

Unlocking flexibility: No-regret actions to remove barriers to demand response

2025 Monitoring Report

9 April 2025



European Union Agency for the Cooperation
of Energy Regulators

Unlocking flexibility: No-regret actions to remove barriers to demand response

2025 Monitoring Report

9 April 2025

Find us at:

ACER

E press@acer.europa.eu

Trg republike 3

1000 Ljubljana

Slovenia

www.acer.europa.eu



Table of contents

Europe needs to unlock its flexibility potential for a clean, secure and competitive energy future.....	4
Achieving the EU's energy goals requires targeted actions.....	4
Flexibility is crucial at a time Europe's energy landscape is at a crossroads.....	5
Unlocking demand response can bring significant opportunities for flexibility .	6
Demand response benefits consumers.....	7
ACER proposes 12 actions to remove barriers to demand response	8
Action 1. Recognise the new actors: clarify responsibilities for emerging market players in national laws	9
Action 2. Facilitate market entry: remove obstacles to market access	11
Action 3. Let aggregators play their role: remove legal obstacles for aggregators.....	13
Action 4. Kick-start the smart revolution: deploy smart meters and ICT services to enable consumers' smart responses	15
Action 5. Optimise the energy cost component of electricity bills: offer time-differentiated retail contracts to enable alternative flexible offers	17
Action 6. Optimise the network component of electricity bills: incentivise the uptake of time-of-use tariffs	20
Action 7. Give an extra push: implement measures to enhance consumers' participation in demand response	23
Action 8. Transform balancing practices: shift from non-market-based to market-based balancing	25
Action 9. Lower barriers to provide balancing services: simplify the prequalification process.....	27
Action 10. Share balancing services across EU borders: ensure balancing products and market structures meet EU requirements	28
Action 11. Cut through red tape: ease administrative burdens and simplify processes for new entrants and small actors.....	30
Action 12. Think outside the wires: encourage non-wire solutions as alternatives to traditional grid investments.....	31

Annex I: Evaluation of responses to Public Consultation on prioritising the removal of barriers to electricity demand response	33
---	-----------

Annex II: Scope and methodology of ACER's monitoring of barriers for distributed energy resources.....	34
---	-----------

Europe needs to unlock its flexibility potential for a clean, secure and competitive energy future

Achieving the EU's energy goals requires targeted actions

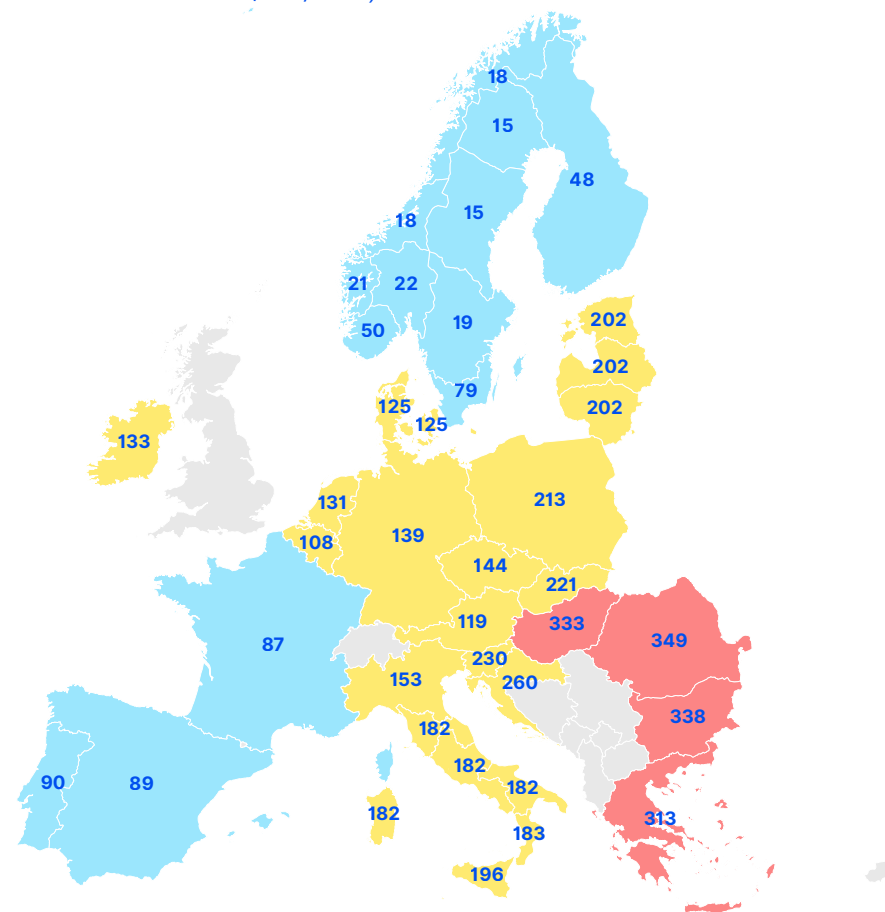
- 1 To deliver a clean, secure, and cost-competitive energy future, the EU needs to:
 - target new transition cost drivers such as grid investments,
 - deepen energy market integration, and
 - harness energy efficiency and flexibility.
- 2 Furthering market integration and flexibility will help prevent fragmentation, as experienced during the summer of 2024.
- 3 The present report focusses on this last element. More concretely, the report looks at how to lift the most pressing barriers for all distributed energy resources, such as demand response, energy storage¹ and distributed generation in the EU².
- 4 The report also serves as a *roadmap* and a *call to action* for all stakeholders—policymakers, system operators, regulators, and market participants—to collaborate in overcoming these critical barriers. Towards this end, it presents 12 actions to take. Additionally, the report serves as *reporting guidelines*, helping prioritise the most relevant aspects in future monitoring³.

1 Energy storage in this report refers to new 'behind-the-meter' and in-front-of-the-meter energy storage solutions, including battery energy storage systems, electric vehicles with bidirectional charging capabilities, etc. and excluding hydro and pumped-hydro storage.

2 The term 'Member States' is used throughout this report to cover the EU-27 Member States and Norway.

3 This also allows to align and coordinate on flexibility barriers which NRAs need to report on as part of their obligations under Article 19e of the Electricity Regulation.

Figure 1: Average day-ahead prices, EU-27/EEA(Norway), July to September 2024 at 17:00 UTC (EUR/MWh)



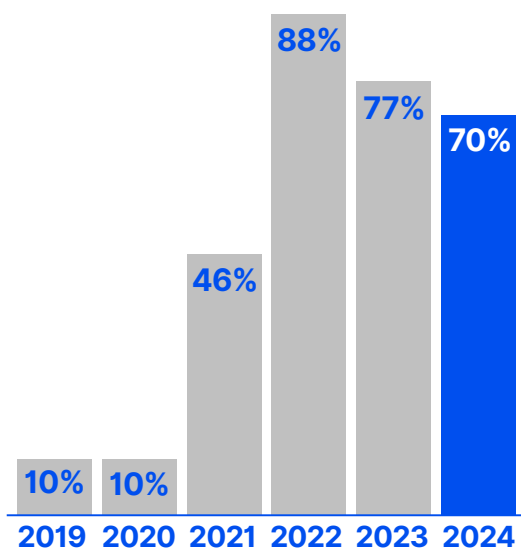
Source: ACER⁴

4 ACER Monitoring Report '[Key developments in EU electricity and gas markets](#)', March 2025.

Flexibility is crucial at a time Europe’s energy landscape is at a crossroads

5 Flexibility is defined as ‘the ability of an electricity system to adjust to the variability of generation and consumption patterns and to grid availability, across relevant market timeframes’⁵. However, flexibility is not just a technical term; it is a crucial component of the EU’s energy transition. By increasing the responsiveness of the power system, the EU will reduce price volatility and price spikes, better accommodate renewable energy sources and increase overall system resilience⁶.

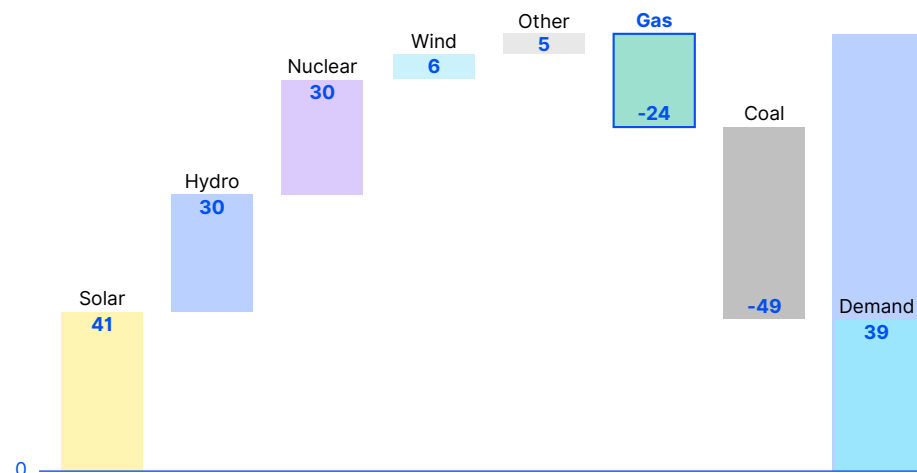
Figure 2: Volatility as represented by the annual percentage of days when the electricity price varies over 50 EUR/MWh in a day, EU-27/EEA(Norway)



Source: ACER⁷

6 The time to fully harness flexibility is now. Renewable energy saw significant growth in 2024. Furthering market integration and flexibility will reap most benefits from the energy transition.

Figure 3: Year-on-year changes for the main generation technologies, EU-27/EEA(Norway), 2024 (TWh)



Source: ACER⁷

5 The consolidated Regulation (EU) 2019/943 on the internal market for electricity (recast) (hereafter Electricity Regulation) Article 2(79).

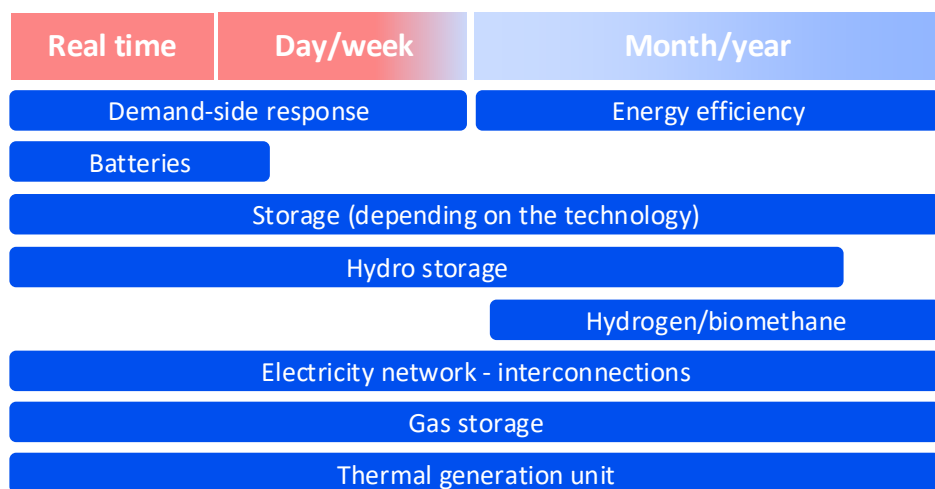
6 More on this topic in the [ACER-EEA 2023 report ‘Flexibility solutions to support a decarbonised and secure EU electricity system’](#).

7 ACER Monitoring Report [‘Key developments in EU electricity and gas markets’](#), March 2025.

Unlocking demand response can bring significant opportunities for flexibility

7 Fossil fuels, particularly gas and coal, remain essential for peak demand flexibility. Over time, this role will be taken over by non-fossil sources of flexibility, such as those offered by distributed energy resources. The corresponding flexibility solutions include demand-side response, electric vehicles, battery storage, and sources of distributed generation.

