Management measures to reduce GHG emissions

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SEGES Innovation

World Jersey Conference 2024

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Promilleafgiftsfonden for landbrug

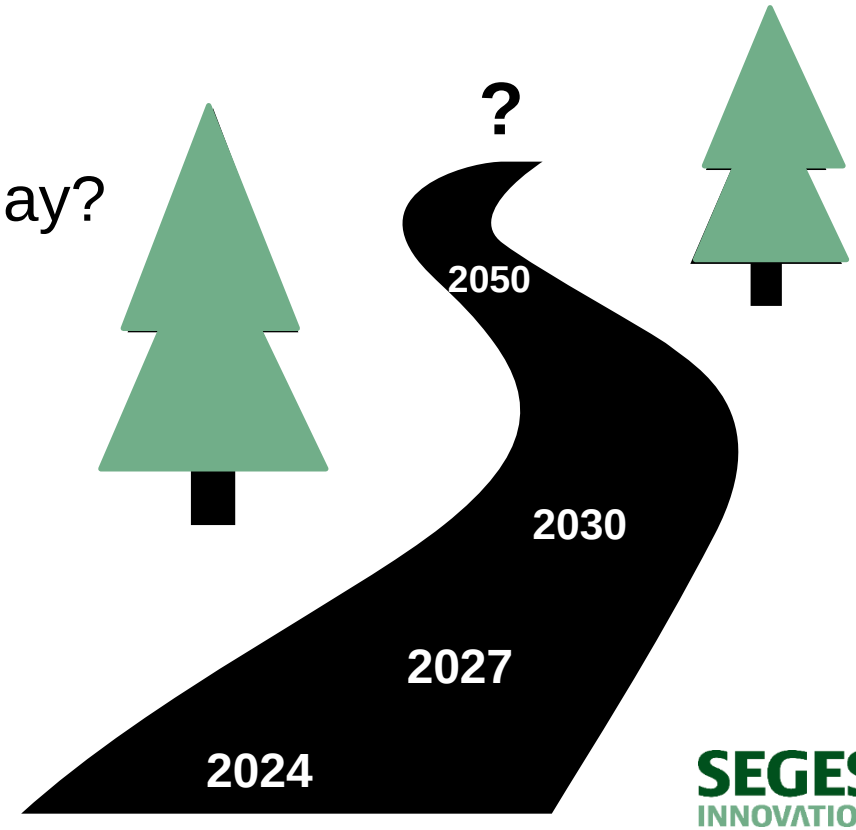
The climate battle in the cattle barn – solutions now and in the future

What is up and down in the climate talk when we talk cows?

What possibilities do we have today in the barn?

What opportunities do we have outside the barn today?

What do we think about the future?



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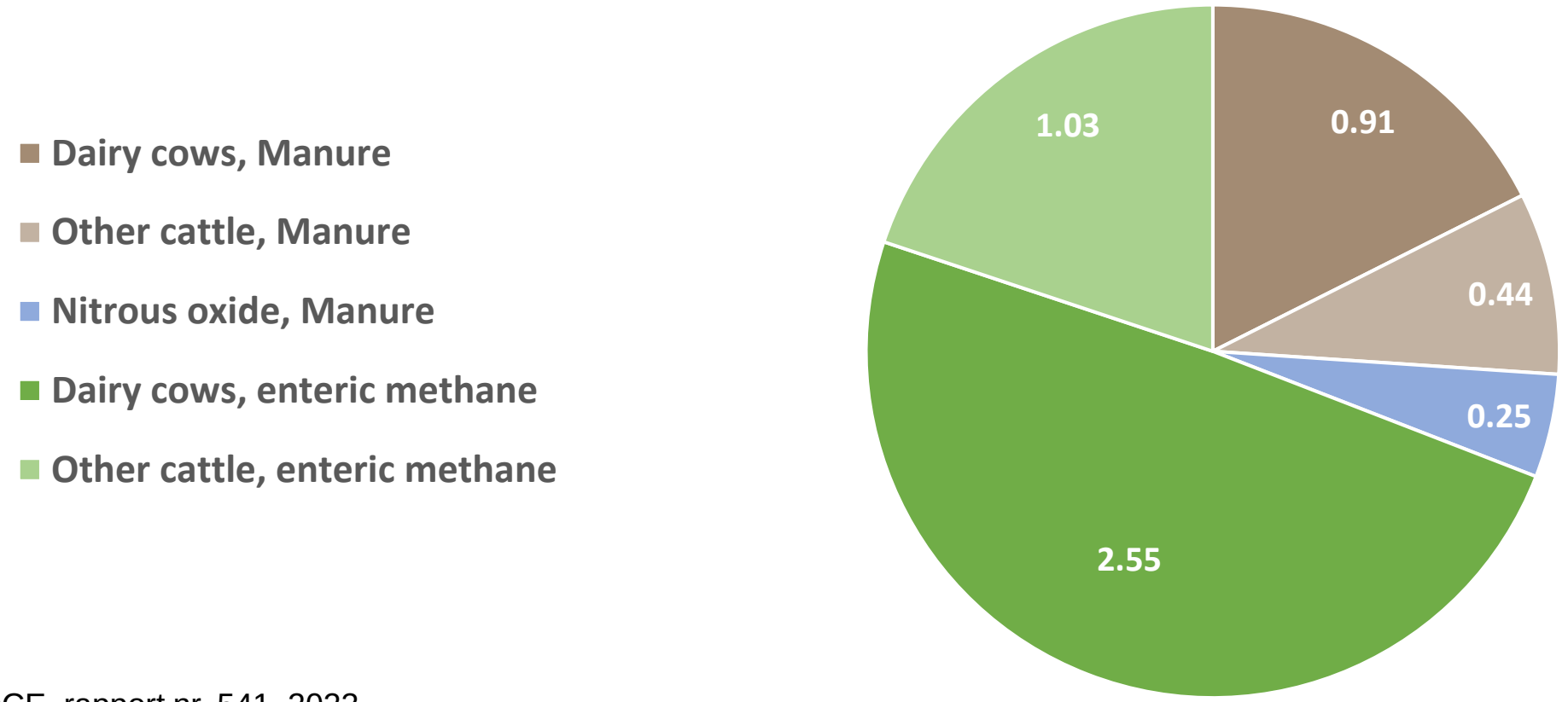
Greenhouse gas emissions from barn and storage from cattle in Denmark (5.18 million tonnes CO2e)



