STEPS project factsheets

Challenges and benefits of energy and power storage in different sectors

Interreg North-West Europe
STEPS
European Regional Development Fund

Batteries in the construction sector

a STEPS project factsheet

Electrifying construction sites

The construction sector becomes more and more aware of its CO_2-emissions. Several solutions are needed to reduce these emissions. One of the ways towards reduction of the sector is to make construction sites more sustainable. For a lot of those sites generators were, until recently, the only way to provide enough electricity. During the last few years, more and more ecological and economically profitable storage solutions are being developed within Europe.

About STEPS

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Visit the STEPS project website for more information.

Challenges

- Tower cranes draw high peaks from the grid and create **grid fluctuations.**
- No or **not enough power** or electrical current available on construction sites.
- A generator set often works inefficiently and causes **noise and air pollution.**

Benefits

- **Cut costs** for fuel and transport.
- **Reduce CO2-emmisions** and use of fossil fuel, contributes to SDG-goals.
- Storage can be aggregated to **gain extra income** by playing on the energy market.
- **Mobile solutions**, can travel with the equipment depending on the construction phase/needs of the construction site.
- **Options for clients**: buy, rent, lease or as-a-service.

POM Oost-Vlaanderen

flux50 ENERGISING THE FUTURE

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Batteries in housing corporations

a STEPS project factsheet

Energy storage lowers the energy bill in social housing

The build environment has to become more sustainable rapidly to reach the climate goals. In the Netherlands, one third of the houses is owned by housing corporations, meaning that they have a significant task to fulfil. Installing energy storage in social housing can contribute to this task. Energy storage in social housing also lowers the energy bill for inhabitants. Moreover, it contributes to reducing the congestion of electricity grid, which is becoming more and more a problem in the Netherlands. Residential buildings with solar panels and storage installations use a much higher percentage of the generated energy within the building. Peaks in energy, for example when a lift in an apartment building is used, also require less peak demand with storage installation installed.

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Challenges

- Housing corporations have a big task in **reducing energy use in social housing**, as they own a significant part of residential buildings.
- **Congestion of the energy grid** is becoming more and more of a problem.
- Little of the energy generated with solar panels on residential buildings is used within the building, putting **more pressure on the grid**.

Benefits

- Storage **lowers the energy bill** of the building (lifts, lighting, etc.) and its residents.
- Energy generated within the building (by solar panels) can be used more within the building, contributing to the **reduction of grid congestion**.
- **Lowers peak demands,** further reducing the pressure on the electricity grid.
- Using self-generated energy contributes to more **sustainable social housing.**

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Interreg North-West Europe STEPS

Network for energy storage innovation

a STEPS project factsheet

Creating a platform for energy storage innovation

Energy storage plays a crucial role in the energy transition. German STEPS partner the House of Energy (HoE) advocates and supports the topic within the triangle between science, business and politics. As an innovation cluster and network, HoE creates support for energy storage measures at state policy level by bringing together stakeholders in this triangle and promoting the exchange of ideas, experiences and best practices. The topic of energy storage is integrated into the annual House of Energy congress. This congress serves as a platform for discussion and expertise of those designing the energy system transformation. It aims to provide information on energy storage and inform policy makers about technologies, applications and potentials. This ensures that energy storage is considered in policy programmes and strategies and leads to political support and new funding opportunities.

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Challenges

The **crucial role of energy storage** in the energy transition is not always recognized or considered.

There is **little exchange of ideas, experiences and best practices** between the fields of science, business and politics.

Benefits

Creating a network that aims to take energy storage to the next level.

Ensuring that energy storage is considered in **political programmes and strategies.**

Creating publicity and offering a platform for **energy storage innovations.**

Interreg North-West Europe STEPS

Batteries in the public sector

a STEPS project factsheet

Reducing Energy Cost in Public Sector Buildings

Due to their size and continuous operation, public sector buildings, such as government offices, water services, commercial state bodies and the health sector consume a substantial amount of energy. These buildings often require lighting, heating, cooling, and electrical equipment to meet the needs of the public they serve. Consequently, their energy consumption can be significant, contributing to both financial costs and environmental impact. Advancements in battery technology offer a promising solution to reduce the energy consumption of public sector buildings. Energy storage systems can store excess energy during low-demand periods and release it during peak hours, thereby optimizing energy usage and reducing reliance on the grid. This technology not only enhances the efficiency and sustainability of public sector buildings but also helps decrease operational costs and promote a greener future.

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Challenges

- Public sector buildings consume a **significant amount of energy** due to their size and continuous operation.
- High energy consumption contributes to **financial costs and environmental impact.**

Benefits

- **Optimizes energy usage** by storing excess energy during low-demand periods.
- **Reduces reliance on the electrical grid**.
- Enhances **energy efficiency and sustainability**.
- **Decreases operational costs,** which leads to public savings.
- Promotes a **greener future**.

