

quantiAGREMI



Ammonia and greenhouse gas emissions
from livestock farming



<https://www.pexels.com>



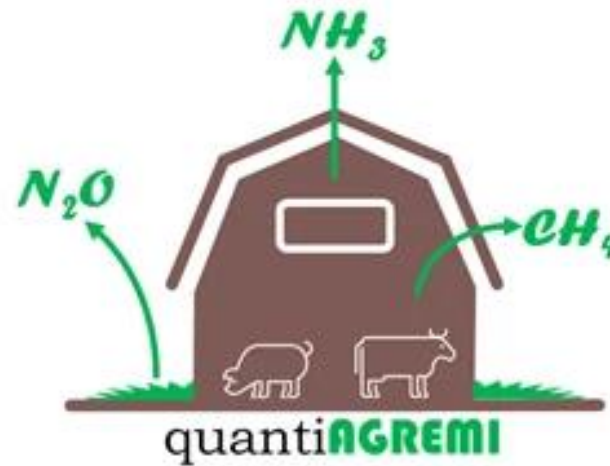
quantiAGREMI

Breakdown of proteins and urea

Eutrophication
Acidification
particle
formation

Microbial conversion of reactive
N-compounds in topsoil

Greenhouse
gas
GWP-100
298

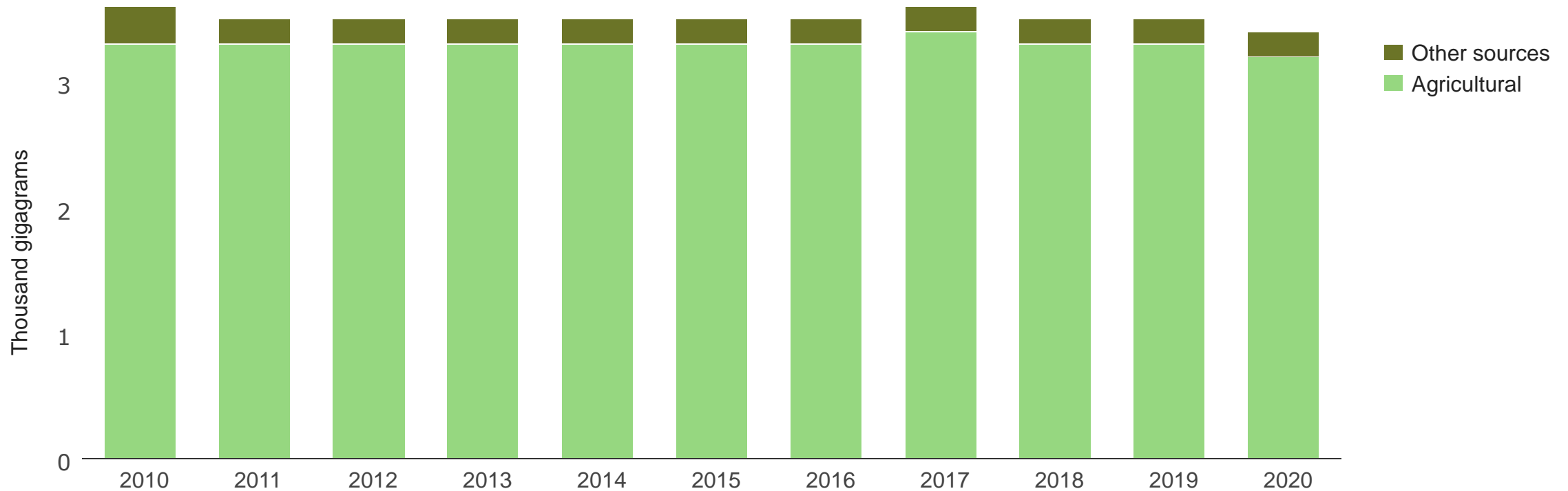


Anaerobic digestion of
ruminants

Greenhouse
gas
GWP-100
25

Emissions from agriculture

Ammonia



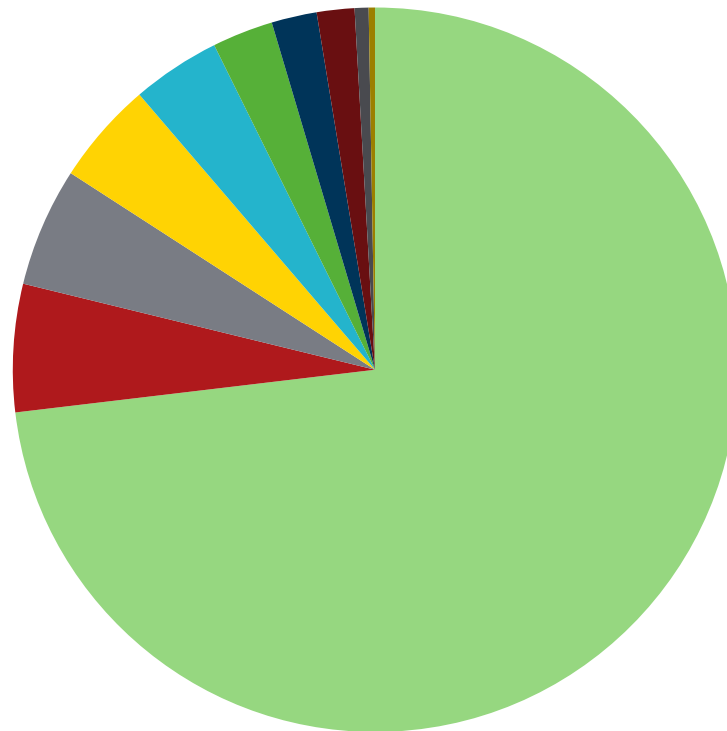
Ammonia emissions from agriculture and other sources

[Ammonia emissions from agriculture and other sources — European Environment Agency \(europa.eu\)](https://www.eea.europa.eu/en/themes/air/air-quality/air-quality-report-2022)

Accessed 18 March 2024

Emissions from agriculture

N₂O



- Agriculture
- Land Use, Land-Use Change and Forestry
- Industry
- Waste
- Domestic transport
- Energy supply
- Residential and commercial
- Other combustion
- International shipping
- International Aviation

