain S2.

Energytransition proof: easy to add devices in the future.



S2 Standard

S2 in the Energy System



S2 Standard

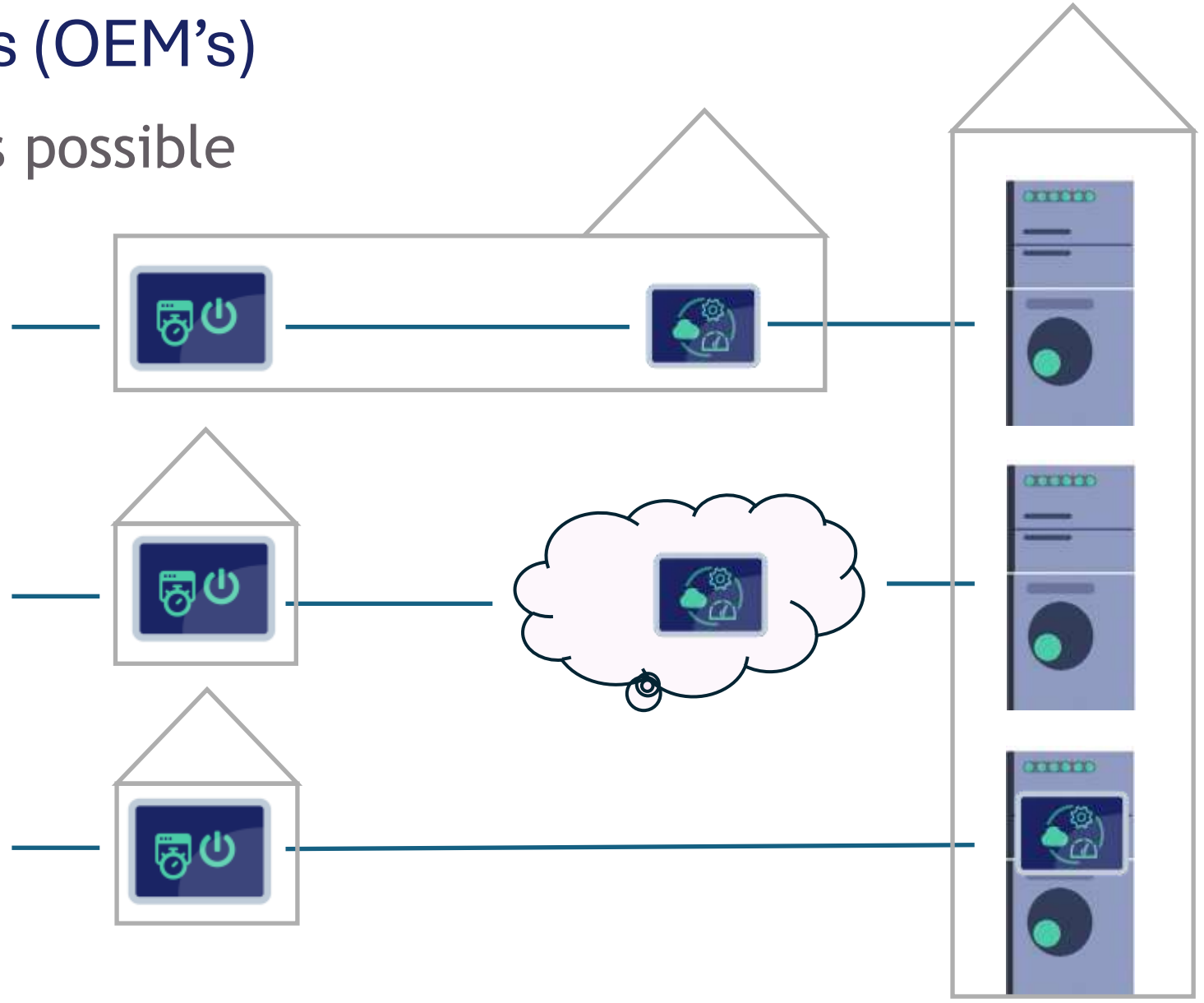
S2 benefits for manufacturers (OEM's)

