

BRIDGE — ACCELERATING SMART GRIDS AND STORAGE DEPLOYMENT BY REMOVING BARRIERS TO INNOVATION



Working Group sessions:

Panagiotis KTENIDIS (WG Regulations)
Piraeus University Applied Sciences,
SEALAB, Greece

Rowena McCappin (WG Business Models)
Th!nk E

Laura MARRETTA (WG Data Management)
Enel SpA

Konstantinos CHALVATZIS (WG Customer Engagement)
University of East Anglia, UK

Rémy DENOS (Moderator) DG ENERGY

Discussion panel:

Manuel SANCHEZ JIMENEZ DG ENERGY

Patricia ARSENE DG CONNECT

Adas PANGONIS / Mariana STANTCHEVA INEA

Jean-Marie BEMTGEN DG ENERGY



bridge

HORIZON 2020



**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

Outline

- Presentation of the BRIDGE initiative
- Main recommendations from the BRIDGE Working Groups
 - Regulations WG
 - Business Models WG
 - Data Management WG
 - Customer Engagement WG
- Discussion panel with Project and Policy Officers from the European Commission

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Presentation of the BRIDGE initiative

Rémy DENOS **DG ENERGY**










**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

BRIDGE Projects overview

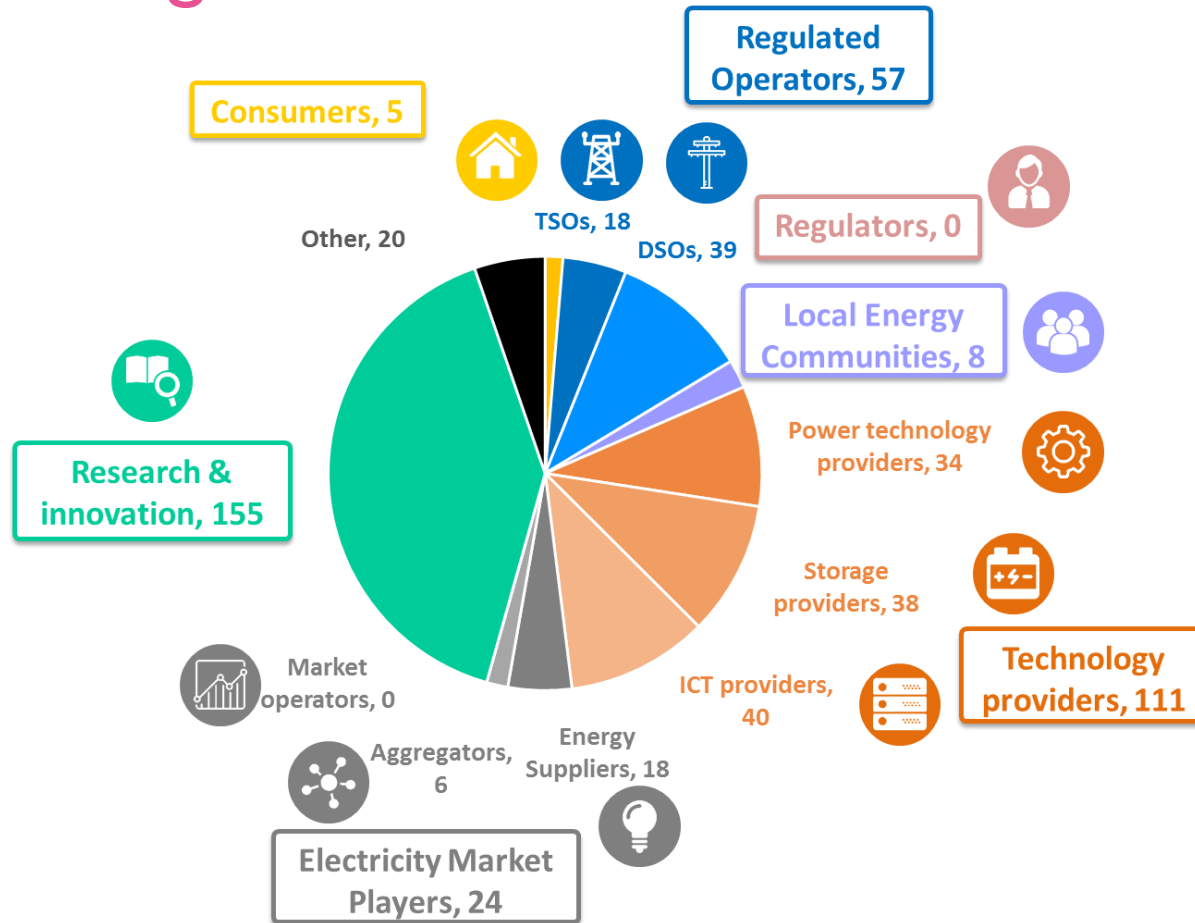
Distribution grids	Distributed Storage	Transmission grids	Large-scale storage	RES and H&C
<p>2014: 10 projects, 60 M€</p> 	<p>2014: 7 projects, 72 M€</p> 	<p>2015: 4 projects, 82 M€</p> 	<p>2015: 2 projects, 25 M€</p> 	<p>2016: 2 projects, 8 M€</p> 
<p>2016: 7 projects, 90 M€</p> 		<p>2016: SmartNet</p> 		