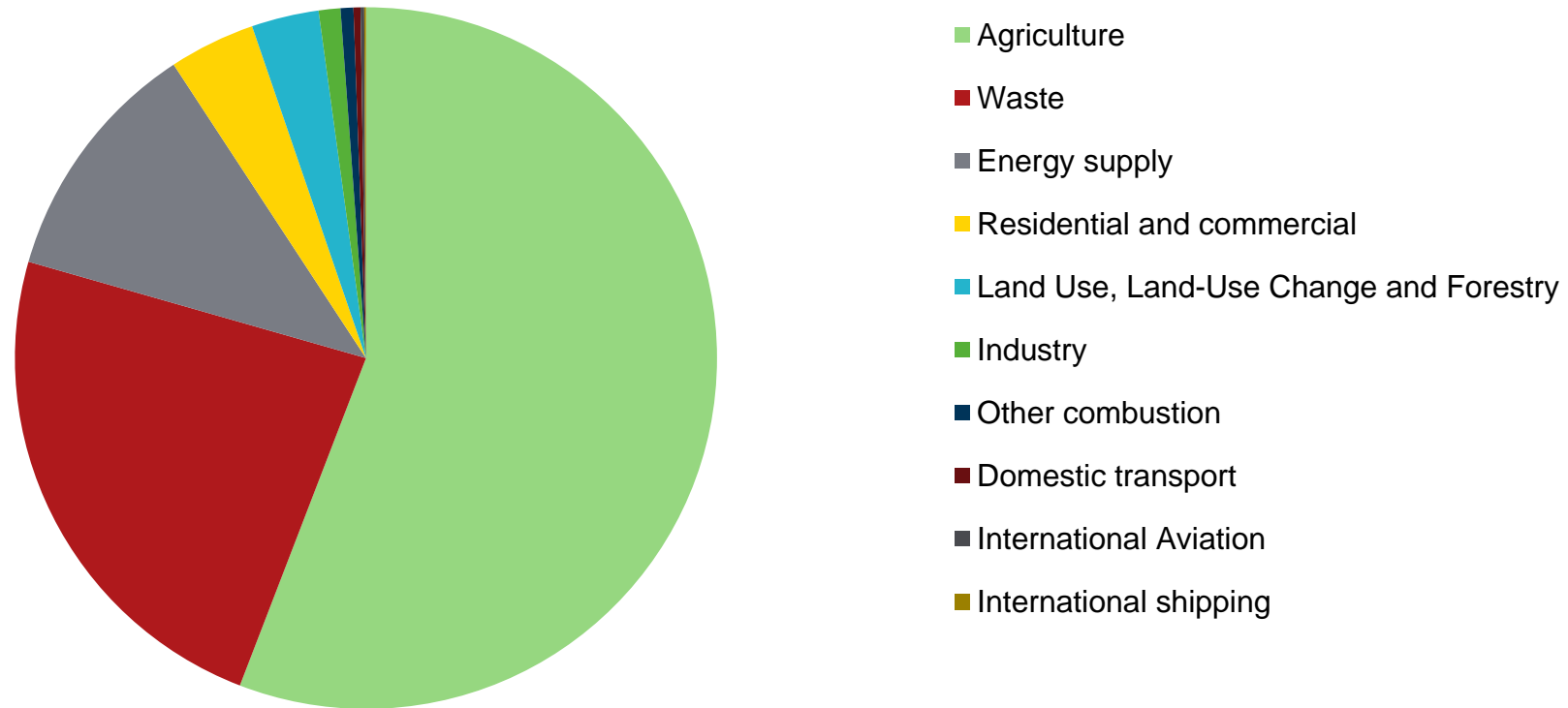
Shares by sector EU-27, 2021

[EEA greenhouse gases — data viewer — European Environment Agency \(europa.eu\)](https://www.eea.europa.eu/data-viewer/greenhouse-gases)

