



Net zero emissions by 2050 – how can it be done?

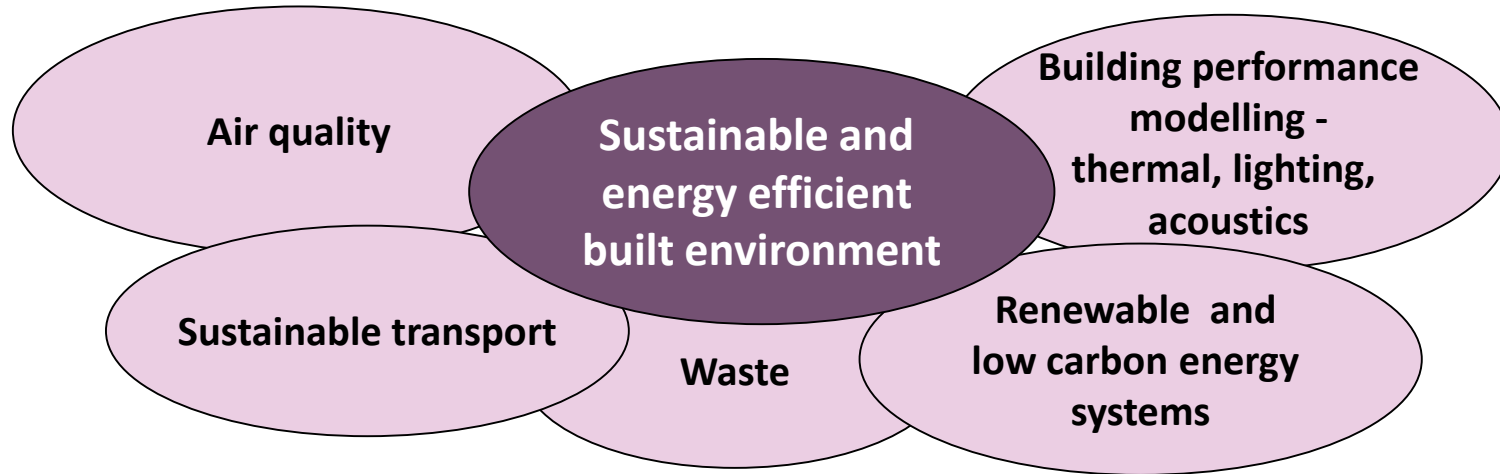
A summary of the CCC's net zero technical report

18th July 2019

Tony Norton

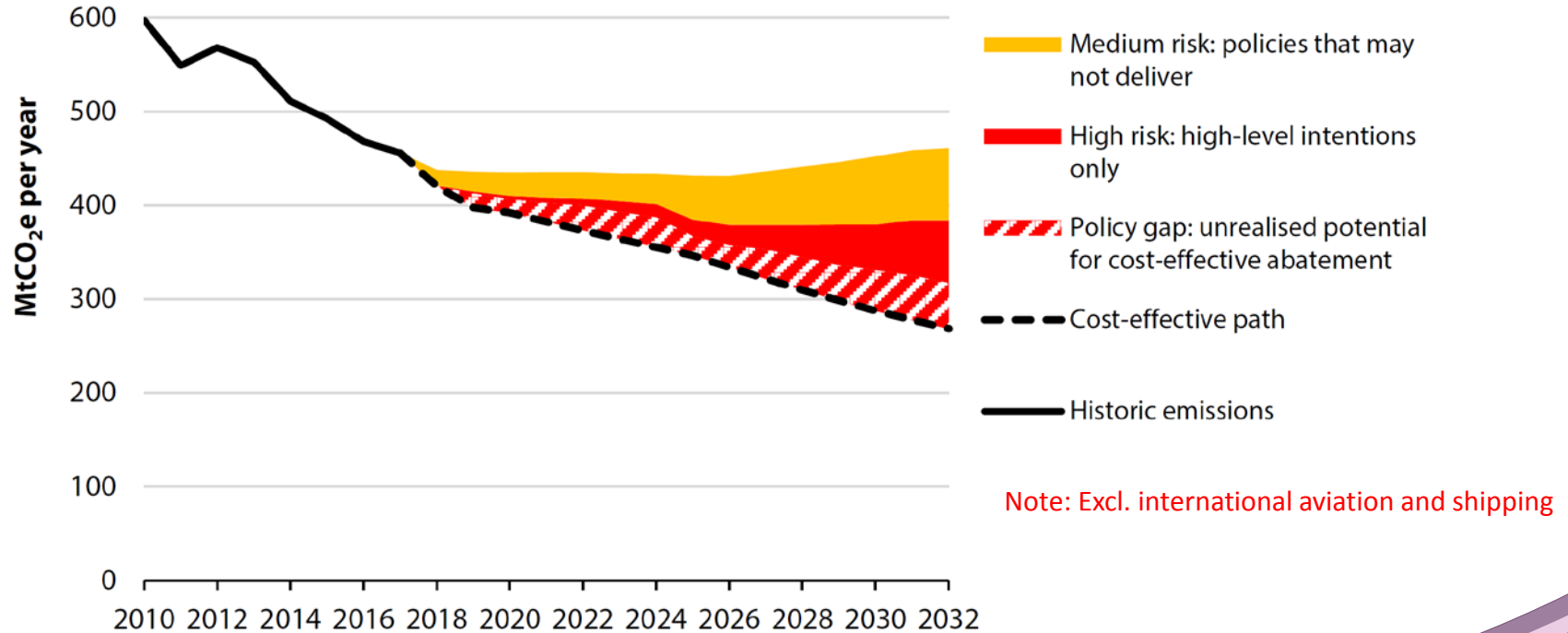
Centre for Energy and the Environment

The Centre for Energy and the Environment



CEE SKILL SETS	CEE CHARACTERISTICS
Field monitoring and measurement	Fast reaction time
Data collection and analysis	Small, medium and large projects – research & consultancy
Computer modelling	Externally facing
Evidence and policy development	Professional consultancy outputs
GIS mapping	Local public sector partners
Economic evaluation	University and CPD teaching

CCC – 2018 Progress Report to Parliament



CCC – Net Zero by 2050



Scenarios

- Core measures needed to achieve 80% by 2050
- Further Ambition more challenging more expensive
- Speculative options low levels of readiness, high cost & barriers to public acceptability

