



REPUBLIC OF ESTONIA
MINISTRY OF THE ENVIRONMENT

Inventories and action plans for reducing ammonia emissions in Estonia

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Outline

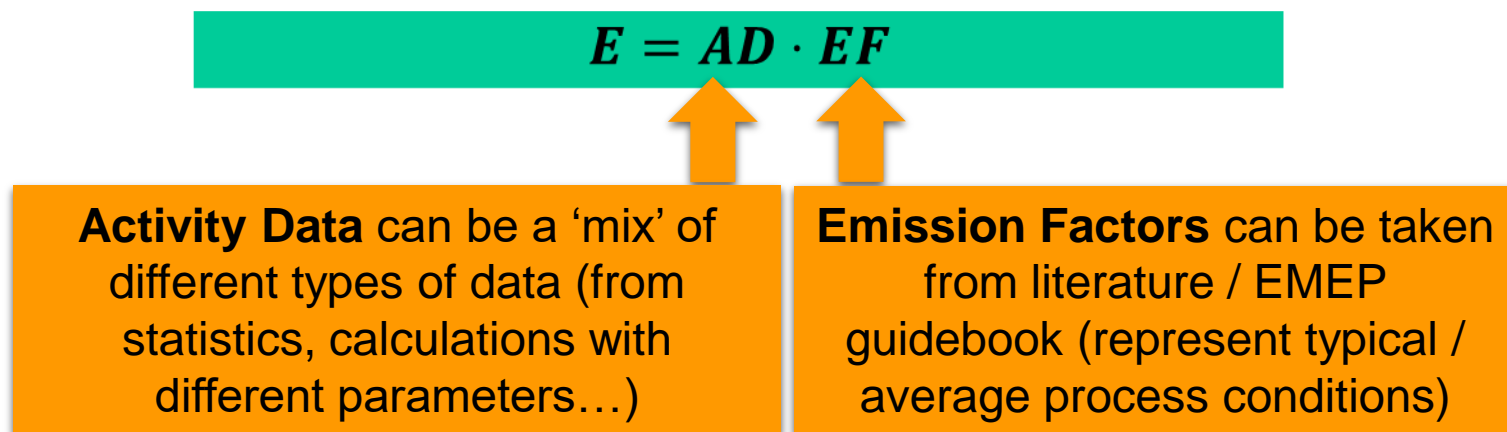
- Estonia's ammonia emission inventory methodology
- Study on mapping the technologies implemented in 1990–2015 for reducing ammonia emissions in livestock production
 - How did it improve the ammonia inventory?
- National Air Pollution Control Programme for 2020–2030 (NAPCP)
 - Estonian commitments
 - Measures for ammonia reduction

Why are inventories important?

- Progress towards national reduction targets
- Feedback on existing PaMs
- Basis for future measures
 - Overestimating = more resources needed (larger costs)
- Lack of good quality data
 - Default values (Tier 1)
 - **Effect of existing measures is not included**

Calculating emissions

Tier 1 approach:



Higher tiers involve:

- **Country-specific EF's** (detailed information on process conditions, abatement technologies, etc.)
- Development/application of **models** to estimate the EF's

When choosing measures it is important, that it could be reflected in the inventory

Estonia's ammonia inventory (1)

NFR	Source	Description	Key categories	Method
3B1a	Cattle dairy	Includes emissions from dairy cows	Yes	Tier 2
3B1b	Cattle non-dairy	Includes emissions from young cattle, beef cattle and suckling cows	Yes	Tier 2
3B2	Sheep	Includes emissions from sheep		Tier 1
3B3	Swine	Includes emissions from fattening pigs and sows	Yes	Tier 2
3B4d	Goats	Includes emissions from goats		Tier 1
3B4e	Horses	Includes emissions from horses		Tier 1
3B4gi	Laying hens	Includes emissions from laying hens	Yes	Tier 2
3B4gii	Broilers	Includes emissions from broilers	Yes	Tier 2
3B4giii	Turkeys	Emissions from this sector are allocated to NFR 3B4giv		Tier 1
3B4giv	Other poultry	Includes emission from cocks, ducks, geese and turkeys		Tier 1
3B4h	Manure management - Other animals	Includes emission from foxes, minks, racoons and chinchillas		Tier 1

Estonia's ammonia inventory (2)

NFR	Source	Description	Key categories	Method
3Da1	Synthetic N-fertilizers	Includes emissions from application of nitrogen fertilizers and field preparation	Yes	Tier 2
3Da2a	Animal manure applied to soils	NH ₃ emissions from this sector are allocated to NFR 3B1a, 3B1b and 3B2	Yes	Tier 2
3Da2b	Sewage sludge applied to soils	Includes emission from sewage sludge applied into soils		Tier 1
3Da2c	Other organic fertilisers applied to soils (including compost)	Includes emission from compost applied to soils		Tier 1
3Da3	Urine and dung deposited by grazing animals	NH ₃ emissions from this sector are allocated to NFR 3B1a, 3B1b and 3B2	Yes	Tier 2

