

Mainstreaming GHG Mitigation and Adaptation across Irish Agriculture

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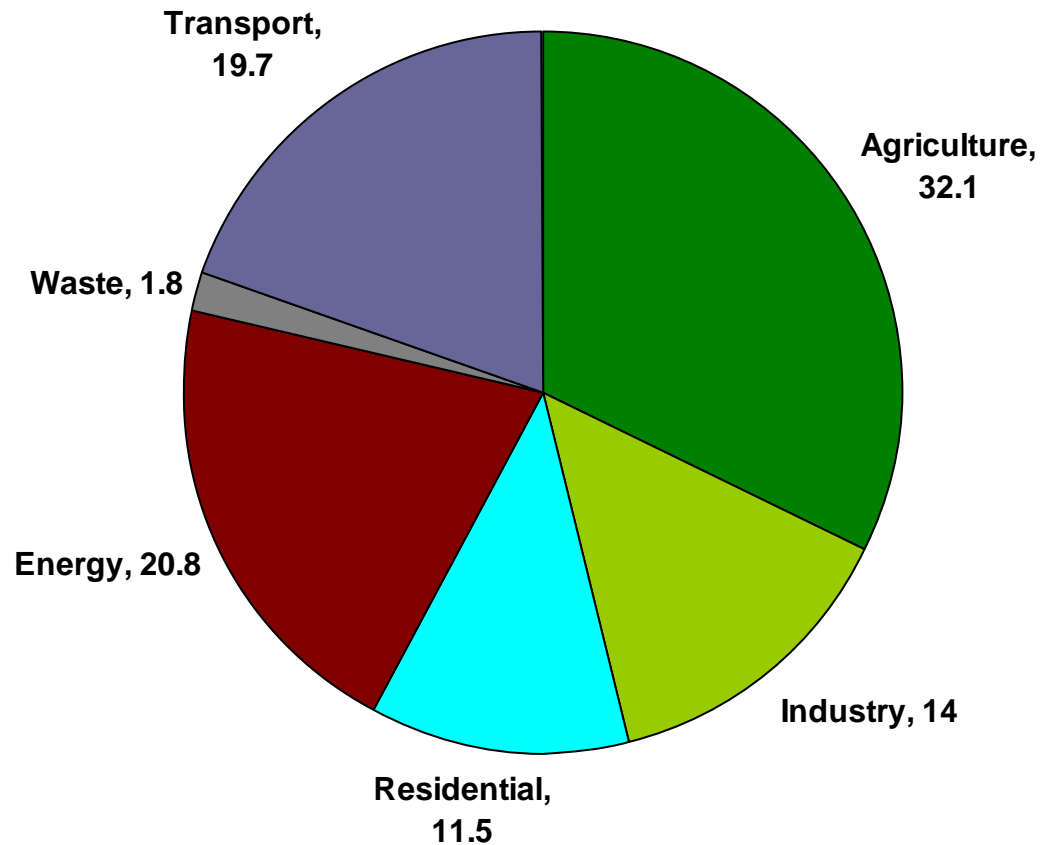


The Irish Agriculture and Food Development Authority

Presentation Overview

- Background & context
- Reducing GHG emissions – Mitigation options
- The Carbon Navigator: a tool to encourage farmer best practice
- Carbon auditing and verifying farm emissions
- Adaptation: Risk assessment baselines
- Future Requirements

Share of national emissions



- Agriculture is the largest contributor to national emissions
- The dairy & beef sector represents the bulk of this

BUT...

Emissions composition and targets

- EU 2020 Target for non-ETS emissions in Ireland – 20% reduction
- Irish Food Harvest 2020 targets: 50% INCREASE IN dairy production

Methane (59.8%)



**Enteric
Fermentation**
8.9 M tonnes



**Manure
management**
2.2 M tonnes

Nitrous Oxide (40.2%)



