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Demand response and other distributed energy resources: what barriers are holding them back?

ACER 2023 Market Monitoring Report

GEODE – WG Innovation & Development meeting

1 February 2024

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ACER monitors barriers to demand response and other distributed energy resources

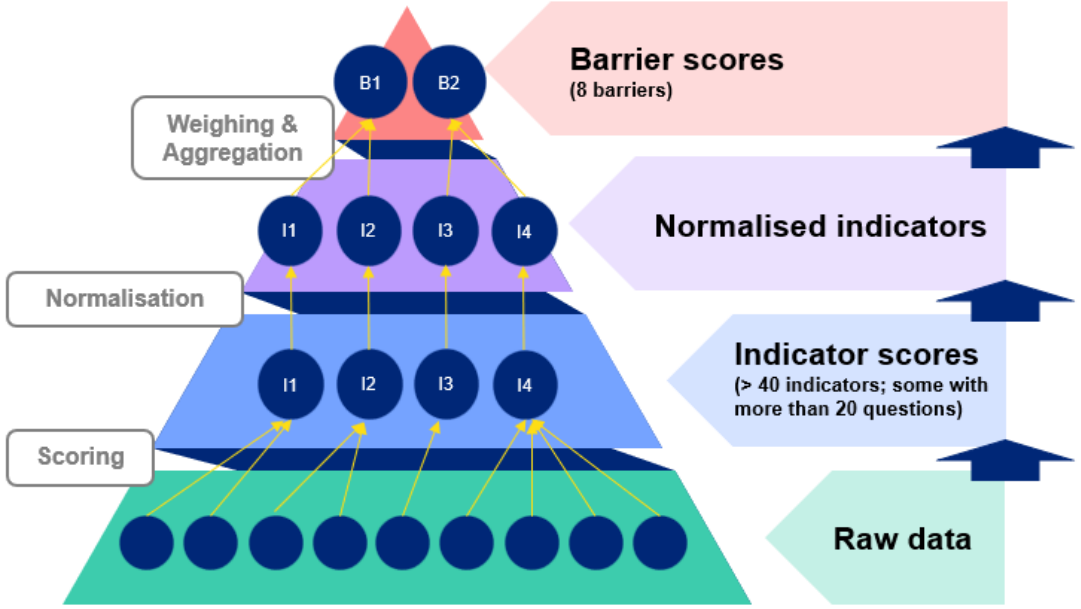
Why?

Flexibility from distributed energy resources brings opportunities…

- ✓ *Ensure **EU market integration***
- ✓ *More **cost-efficient market and system operation***
- ✓ *More **cost-efficient network development***
- ✓ ***Savings** for ALL CONSUMERS*
- ✓ *Make **the most out of resources** (EVs, rooftop solar panels, batteries, etc.)*
- ✓ *(…)*

How?

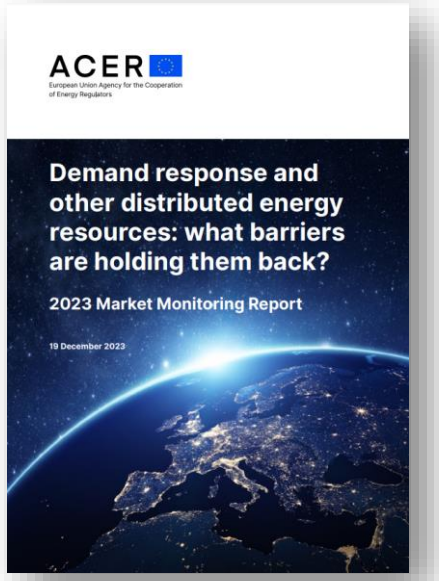
A bottom up approach to measure barriers and ensure comparability between Member States



National Regulatory Authorities are our main data source

Where?

Specific recommendations per Member State



Learn more about our report!

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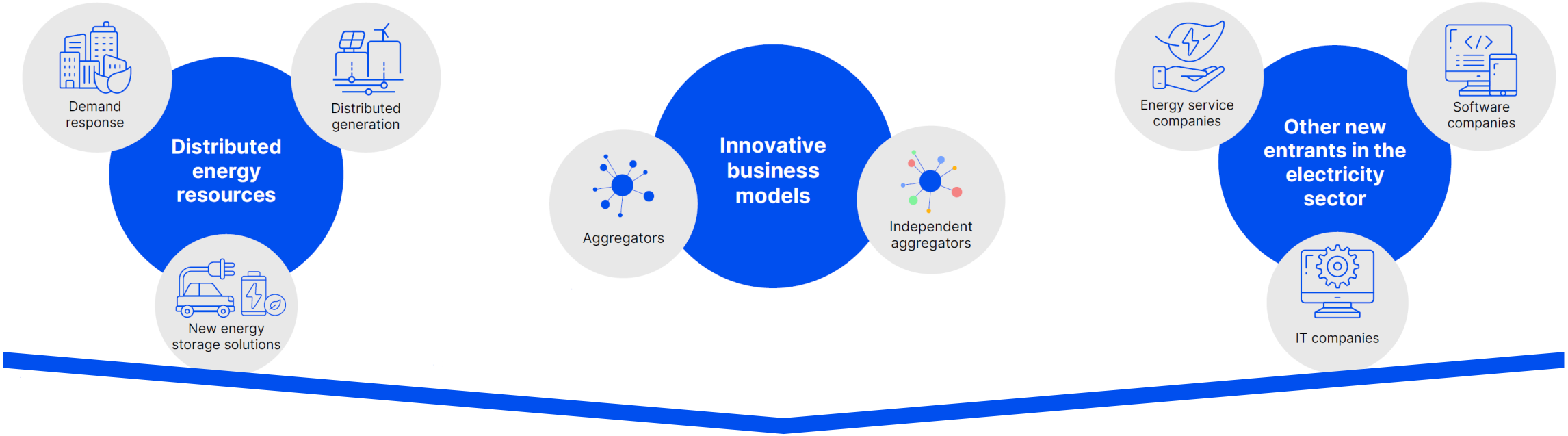
Scope



Regulatory barriers & market restrictions

- Clean Energy Package & some existing EU Guidelines
- Market design and structure

Day-ahead and intraday markets

Balancing services

Congestion management services

Capacity mechanisms and interruptibility schemes

2022 data

Geographical scope

Financial, economic, technological, and behavioural barriers are out of the scope

