

# 'Carbon Navigator' decision support tool

Pat Murphy<sup>1</sup>

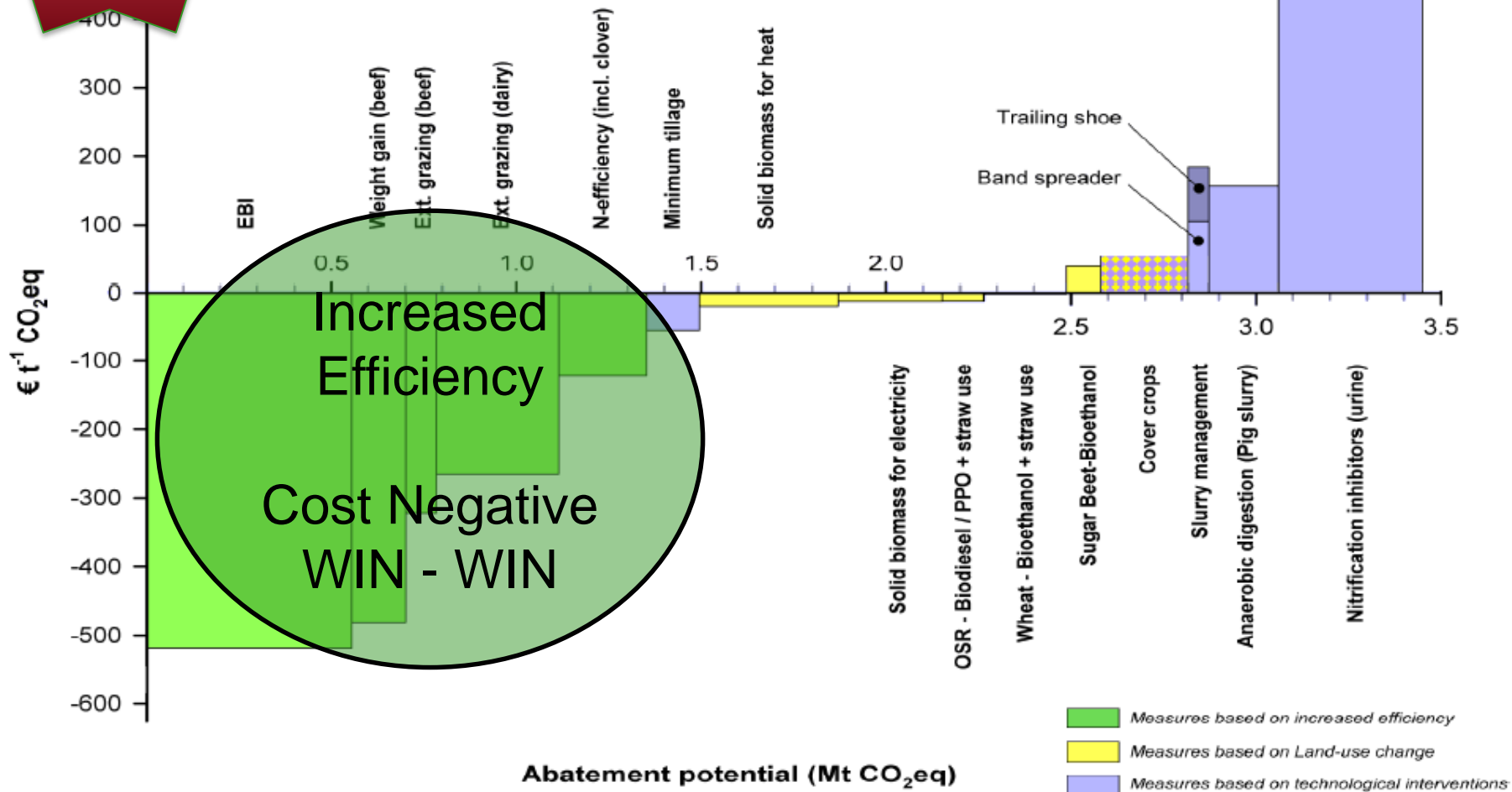
<sup>1</sup> Teagasc, Johnstown Castle

# Outline

- ❑ Objective
- ❑ Implementation and Partnership
- ❑ Impact
- ❑ Future

2012

### Marginal Abatement Cost Curve (LCA)



## The initial objective of the project

- ❑ To raise awareness amongst professionals
- ❑ To put GHG mitigation on farmer's agenda
- ❑ To provide a pathway for improved carbon efficiency, reduced emissions and profitability
- ❑ To support the marketing of Irish dairy and beef produce

# A Partnership Approach

## ❑ Teagasc – Agricultural and Food Development Authority

- ❑ Agricultural and Food Research
- ❑ Education
- ❑ Advisory Services



## ❑ Bord Bia – Food Marketing Organisation

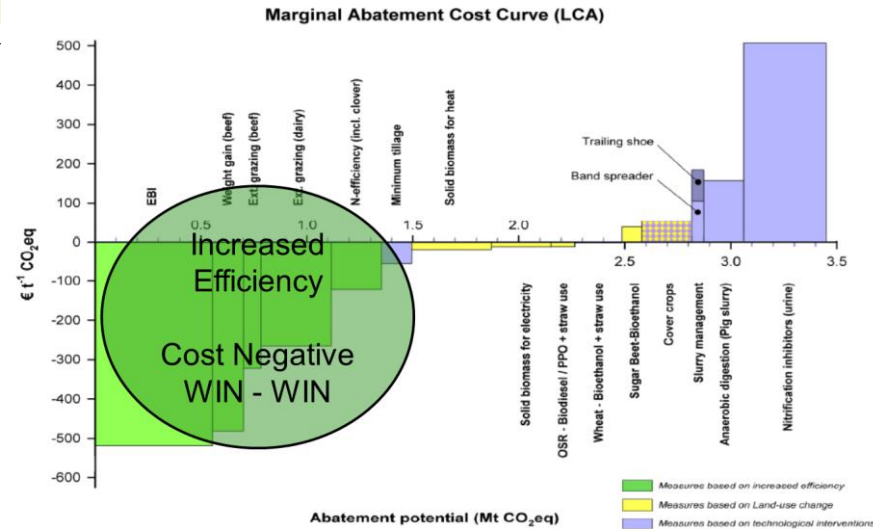
- ❑ Marketing of Food – Green Credentials
- ❑ Quality Assurance Schemes
- ❑ Adding Sustainability