Excreted N
2.6 M tonnes



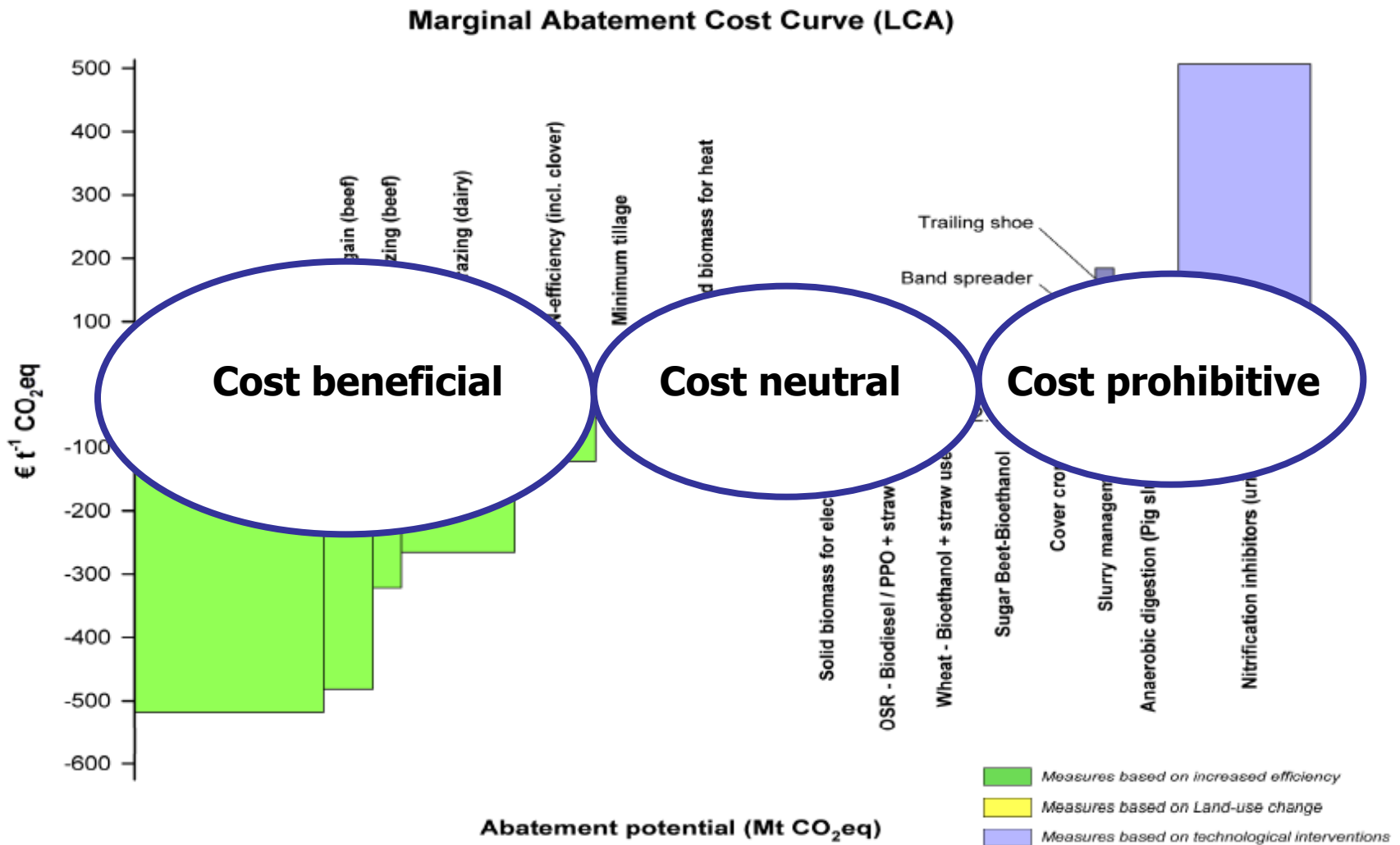
Fertilizer Chemical & Organic	Indirect (Leached and volatilised N)
2.7 M tonnes	1.4 M tonnes

Mitigation measures

- Significant research on dairy emissions
 - Grass Based Systems v Confinement
 - Counting Mechanism – LCA v IPCC
 - Extended Grazing
 - EBI
 - Electricity Usage
 - Slurry Management
 - Fertiliser Use and type
 - Inhibitors - DCD and Urease?
 - Anaerobic Digestion

How do you decide which to encourage/promote?