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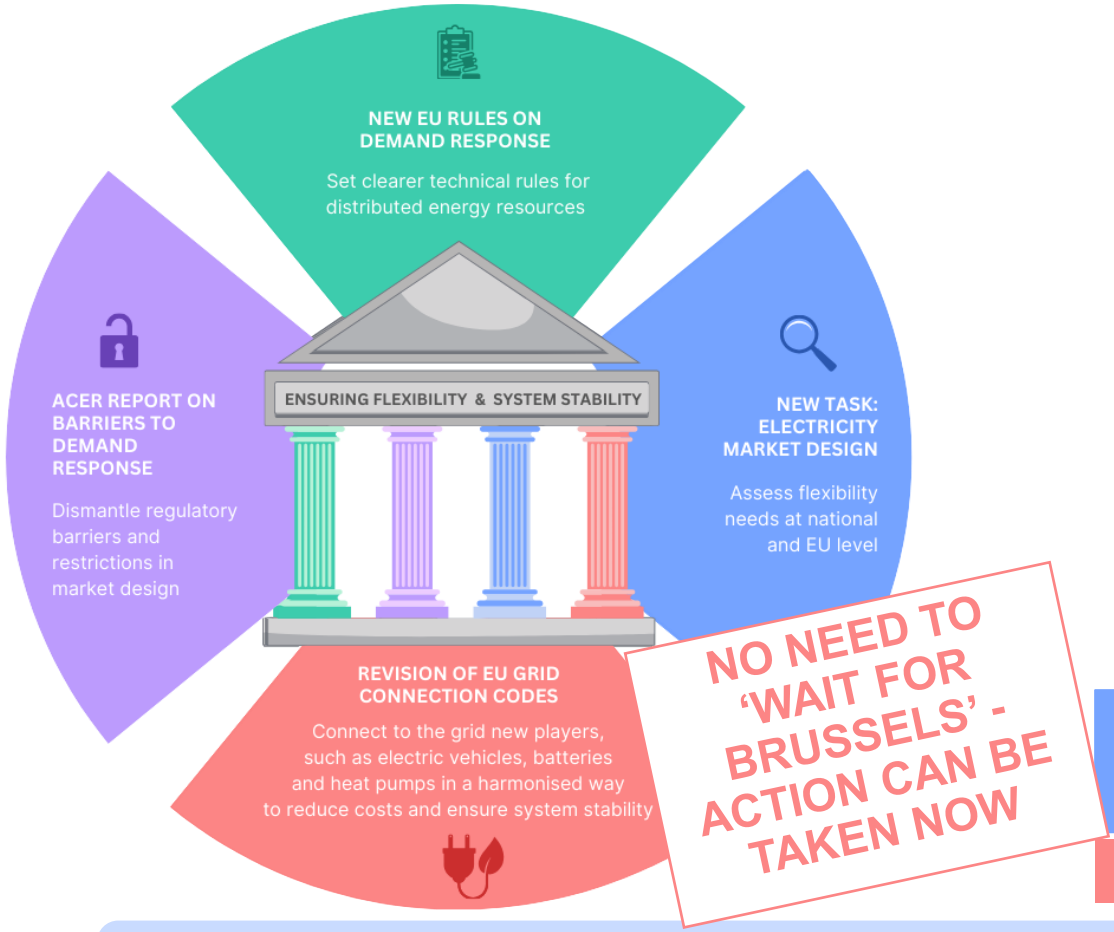
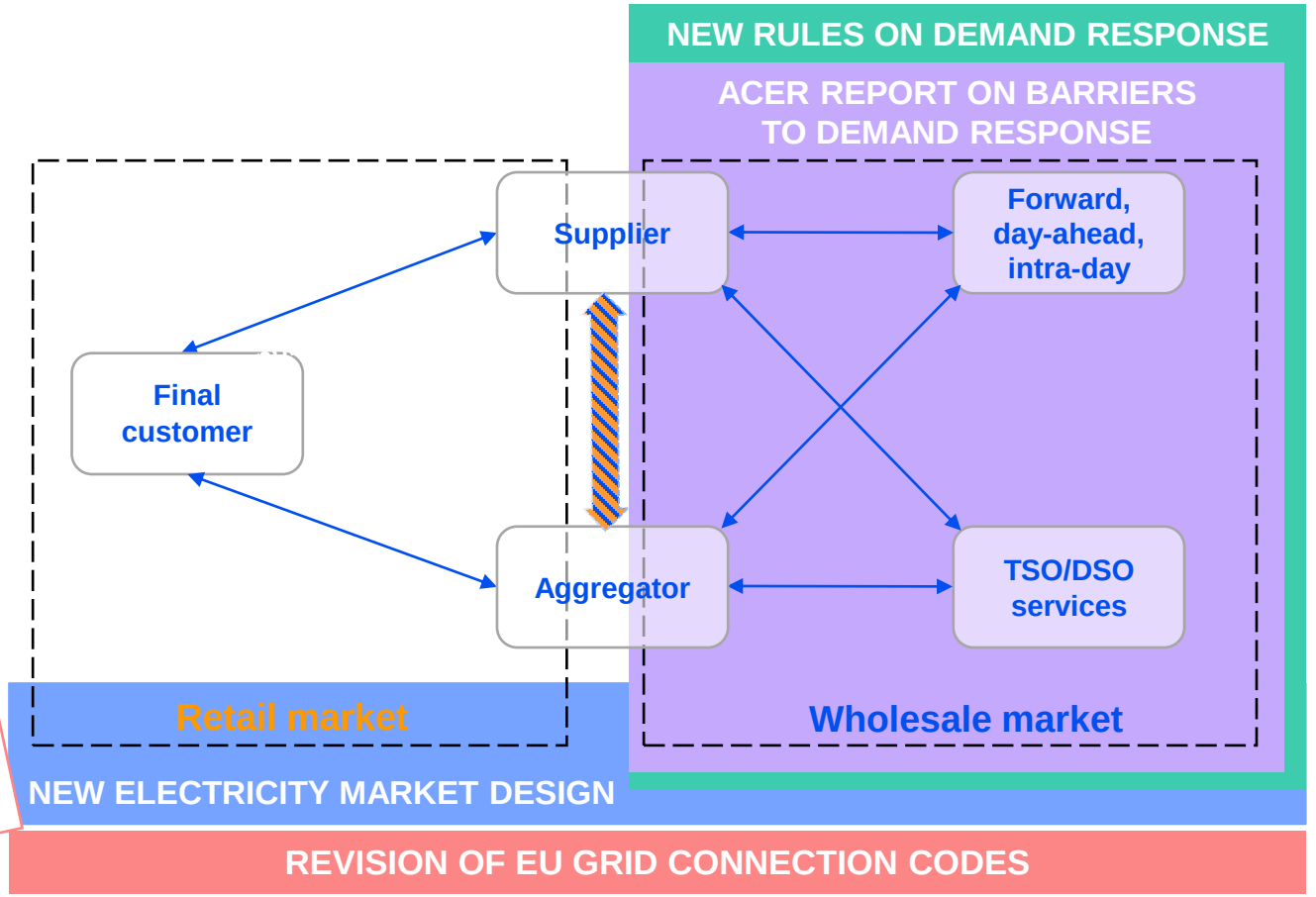
Multiple EU efforts ongoing to 'unlock' flexibility





This report presents **regulatory barriers** and **restrictions in market design** that **merit further consideration and possible removal.**

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Barriers come in many sizes and shapes …

