

National Inventory estimates of
Agriculture and Land Use
GHG emissions
1990-2016



Phillip O'Brien
Climate Change Unit
03rd April 2020

Intergovernmental Panel on Climate Change Special Report on Warming of 1.5 Degree

- **Every bit of warming matters** •
- **Every year matters** •
- **Every choice matters** •

Intergovernmental Panel on Climate Change Special Report on Climate and Land

Land is where we live

Land is under
growing human
pressure

Land is a part
of the solution

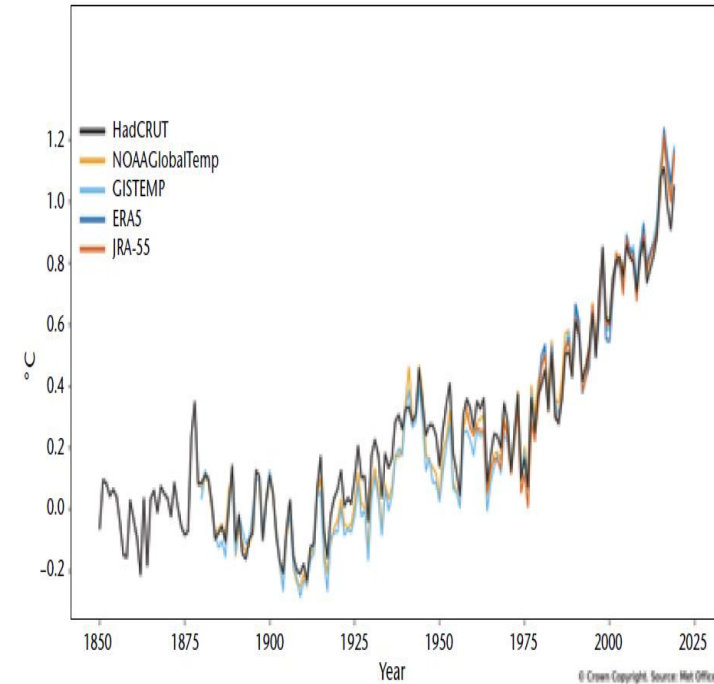
But land can't
do it all

Global perspective

Where are we now?

Since pre-industrial times, human activities have caused approximately 1°C of global warming.

- Already seeing consequences for people, nature and livelihoods
- At current rate, would reach 1.5°C between 2030 and 2052
- Past emissions alone do not commit the world to 1.5°C



ipcc

INTERGOVERNMENTAL PANEL ON climate change



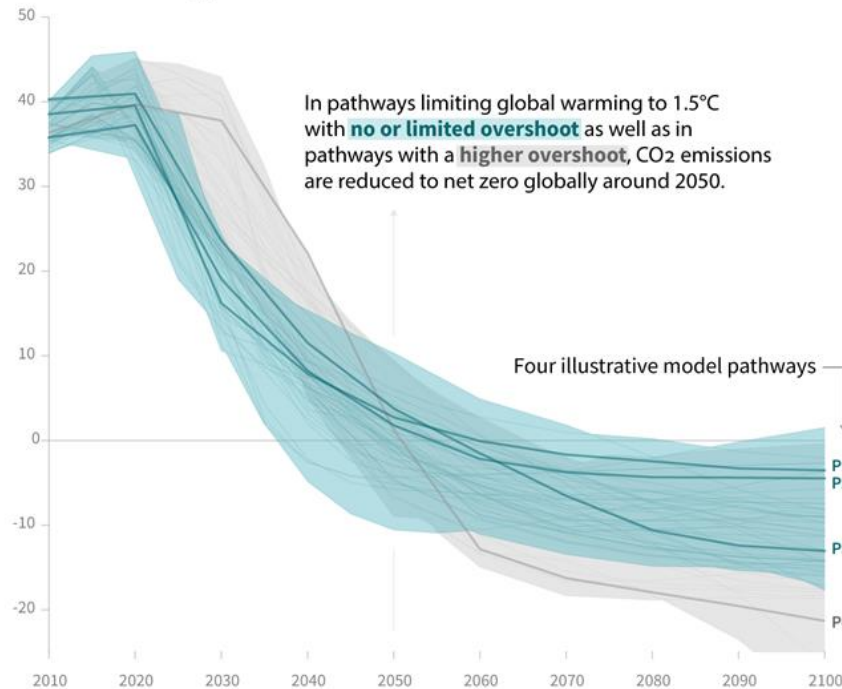
Greenhouse gas emissions pathways

- Limiting warming to 1.5°C would require changes on an unprecedented scale
 - Deep emissions cuts in all sectors
 - A range of technologies
 - Behavioural changes
 - Increased investment in low carbon options
- We would need to start taking carbon dioxide out of the atmosphere

Global perspective

Global total net CO₂ emissions

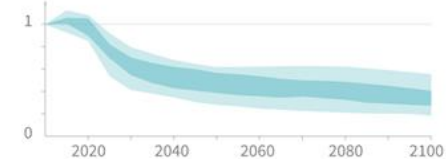
Billion tonnes of CO₂/yr



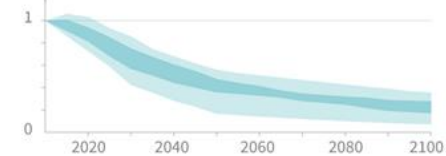
Non-CO₂ emissions relative to 2010

Emissions of non-CO₂ forcers are also reduced or limited in pathways limiting global warming to 1.5°C with **no or limited overshoot**, but they do not reach zero globally.

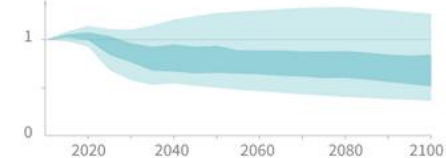
Methane emissions



Black carbon emissions



Nitrous oxide emissions

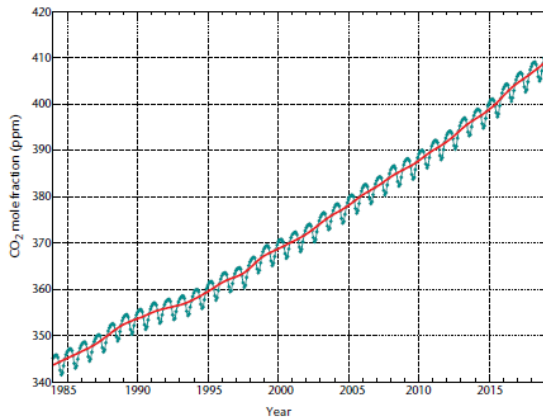


CO₂ emissions are negative
CH₄ and N₂O emissions reduce

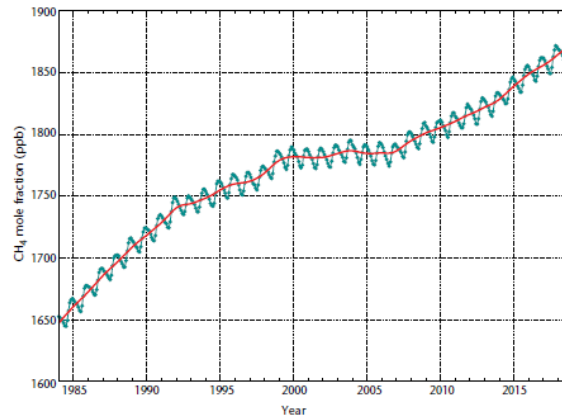
Global perspective

- The concentration of the major GHGs in the atmosphere is increasing (WMO, 2019)

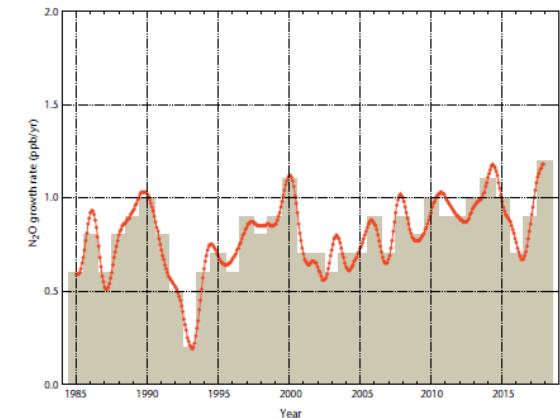
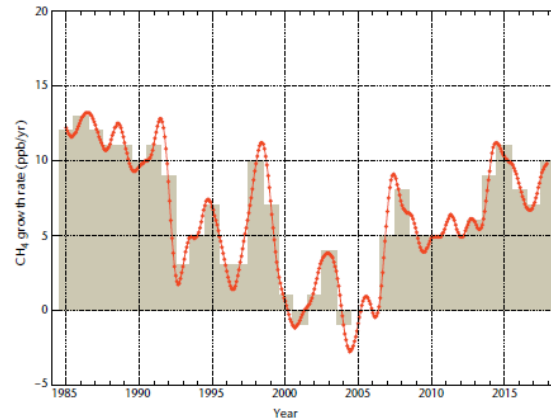
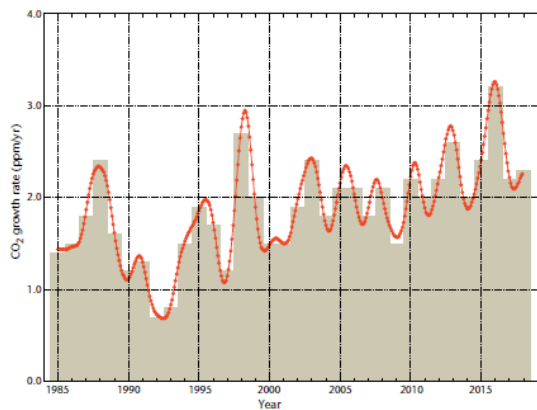
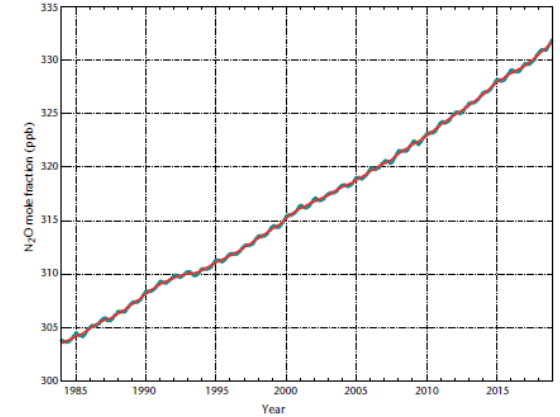
Carbon Dioxide