MACC for Irish Agriculture



...but cost prohibitive measures may become more feasible with time – therefore MACC's must be updated

Challenges - An Integrated Approach

- Working with Farmers:

Objective

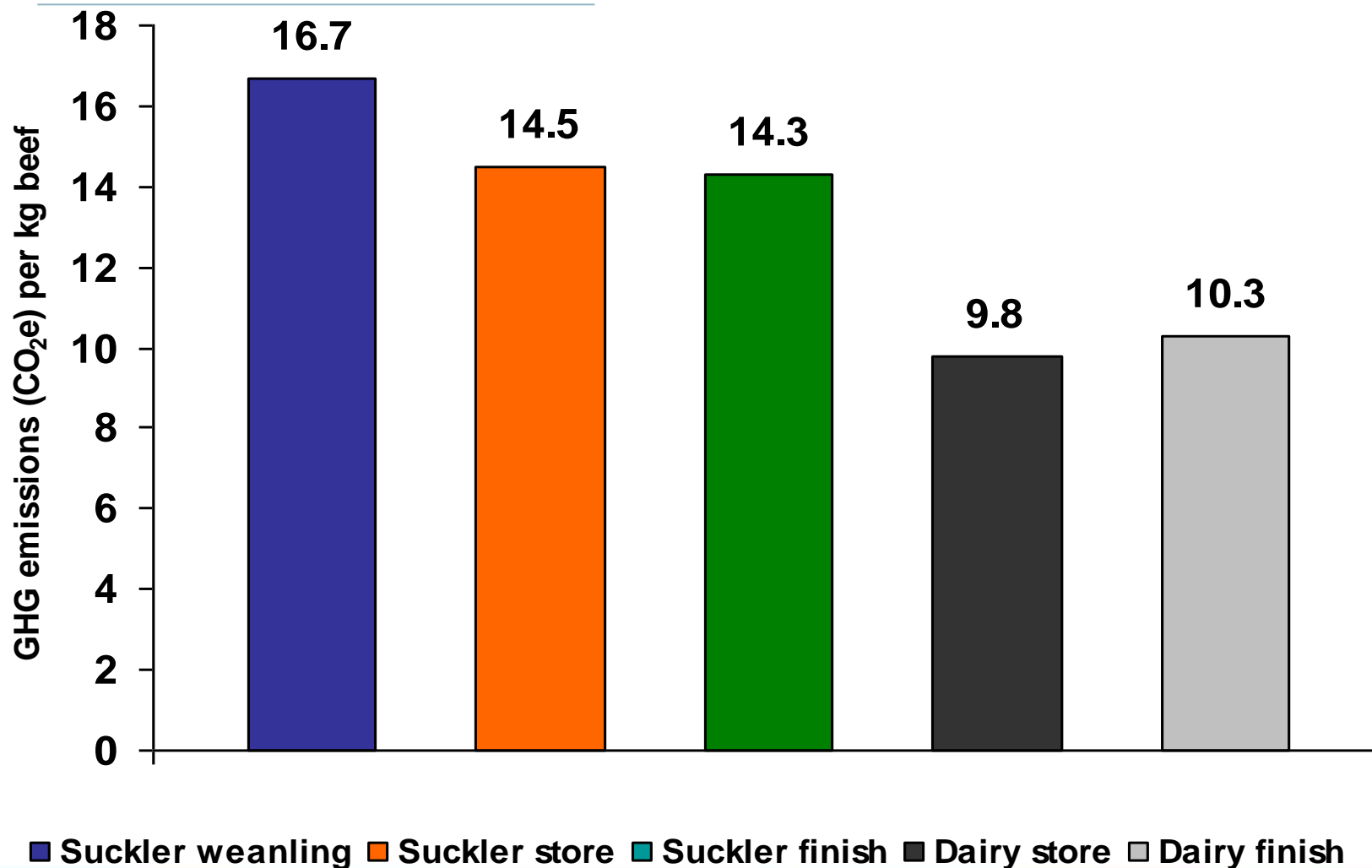
To become the most carbon efficient
Producers of dairy & beef in the EU