Staged implementation of S2 is possible

On separate control-devices

In the cloud

Integrated in firmware of devices



Introduction S2

FAN website (English)
https://flexible-energy.eu/

Adriaan van Eck
adriaan@flexible-energy.eu

- Newsletter: https://nl.flexible-energy.eu/contact-fan/
- LinkedIn: https://www.linkedin.com/company/flexiblepower-alliance-network/

FAN Flexmonitor: research on protocols and devices: https://nl.flexible-energy.eu/flexmonitor/

FAN HEMS in the Netherlands December 2022 (in English) :

https://flexible-energy.eu/energy-management-in-and-around-the-home-offers-great-opportunities/

S2 standard
https://s2standard.org

FLEXCON
/www.flexcon.energy

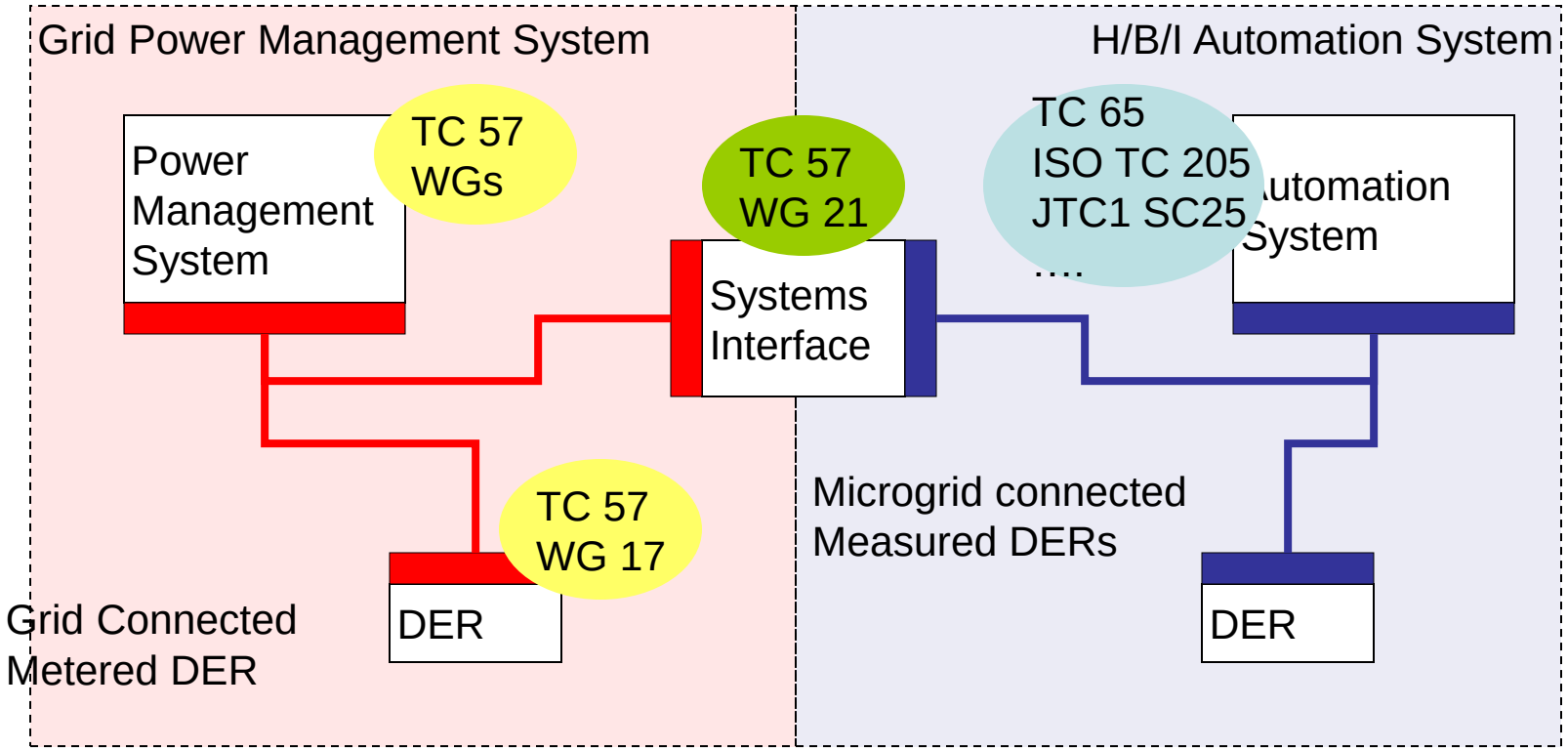
INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