Prod-ID: DAS-270-en Published 18 Apr 2023

Emissions from agriculture

Methane

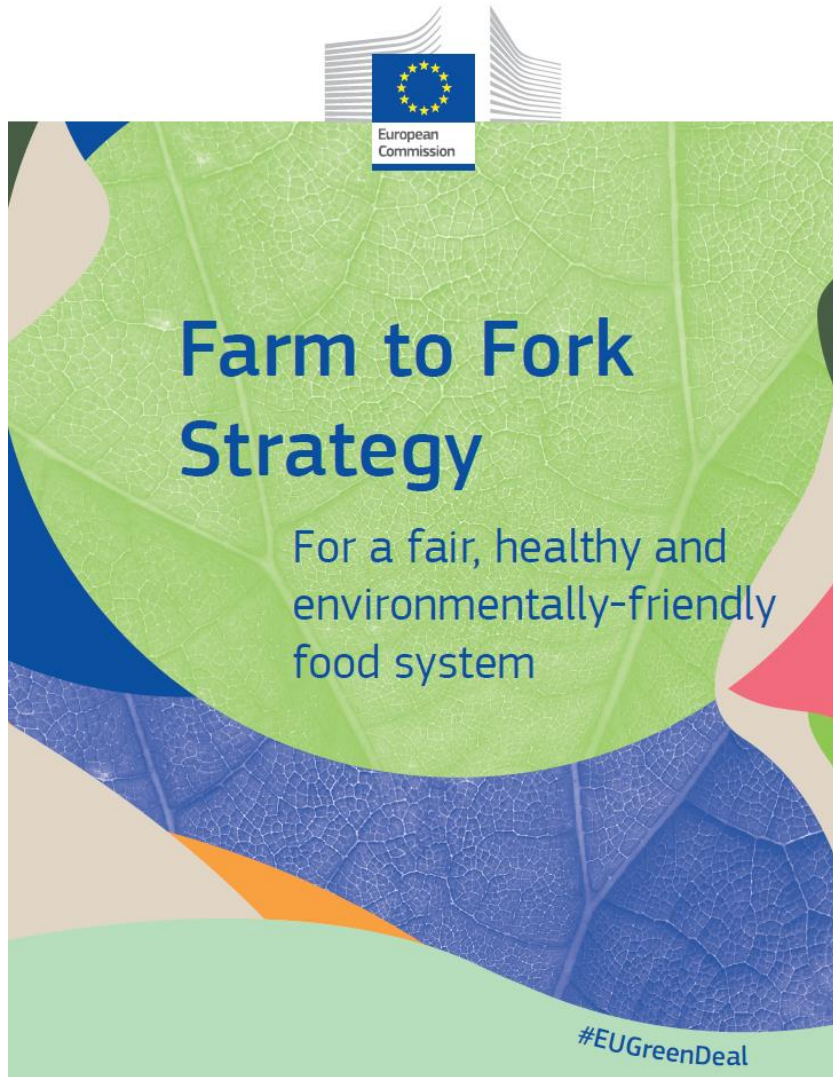


Shares by sector EU-27, 2021

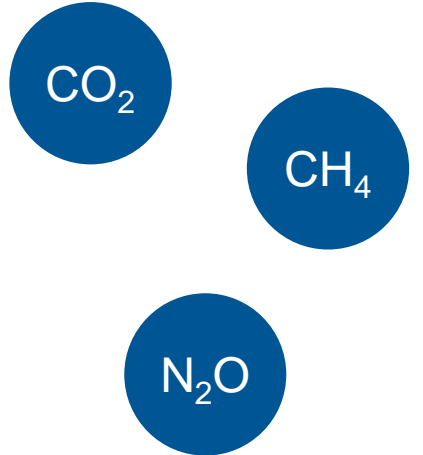
[EEA greenhouse gases — data viewer — European Environment Agency \(europa.eu\)](https://www.eea.europa.eu/data-viewer/greenhouse-gases)

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European Green Deal



Reduce net greenhouse gas emissions by at least 55% by 2030 compared to 1990.



