



Ammonia and Greenhouse Gas Emissions from Irish Farming

· Pat Murphy¹

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Talk Outline

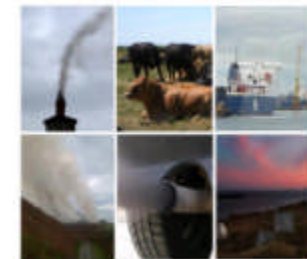
- Challenges
- Background: GHG and ammonia in Irish agriculture
- Reducing emissions

The Role of Irish Farmers

- Job – To produce food
 - High Quality & Safe
 - Environmentally Sustainable
 - Economic – Delivers income
 - Socially Sustainable – Helps rural communities



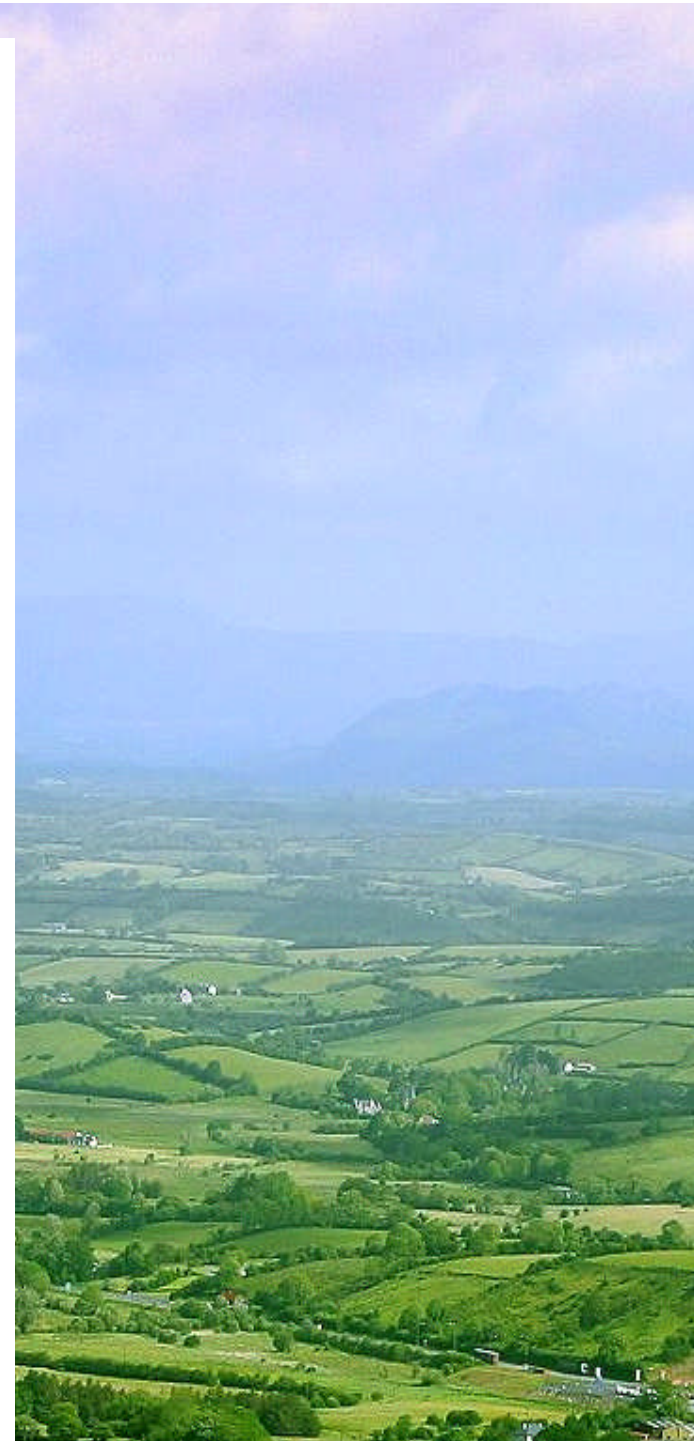
Cleaning Our Air
Public Consultation to inform the development of
a National Clean Air Strategy



Sustainability

Sustainability is a big issue for Irish agriculture

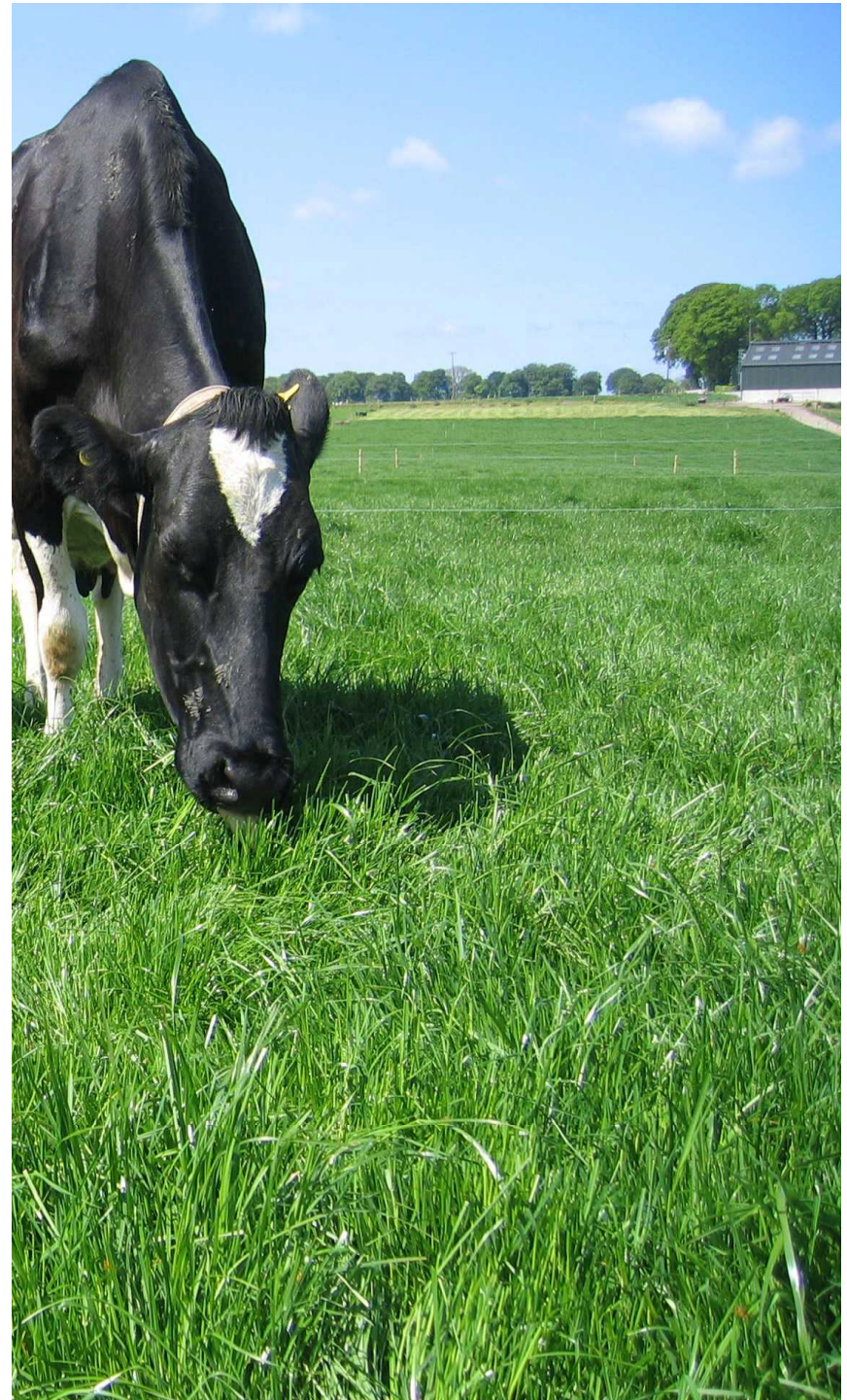
- Export 80-90% of our dairy and beef products
- Sustainability embedded in international food marketing (Bord Bia's Origin Green programme)
- Agricultural emissions are large, and Ireland has signed up to challenging emission reduction targets
- Water Quality & Biodiversity Challenges



Irish dairy industry – a great success story

- Output growing rapidly since quota elimination
- The expansion has generally been low cost and debt levels are low in Irish dairying
- Successful breeding programme has delivered much improved fertility and milk solids
- Very good international reputation for quality
- Very low carbon footprint with downward trajectory

BUT.....





