Drivers & Bottlenecks for the Deployment of Energy Storage Projects in Europe

Eurelectric response to the JRC & DG ENER consultation

July 2026

Contribution ID: 43864e19-0476-4165-be92-2bc6cd6fd6fa

Date: 31/07/2026 13:23:28

Drivers & Bottlenecks for the Deployment of Energy Storage Projects in Europe

1. Identification and General Information

Contact Person

Anton Koninckx

E-mail

akoninckx@eurelectric.org

Organisation

Eurelectric

2. Financial Aspects

2.1 How bankable are BESS projects in European markets today?

- [ ] Not bankable
- [ ] Difficult to finance
- [ ] Challenging financing
- [x] Somewhat bankable
- [ ] Bankable
- [ ] Not applicable/Do not know

2.2 What are the main barriers to bankability? *Please rank the following from 1 = most important to 5 = not so important*

Use drag&drop or the up/down buttons to change the order or accept the initial order.

1. Revenue volatility
2. Regulatory uncertainty
3. Market saturation / cannibalization
4. Grid connection uncertainty

- High financing costs
- Degradation and performance risk
- Other*

* If other, please specify

Network charges, particularly in the form of double charging, are another major barrier to storage bankability.

For pumped hydro: the number one barrier is having a long-term revenue stream provided by a specific mechanism aligned with the lifespan of the asset.

2.3 Capacity/flexibility remuneration mechanisms provide regular payments (capacity rents), but some analysts claim that these mechanisms introduce wholesale market distortions and affect competition?

Use drag&drop or the up/down buttons to change the order or accept the initial order.

- Capacity/flexibility mechanisms can materially improve revenue security
- The procurrement of capacity/flexibility should maximize competition among participants
- Capacity/flexibility mechanisms are absolutrely essential for long-term investments
- Such mechanisms may create dependency or distort market signals
- Capacity/flexibility mechanisms' auctioned quantities, remuneration, and duration should be limited to minimize market distortions.

2.4 Which revenue model do you consider most suitable for scaling storage in Europe?

Use drag&drop or the up/down buttons to change the order or accept the initial order.

- Hybrid models
- Long-term PPAs
- Flexibility/Capacity remuneration mechanisms
- Merchant-only model
- State-aid - public auctions

2.5 Is long-term revenue visibility for storage projects sufficient to attract investment?

- [ ] Yes
- [ ] No
- [x] Other*

* If other, please specify

- Where energy storage projects have access to all energy and flexibility markets and are able to engage in revenue-stacking, long-term revenue visibility is improved and it is easier to attract investment. Implementation of the existing EU energy acquis is therefore key.
- In addition, well-designed support schemes and capacity remuneration mechanisms can complement market revenues by providing greater revenue certainty and reducing financing costs. To attract investment, it is essential to establish remuneration mechanisms that ensure a stable and significant share of revenues over the long term, ideally exceeding 50%.
- Regulatory predictability, including with regard to network tariff methodologies, is also critical, as investors require visibility over the economic conditions applying throughout the lifetime of storage assets. This is not the case in all Member States, with sometimes a visibility on the grids' tariffs for only four years.
- Finally, to improve revenue predictability, market frameworks should adequately reward the full range of services provided by storage to the electricity system.

2.6 Which contracted revenue instruments are most promising for improving the financial profile of BESS projects?

Use drag&drop or the up/down buttons to change the order or accept the initial order.

- Capacity/Flexibility Availability-based contract
- Tolling agreement
- Hybrid PPA
- Contract for difference
- Price spread swap

2.7 Please briefly explain your top choice or any key limitation you see.

Hybrid PPAs offer a merchant route to market with long-term revenue visibility that enhances a project's value for both developer and off-taker: reduces the risk of renewables price cannibalization for the developer, while firming up clean energy supply for the off-taker. However, the uptake of hybrid PPAs remains limited, as they tend to have a relatively higher price compared to single-technology PPAs and are still relatively complex to structure in Europe. The EU should therefore foster a more enabling regulatory framework to unlock their full potential and accelerate the deployment of renewable and clean generation and storage capacity through market-based solutions.

In addition, other forms of remuneration like capacity-/flexibility availability-based contracts or Contracts for Difference (CfDs) could provide greater revenue certainty over the lifetime of a project or asset. In the Polish, market, for example, capacity-/flex availability-based contracts offer stable, predictable revenue streams; are well understood by banks and financial institutions; help meet the needs of the power sector; and are widely deployed.