Overall, **337 MEur** EU funding over three years

**CLEAN ENERGY
FOR ALL EUROPEANS**



A wide range of Stakeholders



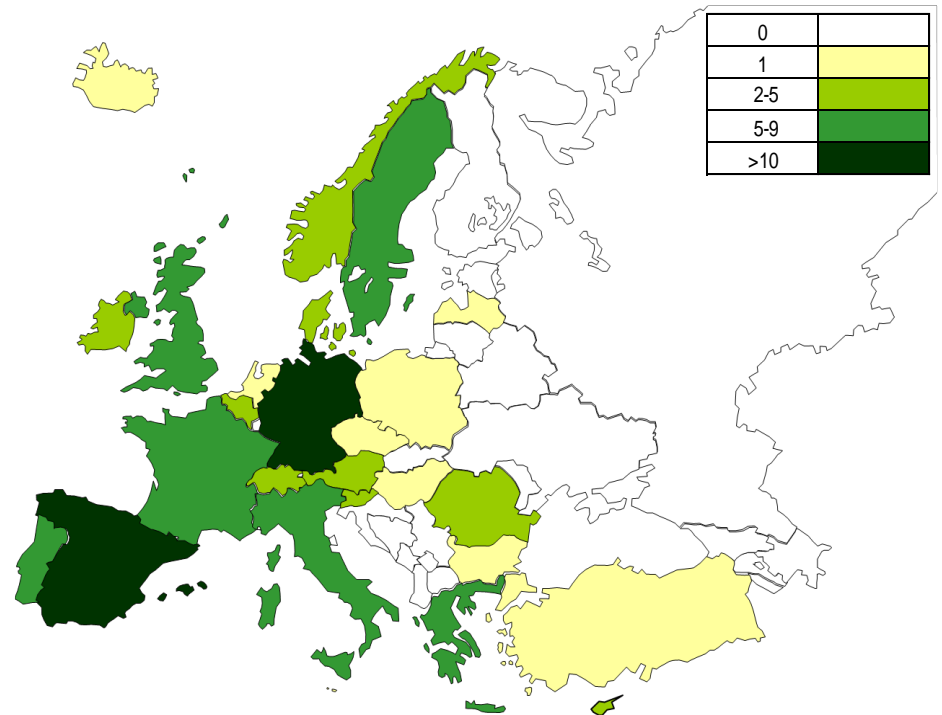
**CLEAN ENERGY
FOR ALL EUROPEANS**

A wide geographical distribution

- 26 countries are hosting BRIDGE demos or pilots

Locations of the
BRIDGE demos and
pilots

0	
1	
2-5	
5-9	
>10	



**CLEAN ENERGY
FOR ALL EUROPEANS**

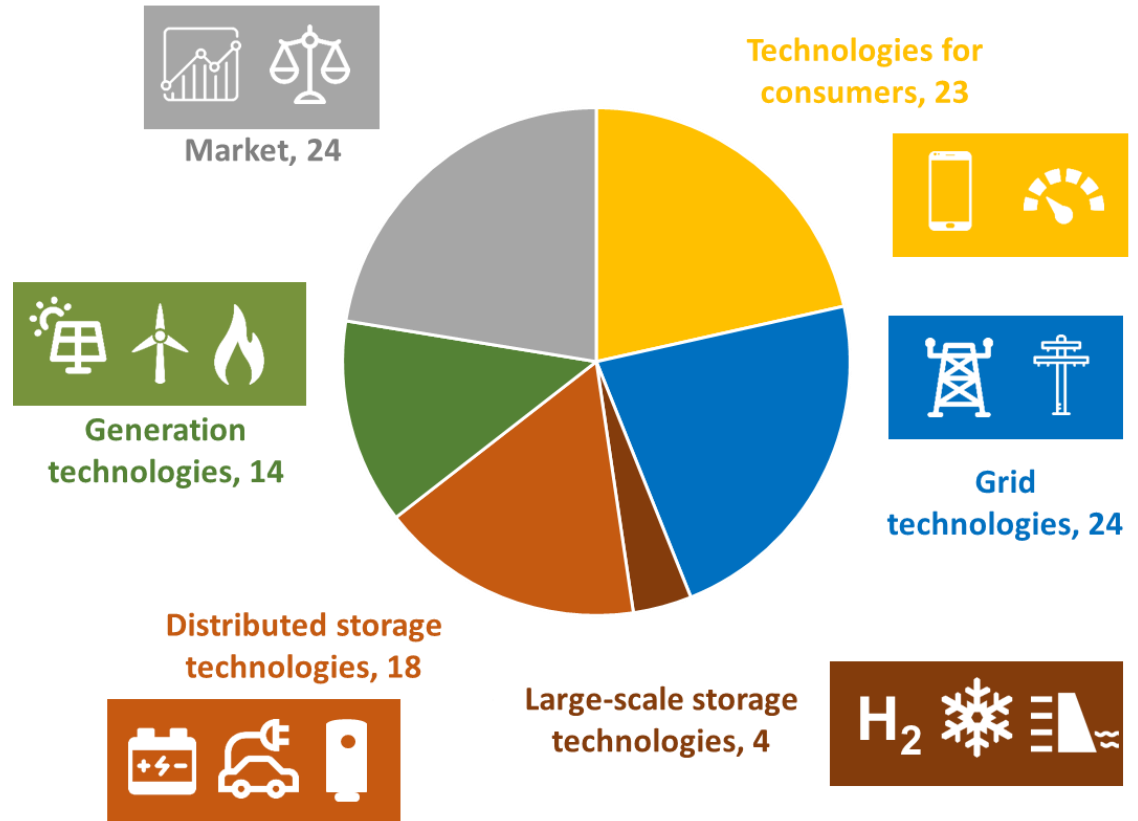


**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

A wide range of Technologies

Number of projects addressing each family of technologies



**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Which barriers to Innovation were identified ?

Data management

Business Models

Regulations

Customer engagement

BRIDGE

- Is a European Commission initiative
- Gathers Horizon 2020 Smart Grid and Energy Storage demonstration projects
- Creates a structured view of obstacles to innovation.
- Fosters continuous knowledge sharing amongst projects
- Delivers conclusions and recommendations with a single voice

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

[@BRIDGE H2020](#)

[BRIDGE brochure](#)

**CLEAN ENERGY
FOR ALL EUROPEANS**



Regulations Working Group

Panagiotis KTENIDIS (Chair Regulations WG)
Piraeus University Applied Sciences, SEALAB



**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

Regulations WG: Obstacles and barriers to innovation deployment

Evidence based & Experimental

(1) Issue #6 New services/New regulations

(2) Issue # 5 Legal framework covering energy “exchange” between two storage system owners -batteries, etc (energy?)