DCE, rapport nr. 541, 2023

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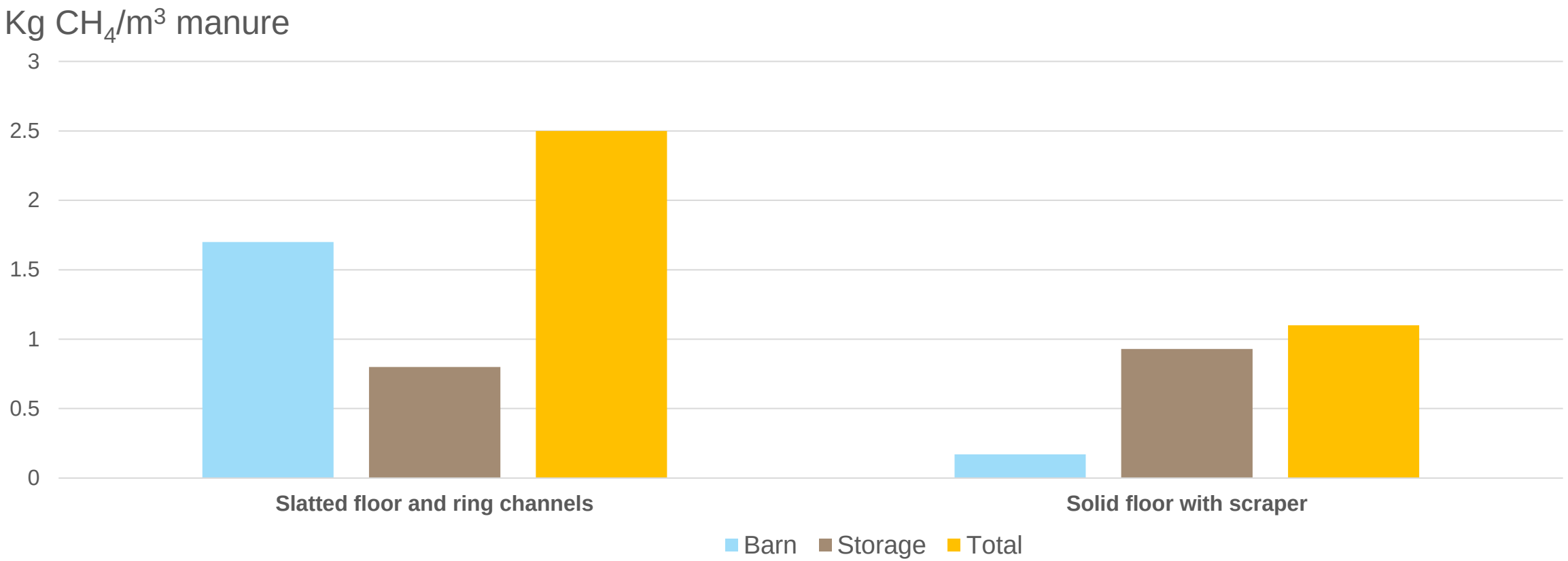
Methane from manure



(DCA report nr. 220, 2023)

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Desires for the cow barn from an environmental and climate perspective

Ammonia:

- As few m2 as possible with manure on the surface

Methane:

- As little manure in the barn as possible

Smell:

- As few m2 as possible with manure surface AND as little manure in the barn as possible

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Animal welfare and the environment/climate – can it go hand in hand?

- Fewer m2 per animal is not a solution...

We must therefore continue to think about:

- Dry floor, where the slurry is quickly removed
- We must collect everything we can - without disturbing the cow

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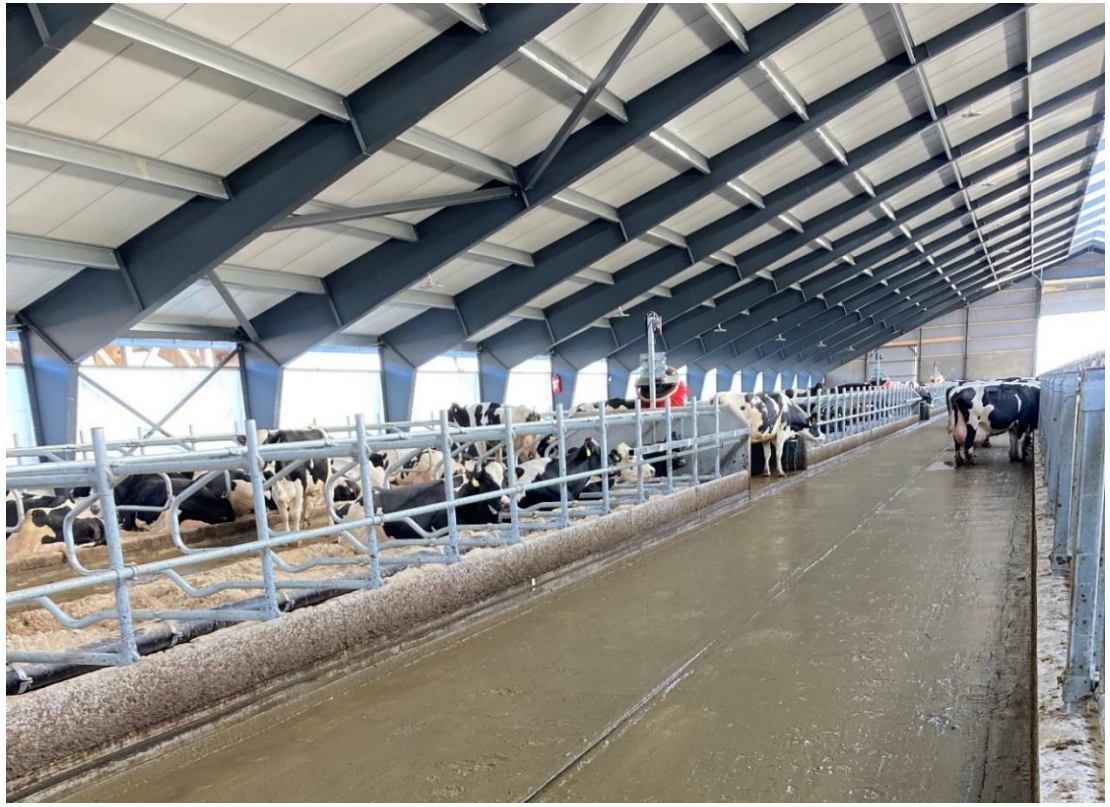
With cubicle systems, we are talking about drained solid floors with drains and scrapers

Dry floor, manure quickly away and out of the barn!



23 % less ammonia

~ 90 % less methane from manure in barn with scraping 12 x daily

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If there talk slatted floor and ring channels
Then we must talk about acidification

33 % less ammonia
70 % less methane from manure in barn and storage

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What options do we have outside the barn?