Sectors

Power and hydrogen

Buildings

Industry

Transport

Aviation and shipping

Agriculture, LUC & forestry

Waste

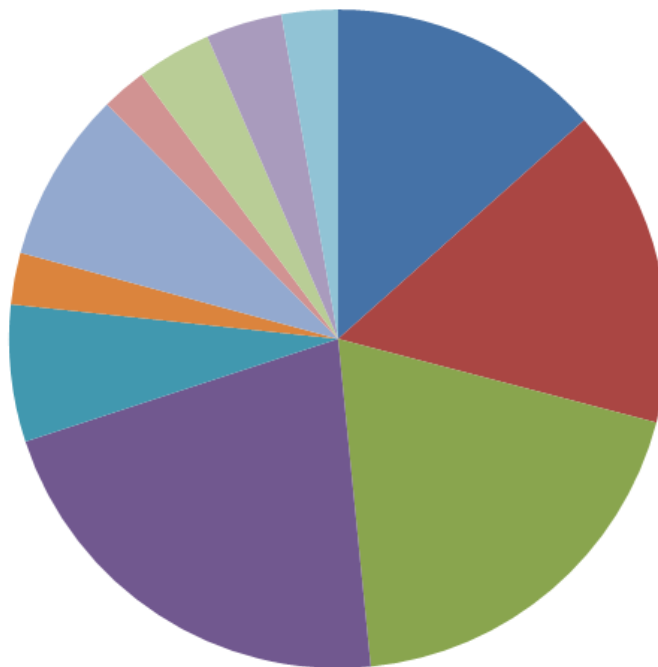
F-gas emissions

Green house gas removal

CCC – 2017 emission by sector

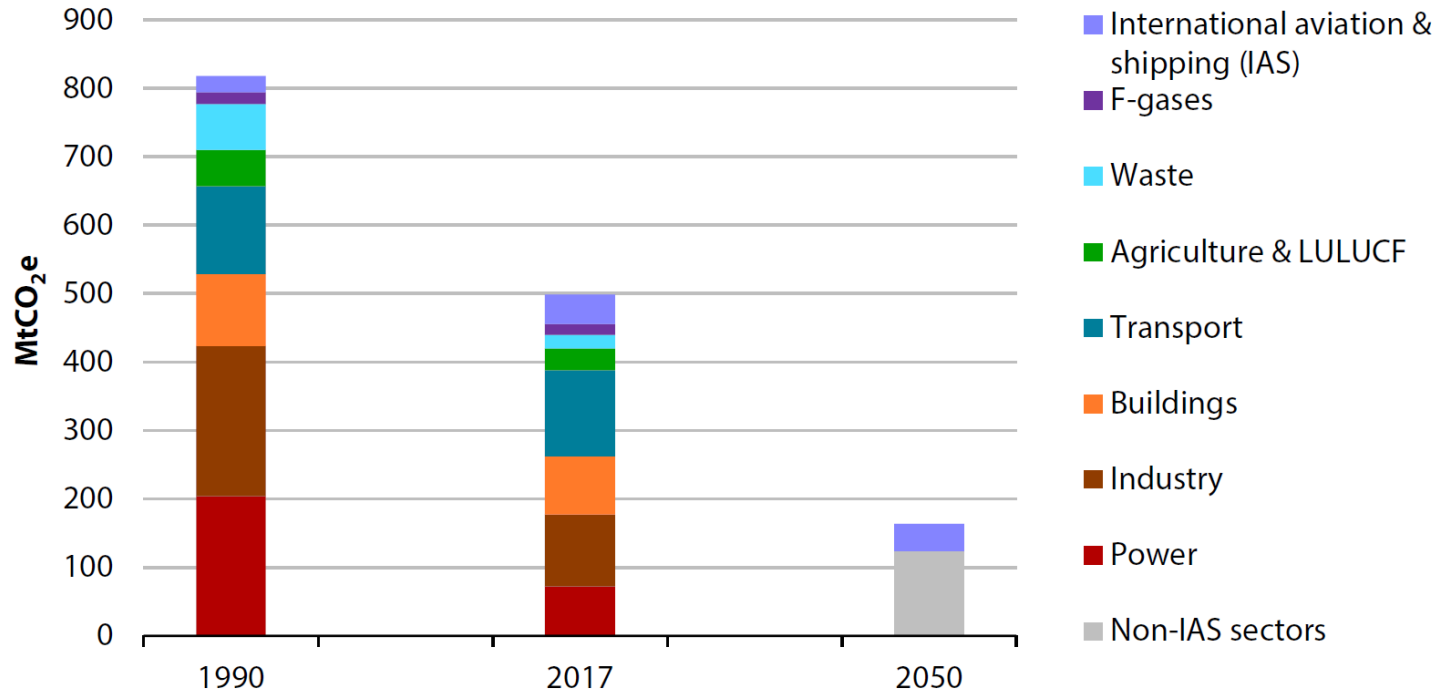


Sector	Emissions MTCO ₂ e	%
Power and hydrogen	73	15%
Buildings	85	17%
Industry	105	21%
Transport	117	23%
Aviation	37	7%
Shipping	14	3%
Agriculture	46	9%
Land use change	12	2%
Forestry	-20	-4%
Waste	20	4%
F gas emissions	15	3%
GHG removal	0	0%
Total	503	100%

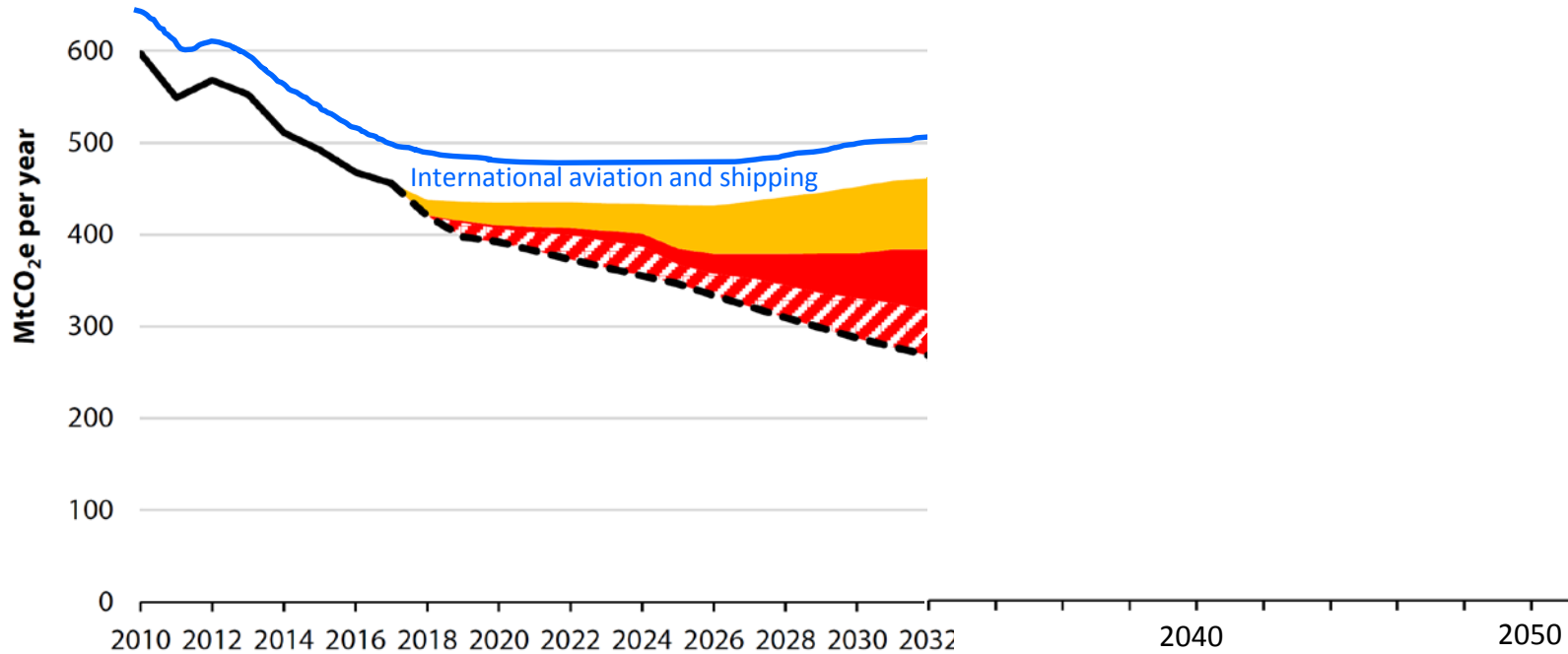


- Power and hydrogen
- Buildings
- Industry
- Transport
- Aviation
- Shipping
- Agriculture
- Land use change
- Forestry
- Waste
- F gas emissions

