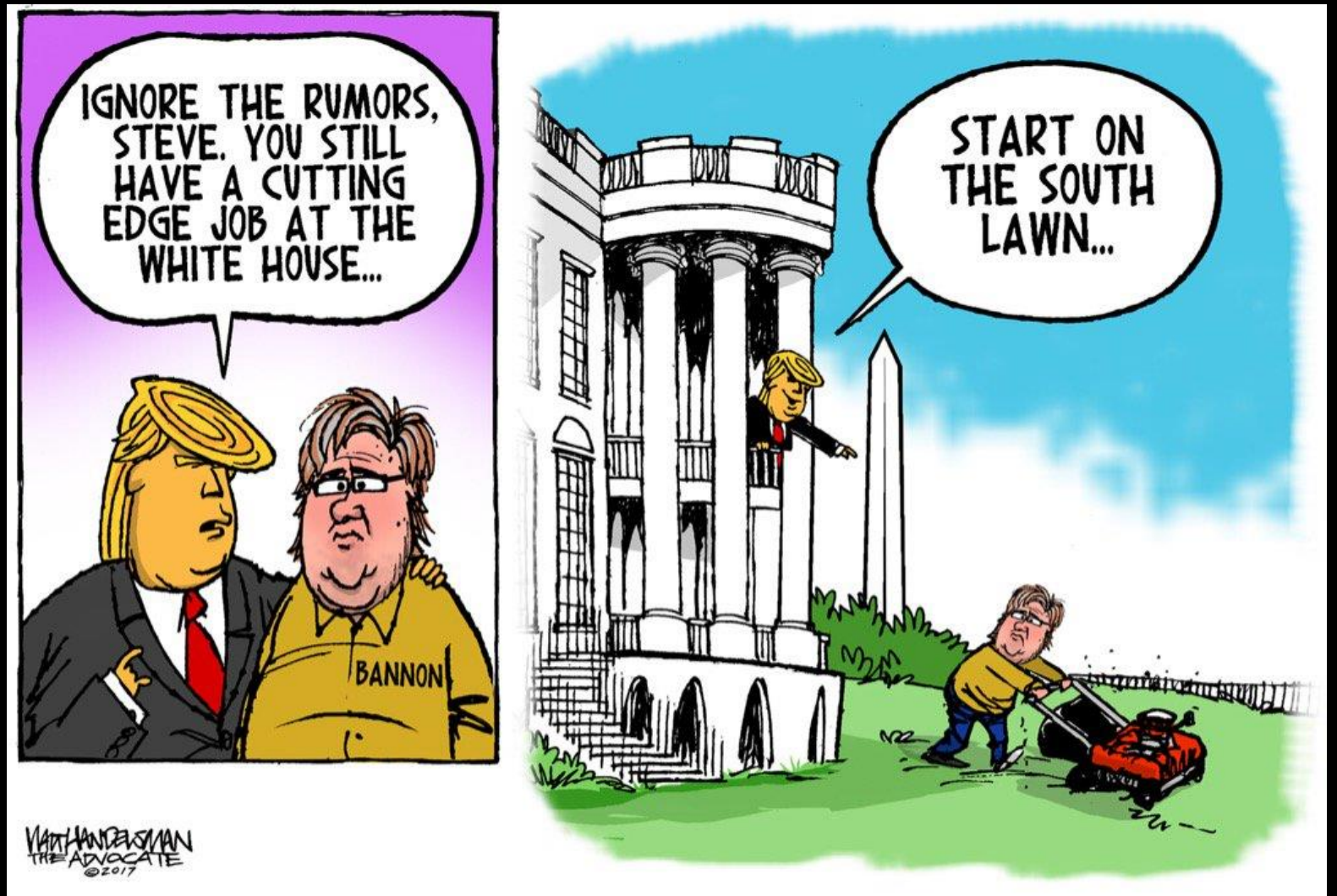
Below 2C?

Where is the cutting edge?