Emissions from tent-covered slurry tanks are currently measured

16 slurry tanks in the period 2020 to 2024

- 6 x pigs
- 4 x cattle
- 2 x low-dose acidification
- 4 x biogas

Ammonia
Methane
Nitrous oxide

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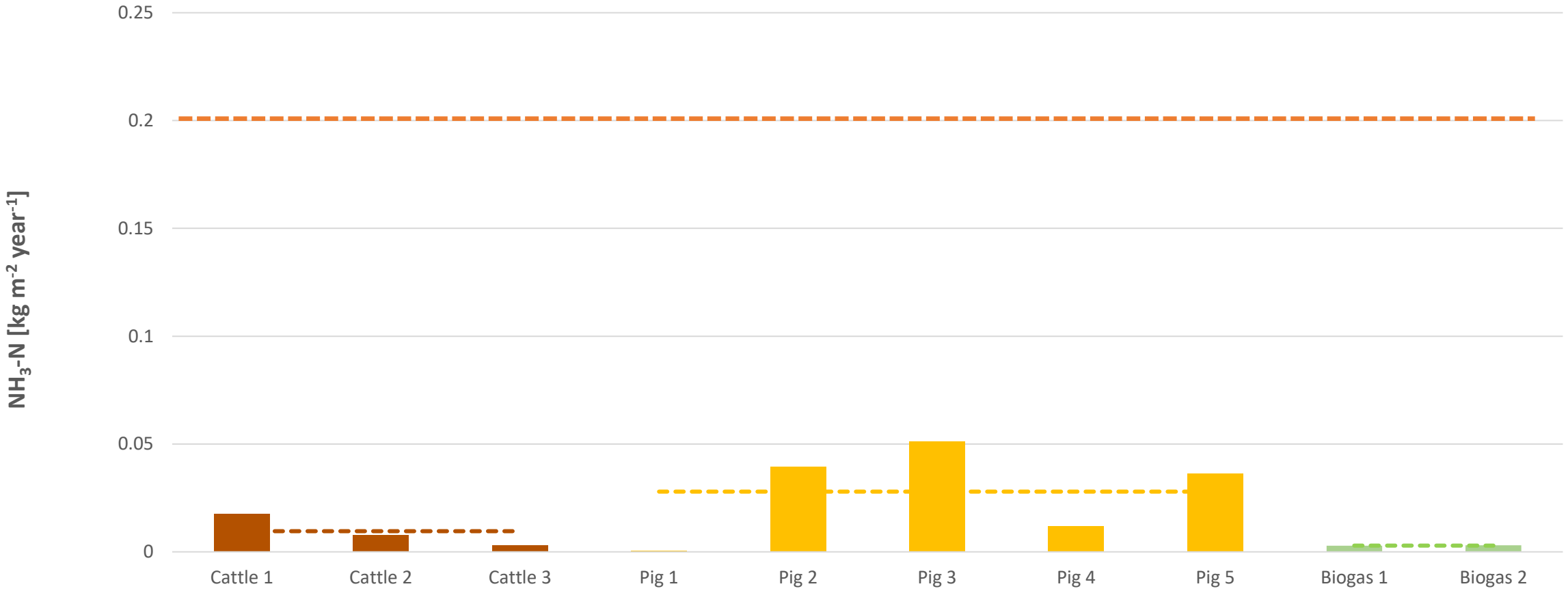
Measurement of ammonia in relation to standard numbers



(SEGES: Preliminary data)

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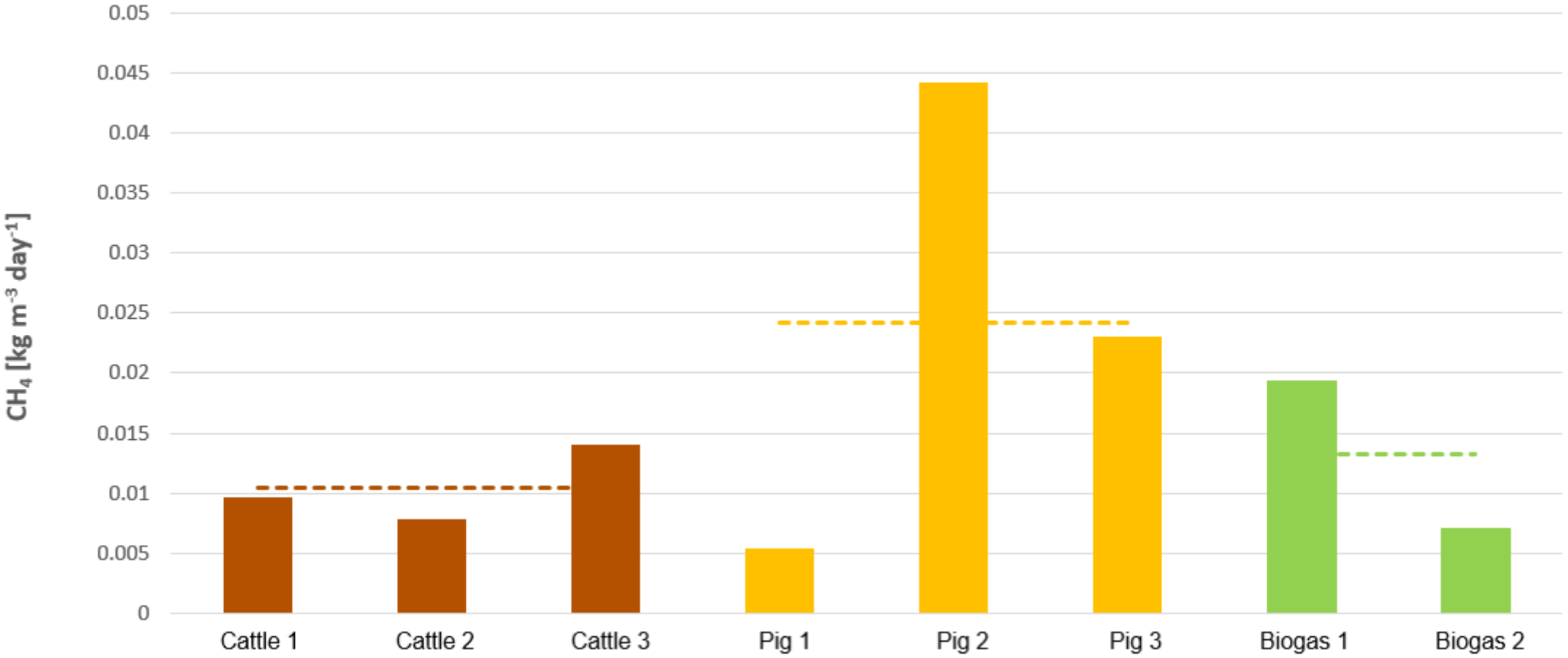
Measurement of methane from tent covered slurry tanks over a year



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Biogas

~ 30% of cattle manure in 2020
expectation: 55-60% of cattle manure in 2030

Short retention time in the barn and storage

Methane production in biogas plant

Storage in tent covered slurry tank

16 – 45 % less methane from slurry

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If there is sand in the cubicles, it must be sorted before biogas!