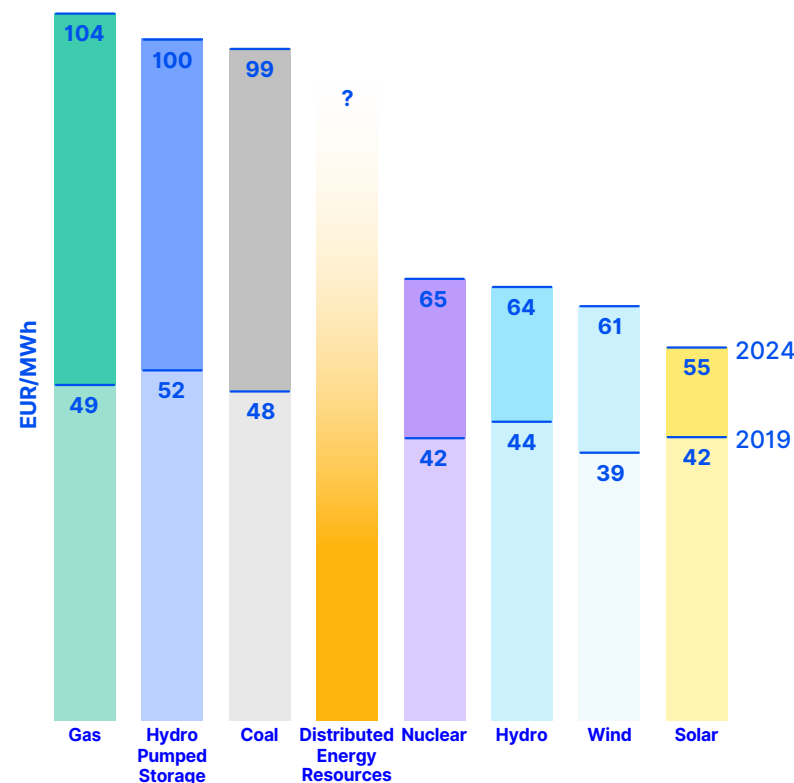
Figure 4: Flexibility services provided by various technologies



Source: ACER⁸

8 These technologies create value by stabilising supply and demand, reducing price volatility, and strengthening overall grid resilience, particularly during peak periods.

Figure 5: Average value of electricity by production type, EU-27/EEA(Norway), 2024 (EUR/MWh)



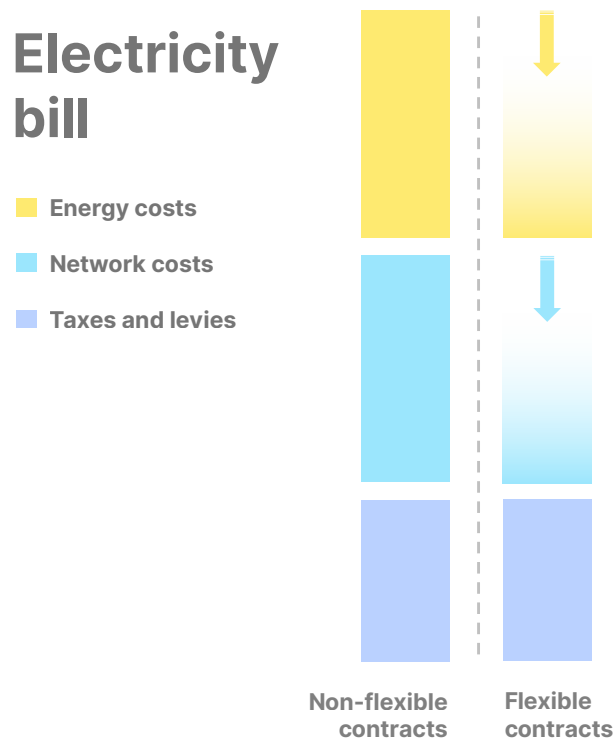
Source: ACER

8 ACER Monitoring Report 'Key developments in EU electricity and gas markets', March 2025.

Demand response benefits consumers

- 9 Demand response benefits consumers in two ways. It creates value for all consumers through price volatility reduction and grid resilience improvement. Moreover, consumers that actively contribute to demand response can reduce their electricity bills.
- 10 Consumers can benefit from providing flexibility by adjusting their behaviour in response to price incentives and grid conditions. Flexible contracts with time-differentiated price signals in the energy and network components lower consumers' overall electricity bills.

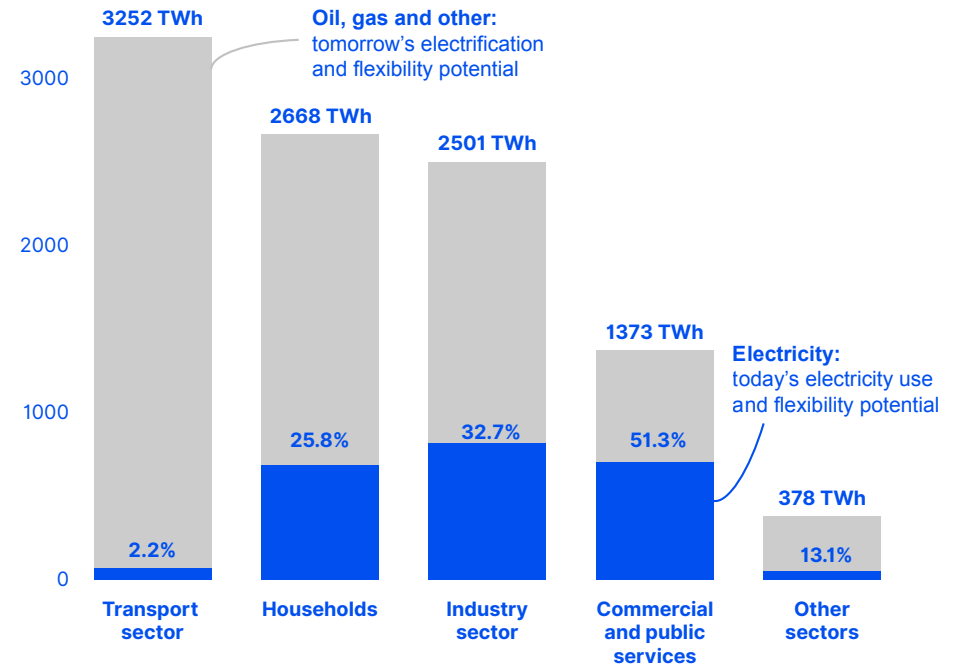
Figure 6: Activating the energy costs and network costs components to lower electricity bills



Source: ACER

- 11 Moreover, as EU households transition to electricity for heating and as transport is also getting increasingly electrified, these sectors will harness even more efficiency gains for consumers.

Figure 7: Energy and electricity usage for different categories of consumers, 2023 (TWh)



Source: ACER, based on Eurostat data

ACER proposes 12 actions to remove barriers to demand response



Action 1

Recognise the new actors: clarify responsibilities for emerging market players in national laws



Action 2

Facilitate market entry: remove obstacles to market access



Action 3

Let aggregators play their role: remove legal obstacles for aggregators



Action 4

Kick-start the smart revolution: deploy smart meters and ICT services to enable consumers' smart responses



Action 5

Optimise the energy cost component of electricity bills: offer time-differentiated retail contracts to enable alternative flexible offers



Action 6

Optimise the network component of electricity bills: incentivise the uptake of time-of-use tariffs



Action 7

Give an extra push: implement measures to enhance consumers' participation in demand response



Action 8

Transform balancing practices: shift from non-market-based to market-based balancing



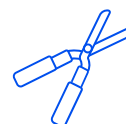
Action 9

Lower barriers to provide balancing services: simplify the prequalification process



Action 10

Share balancing services across EU borders: ensure balancing products and market structures meet EU requirements



Action 11

Cut through red tape: ease administrative burdens and simplify processes for new entrants and small actors



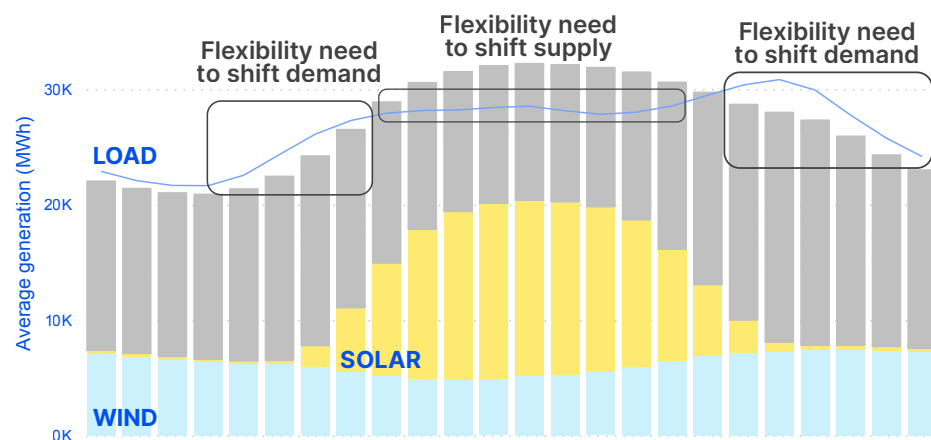
Action 12

Think outside the wires: encourage non-wire solutions as alternatives to traditional grid investments

Action 1 Recognise the new actors: clarify responsibilities for emerging market players in national laws

12 The [Electricity Directive](#)⁹ mandates Member States to establish a regulatory framework for active customers, market participants engaged in aggregation, and citizen energy communities to facilitate demand response. However, multiple Member States still need to fully implement these roles and responsibilities into national legislation.

Figure 8: Hourly averages of energy generation in Spain, 2024 (MWh)



Source: ACER¹⁰

Why is this needed?

- Flexibility needs will only increase. [Figure 8](#) illustrates how such needs can shift, reduce, or increase supply or demand in support of the system.
- Undefined roles and responsibilities for active customers, market participants engaged in aggregation (including independent aggregators), and energy communities can **discourage their participation, leading to inefficiencies in the electricity market.**
- Current regulations in some EU regions **prevent customers from adjusting their energy usage in response to price signals**, making it harder to participate in demand response programs.
- The lack of a clear process for system operators¹¹ to own and operate energy storage in some countries can lead to **breaches of unbundling rules**, which are intended to keep grid operation separate from energy production and supply¹². This uncertainty deters market participants¹³ and distributed energy resources from entering electricity markets and from offering their storage services, **slowing progress towards a more flexible and resilient market and system operation.**
- **Regulatory uncertainty** regarding the specific roles, responsibilities, and market entry conditions for emerging players such as active customers, independent aggregators, and energy communities also **slows down investments and innovation in new technologies.**

9 Articles 13, 15, 16, and 17 of the Directive (EU) 2019/944 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast) (hereafter Electricity Directive).

10 ACER Monitoring Report '[Key developments in EU electricity and gas markets](#)', March 2025.

11 The term 'system operators' is used throughout this report to cover both transmission system operators (TSOs) and distribution system operators (DSOs).

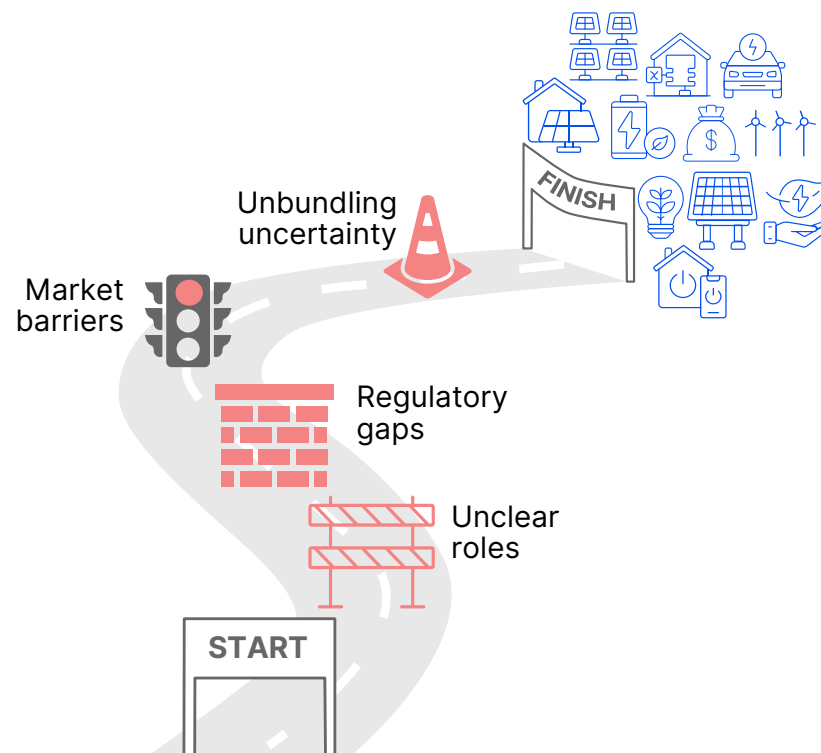
12 With the exception of integrated electricity undertakings serving less than 100,000 connected customers.

