

Carbon leakage from land-based climate change mitigation

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Introduction

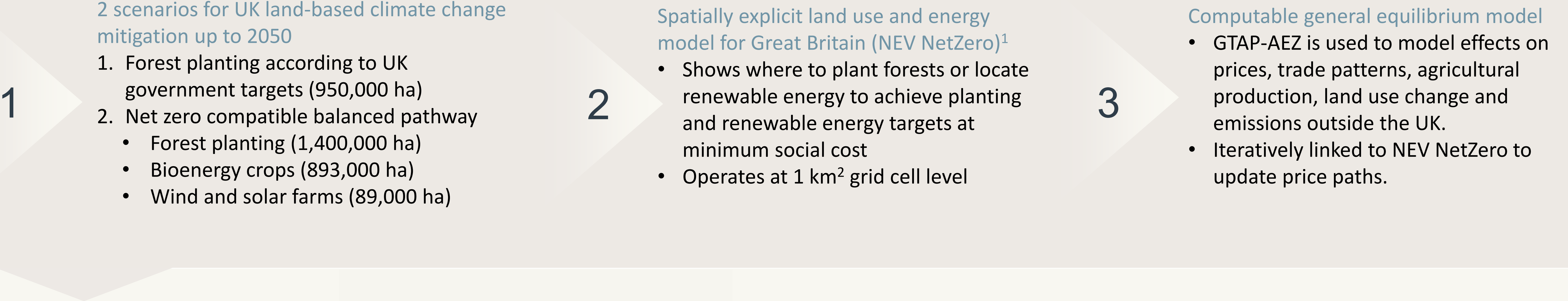
Afforestation and the transition to renewable energy are crucial in supporting countries' net-zero ambitions. However, land-based climate change mitigation replaces agricultural land. Through trade, this can raise agricultural production, deforestation and greenhouse gas emissions abroad. Such carbon leakage reduces the effectiveness of land-based carbon mitigation.

This study quantifies greenhouse gas (GHG) leakage from large-scale afforestation, the expansion of bioenergy crops with carbon capture and storage (BECCS), and wind and solar farms in the UK.

