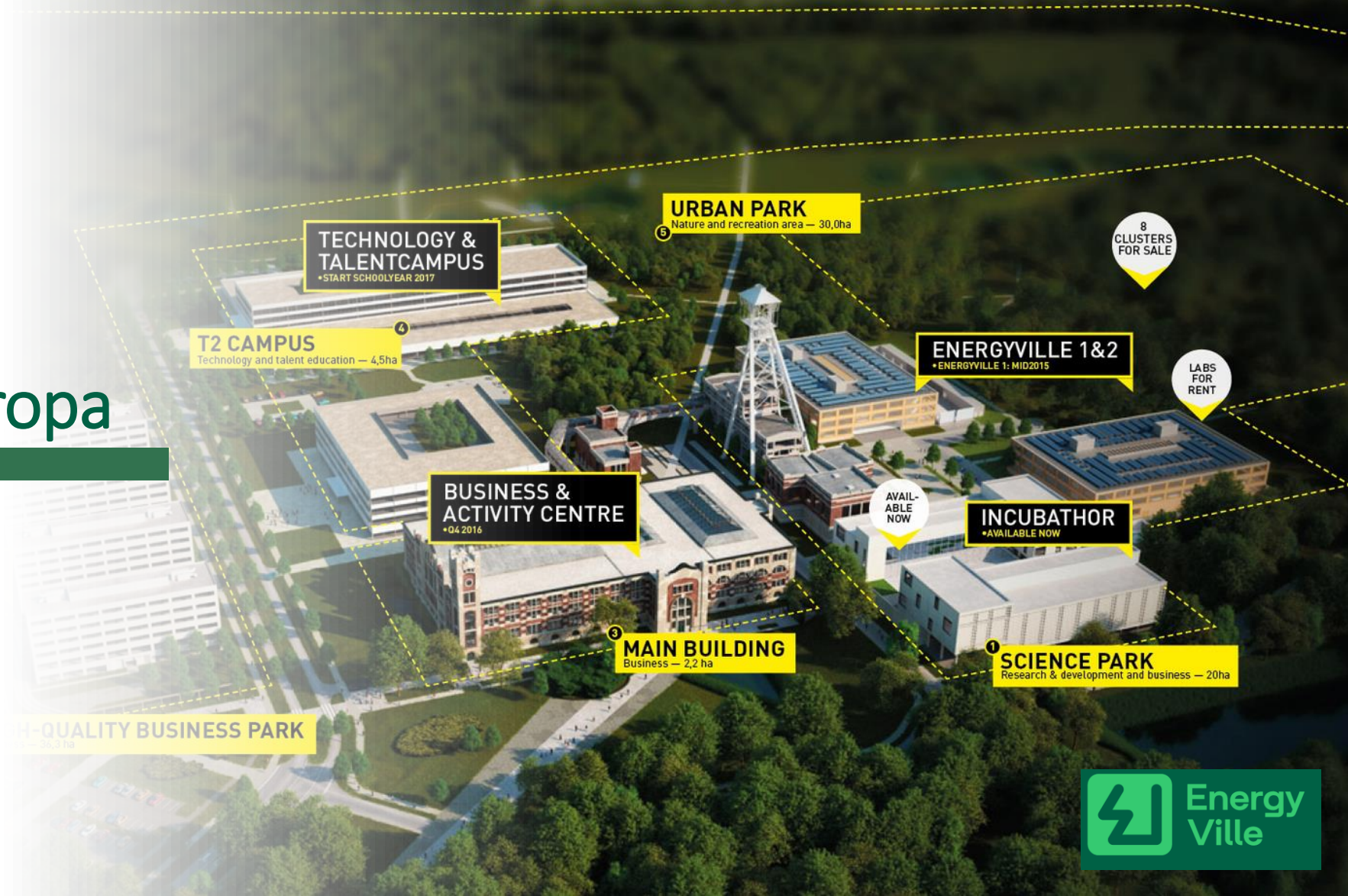


# Toekomstige energiemarkt in Vlaanderen en Europa

## Uitdagingen en opportuniteiten

- Helena Gerard -



# Wat ChatGPT denkt over ons



# Wat EnergyVille echt is:

16 laboratoria → toegepast onderzoek voor grootschalige impact



Solar Energy →



Battery storage →



Power-to-Molecules →



Power electronics →



Buildings and districts →



Electrical networks →



Energy strategies and markets →



Thermal systems →



# Flexibiliteit en digitalisering— hoeksteen van de energietransitie

Wij helpen

- **netbeheerders**
- **beleidsmakers**
- **marktpartijen**

Om de doelstellingen voor 2030 en 2050  
te realiseren

Beleidsadvies

Tools en algoritmes



Battery storage →



Power-to-Molecules →



Power electron



Electrical networks →



Energy strategies and markets →



Thermal system

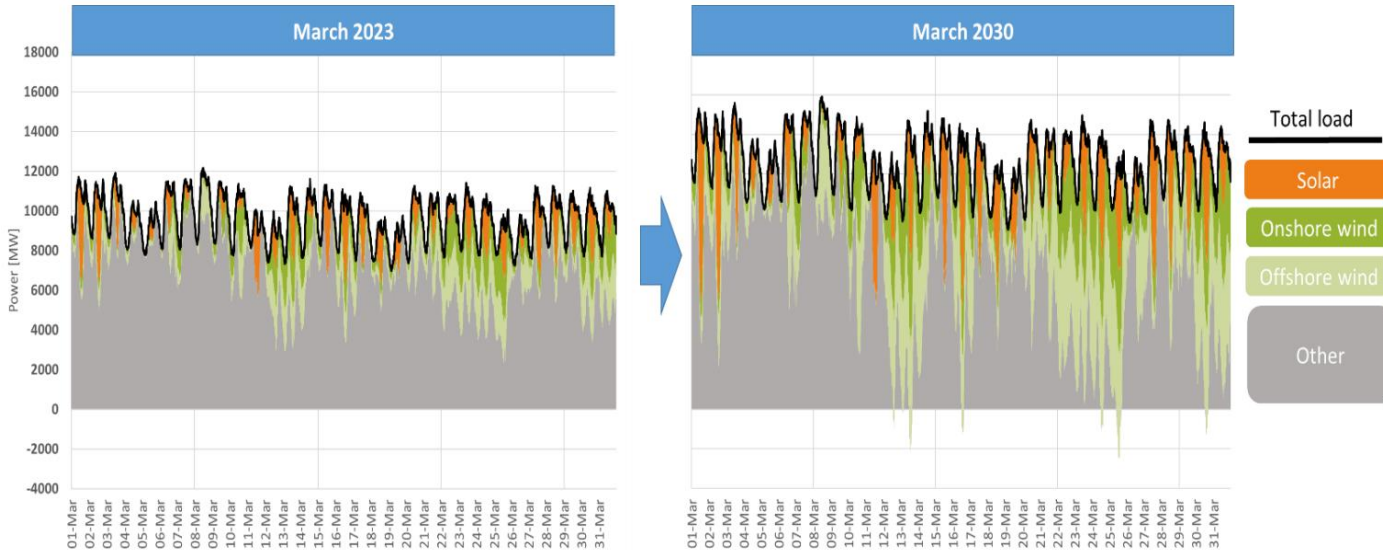




Uitdagingen  
voor een  
toekomstig  
systeem

# Uitdagingen voor het systeem in 2030

*Stijgend aandeel hernieuwbare energie ...*

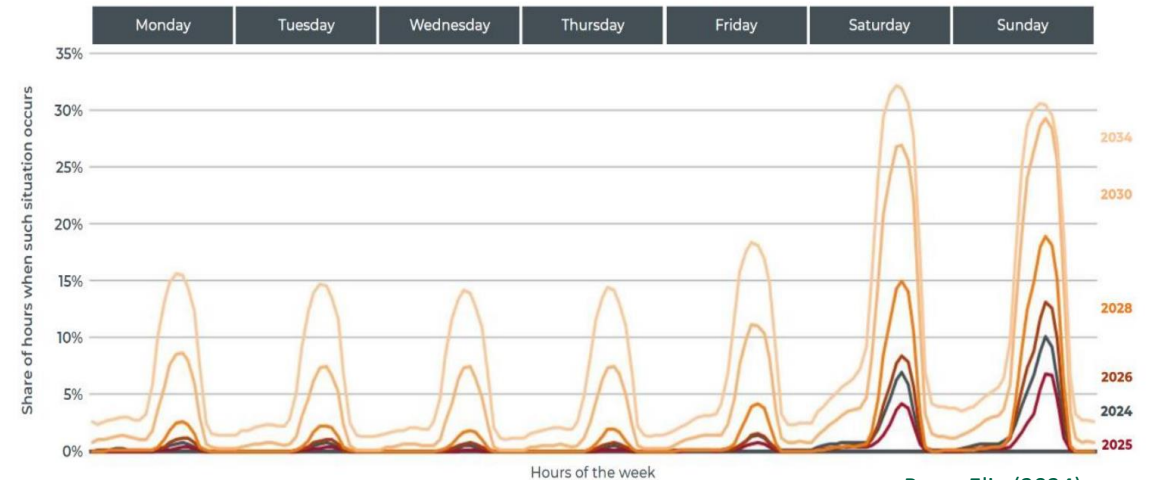


Bron: Elia (2024)