13 'Service provider' means a market participant with service providing units or service providing groups able to provide system operation services in balancing or local markets.

To improve the situation at the national level, ACER encourages:

- ✓ **Member States** to implement primary legislation for new actors, aligning with the requirements of the existing Electricity Directive, and provisions from the upcoming Demand Response Network Code¹⁴.
- ✓ **Member States, national regulatory authorities and/or system operators**¹⁵ to complement primary legislation with secondary laws defining more detailed duties, rules, and procedures is necessary to ensure that these new actors can perform their activities in an efficient, non-discriminatory, and transparent manner.
- ✓ **National regulatory authorities** to ensure proper implementation of the existing legislation and the upcoming rules on demand response, which are expected to further define the main roles and responsibilities of service providers, including independent aggregators¹⁴.

Figure 9: Overcoming legal obstacles for distributed energy resources and demand response



Source: ACER

¹⁴ For more information, please refer to Title II of the Network Code on Demand Response and the proposed amendments to the imbalance settlement chapter of the Electricity Balancing Regulation. See [ACER Recommendation on the Network Code on Demand Response](#), March 2025.

¹⁵ Depending on the specific regulatory framework in place within each Member State.

Action 2 Facilitate market entry: remove obstacles to market access

13 Member States must guarantee equal access to all market participants, whether individual or aggregated, to wholesale electricity markets, including balancing services. This is especially relevant for new actors and smaller entities such as those engaged in electricity generation from variable renewable energy sources, demand response, and energy storage¹⁶. Additionally, when system operators procure congestion management services (including redispatching), they should follow a transparent, non-discriminatory and market-based procedure¹⁷.

Why is this needed?

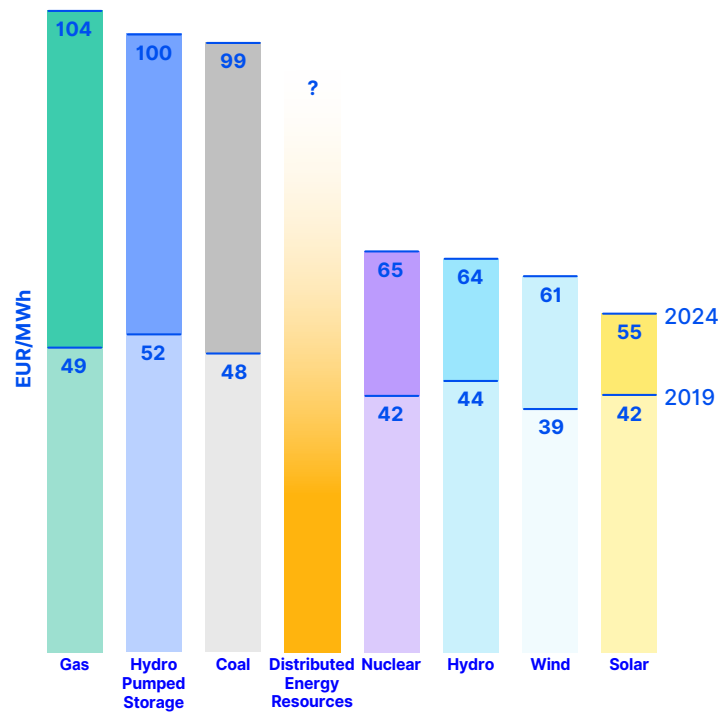
- **All types of distributed energy resources need access to all wholesale electricity markets and to providing balancing and congestion management services.** Today, many distributed energy resources are **not legally permitted to access energy markets due to restrictive regulations.**
- A minimum condition is to have a **comprehensive regulatory framework for all types of distributed energy resources** (e.g. by not excluding behind-the-meter storage without self-consumption to participate).
- Legal frameworks that **do not incorporate residential or small consumers exclude a significant potential for demand response.**

- Regulations often **prevent co-located renewable energy sources and battery storage from being offered in wholesale markets**, inhibiting the synergies between both. This reduces the flexibility potential resulting from these combined systems.
- **Electric vehicles cannot participate in electricity markets in the absence of a regulatory definition for energy storage**, reducing the volume of eligible bids.
- There are still Member States where **some aggregators currently cannot participate in balancing and congestion management services due to regulatory barriers.**
- **Delays in the implementation of the existing regulatory framework**, e.g. regarding energy communities, may hinder and eventually discourage the participation of distributed energy resources in wholesale electricity markets.
- Differences in market participation rules between regions allowing and not allowing demand-side participation in TSO services, **create inconsistencies that hinder the seamless integration of distributed energy resources across regions.** This is especially ambiguous in the context of market integration, where TSOs use their neighbour's resources anyway.
- [Figure 10](#) shows the value of electricity produced by different technologies. It clearly shows that current market conditions, with frequent and significant price swings, support the deployment of flexibility solutions, in this case for the day-ahead market. Market entry to each solution, including all distributed energy resources is therefore critical.

¹⁶ Article 6 and 7 of the Electricity Regulation.

¹⁷ Article 13 of the Electricity Regulation and Article 32 of the Electricity Directive.

Figure 10: Average value of electricity by production type, EU-27/EEA(Norway), 2024 (EUR/MWh)



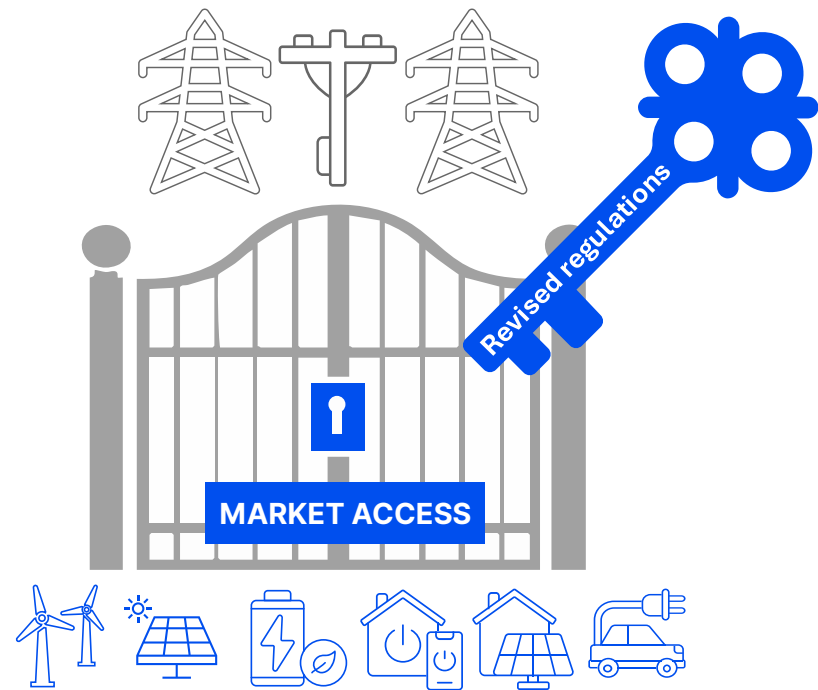
Source: ACER¹⁸

To improve the situation at national level, ACER encourages:

- ✓ **Member States** to revise regulations paving the way for equal market access for all types of resources, whether individual or aggregated, in line with the Electricity Regulation. Legal eligibility does not refer to whether the resources meet the technical or financial requirements to participate in wholesale electricity markets and system operation services.

- ✓ **Member States** to establish regulations ensuring fair access for distributed energy resources to all electricity markets and balancing and local services. This includes, for example, the implementation of 15-minute products in day-ahead and intraday markets, which are better suited for this type of resources.
- ✓ **System operators** to procure services in a market-based and non-discriminatory manner, allowing participation from all generation technologies, energy storage, and demand response.
- ✓ **System operators** to take full advantage of cross-border market-based procurement of system operation services.

Figure 11: Unlocking market access for grid flexibility and stability



Source: ACER

18 ACER Monitoring Report 'Key developments in EU electricity and gas markets', March 2025.

Action 3 Let aggregators play their role: remove legal obstacles for aggregators

- 14 Member States must support demand response through aggregation in all electricity markets and ensure that system operators treat aggregators fairly when procuring ancillary services. Market participants may use various aggregation models, which could depend on factors such as their relationship with the customers' supplier, their balance responsibility, or the market structure in place (partnerships with customers' suppliers or independent aggregators). For example, aggregation could involve combining demand from multiple consumers under a single entity or through a direct contractual relationship with the supplier.
- 15 [Figure 12](#) illustrates that not all Member States have defined the roles and responsibilities of aggregators. This raises a barrier for aggregators to play their role in offering flexibility solutions.
- 16 As set out in ACER's recommendation on the Network Code on Demand Response¹⁹, the new rules further clarify the legal framework on aggregation models. In addition, they provide requirements and principles for Member States to define aggregation models that specify at least the roles and responsibilities for all entities. Moreover, they specify the balance responsibility²⁰, and the calculation of imbalance settlement, including the financial transfer²¹ if applicable in the aggregation model, and the calculation of a financial compensation²², if opted by the Member State. Finally, requirements and principles on the definition, calculation and validation of baselining methods²³ are described in Title II of the Network Code on Demand Response.

¹⁹ [ACER Recommendation on the Network Code on Demand Response](#), March 2025.

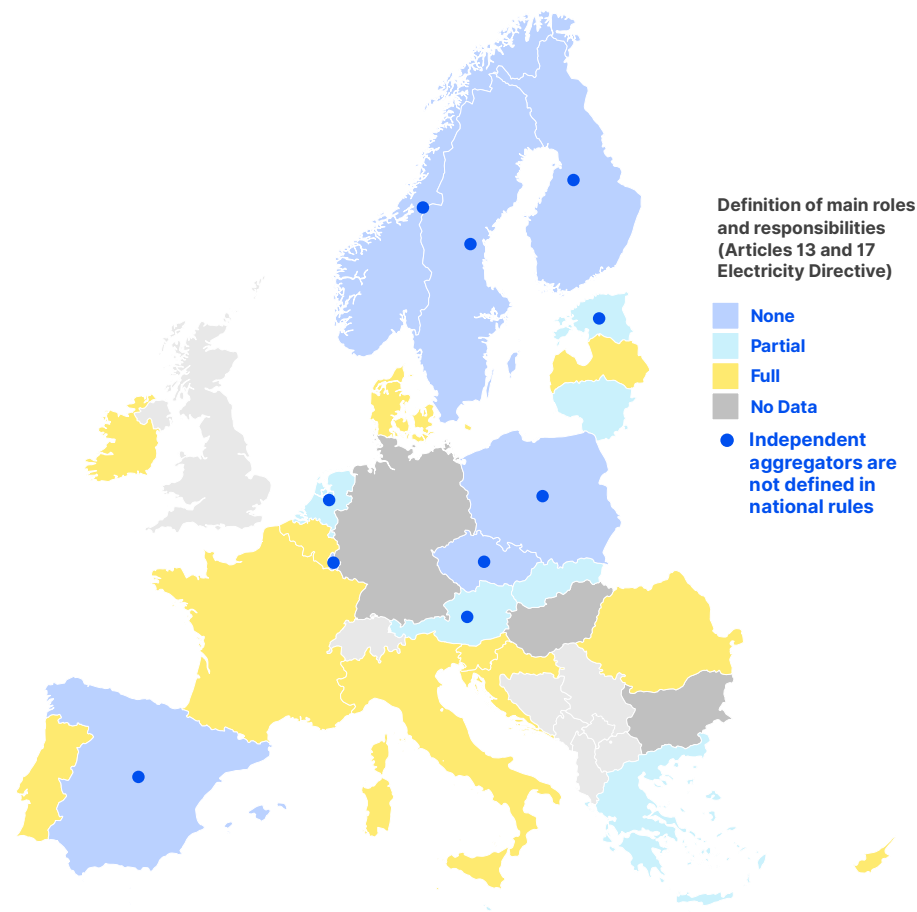
²⁰ A balance responsible party refers to a market participant (or its chosen representative) responsible for its imbalances. The balance responsible party pays for any imbalances he causes via imbalance settlement.