	ISSUE
1	Regulations that might hinder storage valorisation
2+	Safety (present - future)
7	
3	Network Code
4	Legal framework covering energy exchange between storage systems Peer to Peer
5	Storage (Battery) Ownership
6	Multiple services
8	Regulations covering the warranty of the batteries and guaranty of the service delivered
9	Environmental Issues regarding the lifecycle of the storage system
10	Pilot demonstrator in a free zone
11	Smart meter, protocol of communication

**CLEAN ENERGY
FOR ALL EUROPEANS**






**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Regulations WG: Recommendations towards innovation and deployment

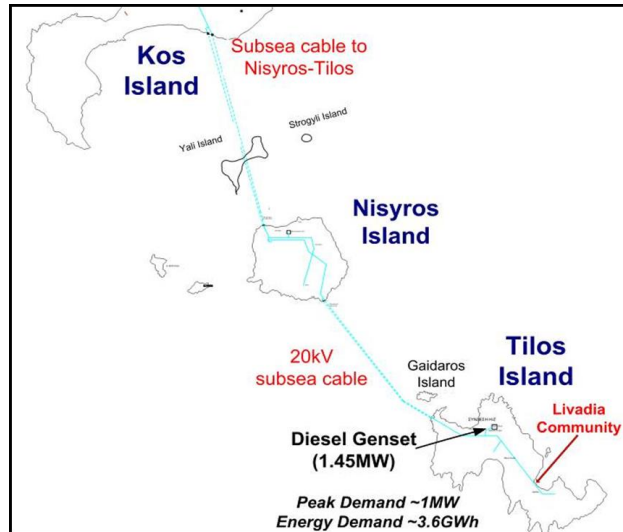
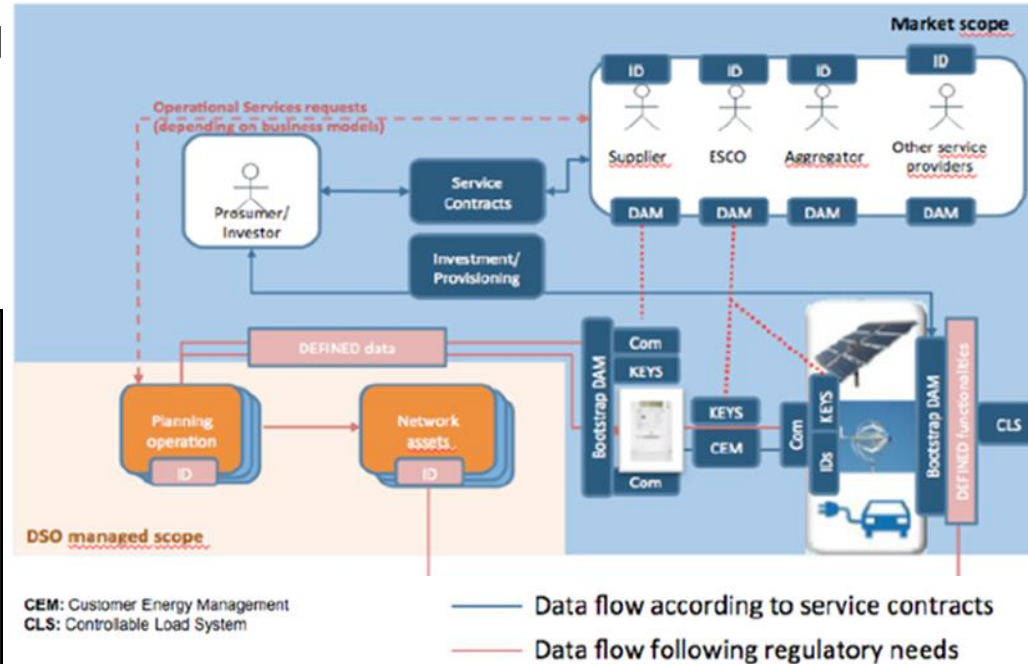
Based on the Transition with uncertainty and complexity:

- (1) frameworks adapted for right signals not to create a bias into purely CAPEX-oriented solutions but rather take into account potential (intermediate or structural) innovative OPEX-oriented solutions under uncertainty
- (2) Network code include new services, storage as "new asset" with separate attributes and support Energy Storage development in all forms electric, thermal, gas, etc.

Issue	New Service	Regulatory Recommendation	RAG
1	Frequency Regulation	Recommendation/requirement to TSO/DSOs to develop flexible pay-for-performance tariffs for frequency regulation. Frequency regulation includes "Enhanced/Fast Frequency Regulation" mode.	 Red
2	Ramp Rate	Recommendation/requirement to corresponding authorities (DSO, TSO, government) to admit additional RES based generation at regions already saturated (the maximum penetration allowed by DSO/TSO is reached). The RES based plant would be forced to include energy storage or any other mechanism for ensuring pre-defined Ramp Rate conditions. The pricing paid to the power plant would be regulated by Price Purchase Agreements.	 Red
3	Multiple Service	As a general recommendation, the participation of the assets in different ancillary markets should be encouraged. All the recommendations to be developed should include an incentive to technologies with a high usage (percentage of use of the asset during a day). The objective is to reach 24/7 systems.	 Amber

Regulations WG: Feedback from demos and pilot sites

Market Reference Models



Smart metering

Demos identified a lack of a clear legal framework for smart metering.

CLEAN ENERGY
FOR ALL EUROPEANS



Conclusions

- High TRL projects that involve innovation need to be supported by corresponding regulations since there are always tasks at the limits of the existing rules and norms
- Normative future deployment of replicating projects in the next phase for: broadening, deepening and scaling up
- Definition of important issues or classes crucial, example: the definition of storage
- Innovative projects deliver the new norms and re-regulatory framework establish more secure, safe and efficient energy for European citizens

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Business Models Working Group

Leen PEETERS (co-Chair Business Models WG)

Th!nk-E



**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

“Europe needs to step up its investment in energy efficiency and renewable technologies, and the development of clean energy business models, embracing the new opportunities and consumer empowerment brought about by digitisation.”

