Session 3.2 The Luxembourgish Landscape for Energy Storage

POLICY TECHNOLOGY MARKET
ENERGY STORAGE
Global Conference
Brussels, 14-16 October 2025

Simeon Hagspiel

Luxembourg Ministry of Energy

Claude Hornick

Institut Luxembourgeois de Régulation

Nicolas Back

Creos Luxembourg

Laure Metz

Enovos

Moderator:

Patrick Clerens

Secretary General / Energy Storage Europe

Session 3.2 The Luxembourgish Landscape for Energy Storage

Simeon Hagspiel

Government Commissioner for Energy

Luxembourg Ministry of Energy

POLICY TECHNOLOGY MARKET

ENERGY STORAGE Global Conference

Brussels, 14-16 October 2025

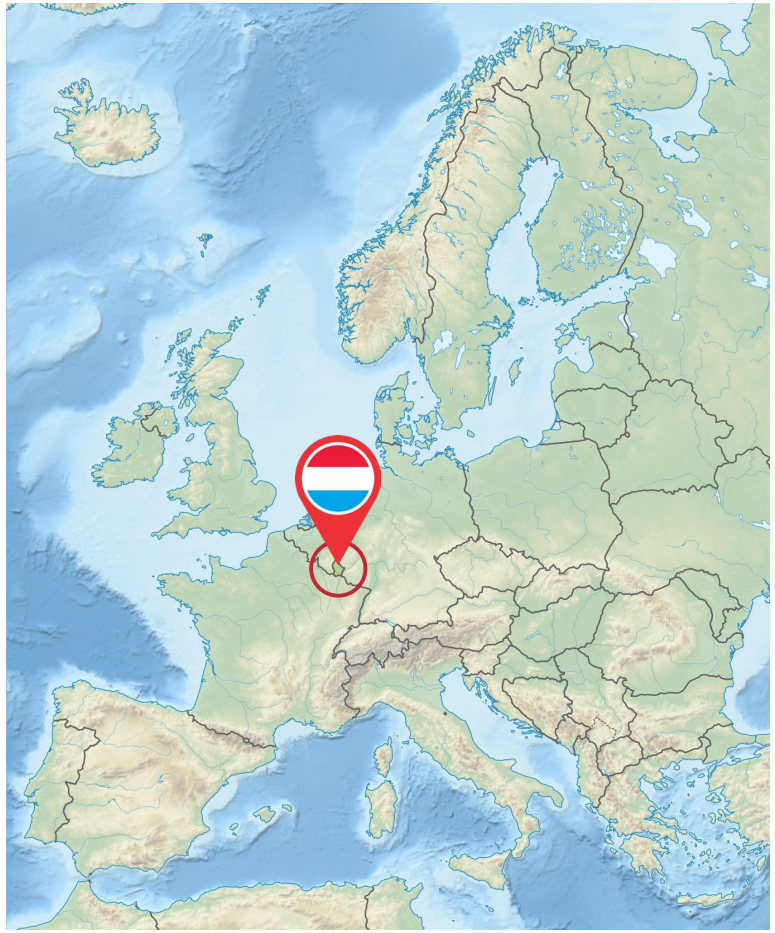
Battery storage strategy Luxembourg

Dr. Simeon Hagspiel
Government Commissioner for Energy

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

Luxembourg

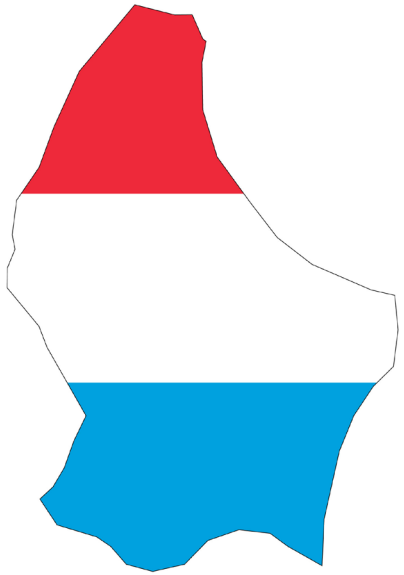
LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG



Luxembourg = Small

Luxembourg

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG



LUXEMBOURG

LET'S MAKE IT HAPPEN

Luxembourg = Small, but also

- ✓ Open, innovative and dynamic
- ✓ Centrally-located and well-embedded
- ✓ Business-friendly
- ✓ Committed to the energy transition, the role of flexibility, and the importance of storage

Luxembourg's electricity sector

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

- Common DE-LU bidding zone
  - Single wholesale electricity price
  - BSPs in Luxembourg have full access to the German market for FCR and aFRR/mFRR
- Smart & digital
  - Digitalisation of the energy system as integral part of the government's wider digitalisation strategy
  - Full smart meter deployment since 2019
  - National energy data platform 'Leneda' officially launched in 2025
- Energy transition in full swing
  - Peak load and generation expected to triple by 2040
  - Increase in peak load driven by demographic and economic growth and electrification of transport and heating sectors
  - New generation largely based on solar and wind
  - Flexibility and storage expected to be crucial for enabling these developments and for aligning demand and supply

