

Project Student: Thomas Prime

Supervisors: Prof Andy Plater, Dr Melinda Acutt, Dr Judith Wolf, Dr Jenny Brown, Prof Joe Spencer

Project Title: Physical, Operational and Economic Resilience of Coastal Energy Networks

Project Outline: This project undertakes an assessment of the physical, operational and economic resilience of coastal energy networks; this is part of the ARCoES project (Adaptation and Resilience of Coastal Energy Supplies). The infrastructure of interest is potential new nuclear sites, Hinkley Point C, Sizewell C and Wylfa. Also of interest is the nuclear waste storage site Sellafield and back up new nuclear sites, Bradwell. In addition to this I will also be looking at North West Coastal Energy Infrastructure, e.g. substations etc.

The first half of the project is assessing the flood risk for all the locations detailed above; this is the one of the biggest factors in maintaining resilience in the future, primarily due to the impact of climate change (Increased sea level, storminess etc). I will be using a flood model to simulate various scenarios, such as extreme sea levels due to storm surges, the effect of waves on sea defenses and the impact of high river flows. This will determine what investment the energy infrastructure requires to maintain resilience.

The other half of the project is to perform a cost benefit analysis and determine the most cost effective way of investing in the energy infrastructure to make sure that it can stay operational into the future. Risks that are acceptable now may not be in the future, the new nuclear power stations will be present until 2180 (160 year lifecycle starting from 2020). To quantify the risks involves undertaking a flood and erosion risk management appraisal. This will also quantify the costs and benefits to allow the most cost efficient option to be selected. It also allows for other ways to maintain resilience such as smart meters/grids and grant's to encourage energy efficiency, e.g. solar panel grant's and subsidised tariffs etc.

The final stage of the project is to incorporate the appraisal into a GIS based system that can be used by third party users to access.

Student Biography: Tom has a Masters in Oceanography from the University of Southampton. He has wide experience of Oceanography, ranging from Physical to Chemical, Biological, Geophysics and Seismic processes. During the last 5 years he has worked for a laboratory service and calibration company; servicing and calibrating laboratory equipment as well as performing air sampling surveys for hospital theatres. His main research interests are flood risk modeling and management appraisal, combining numerical modeling and economic processes.