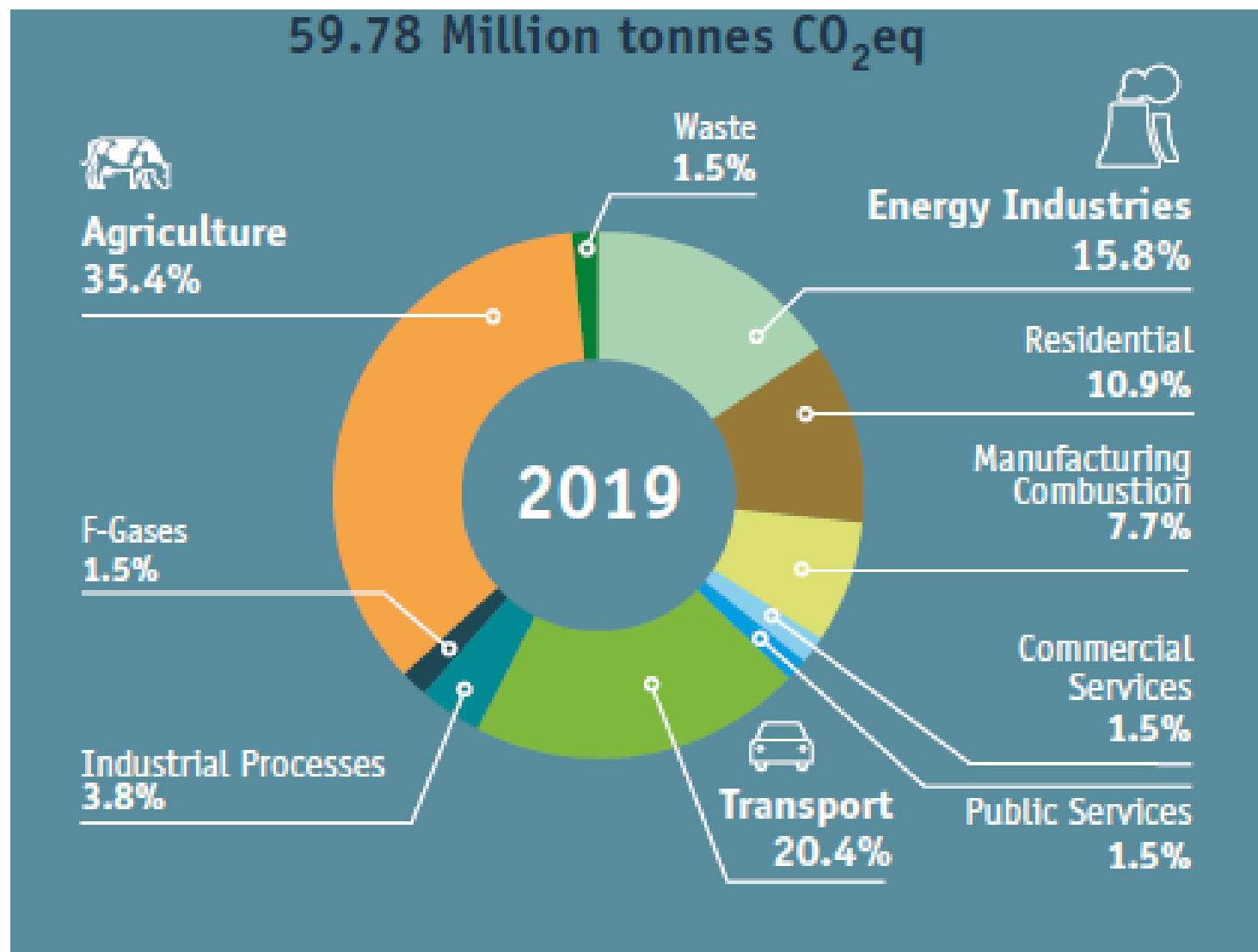# Challenges in delivering the 2030 emission targets for agriculture

Professor Gerry Boyle, Director,Teagasc

Presentation to Dublin Economics Workshop, September 15th 2021

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Outline of presentation

- Some facts

- Some complications

- Scope for emission reductions

- Implications

- Conclusions

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Ireland's Greenhouse Gas emissions, 2019

59.78 Million tonnes CO_2eq

2019

Waste 1.5%

Energy Industries 15.8%

Agriculture 35.4%

Residential 10.9%

Manufacturing Combustion 7.7%

F-Gases 1.5%

Commercial Services 1.5%

Industrial Processes 3.8%

Transport 20.4%

Public Services 1.5%

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Sources of emissions: Agricultural Activity and Land Use (including Forestry)