²¹ A financial transfer is the settlement that follows the transfer of energy from one market participant to the other (e.g. from the supplier to the aggregator). This financial transfer is meant to cover any sourcing costs incurred by the supplier.

²² A financial compensation aims at covering (additional) costs linked to the demand response activation.

²³ A baseline defines what consumers' demand would have been in the absence of any demand response. Different methods can calculate such baseline.

Figure 12: Overview of Member States having defined roles and responsibilities for aggregators (2022)

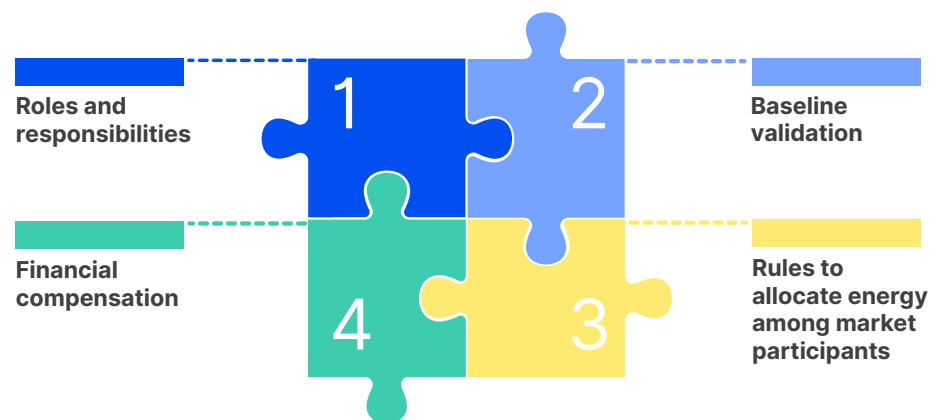


Source: ACER²⁴

²⁴ ACER Monitoring Report '[Demand response and other distributed energy resources: what barriers are holding them back?](#)', December 2023.

- 17 National legislation must align with the Electricity Directive, by establishing clear, non-discriminatory, and transparent rules and responsibilities for each chosen aggregation model. The implementation of such legislation should be in line with the framework described in the Demand Response Network Code and related amendments to existing regulations.

Figure 13: Building cohesive frameworks for aggregation models



Source: ACER

Action 4 Kick-start the smart revolution: deploy smart meters and ICT services to enable consumers' smart responses

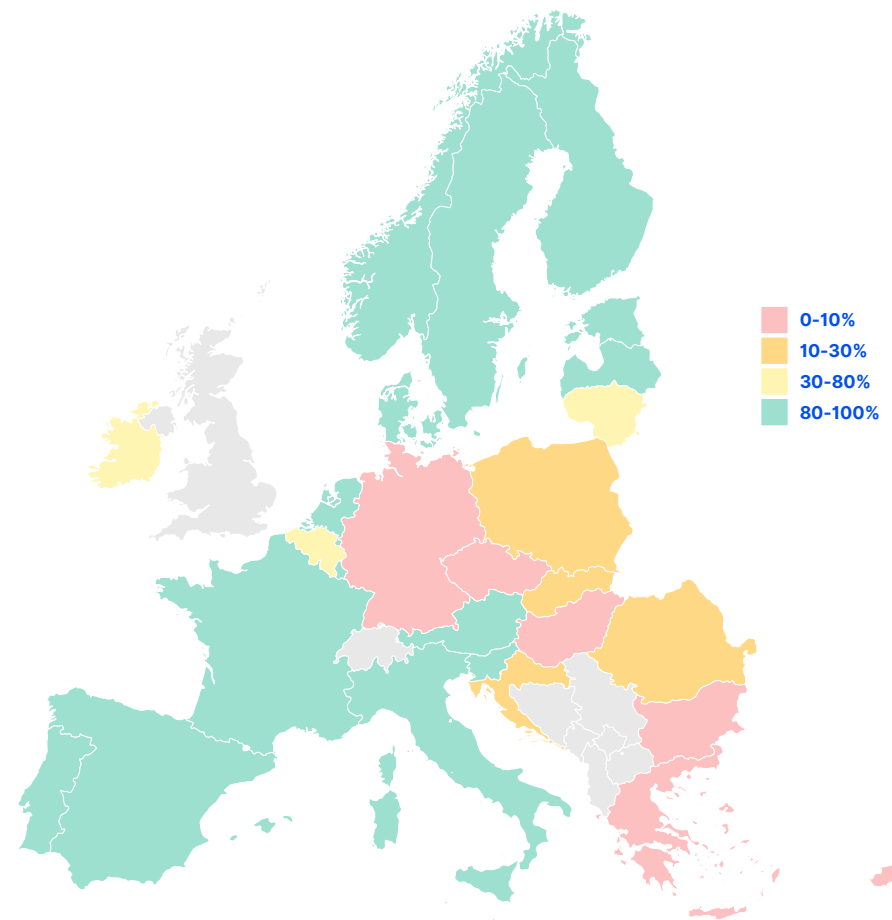
18 Smart meters play a crucial role in providing real-time consumption data, enabling consumers to make informed decisions about energy use and to participate in demand response efforts. Despite targets set by Member States, smart meter deployment remains uneven across Europe and very limited in some Member States. However, without fulfilling Action 4, it will not be possible to progress on Actions 5 and 6 of this report, which refer to removing barriers for enabling price incentives in the energy and network components of electricity bills.

Why is this needed?

- **Effective demand response**, where consumers adjust their behaviours to price signals and grid conditions **can benefit both the consumers' energy bill and the energy system**.
- Without smart metering systems with the right functionalities under the Electricity Directive, **consumers lack any measurement of their actual time of use**. This prevents being billed according to close to real-time consumption, removing the incentive to react to market prices. [Figure 14](#) shows that smart meter roll-out is still lagging behind in several Member States.
- Without widespread smart metering infrastructure, system operators **cannot efficiently manage network congestion and flexibility**.
- Undefined minimum requirements for smart meters at the national level lead to **inconsistencies in their capabilities**.
- **Consumers need clarity on the functionalities of their smart meters to realise the full potential of these devices for demand response**. Standard functionalities can include the display of near real-time²⁵ or detailed historical consumption data or day-ahead prices.

²⁵ In the context of smart metering, it refers to a short period, usually down to seconds or up to the imbalance settlement period in the national market as set out in Article 2 of the Electricity Directive.

Figure 14: Roll-out of smart meters among households across EU-27/EEA(Norway), 2023 (%)



Source: ACER²⁶

²⁶ ACER-CEER Monitoring Report 'Energy retail – Active consumer participation is key to driving the energy transition: how can it happen?', September 2024.

To improve the situation at the national level, ACER encourages:

- ✓ **Member States** to define minimum requirements for smart metering systems in their national legislation in line with the [Electricity Directive](#)²⁷, ensuring interoperability and essential functionalities.
- ✓ **Member States** to ensure widespread installation and use of smart meters quickly, raise consumer awareness and mobilise flexibility. Consumers need smart metering systems with the right functionalities if they are to have smart responses.
- ✓ **System operators** to ensure consumers have access to near-real-time consumption data for effective demand response actions. Access to near real-time consumption data via smart meters and supporting tools like smartphone applications is crucial for consumers to gain insights and take effective demand response actions.
- ✓ **National regulatory authorities** to enhance communication and collaboration with suppliers, system operators and other stakeholders. This would help to access and gather comprehensive information on the functionalities of smart metering devices, to better understand the full potential of these devices and ensure consumers benefit from them.
- ✓ **System operators and national regulatory authorities** to develop associated ICT services, especially in countries lagging in smart meter deployment, to support the collection, processing, and sharing of smart meter data with authorised third parties, such as aggregators and energy service companies. These ICT services may include secure data platforms and a set of rules and protocols that allow third parties, with customer consent, to access real-time or near-real-time consumption data. Without these services, the full potential of smart meters remains unrealised.

Figure 15: Steps towards effective smart meter deployment



Source: ACER

²⁷ Articles 19 and 20 of the Electricity Directive.

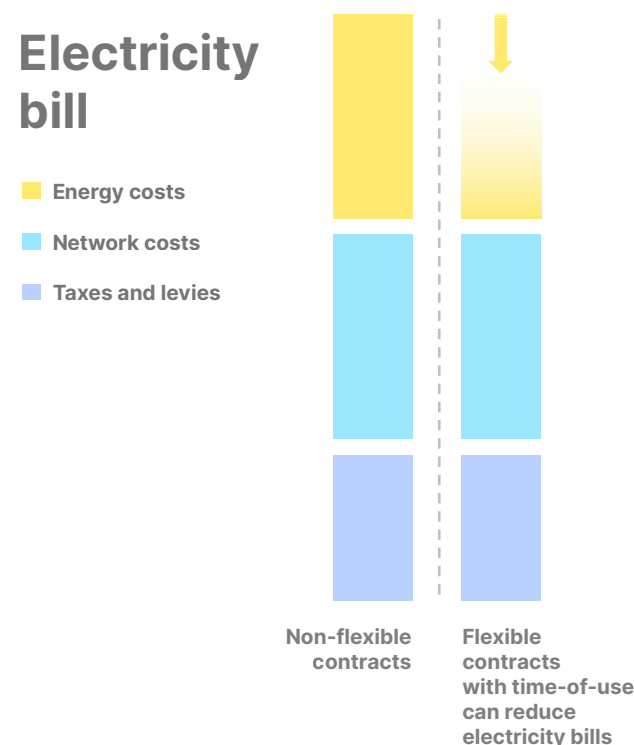
Action 5 Optimise the energy cost component of electricity bills: offer time-differentiated retail contracts to enable alternative flexible offers

- 19 Flexible retail electricity contracts with time-differentiation, including real-time or time-of-use pricing, offer price signals to final customers that reflect the energy production costs and the network tariffs based on the time of consumption. These contracts encourage more flexible consumption patterns and enable customers to benefit from lower rates during off-peak periods, while better reflecting the overall costs associated with electricity use. Article 11 of the Electricity Directive requires²⁸ that final customers equipped with a smart meter are entitled to conclude dynamic electricity price contracts²⁹.
- 20 Action 5 is about reducing the energy cost in [Figure 16](#).

²⁸ The requirements are as follows: (i) to enable final customers with a smart meter installed to conclude a dynamic electricity price contract with at least one supplier and with every supplier that has more than 200,000 final customers, (ii) to ensure final customers to be fully informed by the suppliers of the opportunities, costs and risks of such electricity price contracts, (iii) to ensure NRAs monitor the market developments of these contracts, assess potential risks and deal with abusive practices and (iv) to require suppliers to obtain each final customer's consent before that customer is switched to a dynamic electricity price contract.

²⁹ Dynamic deals, also known as real-time pricing, adjust electricity prices based on real-time market conditions or fluctuations in supply and demand, which can vary at short intervals. This requires consumers to monitor changing rates to benefit from lower prices or avoid higher costs during peak periods.

