

Barrier No. 2 Wave Overtopping and Tidal Flow Energy Capture

Analysis and Solutions

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Scope for wave overtopping and tidal flow energy capture study

The study will investigate the feasibility of incorporating tidal energy capture devices within a new barrier arrangement to prevent wave overtopping. The tidal energy element of the study will determine the potential tidal energy available from Barrier No.1 and Barrier No.2 and provide an indicative arrangement for the placement of devices, barrier opening width and position to optimise the potential for energy capture. Consideration will be given to the level of tidal energy technology currently available, in relation to its technical maturity and the potential for use as part of a barrier overtopping solution.



Outline of overall project methodology and key objectives

The project will follow several stages of assessment, development, design, modelling and refinement as described below. Each of these stages is discussed in detail within the methodology description.

The project is structured as follows:

1. **Scoping study**, which describes the assumptions and methodology of the project.
2. **Data collection**, which includes the collection of hydrodynamic, topographic, sediment sampling and environmental data.
3. **Numerical modelling**, where wave transformation, hydrodynamic, sediment transport and tidal energy modelling will be undertaken.
4. **Engineering design**, where the four proposed options to reduce wave overtopping will be designed and refined based on wave overtopping calculations.
5. **Tidal energy evaluation**, where the potential and preferred arrangement of tidal energy devices and their associated costs will be developed based on the most appropriate technology.
6. **Cost assessment**, which will assess the construction costs for each of the four overtopping options.
7. **Options appraisal and selection**, which will review the four overtopping options, considering technical viability, cost, environmental impacts and stakeholder interests. Following this assessment the preferred option will be identified.
8. **Physical model**, where 3D physical modelling will be undertaken for the preferred option, testing overtopping performance and armour structural stability.
9. **Refinement of engineering design**, which will finalise the design of the preferred option. the placement of devices, barrier opening width and position to optimise the potential for energy capture. Consideration will be given to the level of tidal energy technology currently available, in relation to its technical maturity and the potential for use as part of a barrier overtopping solution.