- Agricultural Activity: 22mt CO2 equivalent 2018

- Land Use (including Forestry): 8mt CO2 equivalent 2018

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Structure of agricultural activity emissions % 2021
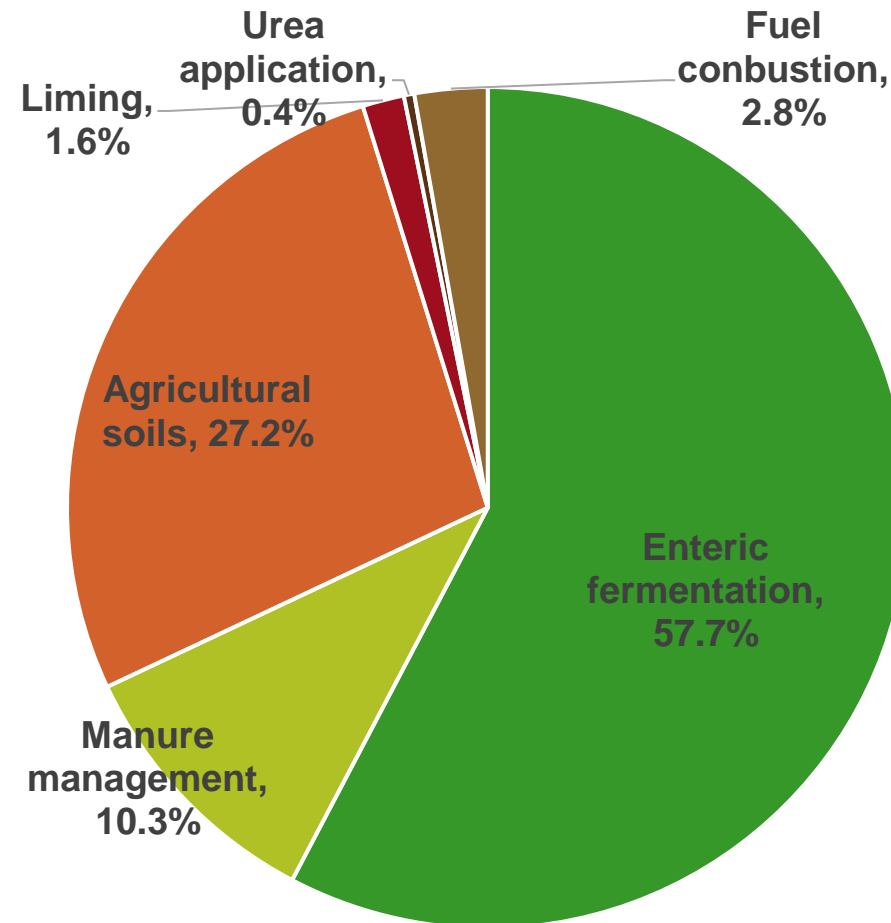
Agriculture in Ireland is mostly grass based

Share of utilized agriculture land under grassland in EU states in 2016

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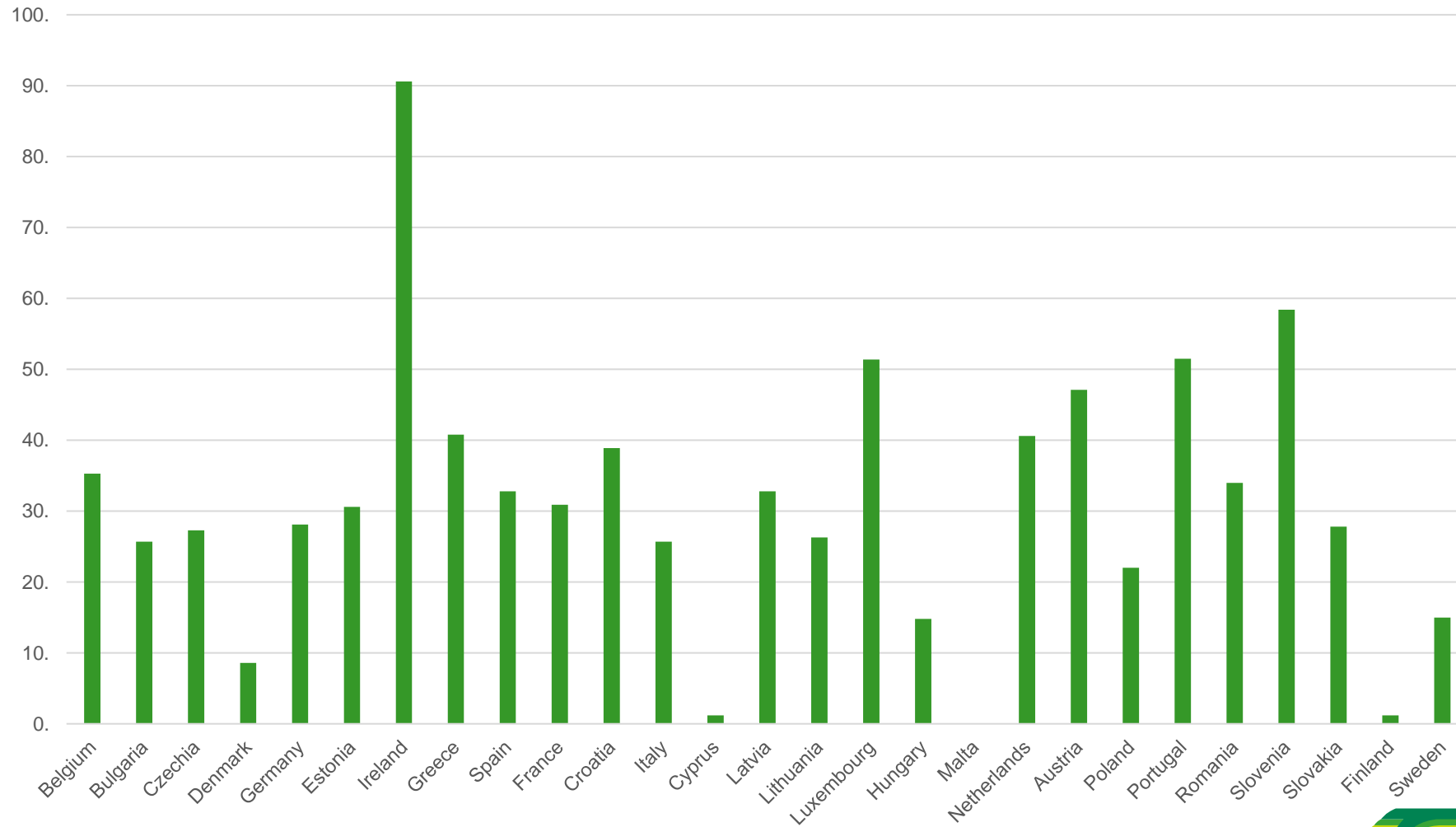
Our grasslands are a major store of carbon