**Farmer Contact – 70% of farmers**

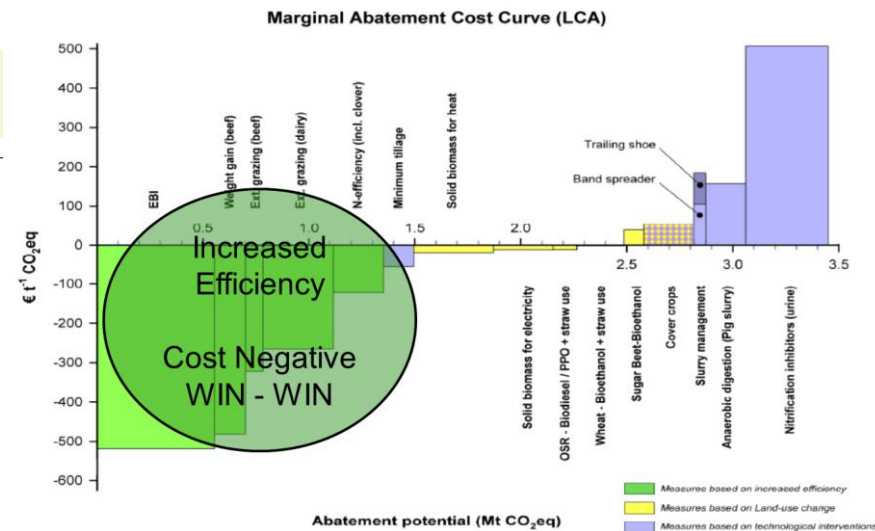
# The Carbon Navigator

- ❑ On-line
- ❑ Simple
- ❑ Focus on practice change and impact – not emissions level
- ❑ Adviser operated
- ❑ Linked to National Data Sets



# The Carbon Navigator

- ❑ To raise awareness
- ❑ To support ‘conversation’
- ❑ To indicate impact for emissions and income
- ❑ To provide direction – How to implement on farm
- ❑ To persuade
- ❑ To reinforce efficiency improvement messages



Farmer Name: Pat Murphy  
 County: Kilkenny North  
 Soil Type: Moderately Drained  
 Area farmed (ha): 85  
 Plan Year: 2014

Average number of dairy cows: 100  
 Average number of cows planned (3 years): 130  
 Livestock Units Other Stock: 60  
 Livestock Units Other Stock (3 years): 30

Potential impact of meeting all targets  
**-12.9%**    **+€10957**

Year 2014		Current	Target	Chart	GHG change	€ benefit
Grazing season length	Turnout Date - Part Time	10/Mar	01/Mar		-2.9%	+€4590
	Turnout Date - Full Time	20/Mar	15/Mar			
	Housing Date - Part Time	01/Nov	07/Nov			
	Housing Date - Full Time	01/Nov	15/Nov			
EBI	EBI	85	115		-6.0%	+€3900
Nitrogen Efficiency	Stocking rate (Kg N / Ha grass)	160.00	160.00		-1.7%	+€1045
	Chemical N used (Kg N / per Ha) : Urea	20.00	50.00			
	Ammonium N	140.00	110.00			
	Import (+) or Export of Org Manure N/Ha					
	Meal keeding Kg / Cow	600.00	600.00			
	Milk output / cow (Kg milk solids)	400.00	420.00			
Slurry Spread Timing	% in Spring	40	60		-1.2%	+€154
	% Summer following 1st cut	60	40			
	% Later in Summer	0	0			
	Application Method	Splash Plate	Splash Plate			
Energy Efficiency	Plate Cooler Present	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		-1.0%	+€1268
	Average Temperature of Milk after Plate Cooler	20.0	14.0			
	Variable Speed Vacuum Pump	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
	Method of Water Heating	Electricity	Oil			

Update



**Grazing Season Length:**

Early nitrogen is essential for early grass. Spread 1.5 bags of urea from mid-February weather permitting

Manage soil fertility - sample your soil and apply P, K and lime as required

**EBI:**

Choose a panel of 5 high EBI bulls that compliment your herd. For most farmers fertility is the main weakness that needs to be improved.

Focus on your heifers - breeding heifers to carefully selected high EBI bulls is the fastest way to improve herd EBI and profitability

Order sufficient straws, e.g. 55 straws per 10 heifers required

**Nitrogen efficiency:**

Use urea, especially early in the season.

Try treated urea on a portion of the farmer for late spring, early summer applications.

**Slurry Spreading:**

Join GLAS selecting Low Emissions Spreading Option

**Energy Use:**

Make sure your plate cooler is working effectively. Measure the temperature of your milk entering your bulk tank and make sure it is not being pumped through too quickly.

