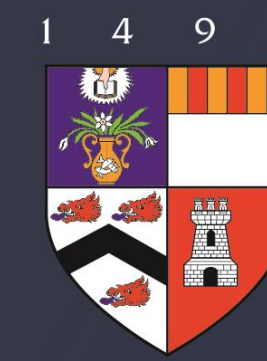


ECONOMIC ANALYSIS AND INVESTMENT APPRAISAL OF AN OFFSHORE WIND FARM IN CYPRUS



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MOTIVATION

- Cyprus, as well as most of island states, heavily depend on the import of fossil fuels to meet their energy needs and as a result they suffer from high electricity production costs due to the high transportation charges, diseconomies of scale in the electricity generation and the existence of an isolated electricity system.
- Supplying affordable and clean electricity is crucial for the country to sustain the level of economic growth in the long-run. Also, considering the abundance of various Renewable Energy Sources (RES) including solar, wind energy and biomass, moving towards a green economy, seems to offer a gateway to the country in dealing with its energy challenges.
- Currently there are six operating onshore wind farms in the country, contributing to around 5% of the annual nationwide electricity production; wind energy is the source contributing the most in electricity generation in Cyprus. Given the country's current energy challenges and its RE potential as well as the upward trend of investing in offshore wind projects in EU over the last five years, led to the decision of completing this research project.

AIM

The project deals with an economic analysis and investment appraisal of an offshore wind farm in Cyprus. The aim of the project is to examine whether an offshore wind farm investment in Cyprus is economically viable.

METHOD

Model	Type	Description
1	Deterministic Model	Model 1 is the base case scenario for which input variables are fixed. DCF analysis is undertaken to estimate NPV, IRR, payback period and Sensitivity Analysis on NPV and IRR is carried out.
2	Deterministic Model	The only difference between Model 2 and the base case scenario is that instead of using the mean average electricity price to estimate the annual revenues, the previous FIT scheme regarding Wind Parks in CY (fixed variable) was used.
3	Stochastic Model	Annual mean electricity prices were randomly simulated assuming log normal distribution. MC Simulation was run (1000 times) to check their effect on the NPV of the project.
4	Stochastic Model	Mean annual offshore wind speed data was randomly simulated assuming uniform distribution. MC Simulation was run 1000 times to model the effect of varying offshore wind speeds on the NPV of the project.
5	Stochastic Model	Mean annual electricity production was randomly simulated assuming uniform distribution and MC simulation was run 1000 times to examine the effect of the mean annual electricity production on the NPV of the project.

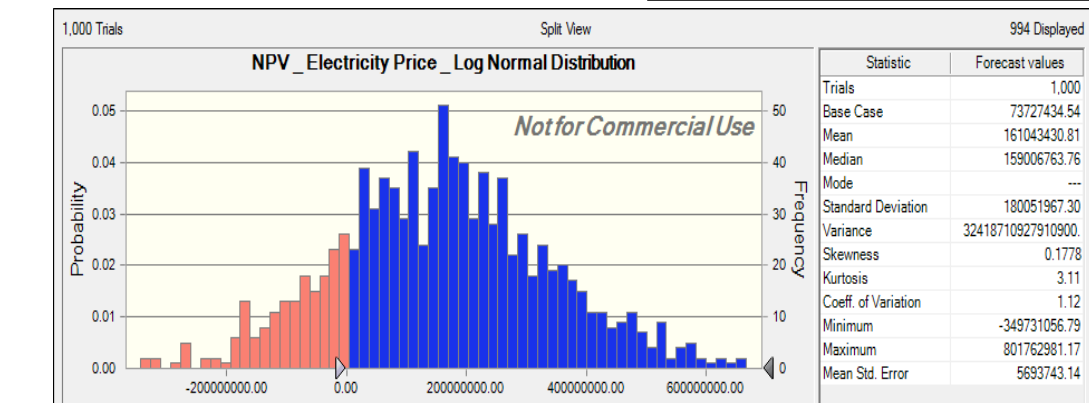
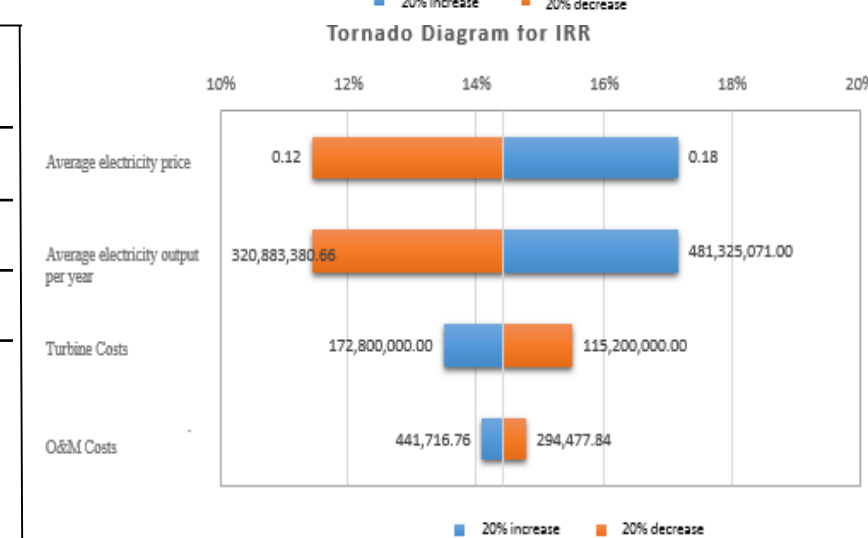
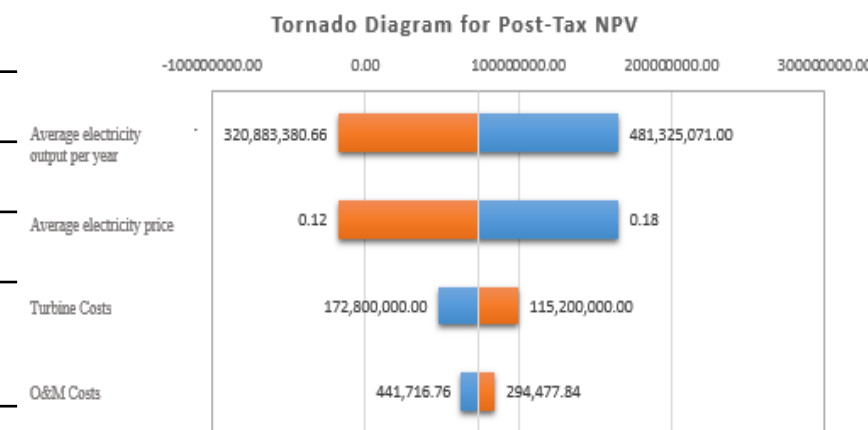
Summary Output for Model 1