Figure 16: Activating the energy costs component of electricity bills to foster flexible contracts



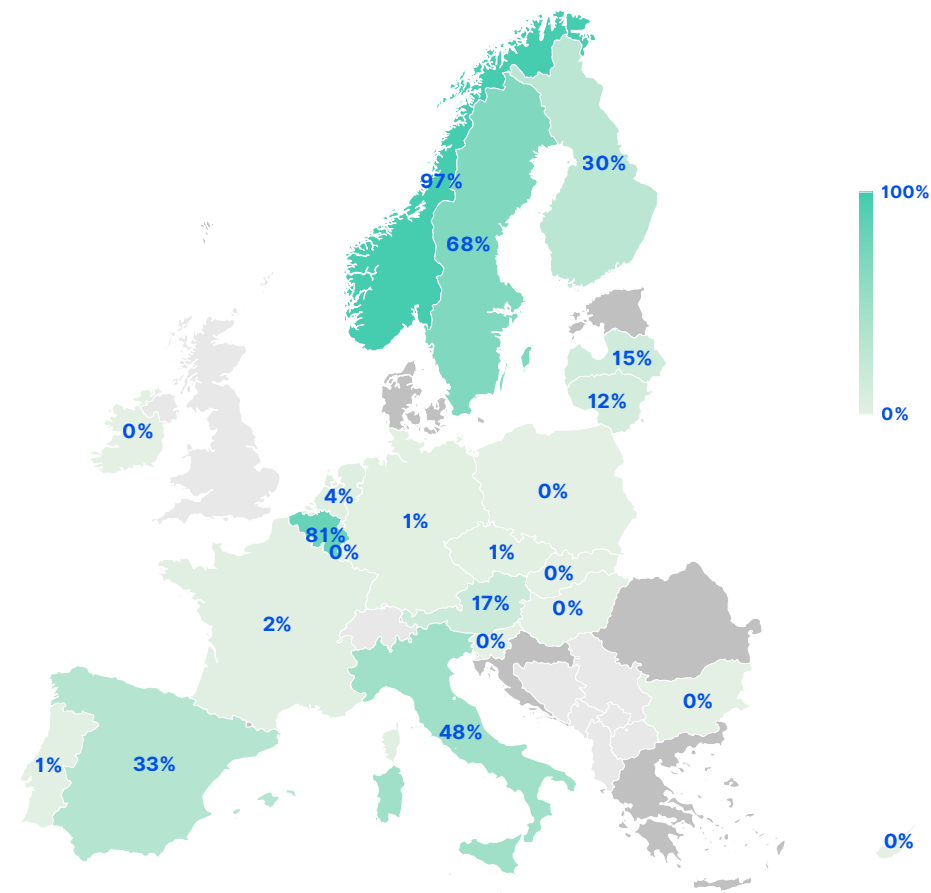
Source: ACER³⁰

³⁰ ACER-CEER Monitoring Report '[Energy retail – Active consumer participation is key to driving the energy transition: how can it happen?](#)', September 2024.

Why is this needed?

- The lack of retail electricity contracts with time-differentiation **hampers effective price signals to consumers**, inhibiting their ability to adjust energy usage according to varying production costs. As EU household energy consumption is primarily devoted to space (63.5%) and water heating (14.8%), and as households transition to electricity for heating, the opportunity to engage in more flexible and automated consumption patterns is increasing³¹.
- Fixed electricity price contracts bundled into a single sum **obscure time-of-use signals, removing any incentive for consumers to adjust their energy consumption patterns**.
- 73% of household consumers are on some form of fixed price contract in the EU and are hence not exposed to price variations incentivising demand response³².
- EU energy consumers are entitled to both fixed and dynamic price contracts under the Electricity Directive. However, fostering an efficient and resilient energy system requires greater flexibility from consumers.

Figure 17: Share of household dynamic contract uptake per Member State and in EEA member Norway (% of some form of dynamic contracts)



Source: ACER³³

³¹ ACER-CEER Monitoring Report '[Energy retail – Active consumer participation is key to driving the energy transition: how can it happen?](#)', September 2024.

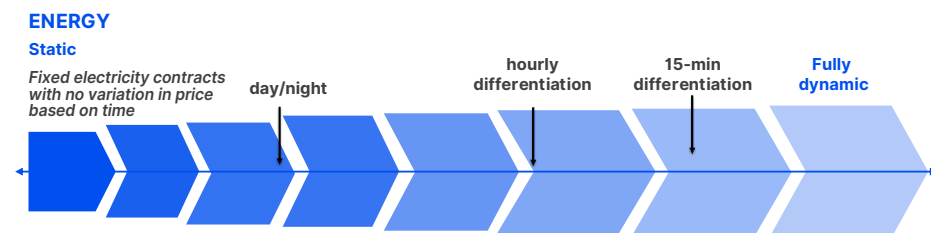
³² Data on the amount of non-household contracts under a fixed price contract are not available. Still, the same reasoning holds: also for non-household sectors, contracts that reflect the real-time price signals allow consumers to adjust their electricity usage.

³³ ACER-CEER Monitoring Report '[Energy retail – Active consumer participation is key to driving the energy transition: how can it happen?](#)', September 2024.

To improve the situation at the national level, ACER encourages:

- ✓ **Electricity suppliers/retailers** to offer time-differentiated price contracts and encourage the adoption of retail electricity contracts with dynamic pricing mechanisms that are more aligned with real-time wholesale market prices. This can reduce peak demand on the electricity network by encouraging customers to delay electricity consumption until when wholesale prices are low. The most time-differentiated contracts are dynamic retail contracts. However, even consumers on fixed price contracts should be incentivised to adjust their demand in response to wholesale price spikes, for example via hourly differentiation. Indeed, second-best types of differentiation can already activate much of the demand response.
- ✓ **National regulatory authorities** to strengthen price signals by offering substantial incentives for shifting consumption from peak to off-peak periods.
- ✓ **Member States** to abolish net metering³⁴ which unduly shift the cost burden across different consumer groups.
- ✓ **Members States** to ensure that dynamic pricing is integrated into broader energy policy and planning frameworks to enhance grid reliability.

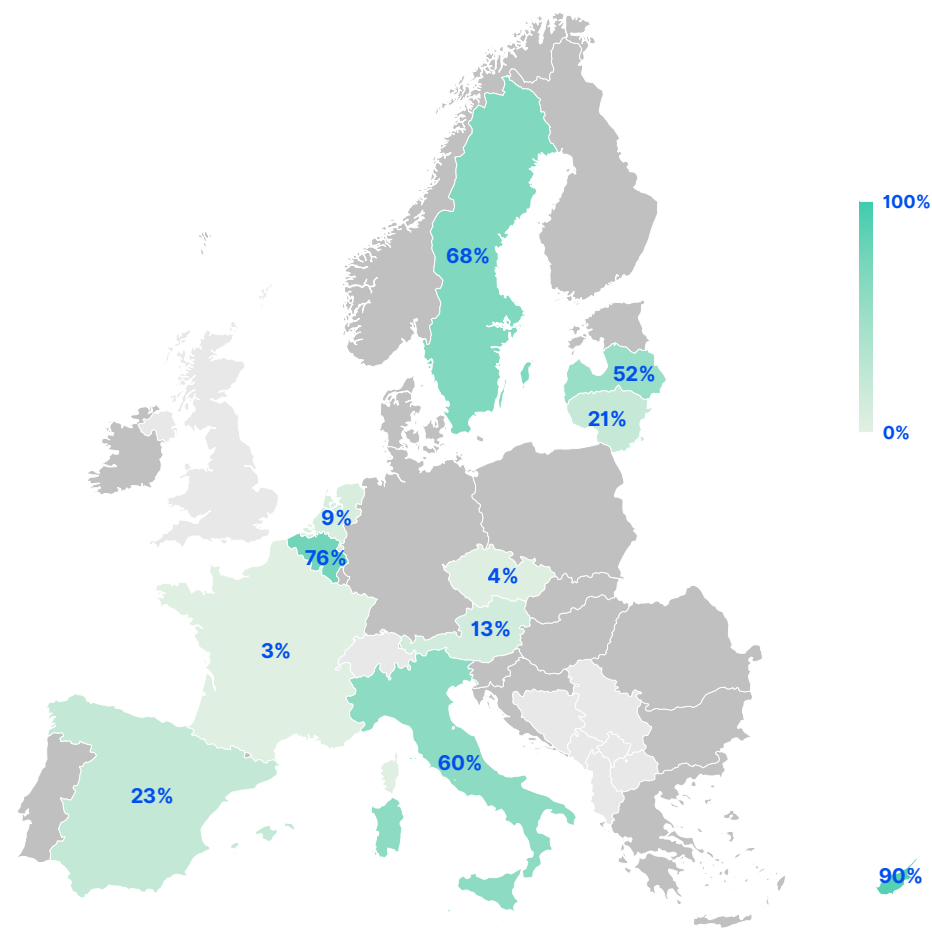
Figure 18: Efficiency gains in the electricity bill energy costs component: from static to fully dynamic



Source: ACER

³⁴ Net metering means that, over a given period, the electricity produced by a household or non-household actor is discounted from the consumed energy. Only the 'net' resulting energy consumption is billed.

Figure 19: Share of non-household dynamic contract uptake per Member State and in EEA member Norway (% of some form of dynamic contract)



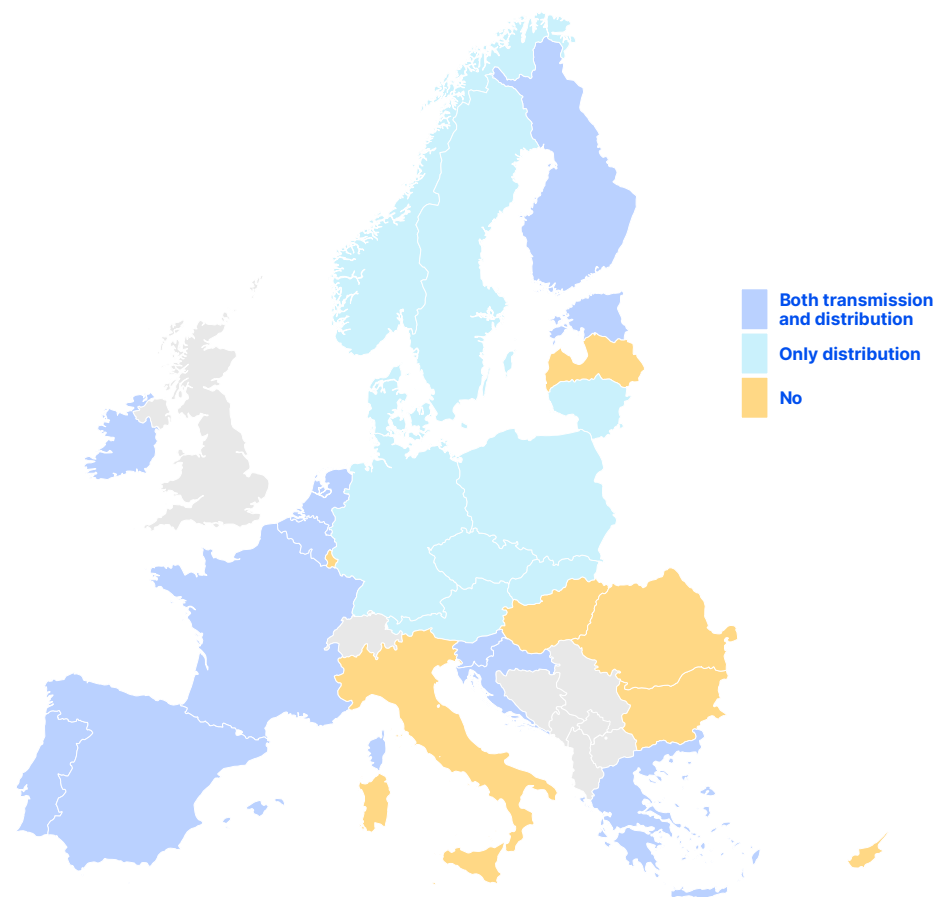
Source: ACER³⁵

³⁵ ACER-CEER Monitoring Report 'Energy retail – Active consumer participation is key to driving the energy transition: how can it happen?', September 2024.

Action 6 Optimise the network component of electricity bills: incentivise the uptake of time-of-use tariffs

- 21 Network tariffs are designed to recover costs of transmission system operators and distribution system operators while ensuring transparency, cost reflectivity and non-discrimination, and considering the need for network security and flexibility. Inefficient network tariff structures can hinder efficient network usage.
- 22 Time-of-use network tariffs are schemes that charge network users based on when they use electricity. This encourages optimising the use of the existing grid, thereby reducing the need for costly new grid build out or congestion management. This, in turn reduces overall costs.
- 23 [Figure 20](#) shows how much time-of-use network tariffs are applied. Especially for the transmission grid, time-of-use tariffs have not been implemented.
- 24 Moving towards more advanced differentiation in time and location through dynamic network tariffs (in which different energy or power-based charges apply) could further increase tariffs' cost-reflectivity and incentivise efficient network behaviour. To solve congestions, system operators can complement the use of time-of-use network tariffs with flexibility markets or incentives and discounts for shifted load.
- 25 Action 6 is about reducing the network cost in [Figure 21](#).

