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Resolving land use conflicts between renewable energy, nature protection and food production

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As countries transition to net zero emissions, the number of land use conflicts between energy generation, nature conservation and food production are expected to rise. Models typically restrict energy deployment from land deemed as providing high societal value (e.g. National Parks, peatland) when exploring future energy pathways to resolve these conflicts. This study applies the spatially explicit ADVENT-NEV model to Great Britain to determine the lower-bound of the implied value being placed on the land excluded**.** It compares the 'optimal' locations for new renewable energy when strict restrictions are applied against those identified when a natural capital approach is used.

When energy development is restricted from Areas of Outstanding Natural Beauty, National Parks and high-grade agricultural land the cost of the energy system is shown to increase by approximately 10%. Even limited bioenergy crop expansion is unfeasible if strict restrictions are applied. In particular, results indicate that such restrictions would not be compatible with net zero emissions targets. These restrictions also result in an increase in the spatial footprint of solar farms, wind farms and bioenergy power stations by up to 13.4%, 79.6% and 15.8% respectively.

Incorporating the valuation of ecosystem services into renewable energy modelling provides a more nuanced approach than a binary exclusion, highlighting how strict restrictions may not always be best for society. The natural capital approach makes trade-offs between energy, nature conservation and food production more explicit for decision-makers allowing them to take a more holistic approach.