



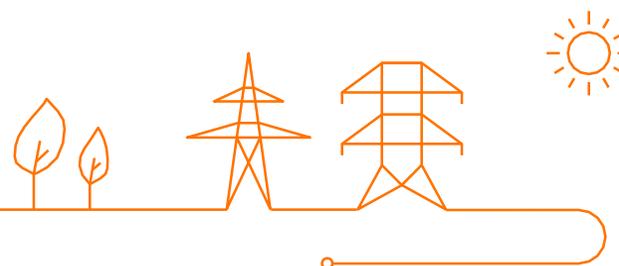
Elia's input to the flexibility discussion

Kristof De Vos – Market Development

Presentation for the Belgian Association of Energy Economics on 13/12/2019

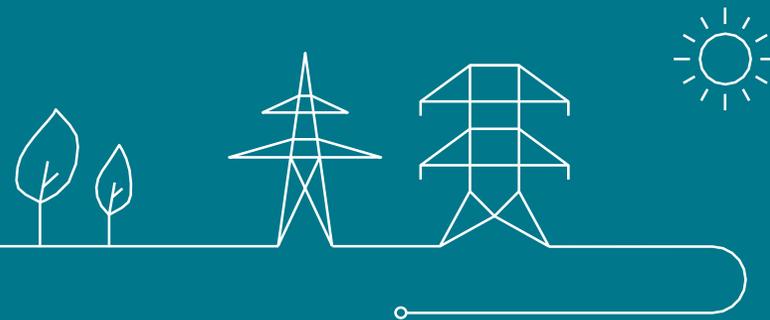
Selected inputs for discussion

1. Elia's 2019 flexibility study
2. Elia's balancing roadmap
3. IO.E – Internet of Energy
4. Compliance with the Clean Energy Package



Elia's flexibility study

Quantifying flexibility needs and means for Belgium towards 2030



Definition: Flexibility in Power Systems

“The extent to which a power system can modify electricity production or consumption in response to variability, expected or otherwise”

IEA - 2011



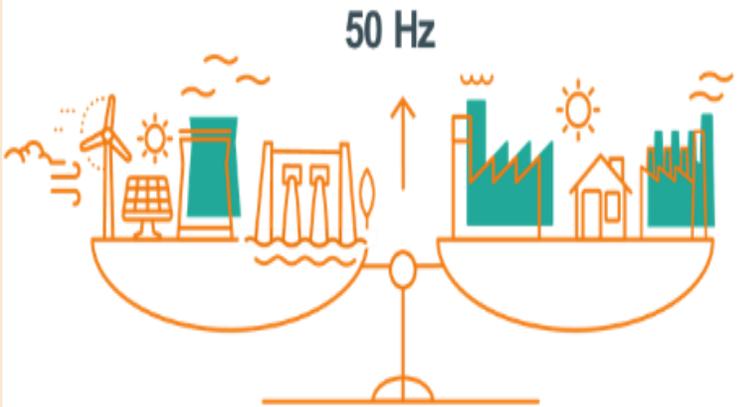
*+ reliably and cost effectively
+ across all relevant timescales*

IEA - 2019

Flexibility drivers

- Variability of the demand
- Variability of generation
- Generation or transmission network incidents

The law of physics directs that injections has to equal the off-take at all times (a matter of seconds and less) in order to ensure system stability



