

atf

animal
task
force

A European Public-Private Partnership

12th ATF Seminar
17 November 2022

Dairy industry: use of an additive
to reduce enteric methane

Simon Bonnet
Bel Group



**Livestock emissions
and the COP26 targets**



Photo credit: Volker Hartmann/Getty Images

BeI: A UNIQUE GROWTH MODEL



Decarbonation as a driver of our performance



CONTRIBUTE TO LIMITING GLOBAL WARMING TO BELOW +1.5°C:

- Reducing the impact of our sites
- Optimise logistics
- Designing responsible packaging
- Reduce food waste
- Protecting and restoring ecosystems



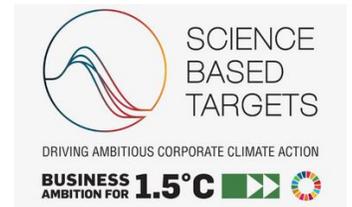
AN ACTION

Deployment in 2022 of the Bel Carbon Impact **steering platform**



A FIGURE

Target of 1/4 net reduction in GHG emissions across the value chain by 2035



What is our Bel Carbon Footprint?

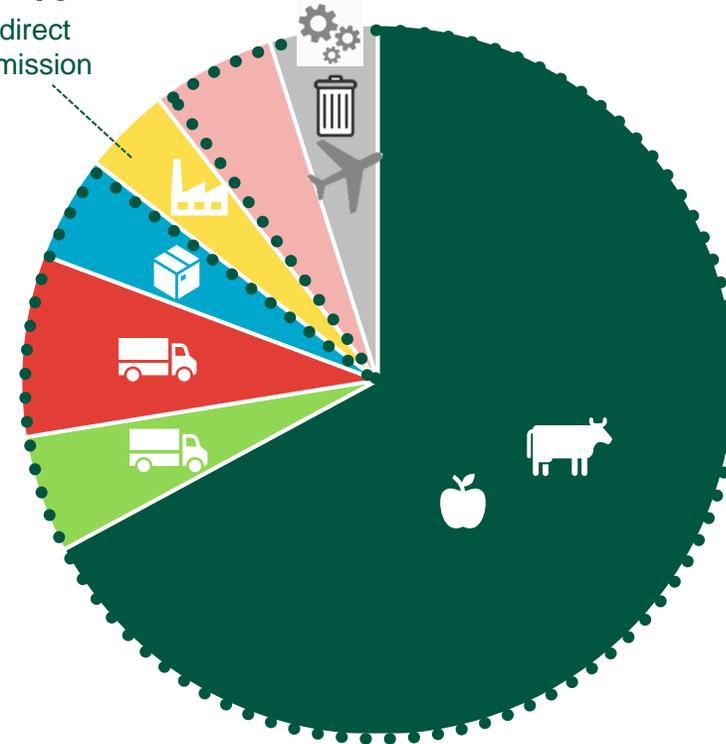


5 Mio T
CO₂ eq / y *



Total Group
CO₂ emission, split as :

4%
direct
emission



- Raw material
- Upstream Transport
- Downstream Transport
- Pack
- Plants
- Subcontractors
- Others

Factories represent **4%** of Bel global carbon footprint → **96%** of Bel Carbon footprint is not “directly” in our hands
The biggest impact comes from raw materials and especially farms.