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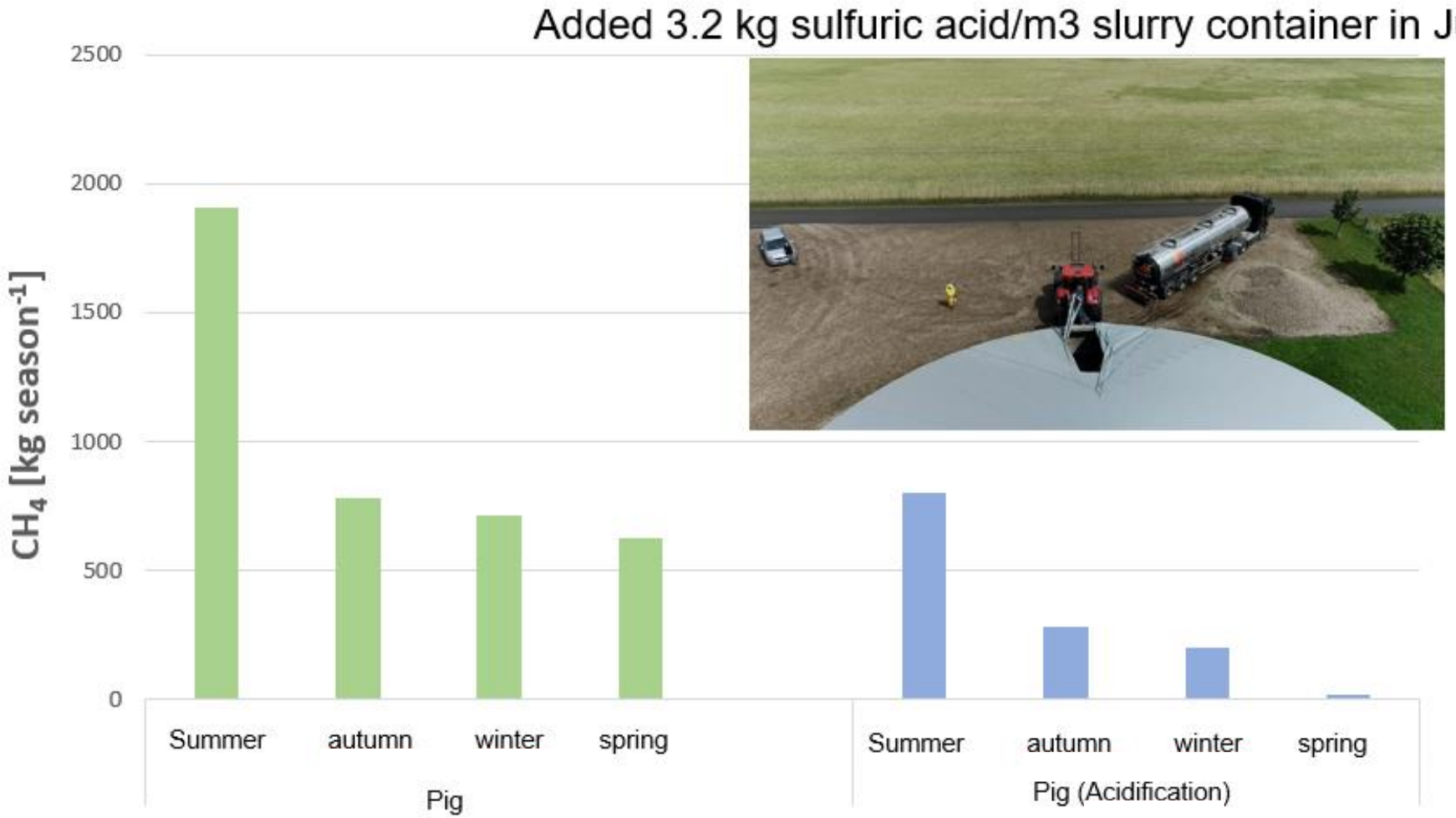
Low-dose acidification in storage (2500 m3 per container)



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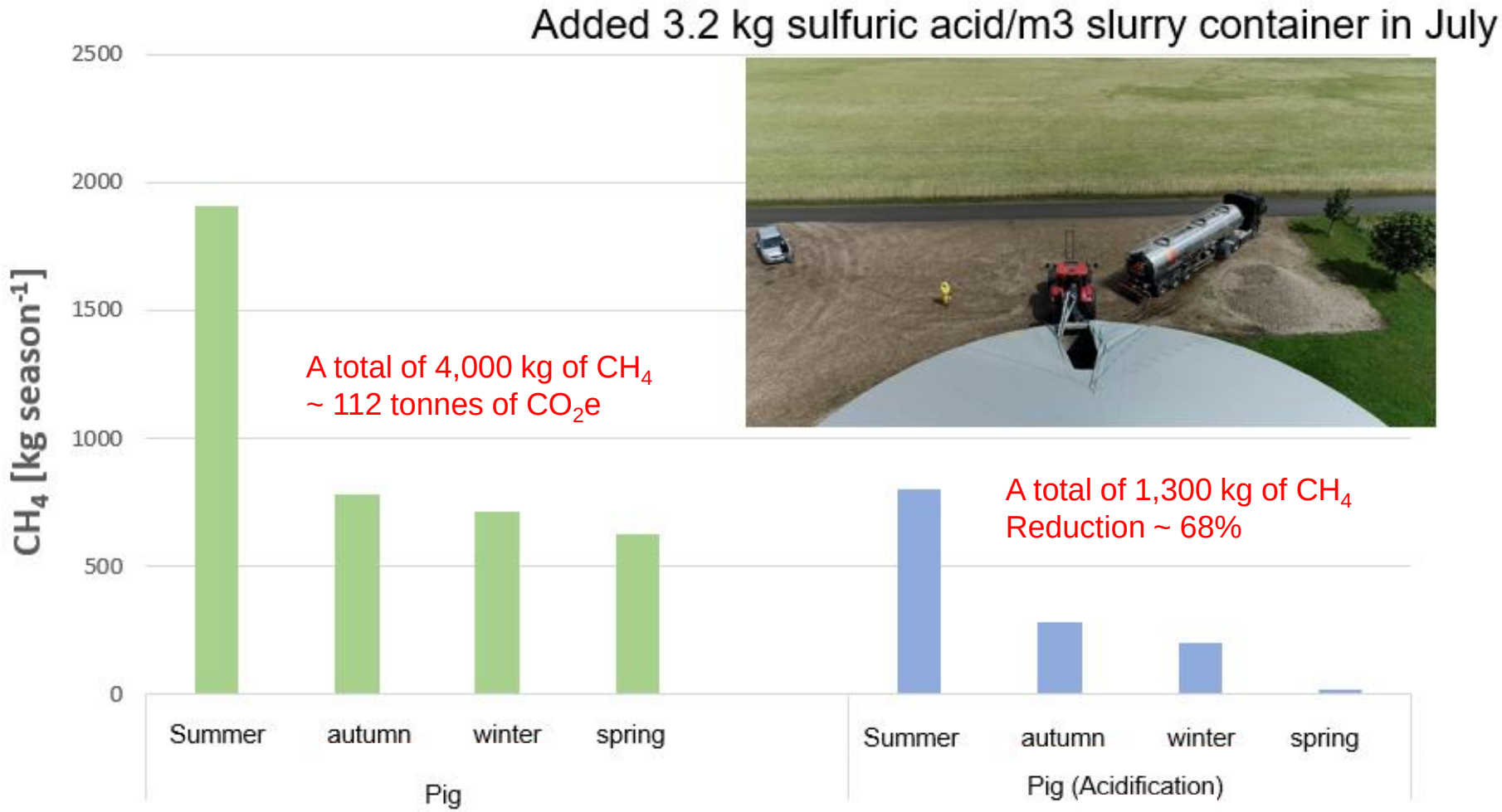