IEC TC57 WG21
New API standards for residential DER flexibility management

L. Schmitt
Convenor TC57 WG21

January 2024

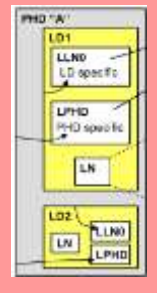
Working Group Scope through TC57



Domain Split for Systems Interface

Grid Technical Operations (After the Market Response)

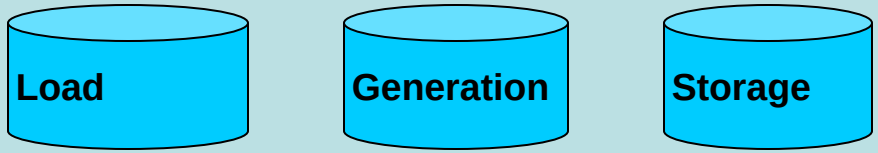
Grid Commercial Operations (DSF Flexibility Markets)

	Grid Control Rooms Redispatch/Emergency Response IEC 62968/62970 (CIM)	Demand side flexibility (Implicit and Explicit) IEC62325 (CIM)	Metering & Settlements IEC62968
Communication	Near Real-time Communication and Data Exchange Platforms		Rest Data Exchange
Data Model	 **Point of Common Coupling Model** Detailed DER connection models as per 61850-90-7 (aligned with IEEE2030-5)	**DER Resource Model** Detailed DER market resource models **IEC62746**	**COSEM** **IEC 62056**

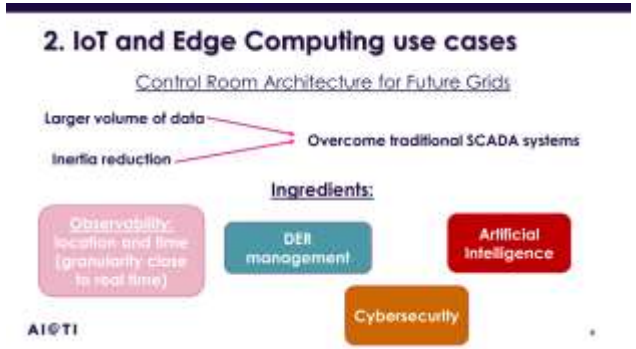
WG17

WG21

Home/ Building / Industry Energy Management



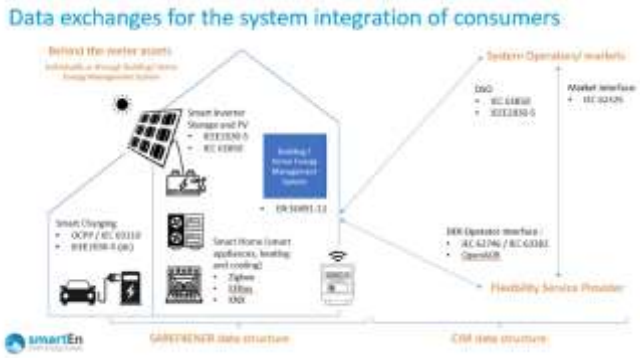
Target data exchange architecture



Leveraging IoT and Edge computing to foster energy flexibilities through cross sectorial integration

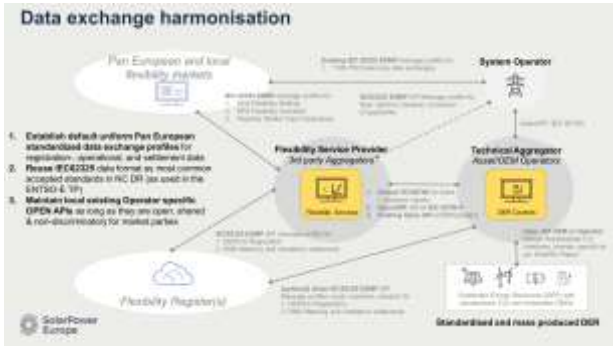
Source : AIOTI, ***December 2022***

Landscape report on energy and flexibility data models and interoperability across the sectors of energy, mobility and buildings Source : European Commission, ***Mai 2023***



