

PREFERRED MODE

OF PRESENTATION:

Oral Poster

PREFERRED SESSION:

Modelling Policy Incentives BECCS
 Weathering Forest Agriculture Soil/Biochar
 Air capture Other:

ESTIMATING NATIONAL CARBON QUOTAS AND MODELLING THE ROLE OF NETS IN COMPATIBLE EMISSION PATHWAYS AT A SMALL NATION SCALE

Barry McMULLIN¹, Paul PRICE¹, Michael B. JONES², Alwynne H. McGEEVER²

¹Dublin City University, Ireland

²University of Dublin Trinity College, Ireland

ABSTRACT

In light of the Paris Agreement to limit global warming to ‘well below 2°C’, the equitable sharing of the finite remaining global carbon budget among UNFCCC parties becomes a key question. Serious policy engagement with the rapidly dwindling nett carbon quota which is now available (on a basis of equity) to the most developed nation states should arguably provide the local rationale for detailed investigation and potential early deployment of negative emissions technologies. We therefore present a case study estimating the remaining national carbon quota for Ireland, a small UNFCCC Annex 1 island nation within the EU regional bloc. We explore the implications of these quota estimates for current and future Irish emission pathways, potentially including already tacit obligations for the deployment of NETs at early and significant scale (whether in-territory or internationally traded as a service).

There are a variety of models to estimate a national carbon quota in line with the Paris Agreement. We consider five options from the existing literature with differing weightings of *inertia*, *equity*, *capability* and *historical responsibility*. As of the end of 2017, a remaining “pure-inertia” CO₂ quota for Ireland (assuming commensurate action on non-CO₂ forcings) is estimated as c. 900 MtCO₂ (~188 tCO₂ per capita). Similarly, a “pure-equity” quota is estimated as c. 500 MtCO₂ (~104 tCO₂ per capita). Normalising the quota on a per capita basis (dividing by current national population) facilitates comparison of quota analyses between different countries (as a baseline, what we here call a “pure-equity” distribution would yield exactly equal per capita quotas in all countries). For context, Ireland reported annual territorial emissions of approximately 44 MtCO₂ in 2016 (~9.3 tCO₂ per capita). Accordingly, to meet even the most liberal (pure inertia) national quota a sustained reduction rate (of nett CO₂ emissions) in excess of 4%/year would be required, and in excess of 8%/year to meet the pure-equity quota.

On this basis, we model and critically assess a number of alternative combinations of gross emissions and gross removals pathways that could be in line with this range of nett quotas. We find that mitigation pathways reliably commensurate with the Paris temperature goals consistently require urgent, substantial and ongoing, near-term reductions in gross emissions. However, if such early reductions in gross emissions *can* be achieved, then even moderate availability of negative emissions (gross removals) by 2050 is found to significantly ease long-term maintenance of the required balance between emissions and removals.

Corresponding author: Barry McMullin, Dublin City University, D09 V209, IRELAND.
barry.mcmullin@dcu.ie