Need

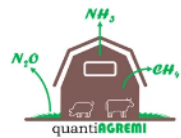
Accurate emission inventories

Currently large uncertainty

Improved quantification of GHG and NH₃ emissions

Reduce ecological footprint of agriculture

Goals



Develop a coordinated European measurement infrastructure

Reduce uncertainty of emission inventories

Implement clear mitigation policies

Assess effectiveness of reduction strategies

Help meet EU targets

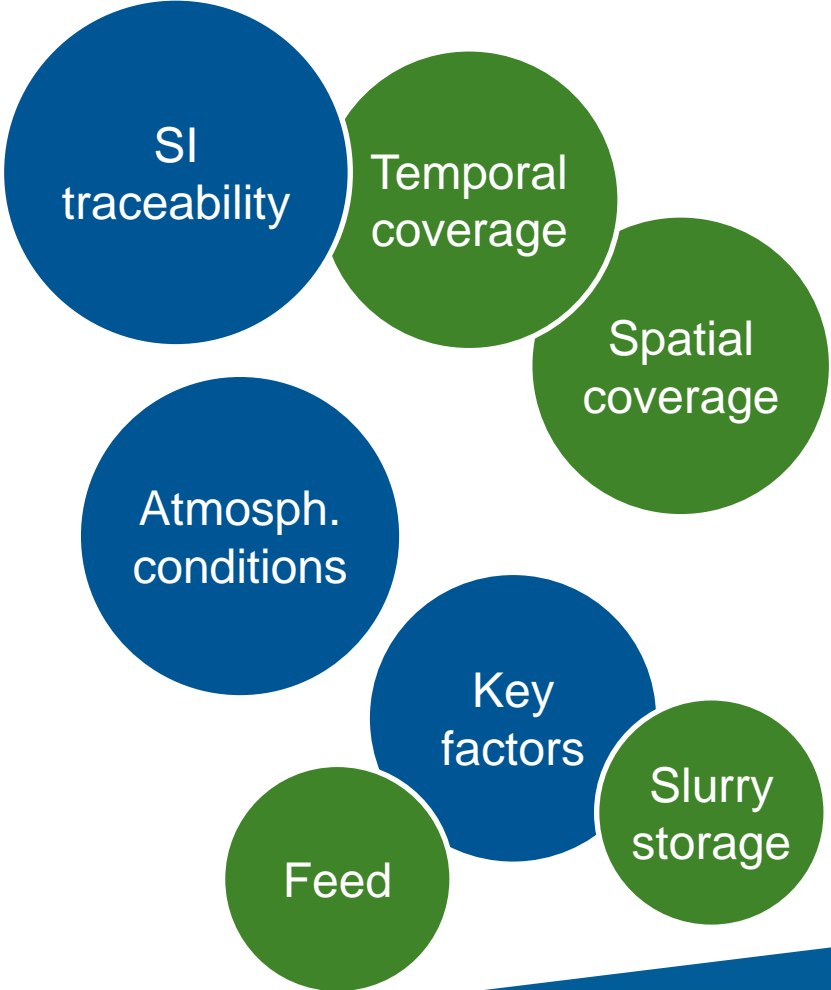
Goals

Provide reference gases

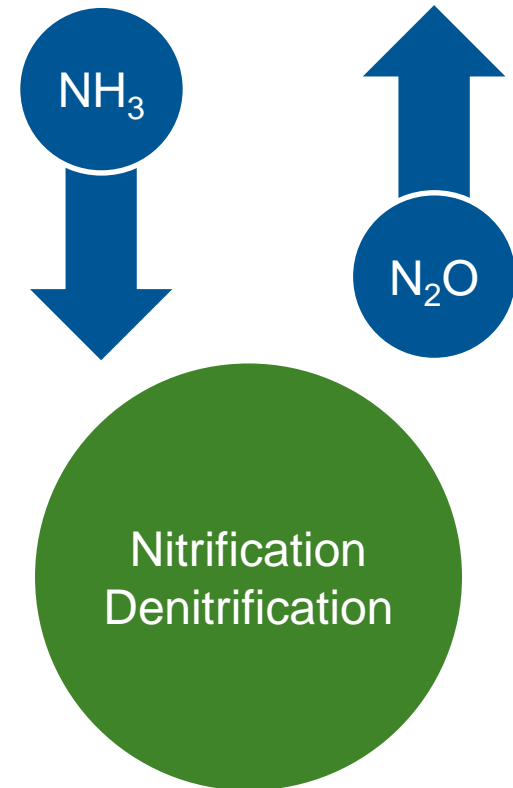
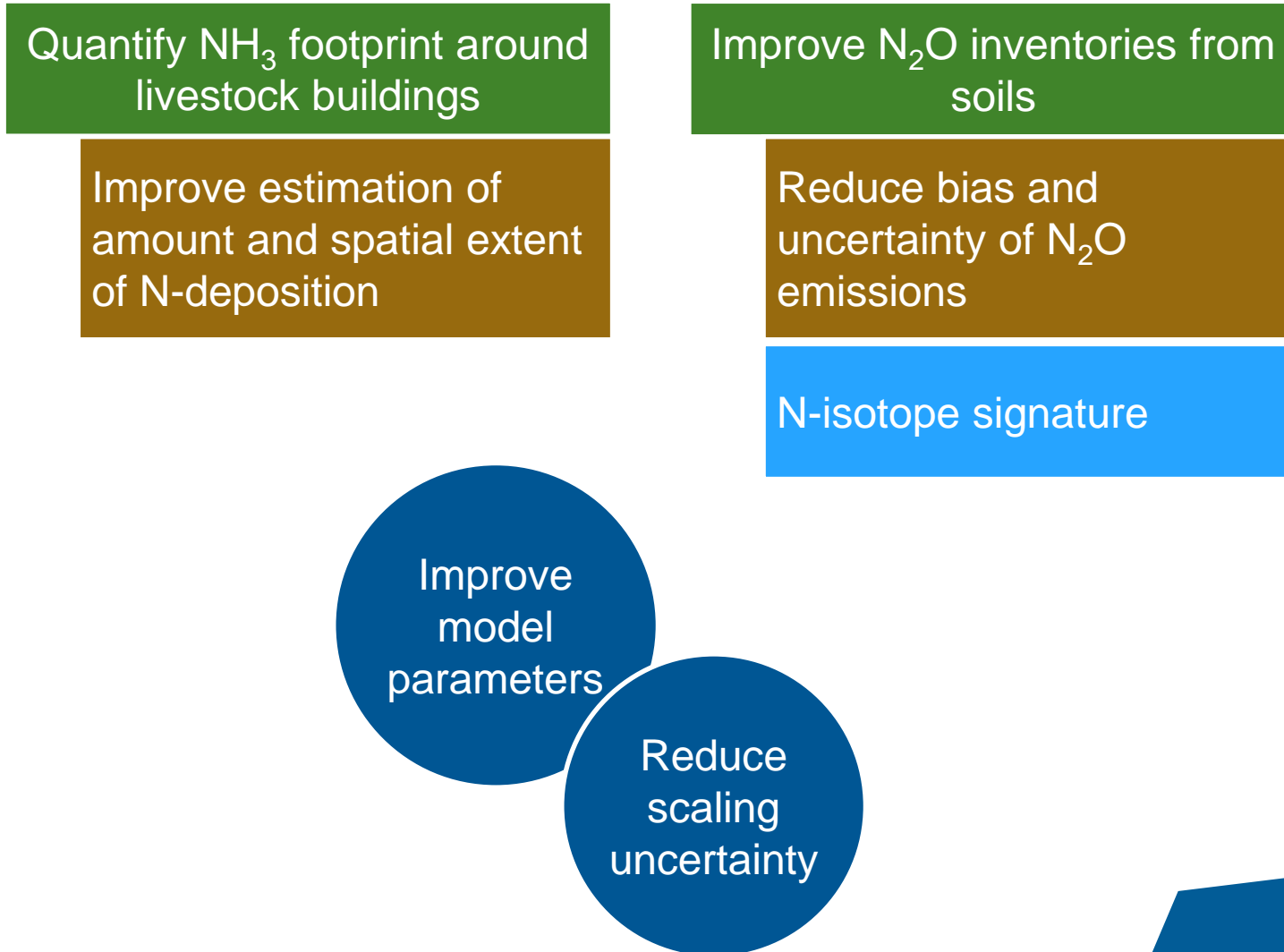
- Calibrate measurement devices in livestock housings
- Dry and wet
- Statically generated
- Dynamically generated