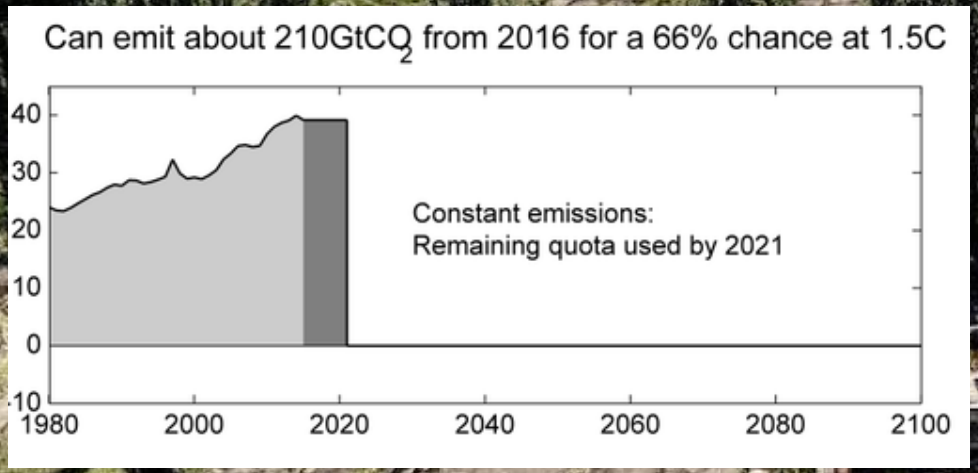
Sonja Vermeulen, Galway, April 2017

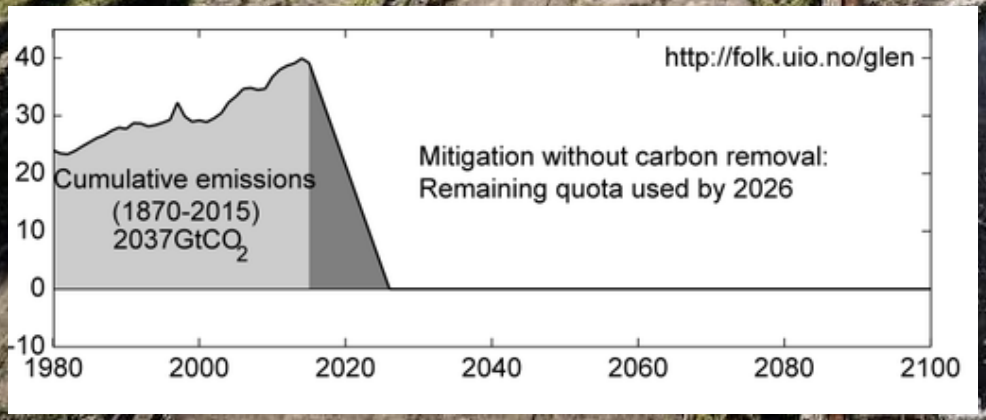


Paris Agreement

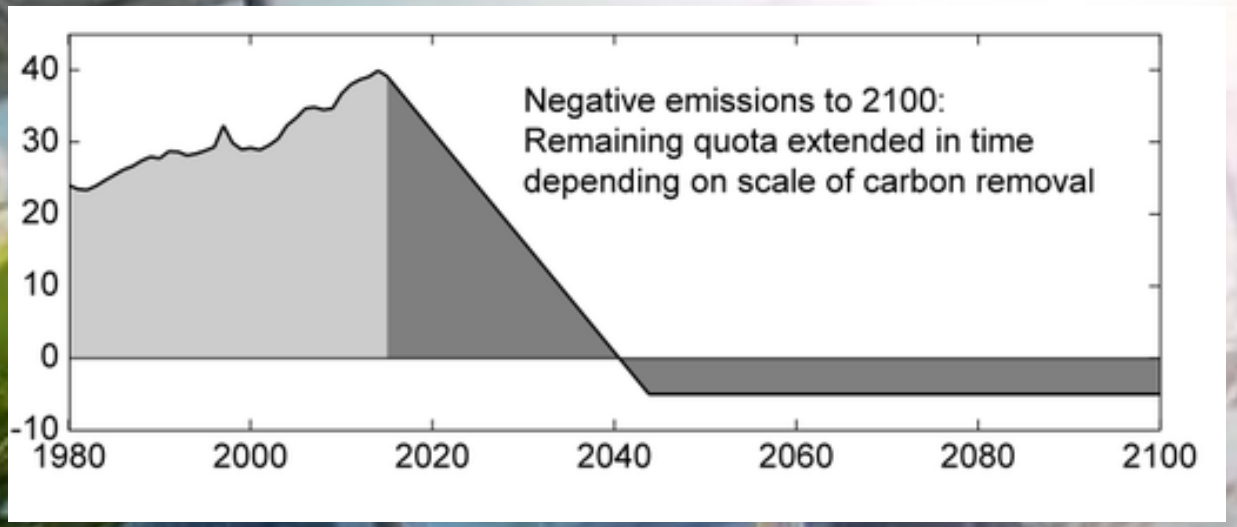
Limit average global surface temperature rise to “well below 2C” above pre-industrial levels