Leneda
Luxembourg energy platform

DEN ENERGIE- A KLIMAPLANG 2021 - 2030
Eng liewenswäert a solidaresch Zukunft fir Lëtzebuerg

Storage strategy Luxembourg

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

09/07/2025

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

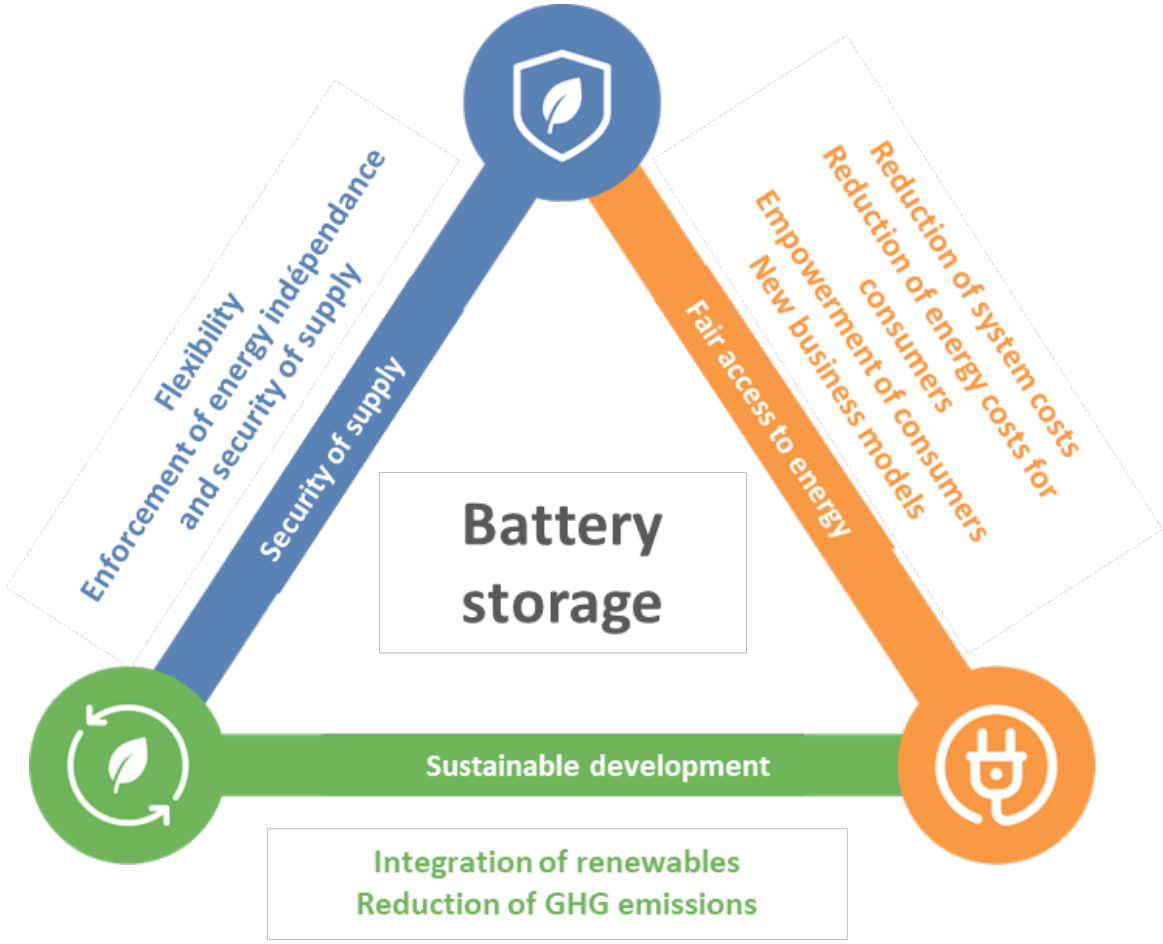
Why a dedicated strategy for battery storage?

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

Battery storage: a key element of a secure, affordable and sustainable electricity system

Aim of the strategy

- Promote and support the deployment of battery storage in Luxembourg
- Stimulate the battery market and activate revenue streams
- Anticipate and enable future evolutions of the electricity market
- Ensure an optimal integration of batteries in the electricity grid



Process

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

Consultation dans le cadre de l'élaboration d'une feuille de route stratégique pour les batteries de stockage au Luxembourg

Contexte et objectifs

Dans le cadre de l'élaboration d'une **feuille de route stratégique pour les batteries de stockage d'électricité au Luxembourg (« Späicherstrategie »)**, le Ministère de l'Économie (DG Energie) lance une consultation stratégique auprès des acteurs directement ou indirectement concernés par cette thématique.