Methane

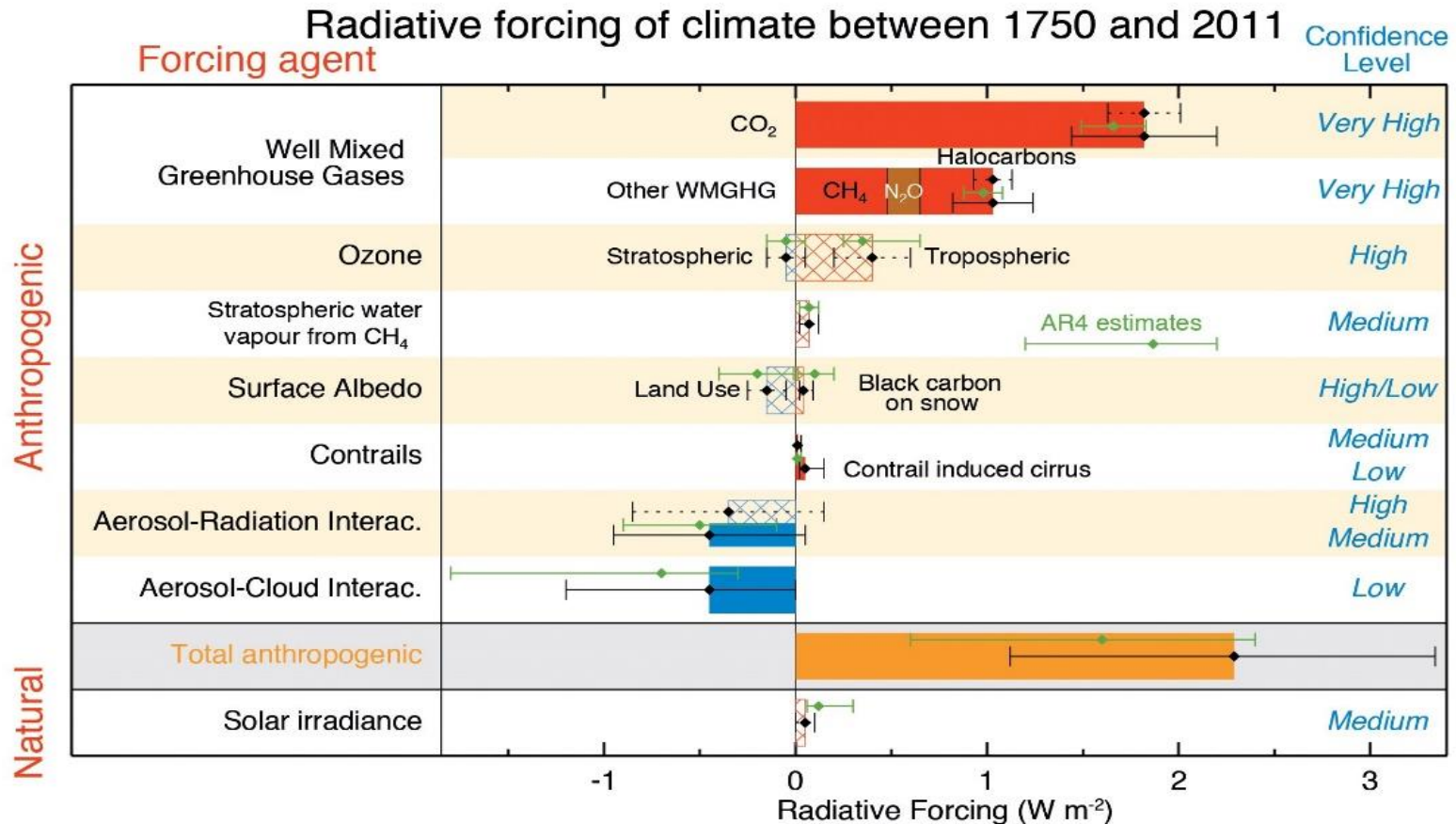


Nitrous Oxide



Global Perspective

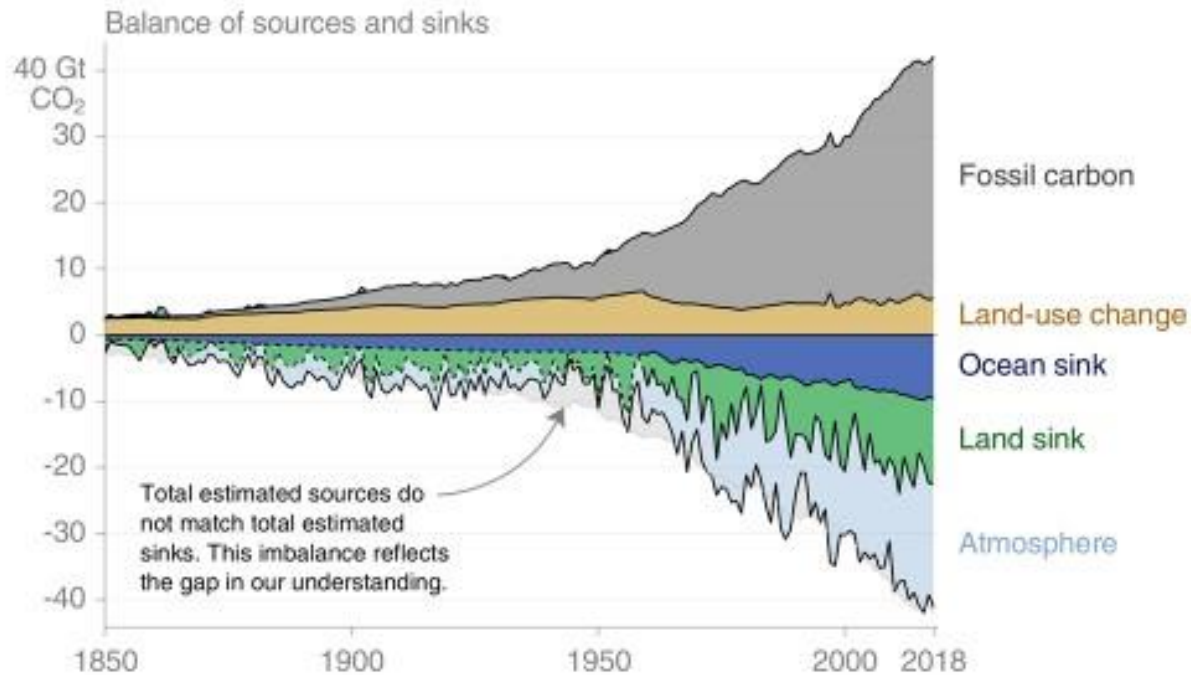
- Extra energy leading to warming
- Approx 30% due to CH₄ and N₂O



Global Perspective

Global carbon budget

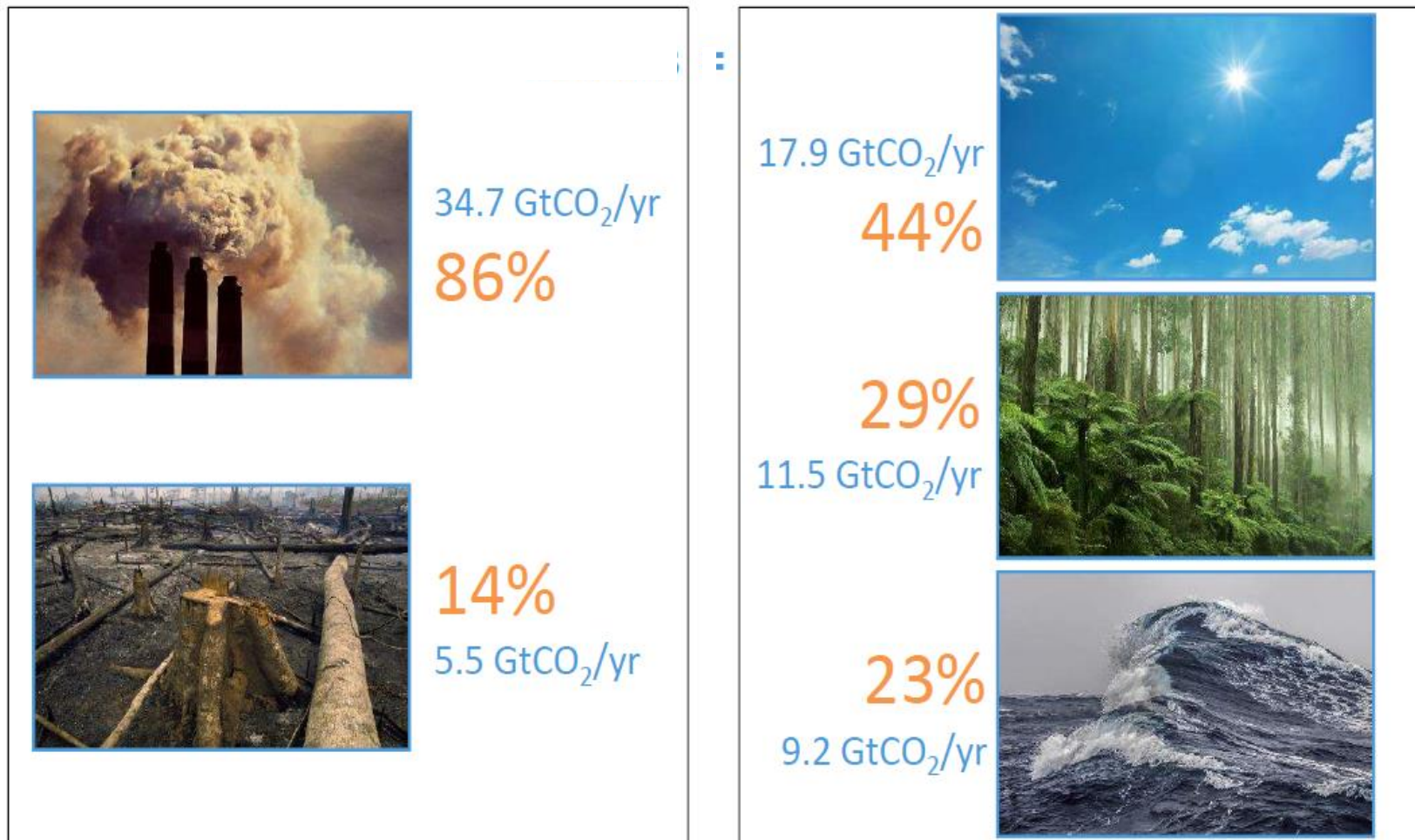
Carbon emissions are partitioned among the atmosphere and carbon sinks on land and in the ocean
The “imbalance” between total emissions and total sinks reflects the gap in our understanding



© Global Carbon Project • Data: CDIAC/GCP/NOAA-ESRL/UNFCCC/BPI/USGS

Source: [CDIAC](#); [NOAA-ESRL](#); [Houghton and Nassikas 2017](#); [Hansis et al 2015](#); [Joos et al 2013](#); [Khaliwala et al. 2013](#); [DeVries 2014](#); [Friedlingstein et al 2019](#); [Global Carbon Budget 2019](#)

Fate of anthropogenic CO₂ emissions (2009–2018)



Budget Imbalance:

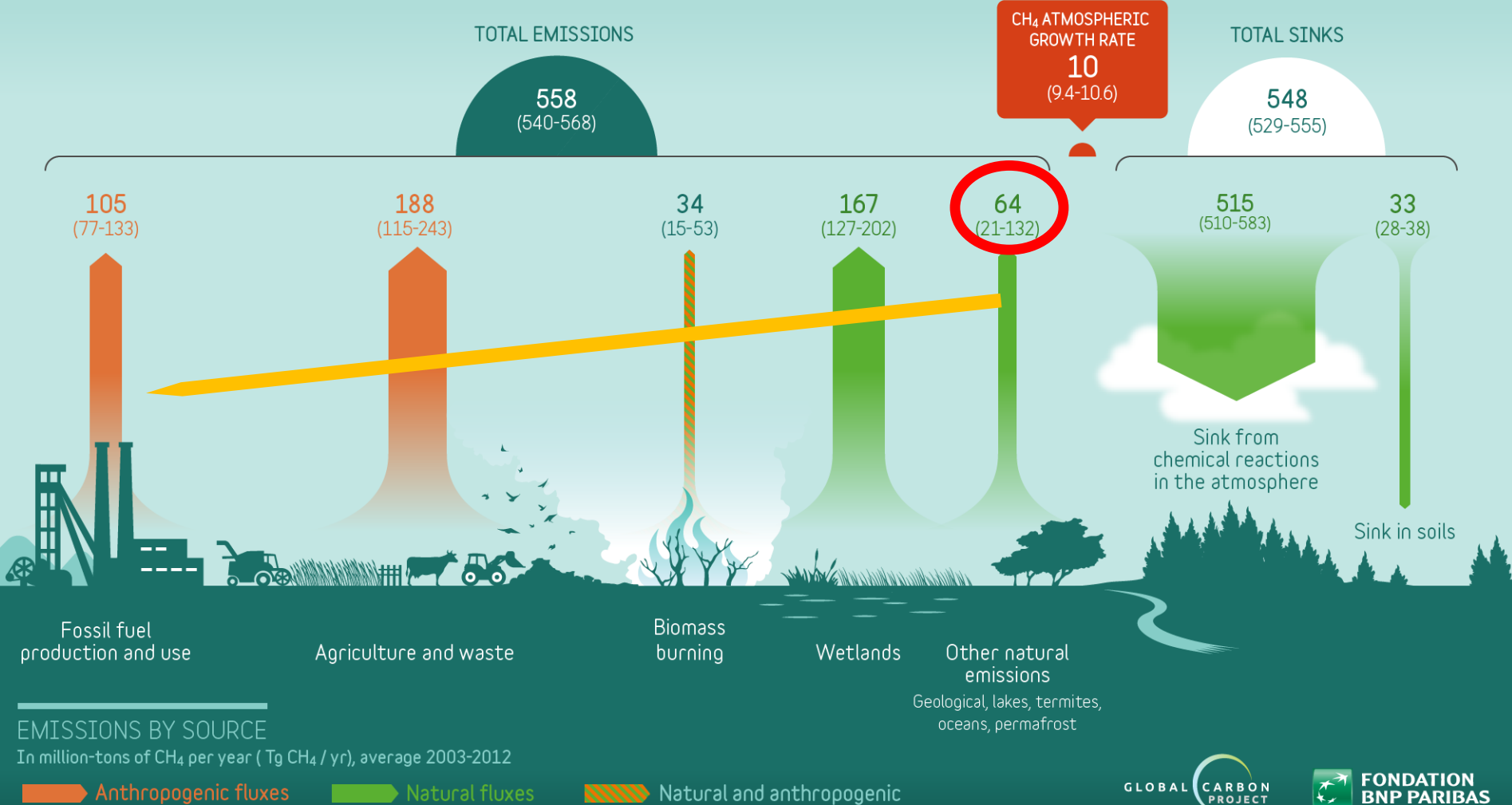
(the difference between estimated sources & sinks)

