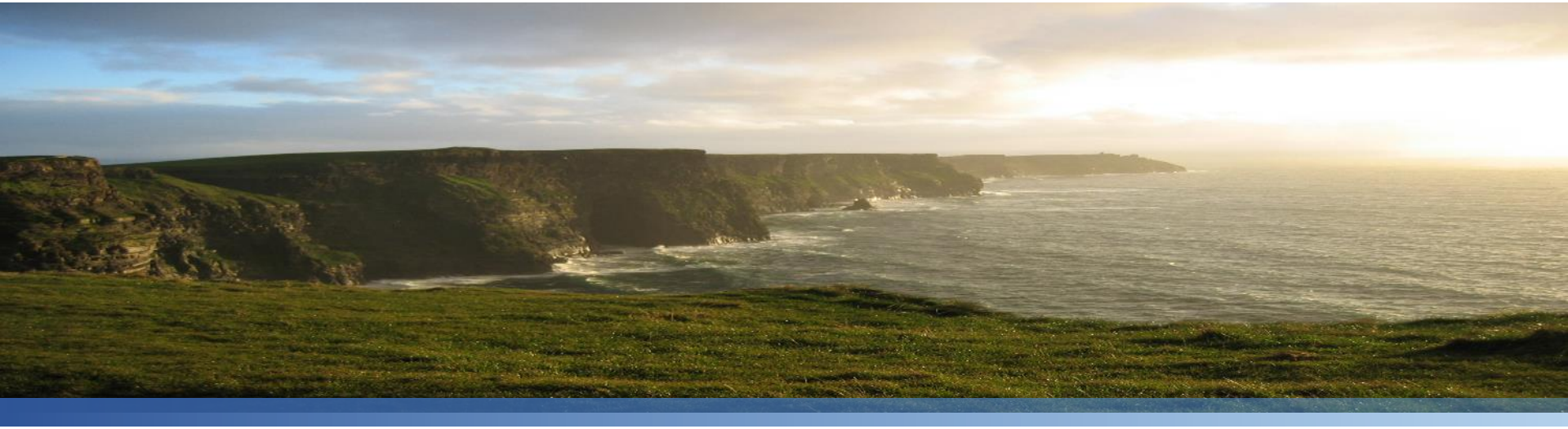
IMPIreland
Integrated Modelling Project

epa
Environmental Protection Agency

Agriculture – Research & Modelling
Ireland



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Andrew Kelly
May 2015
Edinburgh

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Agricultural Modelling in Ireland

Context

Capacities

Outlook

Section 1 **Context**

Agriculture as an Economic Sector

- Primary agriculture gross value added at factor cost in the economy is approximately 2.5%
- Inclusion of the agri-food industry (drinks etc.) boosts the GVA to circa 7%
- Agriculture represents approximately 7% of exports by value from Ireland
- Agriculture exports valued at €10.45bn in 2014 – target of €12bn by 2020
- Agriculture, forestry and fishing accounts for roughly 5-6% of total employment
- Employment contribution would again be boosted to circa 9% by broader definition of agri-food
- It is an important employer in rural areas and is also relevant to EU food production
- It is a long-standing sector in Ireland with comparatively strong technical expertise
- It is a sector which arguably enjoys a produce marketing advantage (pasture base / green image)
- It is a sector facing major challenges in respect of national GHG and NH_3 targets (30%GHG/99%NH_3)