**Other Actions:**

Plant Trees around the farmyard

Plant a double line of Alder west of the Cubicle House

Plant individual or small groups of native trees around the perimeter of the farmyard

Coppice Hedgerow at the top of the lane field

# Use of Carbon Navigator

- ❑ Initially optional use by advisers
  - ❑ Use in training
  - ❑ Limited use with individual farmers (~1000 farmers per annum)
- ❑ Inclusion in Agri-environmental and KT Schemes
  - ❑ Mandatory Tasks
  - ❑ Work with adviser to plan
  - ❑ Follow up included (limited)
  - ❑ 25,000 Beef Farmers
  - ❑ 10,000 Dairy Farmers

# Dairy Farms – How can we reduce Agricultural GHGs



Better slurry and  
fertiliser  
management



Longer  
Grazing  
season

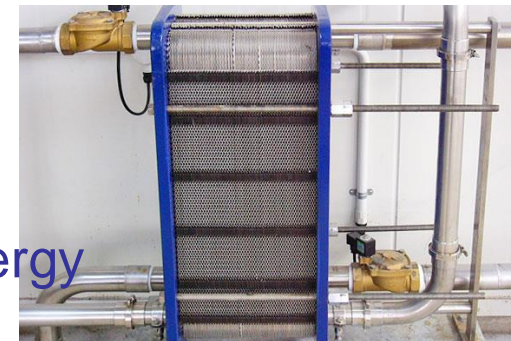
Improved  
Genetics



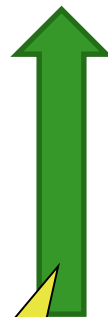
Increased N  
Efficiency



Improved Energy  
Efficiency



Footprint x Activity = Total emissions



Dairy Output  
+60%

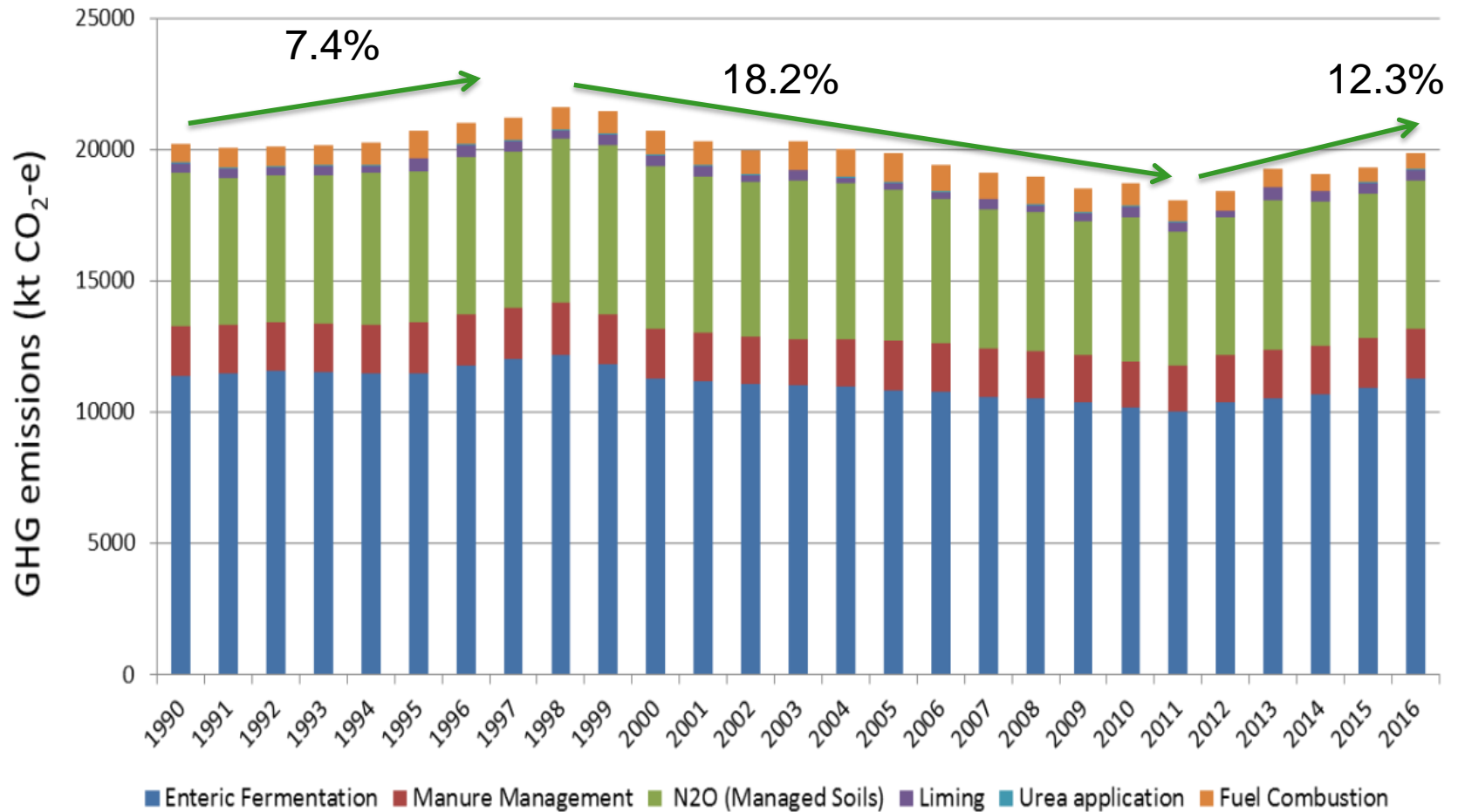
# Did we Save the Planet ???



