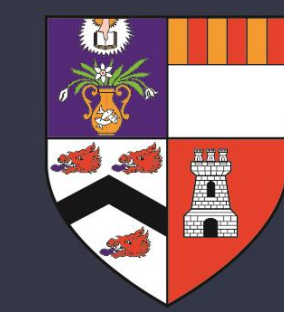


# Title : ECONOMIC ANALYSIS OF MARINE ENERGY CONVERSION DEVICE IN UNITED KINGDOM

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## Introduction

- ❖ It is estimated that UK has around 50% of Europe's tidal resource translated to 30-50 GW of installed capacity.
- ❖ Tidal stream energy has the potential to cover up to 12% of UK's current electricity demand.

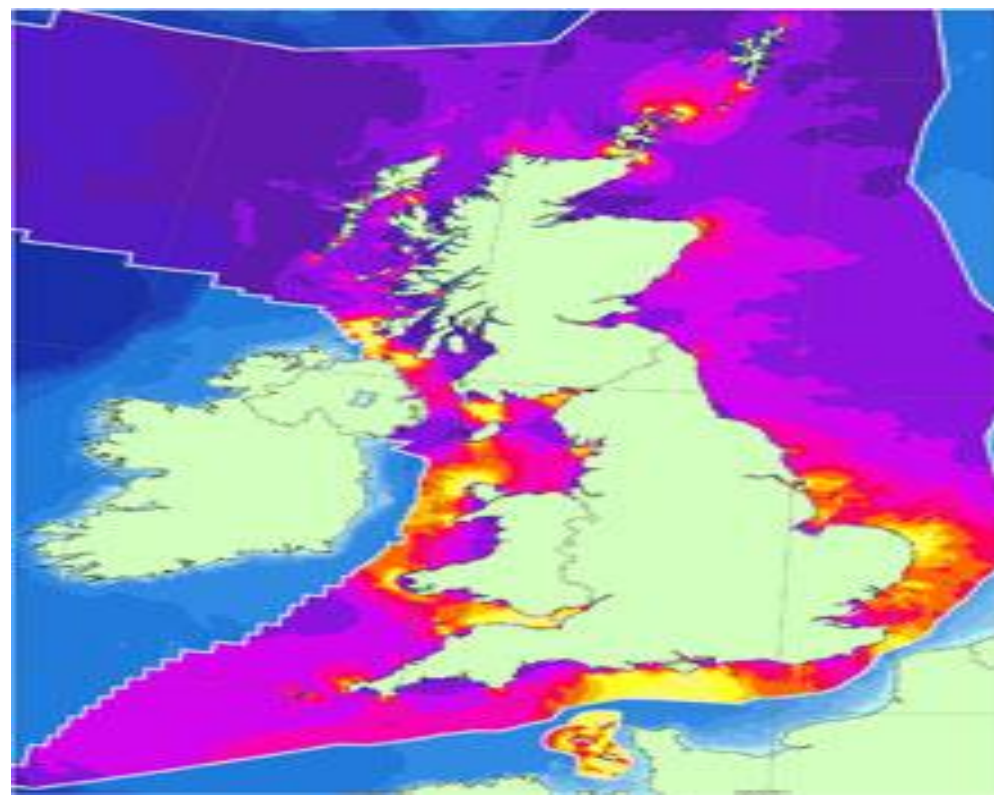


Fig 1: Tidal stream energy in UK

## Obstacles

- ❖ To date, the exploitation of tidal energy is done by using energy conversion devices.
- ❖ Large amount of energy is lost since it is exported to shore via cable.

## Purpose of Study

- ❖ Construct a model to evaluate the economic potential of marine energy conversion device which stores energy in a battery.
- ❖ Identify key parameters affecting the viability of the project.

## Methodology

- ❖ Simple NPV, IRR and Payback Period analysis
- ❖ Levelized Cost of Electricity analysis
- ❖ Sensitivity analysis on Post-tax NPV
- ❖ Monte-Carlo Simulation