4%

1.6 GtCO₂/yr

Global Perspective

GLOBAL METHANE BUDGET



The national perspective

- The emissions inventory is submitted to the UN in Mid-April
- Figures presented here are provisional
- Do not cite
- The projections of the impact of the measures in the Climate Action Plan are not available yet

National Inventory estimates of GHGs All Sectors 1990-2018

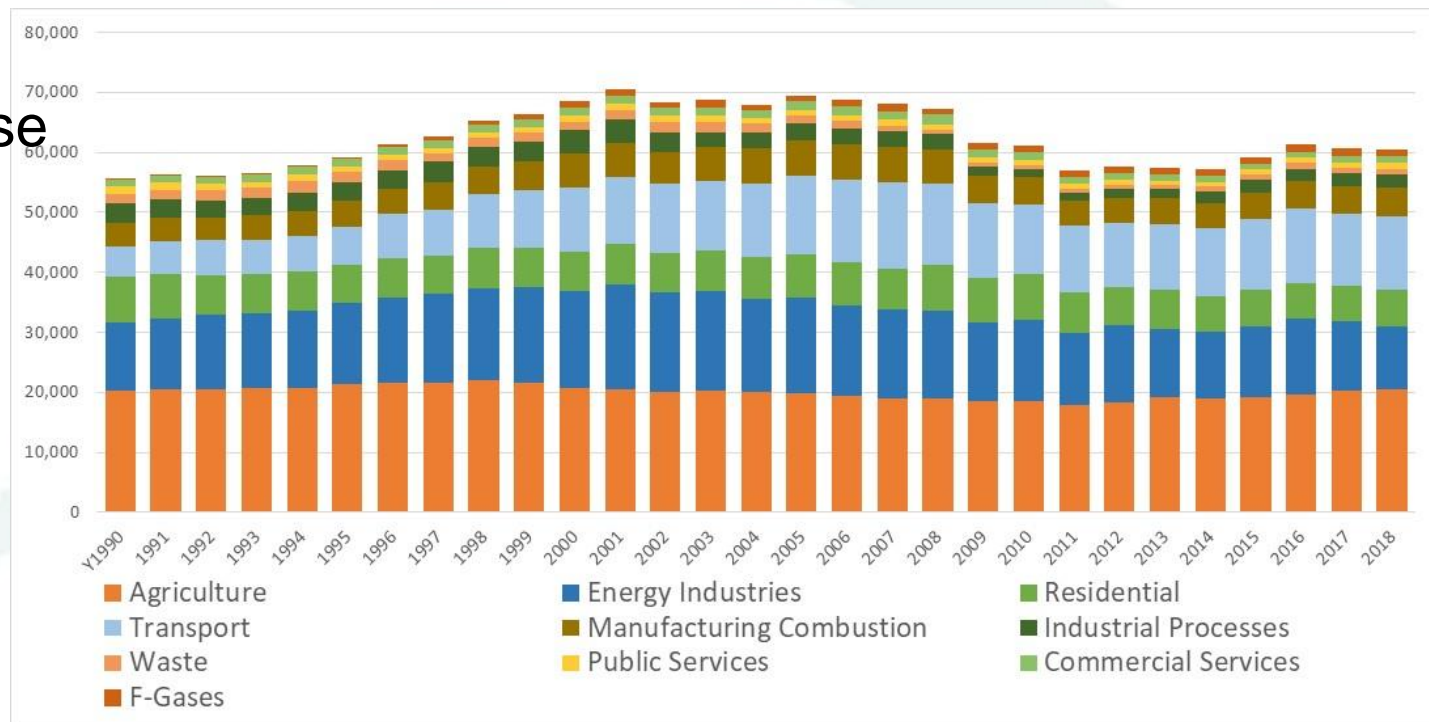
A little good news

Large decrease Electricity

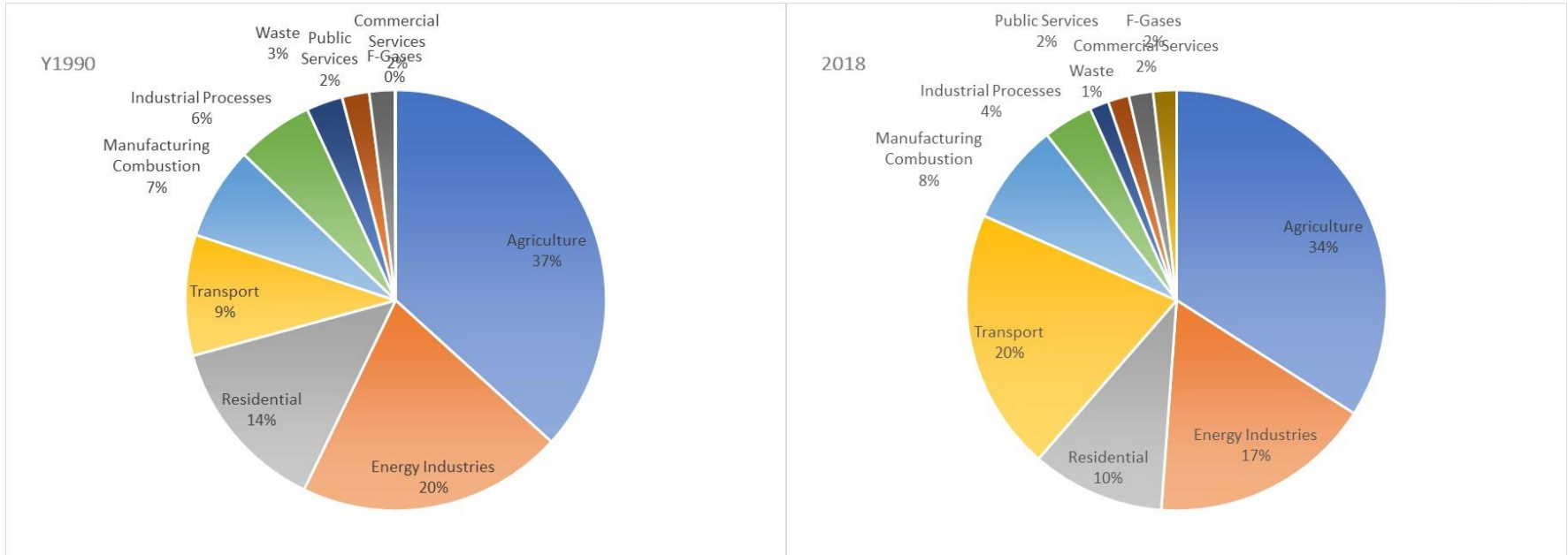
+9.2% 1990

-13% 2005

-0.2% 2017



National Inventory estimates of GHGs All Sectors 1990-2018

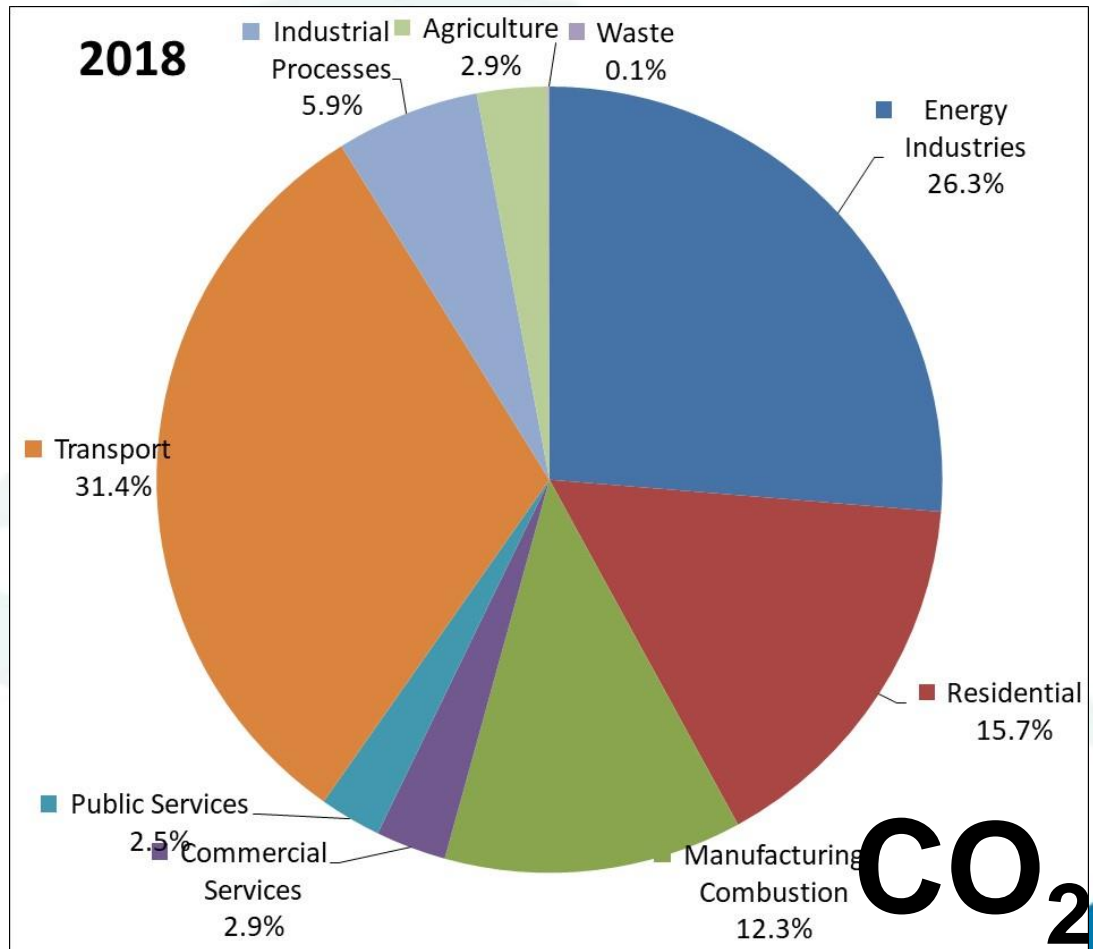


- Agriculture remains the largest share of emissions 34%
- Transport has overtaken Electricity Generation as the 2nd largest

