Programme Area: Energy Storage and Distribution

Project: Transportable Storage

Title: Final Report

Abstract:

With increasing utilisation of renewable energy sources there are many cases where the ability to site generation within easy reach of demand becomes more limited. In these situations, how the energy is moved from where it is generated to where it is needed becomes a more critical aspect of the overall energy system. More remote locations are more costly to connect to transmission lines, be they electricity networks or pipelines. At the same time the intermittency of renewable energy sources places a greater emphasis on the use of energy storage to balance the different variations in supply and demand over time. Transporting stored energy is one possible way to address both of these concerns simultaneously.

Context:

With increasing utilisation of renewable energy sources, there are many cases where the ability to site generation of electricity within easy reach of demand becomes more limited (e.g. offshore wind farms). More remote locations are more costly to connect to electricity networks or pipelines. Additionally, intermittency of renewable energy sources places a greater emphasis on the use of energy storage to balance the different variations in supply and demand over time. Transporting stored energy is one possible way to address these concerns simultaneously. The aim of the project was to understand and quantify transporting energy for a number of different scenarios. Cases were developed for offshore wind farms located off the UK and concentrated solar in the Sahara. A range of options were then analysed for transporting and transmitting energy from source to demand with the different approached quantified and compared.

ETI Programme: Energy Storage and Distribution

Project Name: Transportable Energy (FRP)

Deliverable Reference: FR/Final Report

Contractor/Consortium: EA Technology

Context

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More remote locations are more costly to connect to transmission lines, be they electricity networks or pipelines. At the same time the intermittency of renewable energy sources places a greater emphasis on the use of energy storage to balance the different variations in supply and demand over time. Transporting stored energy is one possible way to address both of these concerns simultaneously.

Project

In deciding whether to support the development of transportable energy storage technologies, the ETI needed access to a thoughtful and factual analysis that considers all the relevant factors and identifies where transportable energy storage is most likely to be beneficial and what cost and performance targets would need to be met to justify the development of potential technologies to deliver transmission scale transportable storage.

Key Project Findings

Key findings of the study are:

- Electricity transmission represents the least cost solution if electrical energy is required at the demand site
- Chemical energy carriers do however compare favourably with electricity transmission where they can be used directly
- The use of electro-chemical energy storage media (i.e. a Zinc-Air Battery/ship concept) is unlikely to represent an economically viable concept as the cost of electricity delivered is over six times that of the baseline transmission option