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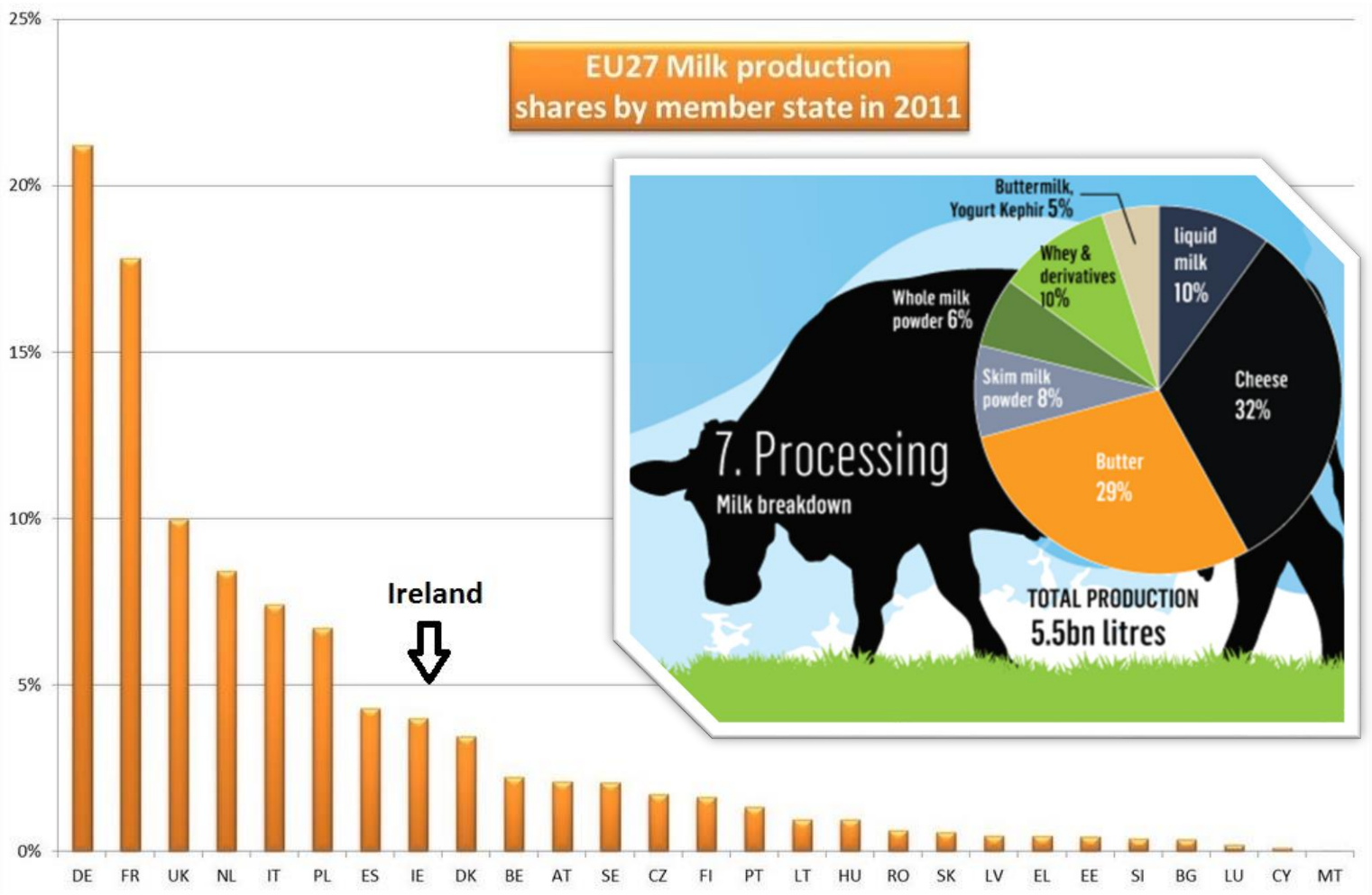
Source: http://www.cso.ie/en/statistics/

Smaller Fish in a Big Pond



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Source: http://ec.europa.eu/agriculture/milk/graph1-large_en.jpg
Source: www.independent.ie

Ireland's Dairy Sector

Bord Bia
Irish Food Board

SUSTAINABLE

IRELAND HAS MANY NATURAL ADVANTAGES FOR SUSTAINABLE DAIRYING - A TEMPERATE CLIMATE, PLENTIFUL RAINFALL AND RICH SOILS

80% OF IRISH FARMLAND IS GRASS-LAND IRISH DAIRY IS FAMOUS FOR ITS NATURAL GRASS BASED PRODUCTION

WE HAVE THE JOINT LOWEST CARBON FOOTPRINT FOR MILK PRODUCTION IN THE EU AND THE LOWEST WATER STRESS INDEX IN THE WORLD

THE NEW SUSTAINABILITY DAIRY ASSURANCE SCHEME IS THE 1ST NATIONAL SCHEME OF ITS TYPE ANYWHERE IN THE WORLD

50%

EXPECTED DAIRY PRODUCTION GROWTH BY 2020 -FROM 5.5BN TO 7.5BN LITRES

WE WILL BE THE FASTEST GROWING DAIRY MARKET GLOBALLY OVER THE NEXT FEW YEARS.

