

www.csct.ac.uk

Energy and Infrastructure Systems Impact: Walking the Temporal Tightrope

the temporal lightrope



www.supergen-bioenergy.net



Samuel Cooper, Marcelle McManus

University of Bath

sjgcooper@bath.edu

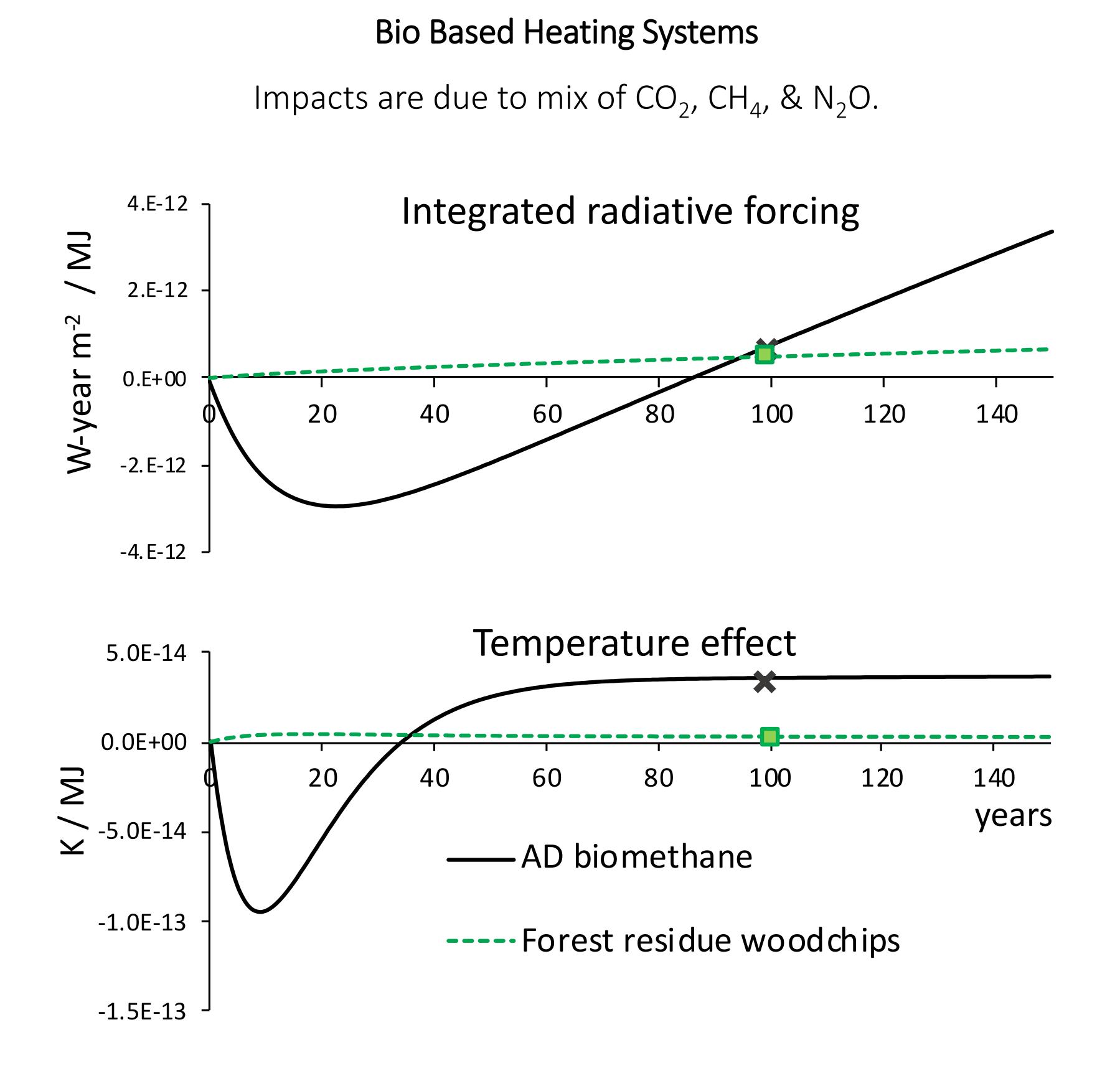
researchportal.bath.ac.uk/en/persons/marcelle-mcmanus