**Achieved significant improvement in Footprint**

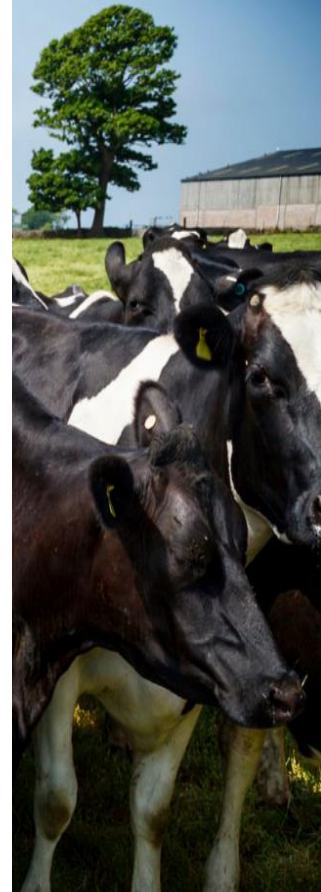
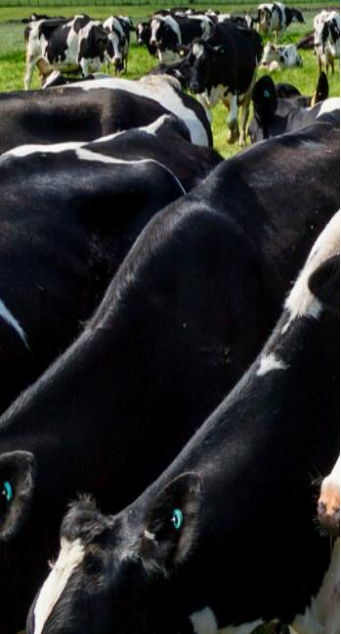
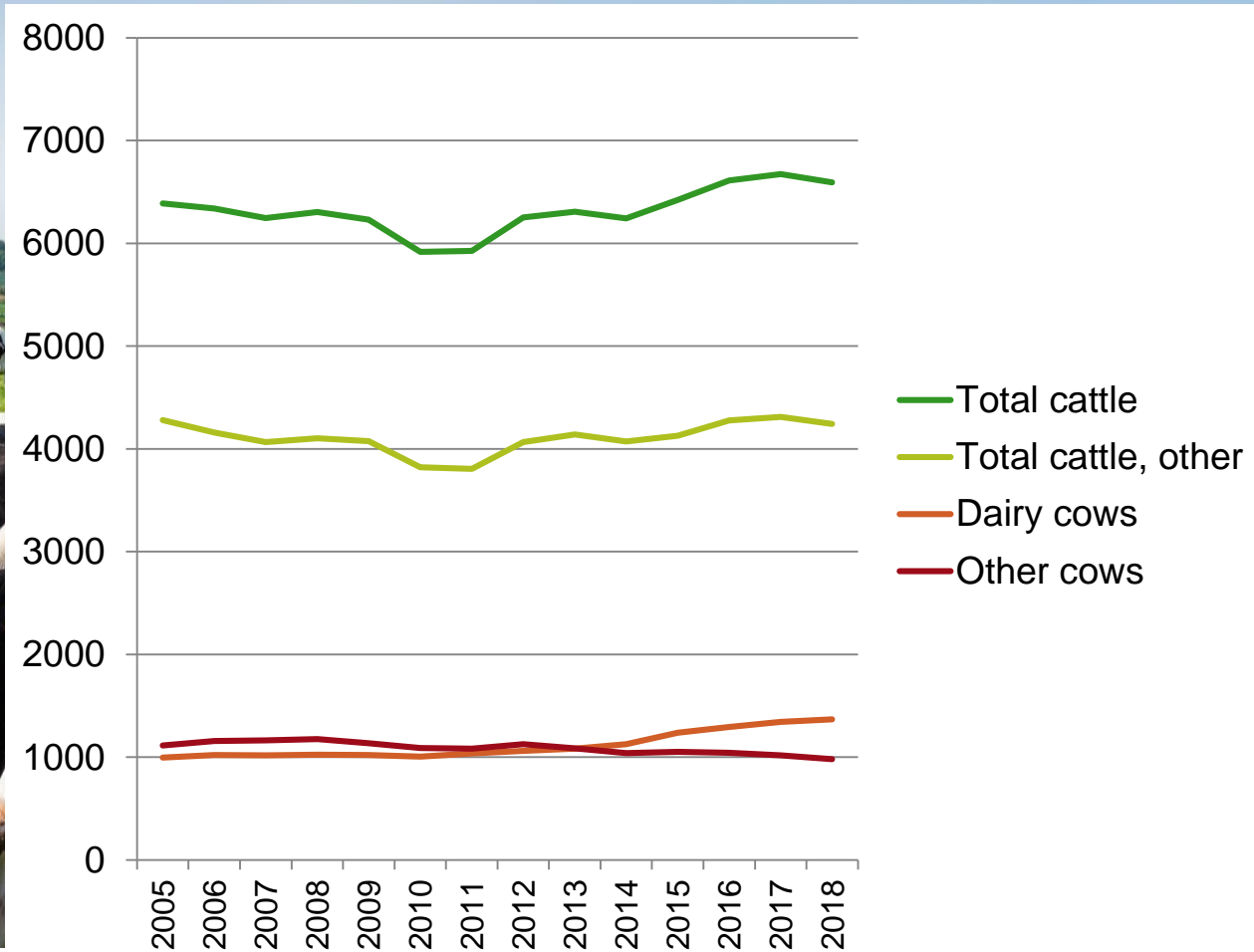
**But**