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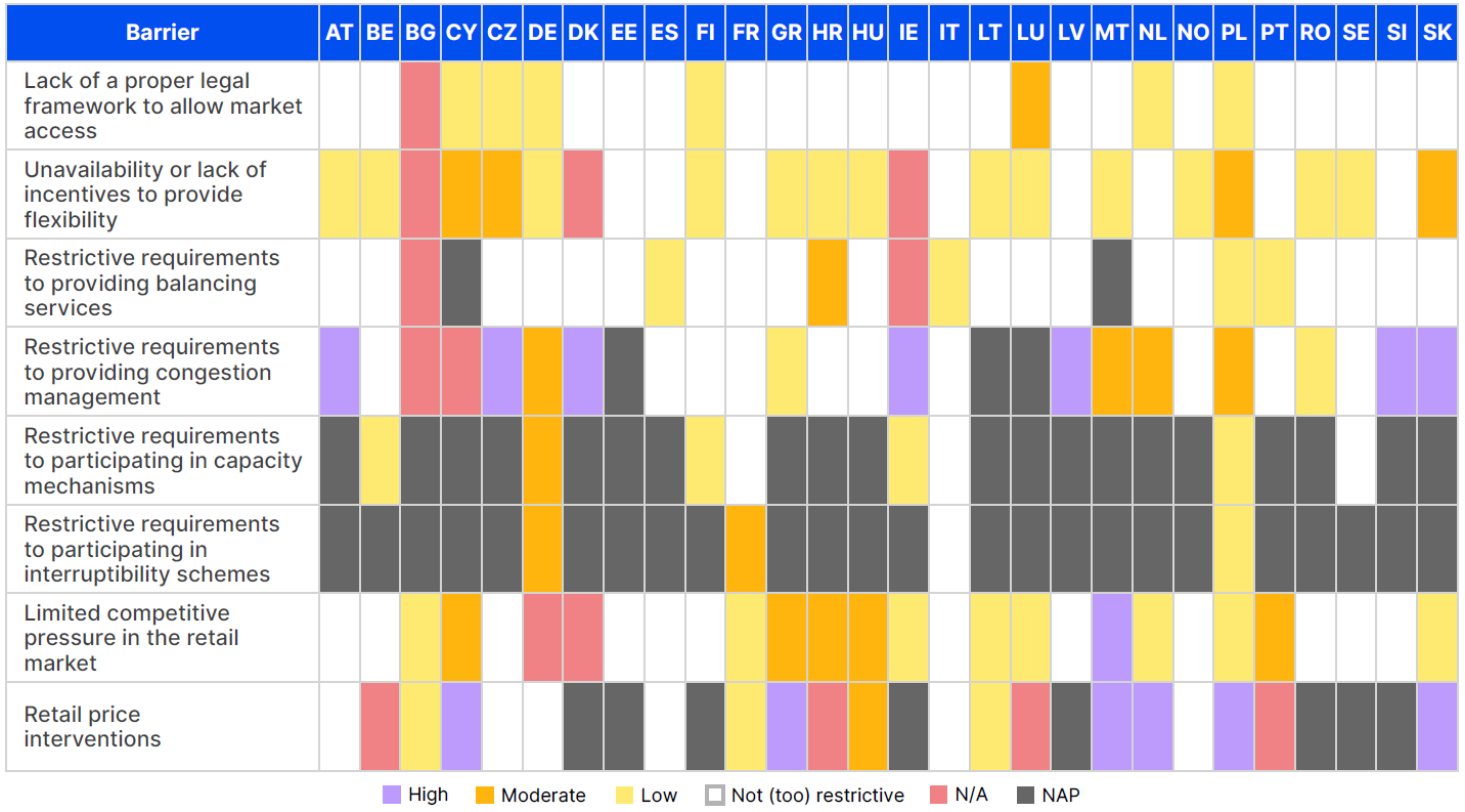
Barriers to distributed energy resources, zooming in …



Barriers to distributed energy resources (including demand response) are **often 'hiding in plain sight'**.
The **sum of many small obstacles can add up to significant barriers**, impeding system flexibility.

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Some examples of barriers holding back distributed energy resources …

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Lack of a legal framework to allow market access

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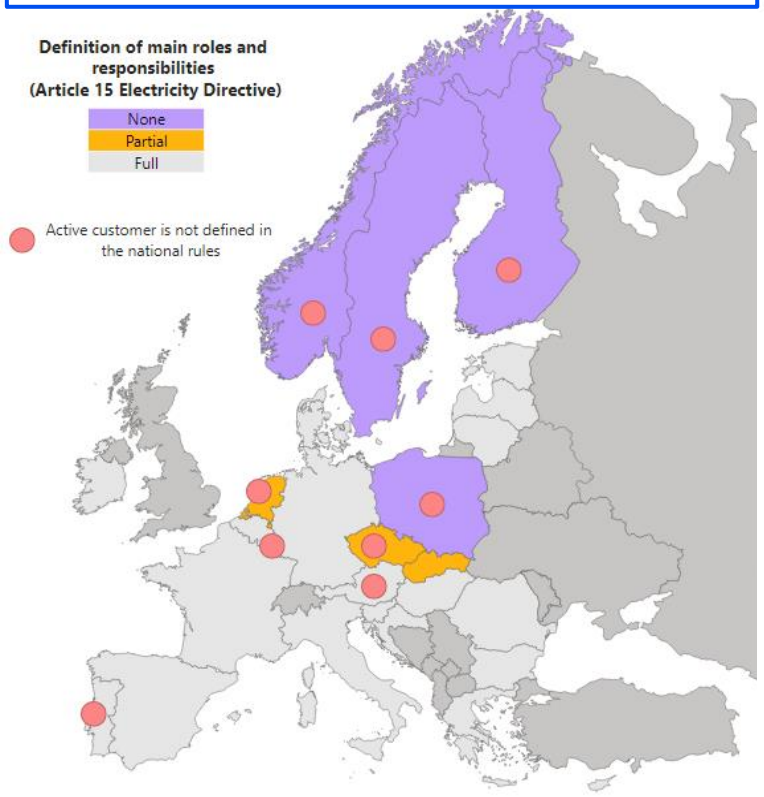
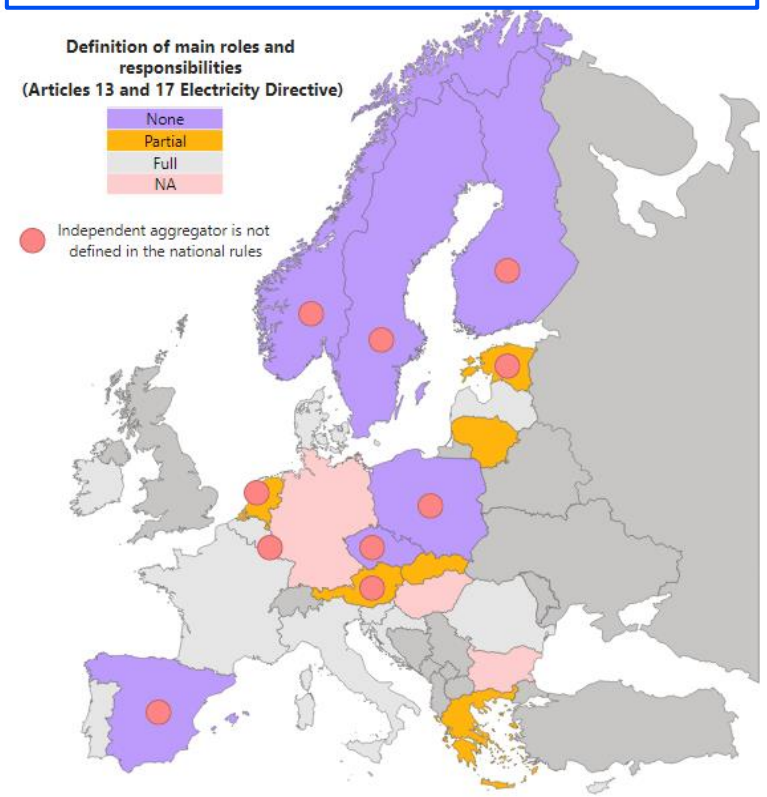
Legal preconditions… still not implemented