m.mcmanus@bath.ac.u @McmanusMarcelle

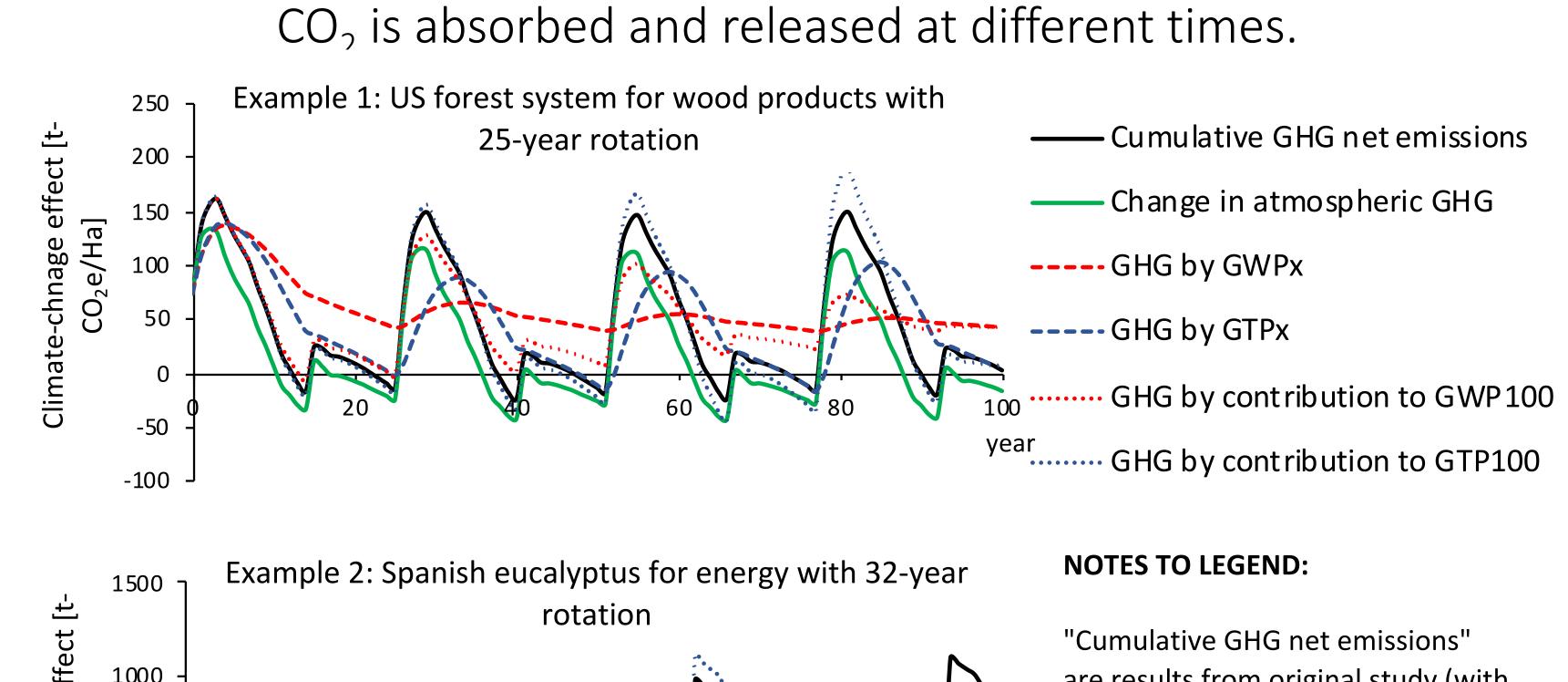
The science

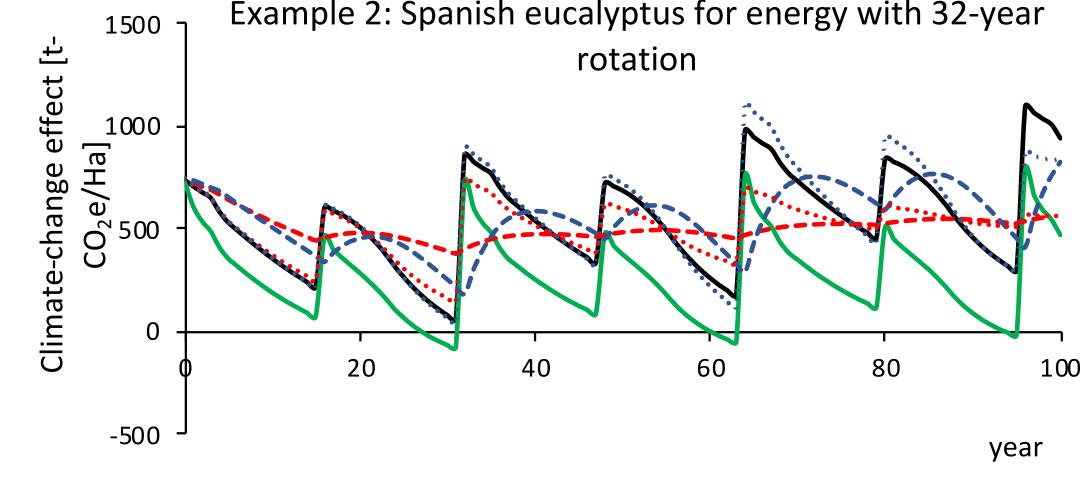
Climate change impacts due to GHG develop with time in different ways depending upon the gas. They have different "potencies" and decay at different rates. Furthermore, many real systems have emissions and absorptions of GHG that occur at different points in time. The **dynamics** of the climate change impacts caused by some systems **cannot be conveyed** with a single metric such as CO_2 e based on GWP_{100}

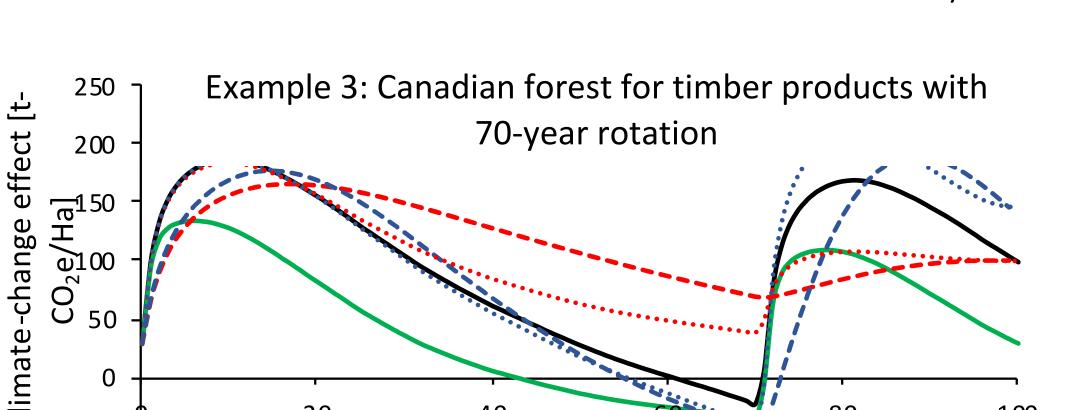
Examples of systems for which it matters:











- are results from original study (with equivalence between GHGs calculated with GWP100)
- "Change in atmospheric GHG" is the change that these emissions result in (accounting for decay, same equivalence)
- "GHG by GWPx" or "...GTPx"
 equivalence is the mass of CO₂
 released in year-0 that would cause
 same effect by that year
- "GHG by contribution to GWP100" or "...GTP100" means the CO₂ equivalence of net emissions up to that year, in terms of effect at year-100 if no more emissions occur. i.e. the "contribution" to the year-100 effect

Does a single CO₂e figure adequately represent your system?

Many systems, including Renewable Technologies and Battery Electric Vehicles often have upfront emissions but low emissions during the lifetime – therefore timing matters. Biobased systems are also complex due to the uptake and release of CO2.

If you're not sure, you can enter the emissions into this simple spreadsheet tool and see how the associated climate change impacts vary with time.

https://doi.org/10.15125/BATH-00923

Read more...

Briefing

note: https://researchportal.bath.ac.uk/en/publica

tions/

greenhouse-gas-emissions-timing-matters

Research article:

https://doi.org/10.1016/j.biombioe.2020.105778