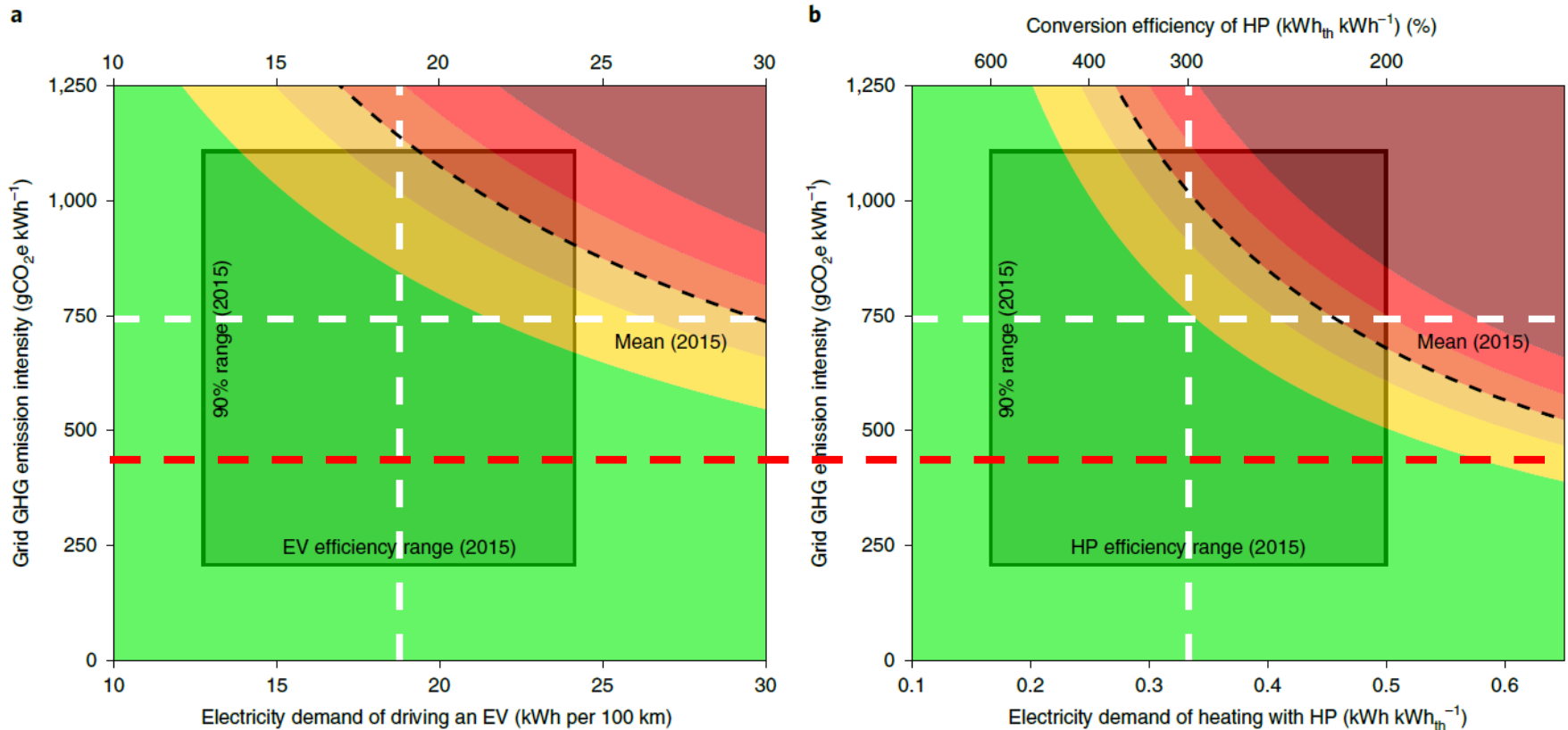
Carbon Dioxide emissions by Sector

- Direct Fossil Fuel use
- Exclude impact of land use

Indirectly agriculture and the wider rural economy impact emissions in the other sectors



Aside on Electric Vehicles and Heat Pumps



Resulting life-cycle GHG emission intensity of EVs/HPs is

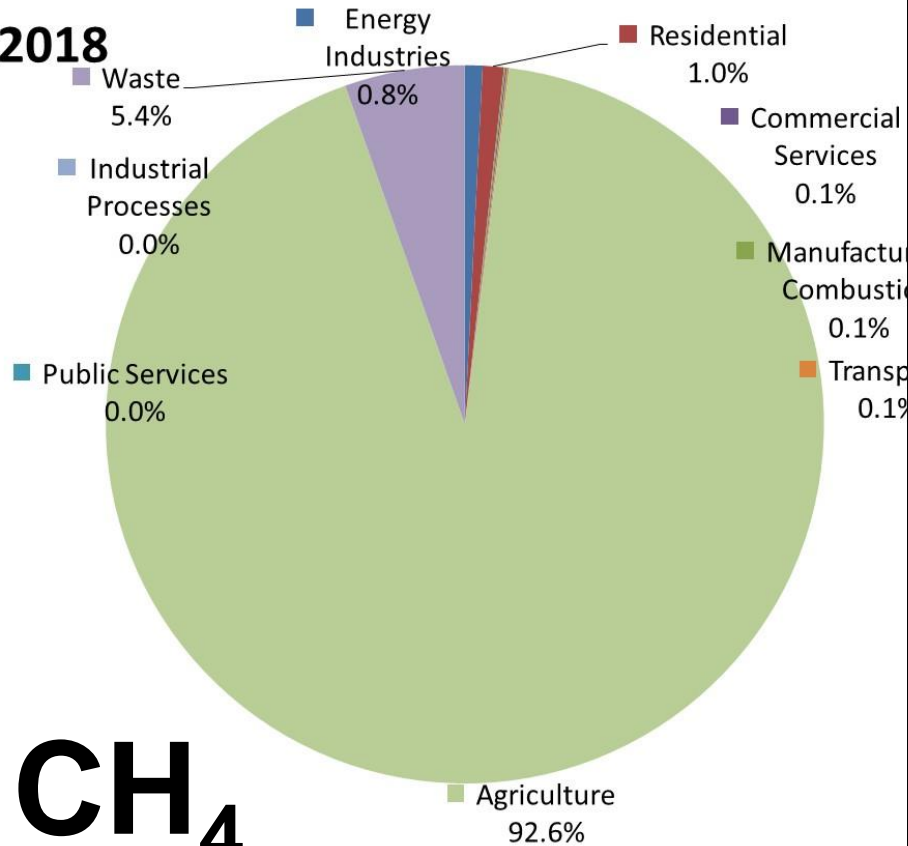


of that of newly sold petrol cars/fossil boilers in 2015 (distribution of average global sales)

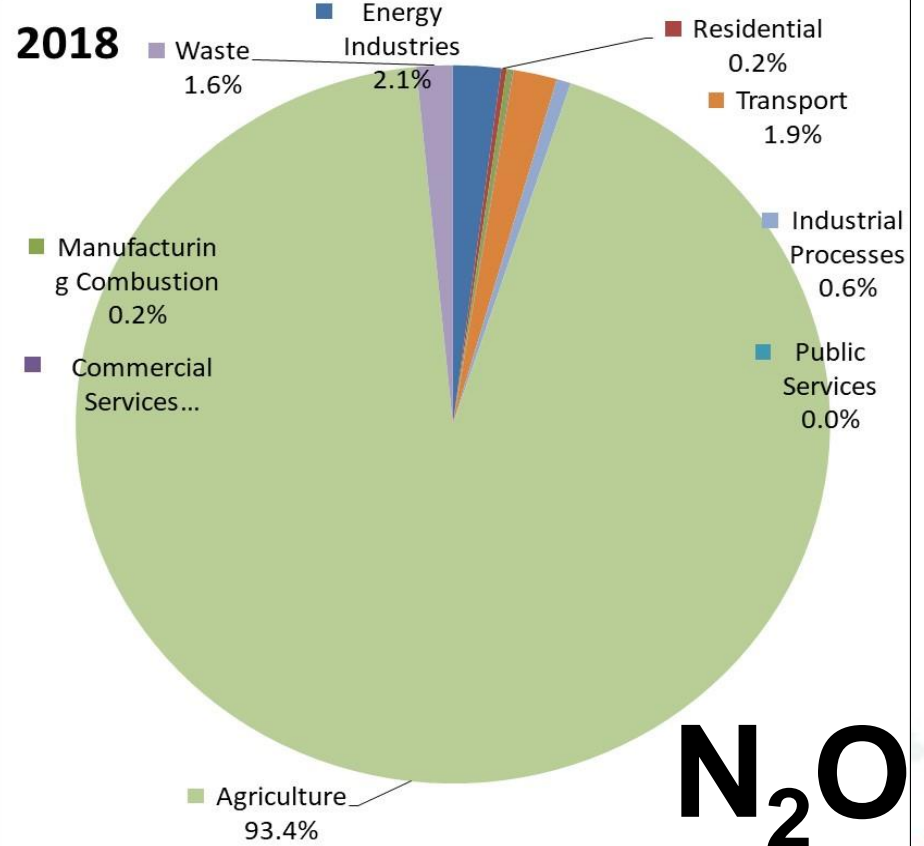
Red line is the GHG intensity of Ireland Electricity in 2019

Methane and Nitrous Oxide emissions by Sector

2018



2018



EU Climate and Energy Package

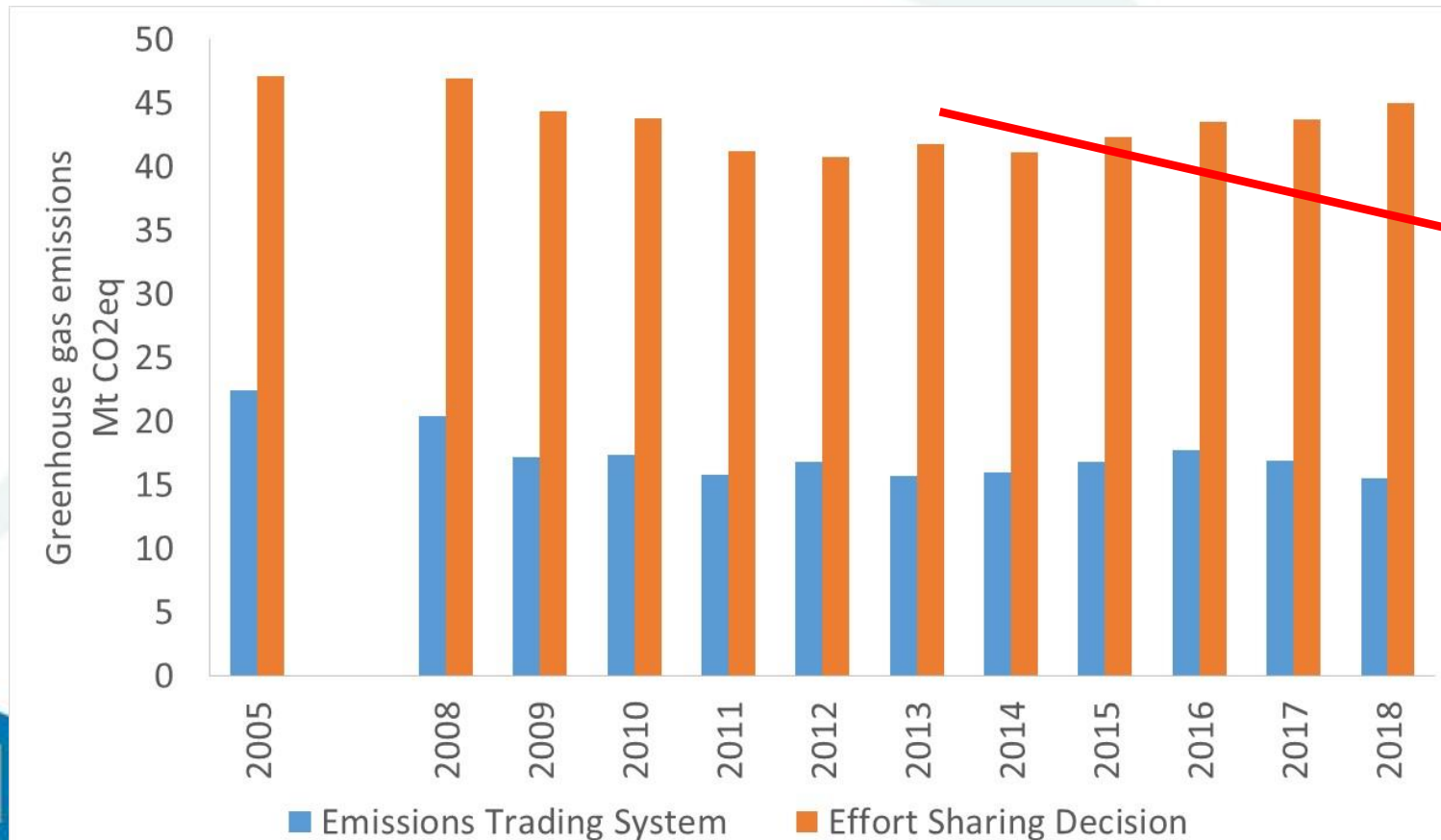
ETS and ESD(R)