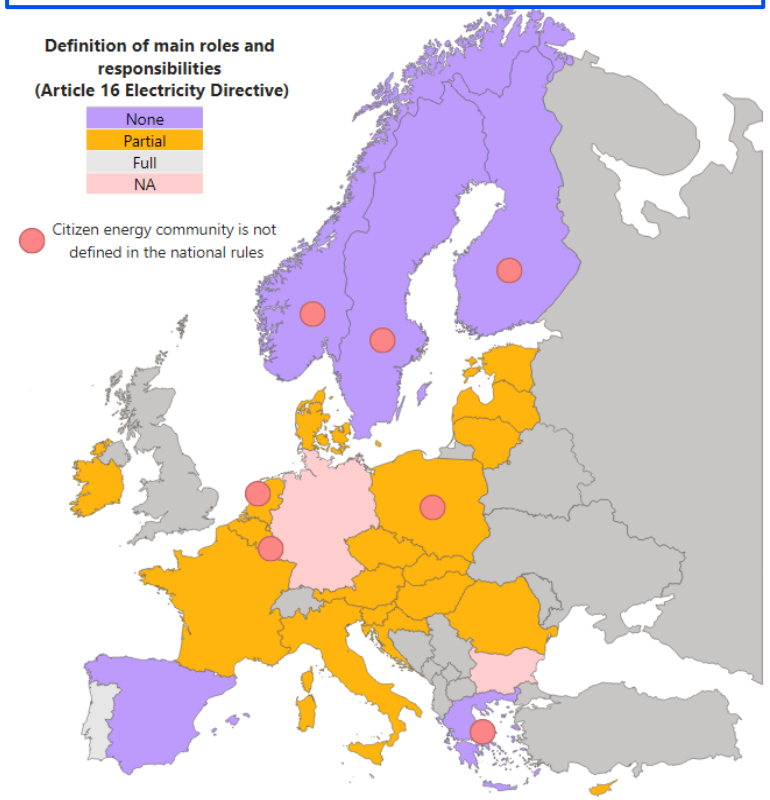
ACTIVE CUSTOMERS



AGGREGATION AND INDEPENDENT AGGREGATORS



CITIZEN ENERGY COMMUNITIES



Many Member States have not yet defined the **main roles and responsibilites** of new entrants and small actors in line with the **Clean Energy Package**.

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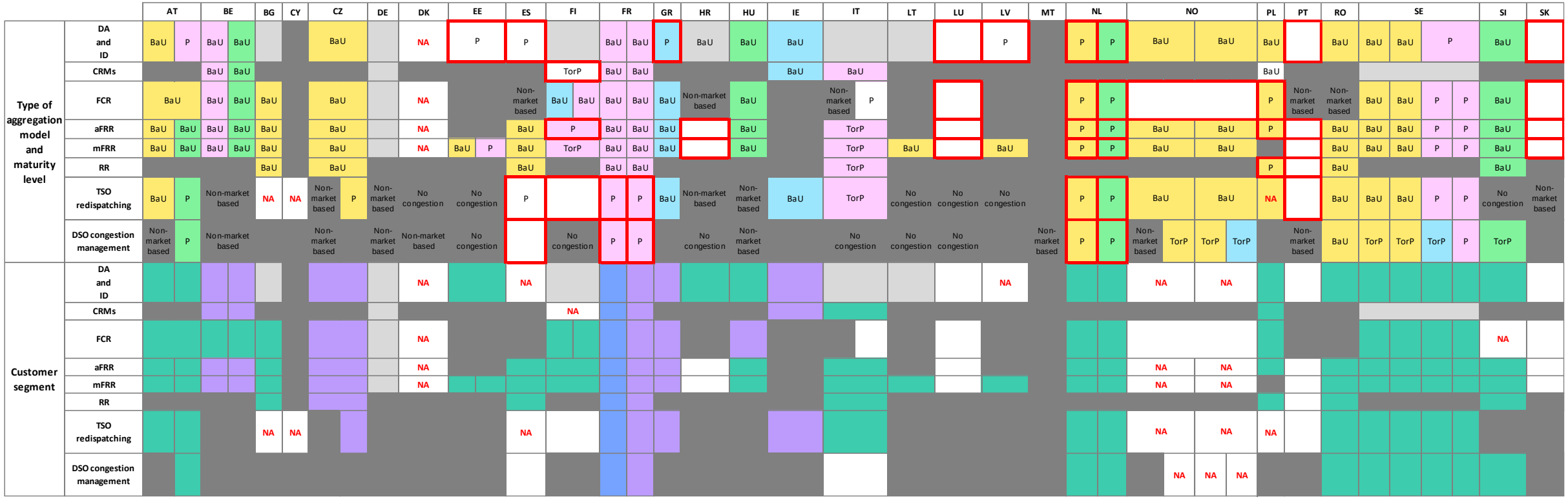
Aggregation models in place?



Type of aggregation model

- 1 BRP/connection point + 1 metering point
- Multiple BRPs/connection point + Multiple metering points
- Multiple BRPs/connection point + 1 metering point + No correction of the BRPs
- Multiple BRPs/connection point + 1 metering point + Correction of the BRPs
- NA (Not available: there is an aggregation model in place but the NRA does not have any information)
- NAP (Not applicable: the market/SO service is not in operation or the SO service is non-market-based)
- No aggregation model implemented as BAU or TorP

Maturity level

BaU: implemented as a business as usual approach

TorP: implemented on a trial stage or in a pilot project

NA: NRA does not have information on the maturity level

Customer segment

- Applicable to all customers
- Only applicable to customers connected to LV level
- Only applicable to customers connected to MV and HV level

NA: NRA does not have information on the customer segment

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Aggregation models in place?