# Agriculture GHG emissions profile

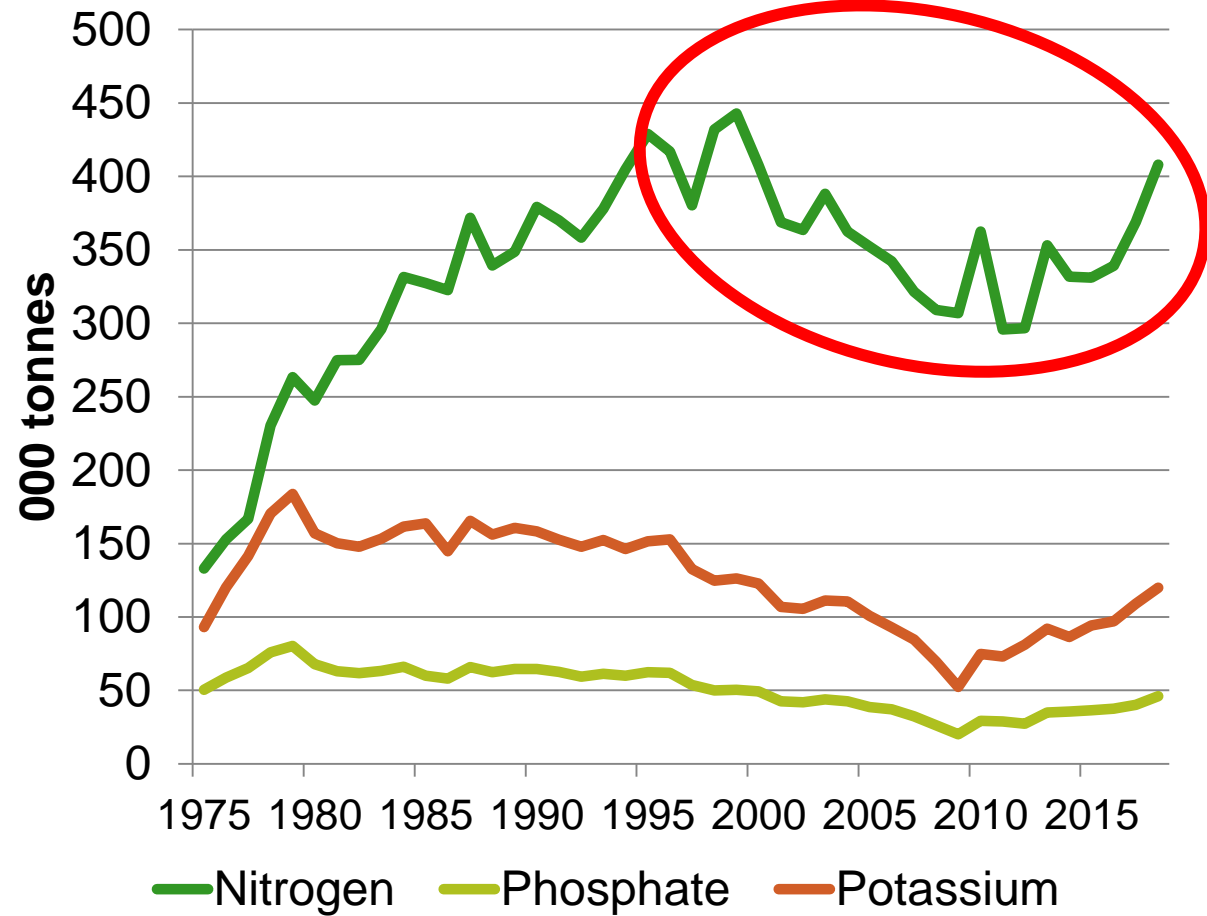


■ Cattle account for 88.7 % of methane emissions and 90% of N<sub>2</sub>O emissions

# Irish cattle numbers ('000)



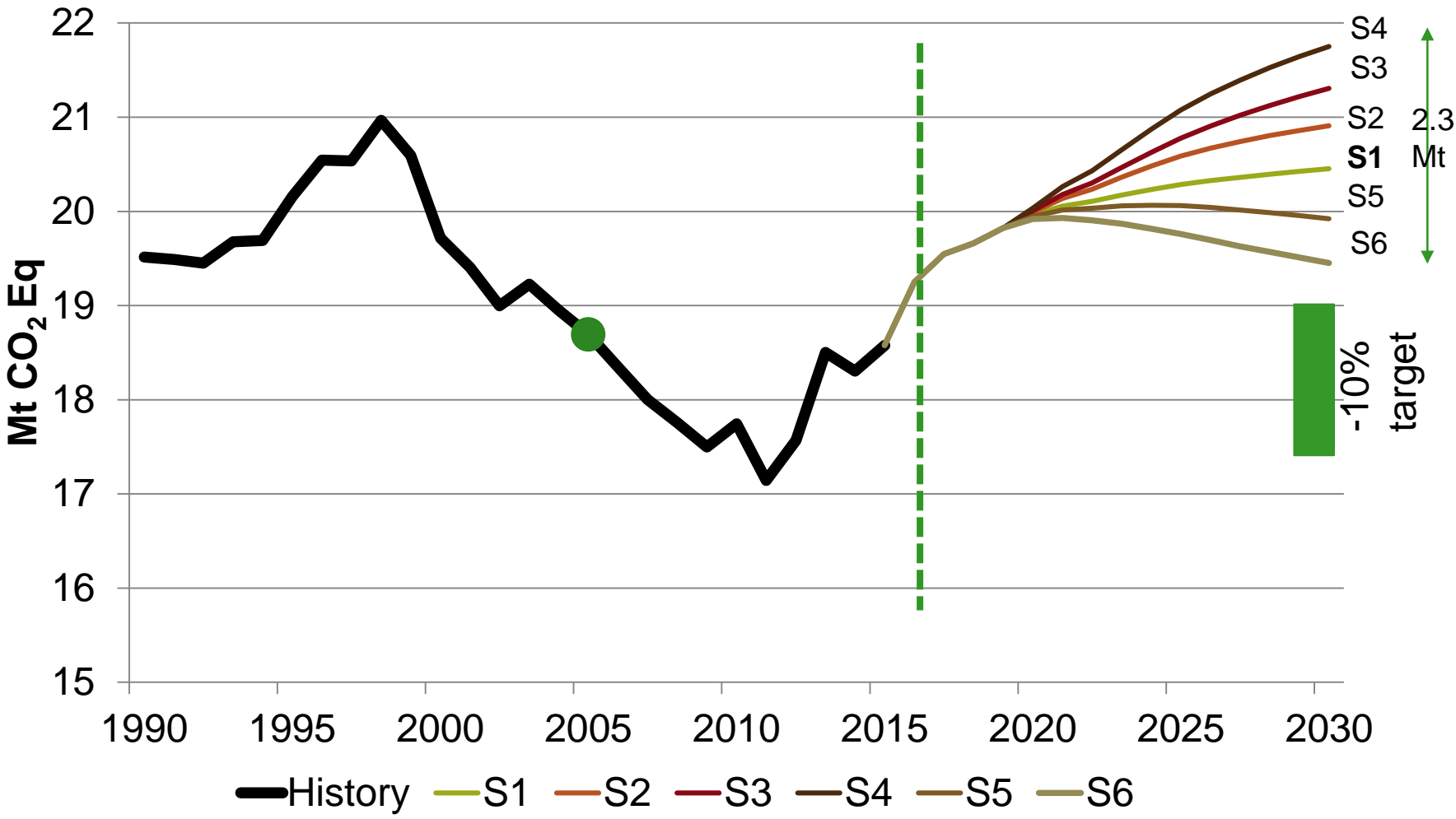
# Annual Fertiliser Sales in Ireland 1975-2018