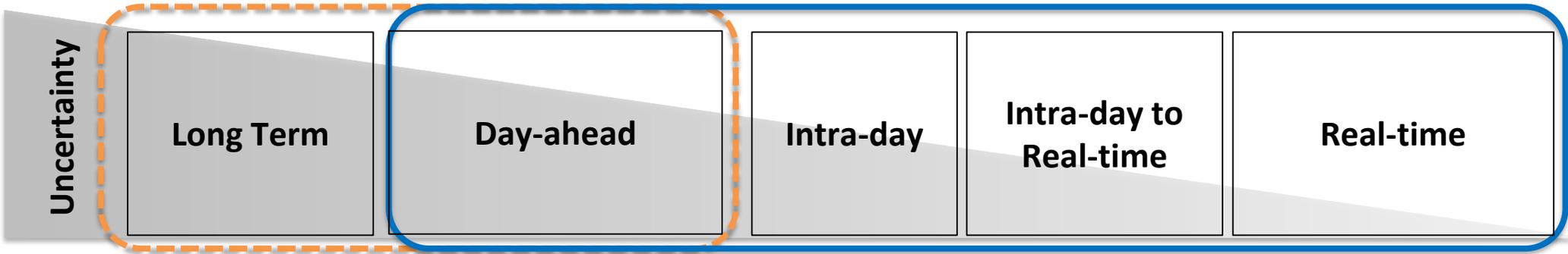
Flexibility sources

- Generation units
- Demand-side
- Interconnections
- Storage

Focus on variations between day-ahead and real-time

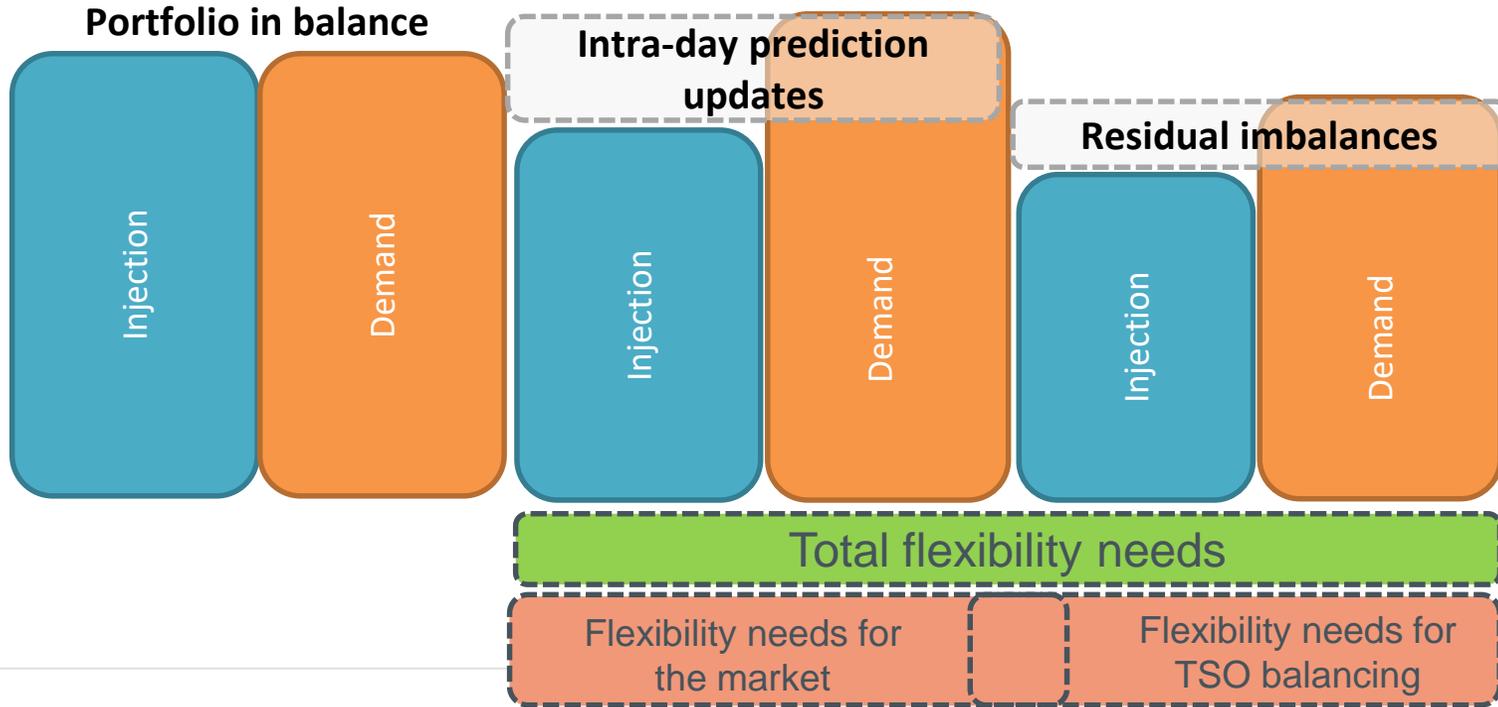
Adequacy study

Flexibility study



The study makes no distinction between flexibility to be delivered by the market or by Elia

- Balancing responsibility lays with the market
- The reserve capacity needed by Elia will be dimensioned day-ahead based on residual imbalances