L'objectif principal de cette consultation est de recueillir un maximum de retours afin d'acquérir une compréhension approfondie de l'état actuel du secteur, d'identifier les défis, les obstacles et les opportunités liés à la promotion et à l'implémentation des batteries de stockage (qu'il s'agisse de batteries domestiques ou à grande échelle). Les contributions de cette consultation permettront d'alimenter et d'adapter les recommandations stratégiques en fonction des besoins réels, et de développer ainsi une stratégie cohérente pour le déploiement efficace des batteries de stockage d'électricité au Luxembourg.

- Strong interest in battery storage from a wide range of stakeholders
- Recognition of the wide range of applications of batteries
- An emerging market in the process of structuring, with visible growth dynamics
- Need to enable the multi-valorisation of batteries through a flexible regulatory framework
- Grid-neutral/grid-friendly integration of batteries

Launch
January 2025

Consultation
March-June 2025

Presentation of the strategy
09.07.2025

Kick-off stakeholder group
27.10.2025

Evaluation & update of the strategy
2027

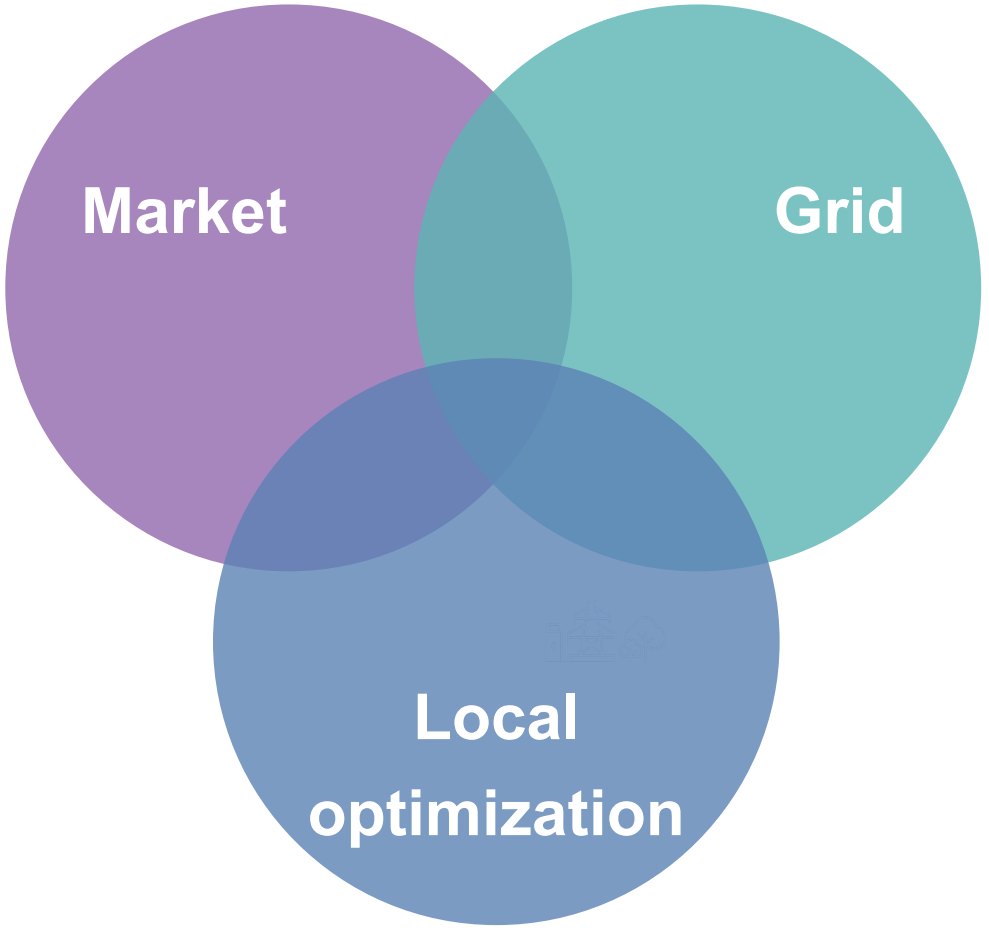
Mapping the battery landscape

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

Types of batteries

- Domestic batteries
- Electric vehicles
- District batteries
- Commercial and industrial batteries
- Batteries colocated with renewables
- Grid-scale batteries

