

Gery Bonduelle

VP Sales & Marketing Reserve Power EMEA, EnerSys
Chair of EUROBAT IBC

Berlin, 17 June 2016



2016: a key year for Energy Storage in Europe

New energy market design legislation - Part of the Energy Union Package

- European Parliament presented its “own initiatives” on market design
- European Commission will present market design package in December 2016
- Shape the future EU energy market – Coherent framework for energy storage could be proposed
- The proposal is likely to directly impact on:
 - Flexible electricity prices
 - Definition of storage
 - Ownership of storage systems
 - Demand-response tools
 - Rewards of flexibility options
 - Market of ancillary services

2015:
Open consultation
on New energy
market design

2016: Own initiative
report of the
European
Parliament

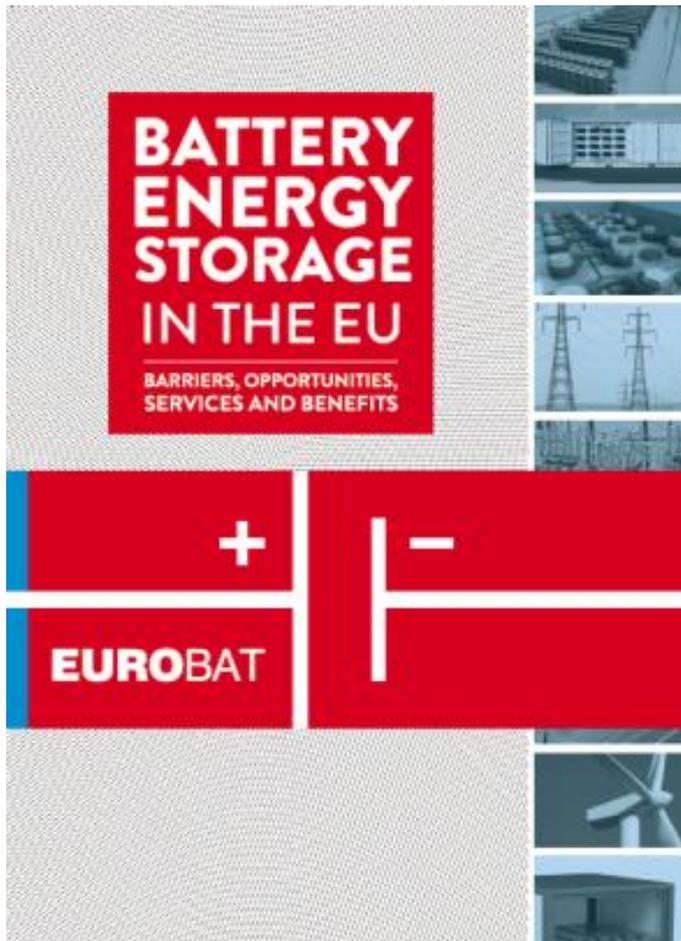
December 2016:
New energy market
design proposal
published

2017:
EP (ITRE committee)
and Council, first
debates

2018/2019:
Final approval

Battery Energy Storage in the EU

Barriers, Opportunities, Services and Benefits



A document to highlight the benefits offered by Battery Energy Storage to EU energy policy and make legislative proposals to European Commission and Parliament

- Benefits and services at different levels of the grid
- Battery technologies for energy storage
- The EU battery industry and market trends
- Legislative barriers and opportunities in Europe

Benefits and services at different levels of the grid

Bulk Energy Services: Large RES Facilities

More RES energy into the grid with fewer conventional generation facilities



- Store the energy produced and release it when prices are higher.
 - Store the energy produced with renewables that would otherwise have been curtailed.
 - More renewable energy into the grid thanks to batteries.
-
- Reduced need for new central-station generation capacity.
 - Compensate for the destabilizing effects of variable generation on grid stability.