Pre-Tax NPV (€)	108,970,539.48
Post-Tax NPV (€)	73,727,434.54
Post-Tax IRR (%)	14%
Approximate Simple Payback Year	8
Breakeven Price (€/kWh)	0.126

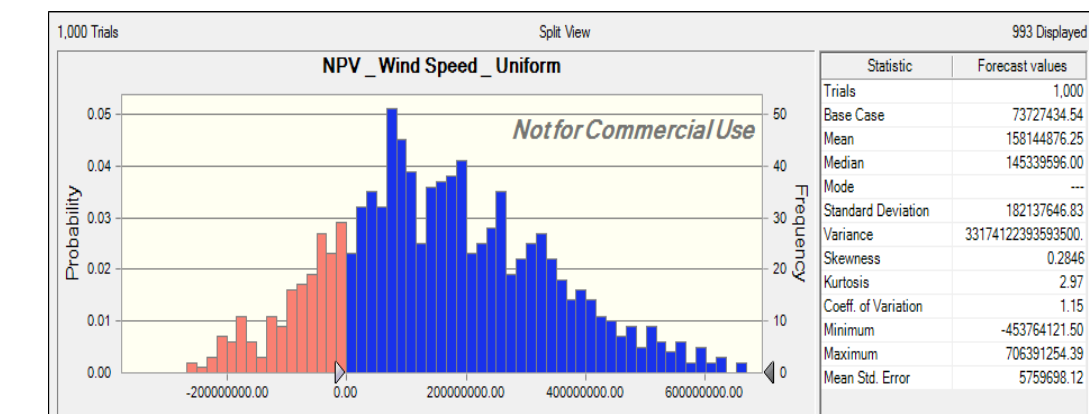
Summary Output for Model 2

Pre-Tax NPV (€)	91,524,951.7
Post-Tax NPV (€)	58,462,545.23
Post-Tax IRR (%)	14%
Approximate Simple Payback Year	8

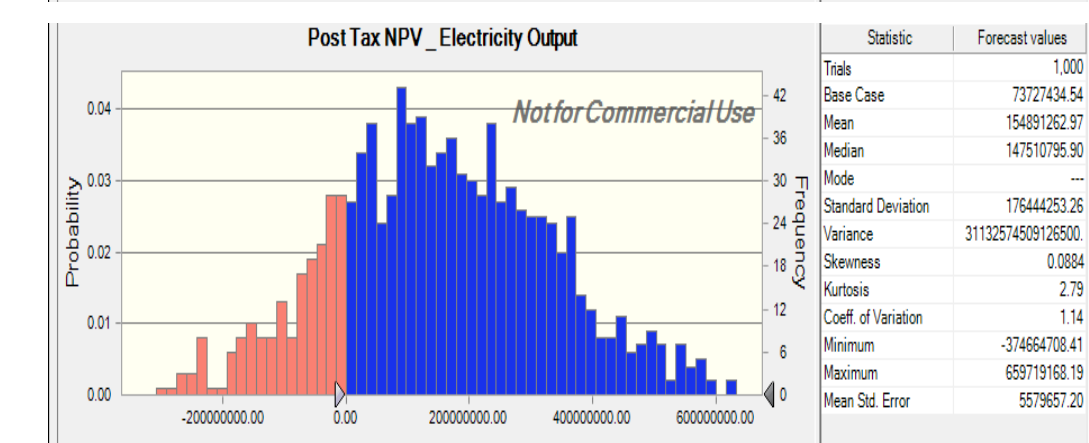
RESULTS



82.54% of generating a positive NPV – Electricity Prices



80.54% of generating a positive NPV – Offshore Wind Speed



80.66% of generating a positive NPV – Electricity Output