3. Market and Revenue Conditions

3.1 Which market currently offers the strongest revenue opportunity for storage? Please select one.

Maximum 1 selection(s)

- [ ] Day-ahead
- [ ] Balancing energy
- [ ] Balancing capacity / reserves
- [ ] Ancillary services
- [x] It varies significantly by country
- [ ] Not applicable

3.2 To what extent are market revenues alone (wholesale and balancing markets on merchant basis) currently sufficient to make most storage projects financially viable?

Maximum 1 selection(s)

- [ ] Yes, broadly sufficient
- [ ] Yes, but only in a limited number of countries
- [x] Sometimes, depending on project structure
- [ ] No, generally insufficient
- [ ] Too early to say

3.3 Do you expect increased market competition – for example, from flexible demand or new entrants – to erode storage revenues over time?

Maximum 1 selection(s)

- [ ] Strong decline
- [x] Moderate decline
- [ ] Limited decline
- [ ] No material decline
- [ ] Revenues may become more stable over time
- [ ] Not applicable/Do not know

3.4 To what extend BESS deployment can reduce renewable generation curtailment and negative price events?

Maximum 1 selection(s)

- [ ] To a high extent – significant reduction
- [x] Only limited reduction
- [ ] No reduction
- [ ] Curtailed energy & negative price events will increase in frequency

3.5 Which European markets are most favorable for energy storage today?

The UK, Germany, Italy and Poland are currently the most attractive markets for BESS.

3.6 How accessible and attractive are the following markets for BESS in the EU today?

Day-ahead and Intraday electricity market (wholesale markets)

5

Balancing energy market

4

Balancing capacity market (reserves)

4

Ancillary services (e.g. congestion resolution, black start, inertia)

2

4. Technological Aspects

4.1 Do you expect total BESS CAPEX to follow a downward trajectory over the next 3–5 years?

Maximum 1 selection(s)

- [ ] Strong decline
- [x] Moderate decline
- [ ] Slight decline
- [ ] Increase
- [ ] Not applicable/Do not know

4.2 Are there meaningful economies of scale in BESS development?

Maximum 6 selection(s)

- [x] Larger power rating
- [x] Longer duration
- [ ] Co-location with renewables
- [x] Portfolio aggregation
- [x] Standardized project design
- [ ] Limited economies of scale
- [ ] Not applicable/Do not know

4.3 Which storage technologies, if any, could scale significantly and play a major role in climate goals? Please select up to three.

Maximum 3 selection(s)

- [x] Lithium-ion BESS
- [ ] Flow batteries
- [ ] Thermal storage
- [x] New pumped hydro
- [ ] Hydrogen-based storage
- [x] *Other

* If other, please specify

Repowered pumped storage hydropower (increased electrical capacity and/or increased storable energy capacity) / Refurbished existing hydropower to bring them new pumped hydro capabilities.

4.4 How important is a strong EU-based battery manufacturing base? *Please rate from 1 to 5*

3

4.5 How serious are supply risks for storage technologies in Europe? Please rate each from 1 to 5.

Use drag&drop or the up/down buttons to change the order or accept the initial order.

- Geopolitical disruption
- Manufacturing concentration
- Raw material supply
- Shipping / logistics disruption
- Other

4.6 To what extent is battery degradation a concern for storage project developers and investors in Europe? *Please rate from 1 to 5*

2

5. Policy and Regulatory Aspects

5.1 Do you consider the flexibility or storage targets at national and EU level to be sufficient?

Maximum 1 selection(s)

- [ ] Yes, sufficient
- [ ] Partly sufficient
- [ ] No, too weak
- [x] Too early to tell

5.2 What specific regulatory reforms or policy actions do you consider most urgent to unlock storage investment at scale in Europe? Please rank the top three.

Use drag&drop or the up/down buttons to change the order or accept the initial order.

- Removal of double tariffs (charge/injection)
- Revenue support mechanisms
- Grid connection reform

⠿ Clarified storage market access rules

⠿ Faster permitting

⠿ Flexibility mechanisms

5.3 Do storage systems in the EU compete on a level-playing field? Are there instances where storage faces discriminatory treatment – for example, market access restrictions, grid priority, or double taxation applied to both the charging and generation phases?