		AT		BE		BG	CY	CZ	DE	DK	EE	ES	FI	FR		GR	HR	HU	IE	IT	LT	LU	LV	MT	NL		NO				PL	PT	RO	SE				SI	SK
Type of aggregation model and maturity level	DA and ID	BaU	P	BaU	BaU			BaU		NA	P	P		BaU	BaU	P	BaU	BaU	BaU				P		P	P	BaU	BaU			BaU		BaU	BaU	BaU	P	BaU	
	CRMs			BaU	BaU								TorP	BaU	BaU				BaU	BaU										BaU							
	FCR	BaU		BaU	BaU	BaU		BaU		NA		Non-market based	BaU	BaU	BaU	BaU	Non-market based	BaU		Non-market based	P				P	P				P	Non-market based	Non-market based	BaU	BaU	P	P	BaU	
	aFRR	BaU	BaU	BaU	BaU	BaU		BaU		NA		BaU	P	BaU	BaU	BaU		BaU		TorP					P	P	BaU	BaU		P		BaU	BaU	BaU	P	P	BaU	
	mFRR	BaU	BaU	BaU	BaU	BaU		BaU		NA	BaU	BaU	TorP	BaU	BaU	BaU		BaU		TorP	BaU		BaU		P	P	BaU	BaU				BaU	BaU	BaU	P	P	BaU	
	RR					BaU		BaU				BaU		BaU	BaU					TorP									P		BaU					BaU	
	TSO redispatching	BaU	P	Non-market based		NA	NA	Non-market based	P	Non-market based	No congestion	No congestion	P	P	P	BaU	Non-market based	Non-market based	BaU	TorP	No congestion	No congestion	No congestion		P	P	BaU	BaU		NA		BaU	BaU	BaU	P	P	No congestion	Non-market based
	DSO congestion management	Non-market based	P	Non-market based				Non-market based	Non-market based	Non-market based	No congestion		No congestion	P	P		No congestion	Non-market based		No congestion	No congestion	No congestion	No congestion	Non-market based	P	P	Non-market based	TorP	TorP	TorP		Non-market based	BaU	TorP	TorP	TorP	P	TorP	
Customer segment	DA and ID									NA		NA											NA				NA	NA										
	CRMs												NA																									
	FCR									NA																											NA	
	aFRR									NA																	NA	NA										
	mFRR									NA																	NA	NA										
	RR																																					
	TSO redispatching					NA	NA					NA															NA	NA	NA									
	DSO congestion management																											NA	NA	NA								

Type of aggregation model

NA (Not available: there is an aggregation model in place but the NRA does not have any information)

No aggregation model implemented as BAU or TorP

Customer segment

Only applicable to customers connected to LV level

Only applicable to customers connected to MV and HV level

NA: NRA does not have information on the customer segment

Maturity level

NA: NRA does not have information on the maturity level

- Lack of at least one aggregation model (up and running or in a trial stage/as a pilot project) in some electricity markets or market-based system operation services in almost half of Member States.
- Missing aggregation models for some customer segments and lack of monitoring of aggregation models.

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Unavailability or lack of incentives to provide flexibility

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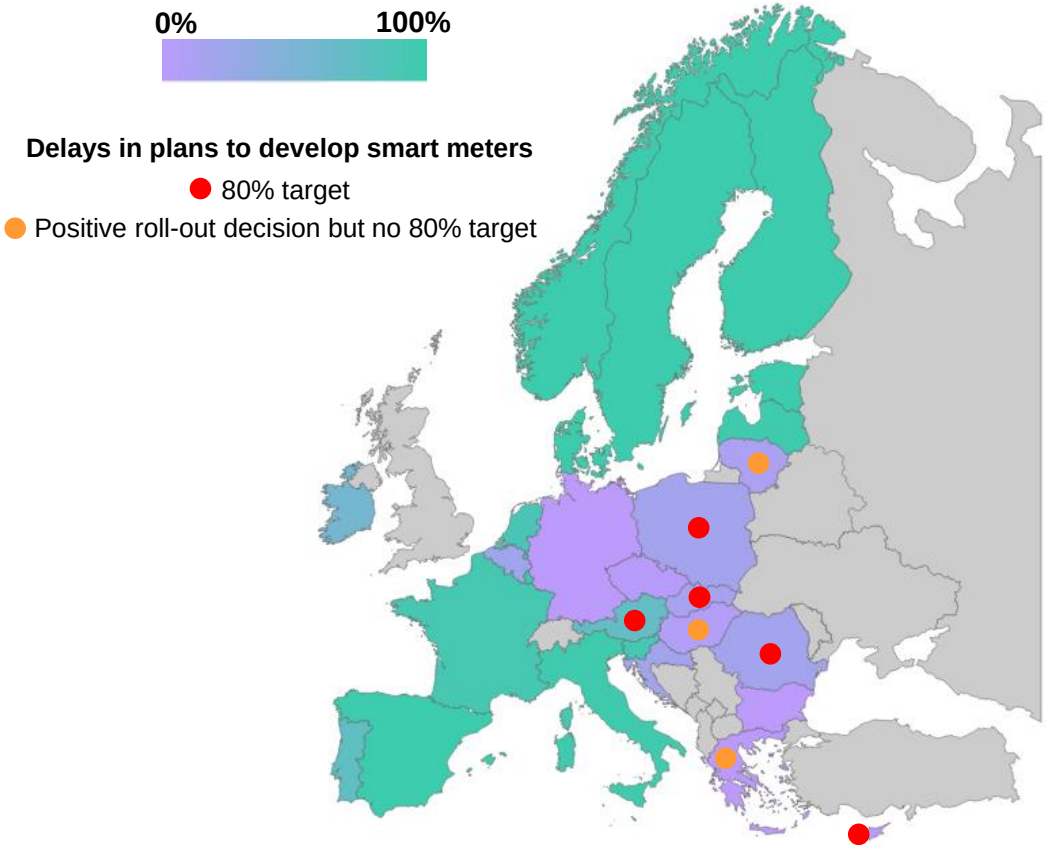
Lack of technical means to activate flexible resources

Smart meters roll-out - 2022



Functionalities of smart meters installed (% ranges) - 2022

	STANDARD VALUE PROPOSITIONS									ADVANCED VALUE PROPOSITIONS					
	Leverage smart meters data	Bill forecasting	Real-time consumption display	Real-time cost display	Unusual usage alert	Historical consumption overview	Real-time carbon impact	Pre-payment capacity	Day-ahead prices	Ability to valorise the provision of explicit demand response to the power markets	Fuel poverty detection	Energy sharing	Integrate prosumers in the market	Facilitate smart charging of EVs at home	Facilitate smart charging of batteries
AT	100%		100%			100%						100%			
BE			0% - 20%									0% - 20%			
BG	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CZ															
DE															
DK															
EE	100%	100%	100%			100%	100%		100%						
ES	0%	0%	100%	0%	0%	100%	0%		100%	100%	0%	100%	0%	0%	0%
FI															
FR	80% - 100%	80% - 100%	80% - 100%	0% - 20%	0% - 20%	80% - 100%	0% - 20%	0%	0%	80% - 100%		80% 100%		100%	100%
GR	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
HR															
HU															
IE															
IT	0%	0%	80% - 100%	0%	80% - 100%	100%	0%	80% - 100%	0%	0%	0%	0%	0%	0%	0%
LT	100%	0%	100%	0%	0%	100%	0%	0%	100%	100%	0%	0%	100%	100%	100%
LU	0%	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	100%	0%	100%	100%
LV	60% - 80%	0% - 20%	100%	60% - 80%	0% - 20%	100%	20% - 40%	20% - 40%	0% - 20%	0%	0%	0%	0%	0% - 20%	0% - 20%
MT	0%	0%	100%		0%	0%	0%	0%			0%	0%			
NL															
NO	100%	100%	100%	100%	0%	100%	0%	0%	100%	0%	0%	100%	100%	100%	100%
PL															
PT	0%	0%	60% - 80%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RO		100%	100%		0%	100%	0%	0%							
SE															
SI	60% - 80%	60% - 80%	80% - 100%	0%	0%	60% - 80%	0%	0%	0%	0%- 20%	0%	0%	0%	40% - 60%	40% - 60%
SK	100%	20% - 40%	60% - 80%												