Milk is @ the heart of Bel decarbonation strategy

9 dairy basins

>1,200 ML of Milk

About 1400 farmers
or collection centers

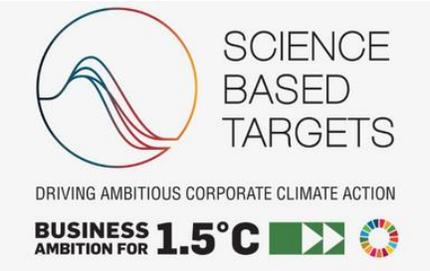


About 1,4 Mio T CO₂eq
in 2021

64% of the farms have
performed a carbon diagnostic

CAP'2ER®

CFT

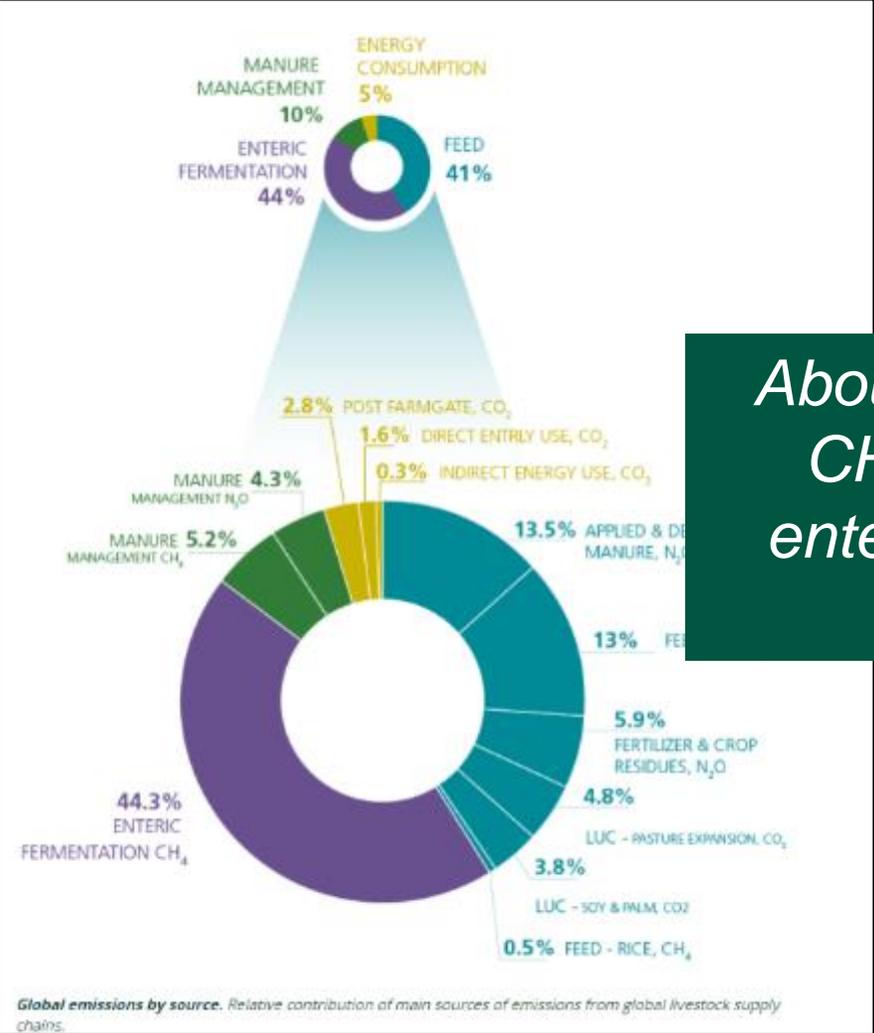


Reduce by 50% GHG coming from farm by 2035

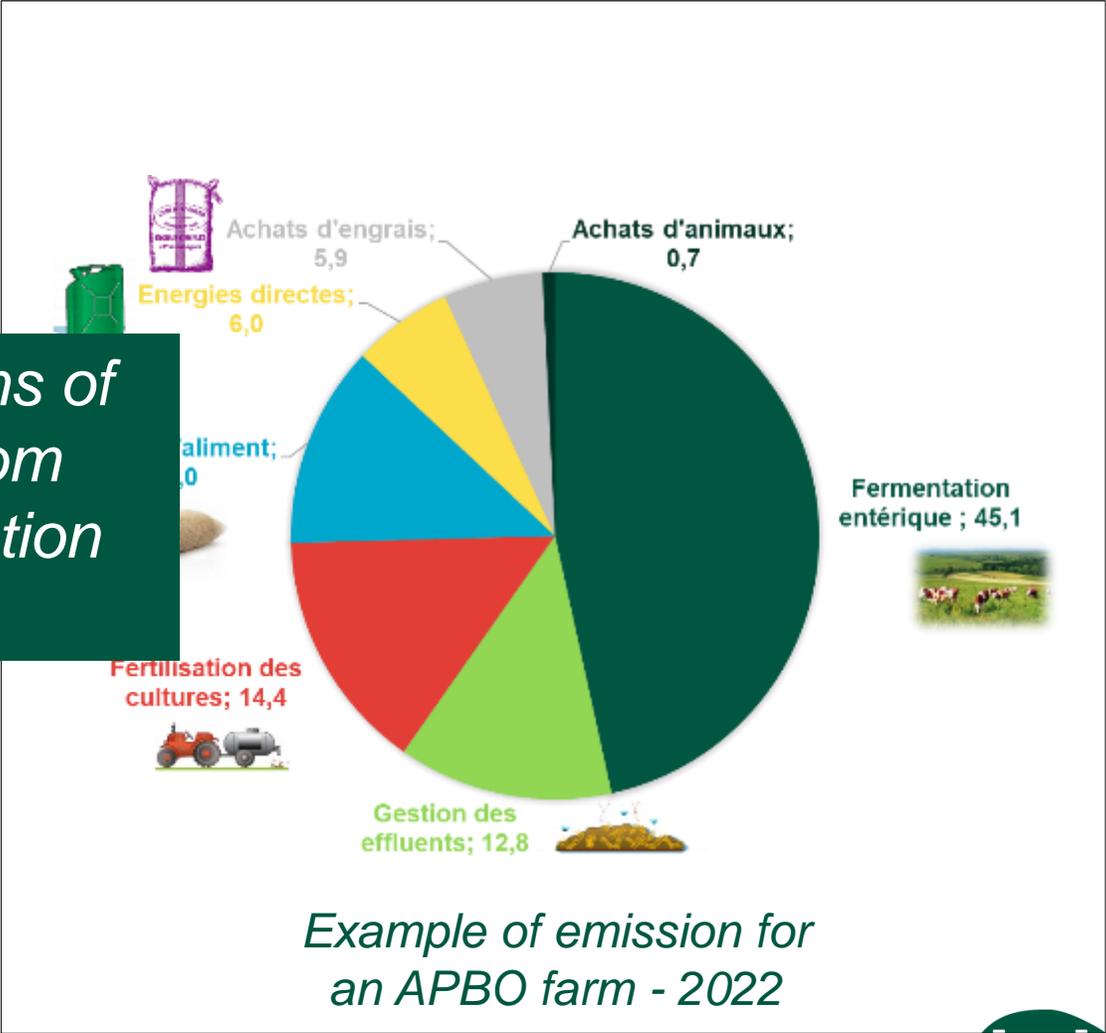
2021 Data



Emission factors are clearly identified @ farm level



About 25,000 tons of CH₄ coming from enteric fermentation every year



<https://www.fao.org/gleam/results/en/>



And first actions have started to reduce CO₂ emissions

	Levers	Frequency	Redu. M
Herd	Optimize first calving age	57%	-2,5%
Herd	Optimize milk production	54%	-6,0%
Herd	Reduce unproductive animals	41%	-4,9%
Energy	Install pre-cooling system	39%	-0,1%
Ration	Substitute soy by rapeseed	28%	-6,1%

Most levers activated in France



Cover crops in FR & USA

Local sustainable feeding & protein autonomy

Regenerative agriculture practices



Grazing management in Azores

And about enteric methane mitigation?



Many solutions on the paper...