‘Clean Energy for All Europeans’ Package, November ‘16

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission



STORY

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

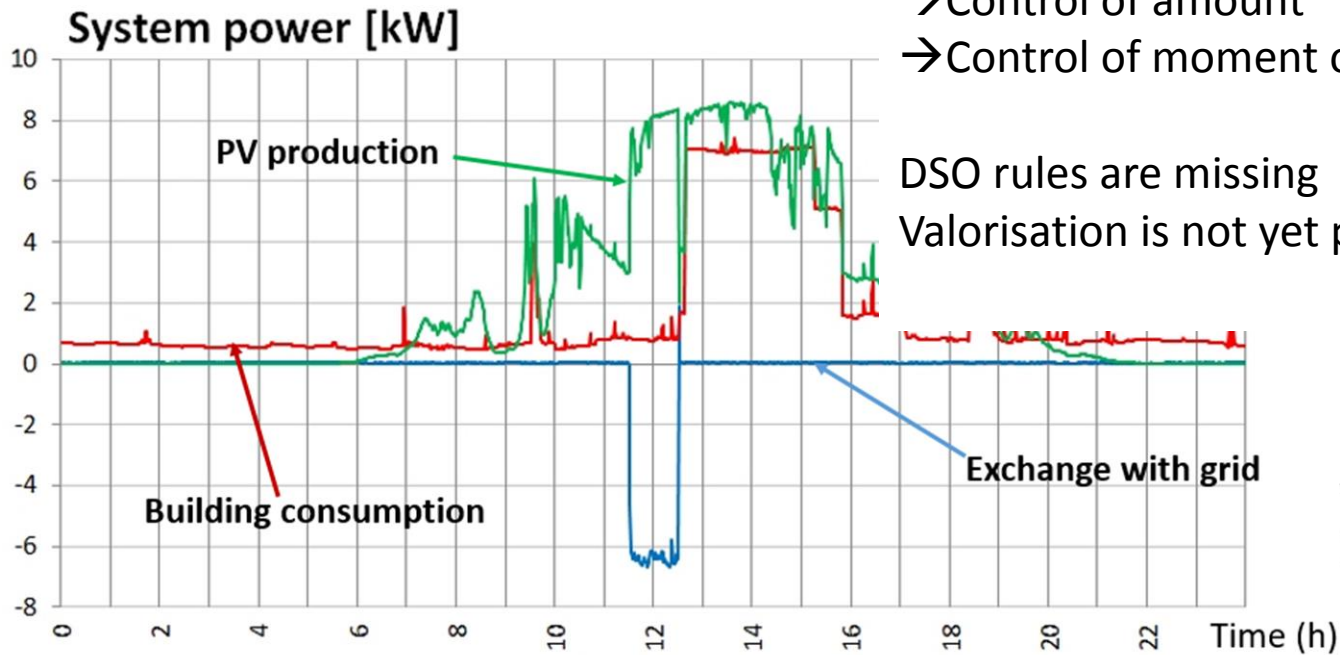
An initiative of the  European Commission

Building level

- Over 1 month off-grid
- Exchange from battery to grid on command

- Control of amount
- Control of moment of action

DSO rules are missing
Valorisation is not yet possible → VALUE???