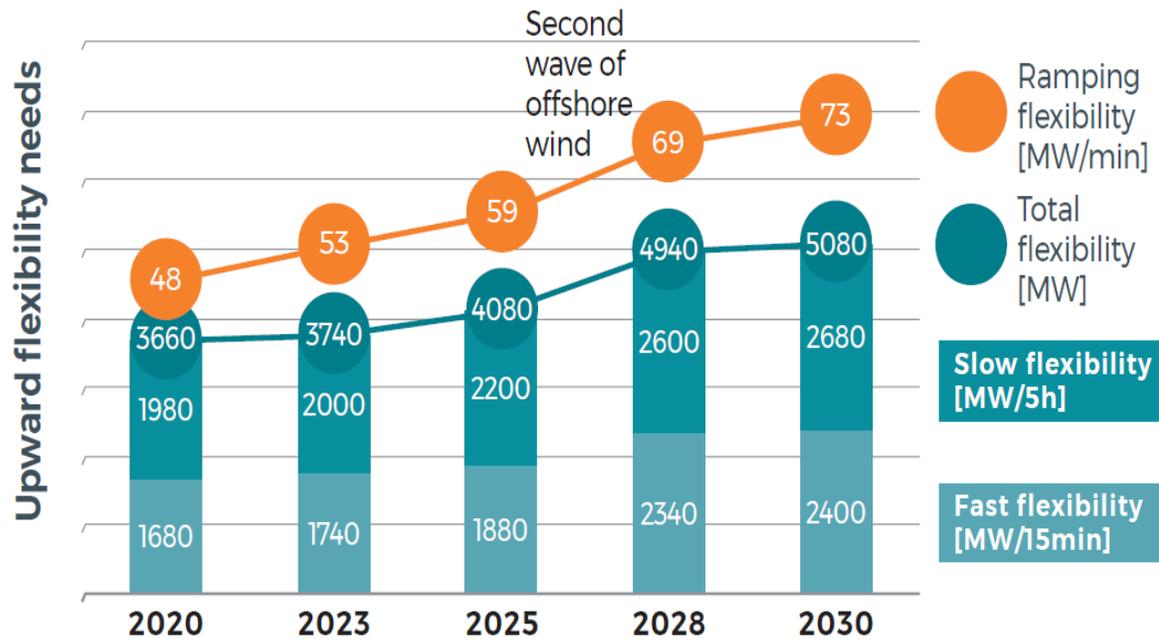


In scope ensure that capacity is available to cover flexibility needs

Key results

Flexibility needs will increase towards 2030

Sufficient flexibility will be installed in the system, but not always operationally available when needed



Installed capacity in the system will be sufficient to cover the flexibility needs

Operational flexibility has to be secured upfront to ensure availability when needed

Technologies such as storage and demand response will increasingly contribute to flexibility



Implications

Keep increasing flexibility needs under control



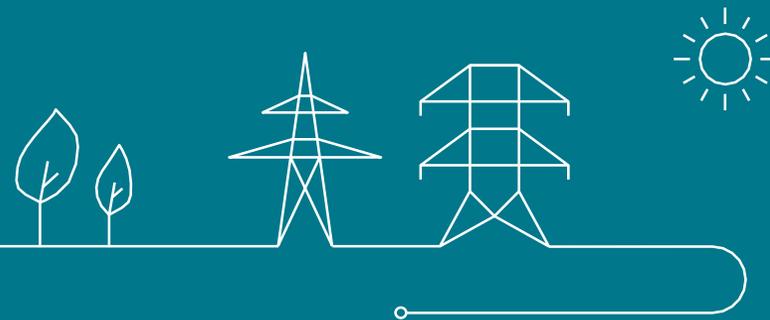
Facilitate increasing flexibility means

1. **Flexibility needs are expected to increase towards 2030 following integration of renewable capacity**
 - **Offshore wind power development (4 GW after 2025) is the largest driver for increasing needs**
 1. Requires performant forecast tools (Elia publishes in real-time its forecasts and is currently investing in specific offshore forecast applications)
 2. Investigate if technologic solutions for offshore wind parks can allow to minimize the impact on the flexibility needs of the system
 3. Requires adequate price signals with Elia's balancing mechanism
 - **Nuclear phase out will increase the available flexibility in the system (but beware common-mode failures of large new units)**

