Coastal Erosion and Flooding around Sizewell

This leaflet can be viewed at: http://www.tasizewellc.org.uk/index.php/leaflets
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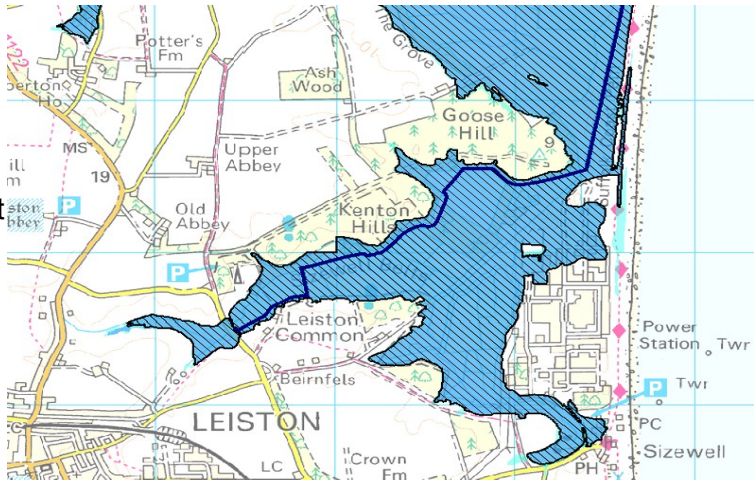
In 2012 The Government published the UK Climate Change Risk Assessment (CCRA) This assessment reviewed the evidence for over 700 potential impacts of climate change in a UK context. This independent analysis was funded by UK Government, though the outputs have been extensively peer reviewed by scientific and economics experts and an independent international peer review panel.



The map reproduced from the UK Environment Agency shows the flood risk around the Sizewell plants.

The assessment states:
"Information from a wide range of sources has been used and analysis has been undertaken by specialists from leading UK institutions. The assessment can therefore be considered to reflect the current state of knowledge on climate risks and opportunities. The analysis did identify, however, a lack of suitable evidence in many areas. It was not possible to quantify many risks and opportunities and in other cases the analysis was incomplete because of a lack of suitable information. In addition, it was not possible to assess some of the more complex interactions such as the overall risks to ecosystems or to analyse multiplicative effects of several risks occurring together; for example successive droughts followed by floods, or multiple infrastructure failures caused by severe weather events."[1]

It goes on to say:

"The many impacts were analysed using single climate variables, the analysis may be over-simplified in cases where the consequence of climate change is caused by more than one climate variable...Climate monitoring, climate modelling and risk assessment methods have improved significantly over the last two decades but there are still limits to our understanding of future climate risks. For example we do not know how fast greenhouse gas emissions will rise, how great the cooling effects are of other atmospheric pollutants or how quickly the ice caps may melt. These and other uncertainties result in a wide range of possible rates of warming and sea level rise. ...Projecting changes in climate for specific regions is still a significant challenge for the current generation of climate models. In particular there is a growing body of evidence suggesting that loss of Arctic sea ice may have major consequences for climate in mid latitudes (Petoukhov and Semenov, 2010; Budikova, 2009; Francis et al., 2009) that are not fully represented in existing models."[2]

With regard to coastal processes, a summary of the findings by the Marine Climate Change Impacts Partnership says:

"The marine scenarios do not attempt to quantify a probability of future changes and cruder estimates of the minimum uncertainty range are made... There are several reasons for this. Firstly, gaps in our understanding of marine processes (e.g. deep ocean mixing processes, which affect ocean circulation and mean sea level) mean that current models may not simulate the full range of possible futures. Secondly, even where we might estimate the range of possible futures there is an insufficient number of model simulations (e.g. of climate driven changes in waves) to credibly fill in the range between the projected highest and lowest values. Finally, insufficient work has been carried out in the marine community on suitable observational constraints for projections of global and local marine and coastal climate change."[3]

It is clear that scientists are uncertain about the extent of future sea level rise and storm surges. The only thing they all agree on is that weather events are going to become more extreme, and that no-one can asses what the combination of different weather patterns, tides and coastal erosion will bring. And yet a press release published on 29/01/13 EDF claimed they are confident "that, with additional defences, the new power station can be protected into the future"

From independent reports that are in the public domain, it appears that the coastline around Sizewell is very dynamic and it is difficult to precisely predict its future behaviour. It is known that vast volumes of deposits such as those that make up the coast at Sizewell can be moved in a single storm surge.
A report concerning a storm surge of 1978 which caused extensive damage to stretches of the East Anglia

1UK Climate Change Risk Assessment: Government Report, 2.2 page 12
2UK Climate Change Risk Assessment 2012 Evidence Report page iv
3 Marine Climate Change Impacts Partnership UKCP09 Marine and coastal projections summary page 8

coast estimated that 30,000m3 of material was moved when the dunes were cut back by 20m at Scolt head on the Norfolk coast. The authors of the report note with regard to the coast at Aldeburgh and Thorpeness

"it is not improbable that this stretch of coast will suffer severely in future gales...this part of the coast is likely to become progressively weaker, and it would not be surprising if considerable, and even serious, changes took place along it" .[4]

According to Dr Colin Brown, director of engineering at the Institution of Mechanical Engineering:

"*...Sizewell will certainly be affected by rising sea levels. Engineers say they can build concrete walls that will keep out the water throughout the working lives of these new plants. But that is not enough. Nuclear plants may operate for 50 years, but it could take hundreds of years to decommission them. By that time, who knows what sea-level rises and what kinds of inundations the country will be experiencing?"*[5]

Although it is noted in the Sizewell C stage 1 environmental report that coastal erosion is a problem and that extra sea defences will be necessary, there are no examples of how this might be achieved, or any assessment of the affects (social, economic and environmental) on the local area of Sizewell. These possible affects need to be studied and quantified before any benefits of the power station can be weighed against the possible loss of homes, businesses and agricultural land as well as the natural environment including Minsmere and the Sizewell AONB

In mitigating any degradation of the shore defences at Sizewell there has been no data presented to show what affect these would have on the adjoining coastline either. Currently the erosion of areas to the north of Sizewell provides material which is naturally transported south along the coast to provide protection for both Sizewell and further south to Thorpeness. Any disruption to this natural process to provide protection for the power stations would necessarily decrease the protection to the south. It has been noted by several local residents that the Thorpeness area which has been relatively stable, has recently undergone increased erosion and upgraded sea defences have been put in place. In 2011 so much erosion took place, homes were threatened with sliding down the cliffs. The District Council the Environment Agency and the local residents had to get together to put in rock defences and geo textiles, half of the cost of which was paid by the residents themselves. This occurred after the out fall was shut off from Sizewell A, and Sizewell B was out of service whilst the pressuriser was being repaired. There is local speculation that the outfalls subscribe to the coastal processes.

EDF are apparently confident that the calculations for the design for Sizewell C will ensure it is sufficiently robust to withstand storm surge levels, therefore they should perhaps be able to also give some indication of the costs and consequences of various flood mitigation measures, given that they have had several years within which to study the coastline. It is difficult to have a meaningful consultation without first being given any sort of clue what we may be faced with at Sizewell.

In the 2008 Proposed Nuclear Development at Sizewell – Environmental Scoping Report, British Energy flood defences are described as follows

"*The Sizewell frontage incorporates a soft shore flood defence. There are two lines of embankment (in general appearance, vegetated dunes) fronting the Sizewell C Site which, properly maintained, comprise the flood defences. The 10m high embankment fronting the B site has an internal structure but the 5m high embankment does not. The design concept is that the 5m structure will collapse into the beach and thus mitigate erosional influences on the 10m structure during extreme storm events."*[6]

It is unclear whether the 5 meter structure, once collapsed would be built up again, and if so how the many tons of fresh shingle would be brought in, or whether it is assumed that only one such extreme storm event will take place during the lifetime of radioactive material being stored at the site. If the 5m structure collapses then it will no longer be there to mitigate future erosional influences on the 10m structure. If more than one storm surge happens within a short space of time, there would be no time to build up the shingle bank.

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4 The Storm Surge of 11 January 1978 on the East Coast of England, J.A. Steers, D. R. Stoddart, T. P. Bayliss-Smith, T. Spencer and P. M. Durbidge,The Geographical Journal, Vol. 145, No. 2 (Jul., 1979), pp. 192-205

5 http://www.guardian.co.uk/science/2009/mar/08/climate-change-flooding

6 http://www.british-energy.com/documents/Sizewell_Environmental_Scoping_Report.pdf