**CLEAN ENERGY
FOR ALL EUROPEANS**





STORY

**CLEAN ENERGY
FOR ALL EUROPEANS**

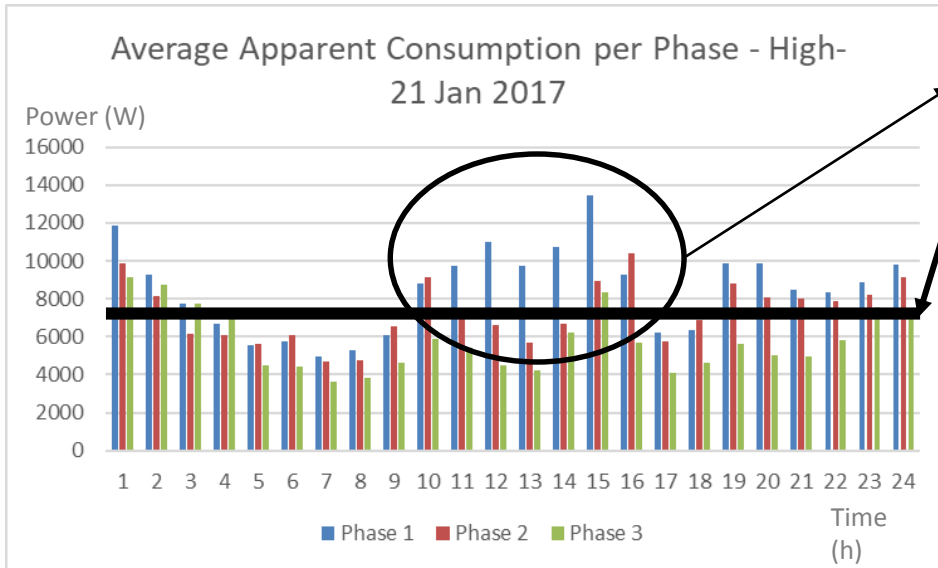


**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Residential Microgrid

- Balancing between phases
- Flattening demand
- Use of EV's and storage

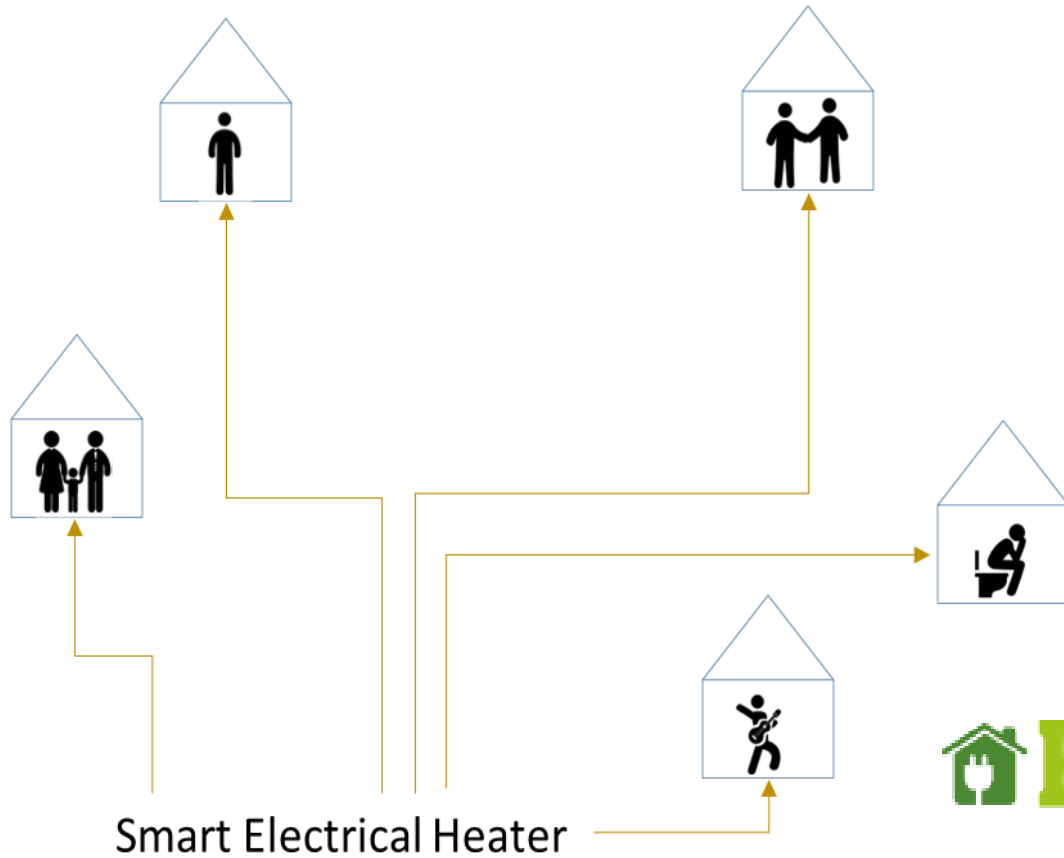


DSO rules are missing

Valorisation is not yet possible → VALUE???