65

COWS IN AN AVERAGE HERD; EACH COW PRODUCES 5,000 – 6,000 LITRES PER YEAR

IRELAND SUPPLY

10%

OF THE GLOBAL INFANT MILK FORMULA DESPITE ONLY HAVING 1% OF GLOBAL DAIRY PRODUCTION

€3BN

WORTH OF EXPORTS TO OVER

140

MARKETS GLOBALLY

18,000

DAIRY FARMERS, OVER 1 MILLION DAIRY COWS

CHEESE

172,000

TONNES OF CHEESE PRODUCED
(EXCL PROCESSED AND SPREADS)

35,000

TONNES SPECIALITY CHEESE

1,100

TONNES FARMHOUSE CHEESE

A BROAD RANGE OF DIFFERENT TYPES OF CHEESE USING COW, GOAT AND EWES MILK

KERRYGOLD

NO.1

BUTTER BRAND IN GERMANY & THE US

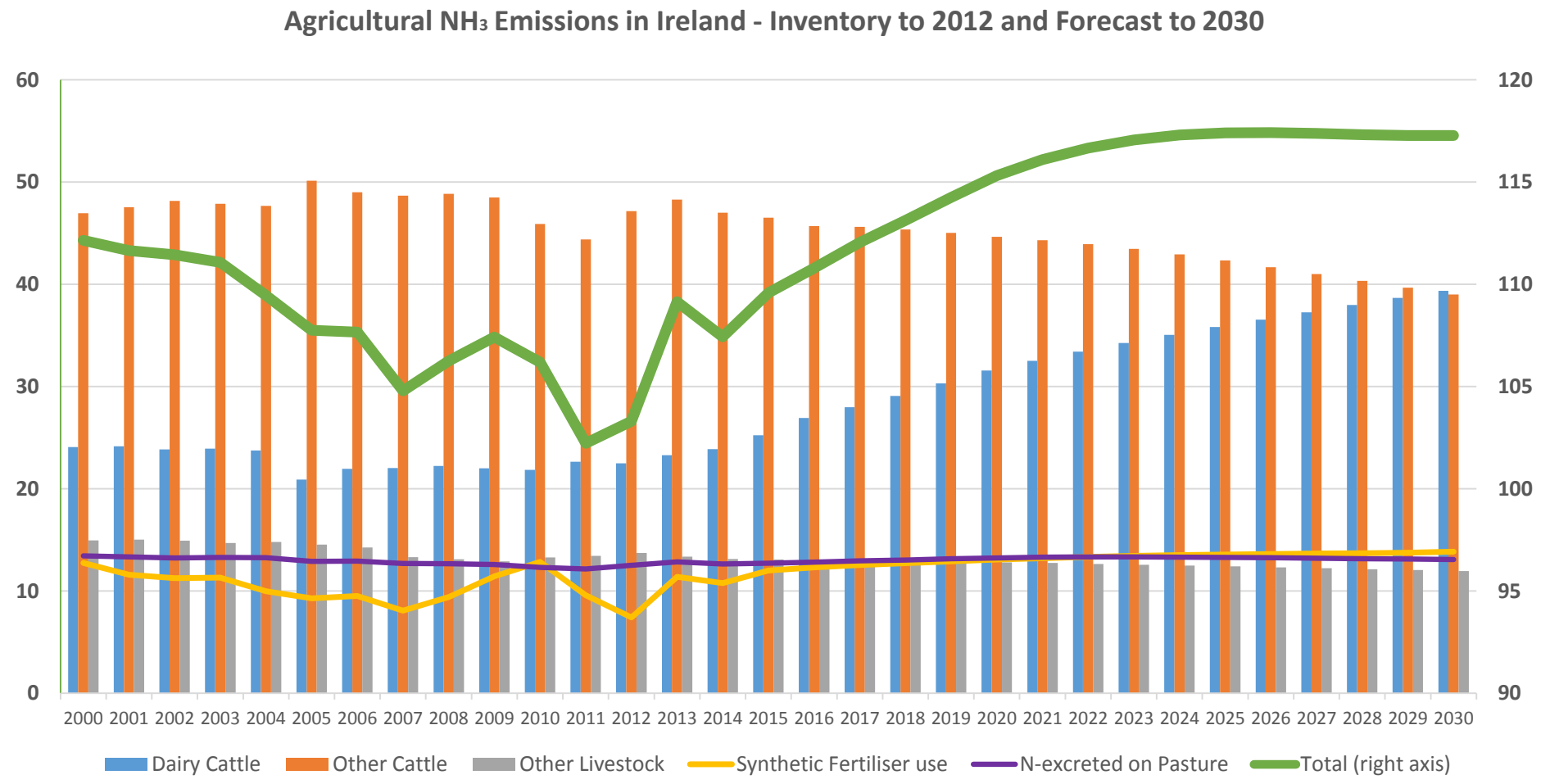
350M

PACKETS OF KERRYGOLD BUTTER SOLD EVERY YEAR

IRELAND IS A WORLD LEADER IN PROBIOTIC RESEARCH

Source http://www.bordbia.ie/

Agriculture as an NH_3 Source



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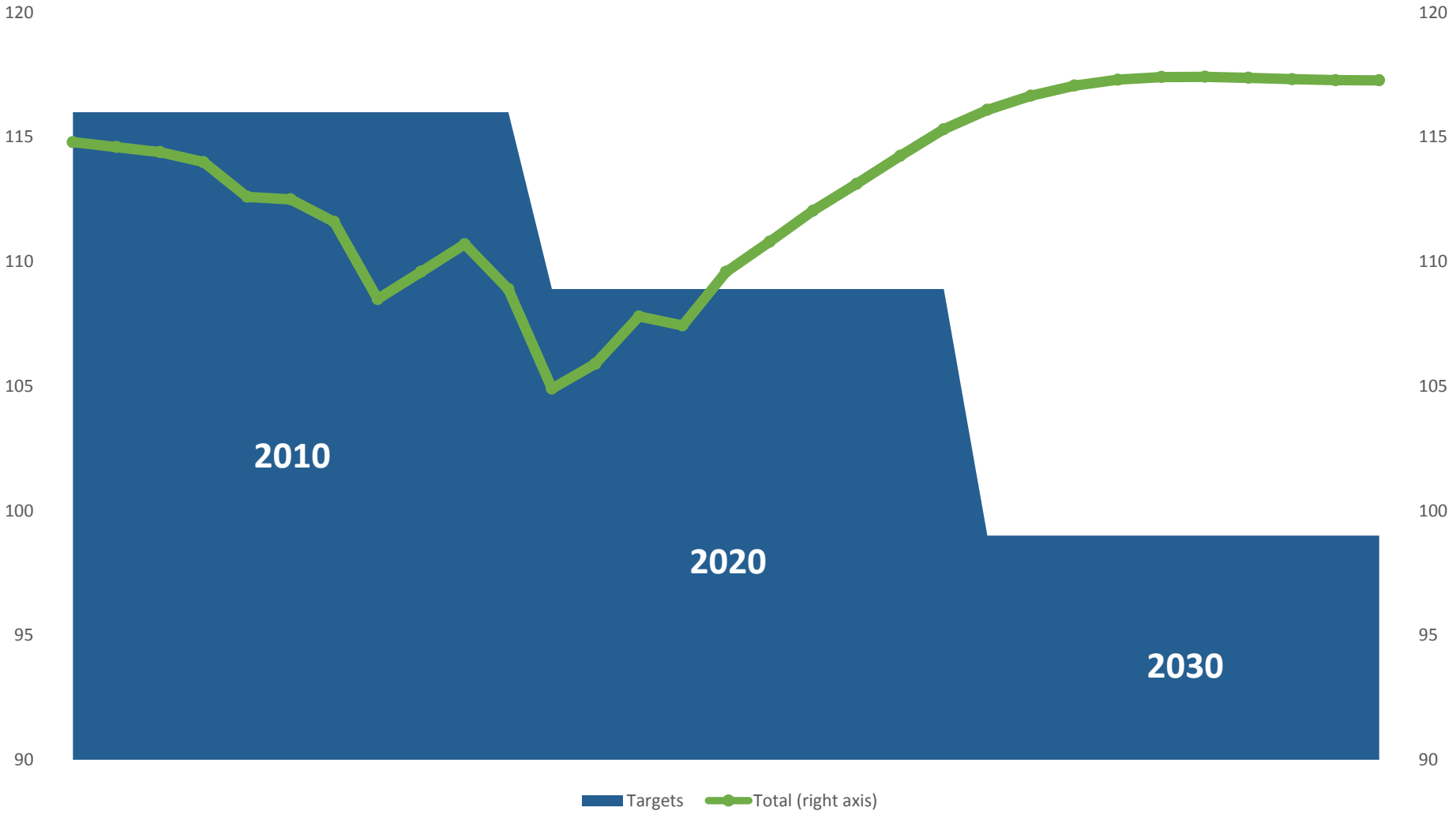
Units: Kt of NH_3