Estonia's ammonia inventory (3)

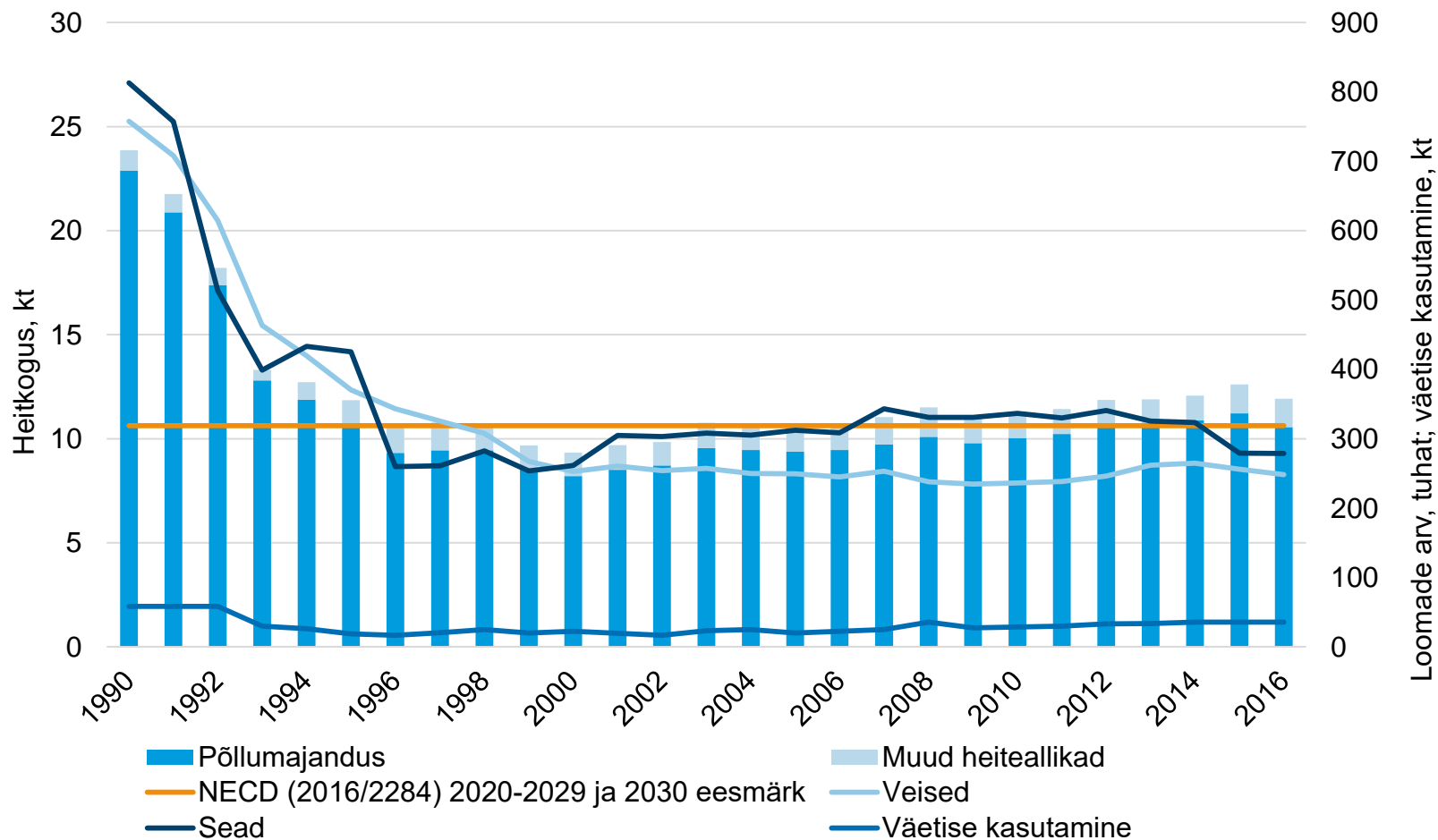
Livestock production (Tier 2):

- Mass flow approach based on TAN through manure management
- Nitrogen excretion estimations:
 - Dairy cattle and non dairy cattle as described in GHG National Inventory
 - For other (swine, broilers) according to Regulation No 66 by the Minister of Environment, 14.12.2016

Application of mineral fertilizers (Tier 2):

