BRIDGE THE GAP

1st Edition

July, 2024

ON-SITE ENERGY STORAGE SYSTEMS

IMPLEMENTATION GUIDELINES

This guideline indicates critical considerations and common hurdles to support potential users in selecting a product but contains no advice on which product to choose.

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DEFINITIONS

On-site energy storage systems (ESS) are pivotal in enhancing the reliability and efficiency of renewable energy sources. By storing energy generated during peak production times and releasing it during periods of high demand, ESS helps to stabilise the grid, reduce energy costs, and promote the integration of renewable energy.

The most popular ESS are batteries, of which there are several types, e.g., lithium-ion, lead-acid, or flow batteries. Bridge the Gap features ESS that are either (1) exceptionally efficient, (2) have a low embodied carbon footprint due to their materialisation or end-of-life handling, (3) are designed circularly, or a combination thereof.

POINTS OF INTEREST

SYSTEM SELECTION

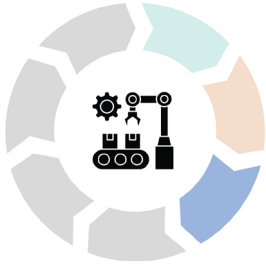
GUIDANCE	DESCRIPTION
Identify requirements	Clearly define the energy storage needs based on the specific application.
Determine goals	Establish goals, such as peak shaving, load shifting, grid stabilisation, or emergency backup, to tailor the ESS accordingly.
Explore alternatives to traditional systems	Consider alternative storage technologies like pumped hydro, compressed air, and thermal storage based on the project requirements and – geographical - feasibility.
Integrate related systems	Consider combining the ESS with photovoltaic panels or wind turbines to decouple the timing of energy production from use.
Balance selection criteria	Base the selection of the type of ESS on multiple criteria other than costs, such as energy density, lifespan, maintenance, and environmental impact.

CONTRACTING AND PROJECT FINANCE

GUIDANCE	DESCRIPTION
Government incentives	Explore available government incentives, e.g. tax reliefs or subsidies, to reduce financial barriers to improving the environmental performance.
Define the scope of work between parties	Suppose part of the technical installations are already pre-installed in off-site building systems. In that case, the contracts should clearly define the division of work and responsibilities between on-site and off-site installers.

DESIGN

GUIDANCE	DESCRIPTION
Select a preferred technology early	Deciding on the preferred technology early in the design process will prevent inefficient or improperly designed technical installations and space conflicts later.
Involve the system supplier in the design process	To realise the full potential of each system, consult the system supplier during the design stages.
Design for Circularity	Position technical installations to be easily accessible and account for maintenance, replacement, and resulting waste. Technical installations have a much shorter lifespan than the structure of the building.
Consider embodied carbon	Apart from optimising operational energy use, the embodied carbon of technical installations has a significant impact. Opt for sustainable and environmentally friendly materials to minimise the ecological footprint. The product's EPD provides verified data.
Make use of the functional unit	When comparing the carbon footprint, use the same functional unit for the different products. The Product Category Rules define the typical functional unit of ESS, which is part of a PV system, as follows: the storage functionality needed to be part of a reference PV system (with a service life of 25 years) that provides 1 kWh of AC energy output to the grid (or end users). Other ESS types, which are not part of a PV system, might have similar functional units, for example: 1 kWh of energy delivered.
Design for modularity and scalability	If future expansions and upgrades are to be expected, consider using modular and scalable systems.



MANUFACTURE

GUIDANCE	DESCRIPTION
Track and manage waste	Clients should verify that their suppliers track the amount of waste generated or monetise it through various reuse/recycle streams. This will help lower the use of raw materials and waste.
Provide documentation of installed product	Suppliers/installers should provide clear documentation of the products installed regarding material type, material amount, reuse potential, etc.

TRANSPORTATION TO SITE

GUIDANCE	DESCRIPTION
Product packaging	Minimise materials needed to package products to reduce environmental impacts. Furthermore, packaging models that allow the return and reuse of packaging should be considered.

ON-SITE ASSEMBLY WHEN COMBINED WITH OFF-SITE CONSTRUCTION

GUIDANCE	DESCRIPTION
Off-site MEP connections	Assemble the volumetric modules as quickly as possible to avoid weather-related difficulties. Plan on-site construction process to “practice” and reduce construction time on-site.
Temporary weather protection during construction	There is a risk of weather damage when on-site assembly is in progress. Temporary weatherproofing should be provided for technical installations integrated into off-site building systems, which risk exposure to weather conditions.

MAINTENANCE

GUIDANCE	DESCRIPTION
Regular inspections	Clients will have full access to the digital information of their property because of the comprehensive manufacturing data. This will help to identify used products, components, and materials and ease maintenance and replacement.
Data management	When using off-site building systems, clients have access to all technical installation data and locations in a digital form as part of the off-site data package. This will help to trace used products, components, and materials and ease maintenance and replacement.
Recycling and disposal	Plan for the end-of-life phase by incorporating recycling and proper disposal practices during the design of the technical installations to minimise environmental impact.

END-OF-LIFE

GUIDANCE	DESCRIPTION
Establish and implement end-of-life scenarios for circularity	End-of-life scenarios to reduce environmental impact should be investigated. Ideas could include, but are not limited to: · Repair and reuse: If a component or system is still functional, repair it as needed and reuse it in future projects. There are companies specialising in the refurbishment of technical installations.program, disassemble the products to the necessary level and return those products or materials so that they can be reused or recycled properly by their supplier. · Return materials to suppliers: If a manufacturer or supplier has a “take-back” program, disassemble the products so they can be reused or recycled correctly by the supplier. · Sell materials with high residual value: Some materials have a high residual value in secondary marketplaces and should be salvaged by the disassembly team. More information on circularity can be found in the Knowledge Bank.

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