**Higher animals numbers,
mainly dairy cows and their
progeny being reared for
beef, are driving up
greenhouse gas (and
ammonia) emissions**

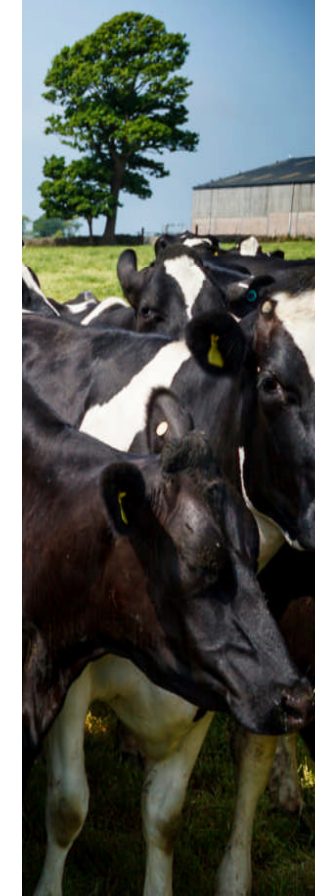
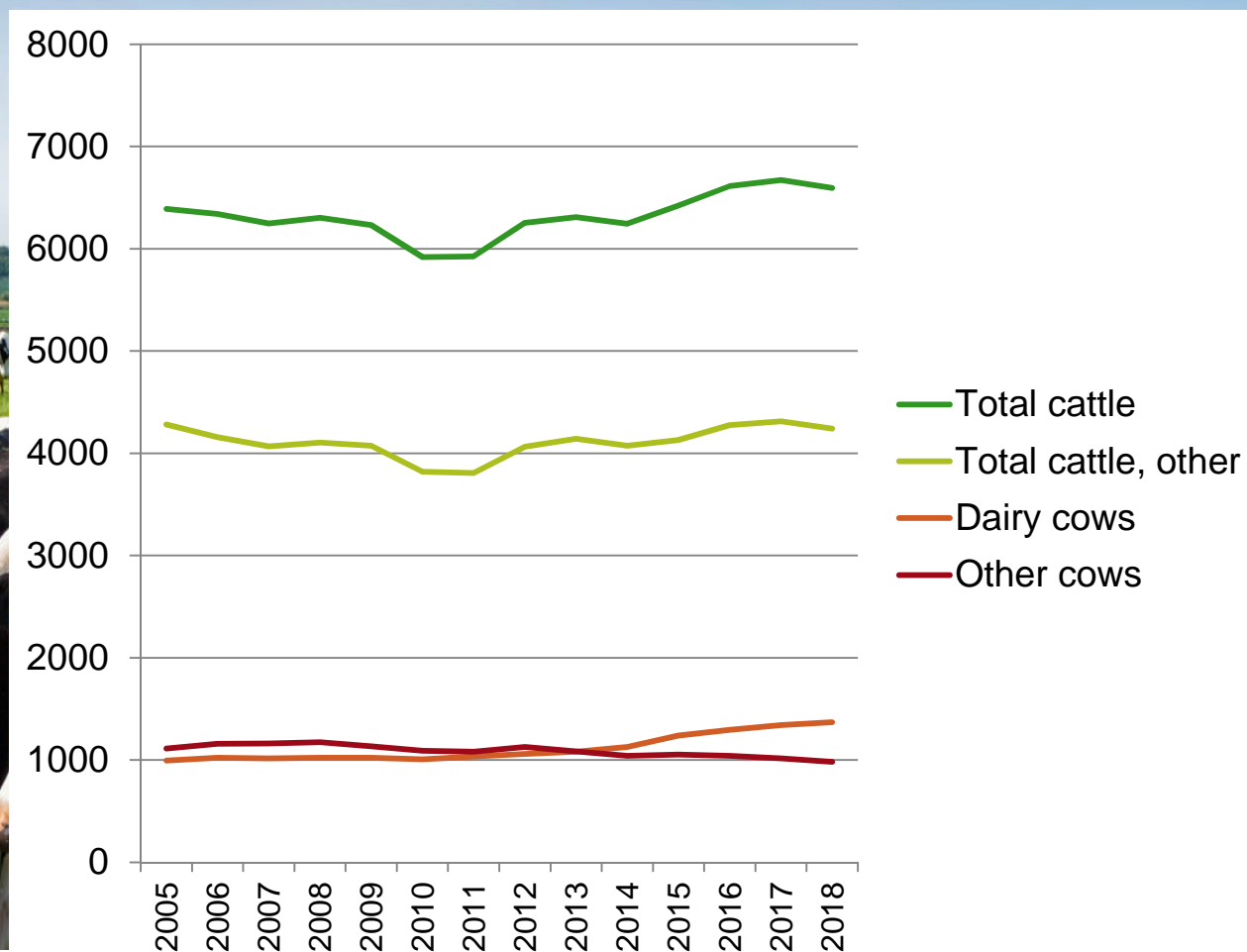
and