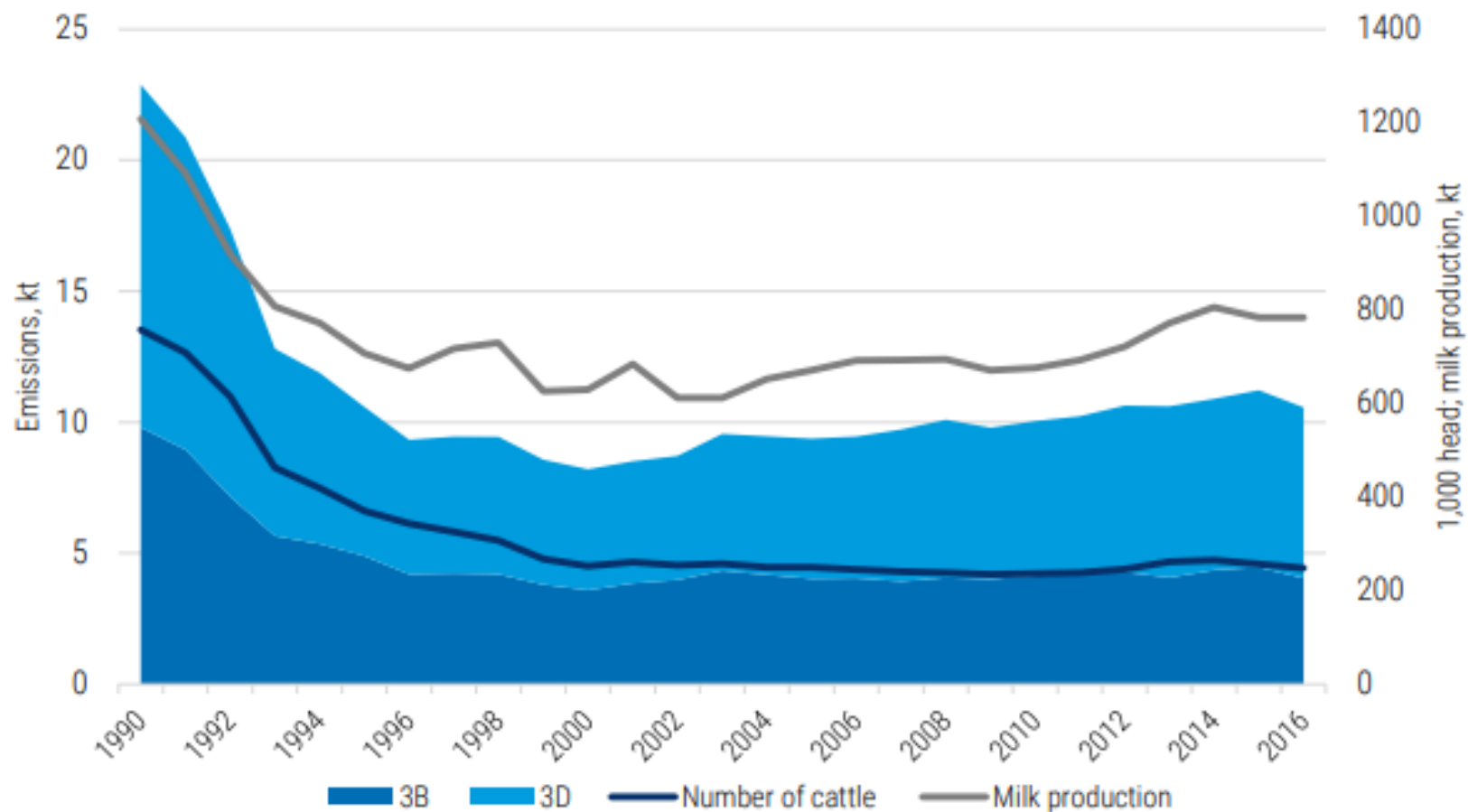
- Activity data from Statistics Estonia

Estonian ammonia emissions



Source: Estonian Inventory Report 1990–2016

Estonian ammonia emissions



Source: Estonian Inventory Report 1990–2016

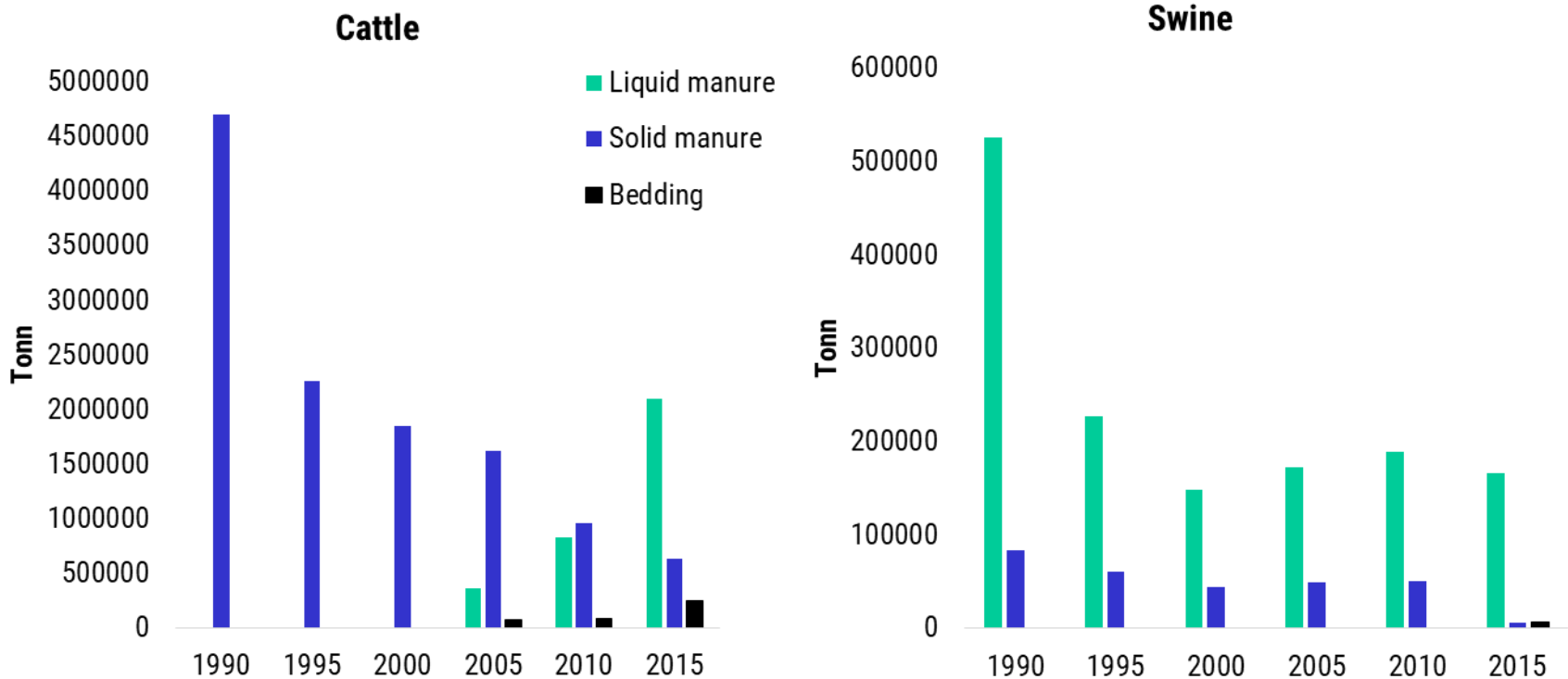
Emissions projections

- **Projections methodology:** Self developed Excel spreadsheet models with bottom-up approach using expert judgements from the Ministry of Rural Affairs and national strategies
- **Data input**
 - number of animals,
 - N in crop residues returned to soils,
 - average milk yield,
 - application of fertilizers,
 - percentage of technological improvements that help to reduce NH₃ emissions, e.g. type of manure storage, manure application technologies
- **Coherence with GHG projections**

Study on technologies in livestock production

- Data on implemented technologies in livestock production in period 1990–2015
 - Based on available databases (environmental permits, yearly reporting, ...)
- Specify manure management usage for swine and cattle
- Basis for the NAPCP
- **Improve data in the ammonia inventory**