4. Demonstrate improvement in GHG emissions per kg beef & MS
5. Use outcomes to promote Irish Products



Carbon auditing and verification

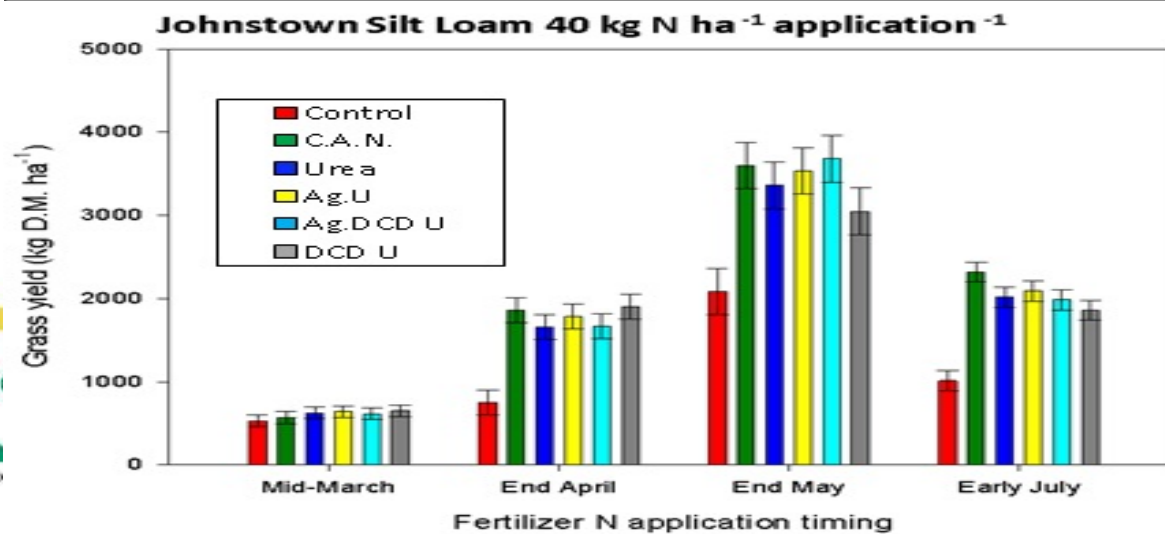
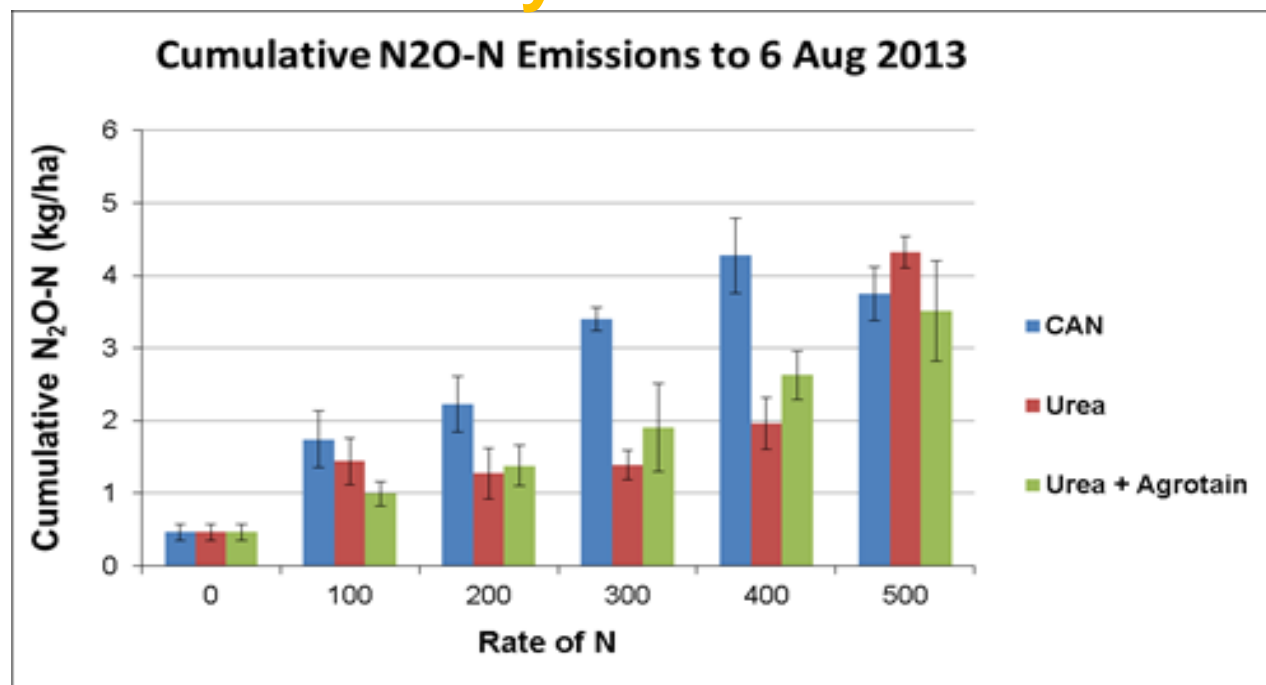
Carbon audit – preliminary findings