- Ireland's response to climate change is framed in the context of the EU's collective response
- Three Pillars
 - Emissions Trading System: Large Industry, Power generation ~45% of EU approx. 26% of Ireland's emissions, ~ 100 facilities
Businesses auction for a limited number of allowances to emit GHGs.
 - Effort Sharing Decision (Regulation): Agriculture, Transport, Residential/Commercial Heat, Waste etc.
Each Member State has a target for emissions reduction
Ireland: 20% by 2020 relative to 2005
30% by 2030 relative to 2005
 - LULUCF decision: from 2021 onwards, a limited amount of the sink achieved in land use can be used to meet the ESR target

EU Climate and Energy Package

ETS and ESD(R)

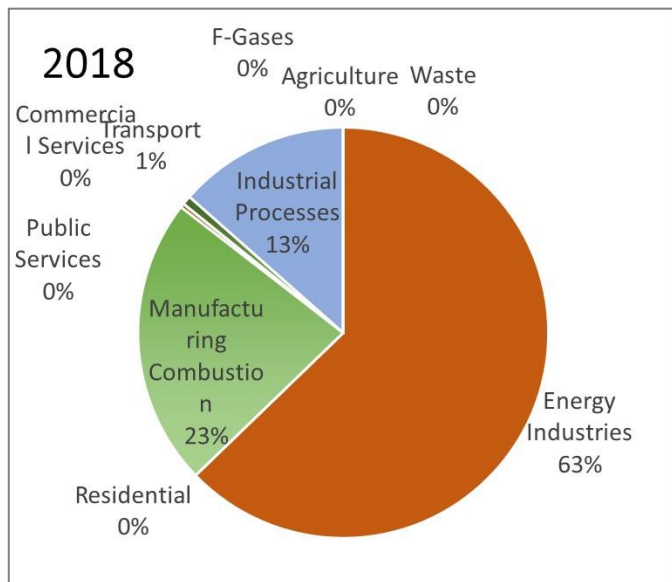
- The Emissions Trading System covers just 26% of total national emissions, down from 32% in 2005



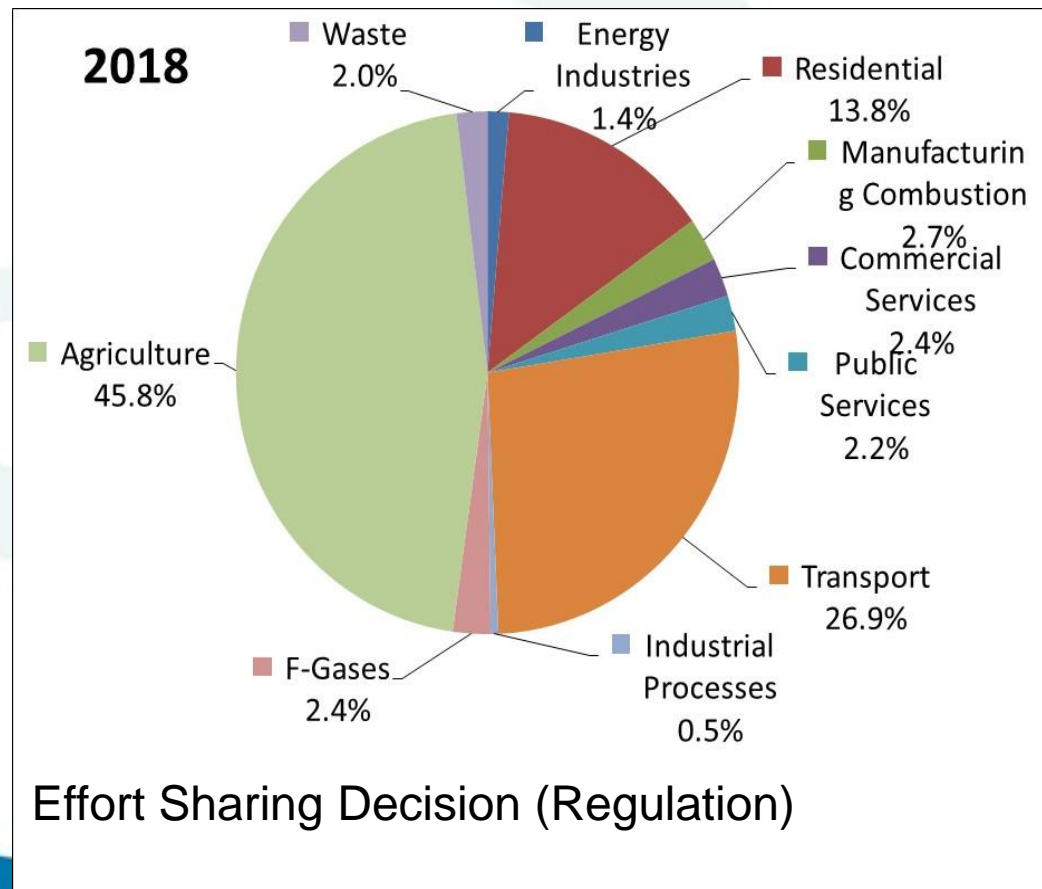
EU Climate and Energy Package

ETS and ESD(R)

- Ireland's response to climate change is framed in the context of the EU's collective response



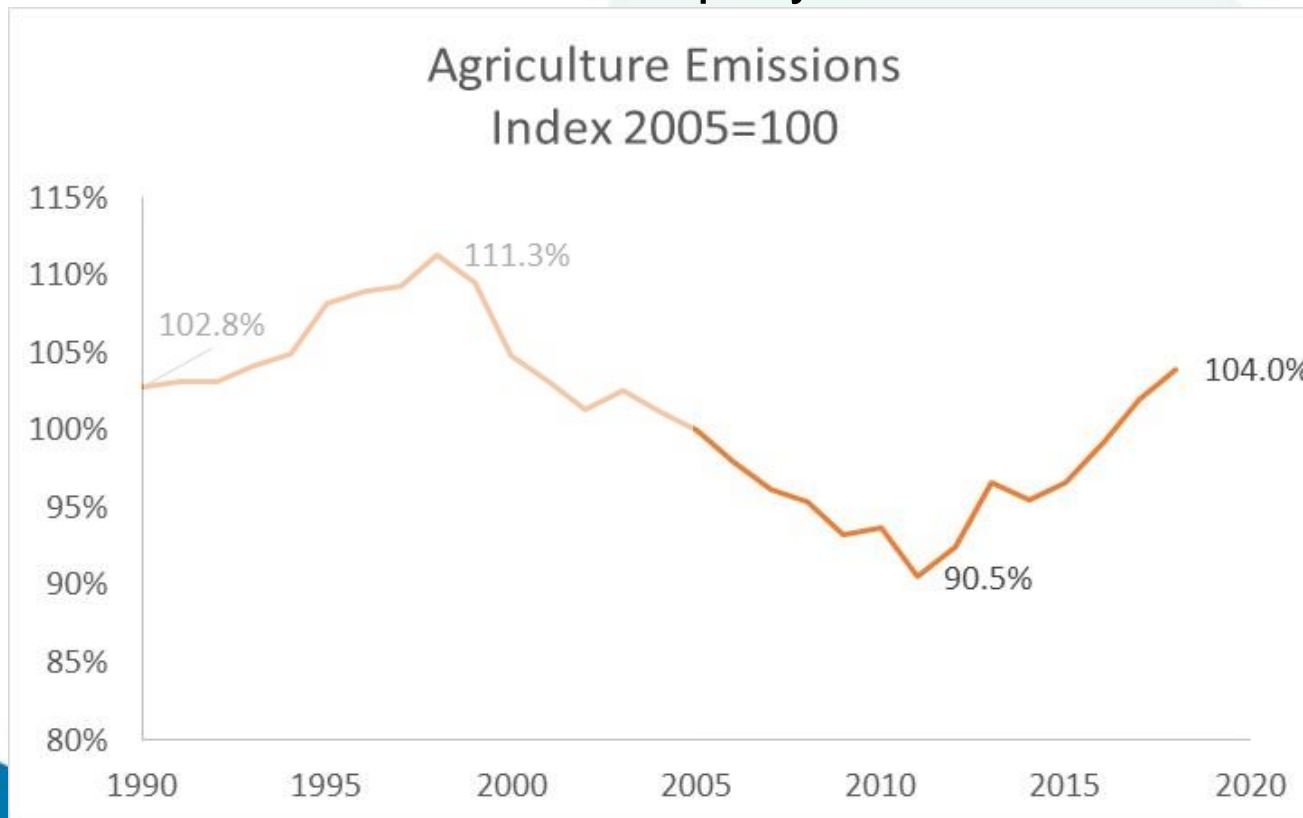
Emissions Trading System



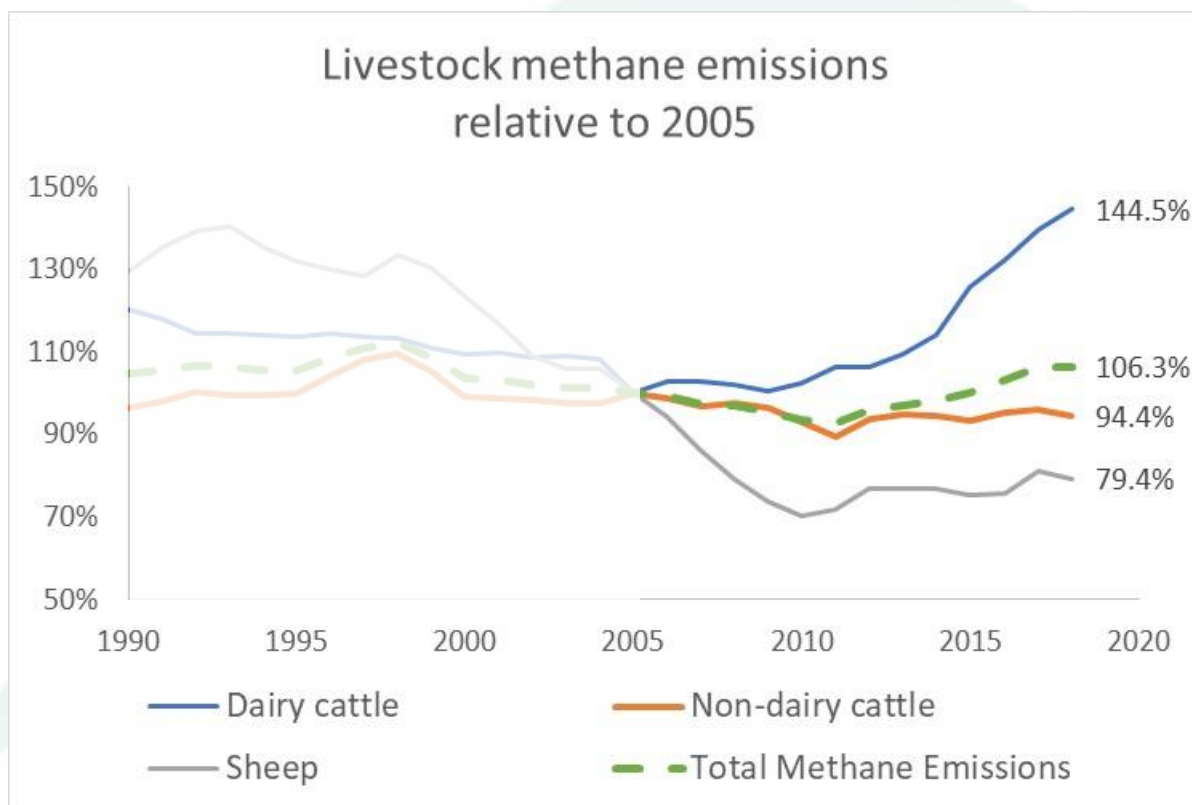
Effort Sharing Decision (Regulation)