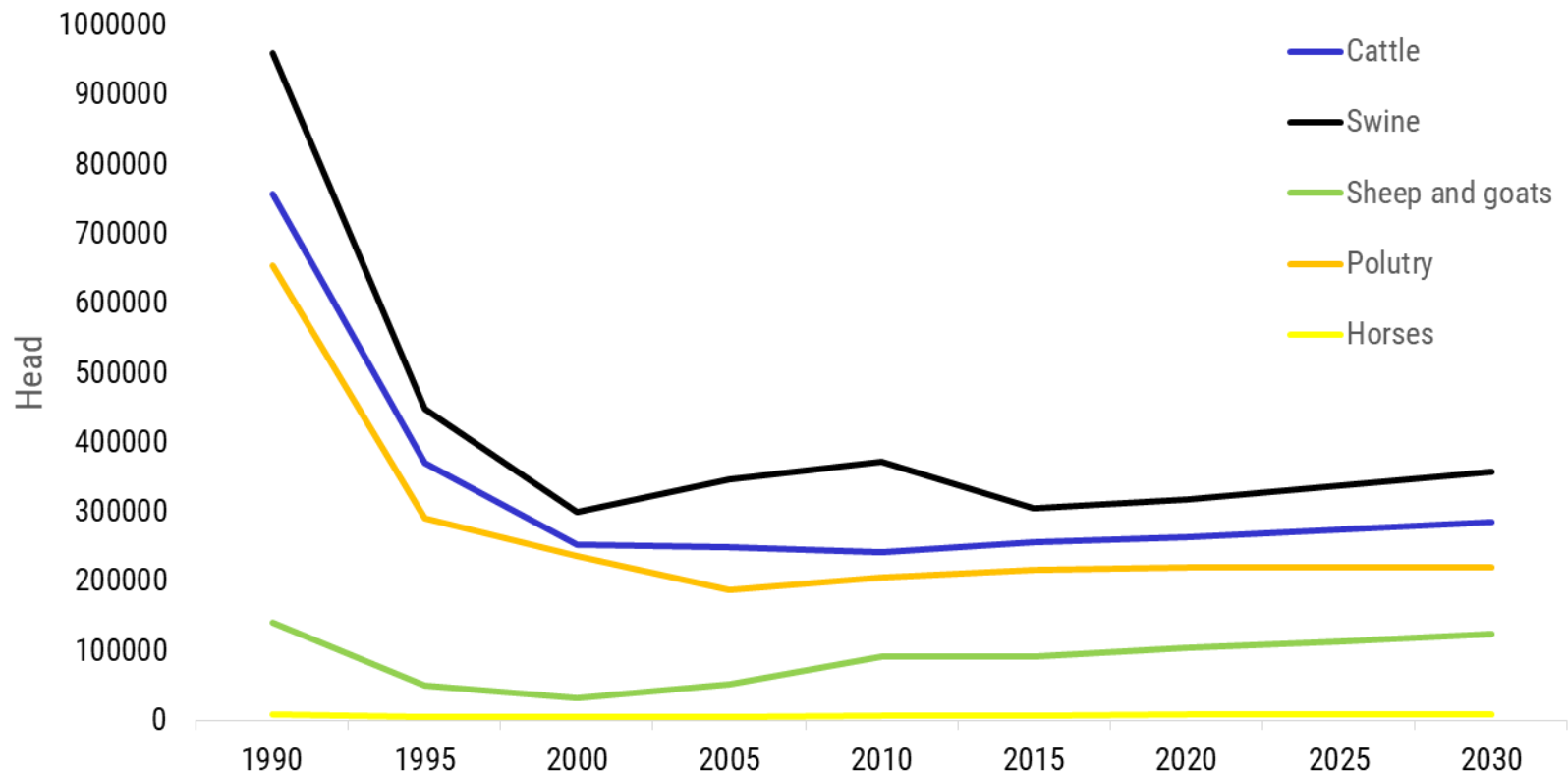
Manure management for swine and cattle in 1990–2015



Results

	Total NH ₃ emission (recalculation), kt	Total NH ₃ emission (IIR 2018), kt
2005	9,4	9,4
2015	9,4	11,2
Difference	0%	20%

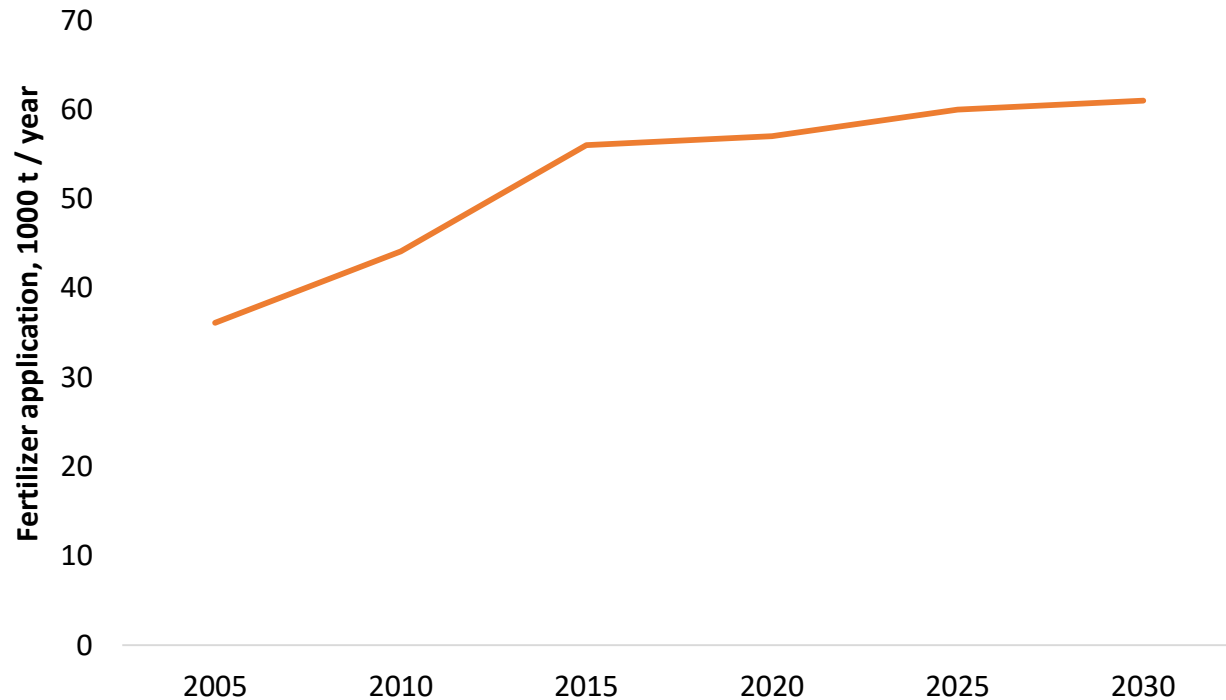
The number of livestock in 1990–2015 and projection for 2020–2030