Improve measurement techniques

- Quantify NH_3 and CH_4 emissions with reduced uncertainties
- Low-cost, field-compatible sensors
- Measurement strategy
- Sampling systems



Goals



Outcomes

Good practice guides	Quantification of NH ₃ and CH ₄ emissions from livestock housings Emission monitoring techniques for CO ₂ , NH ₃ and CH ₄ characterisation Quantification methods for NH ₃ deposition and tracing of N deposition
Evaluation report	New and existing sensors for estimation of livestock emissions
Summary report	Key indicators, improved emission models and uncertainties
Papers	Improved models for N-loss, uncertainty reduction,...

Participants

 <small>LABORATOIRE NATIONAL DE METROLOGIE ET D'ESSAIS</small> LNE	 <small>CZECH METROLOGY INSTITUTE</small> CMI	 <small>Physikalisch-Technische Bundesanstalt Braunschweig und Berlin</small> PTB	 <small>TUBITAK UME</small>	 VSL
LNE 	CMI 	PTB 	TUBITAK 	VSL 
 VTT	 GASERA	 Institut Mines-Télécom	 INRAE	 <small>Karlsruher Institut für Technologie</small> KIT
VTT 	GASERA 	IMTelecom 	INRAE 	KIT 
 <small>LUONNONVARAKESKUS</small> Luke	 Senseair	 THÜNEN	 TNO	 WAGENINGEN UNIVERSITY & RESEARCH
LUKE 	Senseair 	TI 	TNO 	WR 
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Vaisala 	Empa 	NML at LGC 	METAS 	UKCEH 
 <small>Eidgenössisches Departement für Wirtschaft, Bildung und Forschung</small>				
 WBF-Agroscope				