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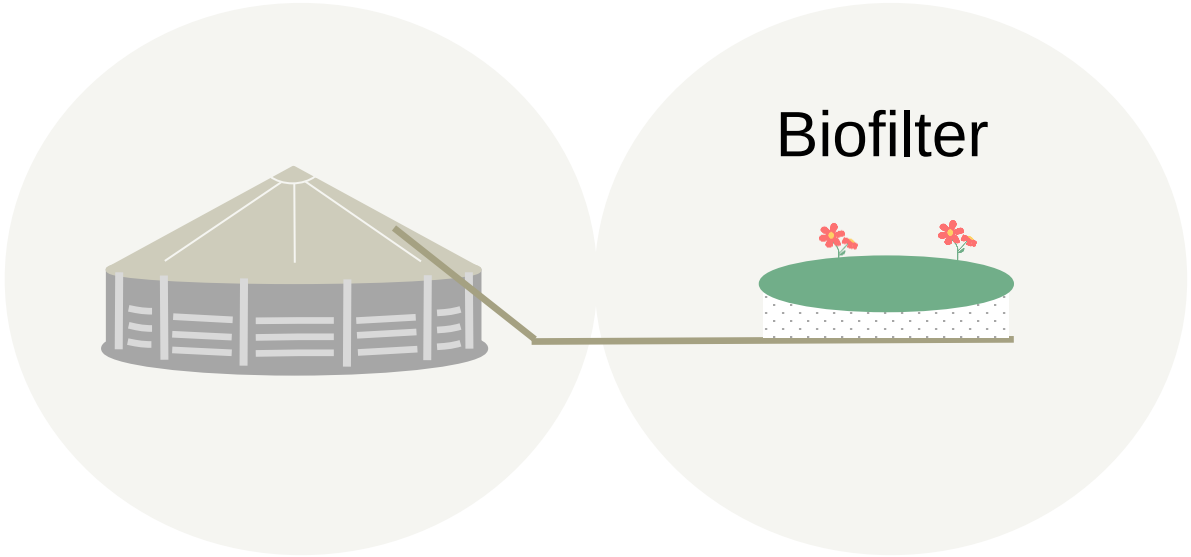
Compost filter



Biofilter at slurry tank

- Compost as a biofilter
- Tent cover

- Methane-consuming bacteria in the compost to oxidize methane to CO2

- Expected effect 60 – 70% methane reduction from storage

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Torch burning

Requires high methane concentration and therefore:

- Tent cover
- Possibly support gas during winter
- Methane is burned to CO_2
- Preliminary test at Aarhus University
- Expected effect 60-70% methane reduction from storage

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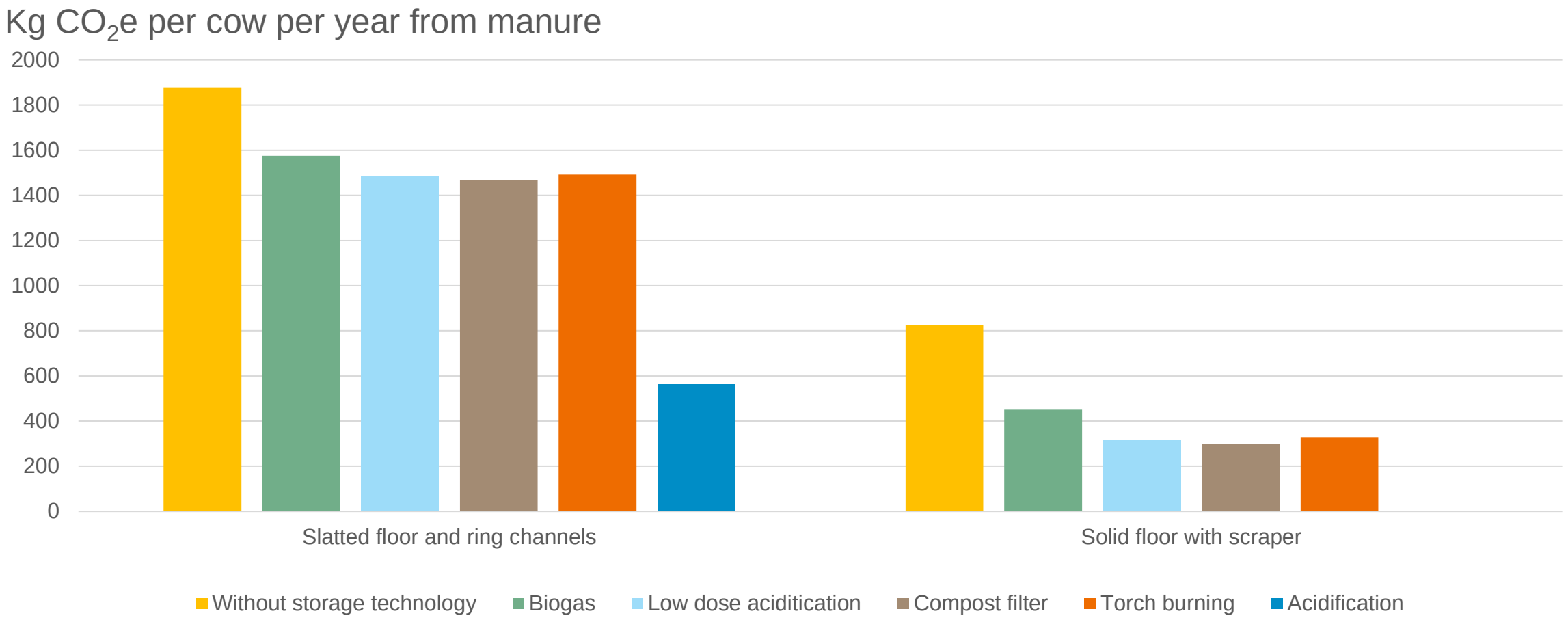
Effect of mitigation strategies on methane emissions from barn and storage