Agriculture emissions

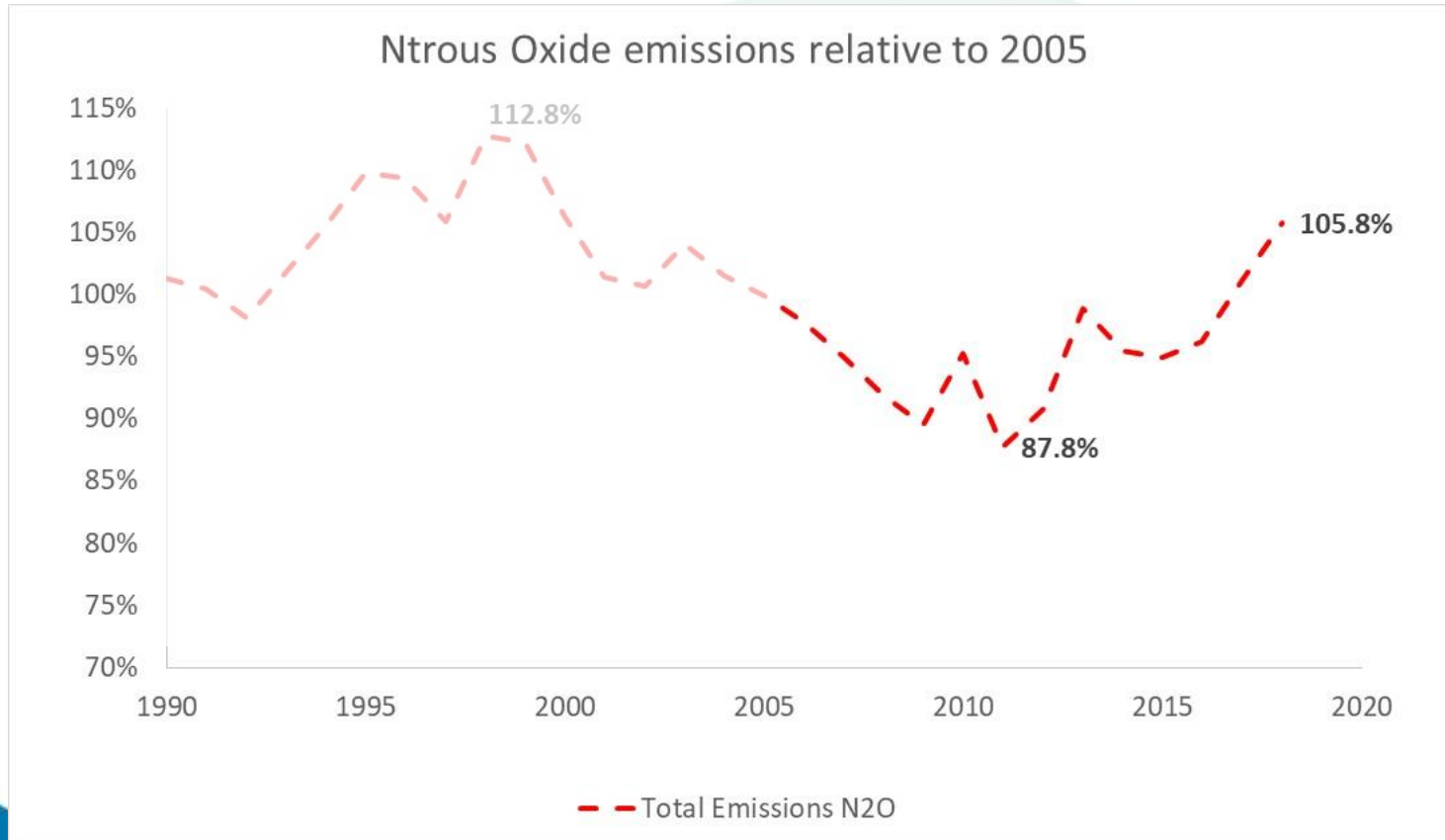
- Emissions have increased rapidly since 2011



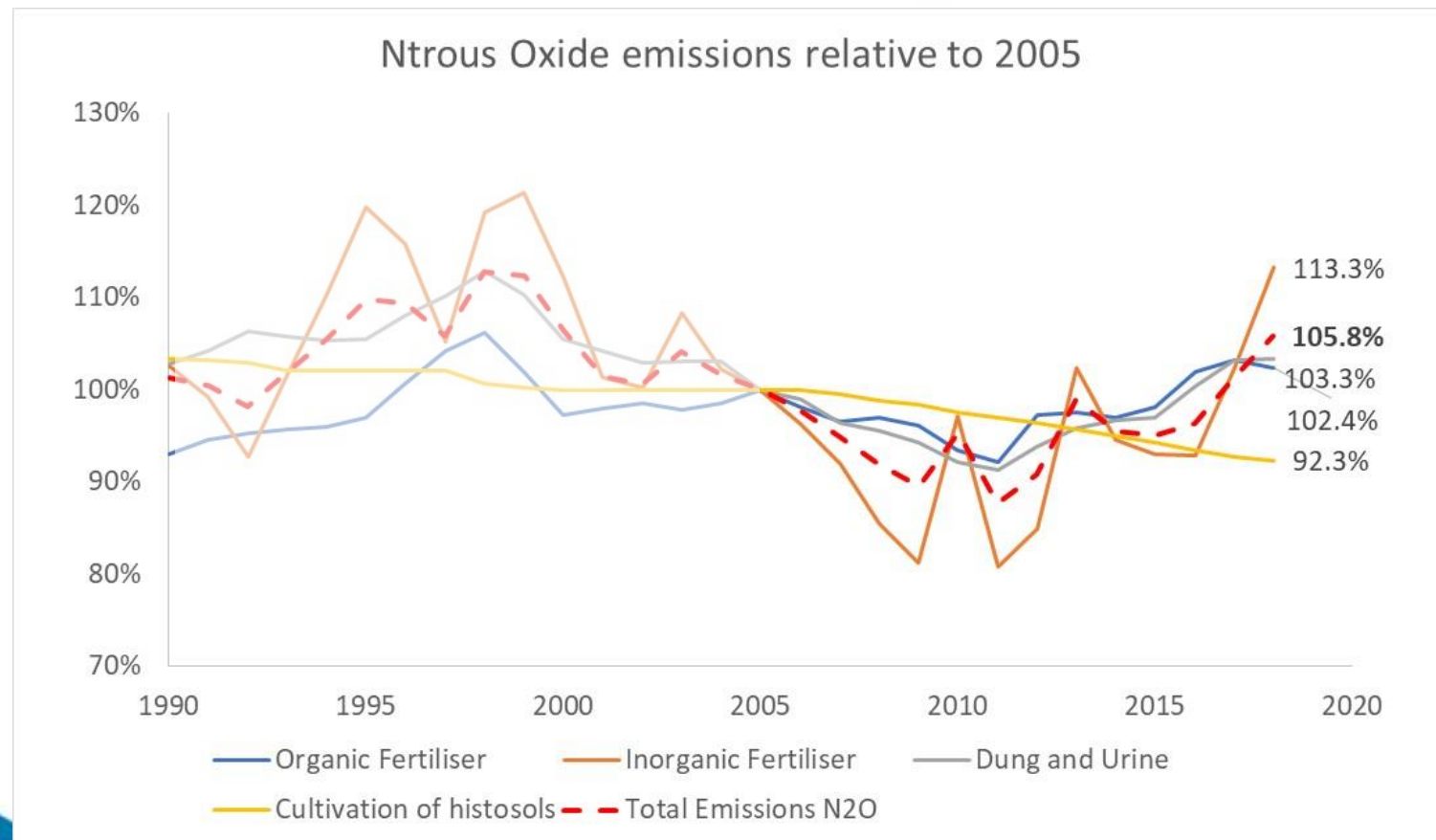
Major Livestock types Methane emissions



Agriculture Nitrous Oxide Emissions relative to 2005



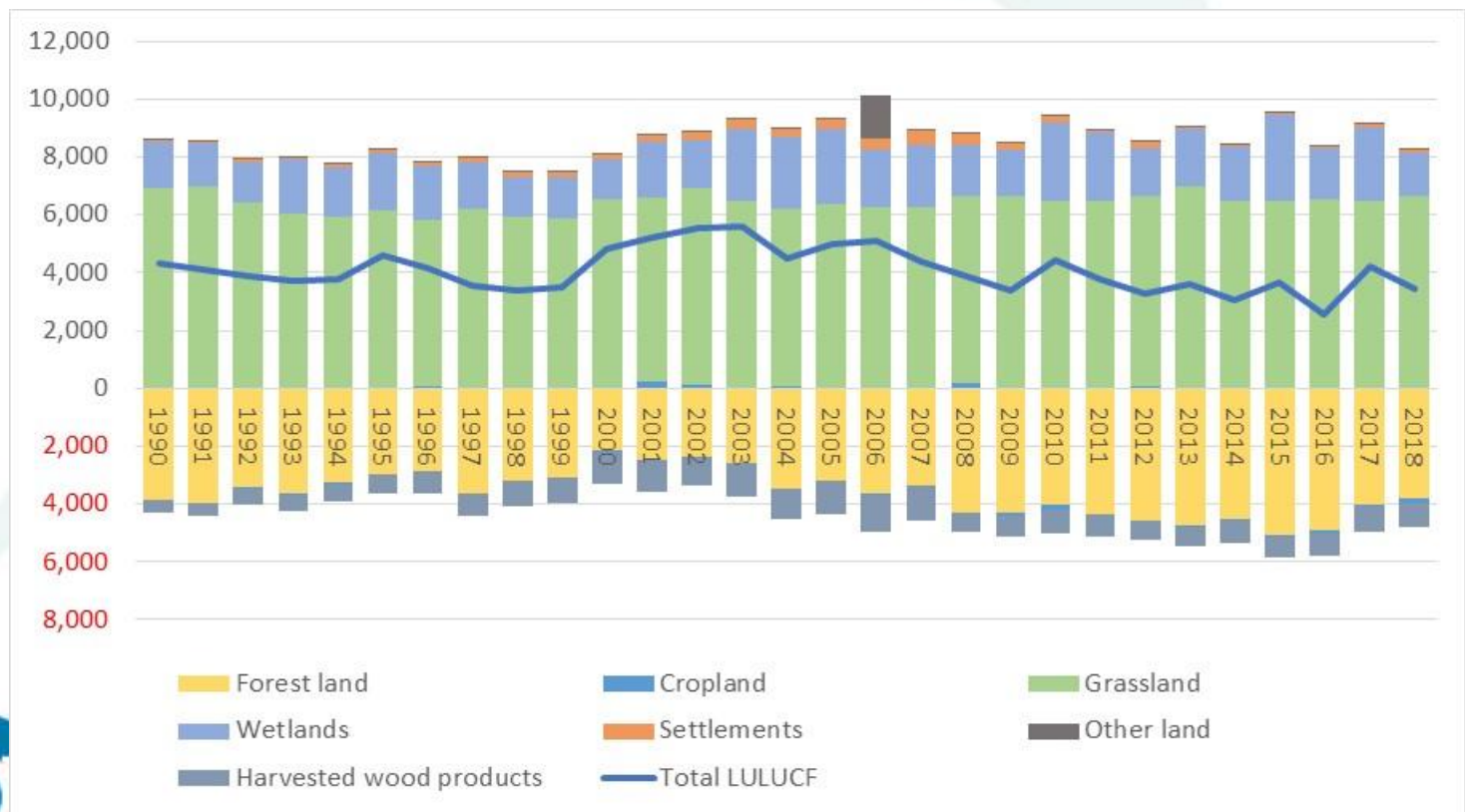
Agriculture Nitrous Oxide Emissions relative to 2005