**the trends are for continued
increases!**

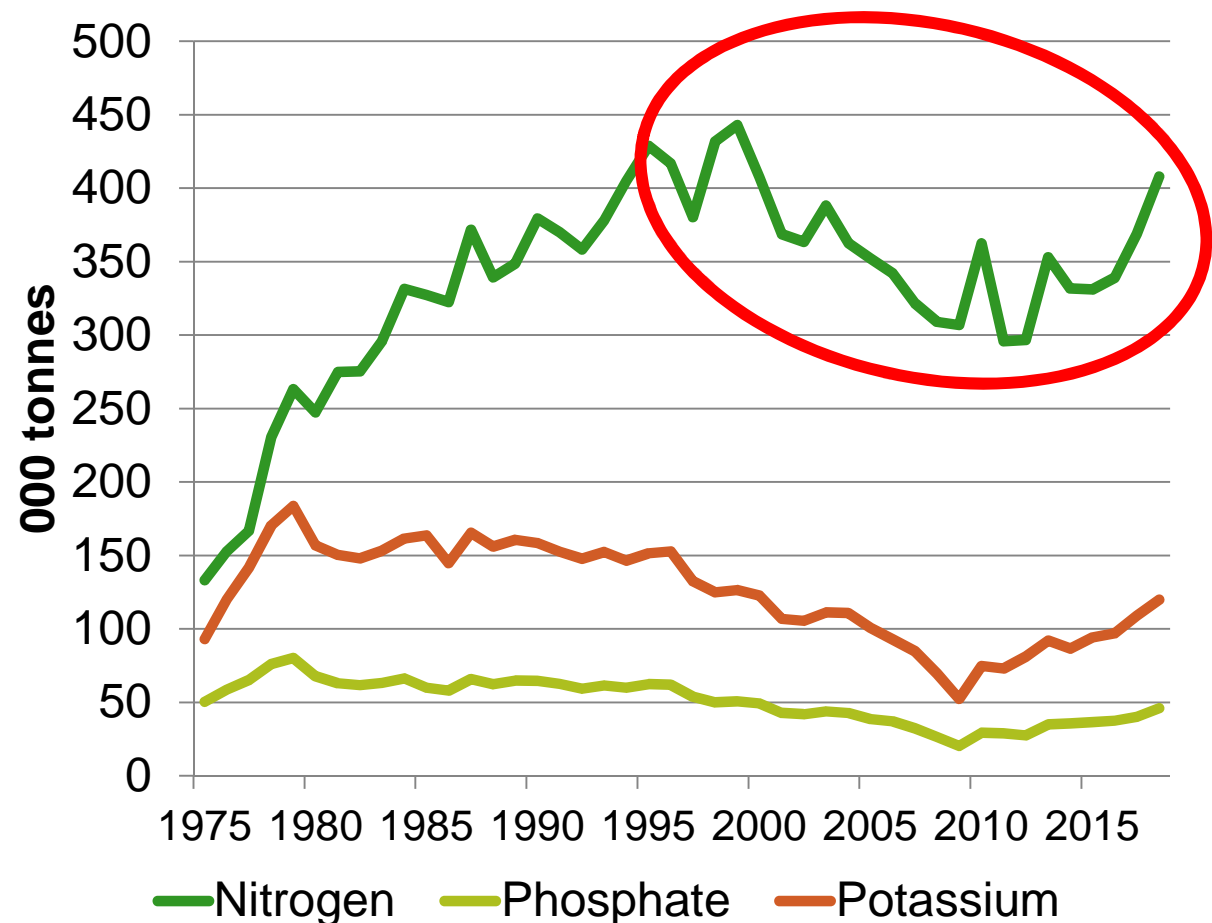
Footprint x Activity = Total emissions



Irish cattle numbers ('000)



Annual Fertiliser Sales in Ireland 1975-2018



Source: DAFM

The Challenges

Agricultural GHG 2030 targets:

- Reduce emissions ~10% (17.5 -19Mt CO₂e)
- Deliver carbon sequestration ~ 10% (2.7 MT CO₂e)

Ammonia targets:

- 1% reduction 2020-30
- 5% from 2030 onwards
- ammonia mitigation can be linked with GHG mitigation
- Sometimes positively – Sometimes negatively

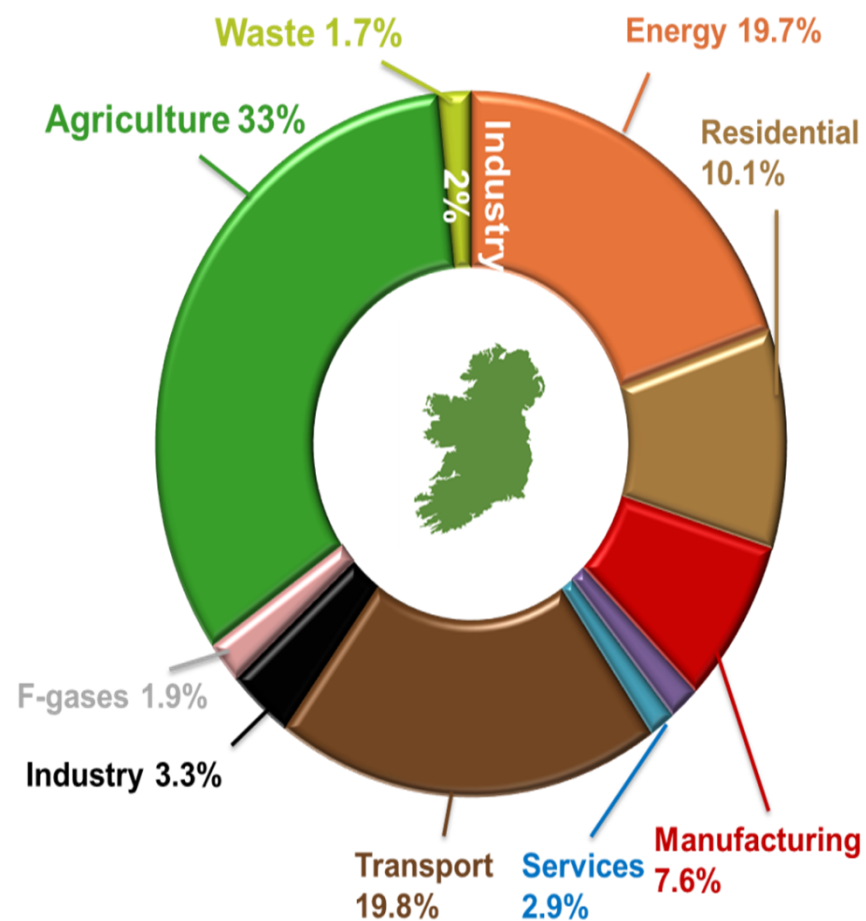


Cleaning Our Air

Public Consultation to inform the development of a National Clean Air Strategy

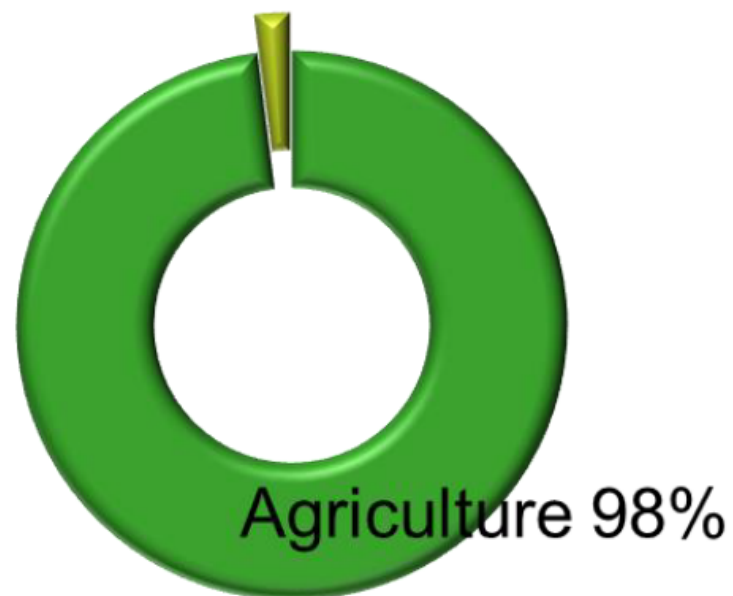


Irish agricultural GHG emissions



Ammonia Emissions

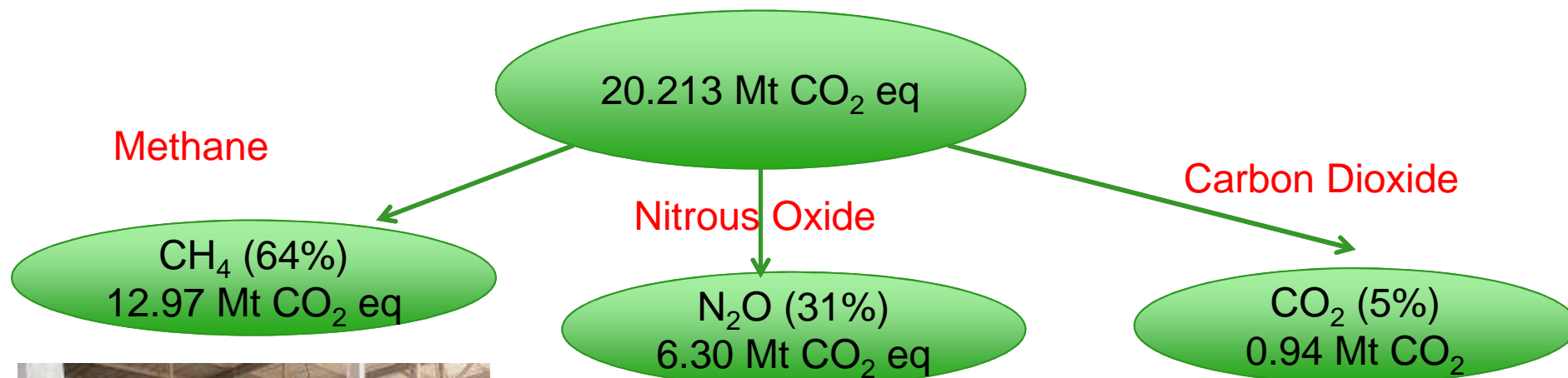
- 80% of ammonia from dairy and beef
- Remainder from pig and poultry