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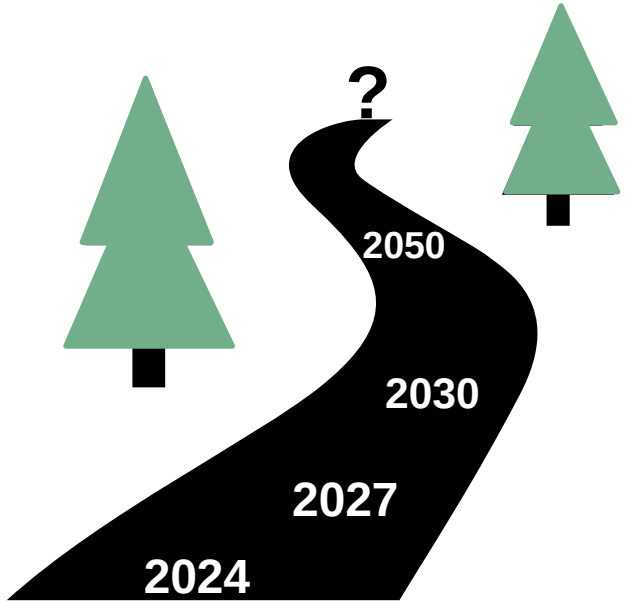
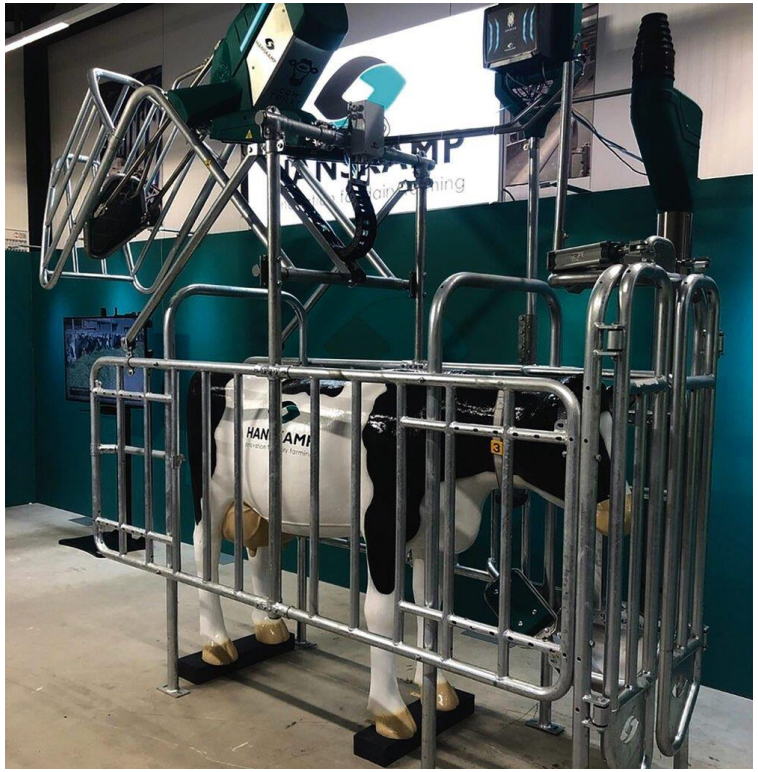
What can we do extra in the barn of the future?



- The easiest will be a cow toilet….
  - But is limited to urine….yet….



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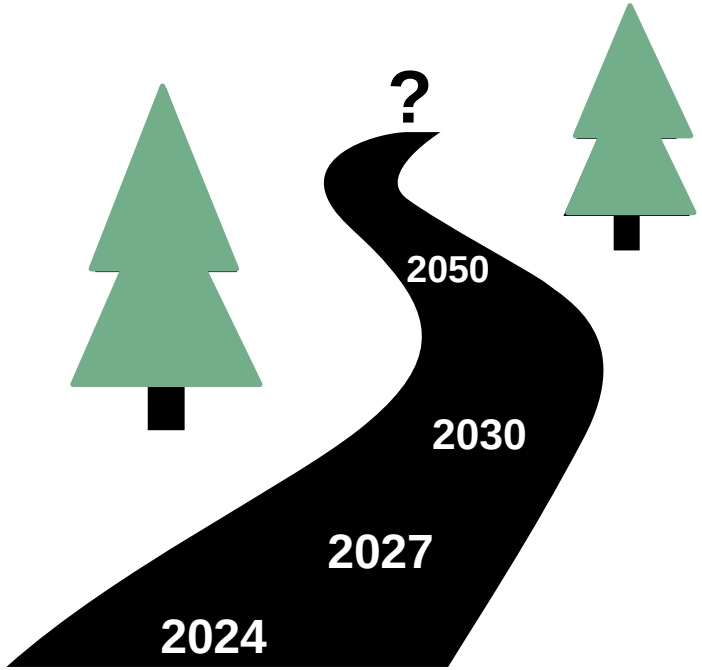

We still must have scrapers on the floor, but maybe we can make better use of our scrapers?
By adding water or another additive?

- Trials in 2024-2025 to measure the effect

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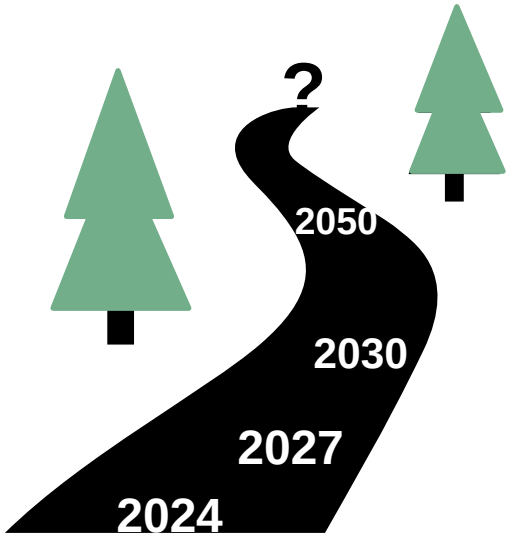
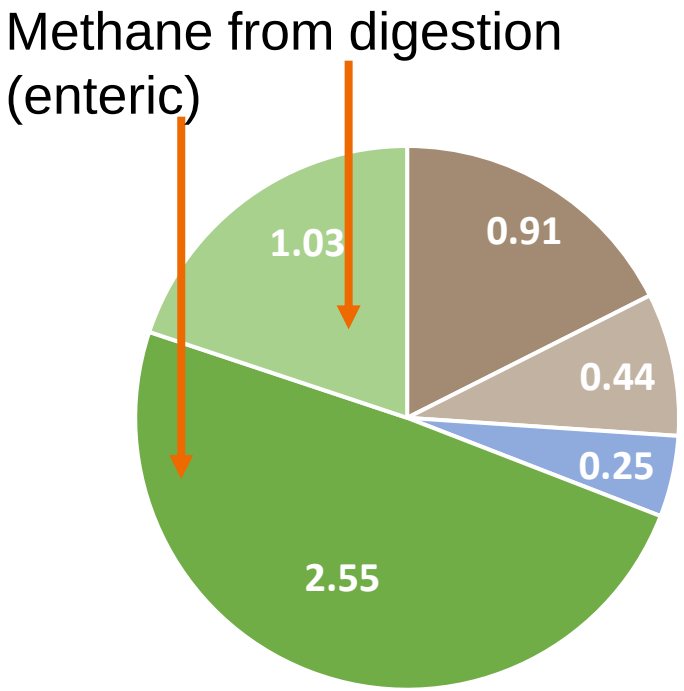
What can we do extra in the barn of the future?