Irish mineral soils (mainly grassland) store 1,832 Mt CO_2e, 90 times what agriculture emits per year

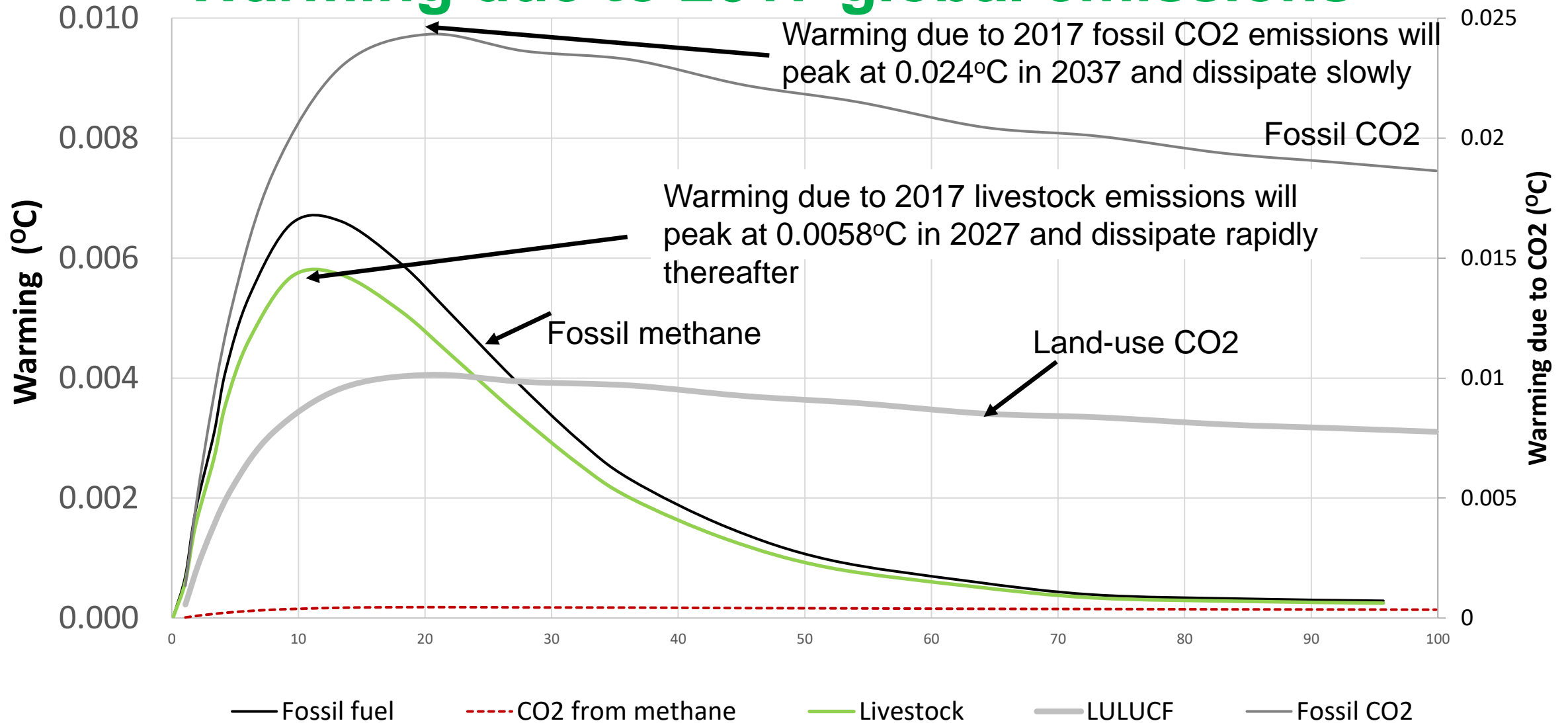Converting grasslands to tillage could release 30% of the soil carbon over 20 years:

represents a loss of 0.8 – 1.6 Mt of CO2e per year for 200k ha

Complications: biogenic methane

- Short lived impact on global warming unlike CO2 or Nitrous Oxide which are long-lived

- Biological nature of ruminant livestock production systems … animals are 'essential' inputs

- Solution: separate target for biogenic methane as recommended by previous CCAC, Agr Strategy 2030 and implemented by New Zealand (-10% by 2030)
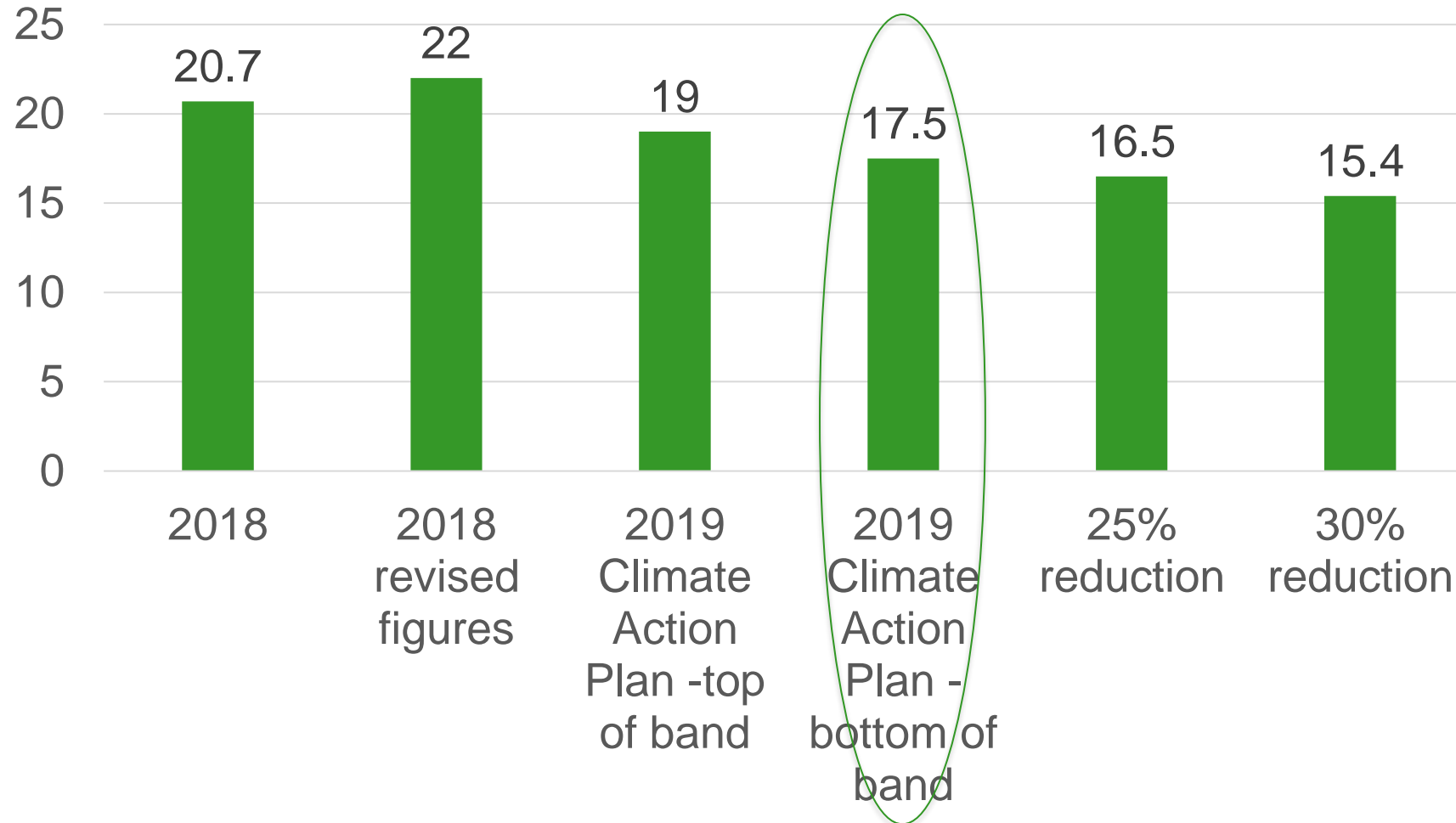
Warming due to 2017 global emissions