**CLEAN ENERGY
FOR ALL EUROPEANS**





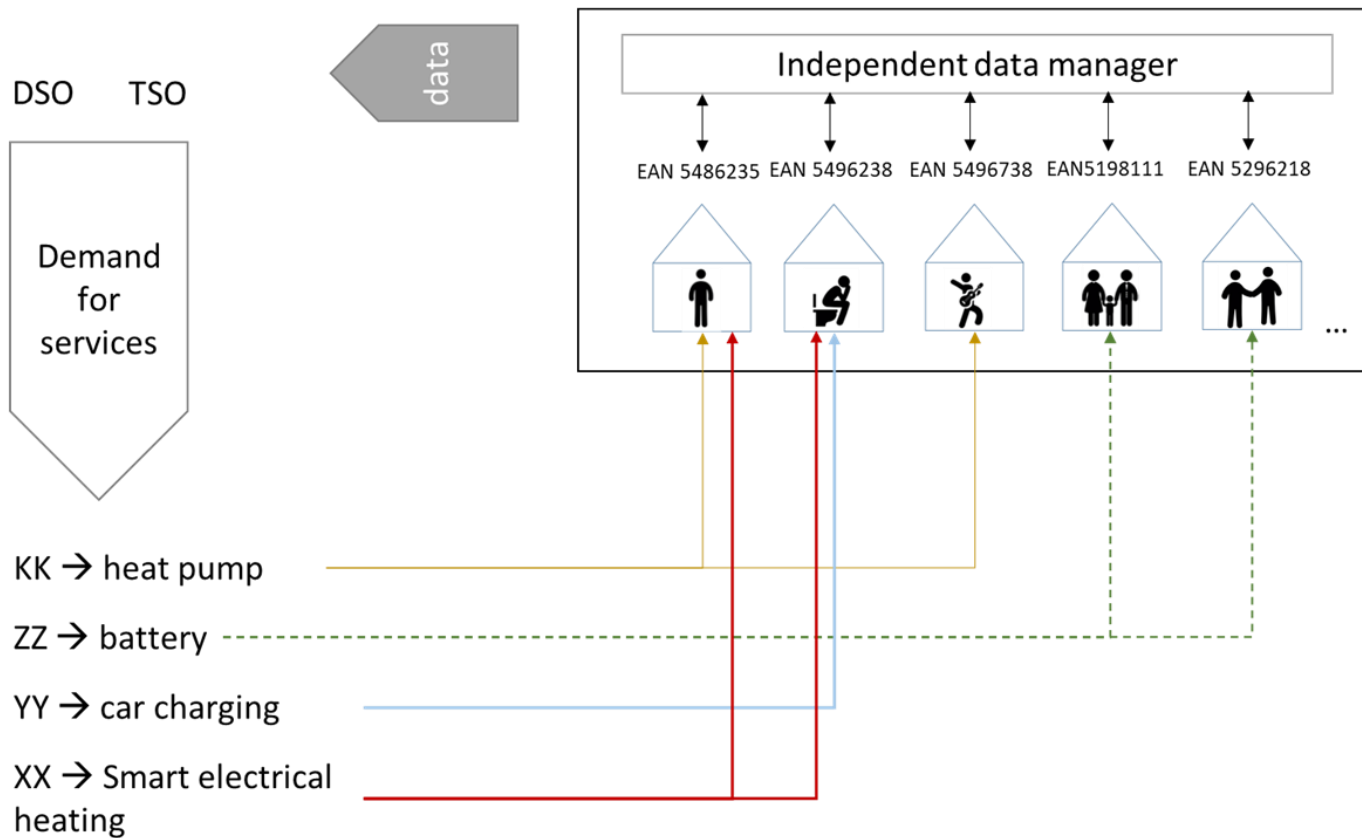
 **RealValue**

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission



**CLEAN ENERGY
FOR ALL EUROPEANS**



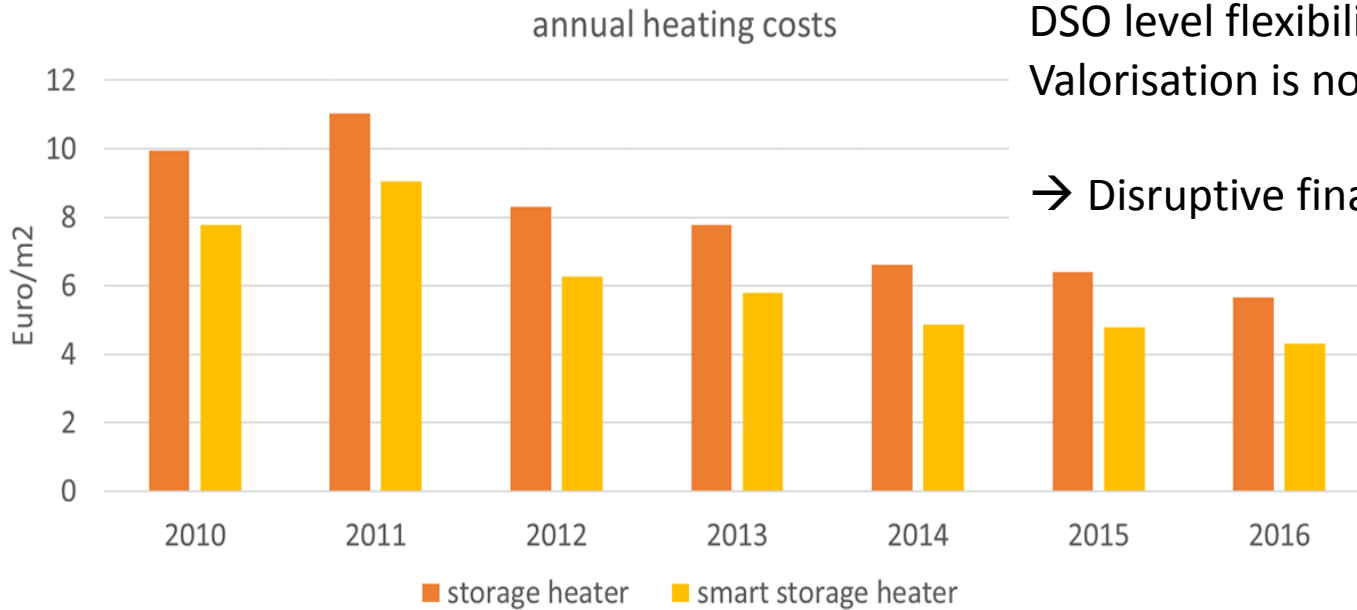
**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

- Distributed flexibility
- 200 € annually
- Operational Costs?

DSO level flexibility could be added
Valorisation is not yet possible → VALUE???

→ Disruptive financing technologies?



**CLEAN ENERGY
FOR ALL EUROPEANS**



Data Management Working Group

Laura MARRETTA (Chair Data Management WG)

Enel SpA



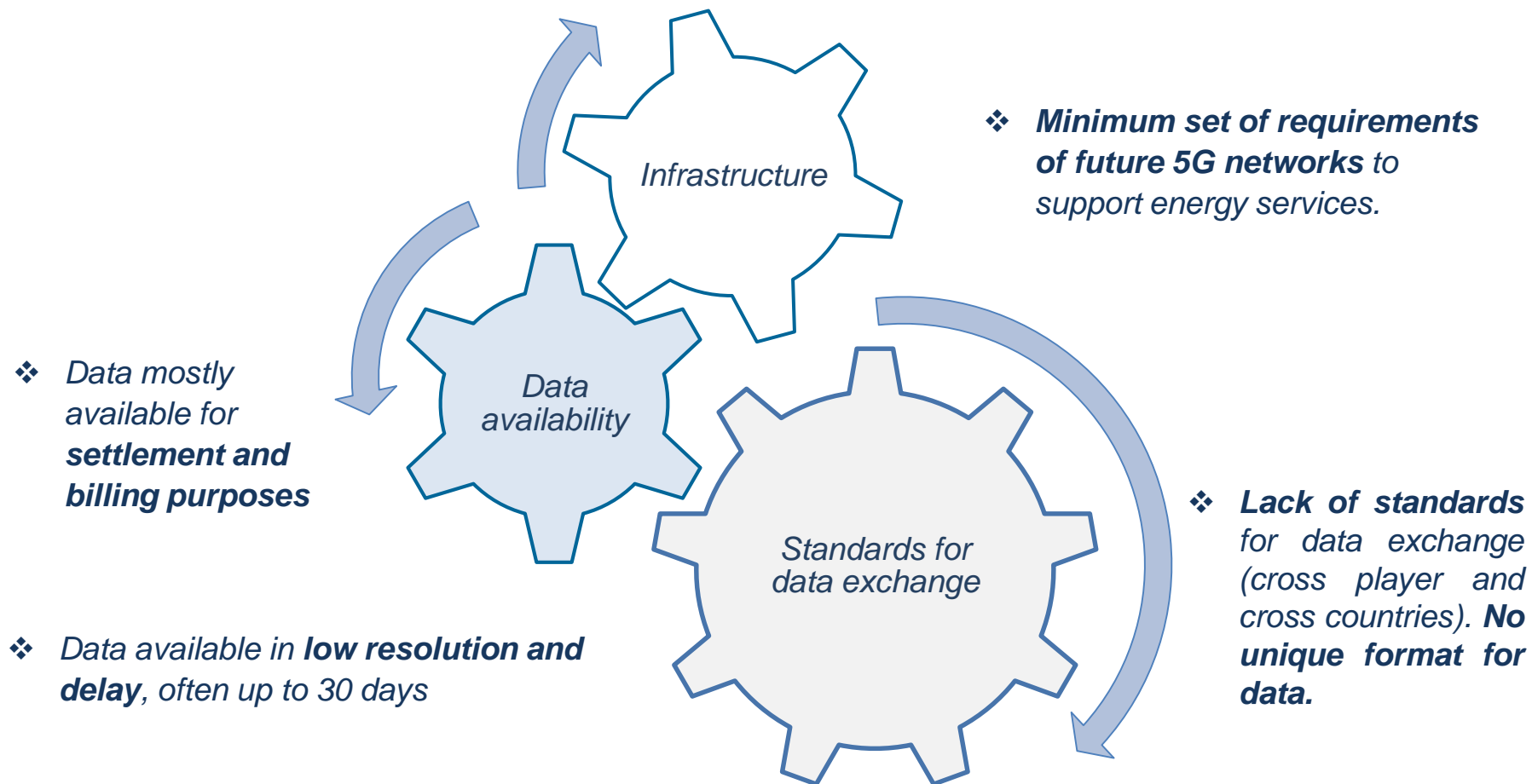
**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