Greenhouse gas emissions Land Use

■ As reported to the UN

Mostly due to the drainage of organic soils Land Use in Ireland is a **Source** of emissions



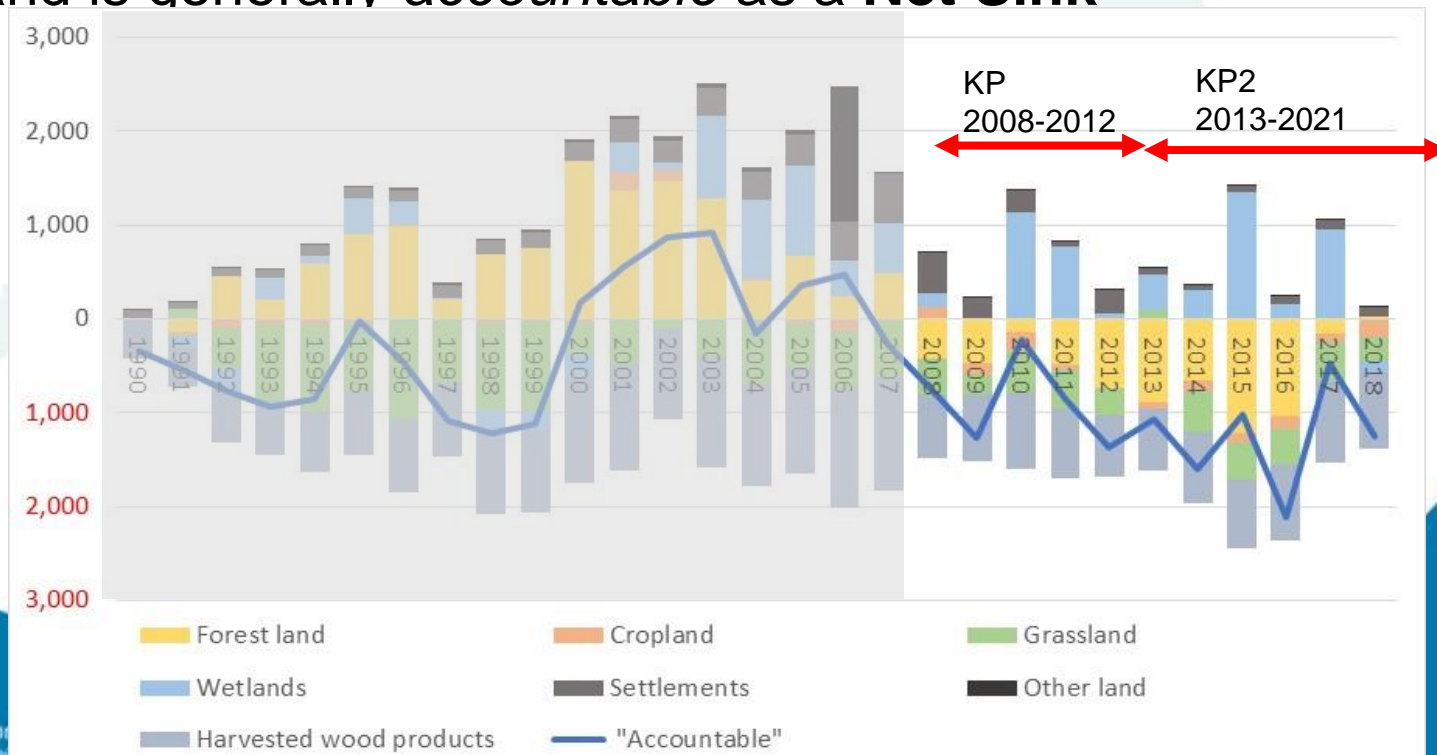
Hypothetical Accounting for Greenhouse gas emissions Land Use

- Under EU rules, but to 2020 what happens in LULUCF does not contribute to targets

Mostly due to

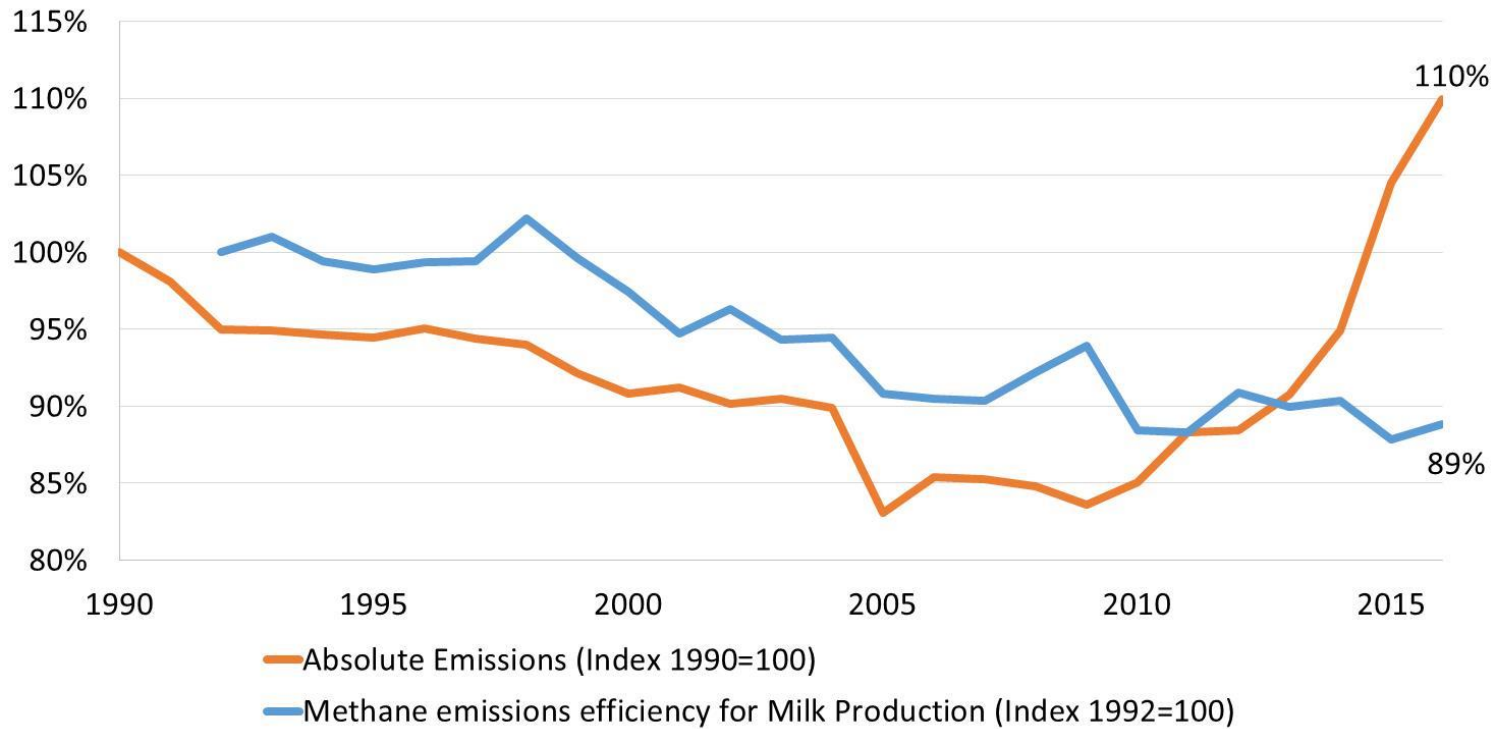
Afforestation, Harvest Wood and Grassland

Land Use in Ireland is generally *accountable* as a **Net Sink** emissions



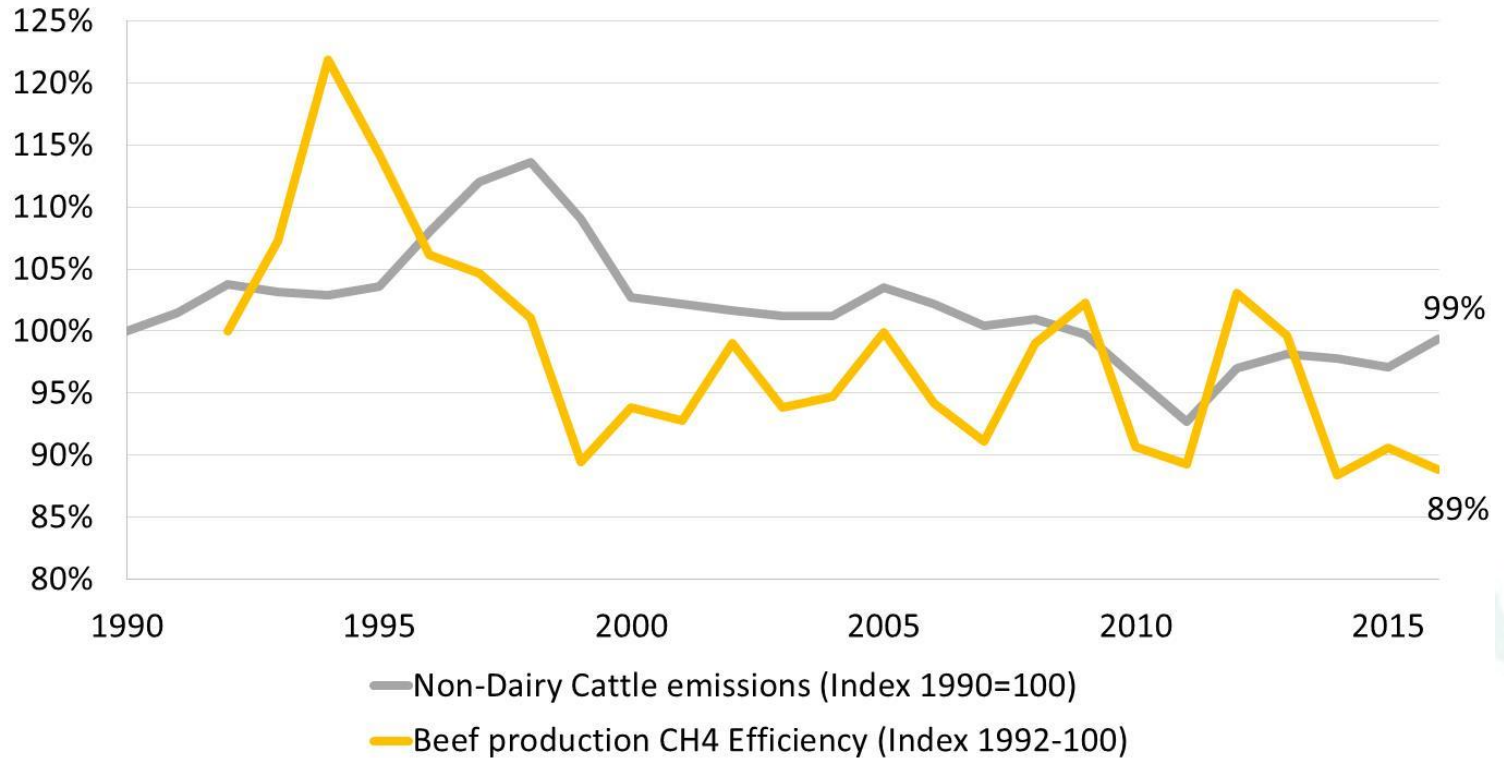
Milk production efficiency (2016)