Ammonia

- Ammonia is not a Greenhouse Gas
- Target to reduce
- Code of Good Agricultural Practice for reducing Ammonia Emissions - Nov 2019
- Currently Exceeding Target
- Why reduce
 - Damage to human health
 - Damage to Environment – Particularly sensitive habitats

GHGs in Irish Agriculture

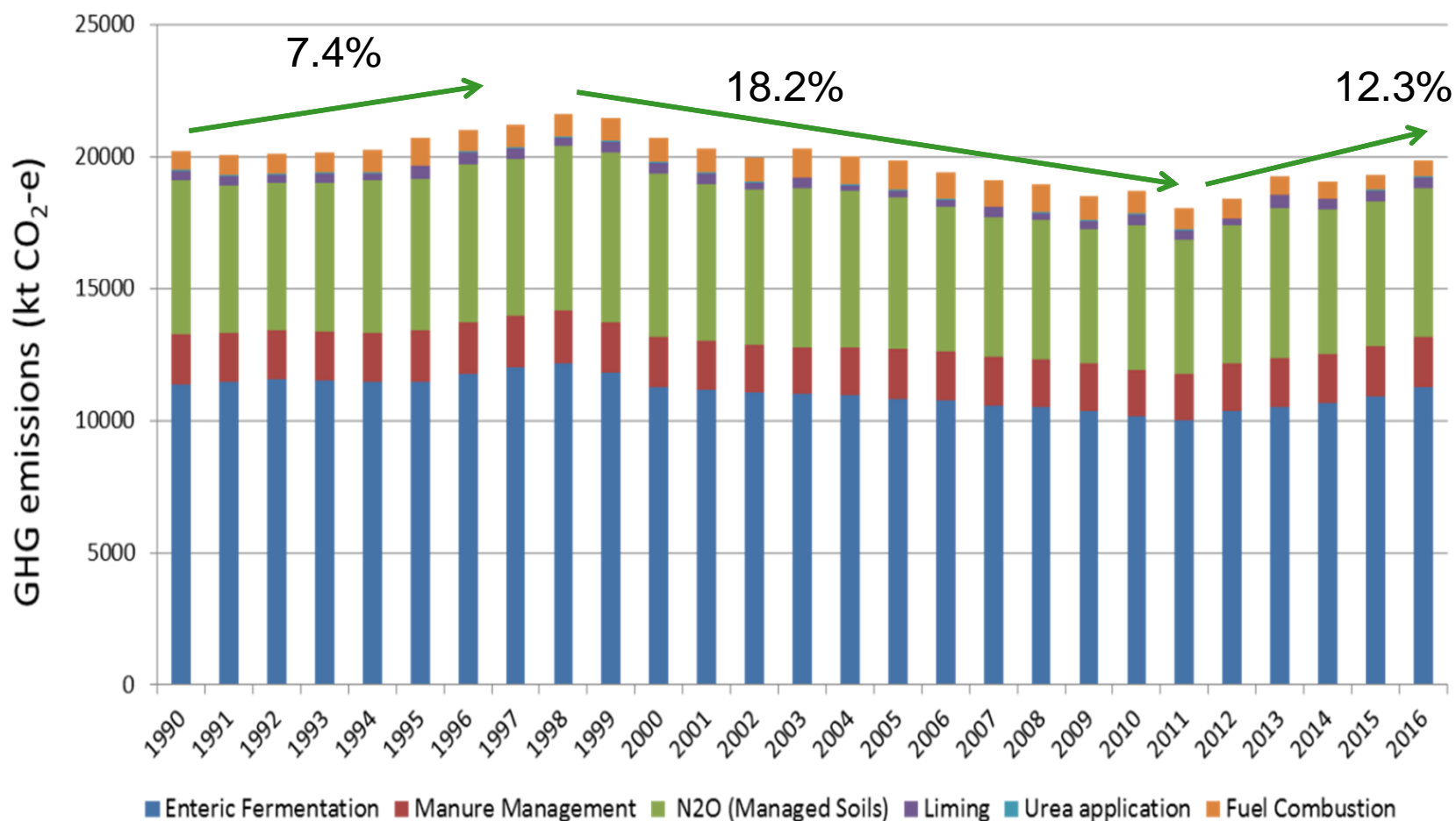


Total emissions V Carbon Footprint

- Total Emissions
 - Carbon Dioxide + Methane x 25 + Nitrous Oxide x298
- Carbon Footprint
 - Emissions per unit of output
- Both Important – But
- Nationally need to reduce Total Emissions
- E.g – Improve EBI gives better Fertility
 - Lower number of Replacements
 - If Farmer keeps extra cow

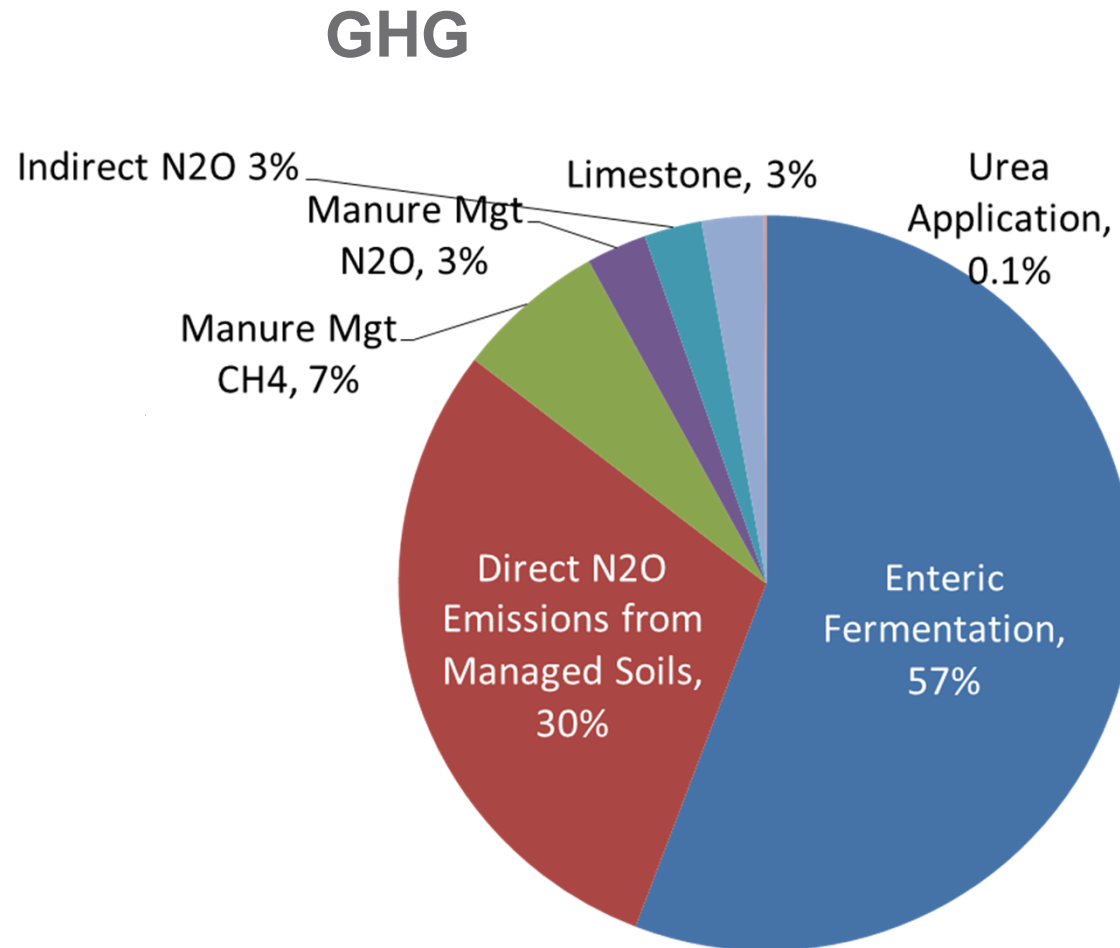


Agriculture GHG emissions profile



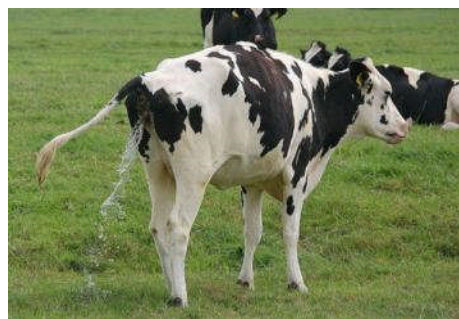
- Cattle account for 88.7 % of methane emissions and 90% of N₂O emissions