Assessment whitepaper on available standards and ontologies

Source : SmartEn, ***June 2023***



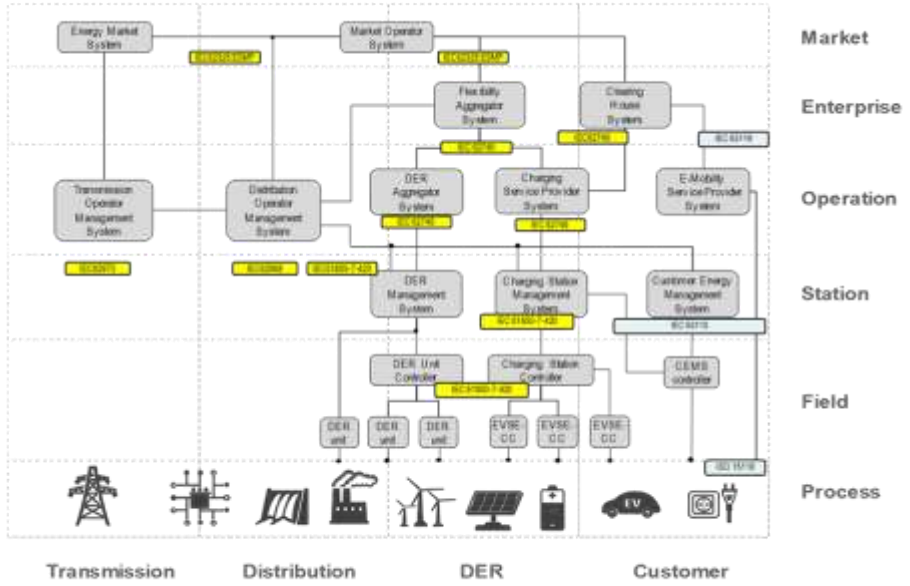
SolarPower advocacy through the Flexibility Code drafting team

Source : SolarPowerEurope, ***January 2024***

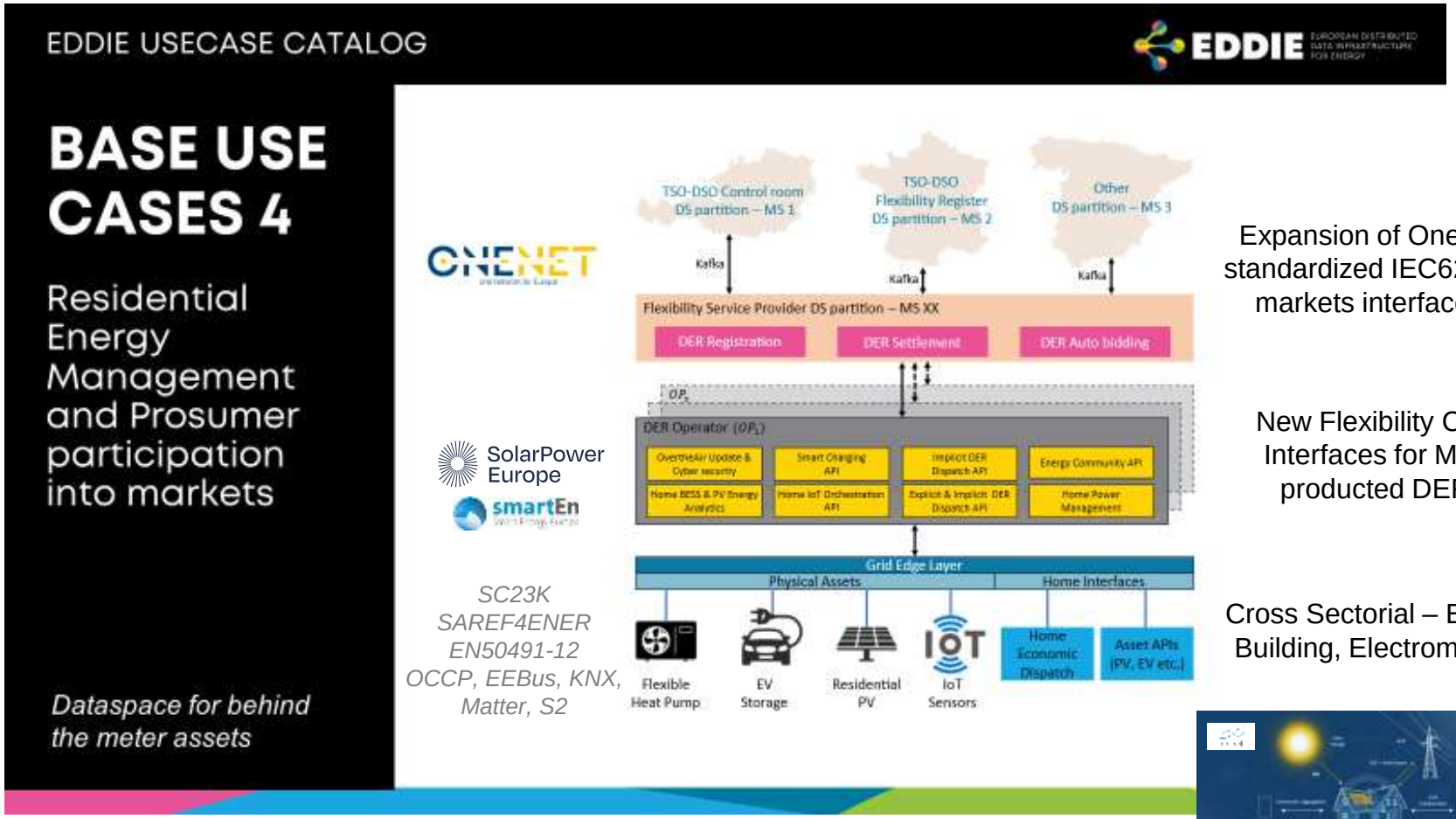
Clear view alignment across Flexibility Service & DER equipment providers