Source: DAFM



# GHG emissions (no mitigation)

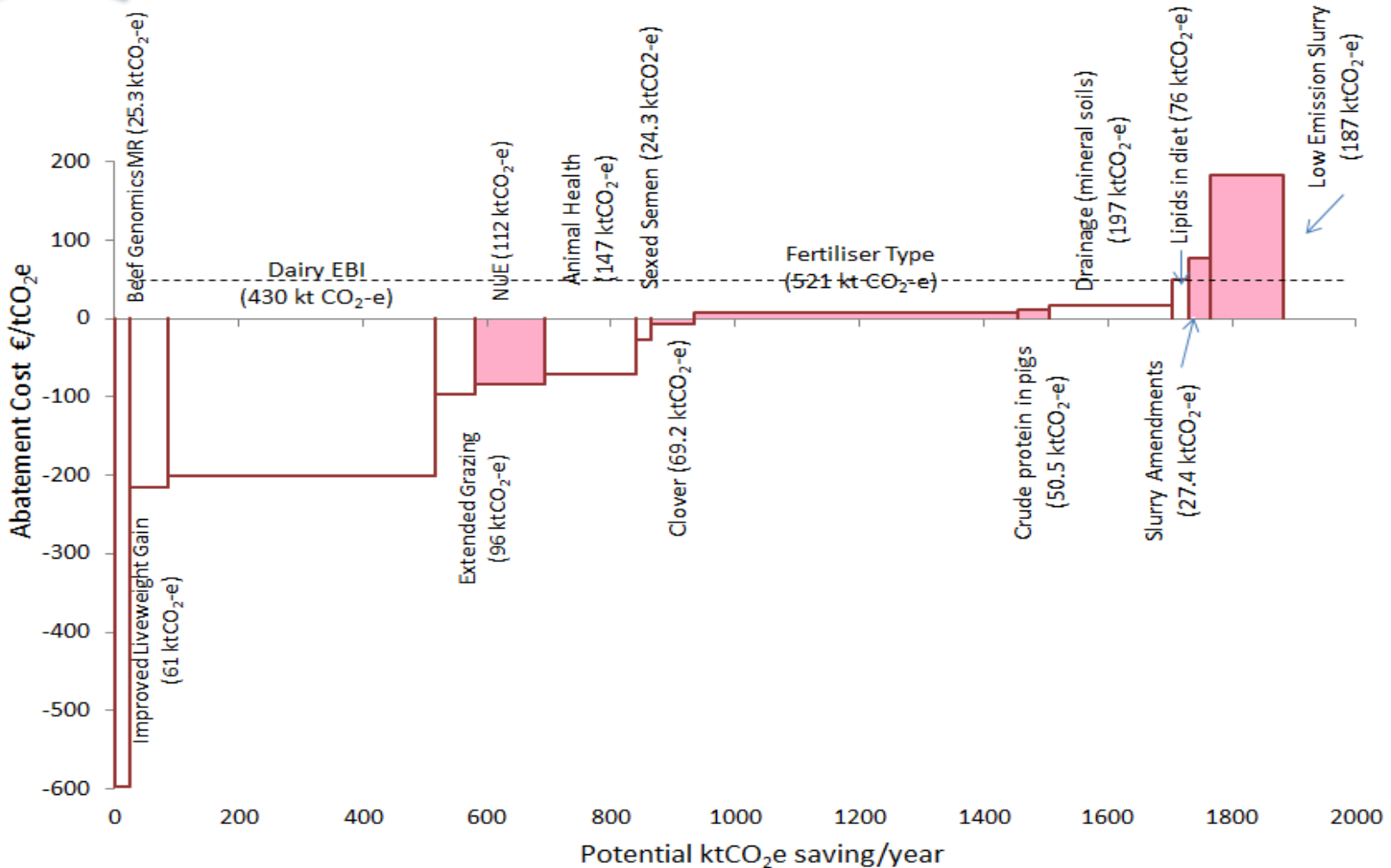


Source: FAPRI-Ireland Model

# MACC – Agricultural Abatement

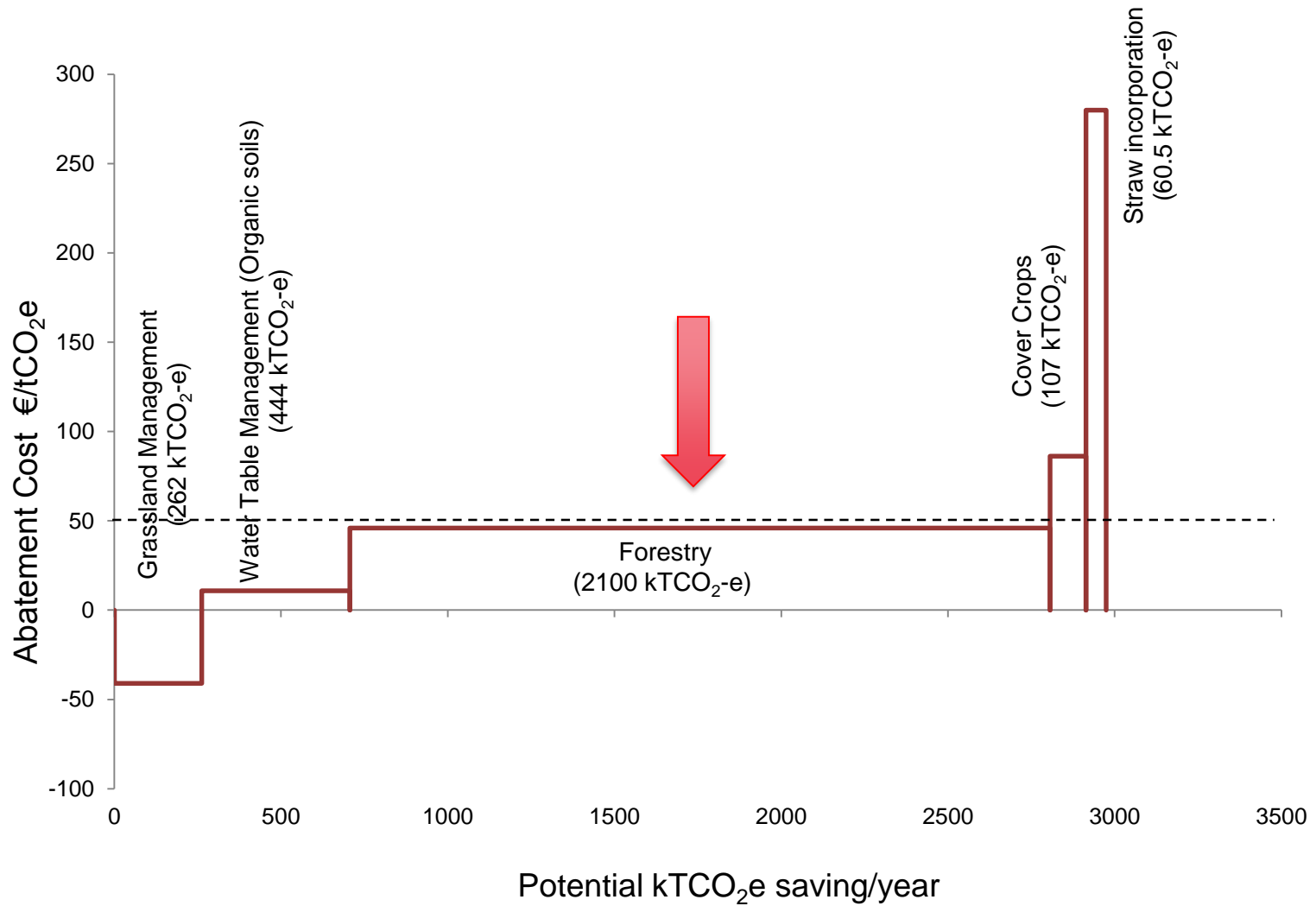
2019

Final Abatement Cost Curve for agriculture for 2021-2030 (direct methane and nitrous oxide abatement). Values are based on linear uptake of measures between the years 2021-2030.