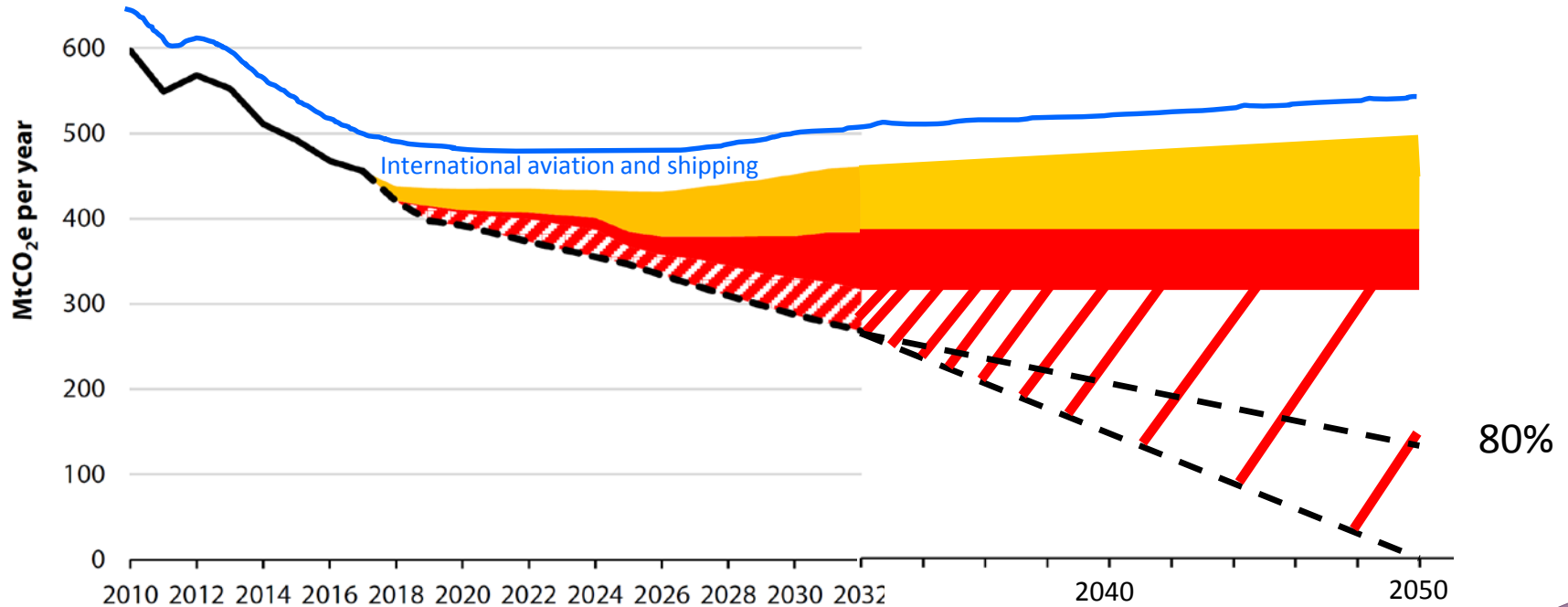
CCC – Scale of the challenge to 80%



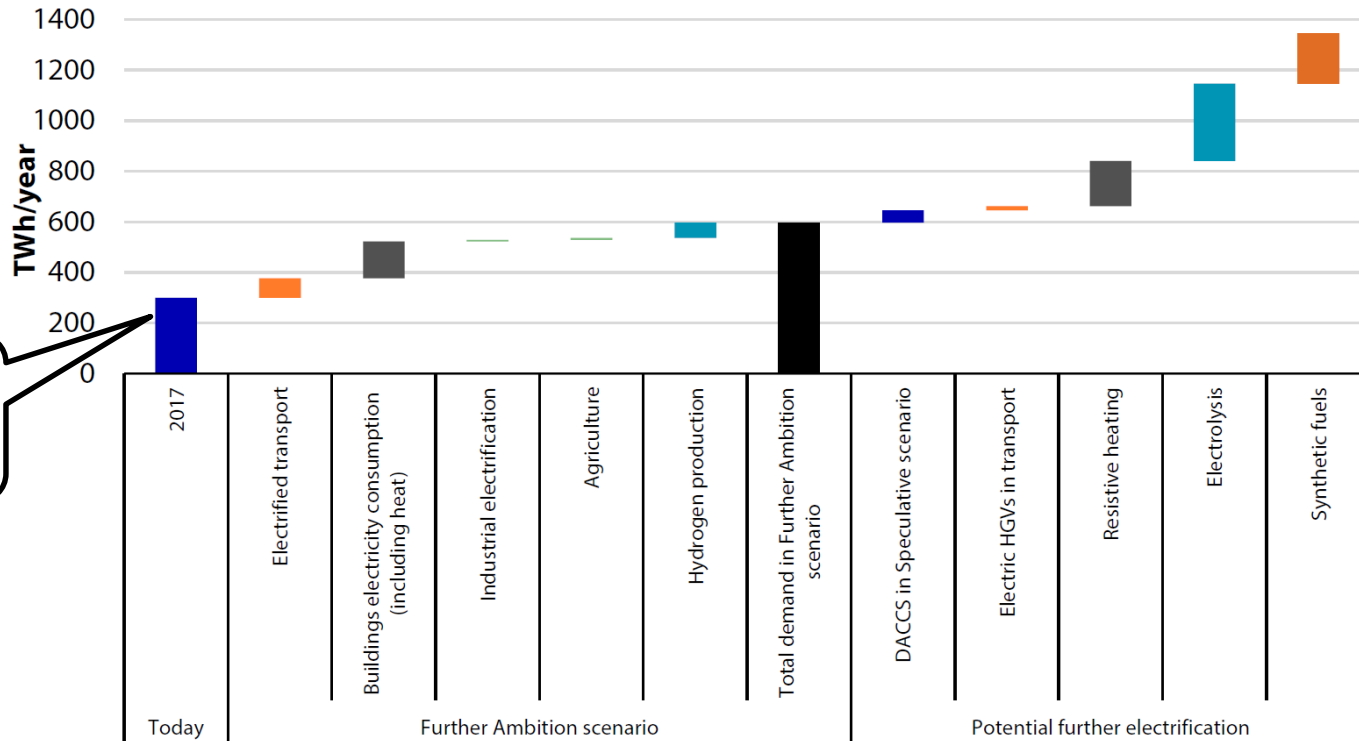
Extrapolation of CCC 2018 projections



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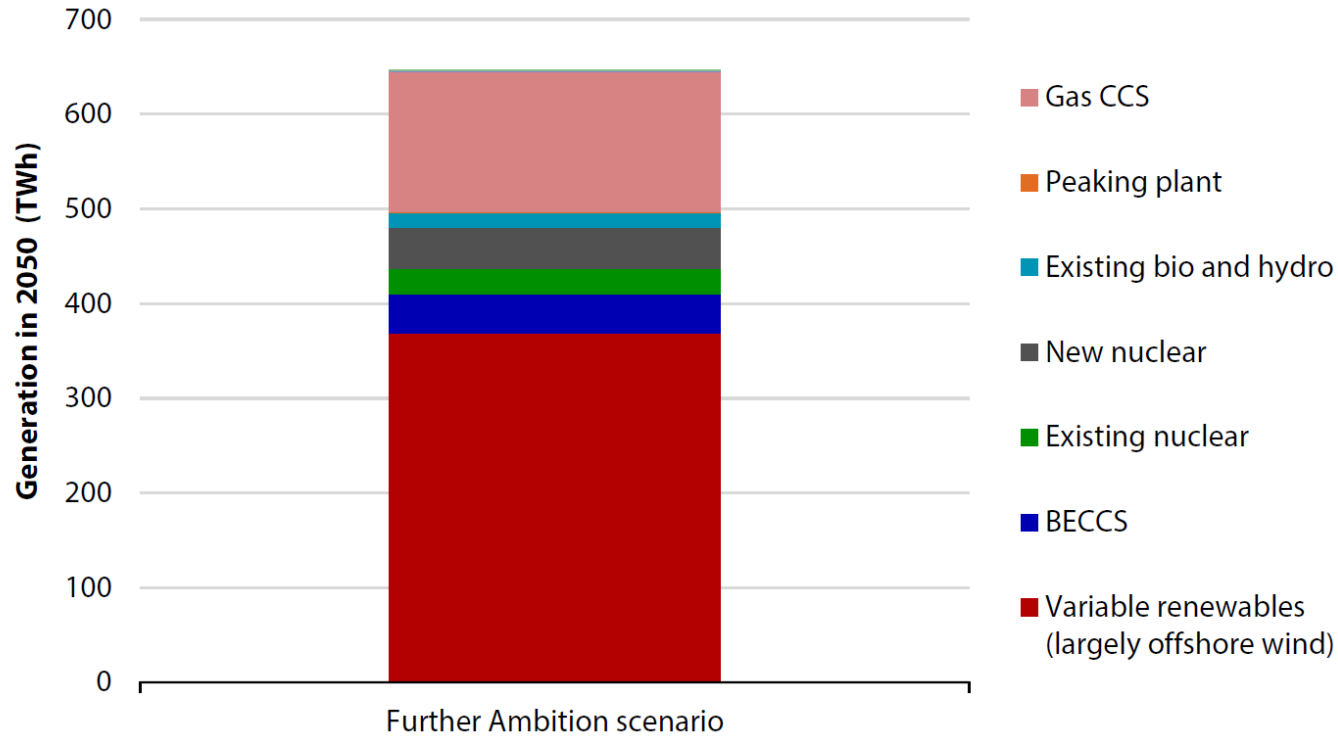