Contributions of METAS

Generation of reference gases



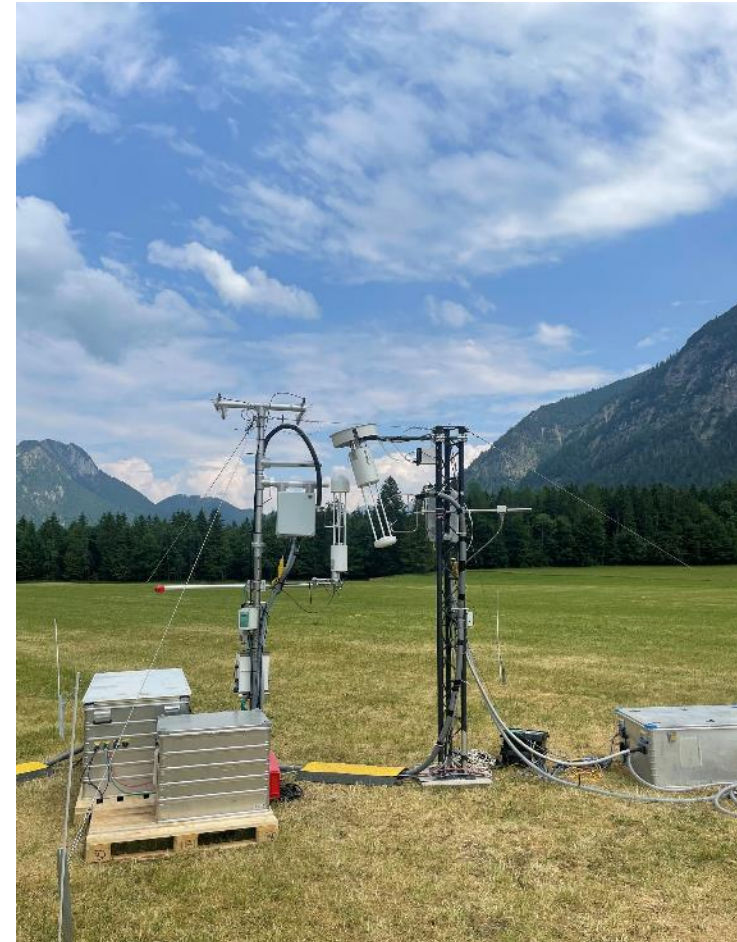
SilcoNert.