Warming due to 2017 fossil CO_2 emissions will peak at 0.024°C in 2037 and dissipate slowly

Fossil CO2

Warming due to 2017 livestock emissions will peak at 0.0058°C in 2027 and dissipate rapidly thereafter

Fossil methane

Land-use CO2

Warming (°C)

Warming due to CO2 (°C)

—— Fossil fuel   ----- CO2 from methane   —— Livestock   —— LULUCF   —— Fossil CO2

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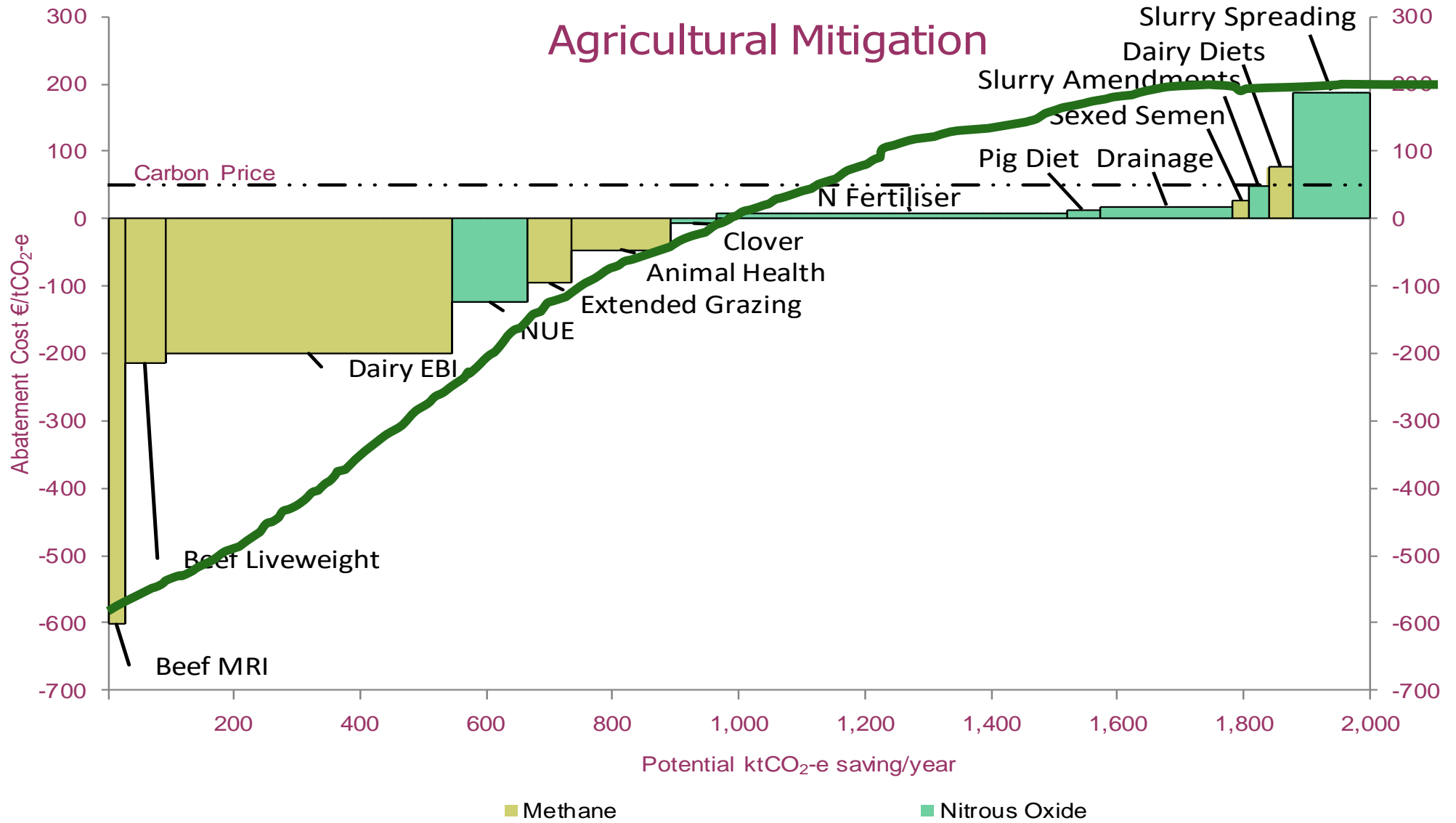
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Complications: accounting for treatment of carbon removals