An evaluation of evidence for efficacy and applicability of methane inhibiting feed additives for livestock

November 2021

Prepared for the Global Research Alliance (GRA) with the support of:

The New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC)

Climate Change, Agriculture and Food Security (CCAFS)

Agriculture and Agri-Food Canada (AAFC)

Climate and Clean Air Coalition (CCAC)

United States Agency for International Development (USAID)



Canada

New Zealand Government



Project Synthesis

Table 1. Summary of mitigation efficacy, applicability, co-benefits, and constraints of feed additives. Numerical and colour codes for efficacy parameters are explained in Figure 1.

Additive	Efficacy			Potential animal welfare risks	Potential food safety risks	Potential co-benefits	Production system applicability ⁴	Development needs
	CH ₄ reduction potential ¹	No. of academic papers ²	Confidence in efficacy ³					
3-Nitrooxypropanol	Very High	> 20	5	None known	None known	Improved feed efficiency.	TMR systems immediately. Grazing systems in future.	Validation in large-scale TMR systems required. Formulation for grazing systems.
Asparagopsis	Very High	< 10	1	Damage to rumen wall	Bromide & iodine residues in animal tissue/products	Improved feed efficiency.	TMR systems immediately. Grazing systems in future.	Validation in large-scale TMR systems required. Formulation for grazing systems.
Nitrate	High	< 20	4	Toxicity in non-adapted animals	None known	Can reduce need for urea supplementation in animal feed.	TMR systems immediately. Grazing systems in future.	Validation in large-scale TMR systems required. Formulation for grazing systems.
Essential Oils	Low	< 20	2	None known	None known	Improved milk productivity (limited evidence & indication of reduced body growth).	TMR & grazing systems (where supplements are administered)	Peer reviewed studies of mitigation potential and productivity within TMR & supplement systems.
Saponin	Low	< 15	1	None known	None known	Improved protein supply by protozoa control.	TMR & grazing systems (where forage crops containing saponin are utilized)	Further research into CH ₄ reductions, productivity impacts & staoinn chemistry required.
Tannins	Low	< 15	2	None known	None known	Shift from urine to faecal excretion of nitrogen reducing risk of N ₂ emissions.	TMR & grazing systems (where forage crops high in tannins are utilized)	Tannins may have a stronger role in forage-based mitigation than as feed additives.
Monensin	Low	< 20	5	None known	None known	Improved weight gain. Reduced risk of bloat & acidosis.	TMR & specialized grazing systems	Few needs – already a widely used product.
Microalgae	Low	< 5	1	None known	None known	PURFA levels in meat improved. Enhanced antioxidants in food products.	TMR & grazing systems (where supplements are administered)	Microalgae supply dependent on use in renewable energy sector.
Biochar	Low	< 5	1	None known	None known	Toxins & heavy metals absorption prevention in animals. Enhanced soil quality when excreta is applied to soils.	TMR & grazing systems (where supplements are administered)	Engineering of an acidified biochar required to achieve adequate efficacy.
Bacterial Direct Fed Microbes	Low	< 15	2	None known	None known	Improved productivity (though inconsistent). Improved calf health. Reduced incidence of E.coli in manure.	TMR & grazing systems (where supplements are administered)	Development of high efficacy bacterial strains.
Fungal Direct Fed Microbes	Low	< 15	1	None known	None known	Improved productivity (+ 3% in milk observed). Improved feed efficiency.	TMR & grazing systems (where supplements are administered)	Development of high efficacy fungal strains.

But very few ready-to-use for the industry...



Many solutions on the paper...



The image shows the cover of a report. At the top, there is a dark blue header with logos for the Global Research Alliance, New Zealand Agricultural Greenhouse Gas Research Centre, CGIAR, and CCAFS. Below the header is a photograph of several brown and white cows in a grassy field. The title of the report is 'An evaluation of evidence for efficacy and applicability of methane inhibiting feed additives for livestock'. Below the title, it says 'November 2021'. At the bottom of the cover, there are logos for the Climate & