

CLIMATE CHANGE UK NUCLEAR

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Executive Summary

In the last year, climate models have run hot. As knowledge of enhanced climate sensitivity and polar ice melt-rate evolves, it has become clear that sea-level rise is significantly faster than previously thought, resulting in more frequent and destructive storm, storm surge, severe precipitation, and flooding.

With rare extreme events today becoming the norm in the future, existing risk mitigation measures become increasingly obsolete. The corollary to this analysis is that present and planned UK coastal nuclear installations will be at significant risk. In other words, nuclear's lower-carbon electricity USP sits in the context of the much larger picture – that UK coastal nuclear will be one of the first, and most significant, casualties to ramping climate impact.

Put simply, UK nuclear is quite literally on the front-line of climate change – and not in a good way.

To better understand the scale of risk and deploying representative sea-level projections closely aligned with median IPCC findings based on only median sea-level projections; annual flood risk maps for the year 2050 at two representative UK nuclear installations are provided. Like all models, including those deployed by EDF and the Office for Nuclear Regulation (ONR), these coastal flood risk maps should be interpreted as plausible threat indicators requiring deeper investigation.

Integrating very recent peer-reviewed scientific knowledge on climate change impact, this Report's key finding is that UK civil nuclear infrastructure is profoundly unprepared for climate impact and there is a very high probability that reactors and their associated high-level spent fuel stores will become unfit for purpose.

Due to ramping climate induced sea-level rise, storm, storm surge, severe precipitation and raised river-flow, UK nuclear installations are set to flood – and much sooner than either the nuclear industry or regulators suggest. This is because risks to nuclear installations from sea-level rise driven extreme climate events will not be linear, as thresholds at which present natural and built environment coastal and inland flood defence barriers are exceeded.

Nuclear industry and ONR efforts to mitigate climate risk will involve significantly increased expense for any nuclear construction, operation, waste management, decommissioning, and even relocation or abandonment. Thus, it is essential that future climate risk to nuclear is transparently reassessed. In doing so, evolutionary modelled prediction of seasonal, decadal, and future climate change impact on nuclear infrastructure must be taken into account – including potential rapid change in extreme events, abrupt interactions and feedbacks.

Comprehensive ONR and nuclear industry risk assessments based on 'all case' scenarios should be published and regularly updated as fundamental scientific climate impact evidence evolves. Such an approach must include costings for any mitigation measures,

and a range of contingency plans for the swift onset of climate-driven severe weather. In this sense, necessary action on climate change impact on UK nuclear infrastructure should be informed by and flow from the UK Presidency of COP 26 and the forthcoming Environment Bill, thereby reinforcing UK Fusion Doctrine.

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