- Land use and forestry emitted an estimated 4mt GHGs in 2018 and 8mt in 2021 on top of 22mt Agr activity

- Up to now the forest sink and land use changes (e.g. rewetting of peatland) could be offset against activity emissions

- Declining afforestation and changing accounting rules (from 2026) will eliminate offsetting and weaken incentives for farmers to change land use
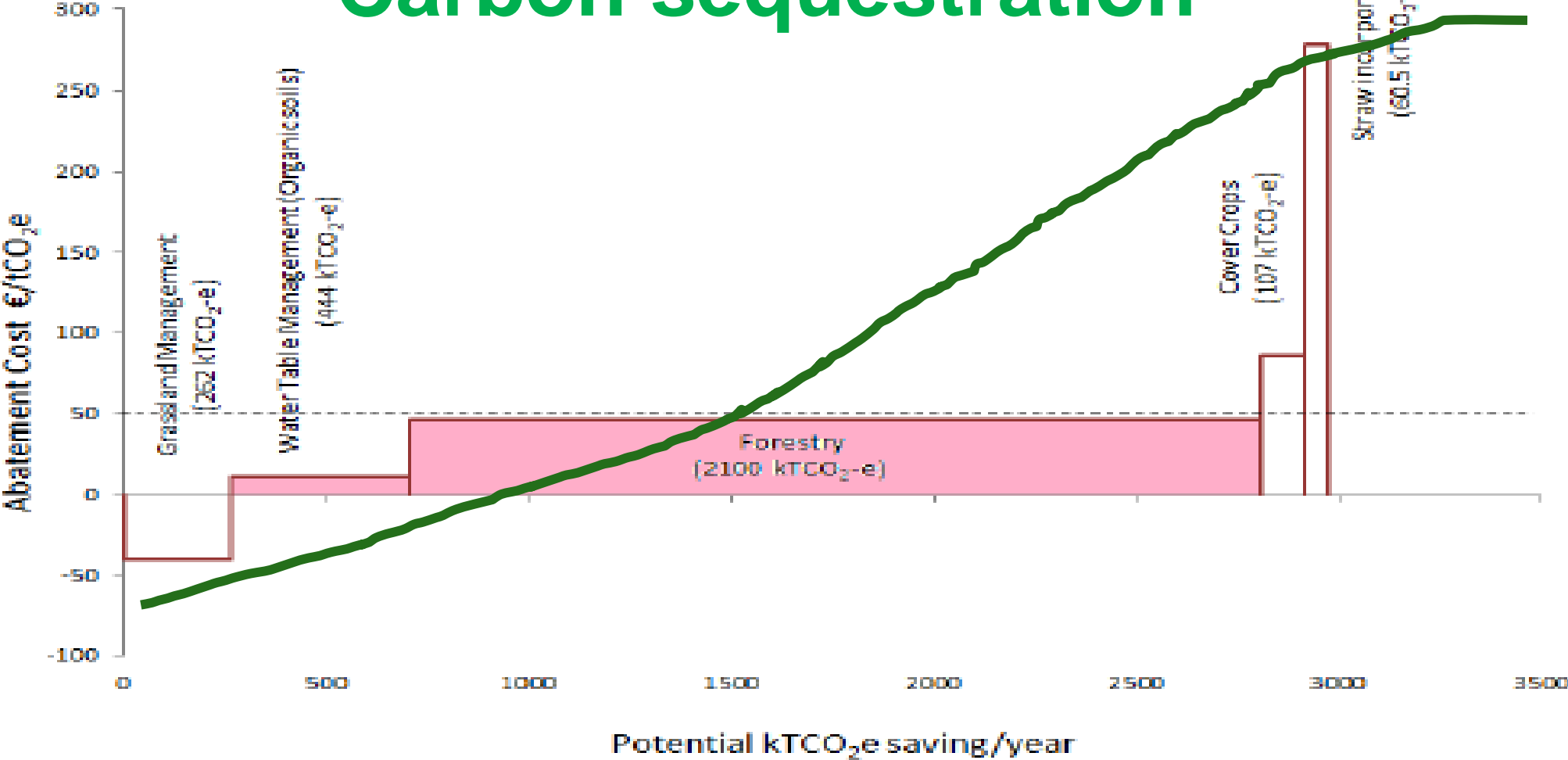
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2018 agricultural emissions vs. possible 2030 targets

Agricultural Mitigation

Abatement Cost €/tCO₂-e vs Potential ktCO₂-e saving/year

Legend: Methane, Nitrous Oxide

Labels: Slurry Spreading, Dairy Diets, Slurry Amendments, Sexed Semen, Pig Diet, Drainage, N Fertiliser, Clover, Animal Health, Extended Grazing, NUE, Dairy EBI, Beef Liveweight, Beef MRI, Carbon Price