GHG Sources



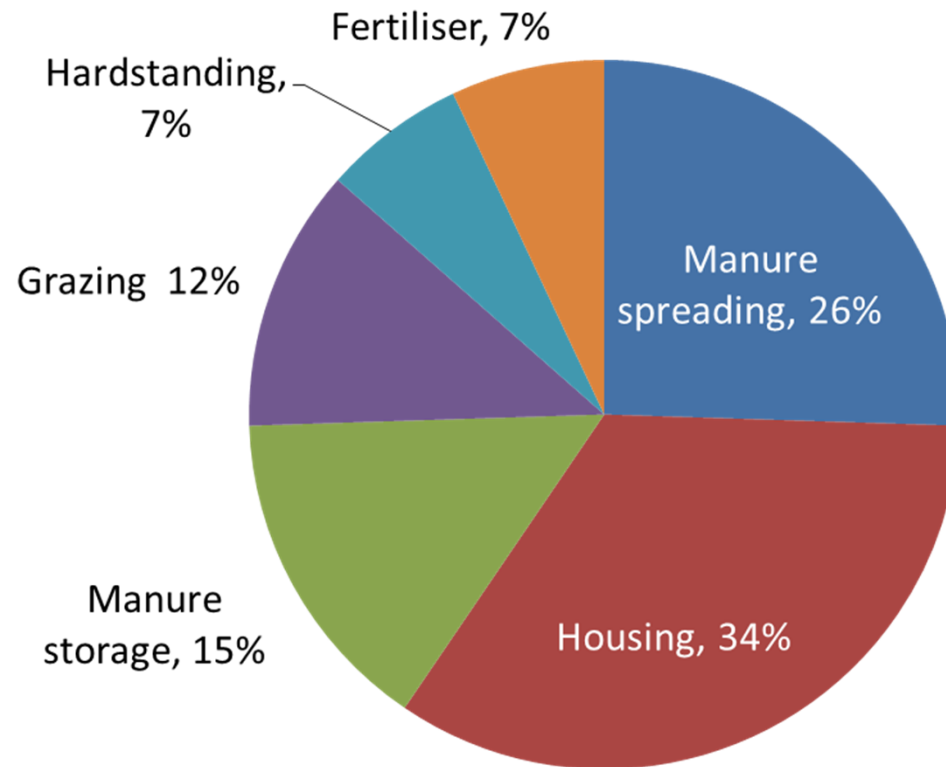
Ammonia in Irish Agriculture

Air pollutant ammonia
(NH₃) 117.4 kt

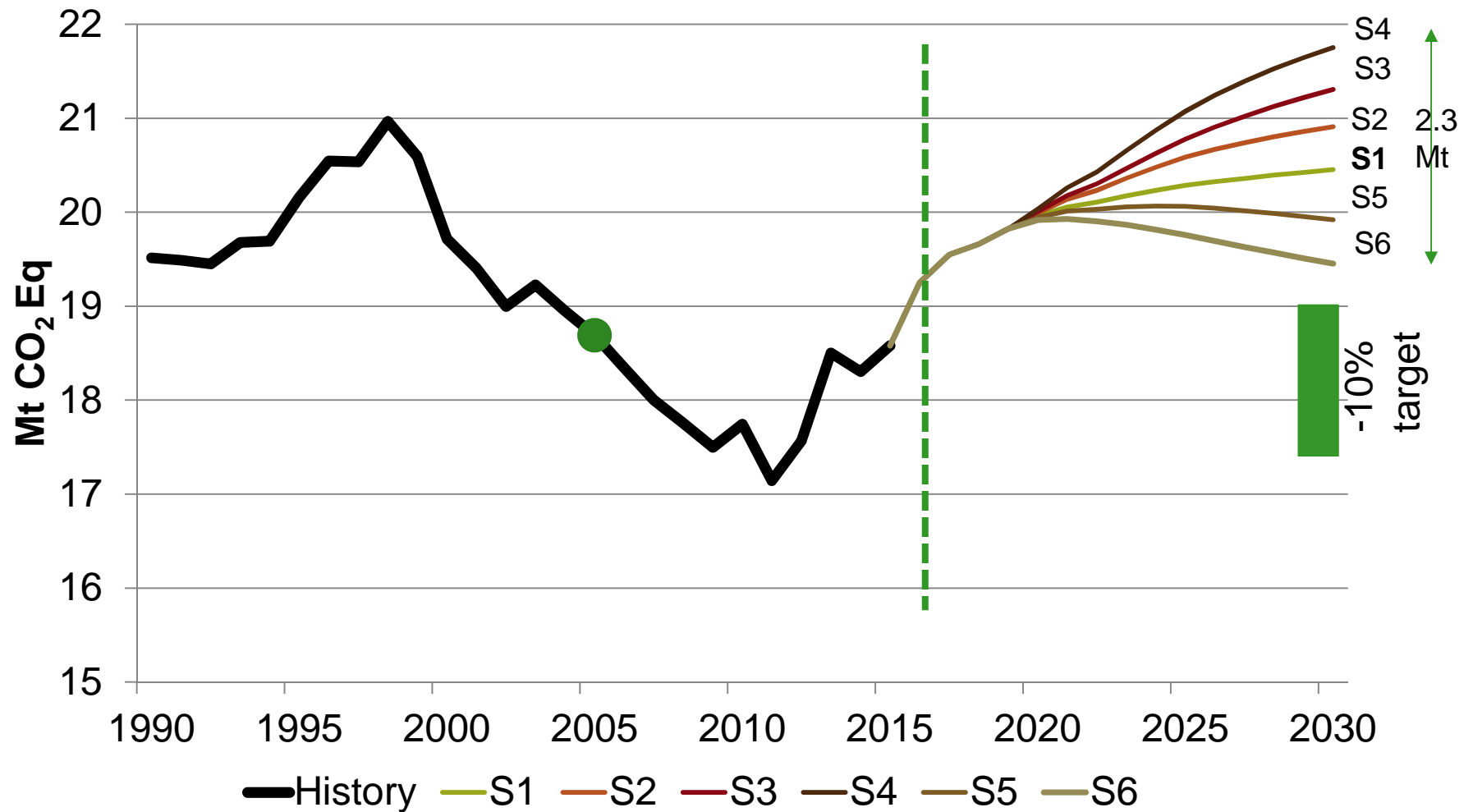


Ammonia Sources

Ammonia



GHG emissions (no mitigation)