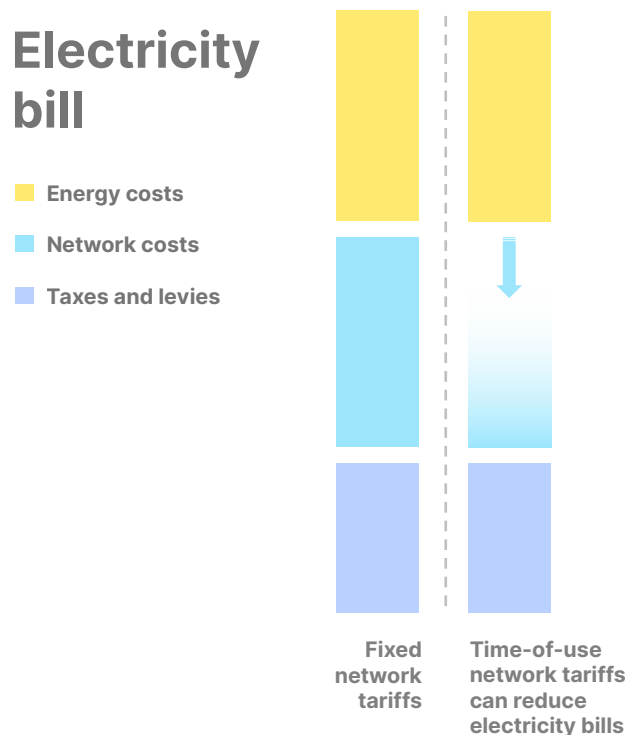
Figure 20: Time-of-use tariffs for transmission and distribution, EU-27/EEA(Norway), 2023



Source: ACER³⁶

36 ACER's report on network tariff practices: '[Getting the price signals right: ACER's principles for fair and cost-reflective electricity network tariffs](#)', March 2025.

Figure 21: Activating the network costs component of electricity bills to incentivise more efficient grid use



Source: ACER

Why is this needed?

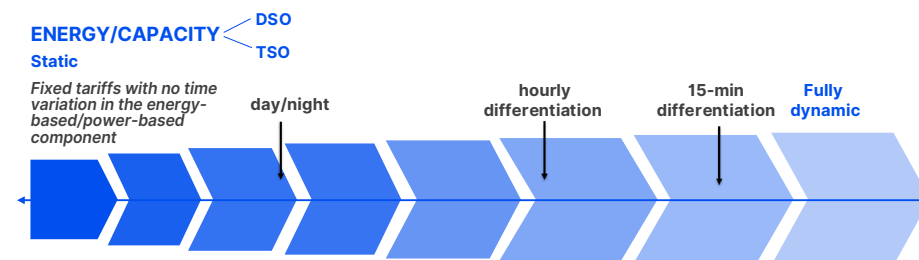
- In regions with limited penetration of time-differentiated network tariffs, **there is minimal financial incentive for end-users to adjust their consumption based on system needs**. As a result, **the potential for demand response participation is constrained**.
- Time-of-use network tariffs (energy-based and power-based) **provide grid operators with tools for better network management**. Considering the time element, e.g. linked to peak network usage, time-of-use network tariffs allow to provide appropriate cost signals for network use and to minimise infrastructure costs.
- **Net metering, currently applied in some Member States, results in non-cost-reflective charges for network users who both inject into and withdraw from the grid**. This practice assumes storage capacity is free, shifts costs to other users with only injection or withdrawal, and reduces time-value sensitivity to price signals.
- Specific tariff regimes for network users may be justified by their system beneficial impacts. However, the need and adequacy of these tariff measures need to be periodically assessed. **Non-justified tariffs can create distortions in system efficiency if they provide undue discounts**.

To improve the situation at the national level, ACER encourages:

- ✓ **National regulatory authorities** to carry out a pilot study or impact assessment before discarding the adoption of time-of-use network tariffs. These tariffs reflect the varying costs of network usage based on time and reduce peak-load on the electricity network.
- ✓ **National regulatory authorities** to assess how customers respond to current network tariff structures to determine if the price signals are leveraging the available flexibility or give signals to invest in more flexibility.
- ✓ **National regulatory authorities** to discourage net metering in energy-based network tariffs. If a network user both withdraws from and injects into the grid, both network uses and their overall impact on the network should be considered when setting the tariffs.
- ✓ **National regulatory authorities** to review and potentially revise their network charging policies to ensure they align with the cost reflectivity principle, in accordance with the Electricity Directive³⁷, ACER's recommendations from its 2023 Monitoring Report³⁸, as well as recommendations from its 2023 ACER tariff report³⁹.

- ✓ **National regulatory authorities** to ensure transparency in network tariff-setting and publish information on network tariff structures and values in each Member State, together with relevant studies underlying key network tariffication choices, and progressively presenting all this information in a centralised EU repository, which could be managed by ACER and NRAs.
- ✓ **National regulatory authorities** to apply exemptions, discounts or other differentiations in network tariffs for specific consumers, e.g. active customers providing demand response, only when justified by the network costs they impose and without creating disincentives for efficient network use.
- ✓ **Member States and national regulatory authorities** to accelerate the proper implementation of the current EU legal framework to address tariff-related barriers.

Figure 22: Efficiency gains in the network costs component: from static to fully dynamic



Source: ACER

37 The Electricity Directive requires that Member States must ensure that network users are subject to cost-reflective, transparent, and non-discriminatory network charges that account separately for the electricity fed into the grid and the electricity consumed from the grid.

38 ACER, in its [2023 Monitoring Report on barriers to distributed energy resources](#), highlights that for the cost reflectivity principle to hold, the decision to apply either the same or different network charges to active and non-active customers should be justified on the basis of the associated cost impact on the network.

39 [ACER report on electricity transmission and distribution tariff methodologies in Europe](#), January 2023.

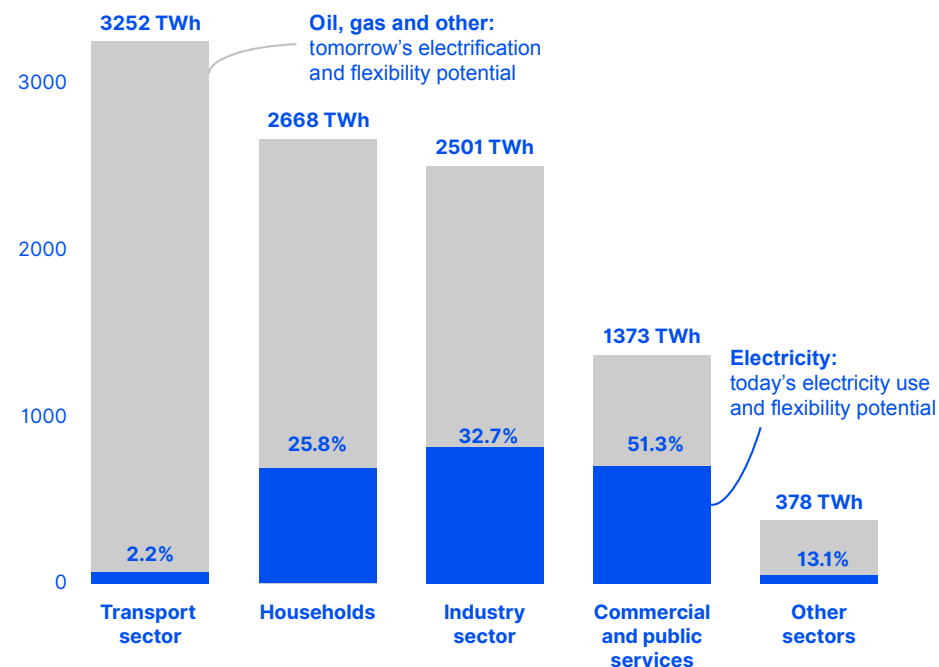
Action 7 Give an extra push: implement measures to enhance consumers' participation in demand response

- 26 National measures to mobilise consumer flexibility are key to unlocking the potential of demand response and distributed energy resources. These measures often involve educational campaigns, information dissemination, and incentive structures designed to help consumers understand how they can benefit from energy management and encourage their participation.
- 27 Different categories of consumers have different usages of energy. To reap the full potential of demand response, all consumers that can provide cheap flexibility, will need to be activated. Today, mainly the commercial and public services and industry sectors are relatively electrified and can offer demand response. Tomorrow, with continued electrification, the demand response potential of the transport sector and households will only increase.

Why is this needed?

- Consumers are often **unaware not only of their potential role in demand response but also of the financial benefits it offers**. Consumers can benefit through remuneration for their demand response services and through lower electricity prices from collective demand response actions. Consumers need information to engage and make effective decisions about their energy use.
- **The absence of targeted initiatives and incentives from public authorities** means there is less motivation for consumers to engage with demand response and distributed energy resources.
- **Some Member States have introduced communication campaigns and tools. Still, consumer participation remains limited.** This indicates that these initiatives may be insufficient to drive participation.

Figure 23: Energy and electricity usage for different categories of consumers, 2023 (TWh)

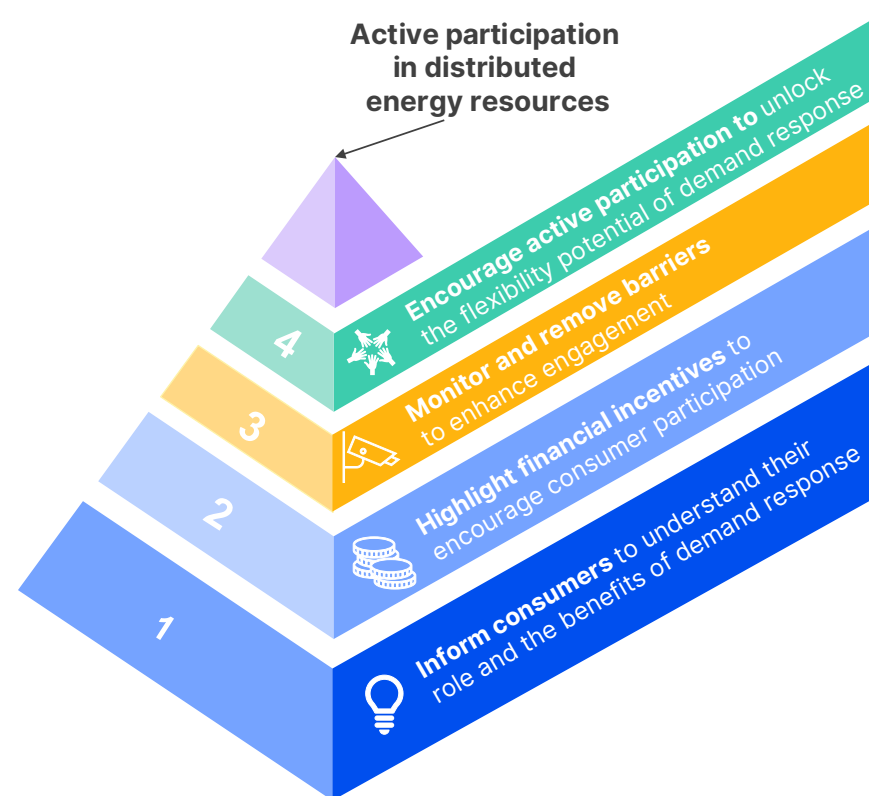


Source: ACER, based on Eurostat data

To improve the situation at the national level, ACER encourages:

- ✓ **Member States** to strengthen national measures to raise consumer awareness and mobilise flexibility. Moreover, Member States can inform consumers about the benefits and potential risks of providing demand response, in line with the consumer category they fall under.
- ✓ **System operators** to explain to consumers the benefits of introducing time-of-use network tariffs to reduce network costs associated with higher peak loads (e.g. communication campaigns).
- ✓ **Suppliers/retailers** to enable mainly household and commercial consumers to make use of dynamic retail contracts by increasing the choice of dynamic pricing offers and rewarding consumers' flexibility when changing consumption patterns.
- ✓ **National regulatory authorities** to monitor outcomes, share experiences, and disseminate good practices to facilitate learning and improvement on different categories of consumers across the country and by other countries.
- ✓ **National regulatory authorities** to investigate barriers to consumer engagement to help policymakers tailor interventions that enhance participation in demand response and unlock flexibility potential.

Figure 24: Supportive frameworks to enhance customers' participation and unlock their flexibility potential



Source: ACER

Action 8 Transform balancing practices: shift from non-market-based to market-based balancing

28 The Electricity Balancing Regulation requires that both the procurement of balancing capacity and the activation of balancing energy⁴⁰ are fair, objective, transparent and market-based. Moreover, the contracting of balancing services needs to avoid undue barriers to entry for new entrants, and to foster the liquidity of balancing markets while preventing undue distortions within the internal market in electricity⁴¹.