Source: Irish EPA (update pending)

NH_3 – Targets and Trends 2000 to 2030



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Units: Kt of NH_3

Source: Irish EPA (update pending)

Section 2 Capacities

Modelling and Research Capacities

- Agriculture and agri-food science is a sizeable subject at UCD and this has enhanced 4th level research work. Specialist colleges also exist.
- Teagasc is a state-supported agricultural and food advisory authority with over 1000 staff spread across 52 locations in Ireland. There are a mix of research, administrative and advisory staff.
- This network allows Teagasc to teach, develop research, manage outcomes and communicate directly with farmers and others.
- Principal sources of official modelling and research in Ireland would be linked to the EPA and Teagasc, as well as the corresponding parent department of agriculture, food and the marine (DAFM).
- GAINS Ireland run by EnvEcon under EPA funded IMP Ireland project links national and EU modelling.

Official Inventory and Forecasts

- Official inventory is handled by the Irish EPA
- Teagasc also contributes data and research to the overall process
- Ammonia inventory was revised in recent years and now uses the N flow approach in line with the Inventory guidebooks
- Next year the agency aims to update the emission factors based on the latest (2013) edition of the guidebook
- Details on the inventory process are contained in the Informative Inventory Report (IIR) 2015 which can be accessed here http://erc.epa.ie/clrtap/ -Summary points on the next slides
- Forecasts are derived from the FAPRI model with full implementation of FH2020 presumed (principally dairy increase and beef reducing). Some measures in place e.g. potential introduction of N Inhibitors (already built-in to GAINS scenario) but still a significant gap to target.

6.2 Manure Management (NFR 3B)

NH_3, the Tier 2 methodology uses a mass flow approach based on the concept of the flow of Total Ammoniacal Nitrogen (TAN) through the manure management system. Emissions are calculated for the same animal sub-categories as those utilised in Ireland's national greenhouse gas inventory (Table E.1 Annex E). The first step in the mass flow approach is the estimation of total annual nitrogen excretion by the animals. For dairy cows, Ireland utilises the method described in IPCC (2006), chapter 10, further enhanced by country specific data on feeding practices and milk production (O'Mara, 2007, Duffy et al., 2013) to estimate N excretion from dairy cows. For all other categories of livestock, national values are utilised. Total nitrogen excretion is then apportioned to that which is deposited in buildings, collection yards (only applicable to dairy cows during milking) and grazing and the TAN for each category of animal is assigned accordingly to Table E.3 Annex E.