Relevant sets of standards

Recommended standard	From - To	Why
IEC 62325 ESMP	Flexibility Service Provider - Electricity Markets - System Operator	• Covers all Demand side message profiles (registration, nomination, bidding, activation, metering and market reporting) • Pan European Balancing platforms (Mari, Picasso) and ENTSO-E (Transparency Platform) already work with the standard
IEC 62746 Profiles	Flexibility Service Provider - Technical Aggregator OpenADR 3.0 or IEC62746-4 profiles	• Proven track records for Service provider – CU Operator communication • Recommended through ETSI-CEN-CENELEC first sets of standards • Opportunity to align message profiles with IEC62325 ESMP
Open Published API	Technical Aggregator (CPO) - Controllable Units	• Can be on premise or Cloud to cloud • Leverage domain specific standards (OCPP2.0,1, EEBus, Zigbee/Matter, IEC61850-7, IEEE 2030-5 etc..)



First implementation piloted under Horizon Europe projects



Expansion of Onenet standardized IEC62325 markets interfaces

New Flexibility Code Interfaces for Mass producted DERs

Cross Sectorial – Energy, Building, Electromobility

Target Eddie demonstration planned in France during 2024

Networking break (25')

Driving standardisation

Panel: de-facto standards, normative, formal standards

Moderator: Moderator: Silvana Muscella, Stand.ICT.eu 2026 Project Coordinator, CEO Trust-IT

Panellists:

- Eusebiu Catana, Senior manager innovation and deployment, ERTICO-ITS Europe, involved in ISO TC204, StandICT.eu fellow
- Marga Martin Sanchez, HSbooster.eu expert
- Dr. Aikaterini POUSTOURLI, Independent Standardisation Expert of R&I Projects, IHU, HSbooster.eu expert
- Reyna Ubeda, ITU Standardisation Bureau, Study Group Engineer in the Study Group Department
- Tanya Suarez, AIOTI Management Board Member, INSTAR project, (BluSpecs)

Coordination and Support Actions for projects working on standardisation

standICT.eu2026
ICT Standardisation Observatory and Support Facility in Europe

Provide financial support (with an overall available budget of 3 million euro) to European ICT Standards specialists operating in the most topical technological domains.
Monitor the global ICT Standardisation landscape and Provide the community of ICT experts with the most accurate coverage of relevant and timely ICT Standards, priorities and needs.