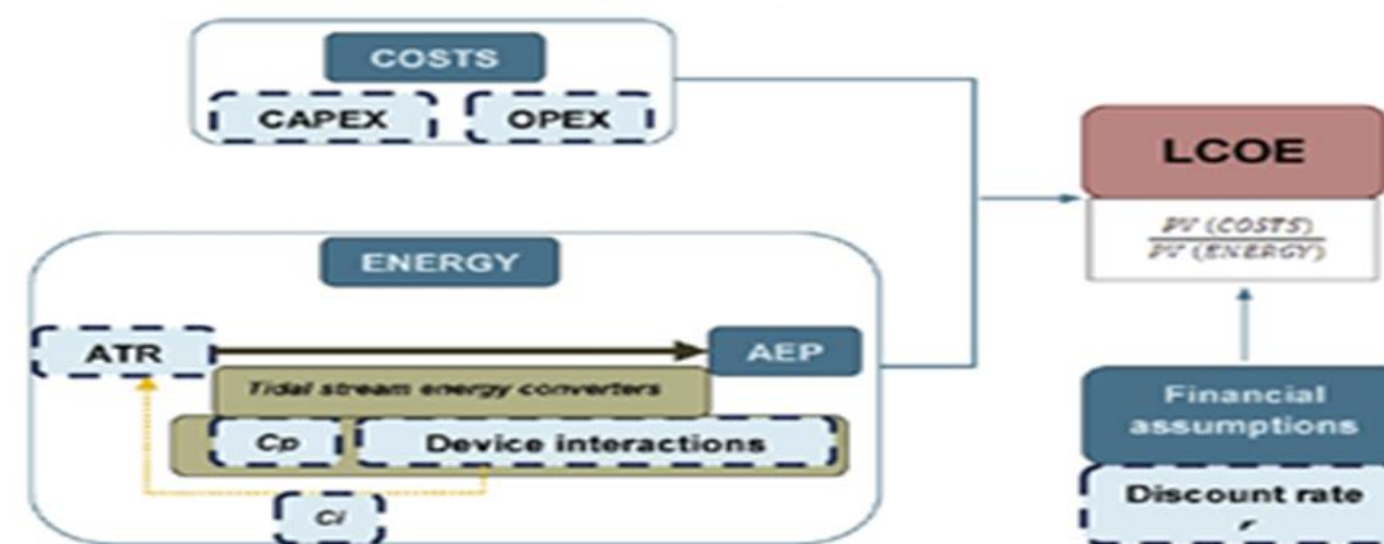


Fig 2: Input parameters and decision nodes

## Results

- ❖ Base case scenario

Summary Output		
Pre-Tax NPV	-£	4.076.237,807
Post-Tax NPV	-£	4.076.237,807
Post Tax NPV Capex Ratio		-2,547648629
Approximate Simple Payback Period		
Post-Tax Internal Rate of Return		

- ❖ Negative NPV of (4.076m)
- ❖ The electricity price to break-even should be:

Electricity Price £/per kWh 8,066274442

- ❖ LCOE analysis and map
- ❖ The LCOE of the project is £9.33/kwh

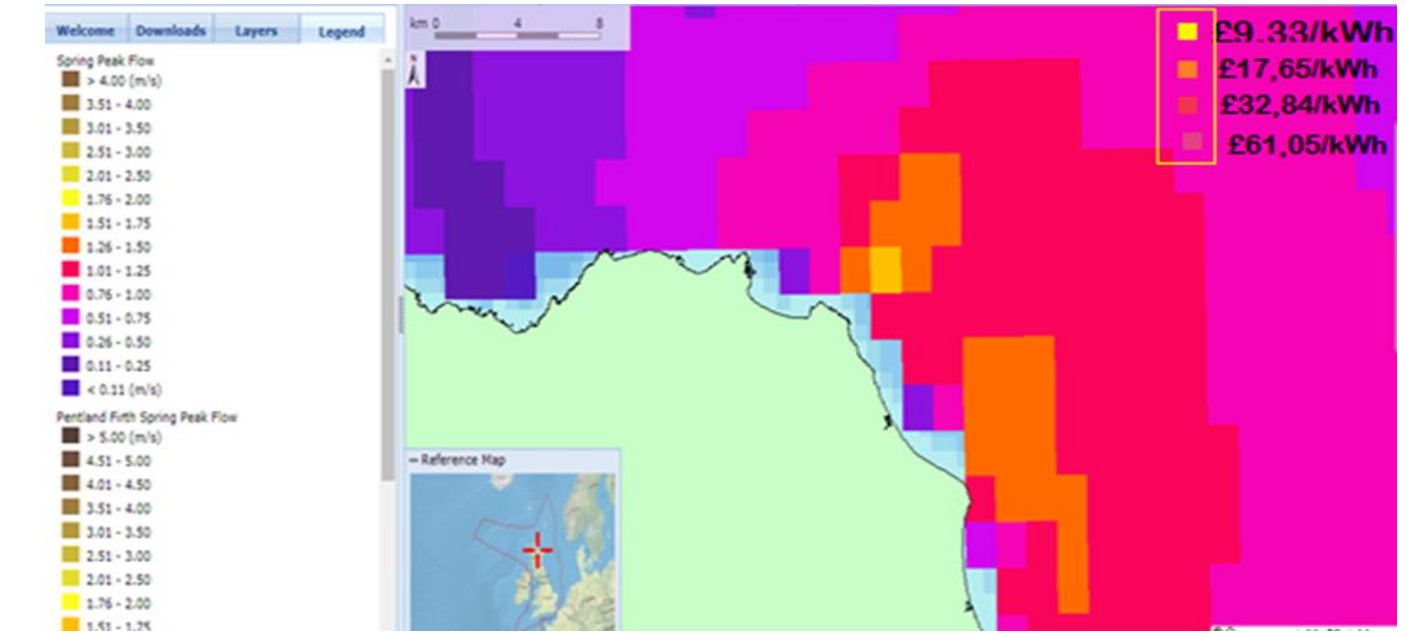
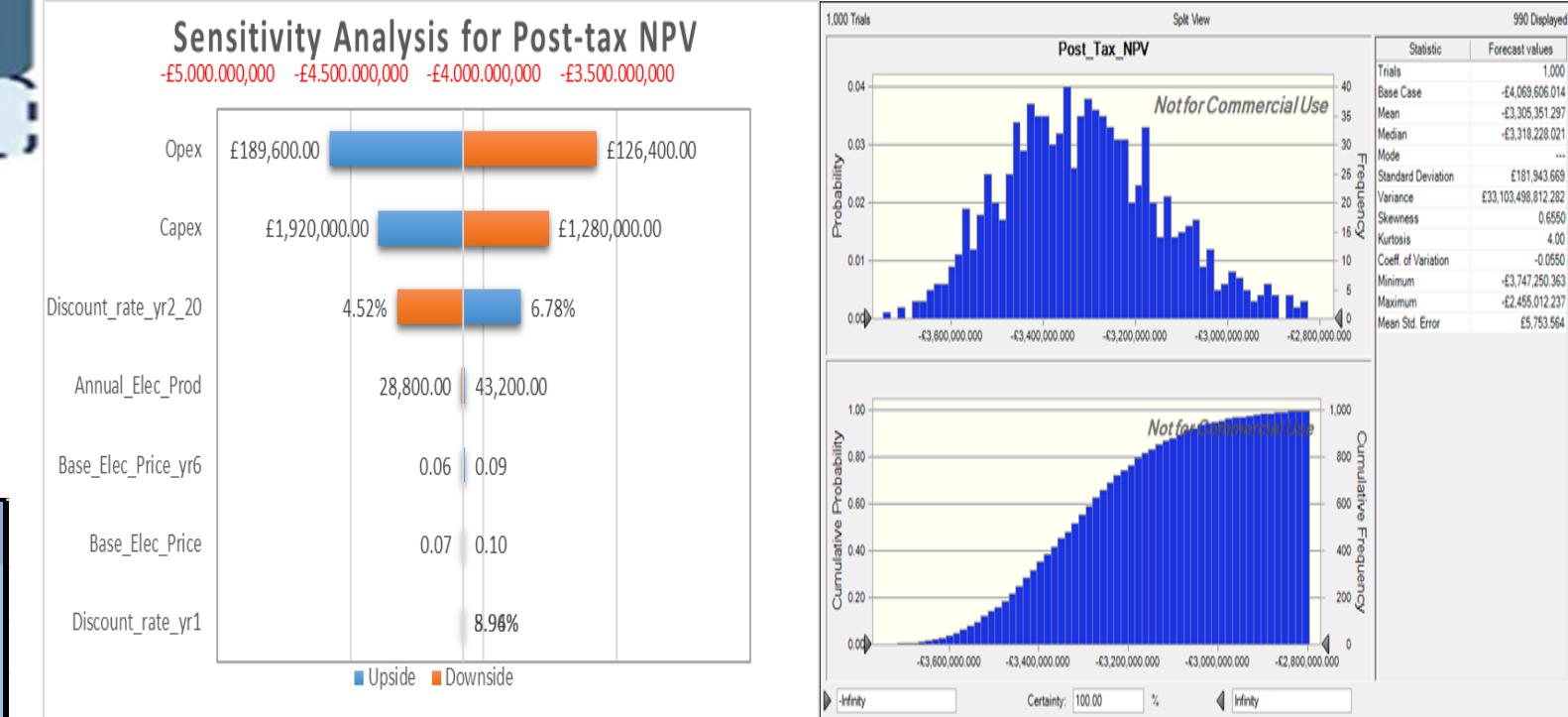


Fig 3: LCOE Map

- ❖ Sensitivity analysis & Monte-Carlo Simulation



- ❖ Higher sensitivity to Opex, Capex and Discount rate
- ❖ 100% certainty of generating negative NPV values -industrial electricity prices

## Conclusion

- ❖ Project is not financial feasible
- ❖ Costs should be reduced
- ❖ Subsidy would make the project feasible
- ❖ Benefit of experience and learning