*...en een groter aandeel negatieve prijzen*

*...leidt tot grotere volatiliteit*

AVERAGE SHARE OF HOURS WITH PRICES BELOW 5 €/MWh FOR EACH HOUR OF THE WEEK  
IN BELGIUM



Bron: Elia (2024)

# Uitdagingen voor het systeem in 2030

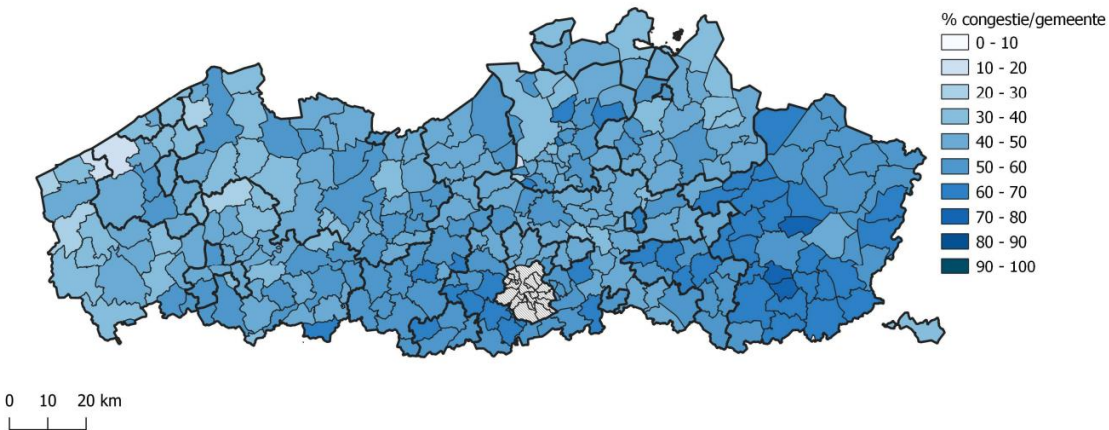
## Congestie – een Europees probleem

Actueel aandeel netten dat potentieel in congestie kan komen (% per gemeente)



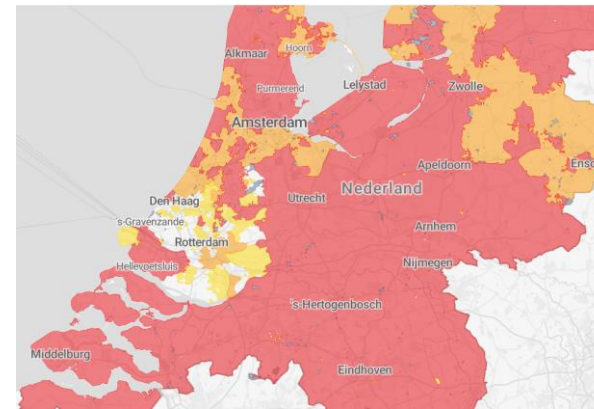
Bron: Fluvius (2022)

aandeel netten dat potentieel in congestie kan komen (% per gemeente) Tegen 2032

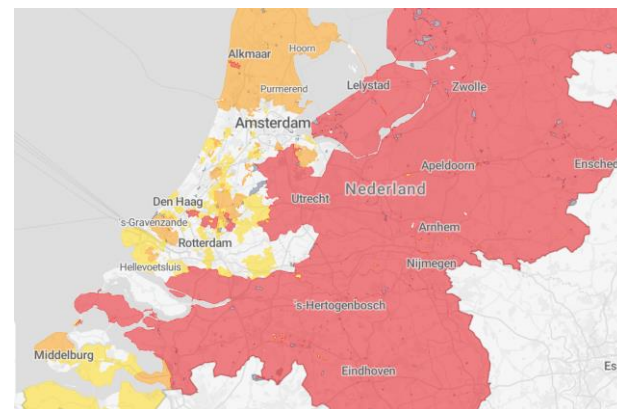


Bron: Fluvius (2022)

NL – actuele netcongestie afname



NL – actuele netcongestie teruglevering



Bron: Netbeheer Nederland (2024)

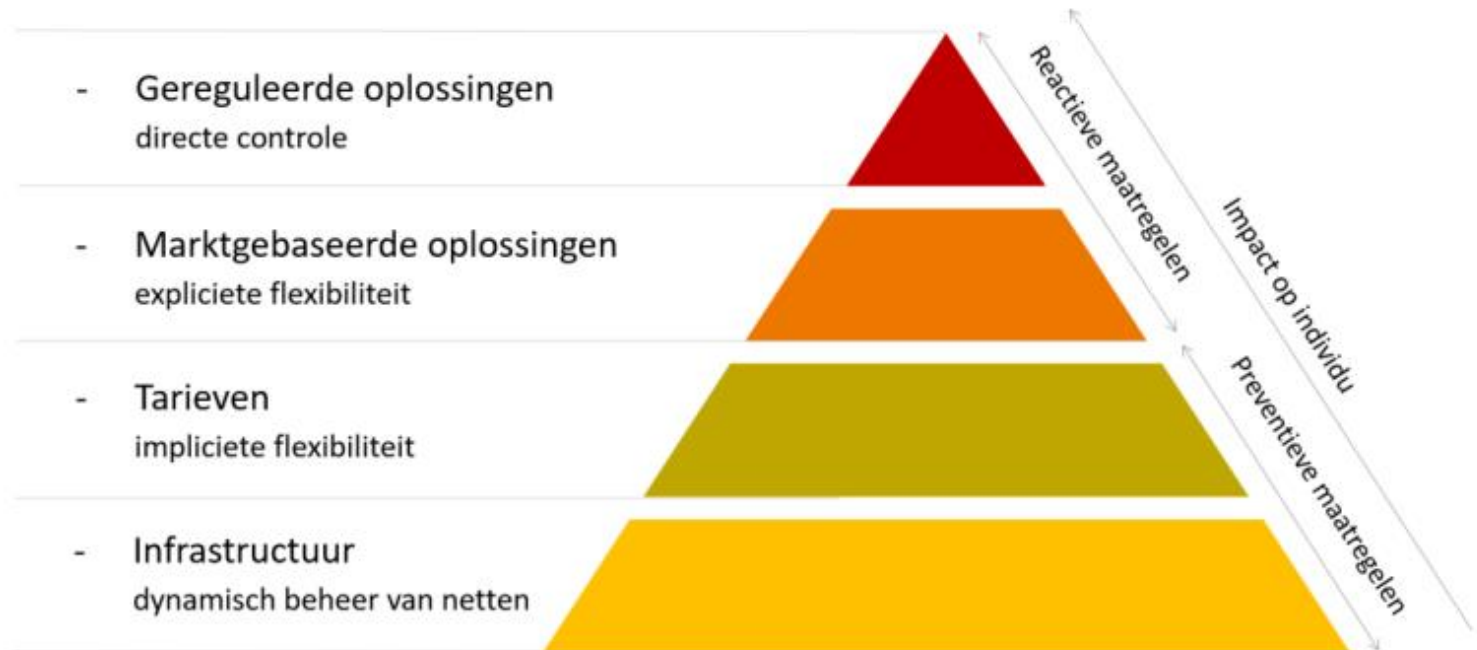
Legenda

- Transportcapaciteit beschikbaar zonder wachtrij
- Transportcapaciteit beperkt beschikbaar zonder wachtrij
- Gebied is in onderzoek met wachtrij
- Tekort aan transportcapaciteit met wachtrij
- Kleur wordt later toegevoegd