The European Standardisation Booster helps EU-funded R&I projects valorise their results by contributing to the creation or revision of standards.

- Standards Orientation Tool.
- HSbooster.eu Training Academy.
- Pool of Standardisation Experts.
- One-to-one guidance service.

Funded by
the European Union

StandICT.eu: Objectives and Achievements

OBJECTIVES

- **Provide financial support** (with an overall available budget of **3 million euro**) to European ICT Standards specialists operating in the most topical technological domains.
- **Monitor the global ICT Standardisation landscape** and
- Provide the community of ICT experts with the most accurate coverage of relevant and timely ICT Standards, priorities and needs that might affect the key ICT domains.

CONSORTIUM

Trust-IT Services communicating to markets · OpenForum Europe · DCU · AUSTRALO · Fraunhofer · European DIGITAL SME Alliance

ENGAGEMENT OF ICT EXTERNAL STANDARDS EXPERTS

External Advisory Group (EAG)

Members with direct links to the Standards Technical Committees or Working Groups

External Pool of Evaluators (EPE)

Evaluators review proposals to the StandICT.eu Fellowship Programme.

FELLOWSHIP PROGRAMME

Open Calls

The call topics are listed in conjunction with the annual **ICT Rolling Plan of Standardisation**

EUR 3 Million

StandICT.eu run a cascade grant process to support participation of standardisation specialists in key international and global SDOs and consortia.

404 Funded Experts

9 impact reports

EU OBSERVATORY FOR ICT STANDARDS

11 Technical Working Groups

Standardisation experts providing focused deliverables in a specific technology area.

9 Landscape Reports + 1 White Paper

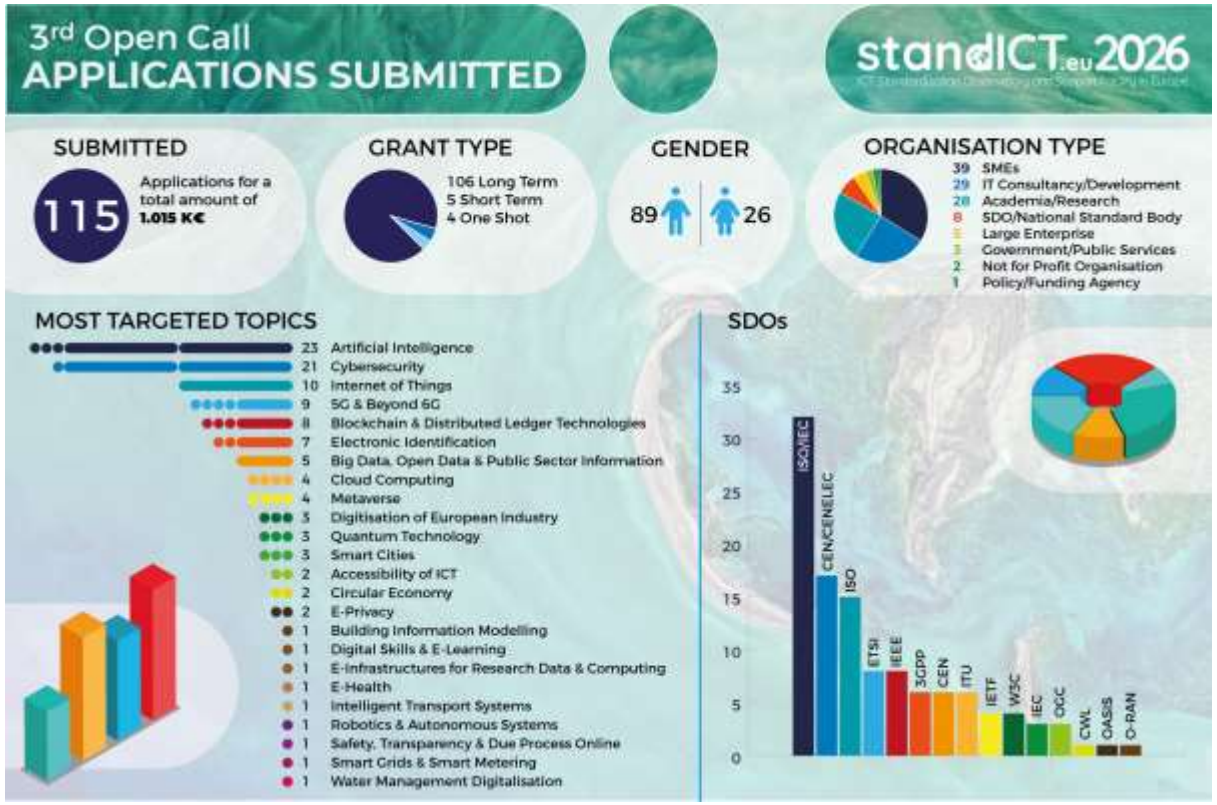
+ 110 Experts contributed to drafting the EUOS TWG Landscape Reports, 27% were funded by StandICT.eu