Relevant issues identified

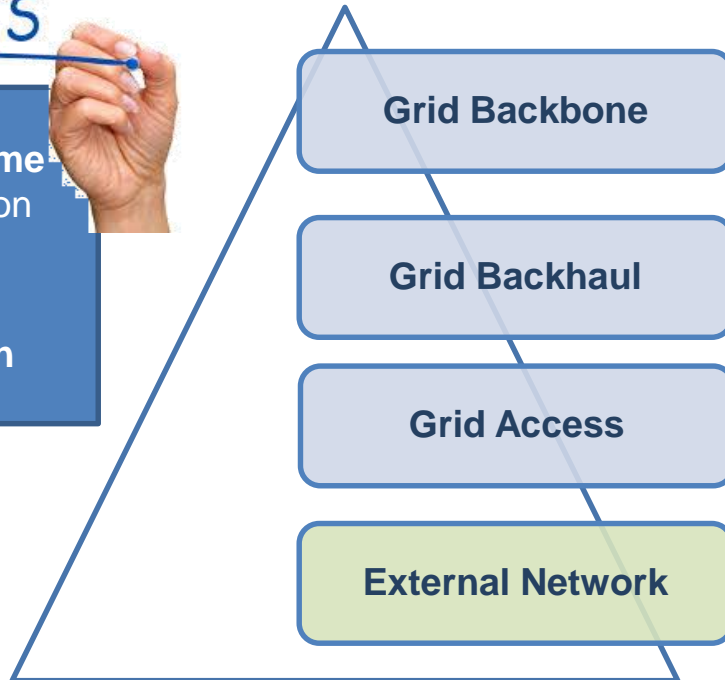


Communication infrastructure

5G requirements for near future energy services

BENEFITS

1. Quasi real-time communication
2. Big data amounts
3. Virtualization



- ❖ **External Network:** similar to Grid Access (but data rate in few tens of kbps).
- ❖ **Grid Access:** bandwidth for some services >1kbps.
- ❖ **Grid backhaul:** deviations (e.g. area $\emptyset < 300$ km, bandwidth of several Mbps and availability 99,9995% for some services, FCT <10s).
- ❖ **Grid backbone:** deviations (e.g. area $\emptyset < 700$ km for SCADA disaster recovery, bandwidth of hundreds of Mbps to Gbps between the control centers, Seamless failover required)

Domains analyzed vs. '5G and Energy White Paper'

CLEAN ENERGY
FOR ALL EUROPEANS



SUSTAINABLE ENERGY WEEK

An initiative of the  European Commission

Data availability

Non discriminatory access close to real time

- ❖ **Data accessible also to 3rd parties with customer consent**, to foster data exchange and new services

- ❖ **Higher data granularity, available close to real time** (data available with low resolution and high delay limits possibility of new services)



Smart meters not fully rolled out and no standardized interfaces. **Additional costs likely for existing smart meters** (*CBA to offset the costs*).

- ❖ **Close to real time** access possible **only for raw data** (*e.g. validation requires longer*)
- ❖ **Platforms to open** to 3rd parties access (*ICT platforms been developed to accelerate data access*)
- ❖ **Ease but secure customer consent** (*e.g. OAuth2.0 application*)

**CLEAN ENERGY
FOR ALL EUROPEANS**

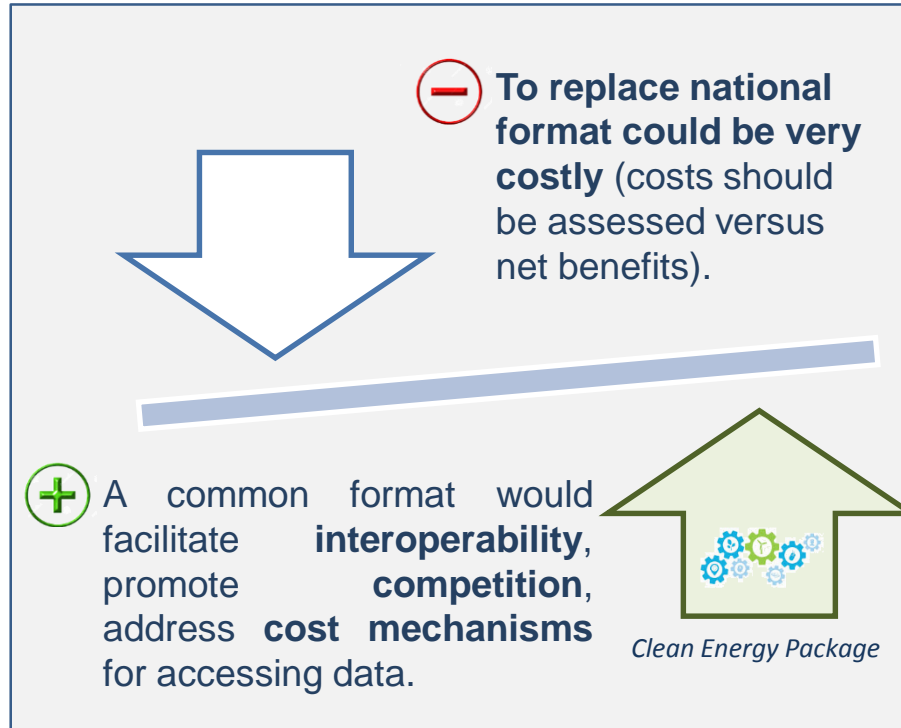


**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Standards for data exchange

Common format for data exchange in Europe



- ❖ No EU standard available on shelf. A challenge is to **cover existing systems and prepare future data services** through the same model. *(CIM adaptation implemented in some projects)*
- ❖ **Not a straightforward activity** requiring involvement of industrial players, standardization bodies and regulators.
- ❖ If too costly refurbishment needed, a **'minimum content'** could be evaluated

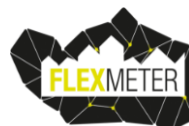
**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Thank you



**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Customer Engagement Working Group

Prof. Konstantinos CHALVATZIS
(Chair Customer Engagement WG)
University of East Anglia, UK