Battery Energy Storage (BES)

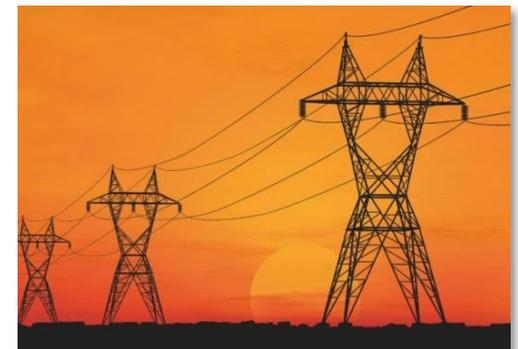
Transmission level

More stability and security

- Storage systems can **improve the security, stability and efficiency** of electricity transmission.
- **Pilot project are on-going** (i.e. TERN in Italy), but legislative uncertainties on ownership must be addressed soon.

Storage applications at transmission level

- ➔ **Frequency control**
- ➔ **Investment deferral**
- ➔ **Voltage control**
- ➔ **Curtailment reduction**
- ➔ **Black starting**



Battery Energy Storage (BES) Distribution level

Smart management of decentralized production

- Changing role of Distribution Service Operators (DSOs).
- Power will no longer only flow in one direction.
- More severe power requirements.
- Decentralised BES has dynamic behaviour with fast and powerful response times enabling for compensation of fluctuating renewable generation.

Storage applications at distribution level

- ➔ Voltage control
- ➔ Peak shaving
- ➔ Curtailment reduction



Benefits and services at different levels of the grid

Customer Energy Management Services

More, Better, and More Reliable Self-Produced Energy

- Increase the share of self-produced energy from 30 to 70percent.
- Minimize the distortion caused by inverters to optimize the injection into the grid.
- Arbitrage and ancillary services: new revenue streams.
- Uninterruptable power supply unit (UPS).



Battery Technologies for Energy Storage

All four batteries technologies – lead, lithium, nickel, sodium – can provide distinct and important functions for grid operators and have the potential for significant further technological and economic improvement.

Lead



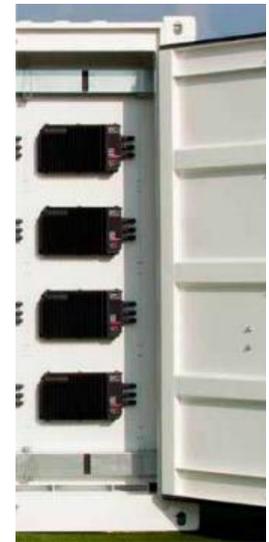
Lithium



Nickel



Sodium



Battery Technologies for Energy Storage



Lead batteries

- Robust and less sensitive to application conditions.
- Can be connected in large battery arrangements without sophisticated management systems.
- Low cost per kWh to install.

Lithium batteries

- Highly scalable, it can be adapted to practically any voltage, power and energy requirement.
- Require sophisticated control electronics, but offers precise management and state of charge control.



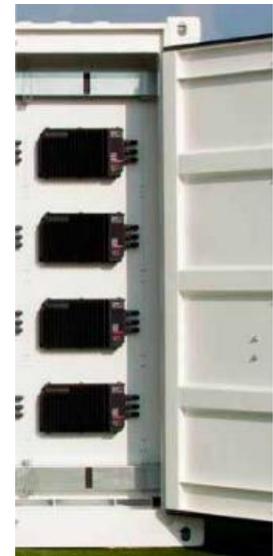
Nickel batteries

- Serve special markets where energy must be stored in extreme climate or cycling or fast charging conditions
- They can be connected in large strings without need for sophisticated management systems.



Sodium batteries

- Originally introduced for Electric and Hybrid-Electric Vehicles.
- High specific energy, constant performance and cycle life in harsh operating environments, low maintenance requirement.



2016: a key year for Storage in Europe

Several barriers prevent the deployment of energy storage in Europe

Lack of
definition of
energy
storage

Electricity
pricing

Unclear
ownership
rights

Curtailement

Double grid
fees

Value streams
of ancillary
services



Key policy proposal presented by EUROBAT

1. Definition of Energy Storage



PROBLEM

- There is **no framework for storage at EU level** and there is **no definition for “Energy Storage”** in the Electricity Directive.



CONSEQUENCES

- Storage considered as generator
- Unclear ownership rights for TSOs/DSOs (unbundling principle)
- Double grid fees
- Lack of recognition for storage

Key policy proposal presented by EUROBAT

1. Definition of Energy Storage



EUROBAT POSITION

- A **clear definition of energy storage** should be included in the Electricity Directive.
- Storage should be **considered as a component of the energy system**, with its characteristics, properties and services.

