

## Energy Storage Selection Tool



### Background Description

To increase efficiency and reduce operational costs, Member States are encouraged to augment the use of Renewable Energy Sources (RES) in their military infrastructure. At certain times, installations are capable of producing much more energy from RES than they are capable of using, and at other times, the RES produce little or no power. It is therefore desirable to store the surplus energy in a manner that makes it reusable within the installation (long-term storage). A proper energy storage system also allows for continuous mediating between available energy sources, variable loads, and variable consumption (short-term storage).

This project idea considers how best to utilise energy storage technologies in combination with a selected RES-solution. Since the efficiency of an energy storage system can vary between 40-95% depending on the method used, a well-informed decision needs to be taken on the most suitable system.

### Project Analysis

This project idea concerns the development of a (software-based) Energy Storage Selection Tool to support decisions on selecting and integrating the most relevant storage technologies in military infrastructure projects.

The toolkit should consider both short-term and long-term storage aspects.

It should also consider the various types of storage categories:

- Electrical;
- Electrochemical;
- Mechanical;
- Thermal (heat and cold).

Only energy storage solutions that can be implemented within the premises of the military installations are to be considered.

The tool should contain and/or take into account:

- A regularly updated database of technology costs and performance;
- Information about the project's location, type of equipment in the system, cost of installing and operating the system, and financial and incentives assumptions;
- Initial pre-screening to select technologies that merit further consideration;
- Resource assessment based on available resource maps and data;
- Collection and review of site and other data;
- Layout of the RES-plant;
- Energy production estimate per technology;

Assessment of operational considerations including interface with wider defence applications.

## Objectives

The objective of this project idea is to develop a tool that would provide guidance to Ministries of Defence (MoDs) about the most suitable energy storage technologies (or a mix) to be used in combination with renewable energy sources. This would need to take into account the specific requirements of defence and security sector infrastructure.

Ultimately, this could:

- maximise RES value of defence lands and properties;
- increase resilience of isolated installations;
- reduce total energy costs while minimising environmental impact.

## Impact – Expected Outcomes

Selecting the most appropriate energy storage solution will be a critical enabler inter alia to support the higher-level goals:

- Reduce carbon footprints;
- Reduce dependence on civilian power grids;
- Increase resilience and business continuity.

## Opportunities

A well-chosen energy storage solution can provide opportunities for:

- On-site transportation solutions;
- MoDs to contribute to grid balancing, which could be a potential source of additional revenue depending on the business model;
- MoDs to additionally maximise cost savings on peak hours (e.g., during periods when RES is insufficient to meet demand).

## Challenges

Challenges include the limited availability of installations with installed RES capacity, and the choice of available storage systems at sufficiently high Technology Readiness Levels (TRL).

An optimised energy storage system also has to be grid connected to be beneficial and practical.

## Methodologies

The project methodology would seek to:

- Assess which energy system and renewable energy source is in place, which will inform decisions regarding the selection of the most energy storage solution;
- Examine the available storage technologies preferably at TRL8 or 9;
- Conduct a mix of desktop studies and field trials of suitable storage systems;
- Identify those most appropriate for use on defence installations in terms of power and capacity;
- Field test identified storage technologies in different installation types and different environmental conditions.

## Way Ahead

Consideration should be given to appointing a consultancy to conduct a desktop study leading to the selection tool and supervise field projects in Member States.

Preferably the field projects should be conducted in more than one Member State and across different environmental conditions and different patterns of electrical load.

The findings should better inform member states on the most appropriate mix of RES and storage systems for different types of installations.

This project idea was developed during the second phase of the Consultation Forum for Sustainable Energy in the Defence and Security Sector (CF SEDSS II) and does not entail any future commitment for the EU Ministries of Defence (MoDs) or the EU institutions or agencies. However, it provides the framework for enabling the formation of multi-national collaborations at the European level to help the MoDs to address common defence energy-related considerations and to move towards a defence decarbonised future. The potential of those ideas will be further explored in the context of the forthcoming CF SEDSS Phase III (2019-2023).