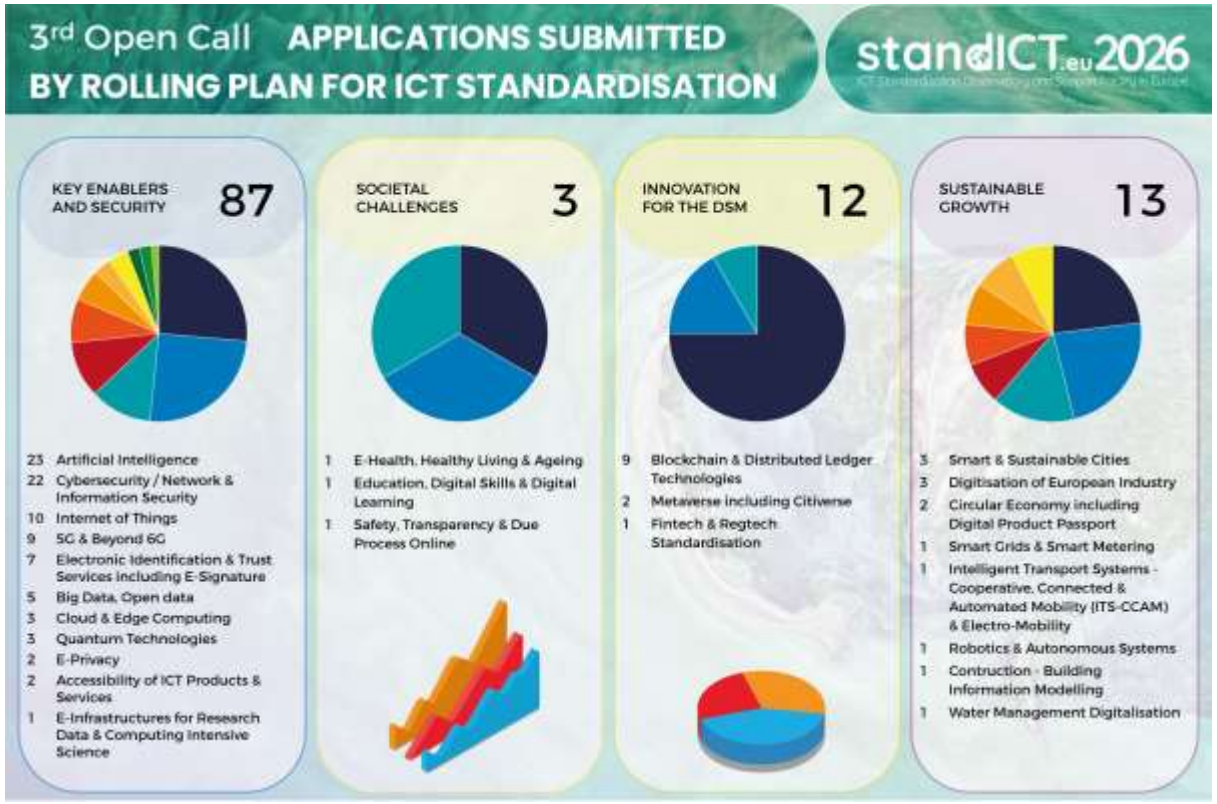
+2600 Standards

Funded by the European Union

standICT.eu2026
ICT Standardisation Observatory and Support Facility in Europe

Results of the StandICT.eu Open Call #3





The most targeted topics were: AI, Cybersecurity, IoT, 5G and beyond, Blockchain & DLT.