Key policy proposal presented by EUROBAT

2. Ownership rights



PROBLEM

- The Commission itself recognizes that the ownership rights of storage systems are not clear.



CONSEQUENCES

- Some TSOs are investing/willing to invest on storage, but there the investment environment is unclear.

Key policy proposal presented by EUROBAT

2. Ownership rights



EUROBAT POSITION

- DSOs/TSOs should have the **possibility to own and control storage systems.**
- Service providers **should be allowed to participate in the balancing market** and sell these services to TSOs and DSOs.
- Build or buy choice should be guaranteed, **allowing operators to choose the more efficient solution** depending on the specific situation on the ground.

Key policy proposal presented by EUROBAT

3. Double Grid Fees and Taxation



PROBLEM

- Some Member States (i.e. Spain, Italy) are discussing or have already approved direct taxation on self-consumed and stored energy.



CONSEQUENCES

- Business case for self-consumed energy seriously hampered.

Key policy proposal presented by EUROBAT

3. Double Grid Fees and Taxation



EUROBAT POSITION

- Grid tariffs should be based on the **principle of cost causality** and be taxed for the net burden on the grid, comparing it to the services offered: storage systems offer flexibility and ancillary services to the grid and can defer or reduce the need for grid investments.
- **Direct taxation on storage** should also be avoided.
- Include in the EU legislation the **right to self-consume** and store electricity.

Key policy proposal presented by EUROBAT

4. Value Streams of Ancillary services



PROBLEM

- Battery energy storage can offer several ancillary services to stabilize the grid – however, these **services are often not remunerate**, and **small players/aggregators often cannot participate to the balancing market**.

Key policy proposal presented by EUROBAT

4. Value Streams of Ancillary services



EUROBAT POSITION

- Develop an **appropriate regulatory framework for aggregators** to allow their participation to the market on a fair ground with established providers.
- **Recognition of the value of the services** offered by storage system is central to create the business case for storage.
- The regulatory **framework should include rewards for grid services** and overall capacity of energy storage to stabilize quality and supply for renewables generation.

Key policy proposal presented by EUROBAT

5. Curtailment and balancing obligations



PROBLEM

- With growing shares of renewables in the energy mix, **curtailment might rise significantly** because of grid constraints and negative prices.
- RES **producers do not have balancing responsibilities** and many member states offer them financial compensation for curtailed energy.

Key policy proposal presented by EUROBAT

5. Curtailment and balancing obligations



EUROBAT POSITION

- Grid constraints naturally preventing renewable energy from having priority of dispatch could be addressed through the **deployment of BES**.
- **Financial compensation for curtailed energy** represents a relevant disincentive for RES producers to install energy storage system; national legislation should not allow it to incentivize the use of storage systems at generation level.
- **Balancing responsibilities should be gradually introduced** for RES producers.

Key policy proposal presented by EUROBAT

6. Electricity pricing



PROBLEM

- The Commission is likely to make proposal to have **scarcity and transmission costs better reflected in the final electricity pricing.**

Key policy proposal presented by EUROBAT

6. Electricity pricing



EUROBAT POSITION

- Electricity prices reflecting scarcity **represent an important market signal for demand-response**, smart appliances (including electric vehicles) and storage solutions like batteries and overall will be crucial tools to ensure flexibility.
- Electricity prices **should reflect transmission costs**: storage solutions could be used for transmission congestion relief, deferring expensive investments and extending the life of the existing transmission infrastructures.

Conclusions and recommendations

- Batteries are key to decarbonise the European energy mix and improve citizen's health and the environment
- Renewable energy can grow further through storage
- Europe must catch-up in its market design, compared to US and several other countries and regions
- Manufacturing in Europe is stimulating both direct job numbers as well as in R&D, universities and installation
- The association is pleased to partner with all stakeholders

- Thank You -

For more information
Contact eurobat@eurobat.org or
Gery.bonduelle@fr.enersys.com

Or visit www.eurobat.org

+32 276 116 53



@eurobat_org