- [x] Yes
- [ ] No
- [ ] Unsure

5.4 Please mention good policy practices and regulatory interventions (real examples) that enabled storage development in EU Member State(s).

Note on question 5.3: 'yes' here is to the second question - i.e. whether there are instances where storage faces discriminatory treatment.

· Germany: 20-year exemption on grid fees for BESS and pumped storage projects; 10-years exemption for capacity enhancement of pumped storage projects (both rules are set to change from 2029 onwards, however)
· Belgium: technology neutrality in capacity remuneration mechanism allowing energy storage projects to compete.
· Italy: MACSE scheme offers a competitive support mechanism to ensure long-term revenue visibility for storage projects.
· The UK: establishment of a wide range of electricity markets (wholesale, balancing & non-frequency service markets (e.g. inertia)) that storage projects can access. Cap&Floor mechanism as a good example to promote LDES in an effective manner.
· Portugal: Energy Storage Strategy splitting pumped hydro and BESS+hybrid targets.
· France: Battery storage systems are eligible to participate in the new capacity mechanism and benefit, in the one-year-ahead delivery auction (PL-1) from a dedicated procurement volume reserved for flexibility resources, including battery storage.
· Poland: a well-functioning, technology-neutral capacity market.
· Greece: between 2023 and 2025, Greece awarded approx. 900MW of standalone storage through three competitive auctions. The scheme combined upfront investment grants with 10-year two-way CfDs, reducing investment risk while maintaining market participation. The third auction also provided a locational signal by targeting former lignite regions in Western Macedonia and Megalopolis.
· Greece: in March 2025, Greece introduced a framework for granting priority grid access to fully merchant BESS projects. Applications exceeded 12 GW, against a target of prioritising 4.7 GW of mature projects, demonstrating the framework's strong investment appeal.

6. Grid Integration and Permitting

6.1 How significant are the following grid connection and permitting challenges for storage projects, in your view:

Insufficient grid capacity at targeted connection points

5

Long lead times for grid connection agreements

2

Complex or slow permitting and environmental approval processes

4

Restrictions in the connection agreements.

4

6.2 What measures, if any, have you observed that have successfully improved grid connection processes or access conditions for storage projects?

- The Netherlands: the Dutch regulator's proposed connection queue reform that prioritises projects that help relieve congestion can speed up storage project connection. Tennet (Dutch TSO) also introduced a 'time-dependent transmission right' (flexible connection agreement) contract that allows projects, including storage, to transport electricity on the high-voltage grid during off-peak hours (at least 85% of hours).
- Spain: accelerated co-location and permitting procedures, making it easier to integrate batteries within existing RES projects. For certain co-located projects, additional environmental assessments are no longer required and permitting timelines have been substantially reduced, facilitating faster grid access for storage. On the contrary, investment signals are not fully aligned with certain system needs (such as system stability, voltage control or grid robustness) but instead promote the deployment of energy storage (i.e., BESS) where renewable projects are located (for hybridisation) or where grid capacity is available.
- The UK: introduction of first ready, first served connection queue management, helping to remove speculative projects and prioritising deliverable projects. This has contributed to a massive increase in energy storage project connection requests.
- France: Grid Connection processes are currently under review in France. The reform introduces priority in the connection queue for projects delivered on schedule and promotes accelerated grid access through flexible connection agreements, including temporary limitations on power injection.
- Poland: Grid connection reform (UC84 project). Changes to the rules for issuing grid connection conditions, through which Poland has limited "speculative applications" and significantly increased the chances for enterprises that are realistically interested in building battery storage systems.
- Greece: Greece has introduced a framework aimed at facilitating 4.7 GW of standalone, fully merchant BESS projects by granting priority access to grid connection capacity. The framework sets caps per project and investor to prevent market concentration, alongside substantial financial guarantees and strict development milestones to ensure that only credible and mature projects proceed.

6.3 How do you assess the feasibility and attractiveness of co-locating batteries with the following assets? Please rate each from 1 to 5.