CCC – Net Zero – Power and hydrogen



48% fossil fuel

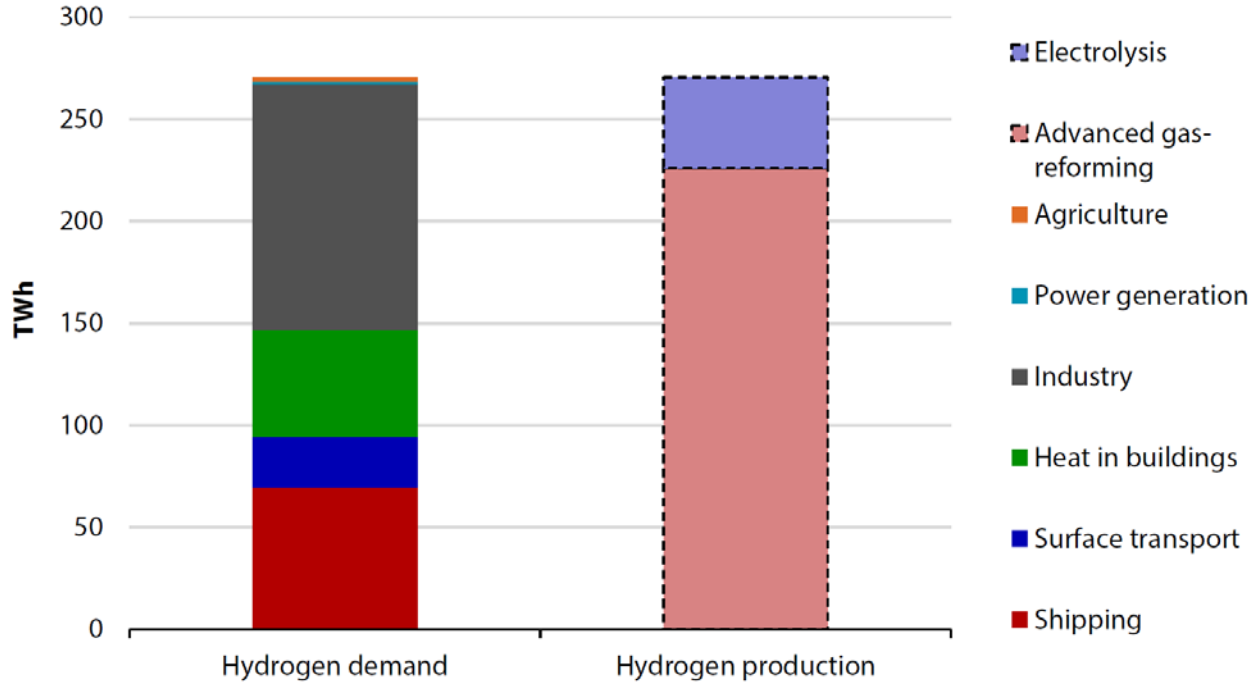
CCC – Net Zero – Power and hydrogen



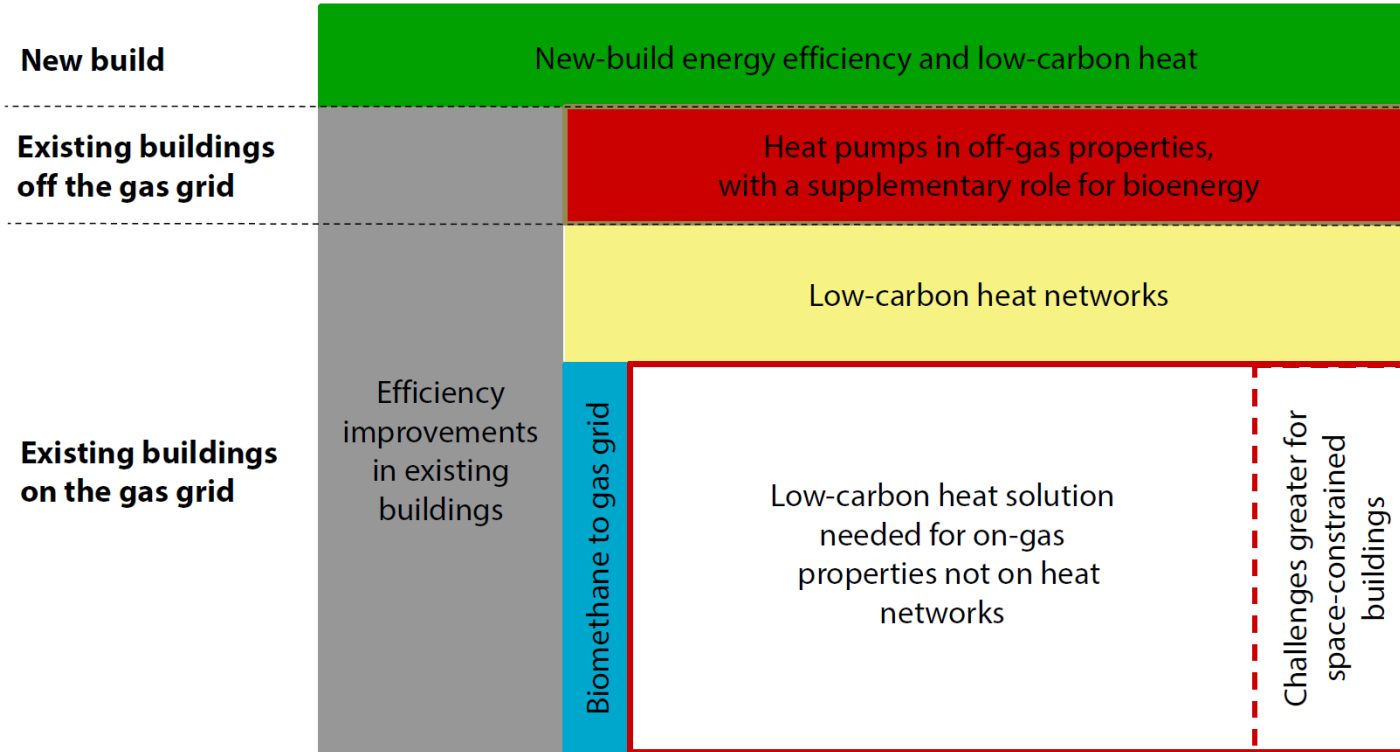
CCC – Net Zero – Power and hydrogen



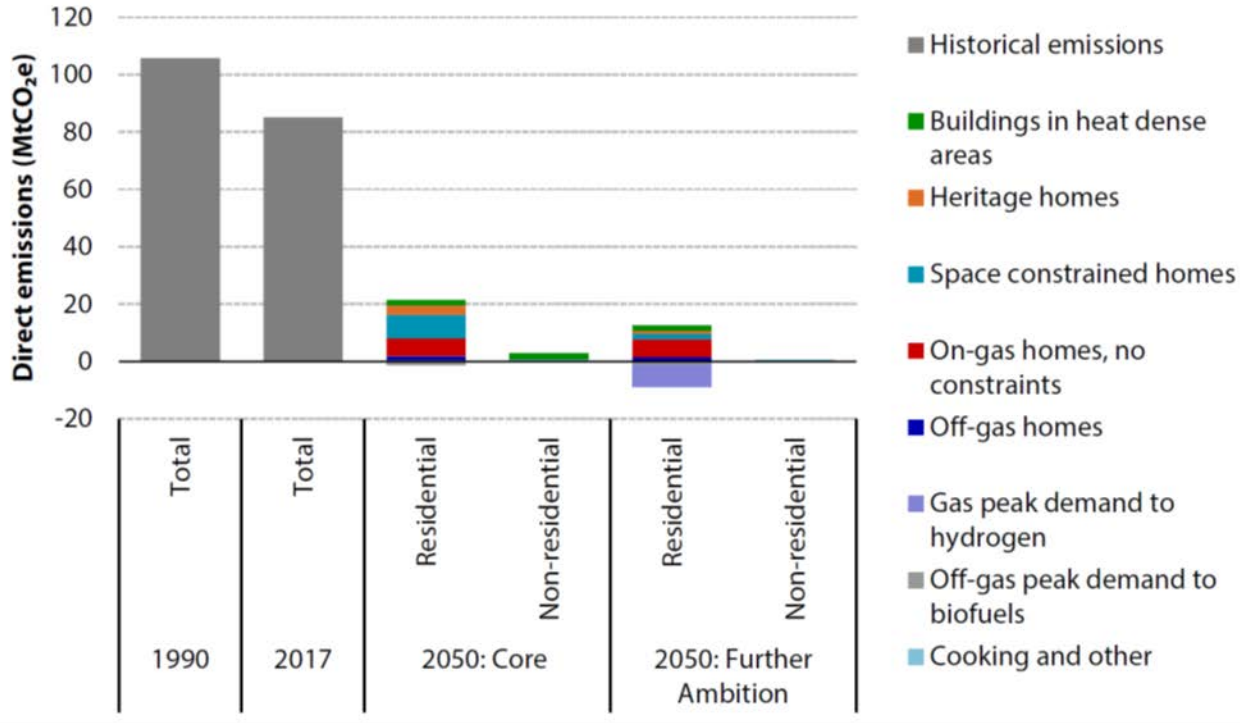
Hydrogen in the Further Ambition scenario