System value

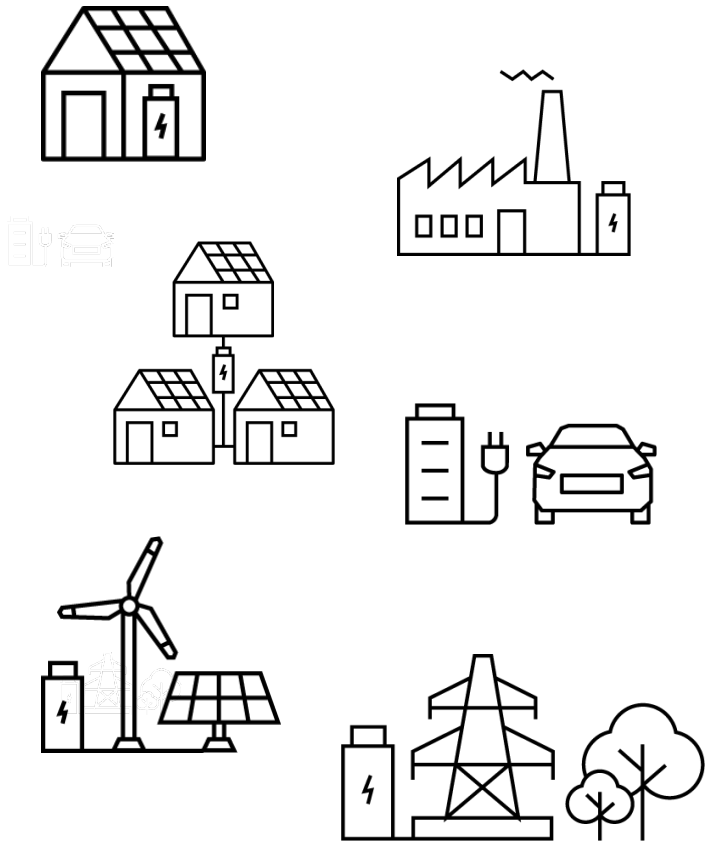


Value stacking

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

Battery value stacking

Local optimization	Market	Grid
Self-consumption	Energy arbitrage	Peak reduction
Energy sharing	Balancing services	Congestion management
Emergency power supply	Capacity mecanisms	Ancillary services



The strategy lays out existing and future accessibility of tangible value streams for different types of batteries in Luxembourg

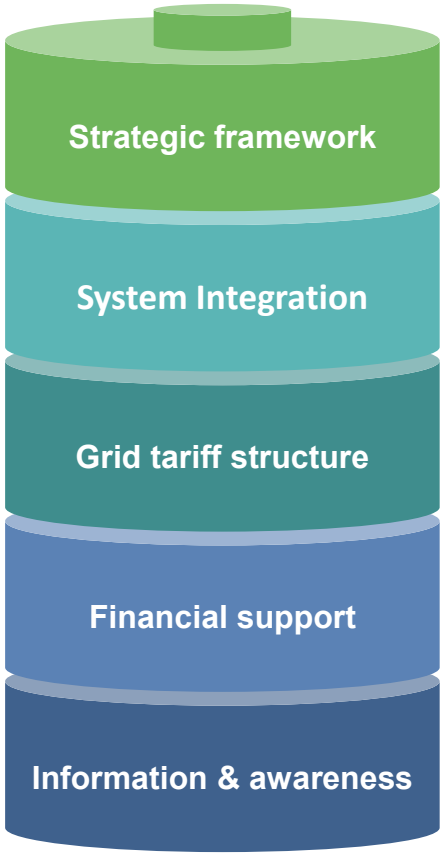
Measures

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

Strategic Framework
1.1 Strategic role of batteries
1.2 Report on flexibility needs and the role of storage in Luxembourg
1.3 Regulatory framework for aggregation

System Integration
2.1 Grid connection conditions
2.2 Flexible connection agreements
2.3 Interactive map of available hosting capacity
2.4 Tenders for grid services
2.5 Valorization of electric vehicle batteries
2.6 Indicators to assess the impact of batteries on the grid

Network Tariff Structure
3.1 Reform of the tariff structure for network usage
3.2 Experimental projects for network tariffs



Financial Support
4.1 Financial aid for domestic batteries combined with photovoltaic solar installations
4.2 Financial support for energy management systems
4.3 “Top-up” financial aid for bidirectional charging stations
4.4 Solar & battery-linked tenders
4.5 Investment tax credit for companies
4.6 Targeted support for specific battery projects, such as neighborhood-scale batteries

Information & awareness
5.1 Awareness-raising and information campaigns
5.2 Recommendations for commercial and industrial batteries
5.3 Targeted training for sector professionals

20 concrete measures along 5 dimensions to foster the role of batteries in Luxembourg

Conclusion

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

- Strategy to fully embrace the value of storage and ensure an **enabling framework** in Luxembourg
- Strategy is **not a final goal but a launchpad** for further market growth and development of regulatory framework
- **Stakeholder involvement** as an integral part of the strategy to facilitate and accelerate developments

Further information

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

- **klima-agence.lu**
- **Coalition agreement** 2023-2028:
  - Launch pilot projects for battery storage
  - Introduce subsidies for battery storage
  - Integration of V2G as storage solution
- 05/2025: National process **Einfach-Séier-Erneierbar** to further accelerate the deployment of renewables
- **National energy and climate plan**
- **Security of Supply Report**
- **Scenario Report 2040** by TSO Creos
- **Network Development Plans**
  Transmission and distribution
- **Pentalateral Energy Forum**
  Flexibility study 2023
- **Flexibility Needs Assessment** (ongoing)

Thank you!