# Uitdagingen voor het systeem in 2030

*Een menu van oplossingen*



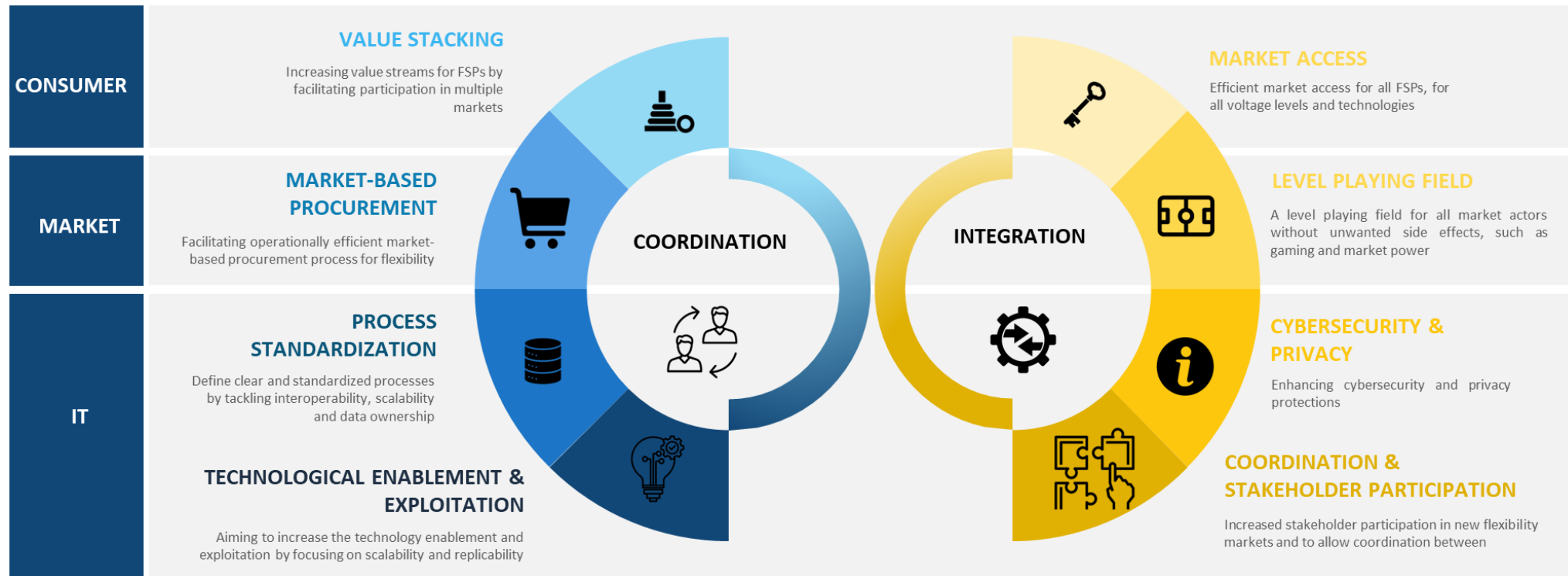
Bron: VREG





# Uitdagingen voor het systeem in 2030

Naar een gecoördineerd en geïntegreerd systeem



Slimme marktorganisatie en digitalisering – het nieuwe powerkoppel?



# Uitdagingen voor het systeem in 2030

Objectives	Barriers
<b>Coordination objectives</b> Maximization of value stacking Cost-efficient acquisition of flexibility Operationally efficient market procurement process for flexibility Ability to exchange, host, and process data in a timely and secure manner	<b>B1</b> Insufficient coordination of flexibility markets for system services with energy markets with regard to timing. <b>B2</b> Insufficient coordination of different system services over different timeframes, valid for all market phases, i.e., prequalification, baselining, procurement, activation, monitoring and settlement. <b>B3</b> Lack of harmonization of flexibility products for system services for both TSO and DSO <b>B4</b> Exclusivity clauses and non-harmonised contracts <b>B5</b> Coordination of explicit procurement of flexibility (flexibility markets) with implicit procurement of flexibility (tariffs, connection agreements,...) <b>B6</b> No specific incentives in the regulatory mechanism (remuneration) that support a common approach between SOs for flexibility procurement <b>B7</b> Limited cross-border coordination/integration <b>B8</b> Limited coordination for procurement of flexibility by DSO and TSO <b>B9</b> Lack of alignment in supporting processes such as prequalification, monitoring and settlement processes including baseline approach. <b>B10</b> Lack of established methodology for network representation for the distribution grid <b>B11</b> ICT challenges: Large uncoordinated collection of data, timely exchange of (confidential) network information, etc.
	<b>B12</b> No appropriate baseline methodology and process established for new flexibility markets and new types of flexibility providers (e.g. low voltage flexibility) <b>B13</b> No uniform access and registration process/platform for assets willing to participate to flexibility markets.
	<b>B14</b> Risk of gaming due to exertion of market power and/or shortcomings in the market setting <b>B15</b> Lack of coordination of markets of different carriers <b>B16</b> Quantification of the benefits of sector integration is missing
	<b>B17</b> Unavailability of adequate information allowing FSPs to anticipate the value of their participation and hence not being able to quantify their business case
<b>Integration objectives</b> Efficient market access for all FSPs, for all voltage levels, for all technologies Ensuring an equal level playing field for all market actors without unwanted side effects such as market power or risk of gaming Maximizing the benefits of sector integration Adequate incentives for participation through availability of relevant information (e.g., anticipated flex needs, etc.)	

Barrières voor een gecoördineerde en geïntegreerde markt (bron: VITO)





Leidt Europa  
ons de weg?



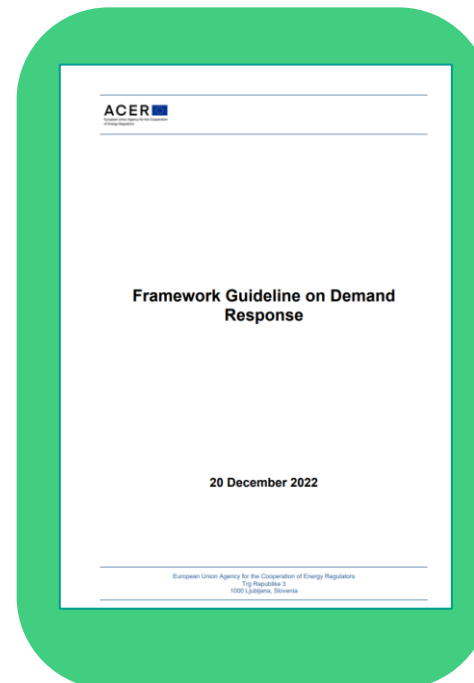
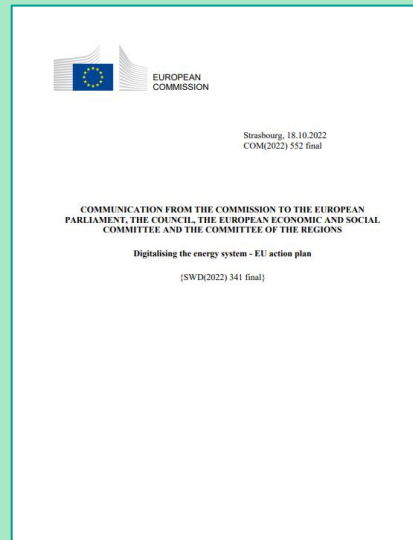
# EU beleid – stimulans voor innovatie