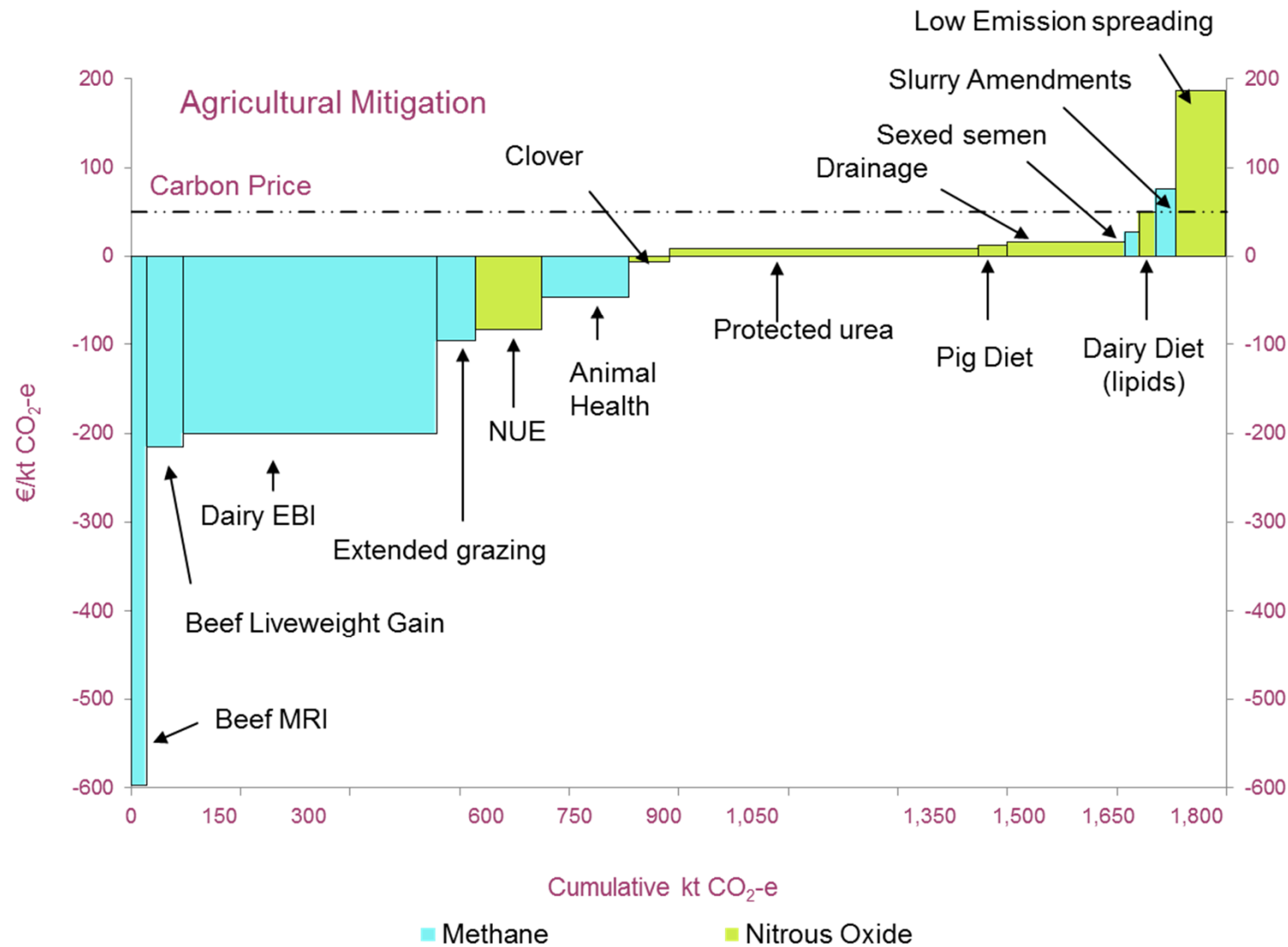


Source: FAPRI-Ireland Model

The MACC Curve

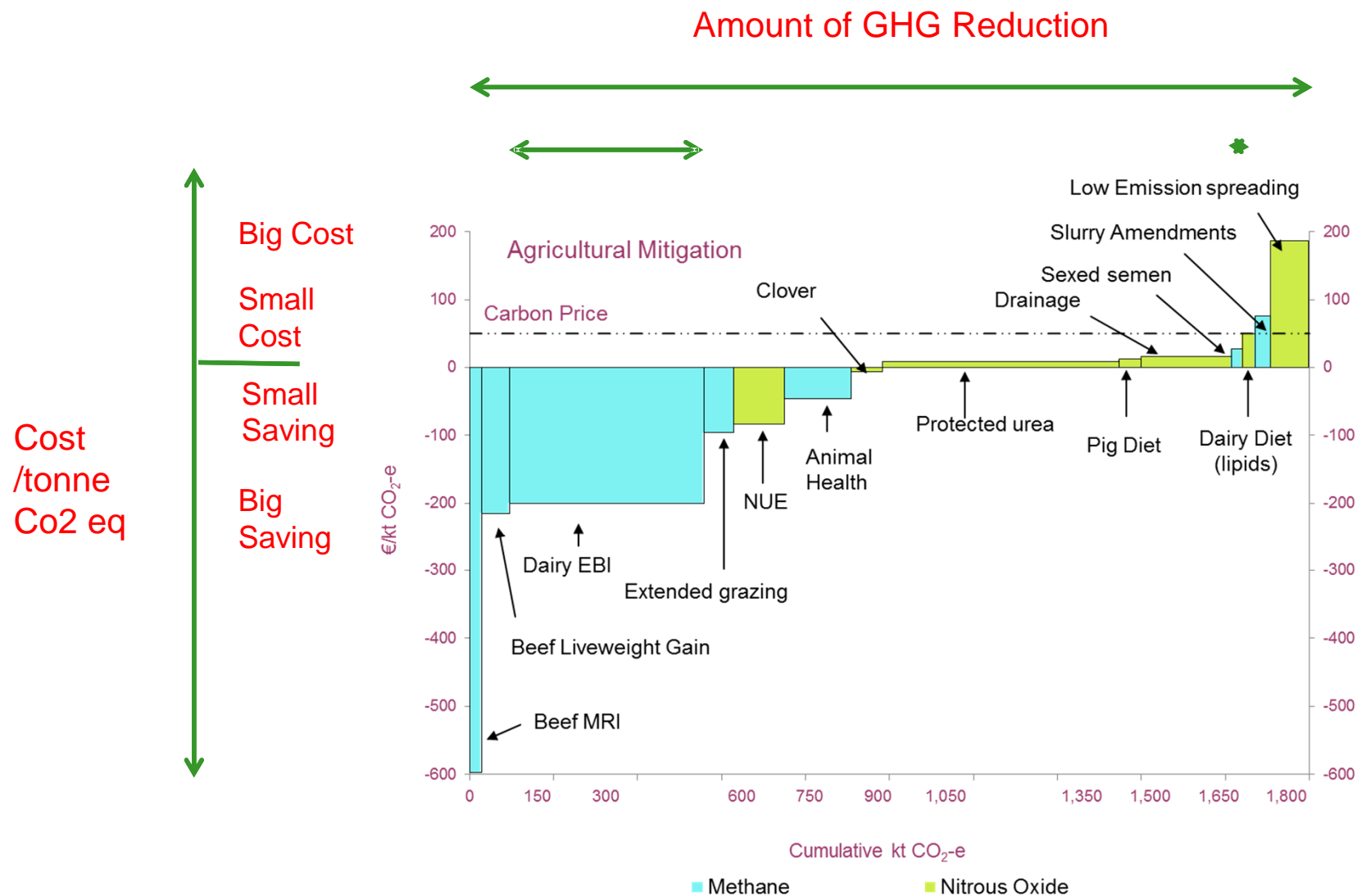
1. Reduce Agricultural Methane and Nitrous Oxide
 - lower emissions from animals, animal waste and fertiliser
2. Sequester Carbon (LULUCF)
 - Via land use change and forestry
3. Energy efficiency & biofuels and bioenergy production
 - to reduce overall energy usage on farms
 - to displace fossil fuel emissions
4. Ammonia