* Polutry x 10

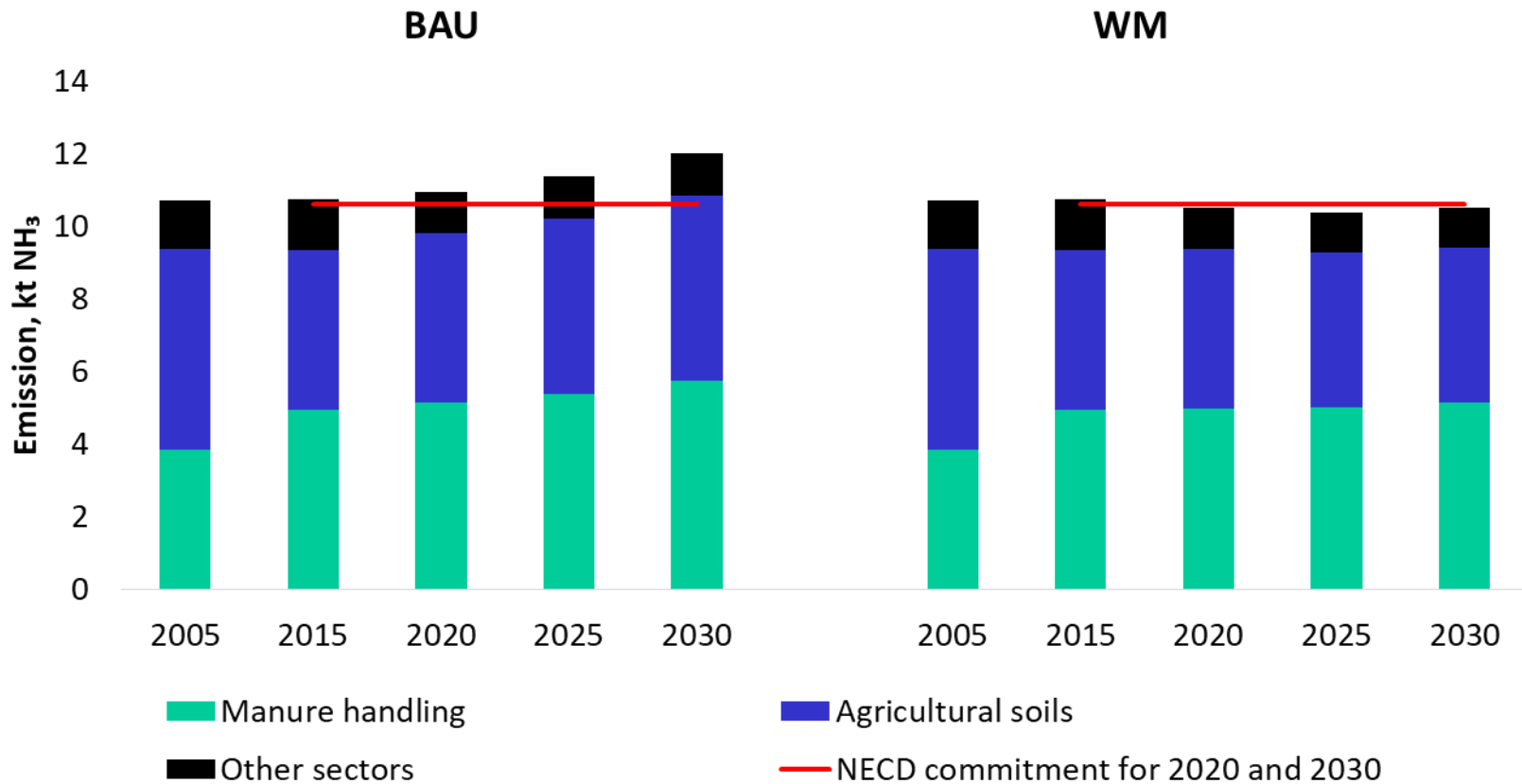
Source: Statistics Estonia, Estonian Ministry of Rular Affairs
2018