Methane emissions associated with Milk Production



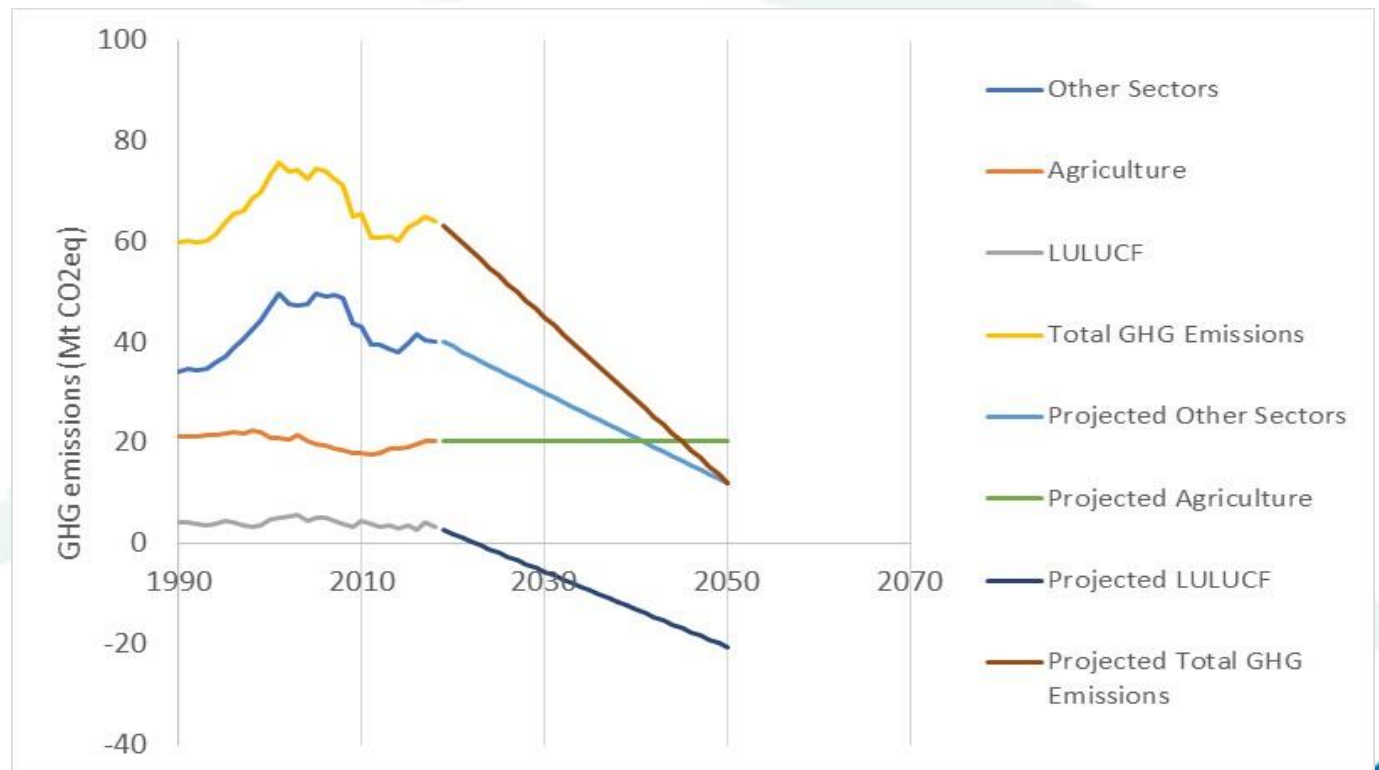
Emissions associated with Livestock (Beef)

Methane emissions associated with Beef Production



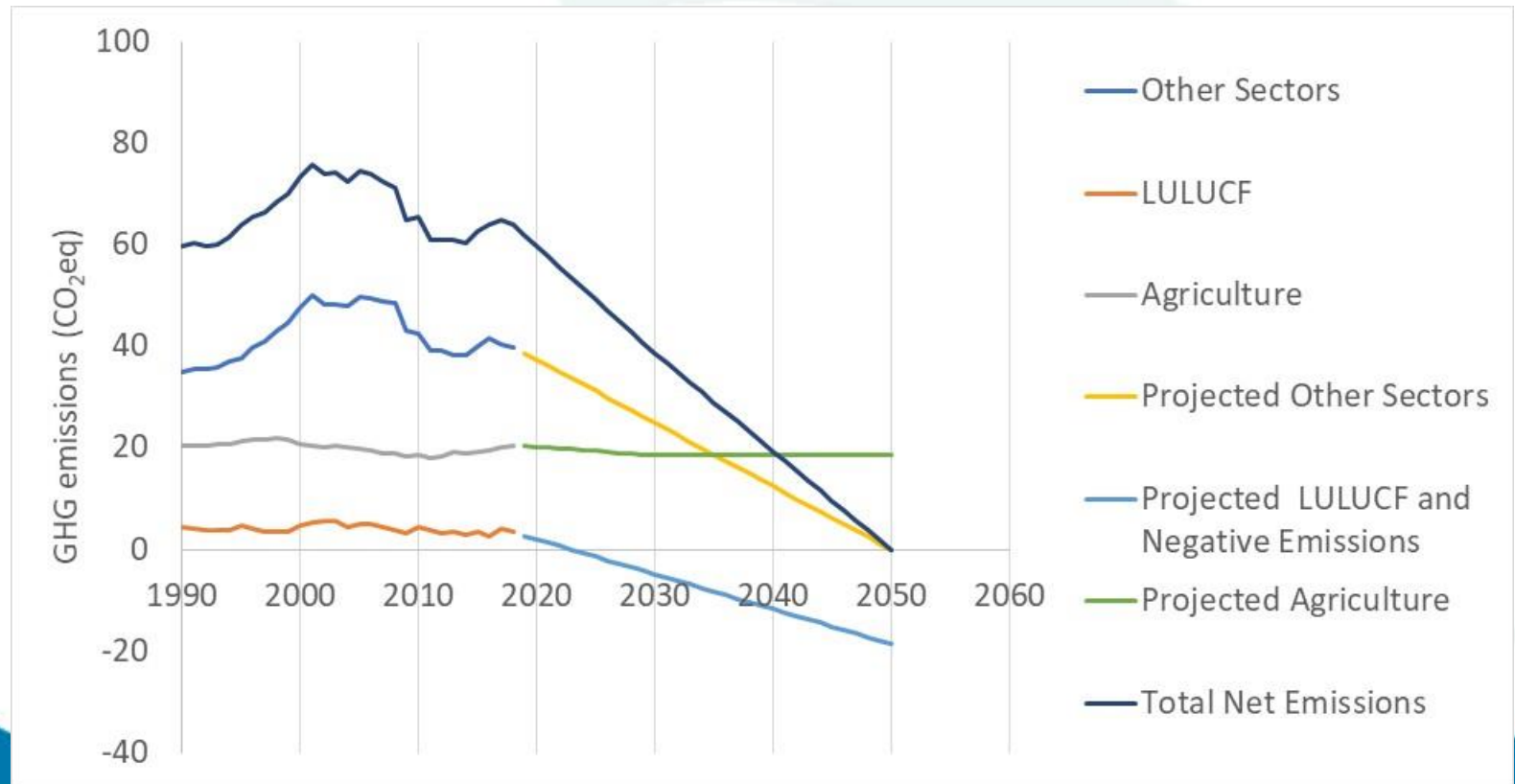
Current National Policy Position

- 80% Fossil Fuel CO₂ emissions reduction by 2050
- Approach neutrality in Agriculture and Land Use



EU Green Deal implies a change will come National Policy Position

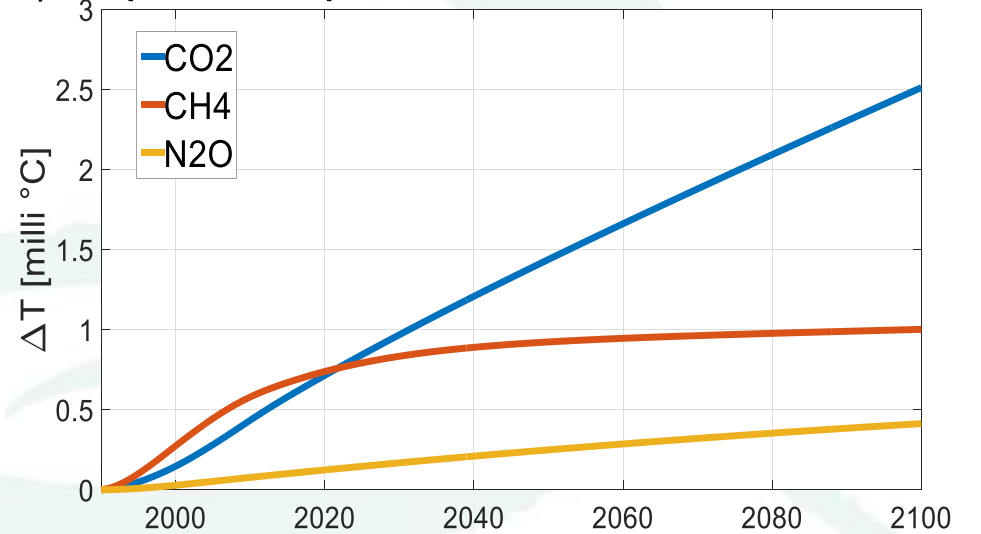
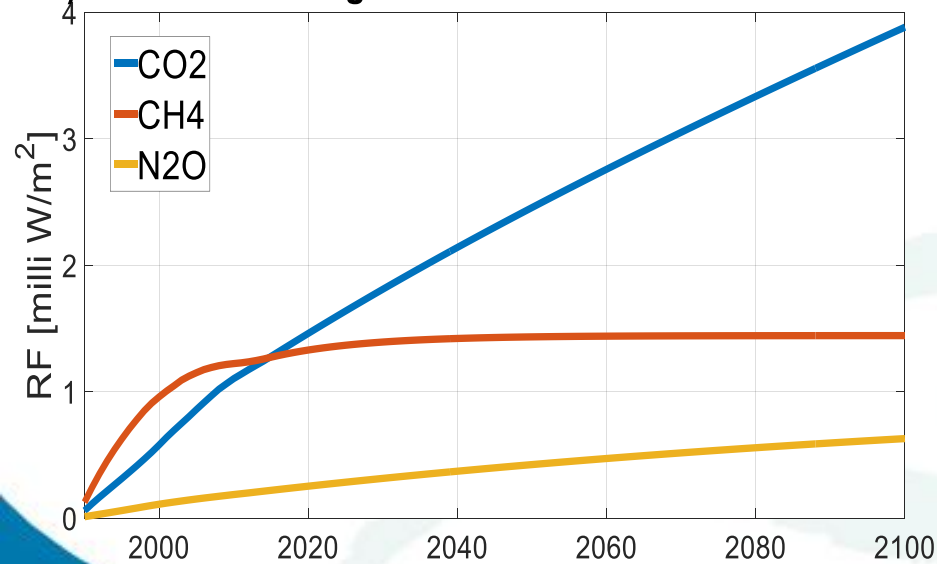
- Net Zero all GHG emissions 2050
- Climate neutrality



Food for thought

■ Different gases CO₂, CH₄, N₂O

A) Radiative forcing with constant emissions 2015-2100 B) Temperature response with constant emissions 2015-2100



Conclusion

- Ireland is not on track to achieve 2020 targets
- Neutrality as a long term goal is challenging (regardless of how this is defined)
- Sustainable land management will be vital
- Need more detailed activity data to demonstrate impact of good practice
- All available, cost effective mitigation measures need to be implemented

Thank you

- Questions