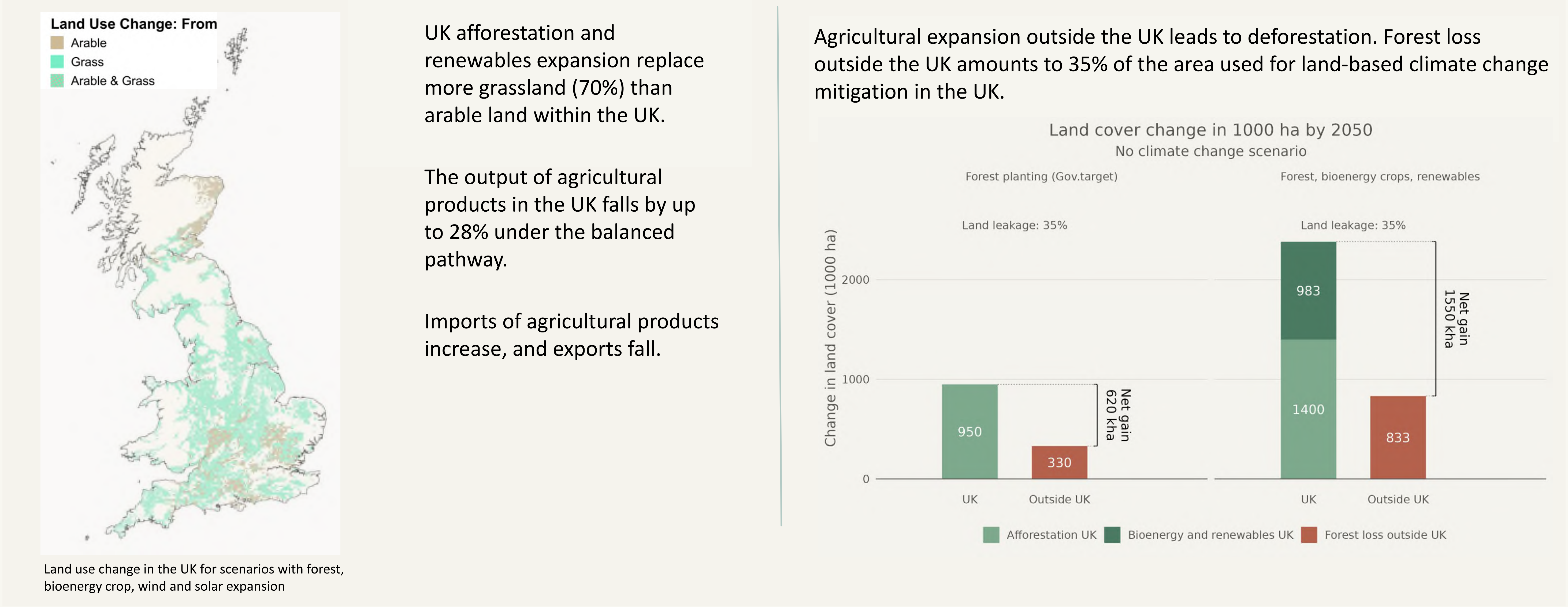
Leakage Mechanism



Methods

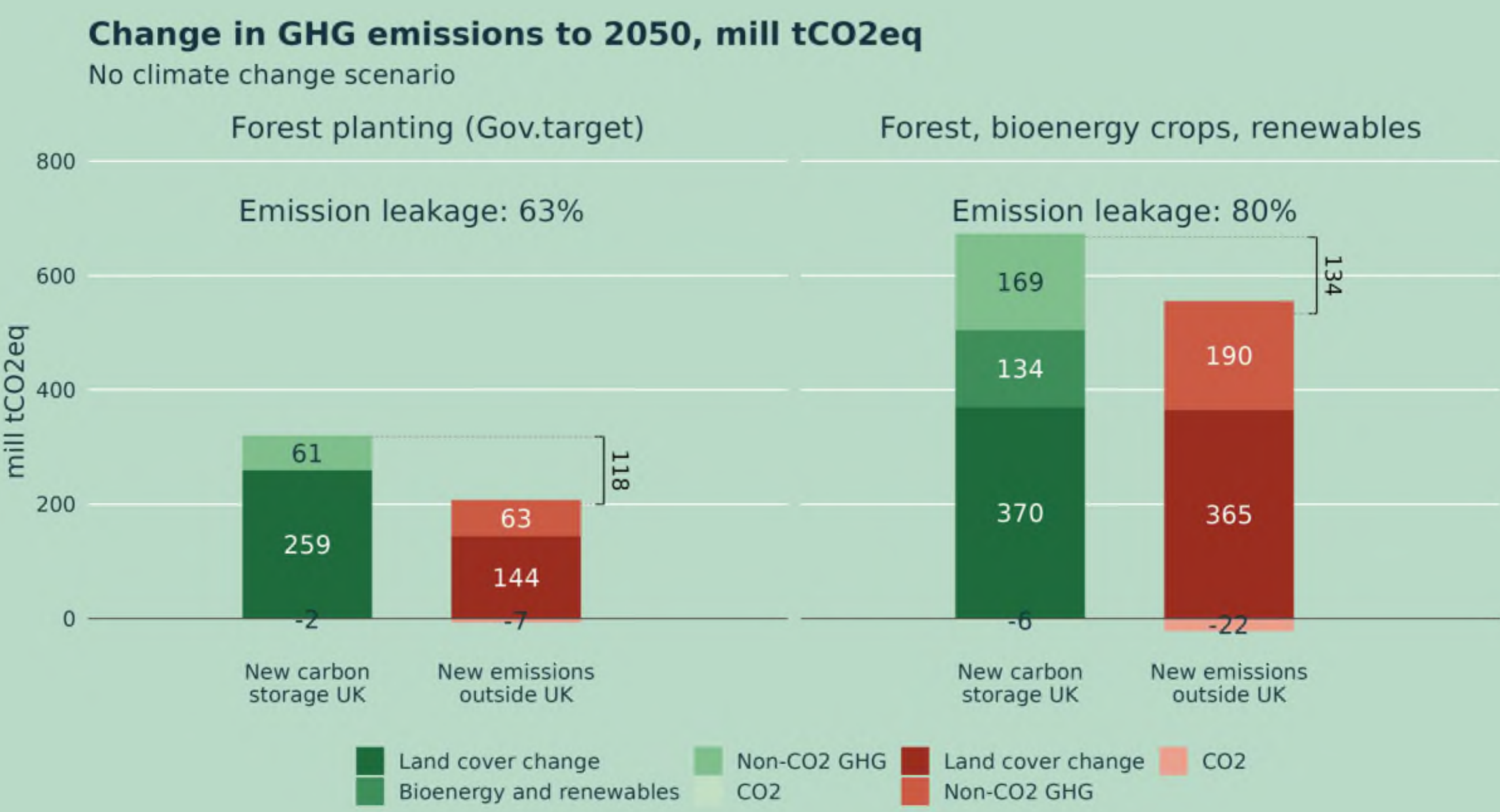


Results



Preliminary Result on Leakage

Outside the UK, greenhouse gas emissions increase due to deforestation and increased agricultural production. The cumulative increase in ROW GHG emissions amounts to 63-80% of the greenhouse gas emission reduction in the UK up to 2050.



Conclusion

Carbon leakage of at least 63% seriously undermines land-based climate mitigation efforts in the UK.

Small biodiversity effects in the UK and the rest of the world.

Preliminary results suggest that a regulator who takes global rather than national GHG emissions into consideration would plant more on arable land.

References

1. NEV NetZero is an extension of Delafield, G., Smith, G. S., Day, B., Holland, R., & Lovett, A. (2023). The Financial and Environmental Consequences of Renewable Energy Exclusion Zones. *Environmental and Resource Economics*. 87(2), 369–398.