Why is this needed?

- Non-market-based procurement practices **hinder entry for distributed energy resources, new market actors, and new technologies**. Cost-based procurement is practically impossible when applied to, for example, energy storage or demand response.
- In several Member States, frequency containment reserves provision is mandatory for certain generation units while in other Member States there is no remuneration for this service provision. This **limits the provision by other flexible resources and reduces efficiency in balancing**. Consequently, such framework not only **perpetuates unfair or no compensation but also restricts the ability of demand response and distributed energy resources to contribute effectively to balancing services**.
- A lack of market-based procurement for system operation services **creates an unpredictable market environment, deterring investment in new flexible resources**.

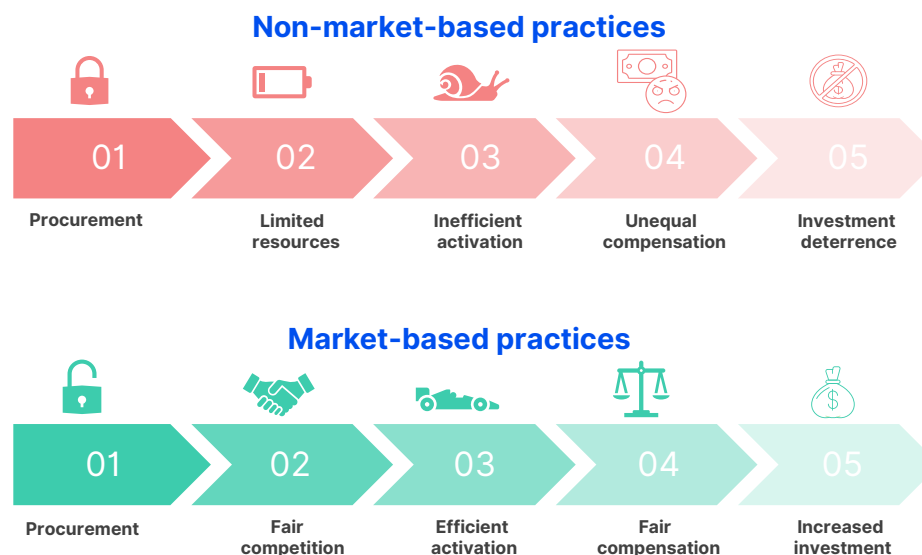
40 Article 2(3) of the Electricity Balancing Regulation.

41 Article 3(1) of the Electricity Balancing Regulation read together with Article 32(2)(c) and Title V, Chapter 2 of the Electricity Balancing Regulation.

To improve the situation at the national level, ACER encourages:

- ✓ **National regulatory authorities** to revise procurement practices to align with the principles of fairness, objectivity, transparency, and market-based approaches required by the Electricity Balancing Regulation.
- ✓ **National regulatory authorities** to shift towards market-based approaches for procuring and exchanging balancing capacity and to allocate cross zonal capacity for those exchanges. This will allow to remove barriers for independent aggregators, energy communities or other new actors aiming to provide balancing services in European markets.
- ✓ **System operators** to initiate market-based procurement processes for frequency containment reserves capacity, ensuring fair competition and efficient allocation of resources.

Figure 25: Shifting towards market-based balancing services



Source: ACER

Action 9 Lower barriers to provide balancing services: simplify the prequalification process

- 29 Before a market participant can offer balancing services to the TSO, it must pass a prequalification process. This process consists of checking that the reserve providing units or groups that the Balancing Service Provider (BSP)⁴² operates or controls meet the product requirements set out by the TSO⁴³ and, where applicable, verifying that the service delivery can be technically supported by the connecting and intermediate grids. When the process raises unnecessary barriers, fewer market participants can offer their services.
- 30 ACER's recommendation on the Network Code on Demand Response⁴⁴ proposes to ease access to balancing and local services requiring a product verification or simplifying and shortening prequalification, when the application of this process is justified. For more information, please refer to Chapter 1 of Title III of the Network Code on Demand Response. It also proposes a national flexibility information system to streamline the qualification processes. The implementation of these changes should make the access more efficient, and proportionate, enhancing market dynamics and participation in demand response services. For more information, please refer to Chapter 2 of Title III of the Network Code on Demand Response.

42 A balancing service provider means a market participant with reserve-providing units or reserve-providing groups able to provide balancing services to TSOs.

43 On some occasions, some TSOs require potential Balancing Service Providers to pass an activation test as part of the product prequalification. In this activation test, the TSO sends an activation signal to the Balancing Service Provider's assets during normal operating conditions to ensure that in case of need (and favourable market clearing) the unit or group is capable of being activated and meets the product requirements.

44 [ACER Recommendation on the Network Code on Demand Response](#), March 2025.

Why is this needed?

- **Large minimum eligible** capacities can exclude smaller or emerging providers from providing balancing services.
- **Smaller energy providers and distributed energy resources often cannot commit to long contracts** (e.g. yearly contracts). Shorter and more flexible contracts would better suit their capabilities.
- **Unregulated or long prequalification durations** can delay the access to balancing services, negatively impacting the business case of Balancing Service Providers.
- **Unit-level prequalification** for a number of assets is restricting and inefficient especially for large number of small assets. The restriction intensifies when TSOs require to repeat the prequalification process after changes.
- **Restrictions to aggregate generation, demand and energy storage units under the same reserve providing group for prequalification** prevents aggregators to manage their portfolio in an effective manner.
- **Restrictive telemetry⁴⁵ data requirements** impose high costs and technical challenges.
- **Prequalification testing requirements** for balancing services often exceed the needs of demand-side resources that only need to provide short-term services. This creates unnecessary barriers, preventing reliable resources from offering valuable fast frequency response.
- **Unjustified technical requirements and administrative costs** create barriers for market entry, especially for smaller providers.

45 Telemetry in energy systems enables remote data collection and transmission for real-time monitoring and control of electricity flow and consumption.

Action 10 Share balancing services across EU borders: ensure balancing products and market structures meet EU requirements

31 A European-wide coupling of national balancing markets means that available balancing services, including those originating from distributed energy sources, can efficiently be matched to needs in a large geographic area. However, not all TSO joined the EU balancing energy platforms at the beginning of 2025. Many TSOs procure local balancing products⁴⁶ and specific balancing products. Certain features of these balancing products and some market structures do not fully align with EU standards.

Why is this needed?

- While the EU **sets** a minimum bid size of 1 MW to allow small-scale resources to participate⁴⁷, **some Member States still require larger bids**. However, a minimum bid size larger than 1 MW restricts participation **of smaller renewable energy providers or demand response systems to join the market**.

- EU rules **require** balancing energy bids to cover 15 minutes. **Such relatively short validity periods make it easier for smaller, limited-energy technologies, to participate**. Most Member States already switched to 15 minutes or plan to do so soon. In some Member States, the **balancing energy gate closure time** is set too early, meaning more than 25 minutes before the start of the market time unit. **This limits participants' ability to respond to real-time fluctuations**.
- **Symmetrical balancing capacity products** (i.e. upward and downward balancing capacity) hinder the participation of variable renewable energy resources, demand response and energy storage since they **are better suited for one type**. For instance, wind and solar can easily reduce their output (downward balancing) but find it harder to increase output when needed (upward balancing).

⁴⁶ Local balancing products refer to balancing products procured nationally by the TSO before joining the respective EU balancing energy platform.

⁴⁷ In its [recommendation on the Network Code on Demand Response](#), proposed as part of the requirements for standard balancing products of the Electricity Balancing Regulation, ACER proposes that by 1 January 2028, every balancing service provider is allowed to submit one bid as low as 0.1 MW and that the minimum bid granularity is set at 0.1 MW, for standard balancing products. Moreover, ACER's proposal includes a requirement for TSOs to assess, by 1 January 2030, the implementation of more than one bid as low as 0.1 MW per service provider.

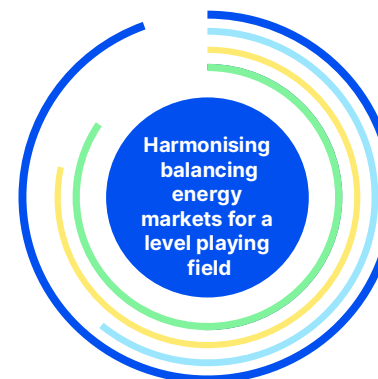
To improve the situation at the national level, ACER encourages:

- ✓ **Transmission system operators** to join the EU balancing energy platforms as soon as possible and to align balancing energy gate closure times. By doing so, TSOs will procure standard balancing products aligned with EU requirements⁴⁸ and allow for later bid submissions, improving the participation of all resources such as battery storage and demand-side flexibility.
- ✓ **National regulatory authorities** to define rules to procure balancing capacity no earlier than one day before its provision and with contracting periods shorter than one day. This shorter lead time and flexible contract length will encourage greater participation from smaller, flexible resources and distributed energy.
- ✓ **System operators** to ensure asymmetrical balancing capacity products are available to match the capabilities of diverse resources, such as renewable energy sources, storage, and demand response, which may be suited for only one direction of balancing (either upward or downward).
- ✓ **National regulatory authorities** to encourage their respective TSO(s) to apply processes (e.g. market-based allocation⁴⁹) to efficiently allocate cross-zonal capacity for the exchange of balancing capacity or sharing of reserves.
- ✓ **National regulatory authorities** to apply EU balancing rules consistently across Member States to mitigate barriers and ensure a level playing field for all market participants.

48 This includes 1 MW minimum bid size, 5 (aFRR) and 12.5-minute (mFRR) full activation times, and validity periods of bids set to 15 minutes to enable the participation of small, distributed energy resources and demand response technologies.

49 Article 41 of the Electricity Balancing Regulation.

Figure 26: Building frameworks for harmonising balancing energy markets



Standard balancing products

- Minimum bid size of 1 MW, enabling smaller renewable providers and demand response resources to compete
- 15-minute activation and bid validity periods, supporting fast-response technologies

Flexible market structures

- Shorter procurement periods (e.g., under one day) enable flexible resources and distributed energy participation
- Later gate closure times allow resources to better respond to real-time fluctuations in supply and demand

Asymmetrical balancing capacity

Ensuring separate products for upward and downward balancing capacity helps:

- Renewable resources like wind and solar, which are more suited for downward balancing.
- Demand response and energy storage, which excel in specific balancing directions.

European-wide integration

ACER supports the swift adoption of EU balancing energy platforms by Transmission System Operators (TSOs) to:

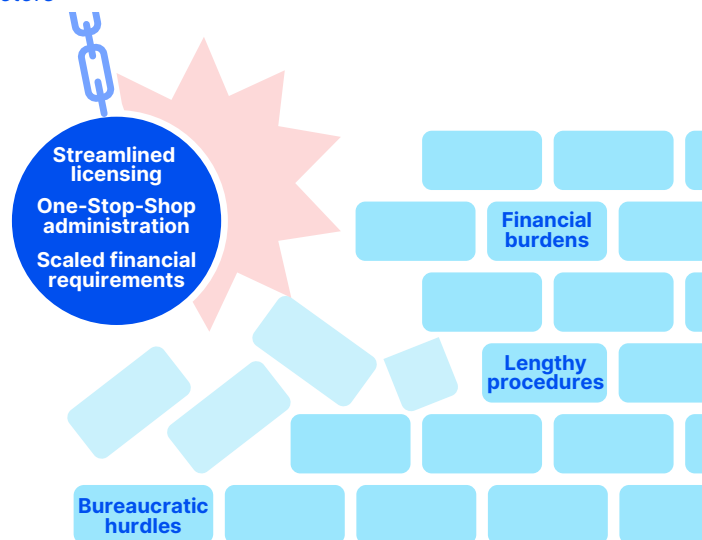
- Implement harmonised rules for gate closure times, balancing product designs, and pricing mechanisms.
- Promote transparent and technologically neutral markets accessible to all participants.

Source: ACER

Action 11 Cut through red tape: ease administrative burdens and simplify processes for new entrants and small actors

32 The electricity sector often has complex and lengthy administrative and financial requirements to manage technical and economic risks. These requirements aim to maintain high performance standards, ensure reliability, and create a secure and stable environment for all participants. However, these measures can sometimes become overly burdensome and create barriers to demand response and other distributed energy resources.