2. **Sufficient flexibility is installed in the Belgian system to meet renewable increase towards 2030, but upfront reservations remain needed to ensure availability when needed (particularly for positive imbalances, e.g. shortages)**
 1. New flexibility providers will increase market liquidity and increase efficiency (avoiding must run generation and wind power reductions)
 2. Optimal flexibility will be determined by the market as long we have adequate price signals in all markets
 3. New flexibility providers need to gain access to markets to enhance the energy transition (Elia is launching IO.Energy)

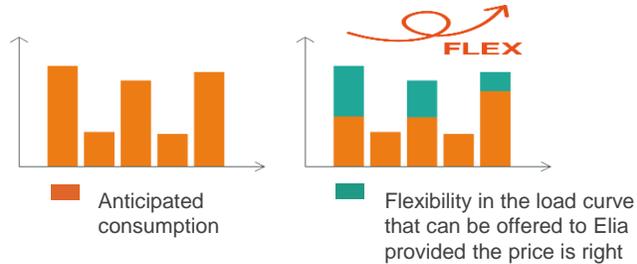
Elia's balancing roadmap

Opening the balancing market for all technologies



Full market opening for flexibility

Market players should be able to valorize flexibility:



Opening Balancing Market to :



Balancing Market

ID/DA Market

Elia's answer:
An ambitious roadmap



Opening to all technologies & Voltage levels



Access via ToE



Daily procurement

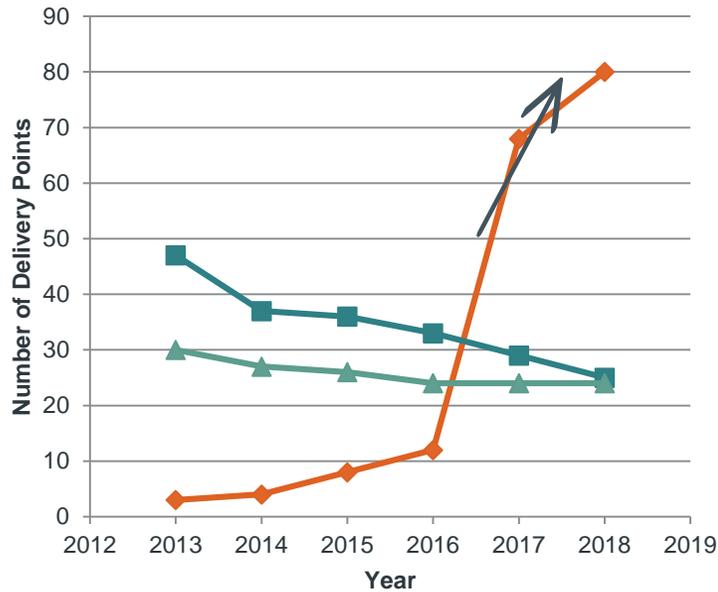


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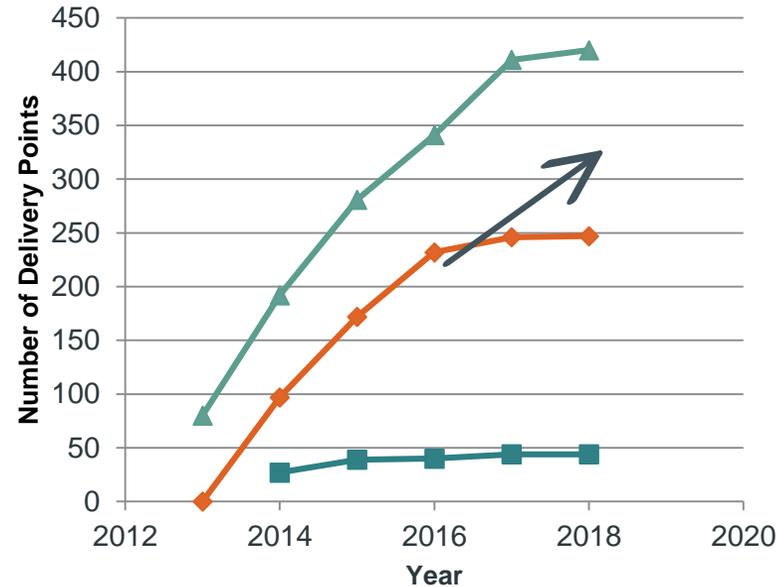
Result of the product opening to new technologies