Contributions of METAS

NH₃-Release experiment



Johannes Fritsche, Graswang 2023



Johannes Fritsche, Graswang 2023

Contributions of METAS

Provide dry NH₃ reference gas mixtures

Provide moist NH₃ reference gas mixtures

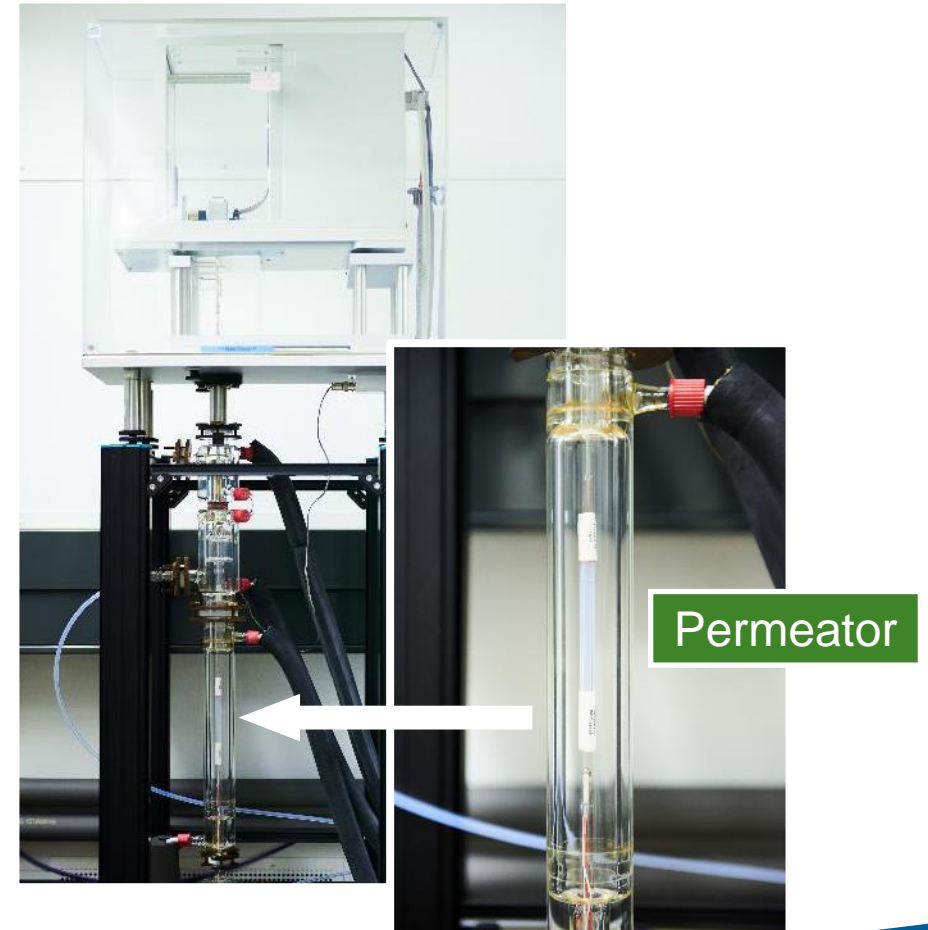
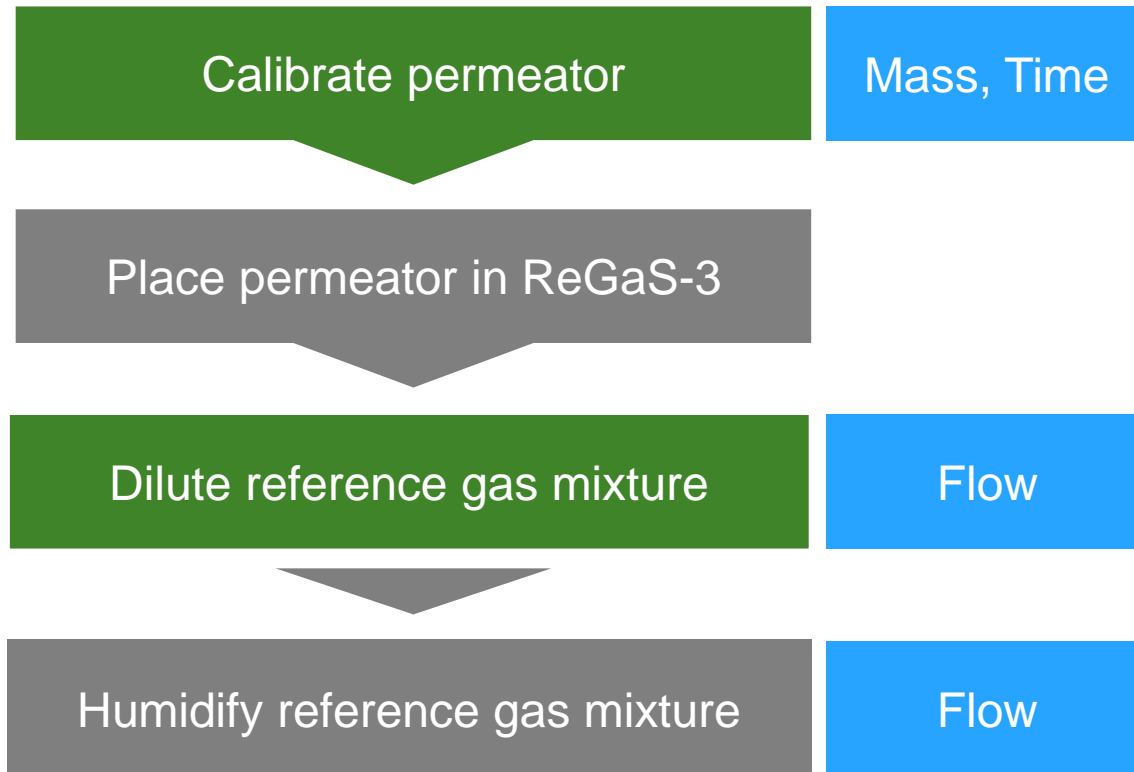
Provide measurement uncertainty budgets for NH₃ reference gas mixtures

- Calibration of instruments
- Measurement comparisons
- Interference testing
- Testing of filters and tubing
- Validation of new sensors

Provide tracer gas mixture (ethane instead of SF₆)

- In-situ emission measurements

Preparation of reference gas mixtures



Thank you for your attention!

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