Figure 27: Breaking through administrative barriers for new entrants and small actors



Source: ACER

Why is this needed?

- Smaller actors and new entrants often **lack the resources to meet stringent financial and administrative demands**, and the bureaucratic burden, e.g. when trying to sell their electricity surplus.

- **Lengthy and complex procedures for acquiring necessary licenses, permitting, and approvals** delay the entry of new market participants.
- **Discriminatory requirements can favour established players and incumbent technologies over new entrants with innovative technologies**, creating an uneven playing field.

To improve the situation at the national level, ACER encourages:

- ✓ **National regulatory authorities and/or Member States⁵⁰** to streamline the process for acquiring necessary licenses and approvals related to market participation. This includes the administrative procedures for access to the network, market entry, and the provision of flexibility services.
- ✓ **National regulatory authorities and/or Member States⁵¹** to implement a one-stop-shop for administrative procedures where all necessary documents and permits can be processed more efficiently.
- ✓ **National regulatory authorities and/or Member States⁵²** to scale financial obligations based on the size and type of market participant to ensure that smaller players and new entrants are not disproportionately burdened.
- ✓ **National regulatory authorities and/or Member States⁵³** to ensure that all administrative and financial requirements are transparent and applied consistently to all market participants to avoid discrimination, in accordance with the Electricity Directive⁵⁴.

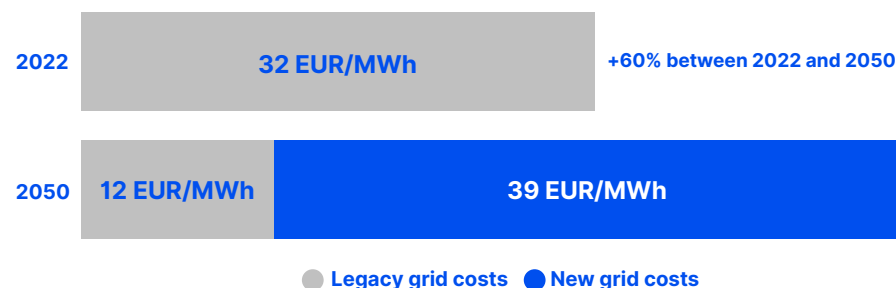
50-53 Depending on the specific regulatory framework in place within each Member State.

54 Article 15 of the Electricity Directive sets out that Member States shall ensure that final customers are entitled to act as active customers without being subject to disproportionate or discriminatory technical requirements, administrative requirements, procedures and charges, and to network charges that are not cost-reflective and that active customers are entitled to sell self-generated electricity, including through Power Purchase Agreements.

Action 12 Think outside the wires: encourage non-wire solutions as alternatives to traditional grid investments

33 Non-wire alternatives refer to solutions and strategies that address grid reliability, capacity and congestion issues without the need for traditional infrastructure investments like building new transmission or distribution lines or expanding substations. Instead, non-wire alternatives leverage market-based and technological solutions to manage and optimise the existing grid.

Figure 28: Evolution of total grid costs (EUR/MWh)



Source: ACER⁵⁵

Why is this needed?

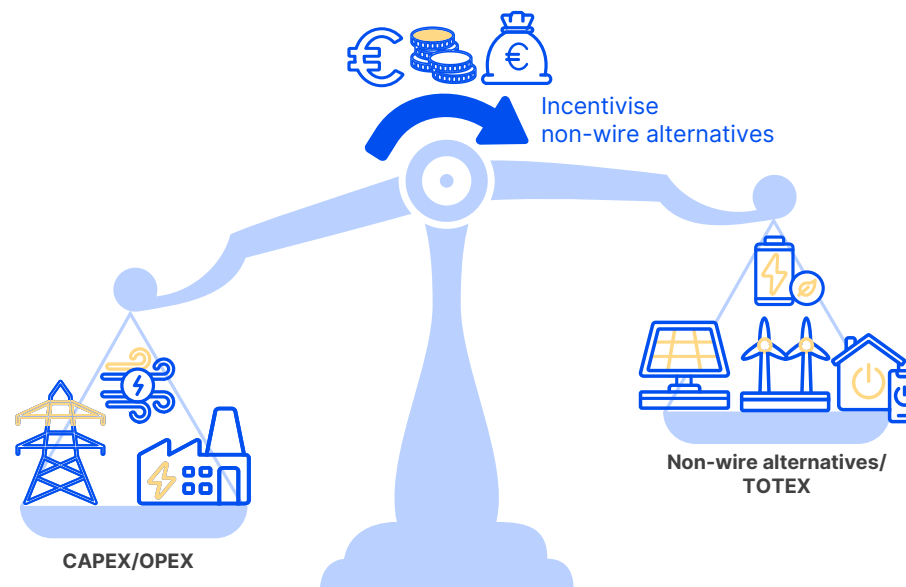
- [Figure 28](#) illustrates that grid costs are projected to increase considerably by 2050. Any solution that can free up transmission and distribution capacity that does not require new infrastructure to be built therefore reduces the grid cost.
- TSOs and DSOs are often influenced by regulatory frameworks that favour **cost estimation based on traditional infrastructure capital expenditures (CAPEX) or operational expenditures (OPEX), instead of a total expenditure (TOTEX) approach that also considers non-wire alternatives**. This CAPEX/OPEX bias means that TSOs and DSOs are more likely to invest in physical assets, which are generally seen as more reliable and tangible solutions. As a result, innovative solutions like demand response and other distributed energy resources, which could provide more cost-effective and flexible grid management, remain underutilised due to the lack of appropriate cost accounting and accompanying incentives for cost recovery of demand response procurement.

55 ACER Monitoring Report '[Electricity infrastructure development to support a competitive and sustainable energy system](#)', December 2024.

To improve the situation at the national level, ACER encourages:

- ✓ **National regulatory authorities** to update revenue models for TSOs and DSOs to incorporate the value of non-wire alternatives, to promote and facilitate innovation in the operation and planning of networks and to incentivise more cost-efficient operation and planning of the grid.
- ✓ **National regulatory authorities** to reform regulatory frameworks to balance CAPEX/OPEX and TOTEX, ensuring that TSOs and DSOs are incentivised to invest in non-wire alternatives to unlock the true potential of the grid. This can be achieved by introducing performance/output-based regulations to incentivise them to pursue predefined goals and metrics, and a total cost approach that recognizes the long-term benefits of non-wire alternatives⁵⁶.

Figure 29: Incentivising system operators by prioritising flexibility solutions and considering a TOTEX approach



Source: ACER

⁵⁶ Electricity Regulation urges NRAs to consider performance-based regulation (Art. 18). The Electricity Directive calls for adequate incentives for non-wire solutions for DSOs (Art. 32) and TSOs (Art. 40). [The Florence School of Regulation study 'Benefit-based remuneration of efficient infrastructure investments'](#) provides a regulatory scheme that promotes more efficient and innovative solutions to address electricity transmission system needs.

Annex I: Evaluation of responses to Public Consultation on prioritising the removal of barriers to electricity demand response

- 34 The findings of this report are informed by a comprehensive [public consultation](#), which gathered valuable stakeholder insights on the topic. ACER expresses its gratitude to all those who participated in the public consultation.
- 35 The public consultation was conducted by the European Union Agency for the Cooperation of Energy Regulators (ACER) from December 2023 to February 2024. The consultation process was comprehensive, engaging a broad spectrum of stakeholders—including industry actors, regulatory bodies, and consumer groups—to ensure that the challenges identified and prioritised by ACER were rooted in the practical realities of the energy landscape.
- 36 The public consultation provided a platform for stakeholders to share their perspectives on the most significant barriers to demand response and the broader integration of distributed energy resources. Their contributions were invaluable in shaping the recommendations and priorities set out in this report. By drawing on its internal expertise and gathering insights from those directly involved in the electricity sector, ACER was able to craft a strategy that is both practical and actionable, reflecting the needs and concerns of the stakeholders.

[Prioritising the removals of barriers to demand response - Public consultation results](#)

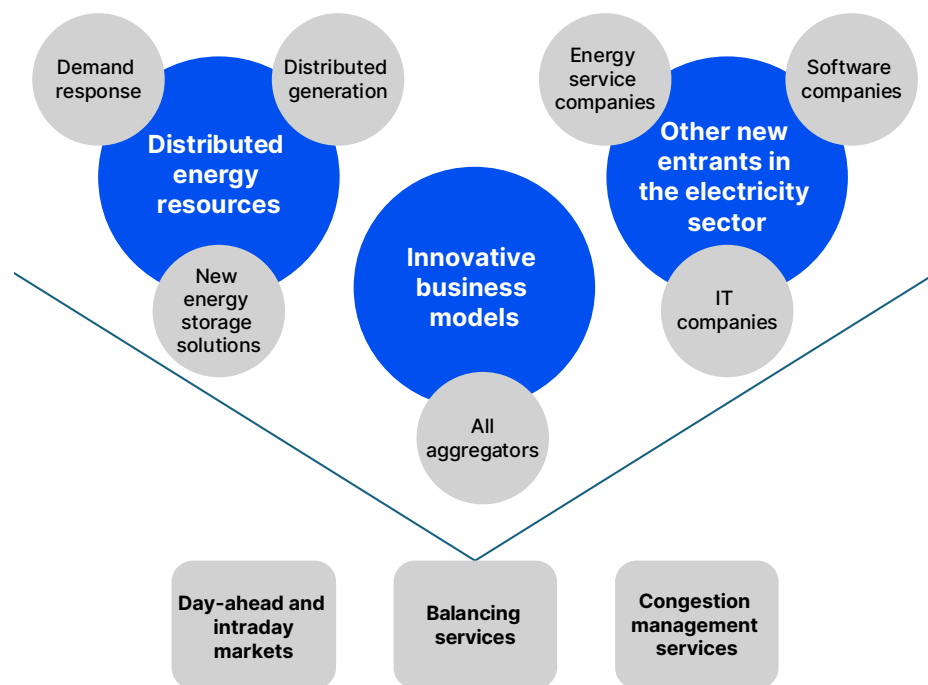
Annex II: Scope and methodology of ACER's monitoring of barriers for distributed energy resources

- 37 The [ACER Regulation](#)⁵⁷ requires ACER to monitor regulatory barriers to new entrants and smaller actors in wholesale electricity markets. This report primarily investigates the challenges encountered by new market players and smaller entities in delivering flexibility, either directly or through aggregation. It pinpoints obstacles to entering and participating in day-ahead and intraday electricity markets, as well as to offering balancing or congestion management services. Any discriminatory, arbitrary, or avoidable requirements placed upon new entrants and small actors⁵⁸, which are not equally imposed on established actors, may be viewed as potential barriers.
- 38 Second, this report focuses on flexibility provided by distributed energy resources. Future ACER monitoring will expand this scope to include all types of non-fossil flexibility, including storage and interconnections.
- 39 Third, the report is centred on identified critical barriers. These barriers broadly stem from not implementing EU legislation or from specific market design obstacles that make it harder or impossible for demand response, storage and distributed generation to participate in energy markets.
- 40 Economic, technical, and behavioural barriers for new entrants and small players are outside the scope of this study.

⁵⁷ Article 15 of Regulation (EU) 2019/942 establishing a European Union Agency for the Cooperation of Energy Regulators (recast) (hereafter ACER Regulation).

⁵⁸ Discriminatory requirements refer to those that create additional costs due to unequal treatment compared to incumbent market participants, arbitrary requirements mean those that are imposed without a valid justification according to the market needs and avoidable requirements refer to those that can be prevented by the competent authorities. For more information, please refer to [DNV's 2021 study on a methodology for benchmarking the performance of the EU Member States in terms of efficient price formation and easy market entry and participation for new entrants and small actors](#).

Figure 30: Scope of ACER's monitoring on barriers for distributed energy resources



Source: ACER⁵⁹

- 41 The current report builds upon insights from the 2023 ACER Monitoring Report on barriers to distributed energy resources: [Demand Response and Other Distributed Energy Resources: What Barriers Are Holding Them Back?](#)⁶⁰ The 2023 report highlights a comprehensive list of opportunities for action.

⁵⁹ ACER Monitoring Report 'Key developments in EU electricity and gas markets', March 2025.

⁶⁰ For the reports ACER has published in 2023 and in previous years, see the [ACER market monitoring page](#).