Evolution of number of Balancing Services Delivery Points



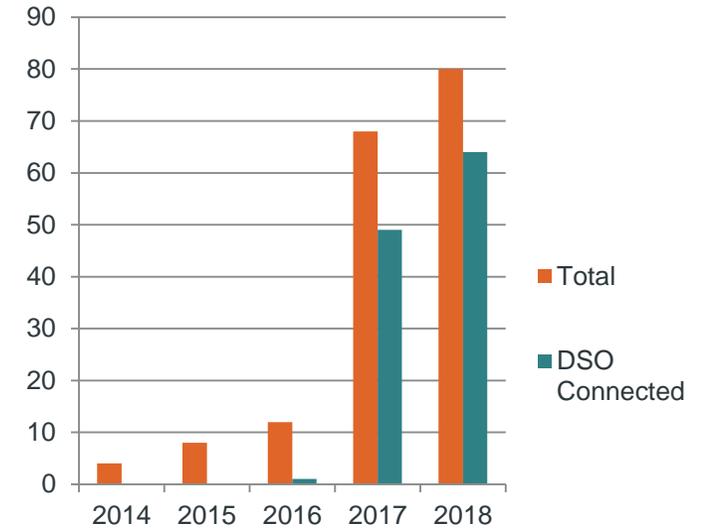
FCR non_cipu FCR Cipu aFRR Cipu

Evolution of number of Balancing Services Delivery Points



mFRR non-Cipu mFRR Cipu Total

FCR non-Cipu Evolution



Total
DSO Connected

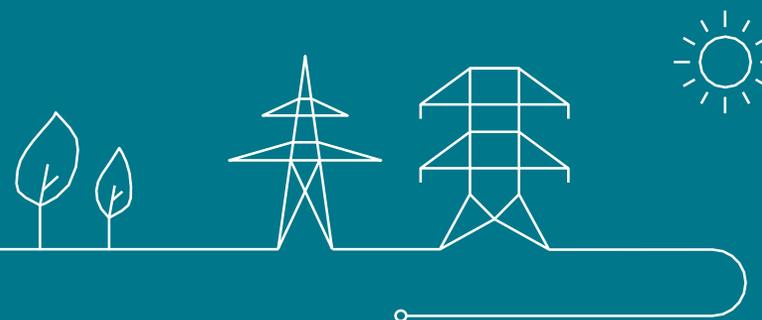
In 2018, the *smartEn Map: European Balancing Markets Edition* report identifies Belgium as one of the three highest scoring countries in terms of advanced balancing markets for demand response and distributed energy resources, showing a deep investment in market solutions provided by different technologies :

http://www.smarten.eu/wp-content/uploads/2018/11/the_smart_en_map_2018.pdf



IO.Energy

Creating a consumer centric system



• A paradigm shift in our sector

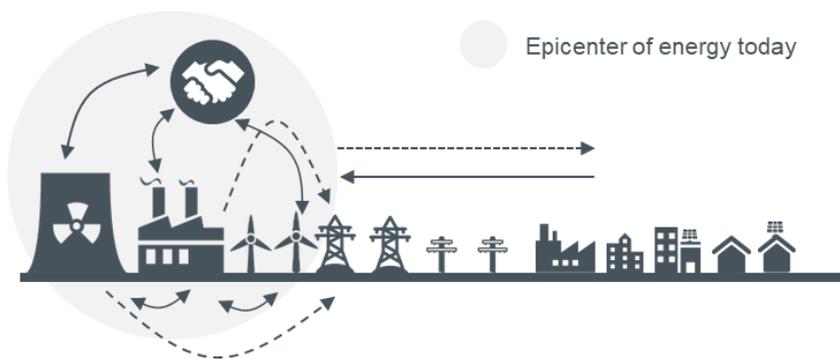
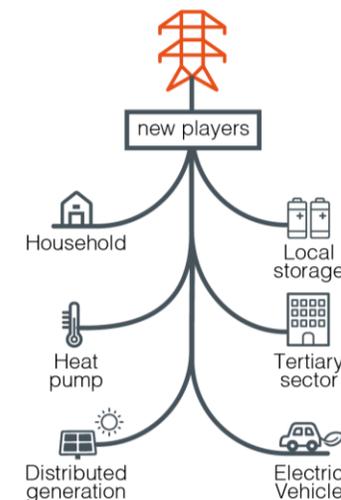