6.3 Agricultural Soils (NFR 3D)

6.3.1 Direct Soil Emissions of Ammonia - Inorganic N-fertilizers (NFR 3Da1)

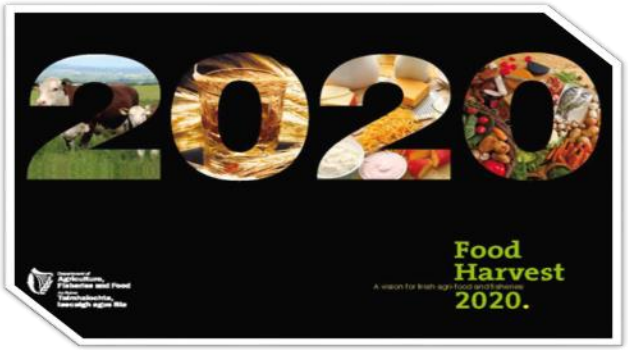
The calculation of NH_3 emissions from nitrogen fertilizer application to agricultural soils utilises the Tier 2 approach outlined in chapter 3D of the Inventory Guidebook (2009). Total fertilizer sales for each year of the time series 1990-2013 (Table E.4, Annex E) are apportioned into the categories, Urea, CAN, Ammonium sulphate and other compounds according to the known sales of these compounds in each year as supplied to the inventory agency by the Department of Agriculture, Food and Marine. The calculation routine to estimate emissions utilises a range of mean spring air temperatures. The mean spring air temperature in Ireland is 6.5°C according to long term monitoring undertaken by the Met Eireann (Irish Meteorological Office) therefore one climatic region is adopted. No effect is applied for the application of nitrogen fertiliser to calcareous soils as the multiplier presented is for soils with a pH >7.0. The target soil pH for grassland and cereals in Ireland are 6.3 and 6.5, respectively. Using this approach the implied emission factor for urea is 13 per cent of the nitrogen applied and for all other compounds 1 per cent. See Table E.10 of Annex E for additional information of the EFs used.

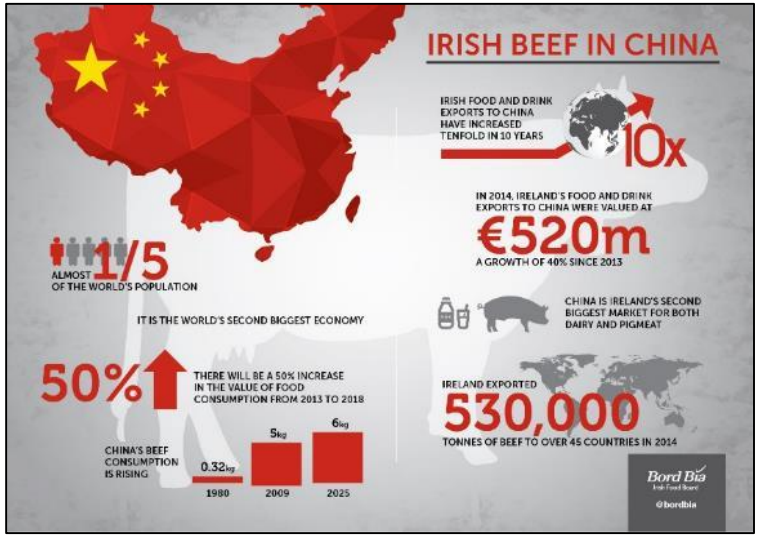
Section 3 Outlook

Markets

- No growth without demand … but Ireland has a number of large export markets and a small increase in a large market can have a very large impact on a small supplier

- Industry plan "Food Harvest 2020" underpins the current national outlook post milk quotas
- 2025 Plan to be released in next months





Source http://www.bordbia.ie/

Not *Just* an Outlook

- The Industry has been primed for the removal of quotas for some time…
- But then Germany, Netherlands, Poland, Denmark, Austria, Cyprus and Luxembourg all also exceeded their quota giving rise to fines of ~€409m
- Investments by major industry players (e.g. Glanbia/CoOps) of circa €600m would suggest that there is commitment to this path
- Time will tell if the necessary market share is secured, but again … even small shares of big markets could have a pronounced impact on Irish agriculture

Farmers owe €69m for breaking milk quotas

'Super levy' relates to 12 months before quota system ended

The EU milk quota regime ended on March 31st and the department has estimated that farmers were 4.34 per cent over quota for the 12 months up to that date.

Alison Healy

Topics: News Environment Department Of Agriculture Eu

Wed, Apr 22, 2015, 20:36 Recommend 12 Tweet 14 +1

CAP payment farmers' full addresses not being published

Drink up, says Minister as National Dairy Week launched

Dairy farmers will have to pay a fine of about €69 million for producing more milk than allowed under the now-defunct milk quota regime, new Department of Agriculture figures show.

The EU milk quota regime ended on March 31st and the department has estimated that farmers were 4.34 per cent over quota for the 12 months up to that date.

This will be the biggest fine, or super levy, ever paid by Irish farmers in the 31 years of the milk quota regime.