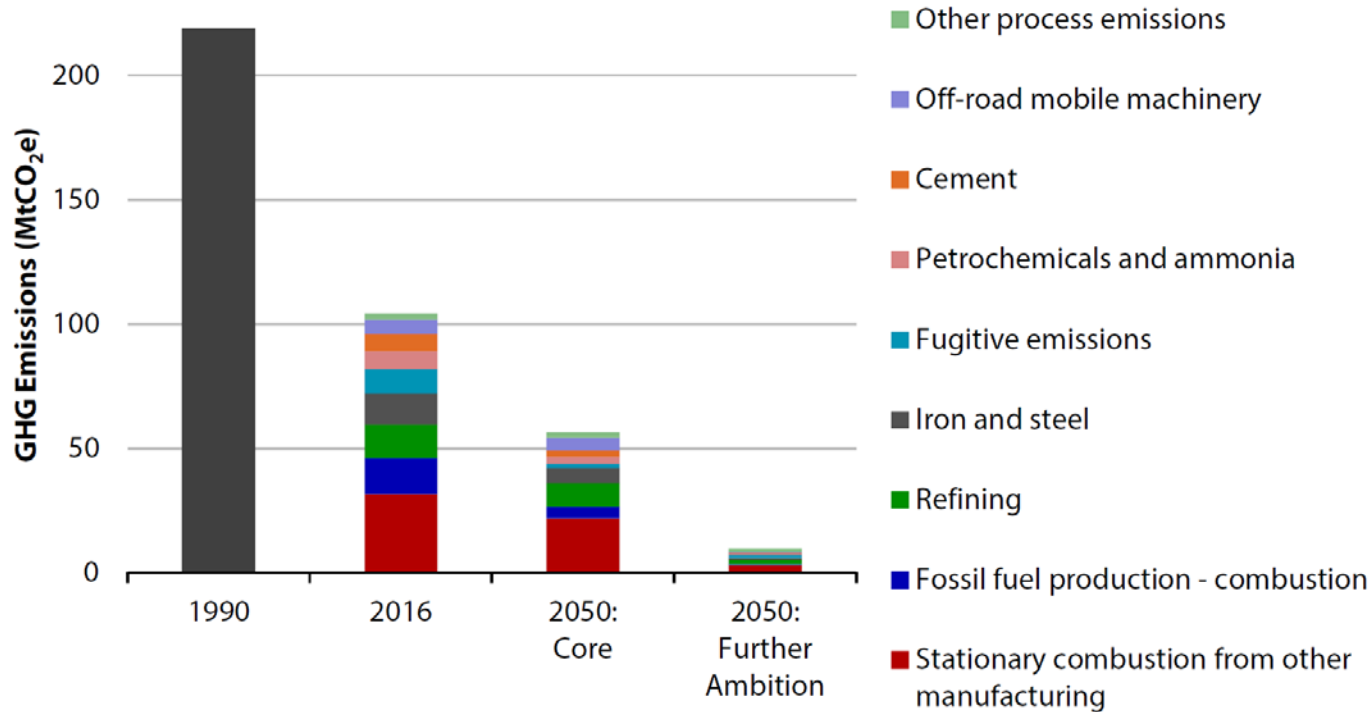
CCC – Net Zero – Buildings



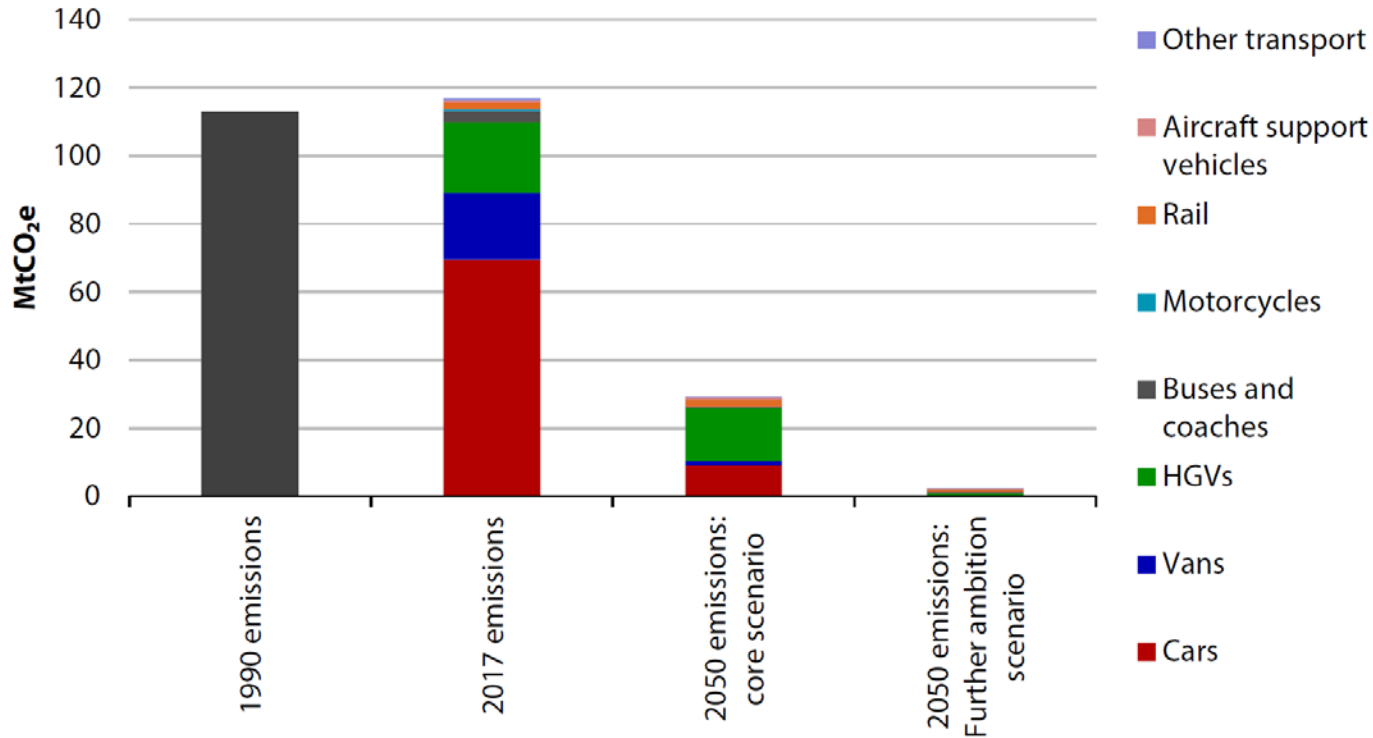
CCC – Net Zero – Buildings



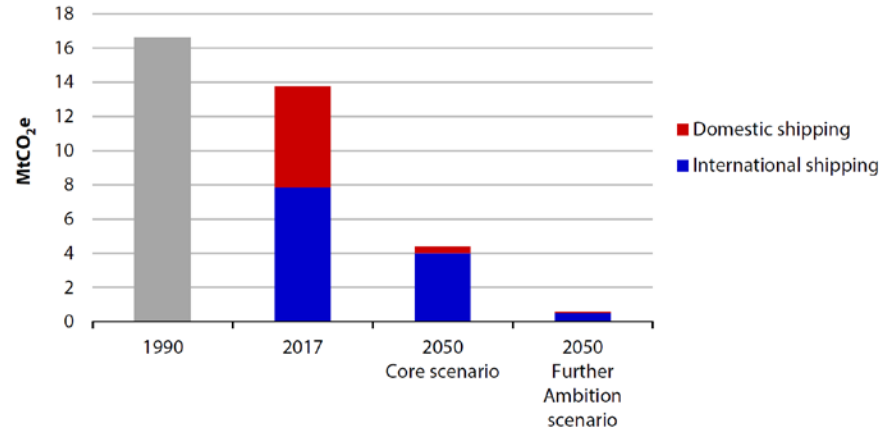
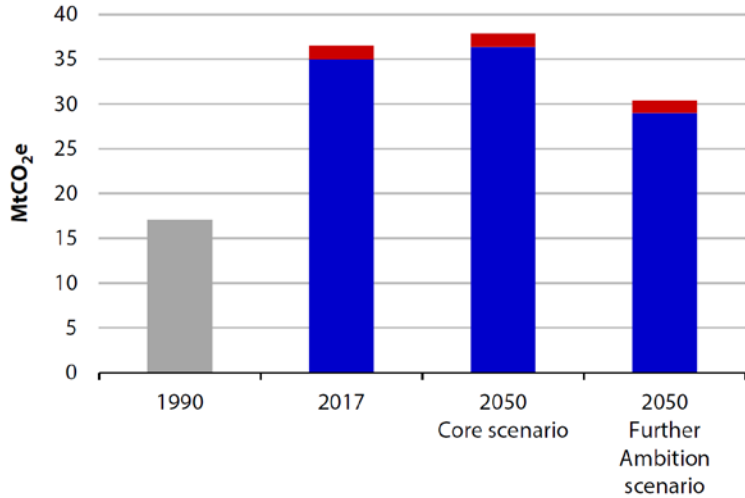
CCC – Net Zero – Industry