Scenario 1: Emissions reductions





Glen Peters CICERO



Glen Peters CICERO

Scenario 2: Post-2050 negative emissions

Speculative –ve emissions technologies

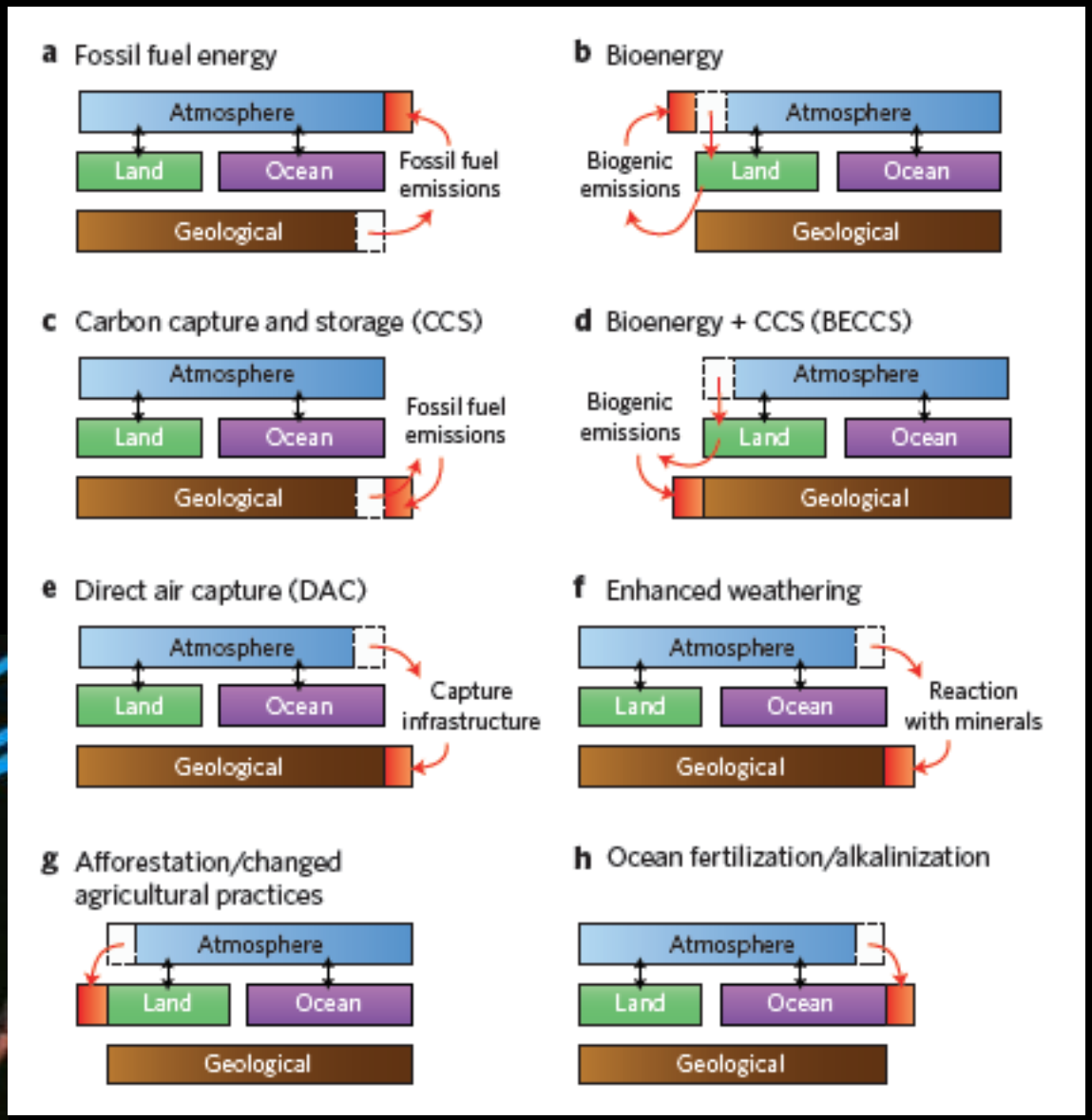
Marine micro-algae: *Greene et al 2016 Oceonography*