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Carbon sequestration

Bioenergy

Abatement Cost: €/tCO₂e vs Potential ktCO₂e saving/year

- Farm energy saving 29.5 ktCO₂-e
- Wood biomass 759 ktCO₂-e
- SRC Biomass (Electricity) 98 ktCO₂-e
- Biomass (Heat) 105 ktCO₂-e
- Anaerobic Digestion 224 ktCO₂-e
- Biomethane 150 ktCO₂-e
- Biodiesel (OSR) 269 ktCO₂-e
- Bioethanol (Beet) 29.8 ktCO₂-e
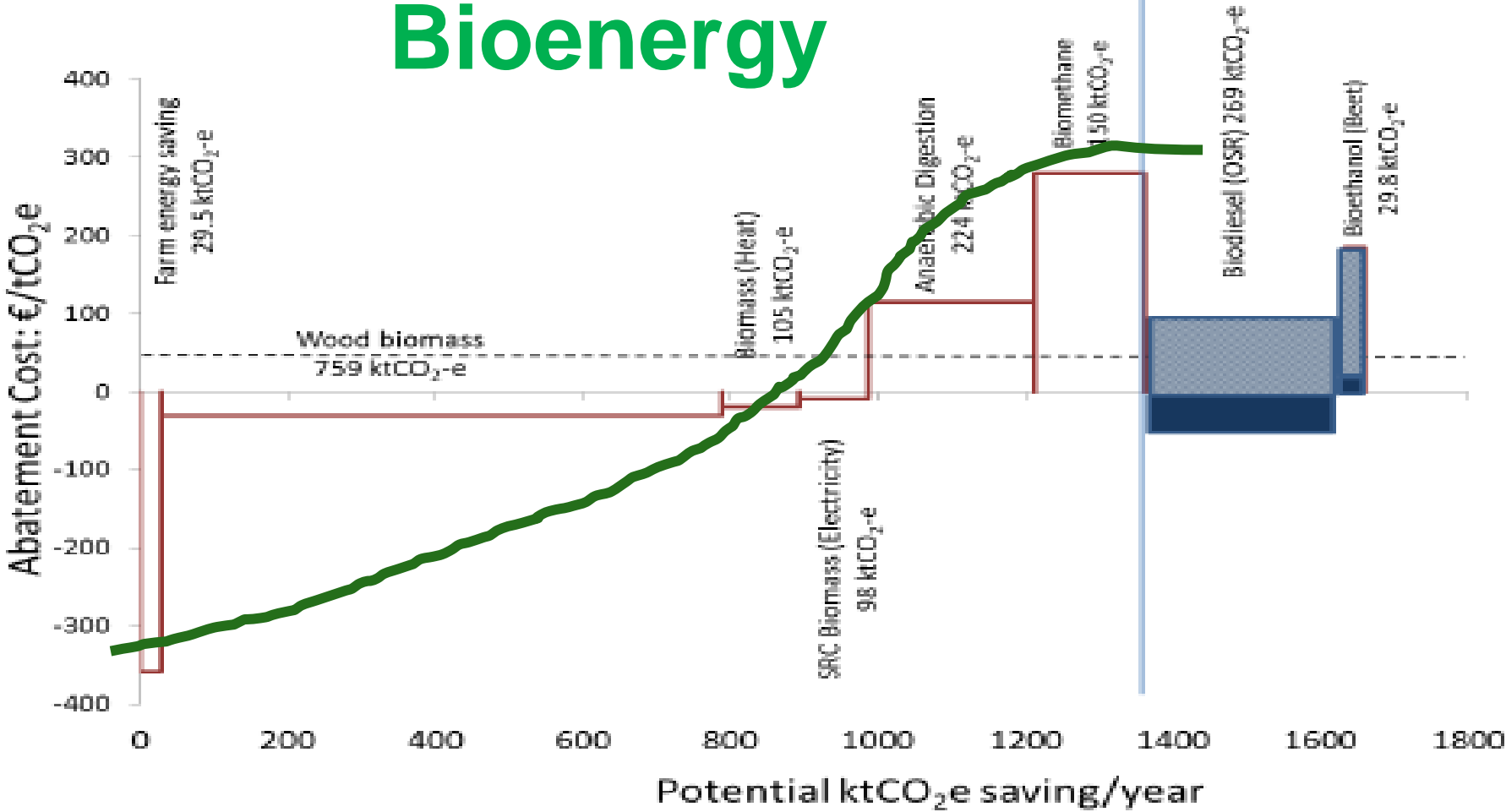
Limited diversification opportunities

- Circa 137,500 farmers in Ireland

- Economic returns and land suitability

- Agriculture is not homogeneous

  - e.g. being a dairy farmer is a very different commitment to being a tillage farmer

