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Water use and water availability constraints to decarbonised electricity systems

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Analysis of numerous low carbon electricity strategies have been shown to have very divergent water requirements, normally needed for cooling of thermoelectric power stations.
Our regional river-basin scale analysis of water use for future UK electricity strategies shows that, whilst in the majority of cases freshwater use is expected to decline, pathways with high levels of carbon capture and storage (CCS) will result in significantly elevated and concentrated water demands in a few key river basins. Furthermore, these growing demands are compared to both current water availability, and our expected regional water availability under the impacts of climate change. We identify key freshwater constraints to electricity strategies with high levels of CCS and show how these risks may be mitigated with higher levels of hybrid cooling and alternative cooling water sources.