0%
0% - 20%
20% - 40%
40% - 60%
60% - 80%
80% - 100%
100%
N/A

- Ten Member States with a rollout rate lower than 20% (with five being (almost) 0%).
- Delays in development plans.

- Limited information on functionalities.
- Many consumers likely not having full advantage of smart meters.

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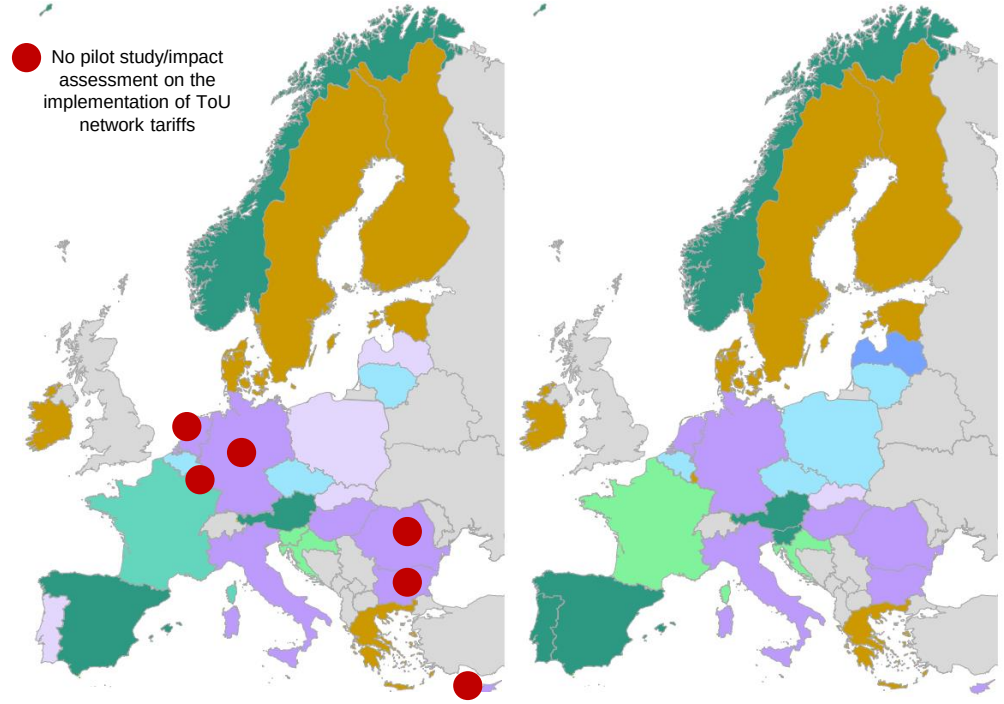
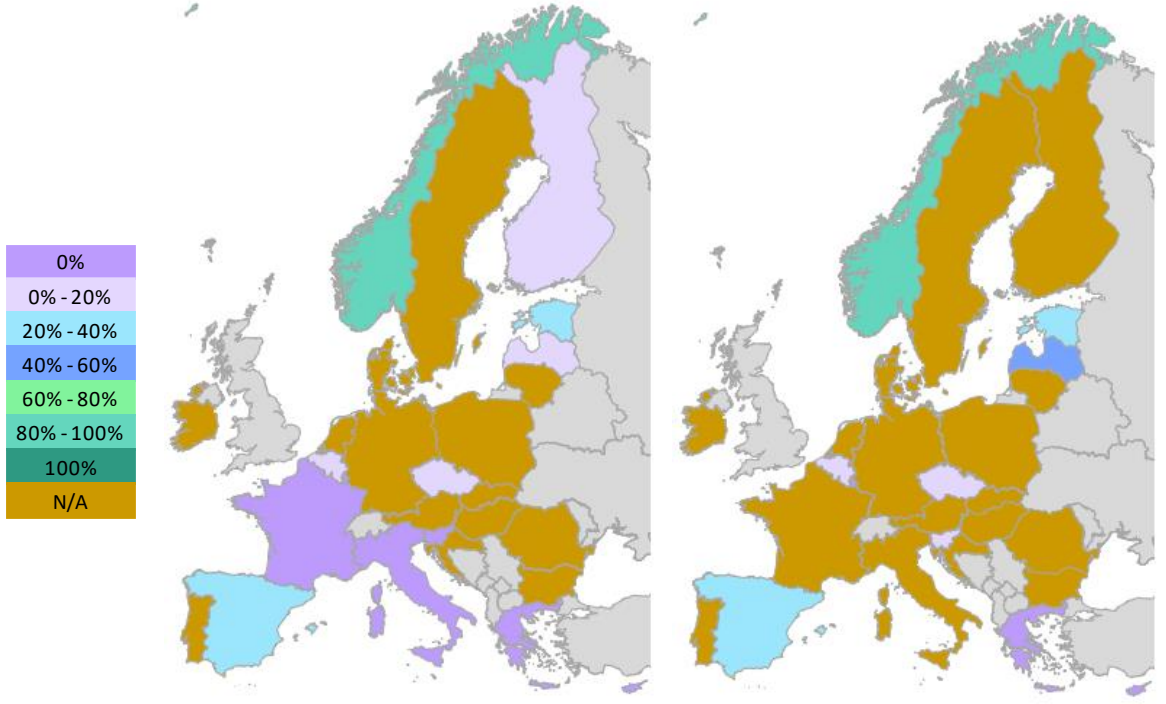
Without price signals or incentives… why respond?

Households (left) and non-households (right) with Time of Use network tariffs with differentiation within the day (% ranges) - 2022



Households (left) and non-households (right) with dynamic electricity price contracts (% ranges) - 2022



- Limited penetration of ToU network tariffs in some Member States.
- Lack of a proper implementation assessment in a few Member States.

Little information on the penetration of retail electricity contracts with time differentiation (e.g. dynamic electricity price contracts)
► Do consumers receive proper price signals?

Note: ToU refers to Time-of-Use network tariffs.