The methane that comes from the cow's mouth - can we catch it?

Previous studies have been tied cows – we want free cows



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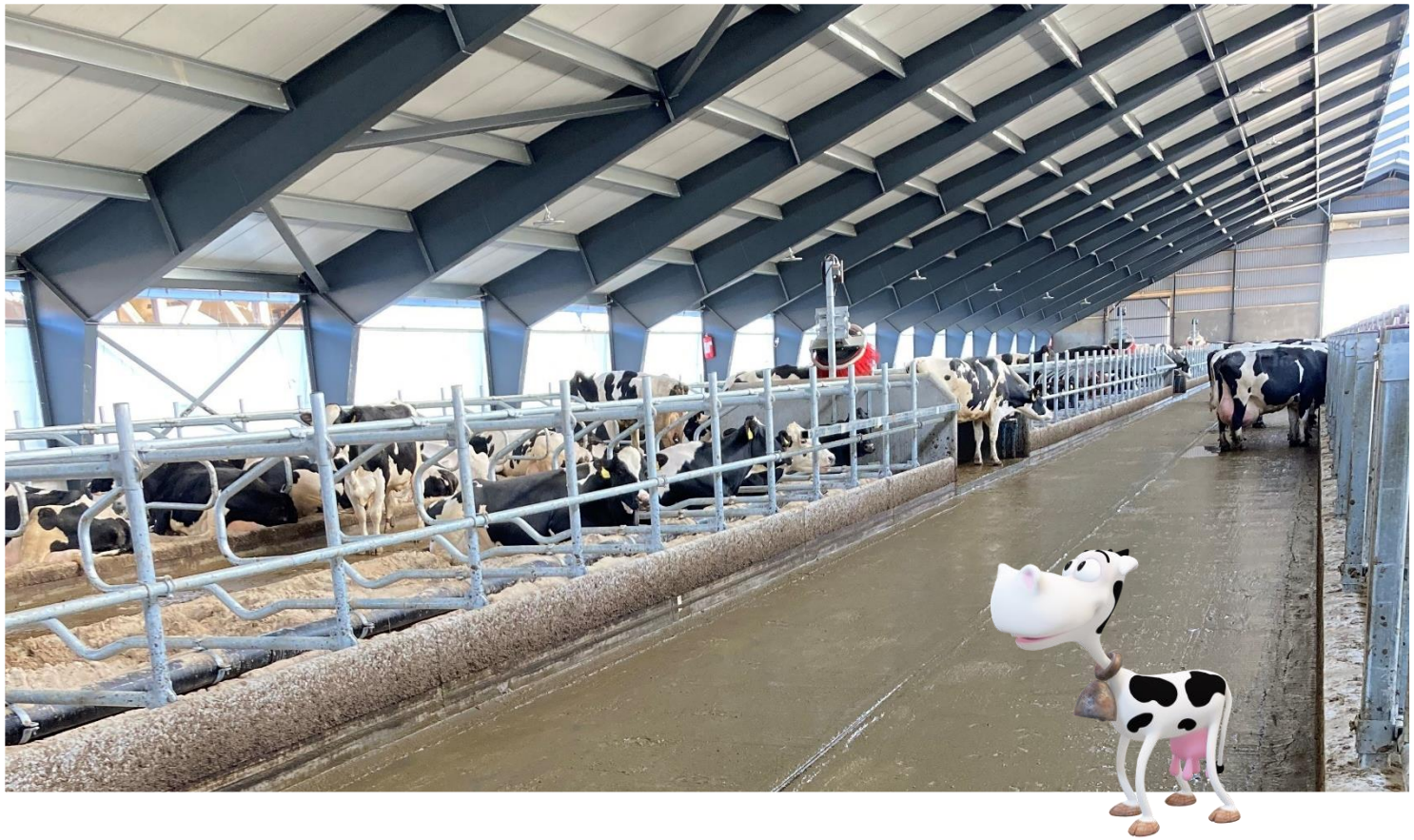
But how will it succeed?



WAY too open to catch anything

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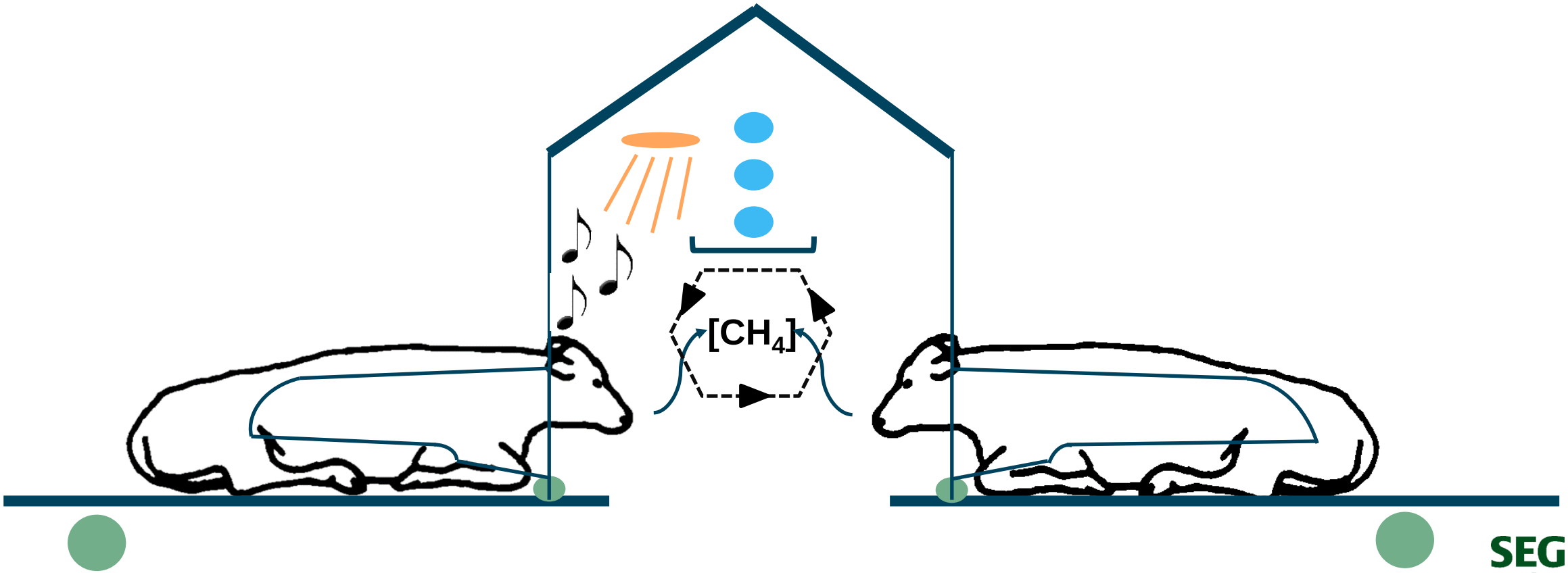
We have to look at the methane house - where the cow will voluntarily be