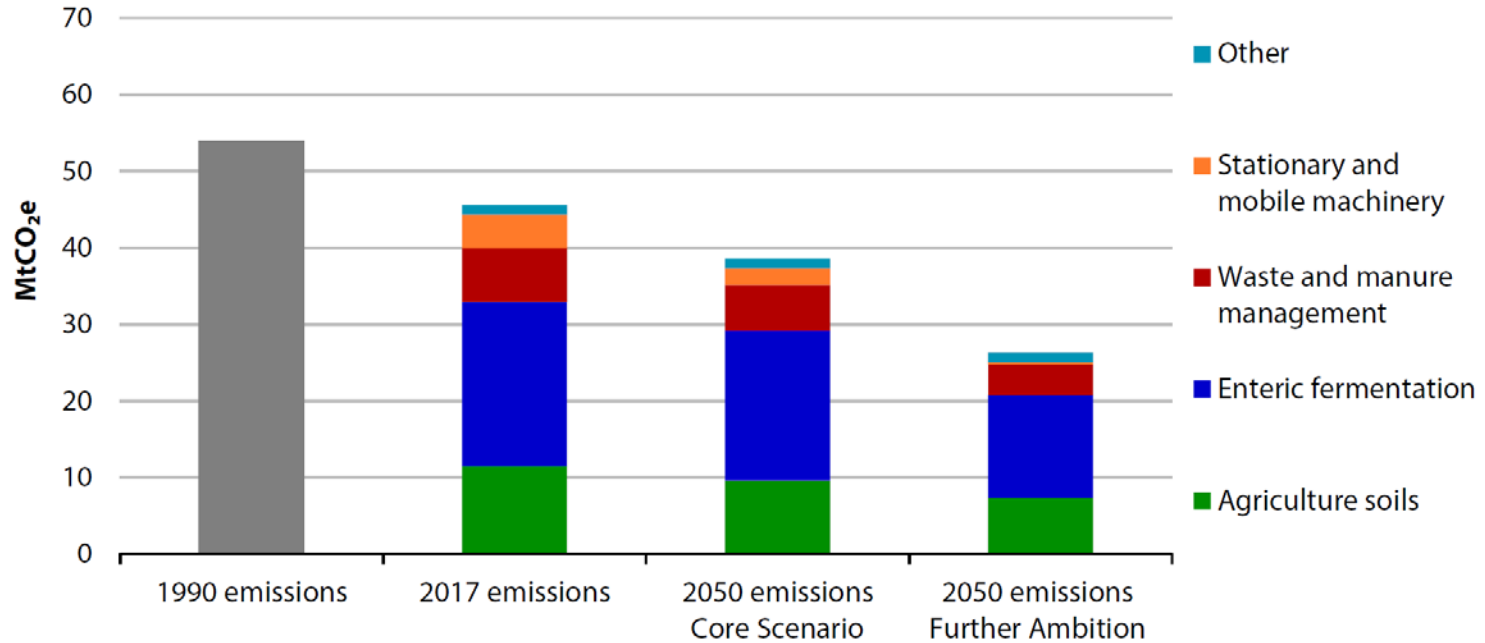
CCC – Net Zero – Transport



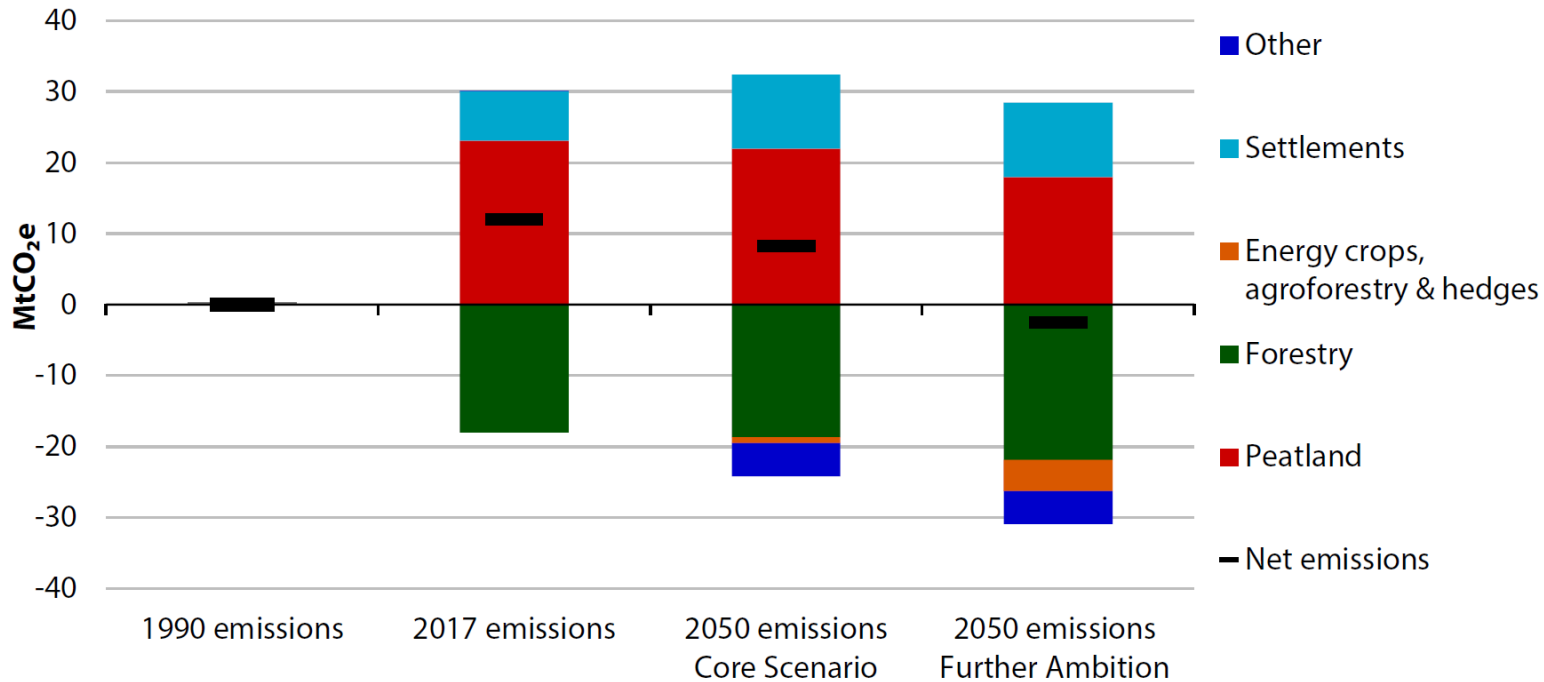
CCC – Net Zero – Aviation and shipping



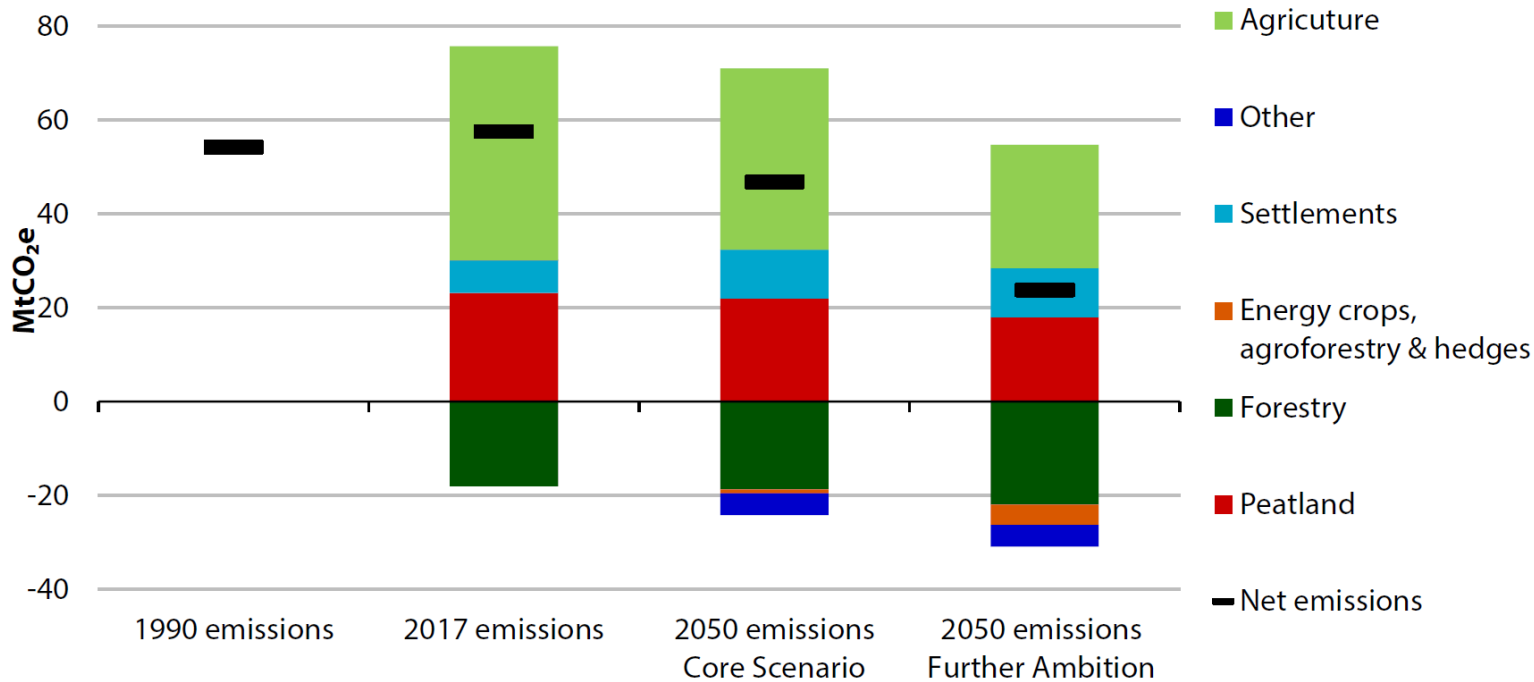
CCC – Net Zero – Agriculture



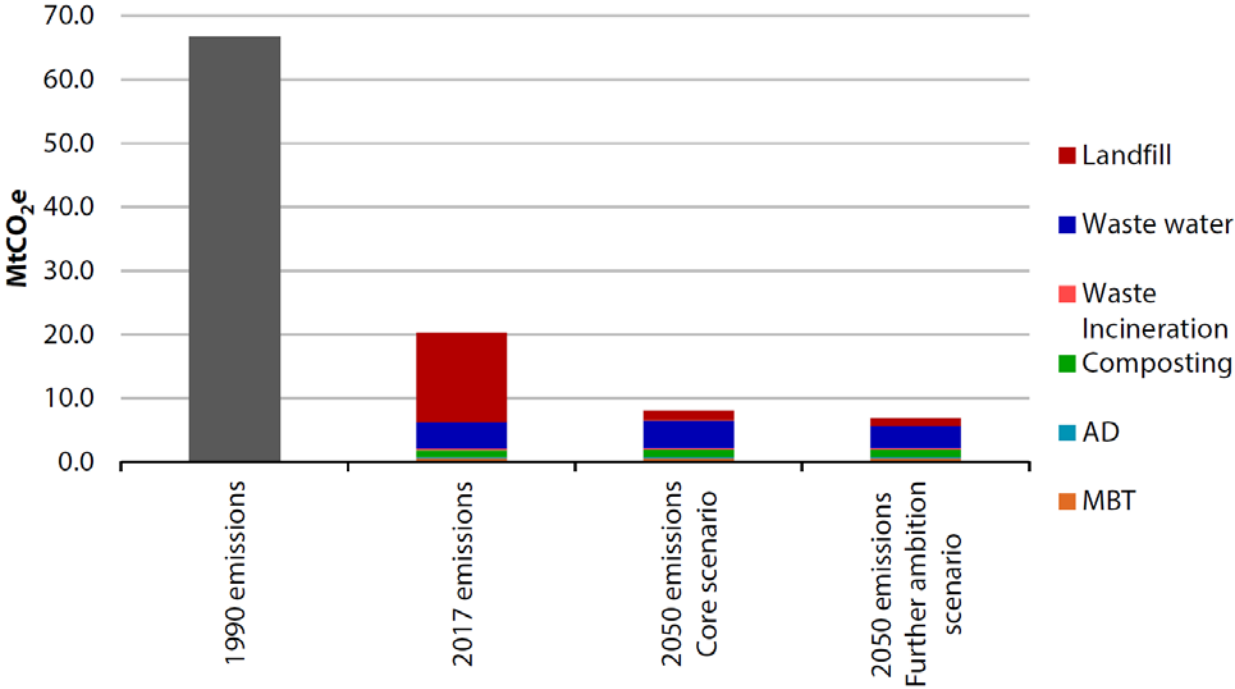