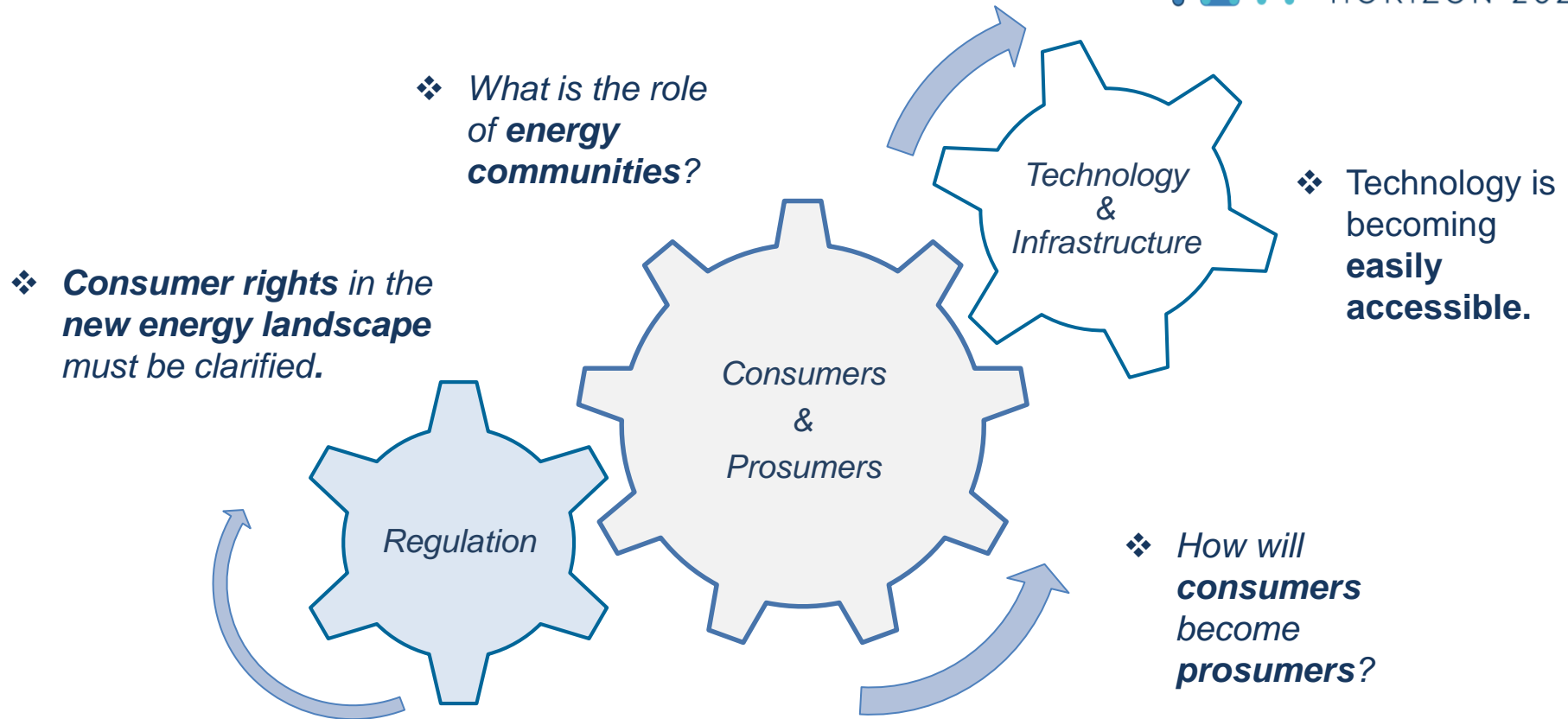
**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

Main issues identified



**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Consumer Rights

Towards a Magna Carta for Energy?

Experience from projects reveals **difficulties with market access and barriers to new entrants.**

- ❖ **Choice of Supplier:** Not readily available across the EU.
- ❖ **Switch of Supplier:** Even when it is possible, there exist persistent barriers.
- ❖ **Access to Dynamic Price Contract:** Ambitious but necessary target. Is the required infrastructure ready?
- ❖ **Access to a Smart Meter:** Roll out still pending in many countries; who will bare the cost? What will be its minimum functionalities?
- ❖ **Contract with Aggregator:** Consumer representation to the grid.

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Energy Communities

Strength in Unity

❖ **Energy Communities** have a unique role to play both in mobilising investment in local energy schemes and providing a vehicle for consumer engagement in the energy markets.

❖ National energy regulations could have an oversight role in securing Energy Communities' rights.



- ❖ How are **Energy Communities** distinguished from **DSOs**? (*could they act as DSOs or do they need to be connected to a DSO?*)
- ❖ Can **Energy Communities** possibly act as **Aggregators**? (*is there need for a distinction or ambiguity may be useful?*)
- ❖ Are **Energy Communities** and **Renewable Energy Communities** parallel developments? (*should there be preference for either type?*)
- ❖ What about **alliances of prosumers** who are **not** physically close? (*will Virtual Energy Communities be considered?*)

CLEAN ENERGY
FOR ALL EUROPEANS



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

The Active Consumer

From Consumers to Prosumers

- ❖ **Renewable Self-Consumers:** Can licensing requirements be minimised to encourage entrants? Can they be protected against penalising tariffs?
- ❖ **Hidden Costs:** Crisp criteria are necessary to define fair grid costs and access provisions.
- ❖ **Mitigating Energy Poverty:** How can deprived consumers reap potential benefits?
- ❖ **Consumer motivation?** Even when switching is available, evidence shows minority of consumers acts.

Experience from projects reveals that **definitional issues** may hinder EU-wide progress.

**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Thank you



**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission

Discussion panel with Project and Policy officers from the EC

Rémy DENOS (Moderator) **DG ENERGY**



Discussion panel:
Manuel SANCHEZ JIMENEZ

DG ENERGY

Patricia ARSENE

DG CONNECT

Adas PANGONIS / Mariana STANTCHEVA

INEA

Jean-Marie BEMTGEN

DG ENERGY



<http://www.h2020-bridge.eu/>
[@BRIDGE_H2020](#)



**SUSTAINABLE
ENERGY WEEK**

An initiative
of the



European
Commission

Join #EUSEW17

www.eusew.eu



'EU Sustainable Energy Week'



@euenergyweek & #EUSEW17



'EU Sustainable Energy Week'



**CLEAN ENERGY
FOR ALL EUROPEANS**



**SUSTAINABLE
ENERGY WEEK**

An initiative of the  European Commission