Contact details:
Dr. Simeon Hagspiel
simeon.hagspiel@eco.etat.lu

Any questions in relation to the strategy?
spaicherstrategie@eco.etat.lu

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

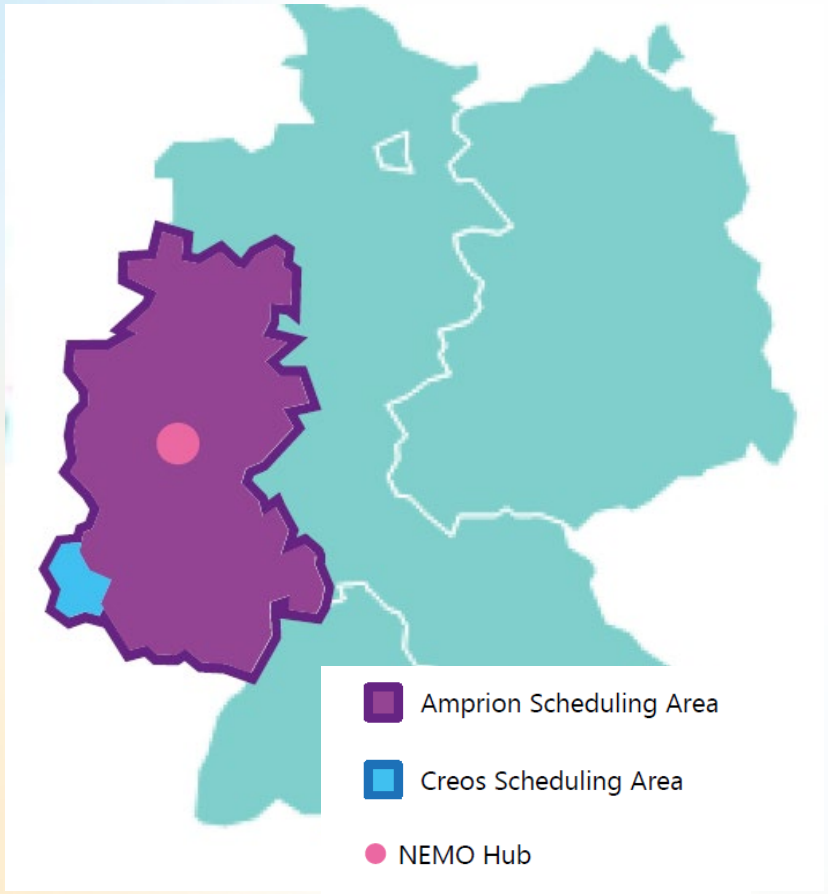
Session 3.2 The Luxembourgish Landscape for Energy Storage

Claude Hornick

Head of the Energy Department

Institut Luxembourgeois de Régulation

Access to all markets is key



Zone delimitations

- Bidding Zone DE/LU
- LFC area AMP+LU
- Scheduling area LU

Separate scheduling area requires cross-border process to access the NEMO Hub and TSO services

- Additional scheduling required for XB process (indirect access to wholesale markets)
- Potentially longer lead times for scheduling processes

Access to the market for frequency restoration reserves (aFRR and mFRR) has been enabled since January 2025

- Service provision directly to Amprion, scheduling processed by Creos
- LU bids integrated in the merit order on the EU balancing platforms

Ensure a **level playing field** for market players by enabling access to all wholesale markets including markets for system operation services

Towards efficient system cost

Moderating overall energy system costs, by **moderating the rise in grid investments** (through better network tariffs and incentives for cheaper 'efficiency first' ways to increase network capacity)

- First steps have been initiated towards a new **network tariff design** – contributions from market players highly welcome through consultation processes
- Meanwhile, **State contribution to grid cost** will substantially reduce network tariffs as from January 2026
- Applications for **regulatory sandboxes** are welcome, allowing for temporary derogations from existing rules

- Ongoing assessments on **demand evolution and flexibility needs** will inform network development planning – again stakeholder participation is much appreciated
- A first distribution **network development plan** is currently being prepared based on scenarios without any battery energy storage capacity forecast due to limited and uncertain data

ENERGY STORAGE
Global Conference
Brussels, 14-16 October 2025

Bringing together the world of energy storage!