National Farm Survey and Fertiliser Use Survey

- A random, nationally representative sample, of between 1,000 and 1,200 farms depending on the year, is selected annually in conjunction with the Central Statistics Office (CSO).
- Animal numbers and type and sub-type (eg. Heifers, sucklers, calves, etc).
- Area of land in tillage, pasture, forestry
- Energy use, housing type
- Timing/amount of fertiliser/manure application
- Fertiliser/manure type and application method

Impacts of fertiliser type and inhibitors on emissions and yields



Mainstreaming Sustainability to farmers: The Carbon Navigator

- Partnership approach: Teagasc & Bord Bia
- Online software to assist farmers:
 - To understand how their farms produce GHG emissions
 - To identify mitigation capacity (cutting not counting!)
 - To set targets and a pathway to reduce emissions

Measures Included (Methane and N₂O)

- Methane
 - Extended grazing
 - Economic Breeding Index
- Nitrogen Management
 - Targeted spreading of manures : indirect N₂O & less CH₄/N₂O
 - Low emissions application techniques:
 - Timing, rate and type of fertiliser:
 - Inclusion of legumes into sward:
 - In order to verify these strategies and include in inventories – require higher Tier N₂O emission factors!! (see later)



Energy Efficiency

Electricity consumption ranged from 53 to 108 Watts per litre

- Small contribution relative to others
- Cost 0.23 to 0.76 cent per litre produced.
- Three key areas to reduce energy costs and related emissions.
 - These were the effective pre-cooling in a Plate Heat Exchanger
 - The use of Variable Speed Drive (VSD) Vacuum Pumps
 - The presence of energy efficient water heating systems.

Year 2010		Current	Target	Chart	GHG change	€ benefit
Grazing season - suckler cows	Turnout Date	24/03/2010	10/03/2010		-2.5%	+€1509
	Housing Date	01/11/2010	15/11/2010			
Grazing season - yearlings/followers	Turnout Date	24/03/2010	10/03/2010		-1.9%	€0
	Housing Date	01/11/2010	15/11/2010			
Age at first calving	Age at first calving (months)	34.5	22.0		-3.8%	+€4392
Calving Rate	Calving rate (calves/cow)	0.0	0.0		0%	€0
Live weight performance	System	Steers & Heifers	Steers & Heifers		0%	€0
	Lifetime live weight per day of age (g)	860.00	946.0			
Nitrogen Efficiency	Total CAN used (t)	6.0	6.0		0%	€0
	Total urea used (t)	0.0	0.0			
	Output kg beef live / ha	473.8	473.8			
Slurry Spread Timing	% in Spring	100	100		0%	+€325
	% Summer following 1st cut	0	0			
	% Later in Summer	0	0			

Set current and target performance

Review impact on GHG emissions per kg beef

Scoring chart

Indicator of improvement in profitability



Age at first calving (AFC)

Current age at first calving (months)
Target age at first calving (months)