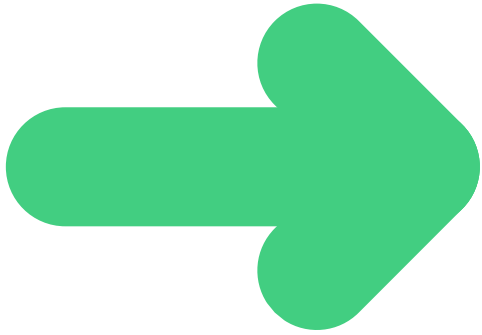
Reform EU Electricity  
Market Design

Digitalisation of  
Energy Action Plan

Network Code  
Demand Response

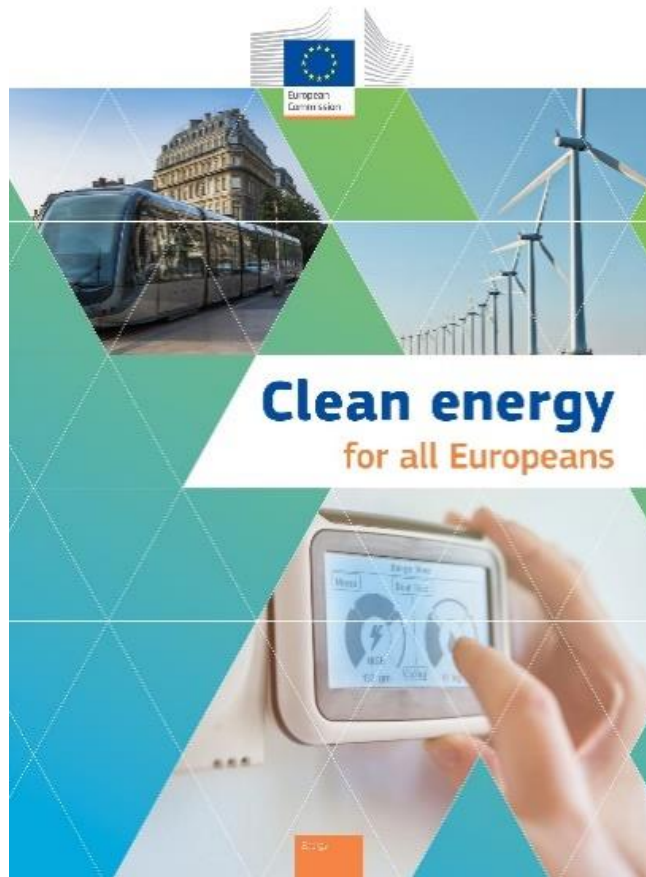
Grid Action Plan





# Network Code Demand Response

*Bepaalt de spelregels voor het ontsluiten en gebruik van flexibiliteit*

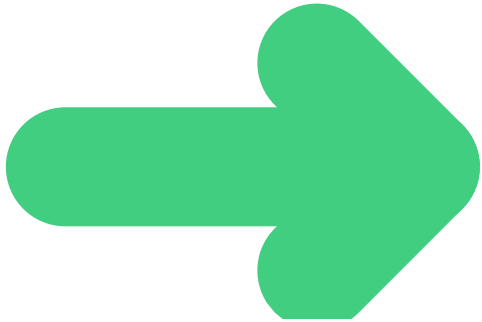


Effectieve deelname van kleine gebruikers aan flexibiliteitsmarkten door verduidelijking en vereenvoudiging van marktprocessen

Uitwerking en ondersteuning voor opzetten van lokale flexibiliteitsmarkten

Operationeel en kosten-efficient netbeheer door samenwerking, informatieuitwisseling en coördinatie tussen netbeheerders

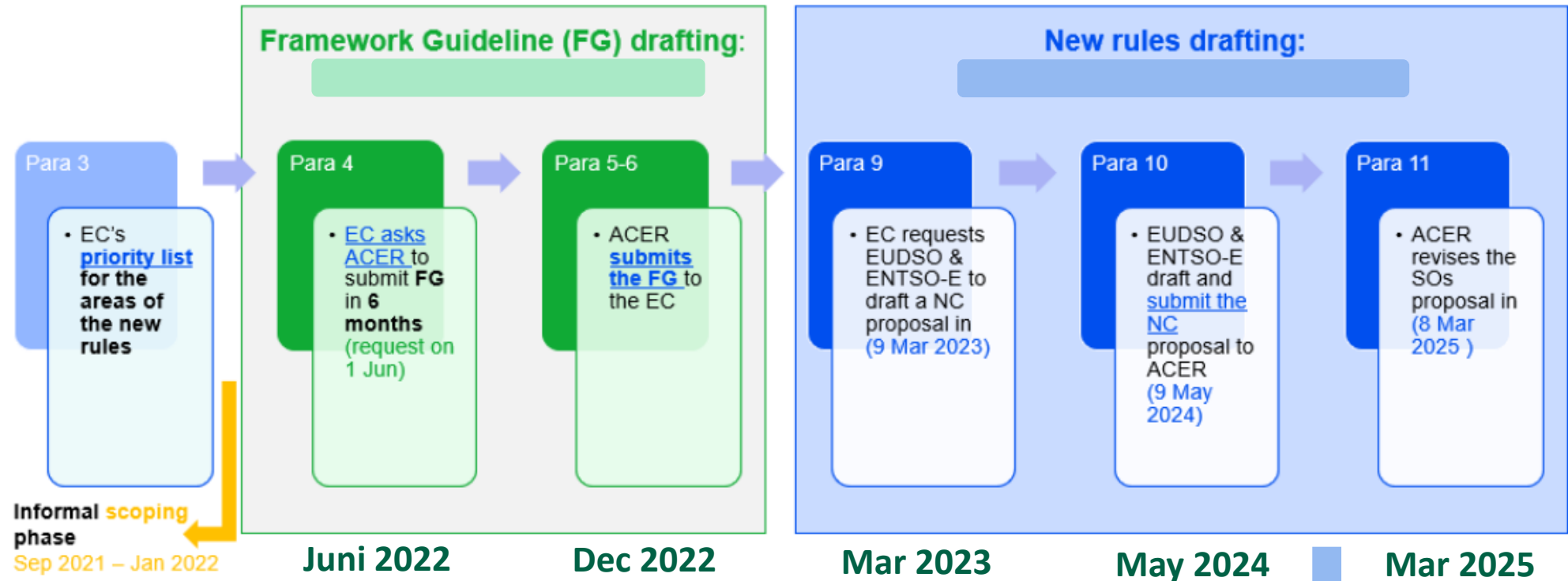




# Network Code Demand Response

## Timing

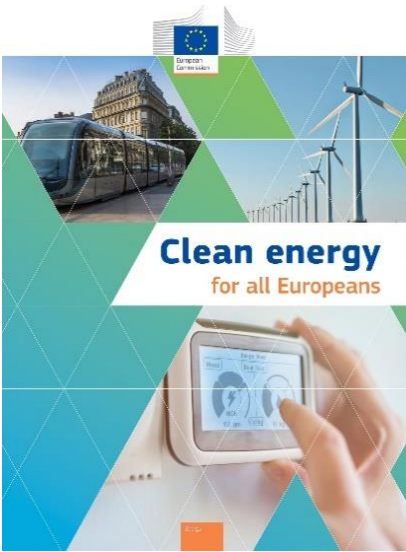
Network Code on Demand Response: development process based on Article 59 [Electricity Regulation](#)



The EC sent a [letter](#) to ACER to initiate the [scoping](#) phase. ACER submitted the [result of the scoping exercise](#) to the EC.

WE ARE HERE





# IMPACT ASSESSMENT ON THE PROPOSAL FOR A NETWORK CODE ON DEMAND RESPONSE'

Baselining

Aggregation

Prequalification

Markets for local services

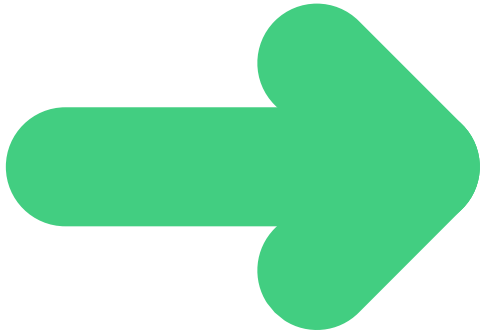
Important to have **EU guidelines and well-defined principles** or criteria to support innovation and create stability for investments

**Balance** between EU harmonisation and national/local solutions

Need for a **clear pathway** towards coordination and integration

[Impact assessment on the proposal for a network code on demand side flexibility - Publications Office of the EU \(europa.eu\)](https://publications.ec.europa.eu/impact-assessment-on-the-proposal-for-a-network-code-on-demand-side-flexibility)

	Specific policy objective	Policy option	Criteria													
			Legal feasibility	Technical feasibility	Coherence with EU objectives	Coherence with FGR	Relevance	Effectiveness	Efficiency	Proportionality						
Baselining	Select an appropriate baseline calculation methodology	No intervention at EU level														
		EU requires definition of requirements at MS level														
		EU guidelines														★
		Exhaustive EU list of baseline methodologies														
Aggregation	Develop suitable aggregation models	No intervention at EU level														
		EU guidelines and high-level principles													★	
		Exhaustive EU list of aggregation models														★
		Standard aggregation models defined at EU level														
Prequalification	Improve the prequalification process	No intervention at EU level														
		EU-level requirements													★	
		EU standardized prequalification processes for specific products and services														
		A single EU standardized prequalification process														
Prequalification	Simplify product prequalification by allowing ex-post verification	No intervention at EU level														
		Ex-post product verification is the default option														★
		EU process to be followed														★
Prequalification	Simplify prequalification for small assets/assets of the same type	No intervention at EU level														
		High-level principles developed at EU level														★
		Definition of conditions at EU level														
Prequalification	Reassess product prequalification and verification in case of changing portfolios or controllable units	No intervention at EU level														
		High-level principles developed at EU level														★
		Definition of criteria for reassessment at EU-level														
Market design for local services	Improve local market design	No intervention at EU level														
		Local markets designed at national level according to high-level EU-principles														★
		Harmonized local market design at EU level														
		Standardized market design for local services at EU level														
Market design for local services	Improve coordination between electricity markets (incl. local markets)	No intervention at EU level														
		High-level principles at EU level for coordination														★
		Fixed rules for market coordination, decided at EU level														