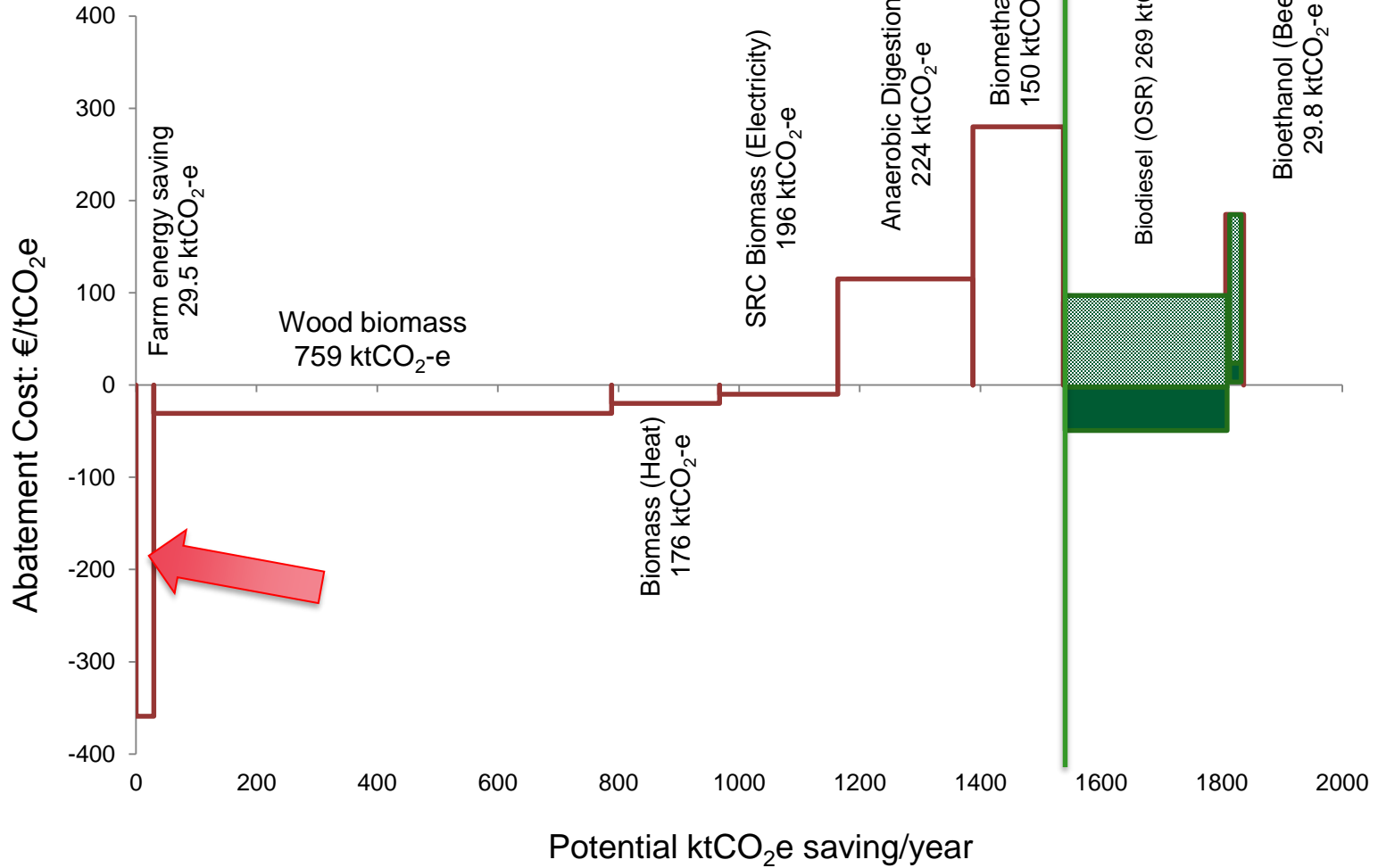


Technical Measures highlighted

# Land-use measure

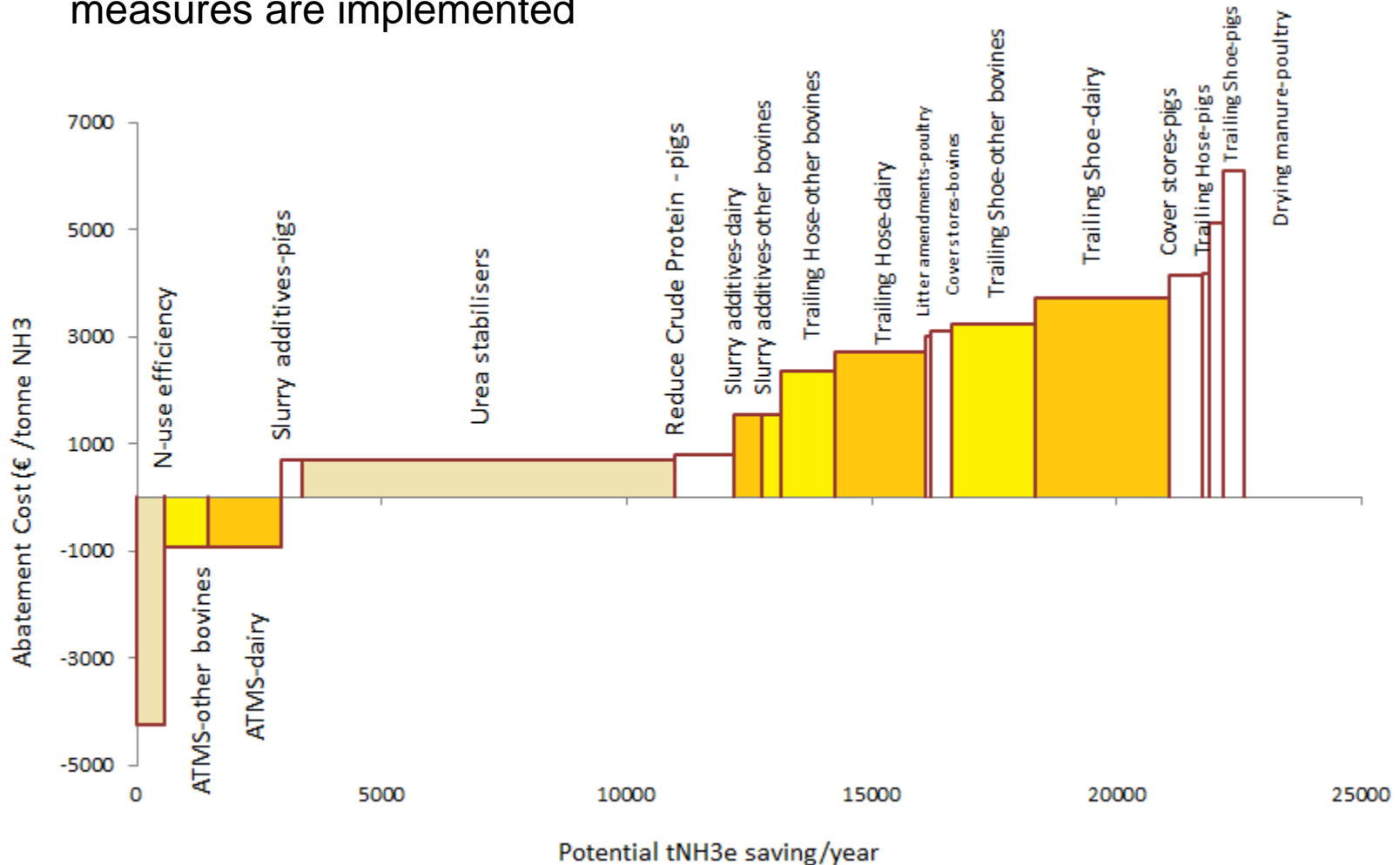


# Energy



# Ammonia MACC

- Total achievable reduction is 22.5 t NH<sub>3</sub>
- Cost varies from 41-78M per annum depending on how landspreading measures are implemented



# Summary of Key of Measures 2019

## GHG

- ❑ Dairy EBI
- ❑ Nitrogen Use Efficiency
- ❑ NBPT Treated Urea
- ❑ Low Emissions Slurry
- ❑ Forestry & Woodland
- ❑ Energy Efficiency

## Ammonia

- ❑ Nitrogen Use Efficiency
- ❑ Urea Stabilisers
- ❑ Low Emissions Slurry





2020

# Carbon Navigator 2

- ❑ Massive Industry Challenge
- ❑ Mitigate or Cut
- ❑ Awareness no longer the focus
- ❑ Too Big to Ignore – 34% of Total emissions
- ❑ Carbon Navigator 2 – Part of Toolkit

2020

# Carbon Navigator 2

- ❑ Urgency for farmers driven by
  - ❑ Multinational Food Companies → Dairy Co-ops
  - ❑ Government & EU Regulation & Support
  - ❑ National Climate Action Plan
  - ❑ Citizens and NGOs and Press
  - ❑ Threat to reduce numbers
  
- ❑ Partnership Approach





2020

# Carbon Navigator 2

- ❑ Integrated tool across sustainability challenges
  - ❑ GHG and Ammonia
  - ❑ Water Quality
  - ❑ Biodiversity
- ❑ Focus on current status of practice adoption on Farms
- ❑ Broad range of measures from MACC
- ❑ Target setting
- ❑ Focus on realistic number of measures
- ❑ Quantification of Impact
- ❑ Advice for Implementation
- ❑ Structured Follow up