32	OR HERE
28	

Set current and target performance

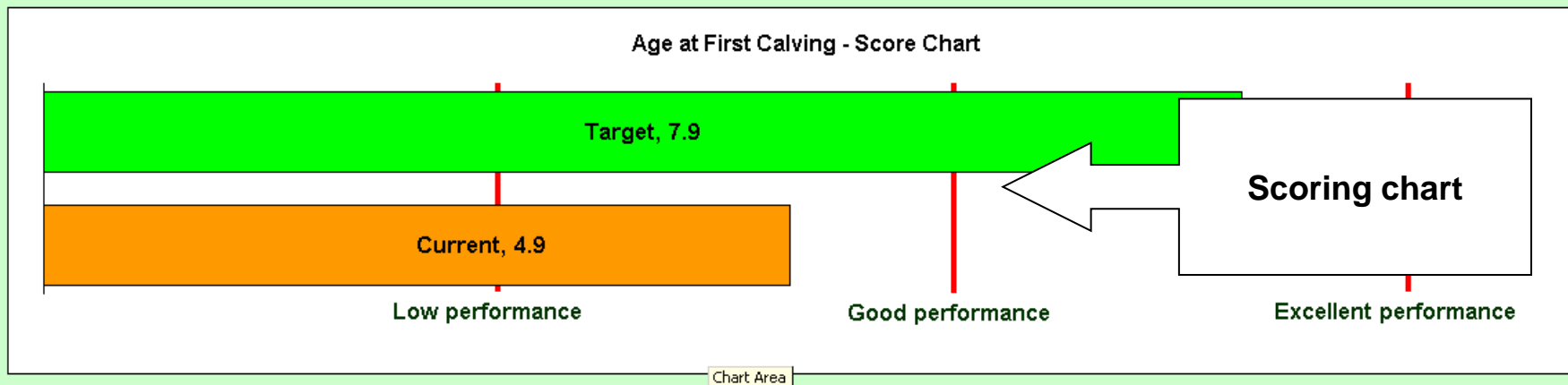
RESULTS

Current	Target	
32.0	28.0	
0.5%	-0.8%	
		-1.22%
4.9	7.9	

Age at
Product
Impact
Score

Review impact on GHG emissions per kg beef

Emissions



Financial Implications

It is estimated that for every day increase in age at first calving there is a potential reduction in profitability of €1.65

Your current AFC is higher than average and reduces profitability by €452 when compared to the average
By achieving your target AFC you could increase profitability by €1205 per farm

Indicator of improvement in profitability

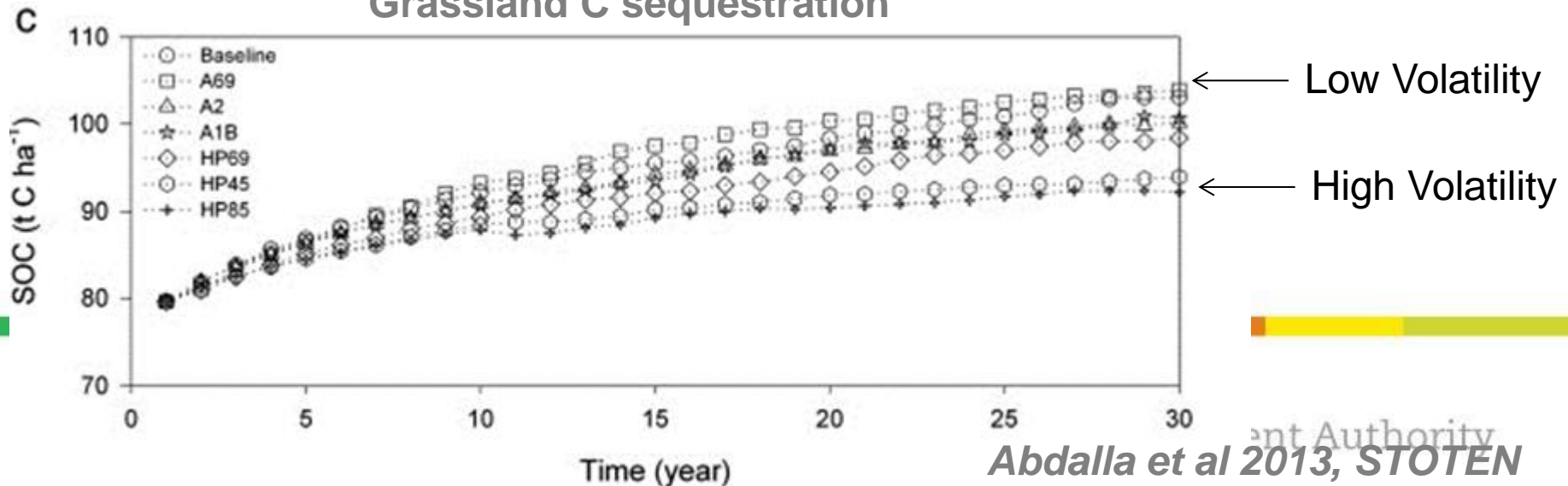
Projected Greenhouse gas reductions

	National Average		High Performance
	2008	2018	
Beef (kg CO ₂ e/kg carcass)	23.1	21.7	18.9

Adaptation

- Future climate effects – do they confound mitigation?
- In Ireland, climate change *per se* may have positive impacts (longer growing season) – but weather volatility could offset any gains
- Currently using climate scenarios in conjunction with different levels of extreme weather events to disaggregate impact on plant growth, environmental losses and economic performance
- To do this – use biogeochemical models (DAYCENT, DNDC) in conjunction with NFS activity data, soils maps and climate model outputs

Grassland C sequestration



Summary

- **GHG emissions; environmental and consumer concerns**
- **Mitigation/reduction options are available that can increase profit and reduce emissions**
- **The Carbon Navigator designed to assist GHG mitigation**
- **The NFS in conjunction with soils maps and LPIS data can be used to downscale national inventories**
- **BUT...we need Tier 2 emission factors**
- **Also need C sequestration baselines for land-use and land management**

Thank you

