

OptiWave

Case study: Sea Power Attenuator

OptiWave is a financial and engineering optimisation platform for wave energy systems which is designed to efficiently and accurately inform developers of key performance metrics. The software helps to de-risk projects and improve investor confidence, thereby reducing barriers to the development of wave energy systems.

Wood and Exceedence recently undertook a case study which considered a hinged wave-following attenuator designed by Sea Power Ltd. Firstly, a single device was examined by the engineering simulator using the known environmental data at two of Ireland's west coast offshore sites known as AMETS and Mollison. These represent productive but challenging environments for wave energy capture and conversion.

Optimum settings for the power take-off mechanism were determined using sensitivity studies, which resulted in increased annual energy production (AEP). The enhanced performance metrics were then passed to the financial modelling software, where a commercial feasibility assessment illustrated reduced levelised cost of energy (LCOE) at both sites. Further financial models were examined for a 100-unit array at the Mollison site, and taking economies of scale into account, the final LCOE figure was lower than the published data on competing device concepts. The combined engineering and financial assessment was completed in a matter of weeks and cost a fraction of the commercial investment made to date by Sea Power in the device development.

Key findings*:

Single device at AMETS test site

- AEP value improved to 2466 MWh/year (7% increase)
- LCOE figure improved to £262.80 GBP per MWh (7% reduction)

Single device at Mollison test site

- AEP value improved to 3086 MWh/year (11% increase)
- LCOE figure improved to £210.00 GBP per MWh (10% reduction)

100 unit array at Mollison

- LCOE further reduced to £156.1 GBP per MWh

"The levelised cost of our technology is ultimately a measure of how competitive the technology can be, and will determine its commercial uptake in the renewable energy sector. We needed to prove to our funders and to the public, that we could engineer down the costs of the Seapower Platform™ in a systematic way, and that this process has been key to our design decisions. For the wave energy industry, Optiwave is a vital step in unlocking the complexities of technical and financial modelling. It allows developers and funders to focus their budgets to develop projects based on a transparent and robust metric - such as a cost per MWh."

Sea Power LTD.

Key benefits of OptiWave:

Accurate financial metrics

Financial projections based on detailed engineering models and real-world wave resources

Accelerated project development

Screen out weaker concepts earlier, and accelerate the development and refinement of innovative designs with genuine prospects

Design optimisation

Explore potential advances in energy generation and identify opportunities for cost reduction

Detailed understanding

Key insights into annual energy production, local power fluctuations, loads in structural members and fatigue life expectancy, based on detailed engineering simulation

Clarity

Complete transparency of both financial and engineering design processes

Consistency

Suitable for all stages in the design process, from concept development, to model scale prototypes, and right through to full scale versions

Unlock investment

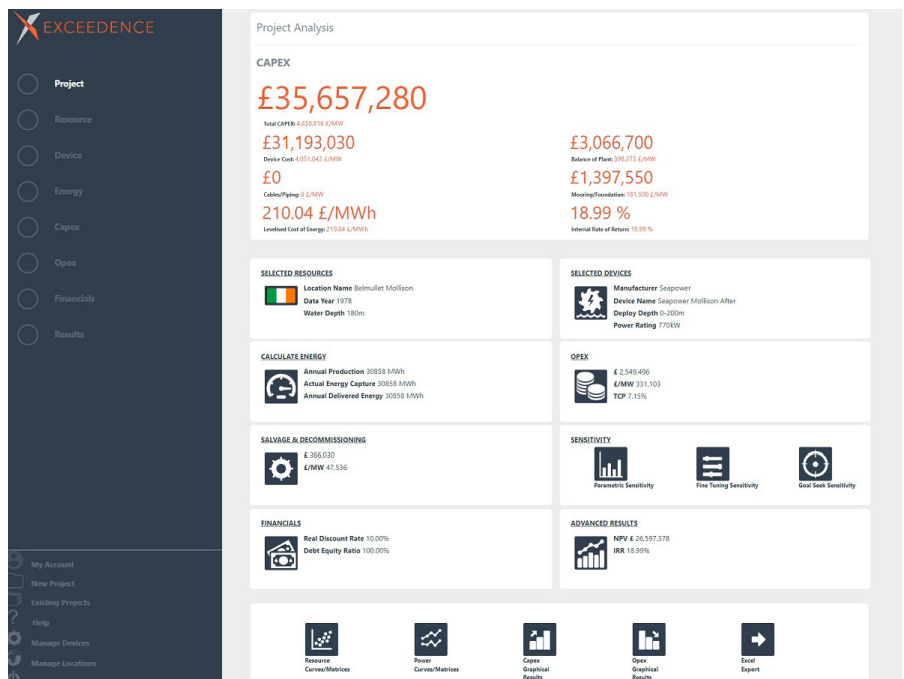
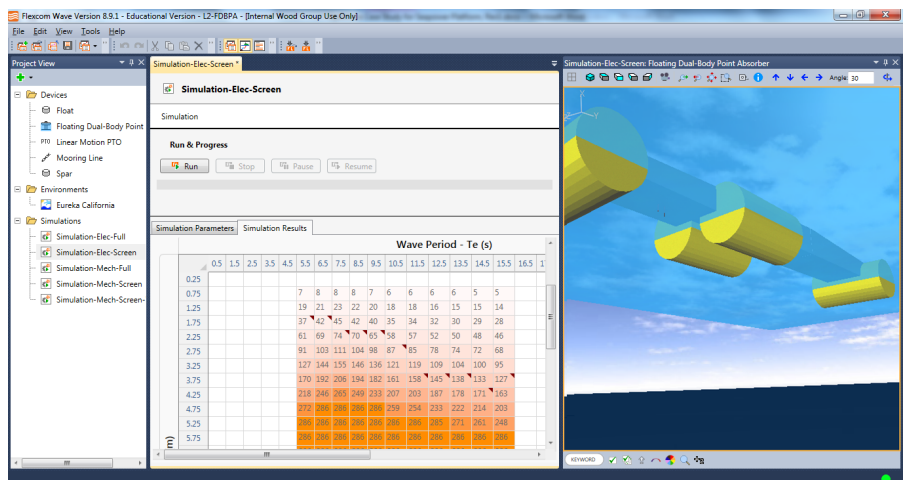
Increase investor confidence by de-risking projects

Recognised by industry

Validated via industry case studies and technical papers

Environmental and societal benefits

Reduces entry barriers to new developers and facilitates growth of wave energy sector in general



"The integrated nature of the engineering and financial models, in addition to the online database of wave resource information, are major plus points for us" - **Sea Power LTD.**