## Network Code Demand Response



*... een Europees traject...*

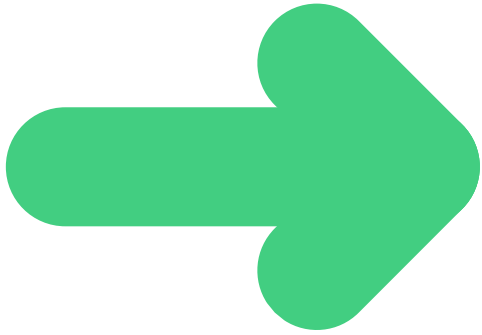
**'UNION-WIDE METHODOLOGIES'**

*... met belangrijke nationale implicaties*

**'NATIONAL TERMS AND CONDITIONS'**







# Network Code Demand Response



*... een Europees traject...*

**‘UNION-WIDE METHODOLOGIES’**



*... met belangrijke nationale implicaties*

**‘NATIONAL TERMS AND CONDITIONS’**

**National process** for the approval of national terms and conditions

Establish a national process for the joint development of common proposals by SOs

Joint development of common SOs proposals for national TCs

Approval by the NRA of national TCs

**EU process** for the approval of EU methodologies

Process for the development of EU proposals

Joint development of EU common proposals by ENTSO-E and EUDSO entity for methodologies

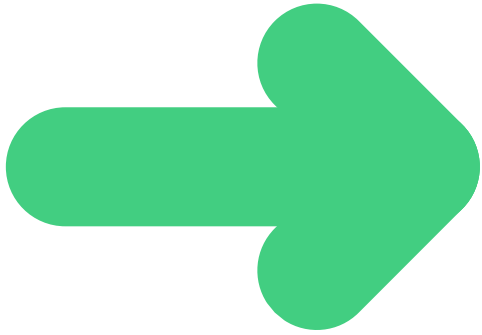
Approval by ACER of EU methodologies

*Article 4*

▲ **National rules of procedure to develop common national terms and conditions**

1. By [six months] after entry into force of this Regulation, each Member States or the designated entity shall establish the rules of procedure at national level according to which the system operators shall develop the proposals for the common national terms and conditions referred to in Article 6.



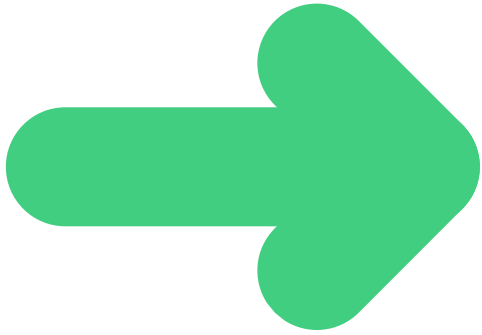


# Network Code Demand Response



Proposal by	National TCs		EU Methodologies	Other EU documents
TSOs in cooperation with DSOs	Balance responsible parties (aggregation models)		Imbalance settlement harmonisation (aggregation models)	
TSOs	Service providers	Balancing service providers	Harmonised EU prequalification for standard balancing products	
SOs (EU DSO entity and ENTSO-E at EU level)		Local service providers	Simplified prequalification	Market based congestion management and product attributes for EU ToEq
	Baselining			EU registry for baselining methodologies
	Flexibility information system			
	TSO-DSO and DSO-DSO coordination			