Session 3.2 The Luxembourgish Landscape for Energy Storage

Nicolas Back

Head of Innovation

Creos Luxembourg

POLICY TECHNOLOGY MARKET
ENERGY STORAGE
Global Conference
Brussels, 14-16 October 2025

Balanced grid fees for grid friendly BESS

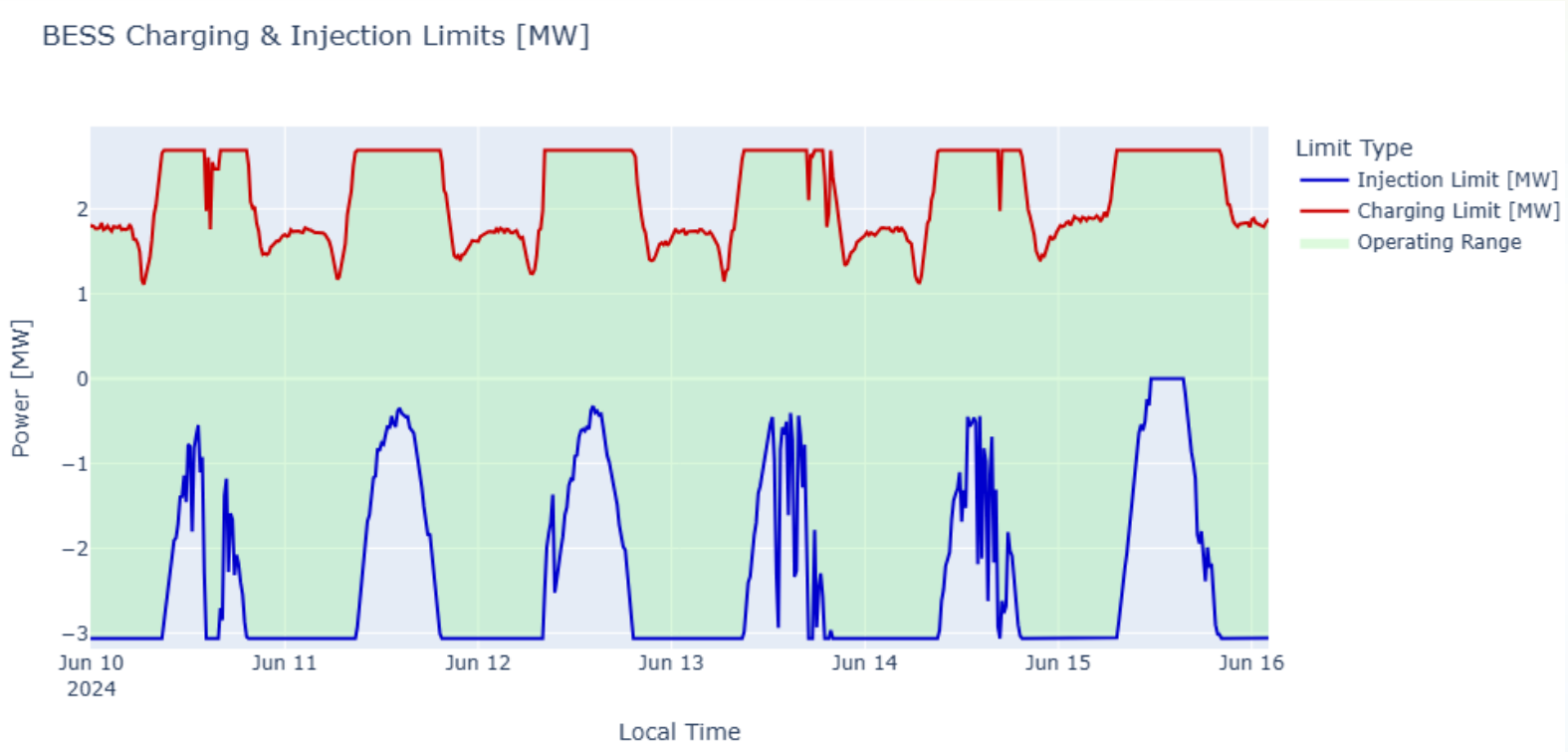
- Todays grid tariff is based on the measured peak and the consumed volume
  - Together with the regulator and the Ministry of Economy, we have started working on a new grid MV/HV/VHV (20 kV – 220 kV) tariff structure
  - The new tariff structure should amongst others integrate better the flexibility aspect
- In this reform, we will have a specific deep dive on batteries to favor grid friendly behavior

Grid friendly behavior

Grid impacting	Grid neutral	Grid beneficial
• Requires additional grid capacity • Increase of national peak import • No specifications of operating times by the system operator	• No utilization of additional grid capacities • No increase of national peak import • Specifications of operating times by the system operator	• Creation of grid capacities by reducing grid bottlenecks • Reduction of national peak import • Specifications for grid-beneficial operating ranges by the system operator

Balanced grid fees for grid friendly BESS

Definition of grid friendly KPI – operating ranges (early idea)



Grid friendly behavior will need to take into account

- Local grid
- National peak import

Grid hosting

Grid capacity map

- A grid hosting capacity map displaying the available capacity on our grid for consumption and injection is planned for end of this year
- This will give customers more visibility on the potential locations of storage units

RES curtailment

- Luxembourg does not have much RES curtailment today
- This might increase in the future, as RES projects continue developing and installations are connected without n-1 security criteria

In certain regions of the grid, no additional producers can be connected with firm connections because of existing installations and reservations
This also impacts battery projects

Flexible Connection Agreements

FCA under development, and could also be offered to BESS

Static time of use	Dynamic time of use	Condition flexibility
• Static ToU flexible consumption/injection limit defined for the year or for a given period of the year (seasons) • Limit needs to respect n-1 criteria • Flexibility is guaranteed in this range	• Dynamic ToU flexible consumption / injection limit defined based on day-ahead up to near-real-time forecasts • Limit needs to respect n-1 criteria • Flexibility is not guaranteed	• Flexibility is always available, expect during maintenance and outage • Limit need to respect N-0 criteria

POLICY
TECHNOLOGY
MARKET

ENERGY STORAGE
Global Conference
Brussels, 14-16 October 2025

THANK YOU!