CCC – Net Zero – LUC & forestry



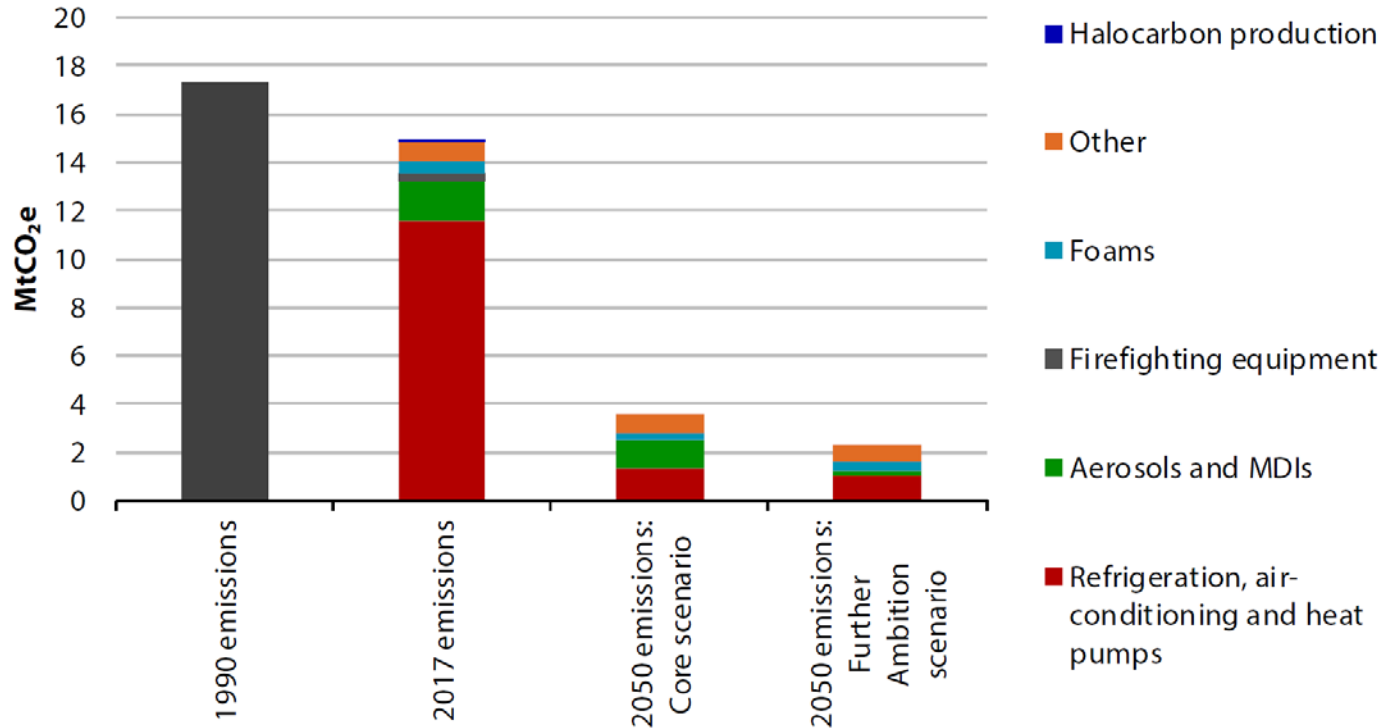
CCC – Net Zero – Agriculture, LUC & forestry



CCC – Net Zero – Waste



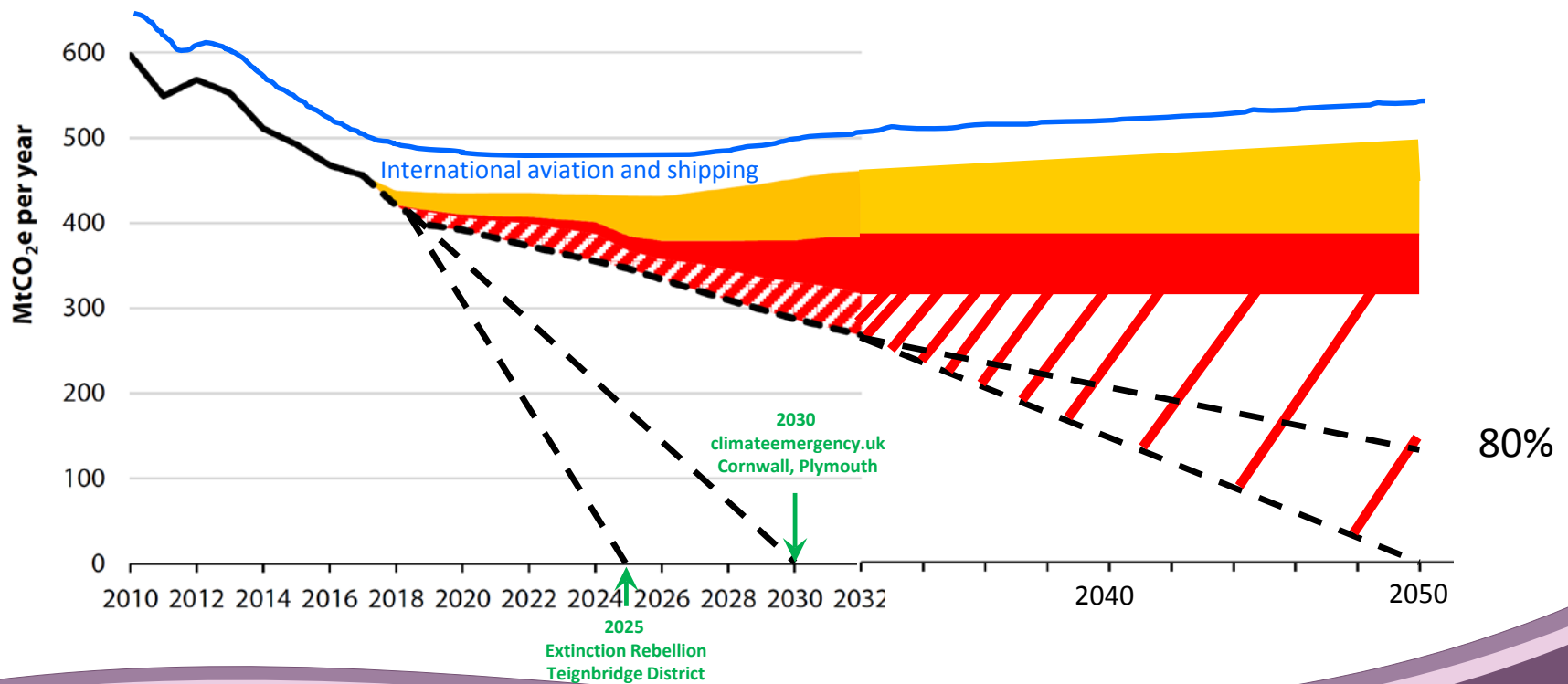
CCC – Net Zero – F gas emissions





- Forestry and peatland (included elsewhere)
- Wood in construction
- Bioenergy with CCS (BECCS)
- Direct air capture of CO₂ with storage (DACCS)
- Biochar
- Enhanced weathering

Accelerating Net Zero





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