Mineral fertilizer application in 1990–2015 and projection for 2020–2030



Source: Statistics Estonia, Estonian Ministry of Rular Affairs
2018

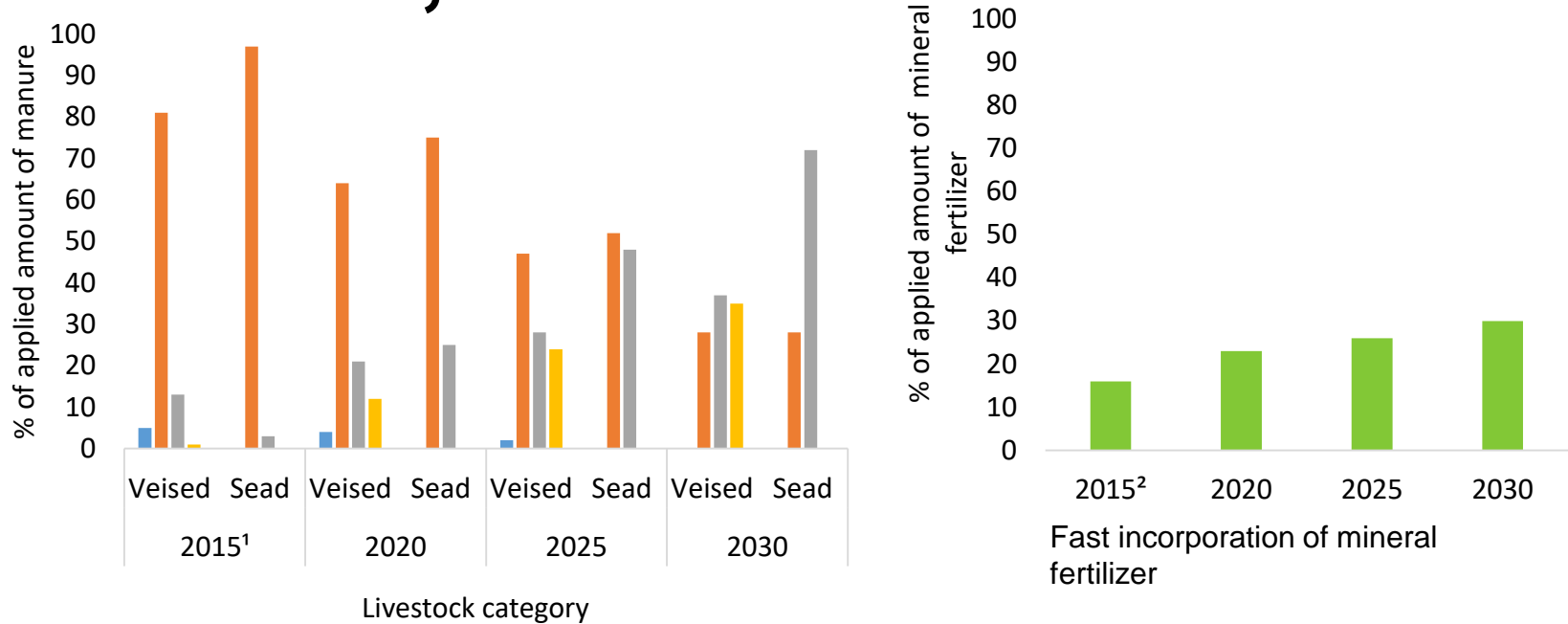
BAU and WM scenarios



Measures for ammonia reduction

- Covered liquid manure storages („tight“ lid, tent or roof structure)
- Spreading liquid manure via injection
- Fast incorporation of mineral fertilizer spread to the arable land