Session 3.2 The Luxembourgish Landscape for Energy Storage

Laure Metz

Business Development Specialist

Enovos

The Battery Landscape in Luxembourg

Large-scale direct BESS

- No grid fee exemption, less attractive than in Germany
- Potential large-scale direct BESS under development
- Design of virtual battery products

Co-location BESS

- No grid fee exemption
- No “dark green” innovation tender like in Germany
- Generally financed via subsidies and through PPAs, enabling certified green energy supply

enovos

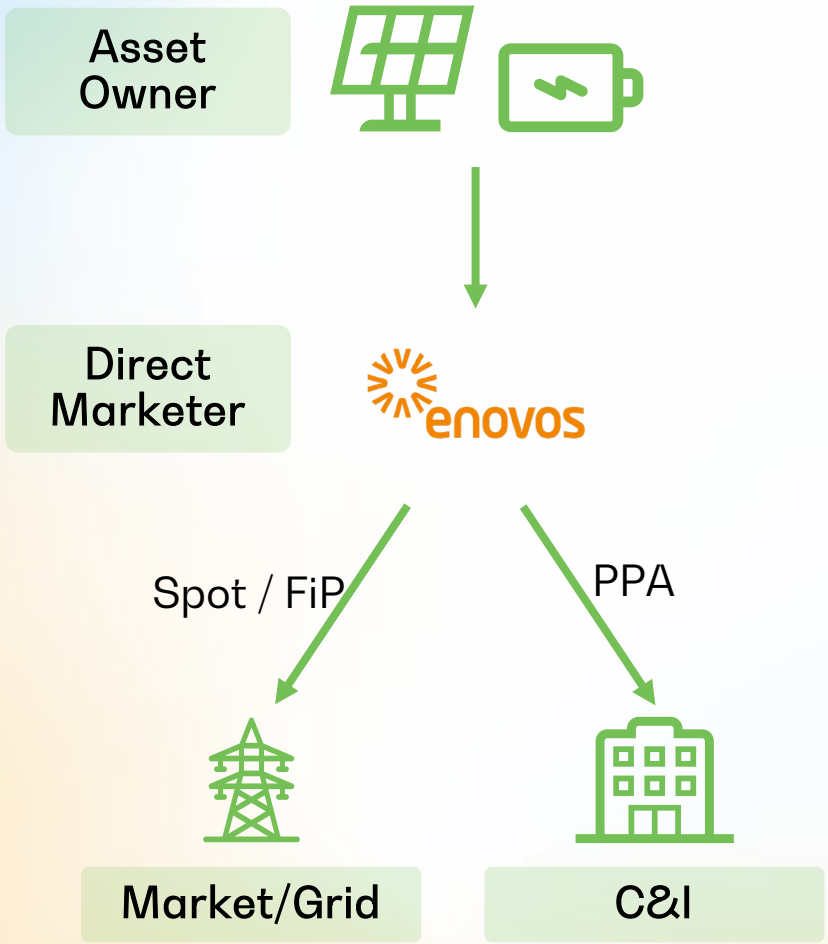
BESS in C&I sites

- Enables increased self-consumption, peak shaving and flexibility for industry
- CAPEX aid tender to be implemented

Residential BESS & EV BESS

- EV BESS as “capex free” substitute for residential BESS
- Key flexibility source for future aggregation and smart charging
- Linked to dynamic & Time-of-Use tariffs