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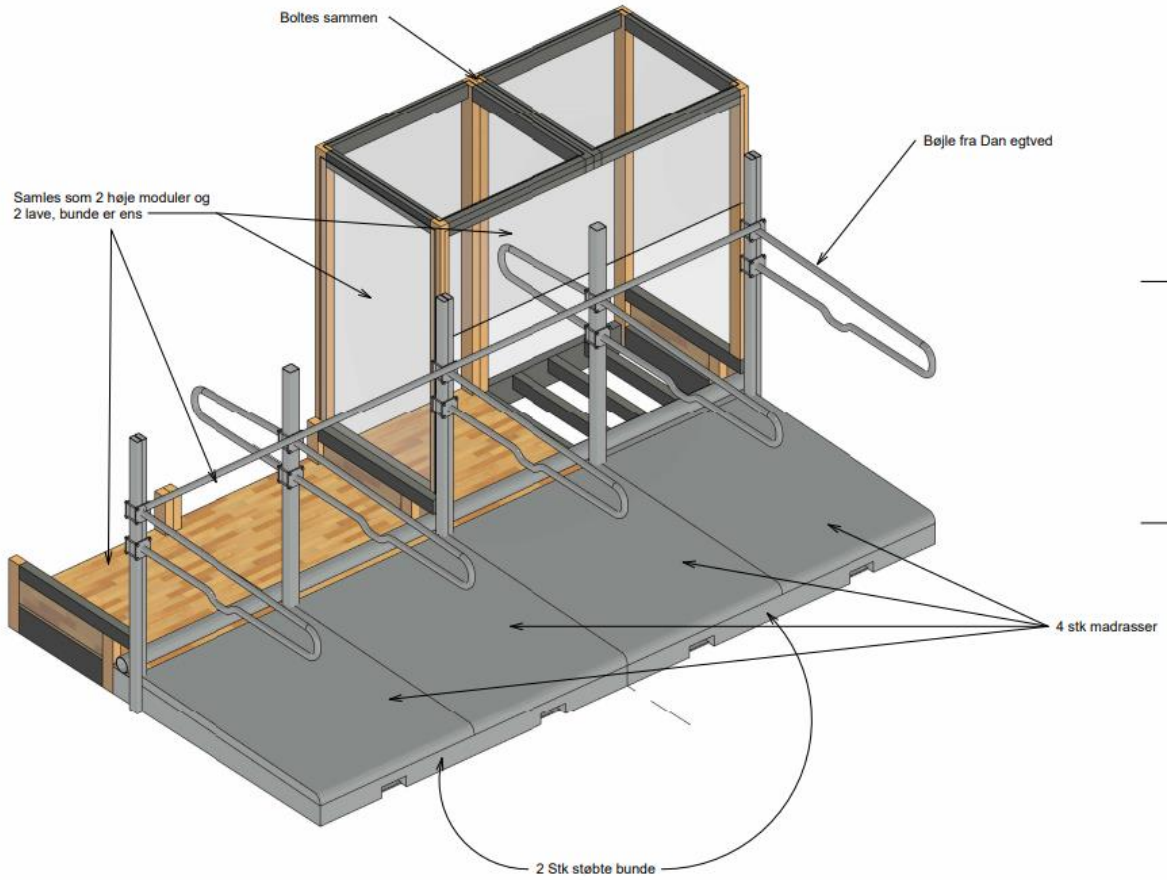
The methane house - in experimental setup



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Methane house in cubicles - the first test is the cows' use of the cubicles

The cows preferred cubicles with a methane house rather than cubicles without a methane house

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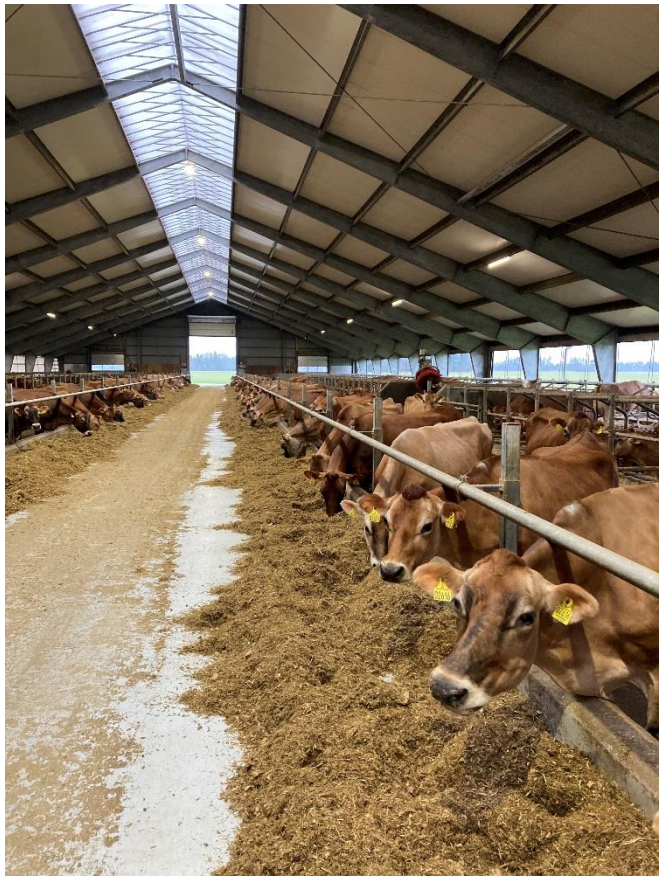
But can we collect from more hours than the rest time?



Can we develop a box for the feeding table?

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Summary - The climate battle in the cow barn

- We have some options
  - Slurry quickly out of the barn
  - We have good opportunities outside the barn

  - There may be more options for the future
    - Which, however, still requires some development.

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Thank you for your time☺

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