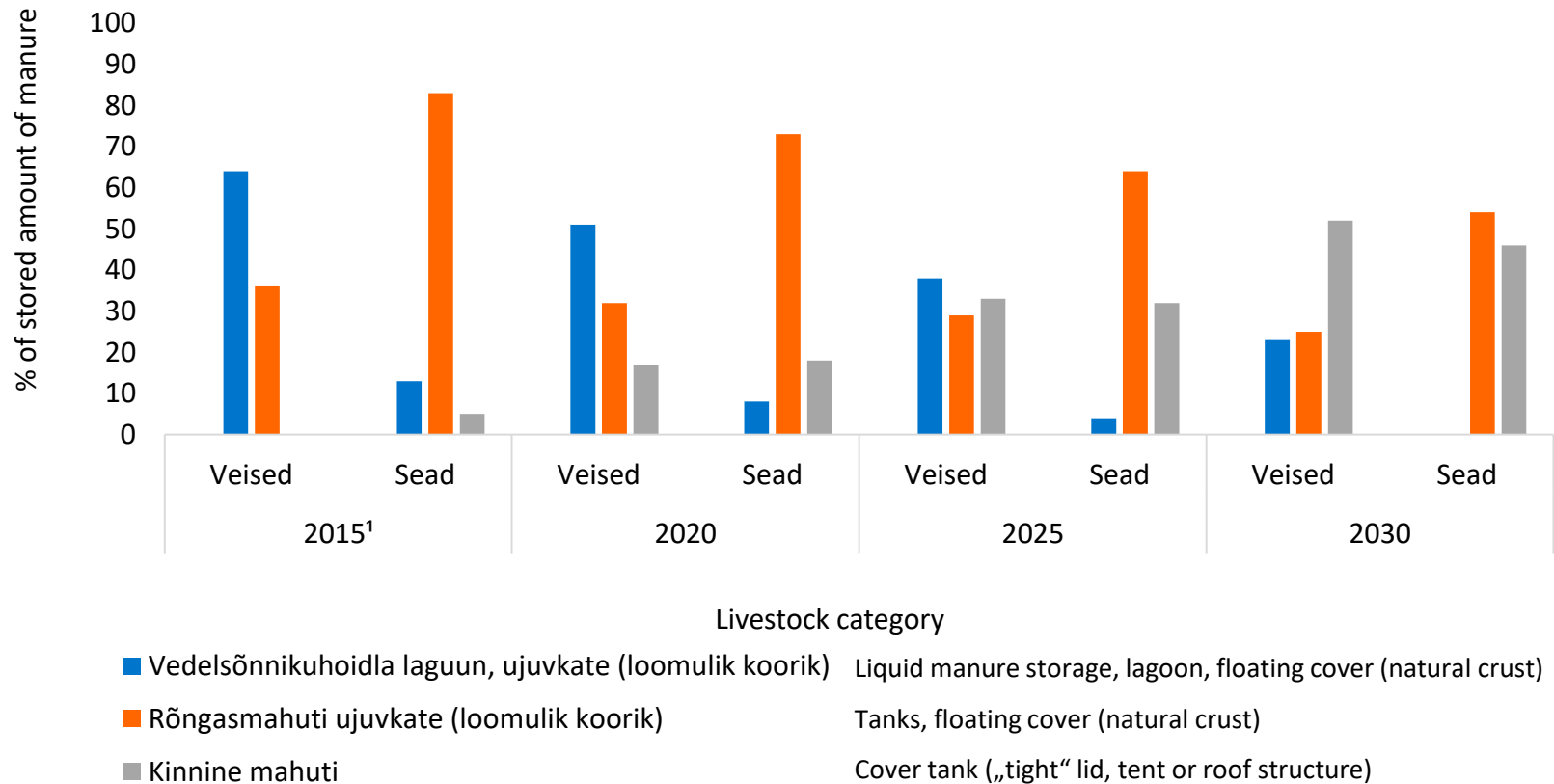
Manure and fertilizer spreading technologies: share for NH₃ reduction, %



- Paisklaotus, vedelsõnnik, muldaviimine < 12 h
- Lohisvooliklaotus, muldaviimine < 12 h
- Avatud lõhega injektorlaotus
- Suletud lõhega injektorlaotus

Broadcast spreading, liquid manure, incorporation into soil < 12 h
Trailing shoe spreading, incorporation into soil < 12 h
Injection – open slot
Injection – closed slot

Manure storage technologies: share for NH₃ reduction, %



NAPCP (1)

- *Business-as-usual* (BAU) and *With measures* (WM) scenarios
 - Industry's plans for reducing air pollutants in 2018–2030
 - Coherence with National Strategic documents / Development plans
- Five workgroups (including relevant interest groups)
 - Energetics
 - Industries
 - Transportation
 - Agriculture
 - Solvents

NAPCP (2)

- Air quality assessment of scenarios
 - Carried out via modelling
 - Includes transboundary modelling
- Ammonia Guidance Document (NECD annex III part 2) to be compiled in autumn 2019
- Environmental Strategic Assessment

Estimated timetable

- Initiation of NAPCP and Strategic Environmental Assessment – *March 2018*
- Workgroup meetings – *May–October 2018*
- NAPCP finished– *February 2019*
- Public consultations – *June 2018, January 2019, February 2019*
- Public consultation on Strategic Environmental Assessment report – *March 2019*



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Thank you!

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