Co-location – From Asset Optimization to Bankable PPAs



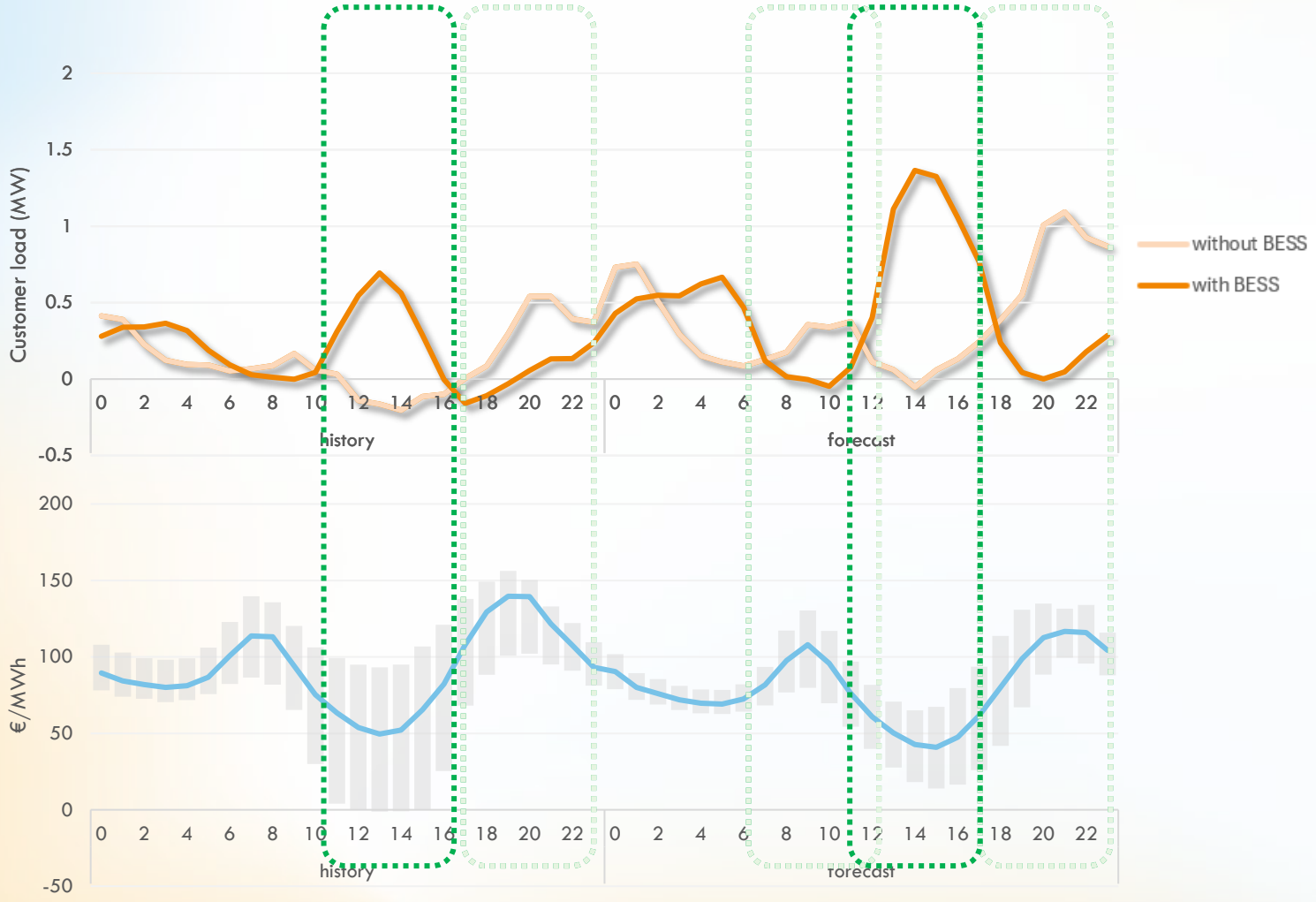
Advantages (PPA):

- **Certified green supply** via GoOs
- **Higher-value profile:** storage shifts production into higher-price hours

Challenges (PPA):

- **GoO quality requirements:** distinction between standalone and coupled GoO (auditor verification)
- **Temporal matching for green hydrogen** (advantage of BESS)

BTM Storage – Turning Flexibility into Customer Value



- **Respect of grid constraints:** operation within yearly maximum load
- **Value stacking complexity:** balancing self-consumption, peak shaving, arbitrage
- **Offer flexible business models**: co-investment, SPV or service-based operation

Challenges:

- **Grid fees not flexibility-friendly in LU:** little reward for avoided peaks and local optimization
- **CAPEX aid still pending:** investment cases remain sensitive to subsidy design

EV BESS – Unlocking No-CAPEX flexibility through connected mobility

POLICY TECHNOLOGY MARKET
ENERGY STORAGE Global Conference
Brussels, 14-16 October 2025

1. Mobile app ✓ Development of a mobile app, which ranked in the top10 App in LU App Store (Utilitaires) in only a year (30k users/month)

2. Advanced B2C tariffs ✓ ToU EV tariff & Dynamic tariffs (bi-directional) released with active customer base

3. Asset API connection ✓ EV API connectivity launched for early adopters and selected car manufacturers

4. Aggregation Ability to virtually aggregate flexibility from EV BESS

5. Flex volumes optimization Ability to unlock value through optimization of aggregated flexible volumes

Rationale for EV BESS:

- EV batteries are **"NO-CAPEX", fastest-growing flexible resource,** already **connected & steerable** via Enovos Mobile App.

First Lessons Learned from Smart Charging in Enovos App:

- Smart charging and/associated with Time-of-Use tariffs generated strong customer interest; however additional functionalities such as solar charging or market participation are needed to increase adoption & customer value.