Agricultural Measures



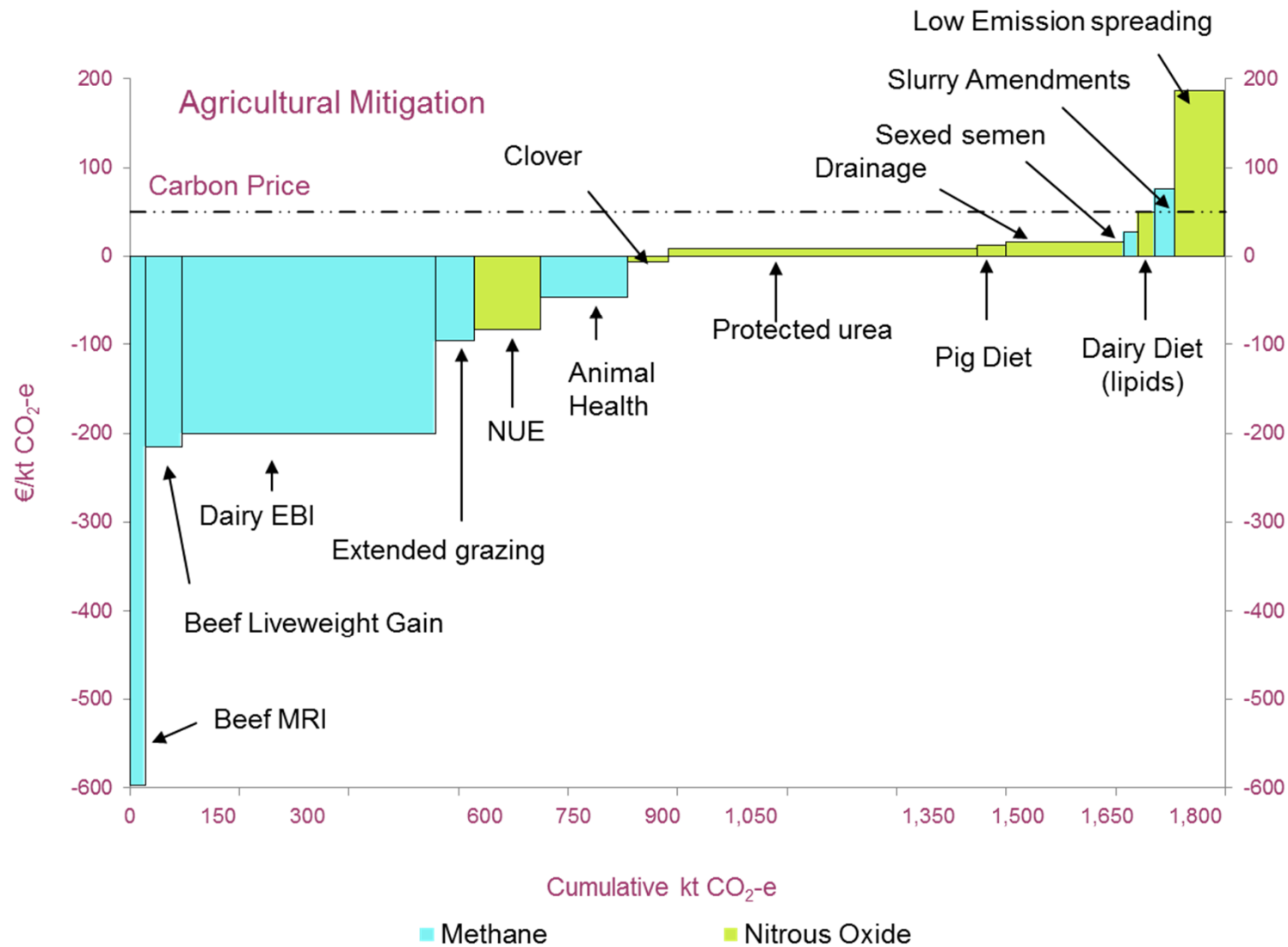
Gary J. Lanigan G.J. & Donnellan T. (eds.) 2018 An Analysis of Abatement Potential of Greenhouse Gas Emissions in Irish Agriculture 2021-2030, Teagasc .