Source: http://www.irishtimes.com

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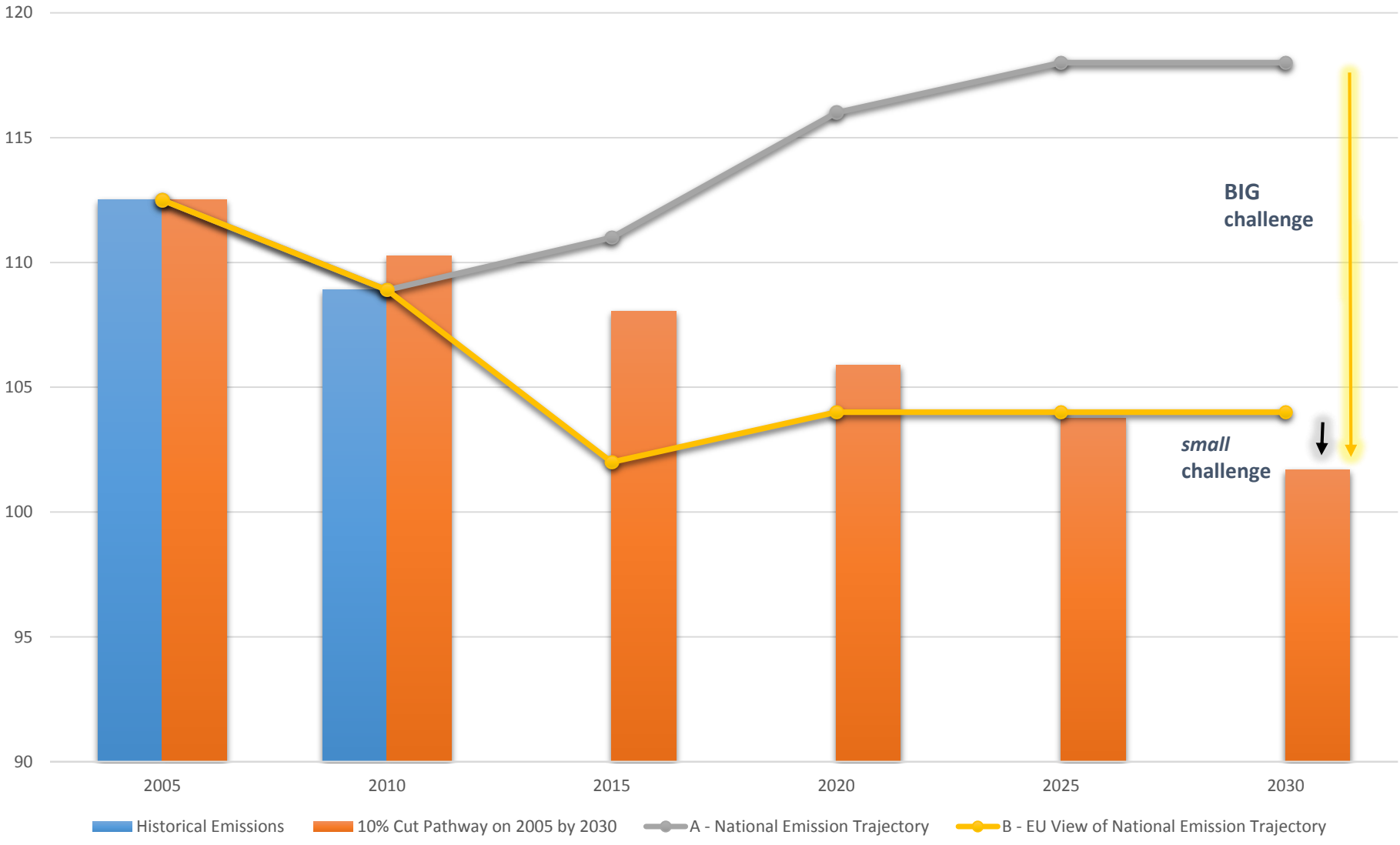
The Importance of Outlooks



Air Targets 2020 and 2030 Proposals

NECD Ceilings	NH_3
2005 Emissions (Latest Inventory in Kt)	112.5
2020 Ceiling (proportional [%] from 2005)	-0.01
2030 Proposal (proportional [%] from 2005) – *WPE 2014 Version*	-0.10
2030 WM Projection (proportional [%] from 2005)	**+0.05**

NH_3 **Under the current Irish outlook NH_3 would exceed the proposed EU target by 17kt in 2030.**

Contact

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www.EnvEcon.eu