Variability and prediction errors of wind power, photovoltaics and some distributed generation sources

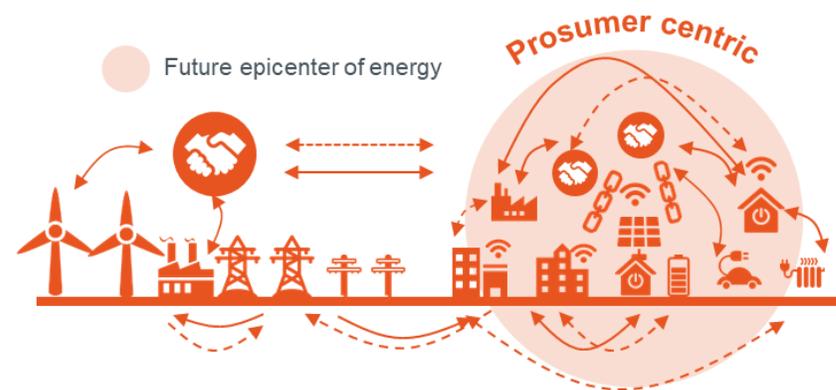
- Generation sources with limited controllability depending on weather conditions
- Results in expected seasonal / daily variations up to unexpected hourly to second variations

But also changing demand profiles following new electrical applications

- Heat pumps, electrical vehicles, electrical boilers, stand-alone batteries
- These technologies also show potential towards providing flexibility to the system