The growing Standardisation portfolio funded under the EC HE & DEP

EDU4Standards.eu | Education for HEIs

- ITCoS on education in HEIs
- 6 Pilots in EU HEIs
- Academic standards Day
- CEN Workshop Agreement

standICT.eu 2026 | Grants for ICT Experts

- Grants for EU ICT Standardisation experts
- Training Academy on ICT standards
- EU ICT Standards Observatory

HSbooster.eu | Expert support for EU Projects

- Pilot for Standardisation Booster
- Expert consultancy services to EU projects
- Standards Training Academy
- Online tools – Norma & Standards Orientation tool

SEEBLOCKS.eu | Grants for Blockchain & DLT experts

- Int'l cooperation on Blockchain & DLT
- Landscape Analysis & Permanent Task Force
- Educational Visualisation Tool

INSTAR | Int'l cooperation on Verticals

- International collaboration on verticals on standards: Australia, Canada, Japan, Singapore, South Korea, Taiwan and the USA
- Standards Dashboard & Tracer
- Thematic Task Forces & Frameworks

indico GLOBAL | Grants & ICT int'l cooperation

- Grants for int'l cooperation Brazil, China, India, Japan, South Korea & the United States

STAND4EU | Market impact for EU Projects

- Bridge gaps in research to market
- Training Academy
- Focus on SMEs & industry

BLOCKSTAND | Int'l cooperation on Blockchain & DLT

- Open, continuous and inclusive selection of Experts in Blockchain/DLT standardisation

Funded by the European Union

HSbooster.eu
Horizon Standardisation Booster

Joint training session HSbooster.eu and StandICT.eu 2026

The training session is intended for the researchers who participate in EU-funded R&I projects and anyone interested in the basics of standardisation.

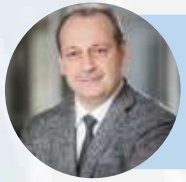
https://www.hsbooster.eu/events/standardisation-practice-when-right-time-standardisation-research-processes

1st February 2024

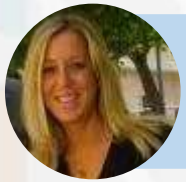
REGISTER NOW

Funded by the European Union

Panel discussion



Eusebiu Catana, Senior Manager in the Innovation and deployment department at **ERTICO-ITS Europe** and involved in **ISO TC204**



Marga Martin Sanchez, Programme Manager at the **European Association for Data and Cloud AISBL and** responsible for management of the **Gaia-X** interdependent programmes.

Dr. **Aikaterini Poustourli**, Scientific and Technical Officer at the **International Hellenic University**, is a professional expert in innovation and technology, strategy and policy development and standards and governance.

Reyna Ubeda, Project Officer at **International Telecommunication Union's Standardization Bureau (ITU)**, supporting their activities related to different field of application in IoT, ICTs and smart cities.

Tanya Suarez is the CEO and co-founder of **BluSpecs**, Coordinator of **INSTAR** project and **AIOTI** Board Member, Governing Board Member **Quantum Industry Consortium**

Funded by
the European Union

Panel discussion

1. **Can you provide real-world examples and solutions to standardisation challenges, particularly addressing the insights and issues raised in previous panels?**

2. **How can projects effectively engage with standardisation (both formal via SDOs and informal? Are there any fast-track solutions, to support projects and SMEs in this path?**

3. **In the context of preparing proposals for projects in mobility, buildings, and energy, what are your recommendations for aligning with both global and international standards, beyond EU standards? How can projects ensure they are considering and integrating these standards in their strategic planning and implementation?**

4. **Share your one key take away from the event**

Funded by
the European Union

Fireside chat

Fireside chat

Moderator: Tanya Suarez, AIOTI Management Board Member, INSTAR project, (BluSpecs)

Panellists:

- Eusebiu Catana, Senior manager innovation and deployment, ERTICO-ITS Europe
- Ovidiu Vermesan, Chief Scientist, SINTEF