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Restrictions to providing congestion management services

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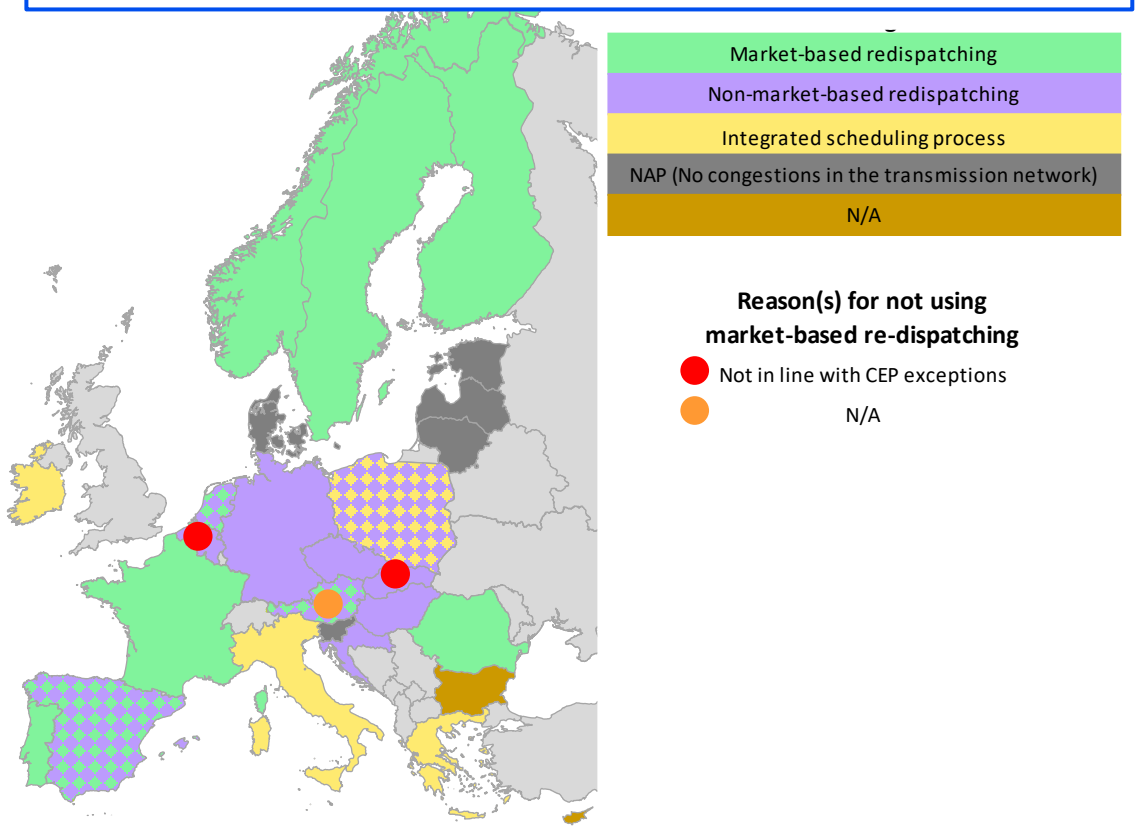
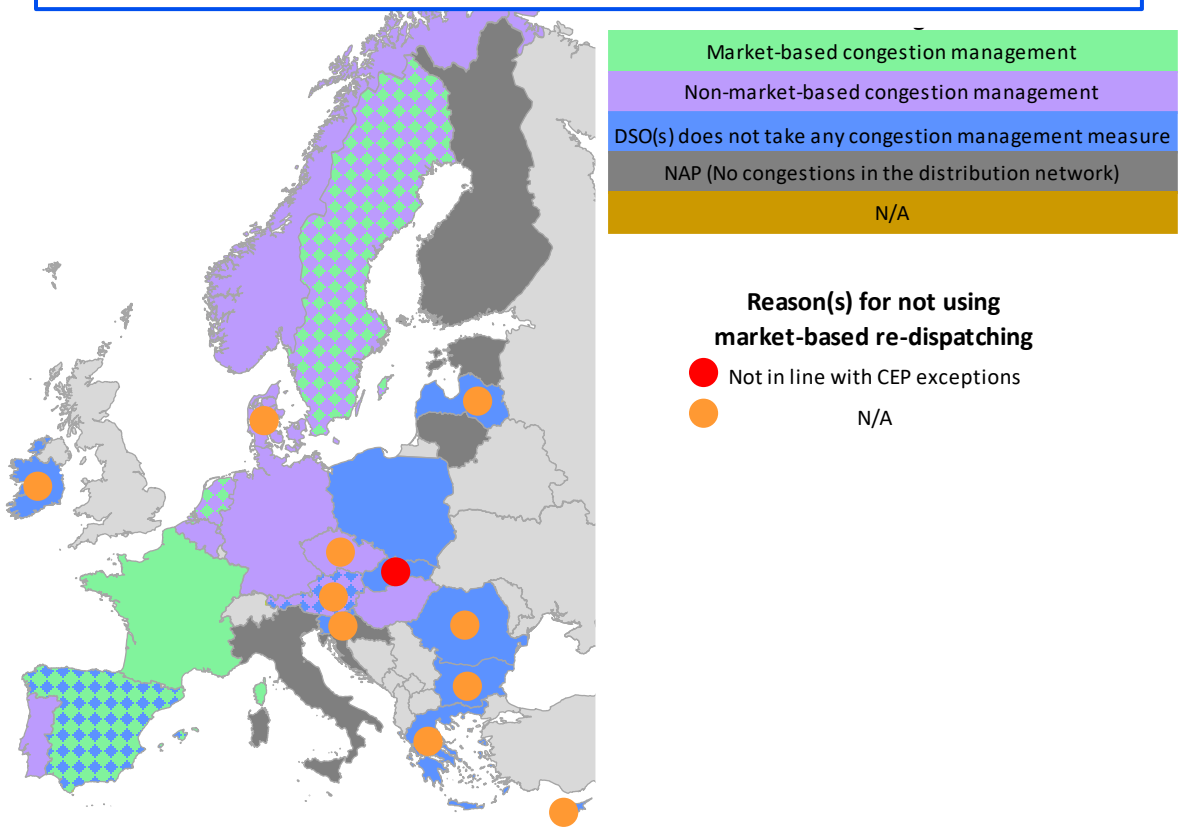
Is market-based re-dispatching typically used?

TSOs congestion management



DSOs congestion management



- No, congestion management measures are usually based on non-market-based procedures, especially at distribution level.
- In many Member States, NRAs cannot ensure whether the reasons for not using market-based re-dispatching, especially by DSOs, are in line with the exceptions allowed by the Clean Energy Package.

