

Introduction

The future of electricity generation in the UK must progress through a diminishing role of fossil fuels and an increased role of renewable energy.

BUT due to intermittency of supply, the increased proportion of renewable capacity creates system reliability and balancing problems for National Grid.

Energy storage is recognised as a method to mitigate risk, but is storage economically viable to private investor?

Research Objectives

- Review energy storage in the UK
- Identify problems storage can address
- Assess which storage method is optimal for use at an onshore wind farm
- Determine if this is economically viable using NPV and IRR measures

Methodology

An Economic Review identified negative pricing, imbalance costs and ancillary services as driving factors behind increased storage.

A Technology review and Cost Analysis found Carbon – Enhanced Lead Acid Battery Storage to be optimal for onshore wind farms.

Discounted cash flow analysis used to compare a 25 MW wind farm with and without 4 MW co-located battery storage.

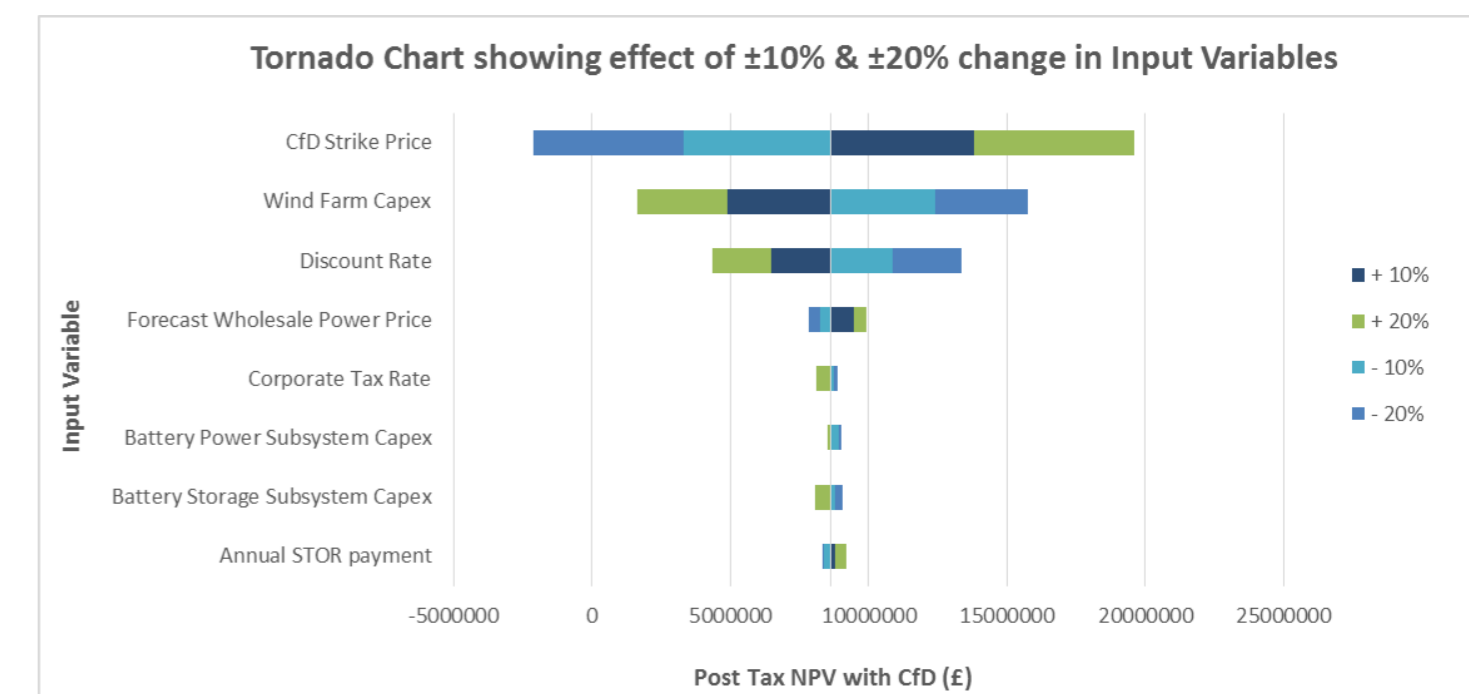
Results

NPV reduced by c.£3 million and IRR reduced by 1%. However, IRR still above the ‘hurdle rate’ for onshore wind of 7.9%. Therefore the wind storage project is still viable.

Wind Farm with:	No Storage	Storage
Pre Tax NPV	£13,173,198	£ 10,143,139
Post Tax NPV	£11,811,961	£ 8,740,057
Post Tax IRR	10%	9%
NPV Capex	£ 2,127,876	£ 2,307,055
Post Tax NPV Capex Ratio	5.55	3.79
Payback Year	2026	2027

Sensitivity Analysis found inputs relating to the wind farms costs (capex) and revenues (Cfd strike price) to have greatest effect on NPV.

The costs (capex) and revenues (wholesale power price and STOR payments) of storage were not found as a major NPV determinants.



Conclusion

- Energy storage in UK lags behind the EU
- Currently receives no Government support
- Carbon - enhanced lead acid batteries optimal for onshore wind farms
- Storage has negative effect on NPV and IRR
- Therefore not yet economically viable
- Government action required