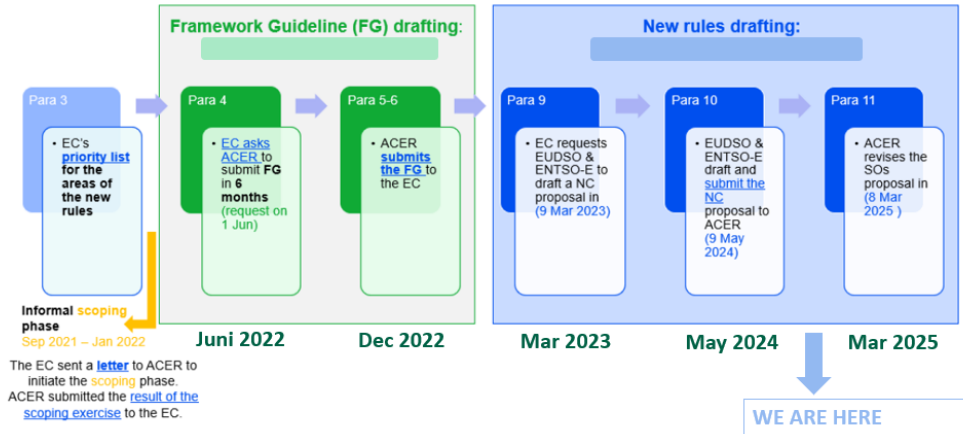


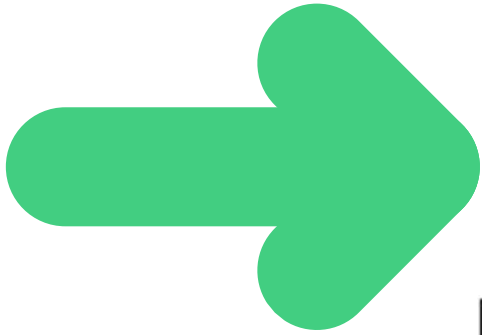


# Network Code Demand Response

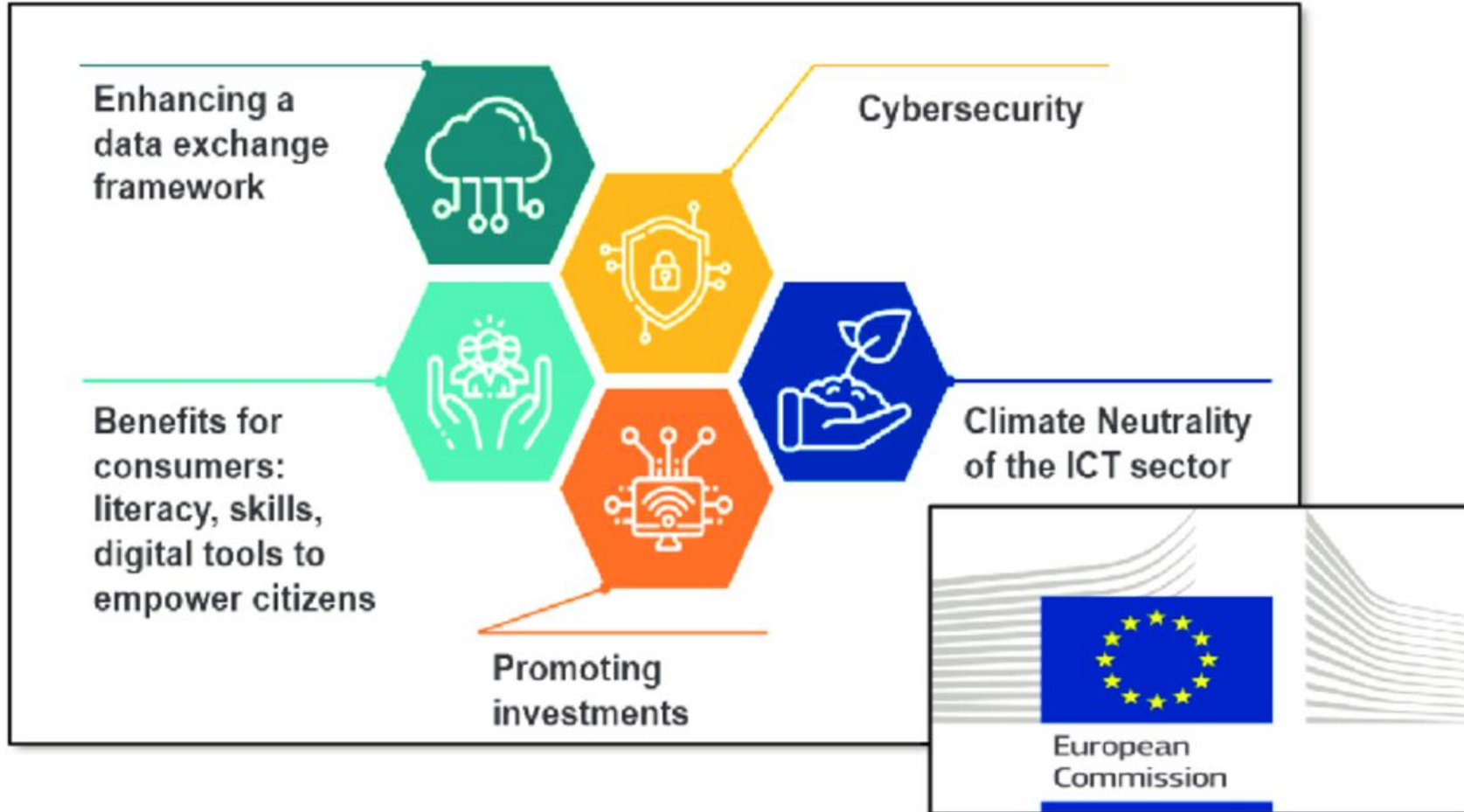
## Timing

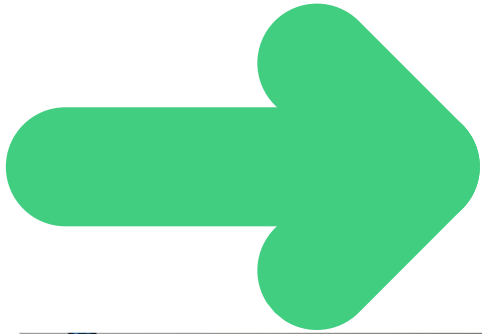
Network Code on Demand Response: development process based on Article 59 [Electricity Regulation](#)





# Digitalisation of Energy Action Plan





# Digitalisation of Energy Action Plan

*Doelstelling om vanuit Europa de energiesector versneld te digitaliseren*

*Digital Twin van het Europese Transmissie en  
Distributienet*

*Een geavanceerd virtueel model van het Europese elektriciteitsnet*

Waarneembaarheid

Infrastructuur en netwerkplanning

Netwerksimulaties

Actief systeembeheer ondersteunend aan  
flexibiliteit

Gegevensuitwisseling tussen netbeheerders

Supported by EU Research

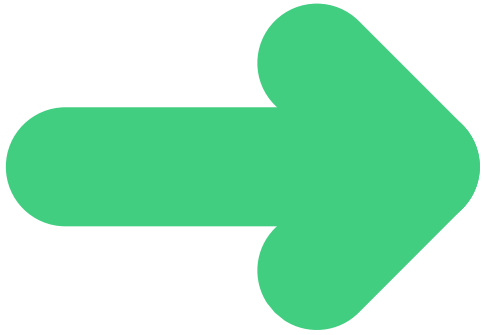


Mr. Vincenzo Ranieri, President EU DSO Entity and Mr. Hervé Laffaye, President of ENTSO-E Assembly signing the Declaration on Intent in presence of European Commissioner for Energy Kadri Simson and Joachim Vanzetta, Chair of the Board of ENTSO-E.

**Declaration of Intent  
between ENTSO-E and EU  
DSO Entity to develop  
jointly the Digital Twin of  
the EU electricity grid**



**TwinEU**



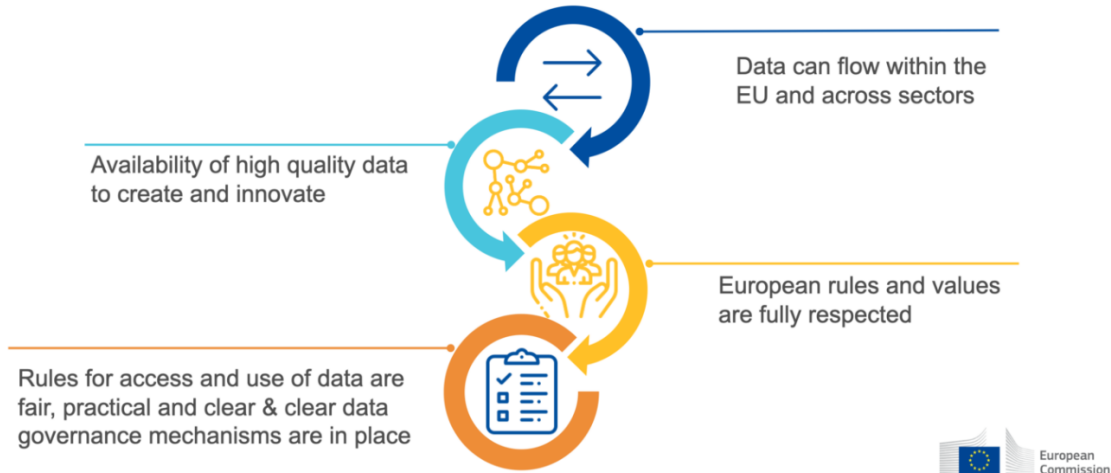
# Digitalisation of Energy Action Plan

*Doelstelling om vanuit Europa de energiesector versneld te digitaliseren*

*Een gemeenschappelijke Europese 'dataspace'*

## European Strategy for Data

A common European data space, a single market for data



**Gereguleerde versus commerciële data**

**Privacy en cybersecurity**

**Rollen en verantwoordelijkheden?**

**Wie mag toegang hebben?**

**Welke toepassingen zijn Europees/nationaal?**

*Belangrijke EU-wetgeving rond data: Data Act – AI Act – Cybersecurity - ...*





Uitdaging of  
opportuniteit?

# Meten is weten

## De uitdaging

Netbeheerder moet:

- ✓ congestie en spanningsproblemen voorspellen en detecteren
- ✓ gebruik maken van digitale tools
- ✓ op lange termijn en korte termijn

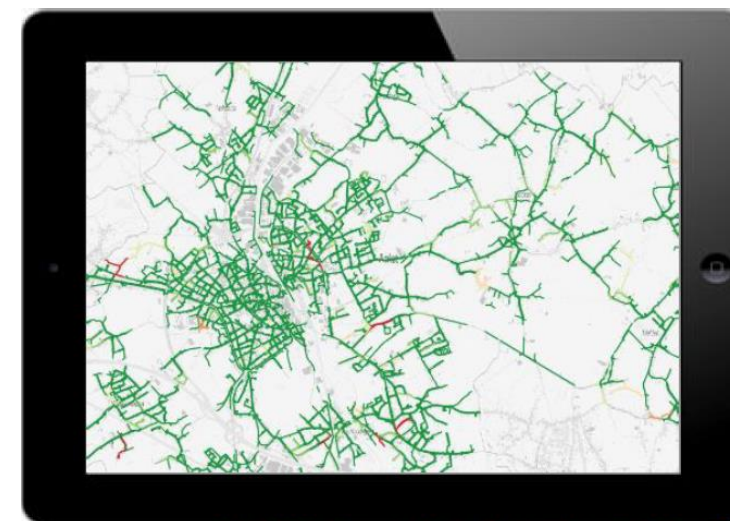
[ART 31, 52, 53, 55, 56, 57]

## Marktorganisatie



- ✓ Robuuste scenario's
- ✓ Netinvestering versus flexibiliteit
- ✓ Nettarieven
- ✓ Kostenstructuur netbeheerders

## Digitalisering



- ✓ Rol van meetapparatuur
- ✓ Rol van AI
- ✓ Wat met de data van digitale (sub)meters?