  - different skill sets, different labour commitments, different risk levels

- Switching farming activities is a major commitment

  - human capital (new skills) and financial capital (borrowings) required

  - learning curve involved – effectively doing a different job

- Forestry and shift to Dairy Beef and possibly Anaerobic Digestion (medium to long term), Carbon Farming (long term) mainstream options and niche opportunities (e.g. Organics)

- Fiscal costs
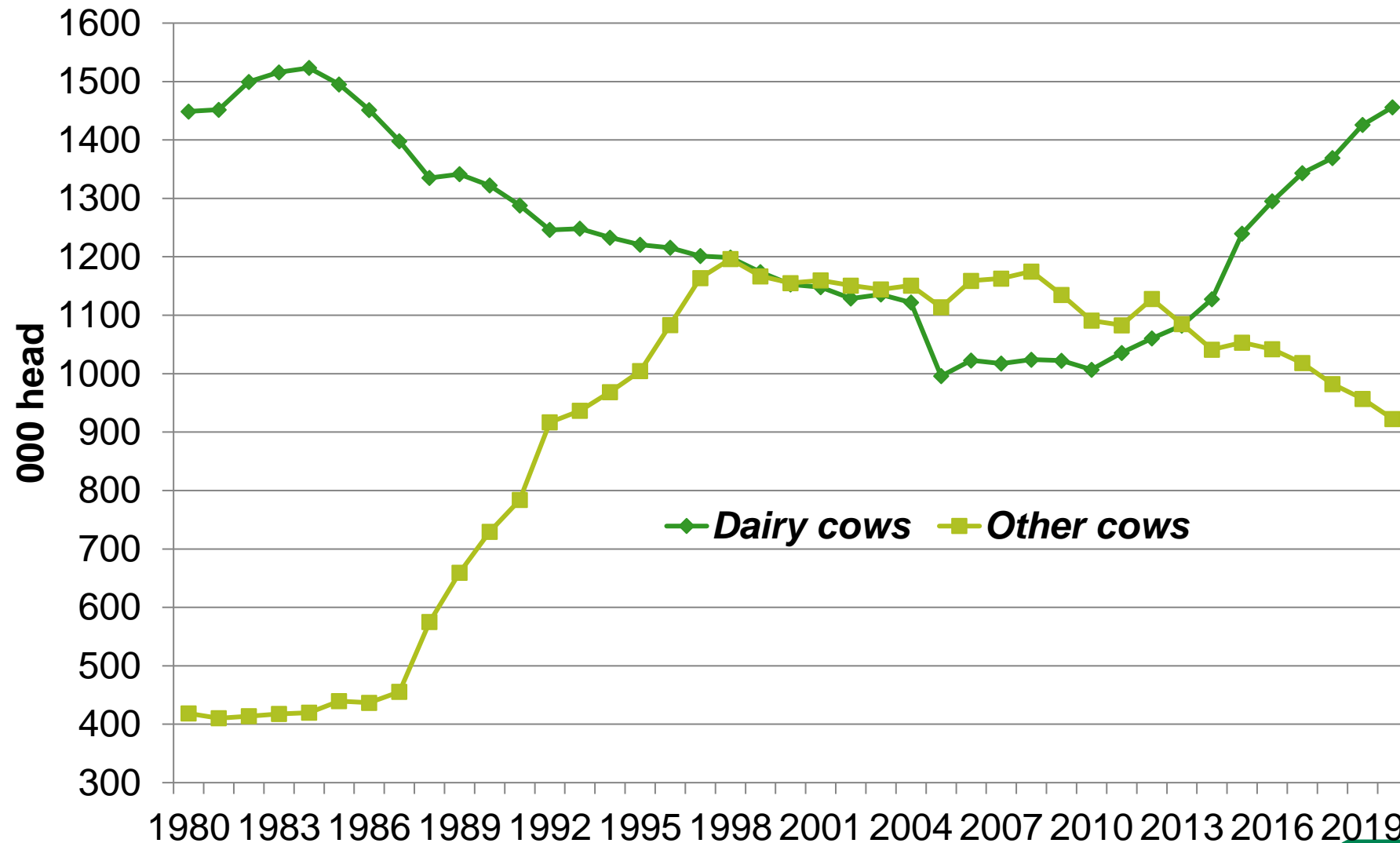
Conclusions

- At best a 20%+ reduction in emissions by 2030 is achievable via decarbonisation (via technology; reduced N etc)

- Separate target for biogenic methane required (-10%? via technology)

- Implications for livestock activity levels to achieve 51%

- Limited diversification opportunities: forestry, anaerobic digestion, dairy beef, carbon farming and niche activities (e.g. organics)

- Land use: how to reverse the decline in afforestation? Substantial research on land use sources and sinks needed