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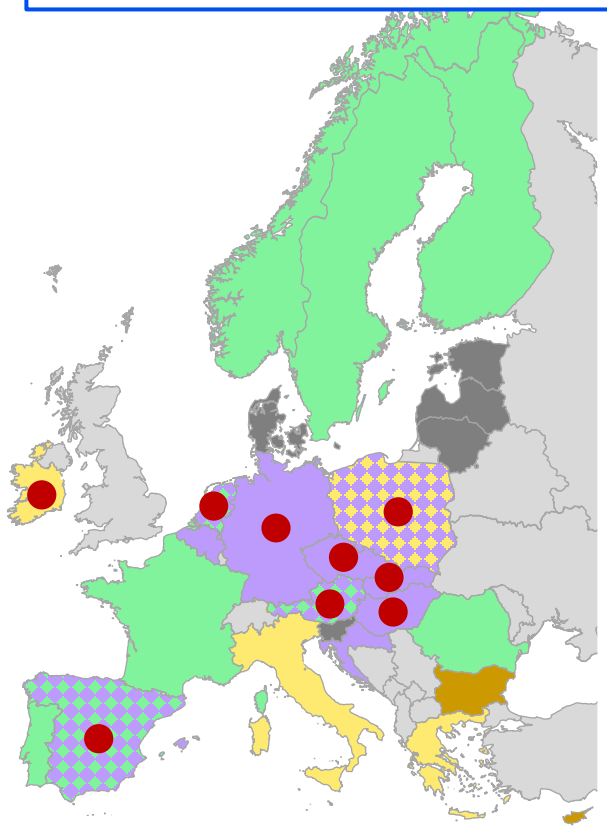
Difficulties for local markets to develop and mature

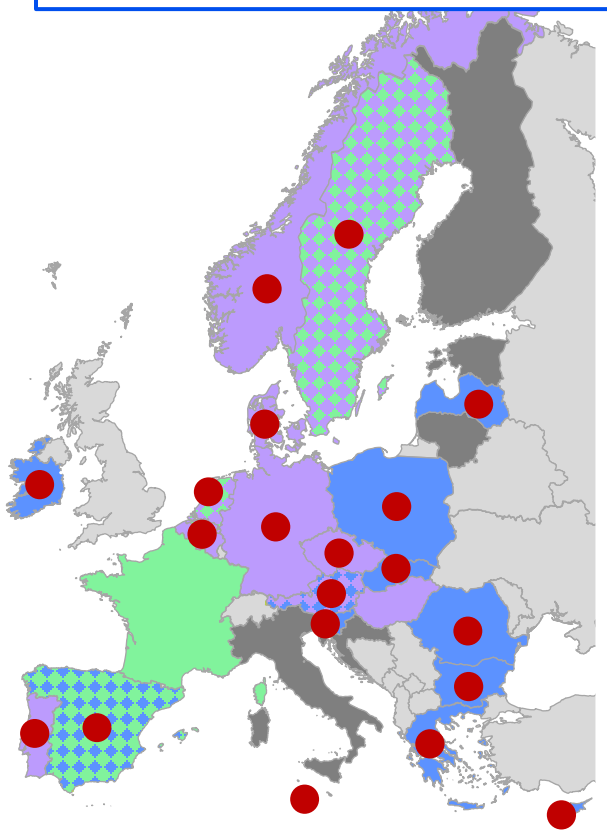
TSOs congestion management



- Market-based redispatching
- Non-market-based redispatching
- Integrated scheduling process
- NAP (No congestions in the transmission network)
- N/A

● **No iterative national reassessment process to review the exceptions from using market-based re-dispatching**

DSOs congestion management



- Market-based congestion management
- Non-market-based congestion management
- DSO(s) does not take any congestion management measure
- NAP (No congestions in the distribution network)
- N/A

● **No iterative national reassessment process to review the exceptions from using market-based re-dispatching**

Most Member States lack an iterative national reassessment process with a transparent decision-making procedure to review whether the exceptions from using market-based re-dispatching.
This hinders distributed energy resources from playing a role in “local markets”.

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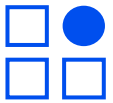
Focal topic: Network tariffs as facilitators or barriers for active customers and demand response

- **No study, pilot project or impact assessment** in most Member States to determine whether network charges for active customers must have some differentiation compared to non-active customers ► Hindering judgment whether network tariffs for active customers are cost-reflective and non-discriminatory.



- No kind of differentiation in network charges for active customers providing explicit demand response services to system operators in most Member States ► Any **differentiation/non-differentiation** should be justified by their corresponding network impact.

- **Exemptions, discounts and/or other differentiations** in the network tariffs for specific consumers (e.g. industrial customers) in multiple Member States. **The justification is often not reported or not network related** ► Potential distortion of cost signals or inefficiency in the development/operation of the power system.

Network design elements that are not cost-reflective and may undermine efforts to unlock flexibility in a few Member States:

- only energy-based transmission and/or distribution tariffs without time-differentiation
- net-metering (i.e. charging based on the difference between withdrawal and injection)

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A possible “To-do list” to address barriers…

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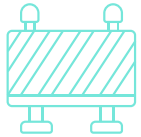
ACER´s main recommendations for governments, regulators and system operators to remove regulatory barriers and restrictions in the market design for demand response and other distributed energy resources

1 **Speed up** implementing regulatory changes to **remove persistent barriers**.

2 Set suitable **rules for new entrants**: clarify roles and responsibilities, define aggregation models, ensure data access, etc.

3 Ensure **open access** to all electricity markets and system operation services (balancing and congestion management services).

4 Provide the **technical means** and **incentives** by speeding up the rollout of smart meters, giving proper price signals in the electricity bills and raising consumer awareness.



5 Remove **restrictive requirements** to participate in balancing markets, capacity mechanisms and interruptibility schemes.

6 Ensure that **local markets for congestion management** have a chance to develop and mature. Define a transparent national process to assess when/where local markets may be implemented.

7 Facilitate new entrants' **access to retail electricity markets**.

8 Be **targeted, tailored and temporary** when considering retail price interventions.

9 Ensure **sufficient granular data** on all restrictions to demand response and other distributed energy resources.

Want to learn more ?

Check out our ACER Market Monitoring Report on Demand response and other distributed energy resources: what barriers are holding them back?

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Wholesale electricity market monitoring in 2024


KEY DEVELOPMENTS

- Electricity consumption & generation
- Electricity prices
- GHG emissions

CROSS-BORDER CAPACITY

70% transmission capacity available for cross-zonal electricity trade

MARKET INTEGRATION

- Evolution of electricity markets
- Remedial actions

FLEXIBILITY & BARRIERS

- Barriers to distributed energy resources
- Bringing flexibility through the electricity markets

SUMMARY

- Presentation for ITRE committee
- Possible formal recommendation or opinion

Learn more about our Market Monitoring Reports!

ACER aims to continue monitoring all barriers to market integration.
This includes barriers to distributed energy resources and challenges to bring flexibility through the electricity markets.
Increasing the flexibility and interconnection of the EU electricity system is key to meet the EU Green Deal targets.

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Have your say!

- On 19 December 2023 ACER launched a public consultation seeking feedback on the ACER 2023 Market Monitoring Report and aiming to gather input to bring more flexibility through the markets.

- ACER will use your input to:
  - ✓ Narrow the scope of ACER 2024 MMR: focus on the most relevant regulatory barriers and restrictions to distributed energy resources
  - ✓ Assess how to unlock flexibility from all resources through the markets
  - ✓ Help define the scope of this MMR in the upcoming years
- If you have any questions, please do not hesitate to contact us (ewpmm@acer.europa.eu).

Thank you for your attention

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