Gridprekwalificatie **flexaanbieders**





# Toegang tot flexibiliteitsmarkt

## De uitdaging

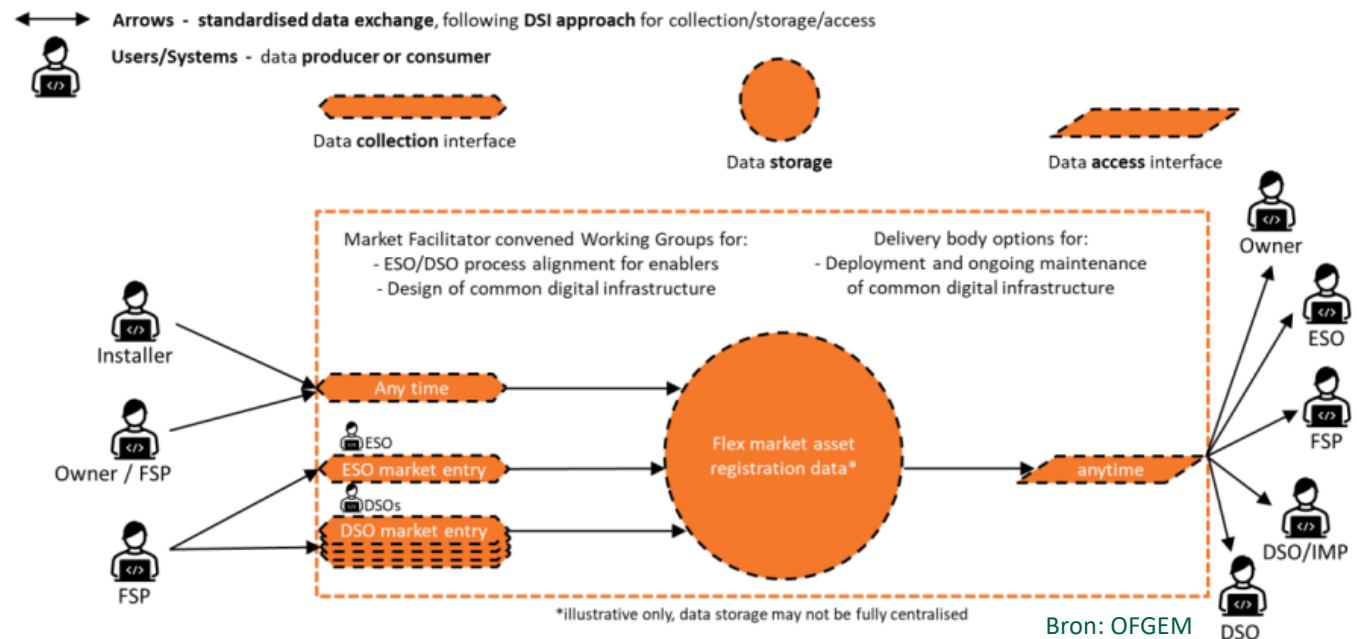
Eenvoudiger maken voor FSPs om aan markten voor flexibiliteit deel te nemen:

- ✓ Prekwalificatie
- ✓ Baselining
- ✓ Submetering
- ✓ Uitwisseling van data

[ART 19, 21, 22, 23, 25, 29, 33, 34, 35]

## Marktorganisatie

### Rollen en verantwoordelijkheden



## Procesoptimalisatie

## Digitalisering

### Framework voor validatie en datakwaliteit

## Infrastructuur voor het delen van data



# Waarde van flexibiliteit

... van strategische samenwerking

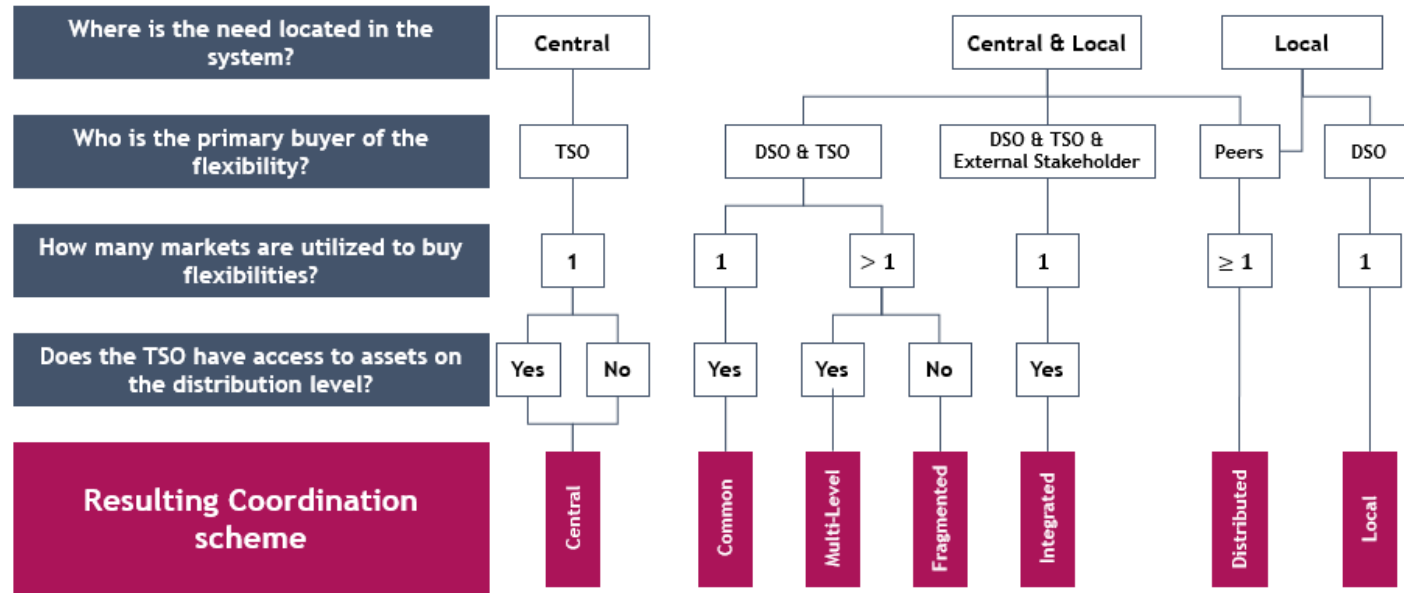
## De uitdaging

Waarde van flexibiliteit maximaliseren:

- ✓ Voor het systeem
- ✓ Voor de aanbieder van flexibiliteit

[ART 38, 41, 42, 43, 45, 46, 54, 59]

## Marktorganisatie



Bron: VITO

Samenwerkingsmodellen

Marktmodellen



# Waarde van flexibiliteit

... tot operationele implementatie

## De uitdaging

Waarde van flexibiliteit maximaliseren:

- ✓ Voor het systeem
- ✓ Voor de aanbieder van flexibiliteit

[ART 38, 41, 42, 43, 45, 46, 54, 59]

## Digitalisering

Tools voor netbeheerders voor coördinatie flexibeliteitsaankoop en activatie

Tools voor biedingstrategie FSP

Characteristics of the pilot for the 'flexibility market places' category

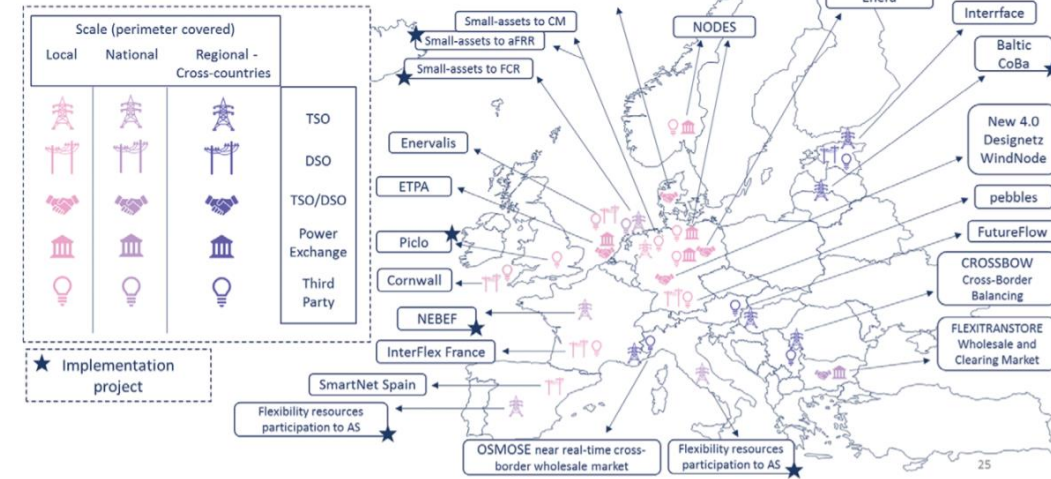


Figure 2: Emergence of flexibility platforms across EU member states

Source: ENTSO-E. Available at: [eepublicdownloads.entsoe.eu/clean-documents/events/2019/191205\\_Flexibility%20Framework\\_full\\_public.pdf?Web=1](https://eepublicdownloads.entsoe.eu/clean-documents/events/2019/191205_Flexibility%20Framework_full_public.pdf?Web=1)



# Waarde van flexibiliteit

... tot operationele implementatie

## De uitdaging

Waarde van flexibiliteit maximaliseren:

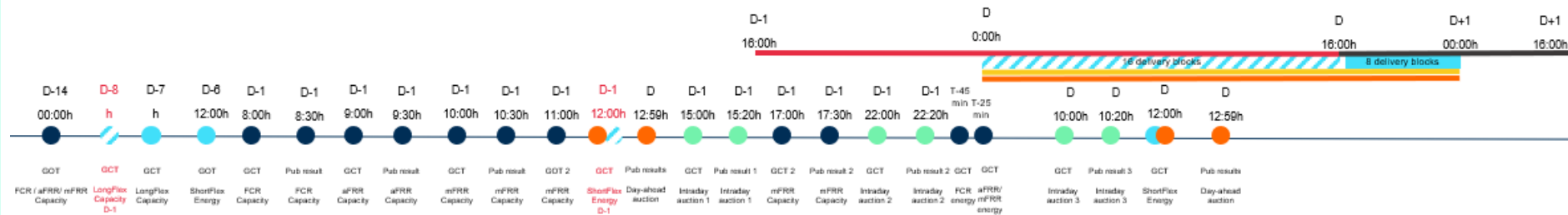
- ✓ Voor het systeem
- ✓ Voor de aanbieder van flexibiliteit

[ART 38, 41, 42, 43, 45, 46, 54, 59]

## Digitalisering

Tools voor netbeheerders voor coördinatie  
flexibiliteitsaankoop en activatie

Tools voor biedingstrategie FSP



Bron: Fluvius/Elia/VITO

Data-uitwisseling tussen meerdere systemen en platformen

Snelheid – hoeveelheid – robuustheid



# De eindgebruiker in het centrum

... naar een inclusieve transitie

## De uitdaging

Hoe krijgen we de eindgebruiker mee en vertalen we de hoeveelheid data naar echte en effectieve informatie?



Datagedreven

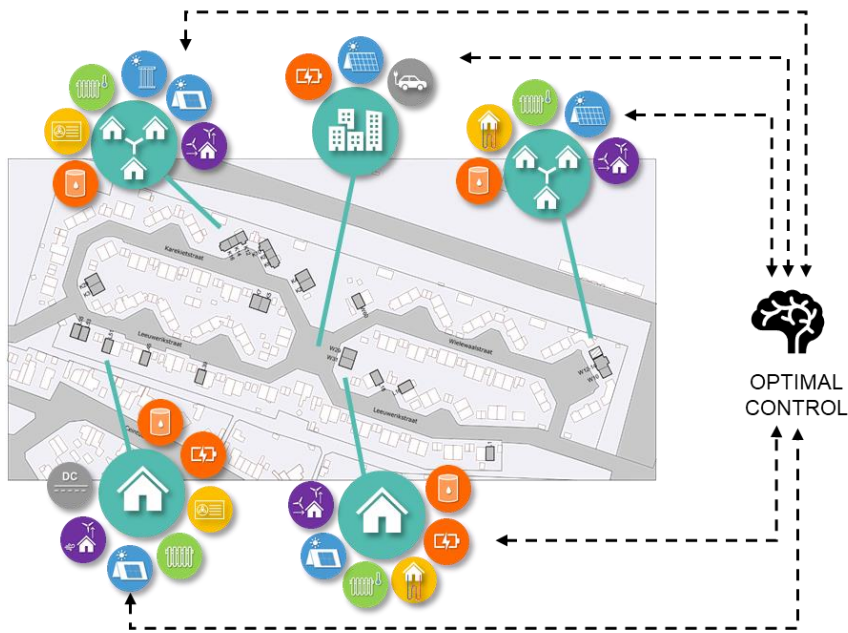
Op fysica gebaseerd

in functie van de noden van de eindgebruiker

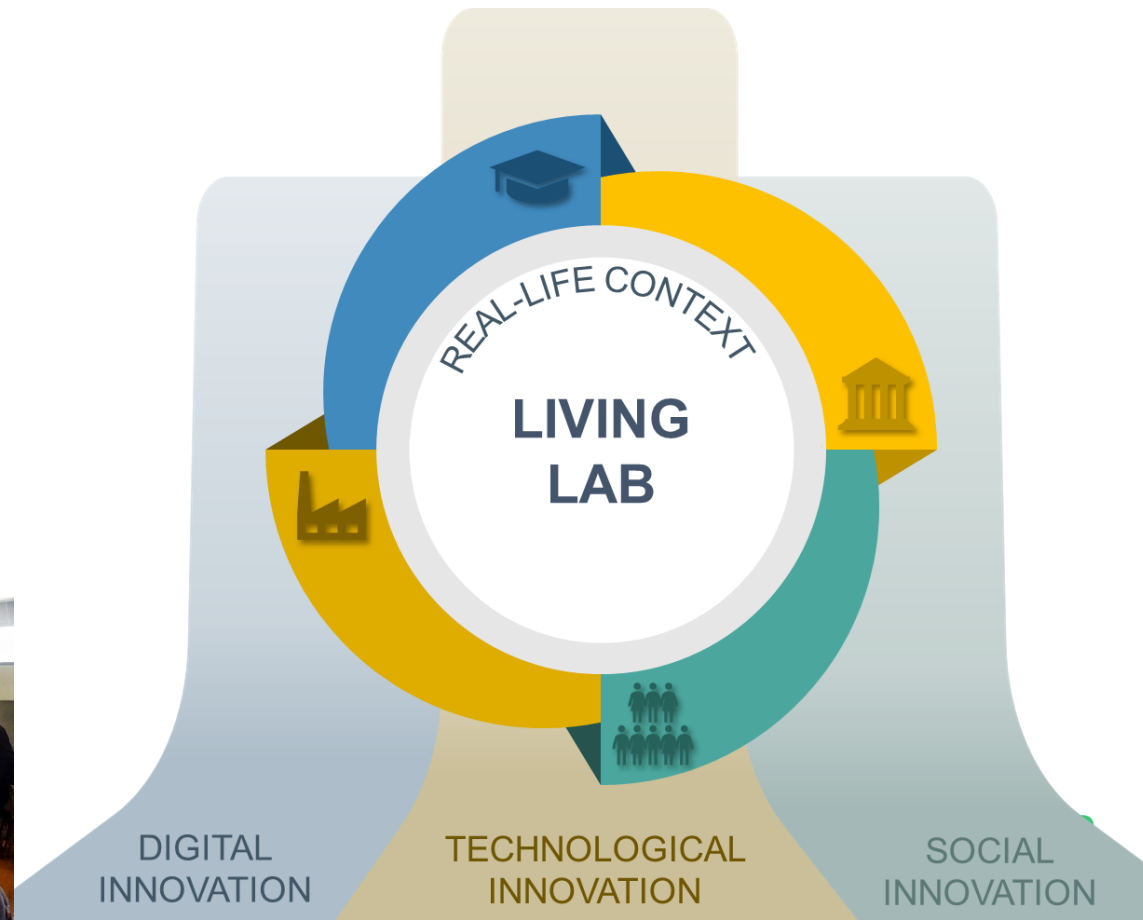


# OpenThor Living Lab

Digitale en technologische innovatie hand in hand sociale innovatie



- |                              |                        |
|------------------------------|------------------------|
| <b>TECHNOLOGY BOXES</b>      | <b>EMISSION SYSTEM</b> |
| INDIVIDUAL                   | EXISTING RADIATORS     |
| MICROGRID                    | LOW-TEMP RADIATORS     |
| NEIGHBOURHOOD INFRASTRUCTURE | SURFACE HEATING        |
| <b>HEAT PUMPS</b>            | <b>STORAGE</b>         |
| AIR-WATER                    | THERMAL                |
| GEOTHERMAL                   | ELECTRIC               |
| <b>RENEWABLE ENERGY</b>      | SOLAR THERMAL          |
| PV                           | HYBRID (PVT)           |
| BIPV                         | DC GRID                |
| <b>VENTILATION</b>           | <b>OTHER</b>           |
| EXTRACT with DEMAND CONTROL  | EV CHARGING            |
| BALANCED with HEAT RECOVERY  |                        |





Conclusies

# Naar een slimmer en flexibeler systeem

“DE WEG VOORUIT MAAR NOG NIET AAN DE FINISH”



Aanpassingen aan regelgeving en marktdesign gaan samen met innovaties in digitalisering



Europa geeft richting maar veel innovatie zal vanuit het nationale niveau gestimuleerd moeten worden



Innovaties moeten vertrekken vanuit een visie om een patchwork van oplossingen te vermijden en een **samenhangend traject** te realiseren



**Samenwerking** tussen alle actoren uit het ecosysteem, over grenzen en sectoren, is essentieel







# Vragen ?

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Activity Lead Energy Markt Design

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