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Agricultural Measures

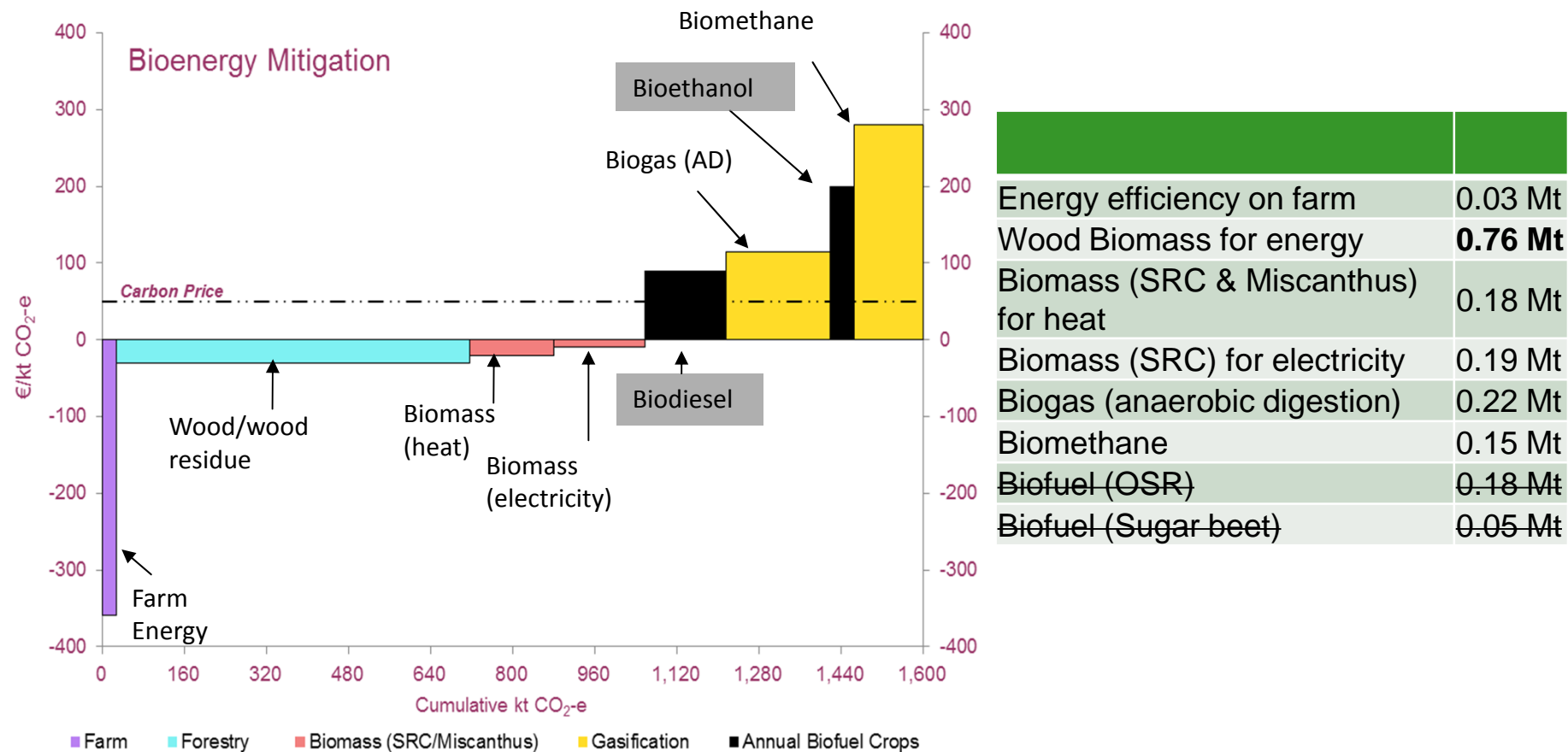


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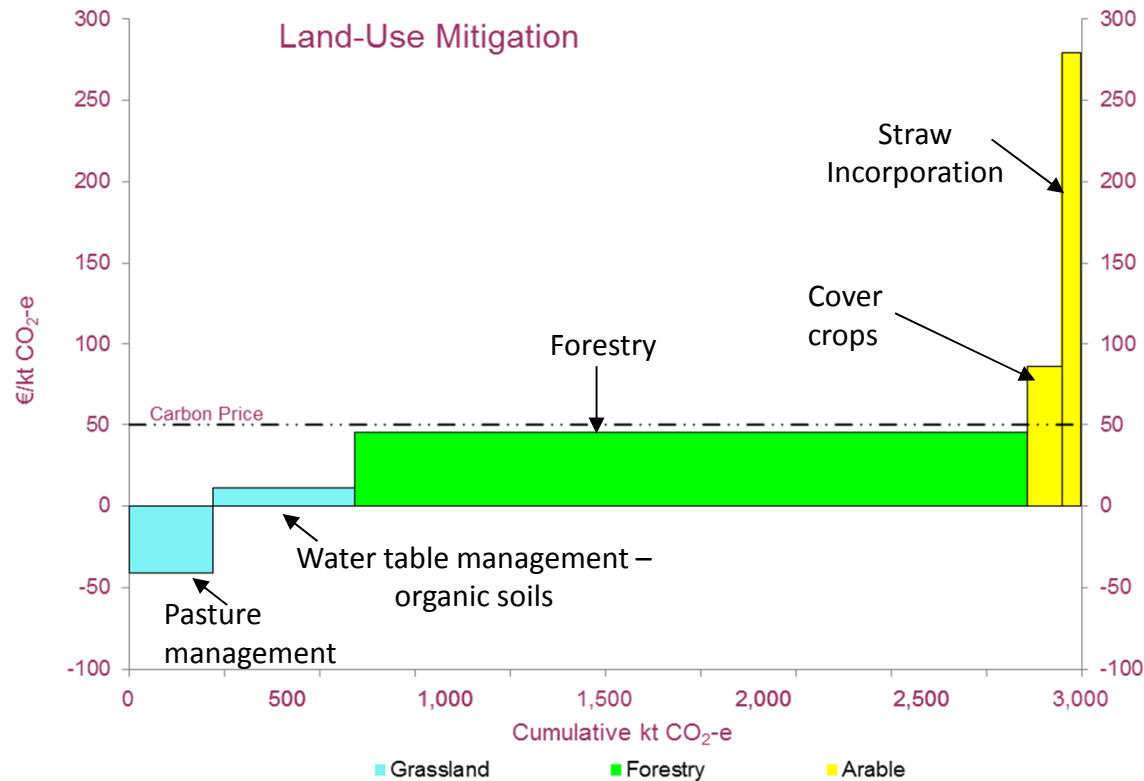
GHG & Ammonia from Fertiliser

N Type	GHG	Ammonia	Advice
CAN	High	Low	Reduce
Urea	Low	High	Eliminate
Protected Urea	Low	Low	Increase

Energy Efficiency, Bioenergy and Biofuels



Land-Use C Sequestration

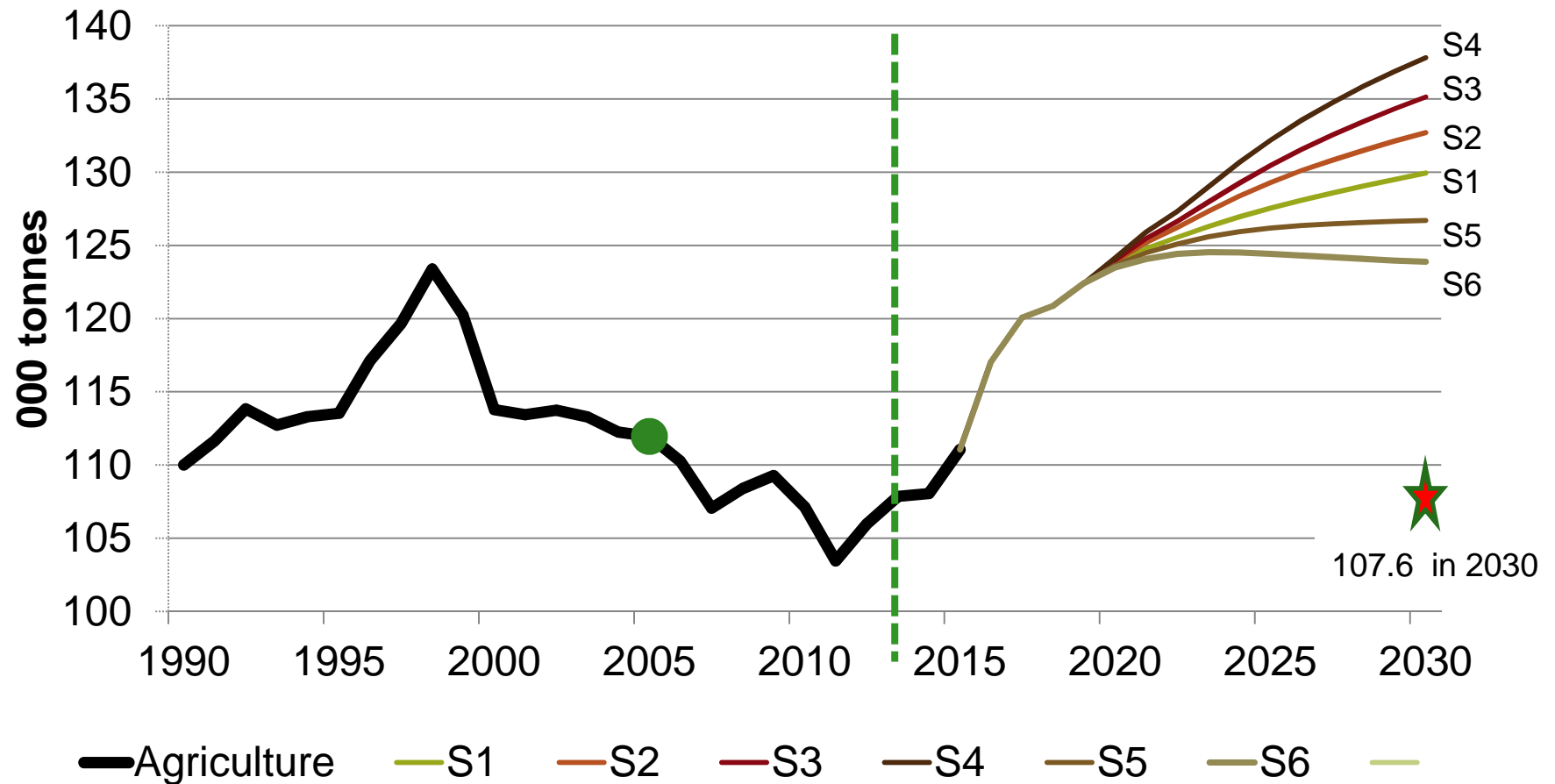


Pasture management	0.26 Mt
Water table mgt of organic soils	0.44 Mt
Forestry	2.1 Mt
Tillage mgt - Cover crops	0.1 Mt
Tillage mgt - Straw incorporation	0.06 Mt

Key Measures

1. Replace CAN and Urea with Protected Urea as much as possible
 2. Slurry Management
 - Low emissions Slurry Spreading
 - Spring Spreading of Slurry
 3. Better Grassland Management
 4. Better Nutrient Management
 5. EBI & MRI
 6. Energy efficiency & Generation
 - to reduce overall energy usage on farms
 - to displace fossil fuel emissions
 7. Forestry
- } Better N efficiency – Lower N
Lower Methane – Better quality Grass
Longer Grazing Season

Ammonia emissions (no mitigation)



Source: FAPRI-Ireland Model

Reducing NH₃ Draft MACC