Solar PV

5

Wind

4

EV charging infrastructure

4

Industrial loads

4

6.4 How important is behind-the-meter storage in achieving EU storage and climate targets?

Maximum 1 selection(s)

- [ ] Very important
- [ ] Important
- [x] Somewhat important
- [ ] Limited importance
- [ ] Not important
- [ ] Not applicable/Do not know

6.5 Please mention any important aspect of storage deployment in Europe that is not covered above.

Pumped hydro storage
-PHS will play a crucial role, alongside other flexible resources, in ensuring the security, sustainability and resilience of the European power system while strengthening Europe's industrial sovereignty and supply-chain security.
-A key advantage of PHS is its ability to provide long-duration flexibility, shifting energy not only within a day but also across multiple days or weeks. This makes it particularly valuable during prolonged periods of low renewable generation or sustained high electricity demand.
-From an environmental perspective, PHS reservoirs can contribute to water retention and broader water management objectives, generating benefits beyond electricity storage alone.
-PHS supports European industrial sovereignty and supply-chain resilience because it can largely be designed, manufactured, constructed and operated using technologies, materials and expertise available within Europe, reducing dependence on third countries.
-PHS assets typically operate for more than 60-80 years with appropriate maintenance, making them highly durable and cost-effective infrastructure investments.

Storage policy should remain technology-neutral
-A key risk is that storage policy is increasingly being designed around technology deployment targets rather than the services required by the power system.
-Different storage technologies provide different types of value. While batteries are well suited to fast-response flexibility, technologies such as pumped hydro storage provide longer-duration flexibility and contribute differently to system adequacy and resilience.
-Capacity and flexibility mechanisms should reward the service delivered rather than the technology deployed. Remuneration should reflect measurable contributions such as firm capacity, flexibility, availability, reliability

and security of supply.
-Regulatory frameworks should remain technology-neutral and remunerate storage according to objective system-value criteria, including storage duration, firm capacity contribution, availability, resilience, system stability and lifetime performance.
-Different technologies also have different operational and economic characteristics. Batteries typically have shorter lifetimes and rely more on balancing and ancillary service revenues, while long-duration storage technologies can provide flexibility over longer periods and asset lifetimes.
-The current situation in Spain illustrates the need for a technology-neutral approach. Although pumped hydro storage equipment is largely manufactured in Europe, provides long-duration flexibility and has very long operational lifetimes, existing support schemes remain significantly more favourable to batteries — providing roughly three times more support in installed power and around twelve times more support in storage capacity.
-As renewable generation grows, power systems will require a portfolio of storage solutions with different durations and capabilities. Batteries can address short-term flexibility needs, while longer-duration storage technologies are needed for multi-day energy shifting and wider system resilience.
Support schemes, market design arrangements and planning frameworks should therefore reward the value delivered to the electricity system rather than favour specific technologies.

Public support & market distortions
-Flexibility needs should be met by the solutions that provide the highest overall value to the electricity system, in line with a technology-neutral approach.
-Granting dedicated support to batteries would distort competition and favour a specific technology over other flexibility solutions.
-Support mechanisms for renewable electricity generation and storage assets should be clearly distinguished and kept separate.
-Combining support for renewable generation and storage does not necessarily create additional system value and may reduce policymakers' ability to design and control support schemes effectively. It may also result in storage assets receiving indirect support through measures intended for renewable electricity generation.

Self-consumption & storage
- Storage deployed within self-consumption schemes may not be exposed to undistorted market price signals but instead to incentives created by exemptions and support measures, including reduced network tariffs and tax advantages.
- This can lead to market distortions and inefficient outcomes, particularly during periods of negative electricity prices when renewable generation would otherwise respond to market signals by reducing output.
- As a result, market signals may become less effective and overall system efficiency may be reduced.
-The regulatory framework for energy sharing of renewable and stored energy also deserves attention, as it may extend exemptions from network tariffs, system charges and taxes to broad geographical areas that do not necessarily reflect the benefits provided to the electricity system.

Contact

Contact Form

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent a total of +3500 companies in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:
- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

Dépôt légal: D/2026/12.105/39

WG RES & Storage (lead)
WG Hydro

Contact:
Anton KONINCKX,
Advisor – Climate, Renewables & Storage
akoninckx@eurelectric.org

Union of the Electricity Industry - Eurelectric aisbl
Boulevard de l'Impératrice, 66 – bte 2 - 1000 Brussels, Belgium
Tel: + 32 2 515 10 00 - VAT: BE 0462 679 112 • www.eurelectric.org
EU Transparency Register number: 4271427696-87