SOUTH EAST ENERGY AGENCY

Interreg North-West Europe STEPS

Batteries in the agricultural sector

a STEPS project factsheet

Electrifying Dairy Farms sites

Dairy farms are intensive agricultural operations that rely heavily on energy for various processes, such as milk cooling, ventilation, lighting, and equipment operation. The energy consumption of dairy farms can be substantial due to the need for round-the-clock operations, particularly in large-scale commercial setups. These farms face challenges in managing their energy usage efficiently, leading to increased costs and environmental impact. Battery technology offers a promising solution to address these issues. By integrating energy storage systems with renewable energy, you can reduce greenhouse and future proof your business. Batteries can store surplus energy generated during periods of low demand, during the night or when energy prices are lower. This stored energy can then be used during peak periods, effectively reducing the reliance on the electrical grid and optimizing energy consumption. Implementing battery technology on dairy farms can lead to significant energy savings, cost reductions, and a more sustainable farming operation.

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Challenges

Dairy farms **require substantial energy** for milk cooling, ventilation, lighting, and equipment operation.

Round-the-clock operations contribute to high energy consumption.

Challenges in managing energy usage efficiently increase **costs and environmental impact.**

Benefits

Integrating energy storage systems with renewable energy, you can **reduce greenhouse gas emissions**

Stores surplus energy generated during low-demand periods. And reduces reliance on the electrical grid.

Optimizes energy consumption and enhances efficiency which leads to significant **energy savings and cost reductions**.

SOUTH EAST ENERGY AGENCY

Interreg North-West Europe STEPS

Batteries in the food storage sector

a STEPS project factsheet

Making food storage facilities greener

Food storage facilities, such as warehouses and cold storage units, play a crucial role in preserving perishable food items before they reach consumers. These facilities require a substantial amount of energy to maintain optimal temperature and humidity levels necessary for food preservation. Energy-intensive refrigeration systems, lighting, and ventilation contribute to the high energy consumption of these facilities. The need for continuous operation and the increasing demand for refrigerated storage pose additional challenges in managing energy consumption effectively. Battery technology can offer significant benefits in this context. Energy storage systems can store excess energy during off-peak hours or when renewable energy generation is high. This stored energy can then be used during peak demand periods, reducing the reliance on the electrical grid and lowering energy costs. The integration of battery technology in food storage facilities can enhance energy efficiency, improve sustainability, and contribute to a more resilient and reliable food supply chain.

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Challenges

- Food storage facilities require significant energy for refrigeration systems, lighting, and ventilation.
- **Continuous operation and increasing demand** for refrigerated storage pose challenges in managing energy consumption effectively.

Benefits

- **Stores excess energy** during off-peak hours or high renewable energy generation.
- **Reduces reliance on the electrical grid**.
- **Lowers energy costs** and enhances cost-effectiveness.
- Improves **energy efficiency and sustainability**.
- Contributes to a **more resilient and reliable** food supply chain.

SOUTH EAST ENERGY AGENCY

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Batteries on campuses & science parks

a STEPS project factsheet

Decarbonising campuses and science parks

For events and mobile catering facilities, (university) campuses and science park often use fuel generators. These mobile facilities are often outside and buildings on the site are not close enough or do not have enough electrical current or power to provide their energy. However, fuel generators lead to avoidable sound pollution and green house gas emissions. Replacing them with mobile battery solutions makes campuses and science park facilities cleaner and greener. Mobile battery powerpacks can provide green energy during the day, when there is staff and students on the campus or park. Overnight, they can charge at nearby EV charging facilities or at buildings, when the campus or science park is not in use and uses little energy.

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Challenges

- Need to reduce the **reliance on diesel** due to the ever-increasing **cost of fuel**.
- **No or not enough electrical current/power** available on parts of the sites (mobile catering facilities, events).
- A generator set often works inefficiently and causes **noise and air pollution.**

Benefits

- **Mobile battery powerpack** can be charged at a nearby EV charging.
- **Reduces around 80% CO_2-emmisions** and use of fossil fuel compared to fuel generators.
- Possible **payback period of 14 months** compared to LPG portable generators.
- **Options for clients**: buy, rent, lease or as-a-service.

CAMBRIDGE CLEANTECH

powerQuad

Interreg North-West Europe STEPS

Lower costs & risks for energy storage

a STEPS project factsheet

Safe storage for data centres, solar parks and buildings

Energy storages is essential for decarbonising the energy sector. Solar parks and data centres need storage on a large scale. If this is realised with lithium-ion batteries, which are most commonly used nowadays, this can be an expensive investment. Lithium is a scarce resource, it in high demand and there are geopolitical risks for the supply chain. Moreover, lithium-ion batteries have a risk of thermal runaway when the temperature gets too high. However, there are other battery solutions, like sodium-ion batteries. These are a lower costs and lower risk, and very suitable for stationary storage where high energy density per size and is not required (like it is in mobile devices and EV's). Sodium-ion batteries are a good solution for larger scale static installations like at solar parks or data centres.

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Challenges

- Lithium-ion batteries are **expensive and in high demand**.
- Lithium is a **scarce resource** with geopolitical **issues in the supply chain**.
- Lithium is suitable for high energy density use cases where weight is important (mobile devices and EVs) but **not necessary for larger scale static installations**.
- **Risk of thermal runaway.**

Benefits

- Sodium ion batteries are **lower cost** for stationary storage solutions where lower energy density, size and weight are of less importance.
- The base material is **highly abundant.**
- Energy storage security benefits and **no global supply issues**.
- **No risk** of thermal runaway.

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