Direct air capture, enhanced weathering: *Smith et al 2016 NCC*

Ocean fertilisation: *Harrison 2017 ERL*

Carbon capture and utilisation: *MacDowell et al 2017 NCC*

Biochar: *Smith 2016 GCB*



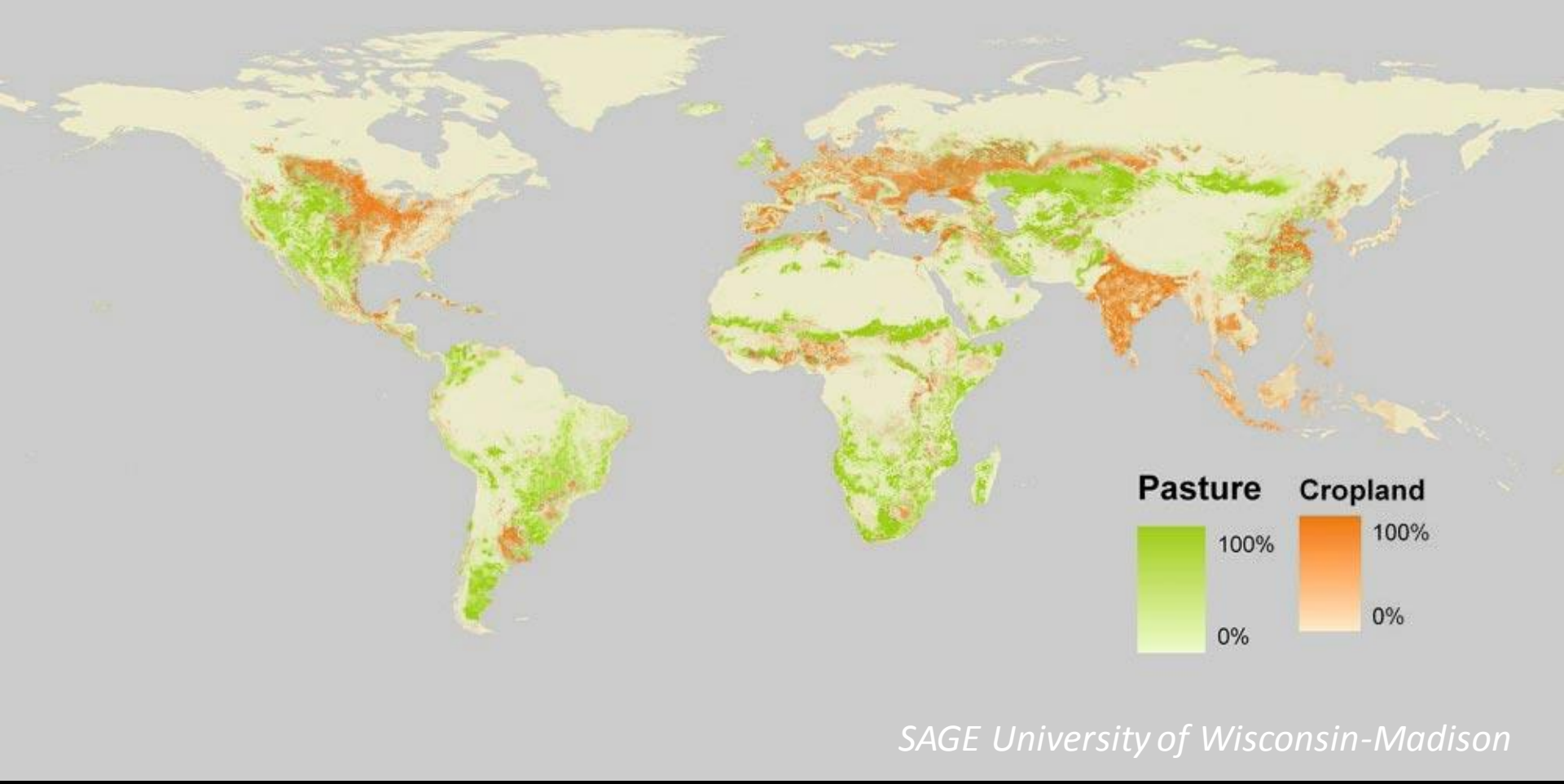
Top –ve emissions technology = BECCS (bioenergy, carbon capture & storage)