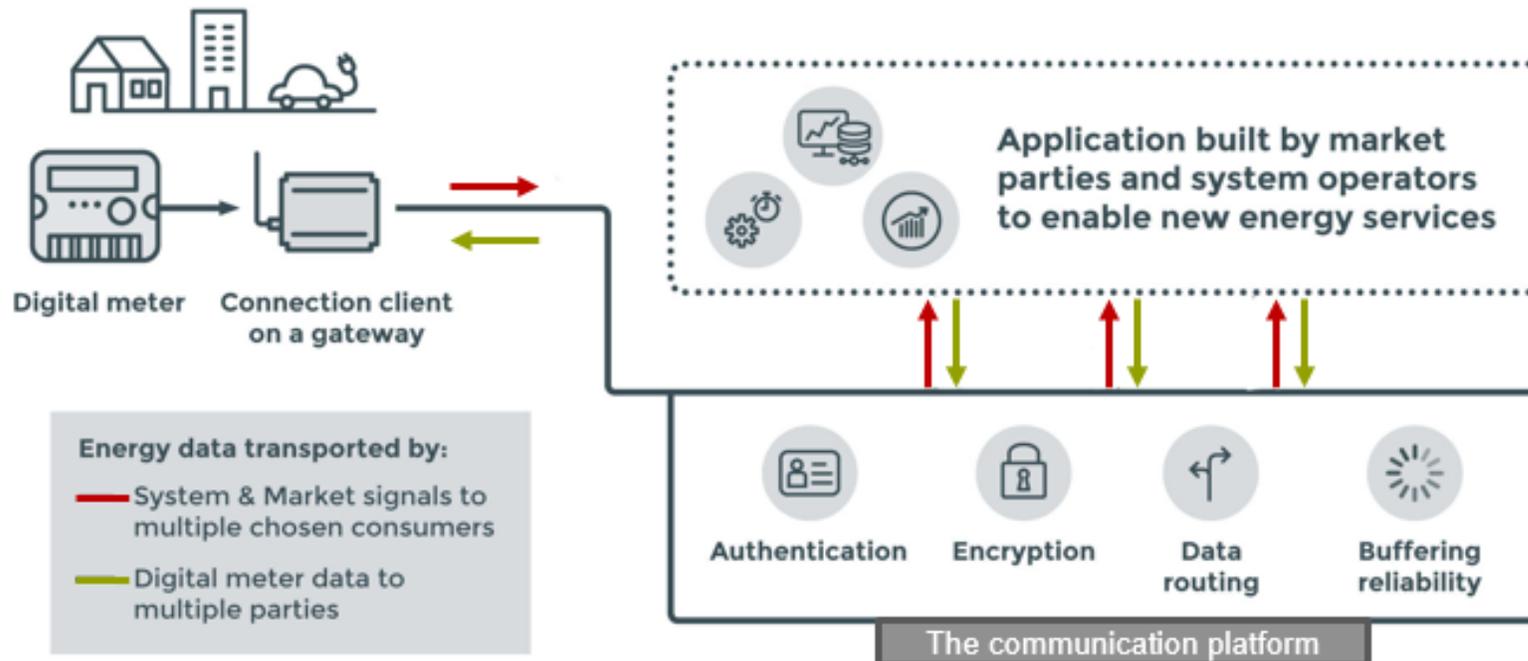
Generation follows consumption



Demand will follow generation

Based on a novel approach on data

IO.E communication platform



Offering unique features to the Belgian society

-  Enables new business models
-  Creates a data level playing field
-  Ensures trust among parties
-  Gives full data ownership to consumers
-  Keeps the privacy of interactions
-  Neutral and cost effective for Belgian society

Having reached a first milestone

Define your comfort,
we take care of the rest



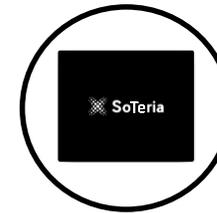
Operating an energy
community has never been so
easy



Like a weather forecast, it
indicates the greenest time to
consume energy



We unlock your residential
flexibility in a grid-secure
way



<https://www.ioenergy.eu/use-cases/>

Consuming local and clean
energy as a smart community?
Here is your guide



Unlocks and valorizes the
energy potential in large
commercial real estate



Enabling end-consumer to
contribute in the energy
transition

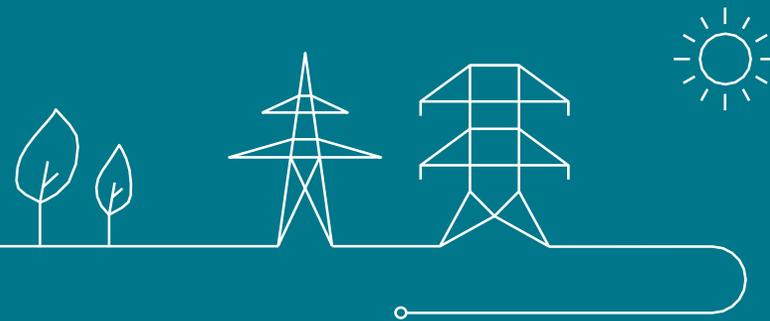


Empowering the consumer
towards energy efficiency



Clean Energy Package

Impact on Elia System Operator



Directive on Common Rules for the Internal Market for Electricity

Aggregation

- Right to enter into aggregation for DR
- Aggregators shall be responsible for imbalances
- Calculation of settlement approved by NRA
- Receive all relevant demand response data
- [...]

Active customers

- Choice of a smart metering system
- Right to consume, store or sell self-generated electricity
- participate in flexibility and energy efficiency schemes
- Access to a dynamic electricity tariff
- [...]

Community Energy

- networks subject to an agreement with the DSO/TSO
- accordance with the obligations and correct timeframes for balancing, metering and settlement.
- tariffs should be non-discriminatory and transparent
- [...]

Flexibility in distribution networks

- allow to DSO's to procure flexibility services
- rules and technical requirements for participation shall be developed in coordination with TSO's
- DSOs shall cooperate with TSO's for the effective participation
- [...]

Application 31
December 2020



Transfer Of
Energy scheme



Regulation on the Internal Market for Electricity

Application January
2020

Core principles

- Safe and sustainable generation, storage and demand are to participate on an equal footing in the market. ✓
- Barriers to cross-border electricity flows and transactions shall be progressively removed include the cross-border use of demand response and energy storage. ✓
- New network codes shall include rules on demand response, aggregation, energy storage and cyber security.

Specific takeaways



Wholesale markets

- Day-ahead and intraday markets shall include:
 - harmonised gate closure times;
 - short market intervals; and
 - products with bid sizes of ≤ 500 kW to allow for participation of demand response, energy storage and small-scale renewables.



Balancing

- Market participants are responsible for the imbalances they cause as a general rule. ✓
- By 2021 the imbalance settlement period across Europe will be 15 minutes.



Network charges

- Distribution tariffs must be cost-reflective, taking into account the use of the distribution network by system users.