Matter et al 2016 Science

One new CCS plant completed every working day for the next 70 years

Skuce 2016 Bulletin of Atomic Scientists

Growing on 430-580 million hectares i.e. 1/3 of world's arable land



Williamson 2016 Nature
Smith et al 2016 NCC give 380–700 Mha

Questions for CCAFS-type work?

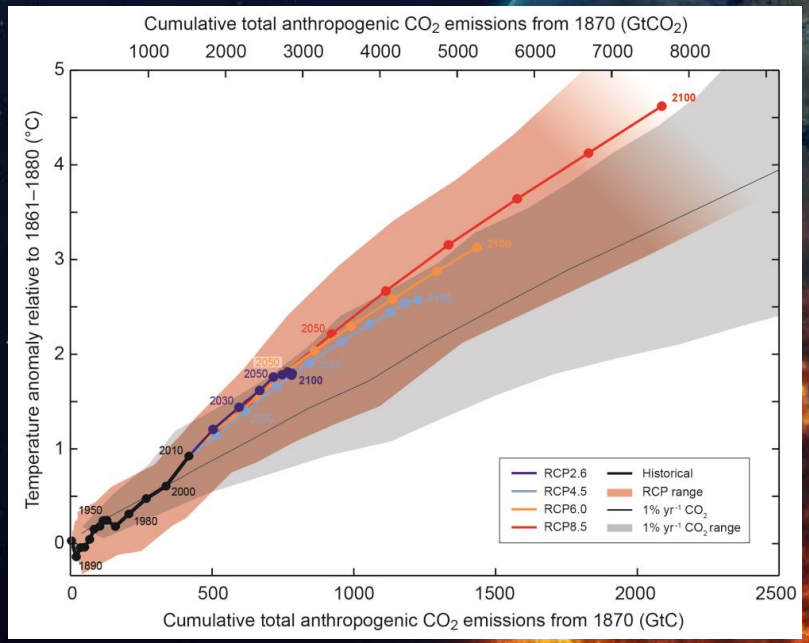
Better land use & productivity estimates for BECCS? Where? At what cost?

Implications for smallholders, social equity, food security?

Governance, land rights, private sector, economies of scale?

Co-benefits and trade-offs? Biodiversity, water, energy?

Scenario 3: Adapt to a 4-5 C world



IPCC AR5

Final words: paradigm shift?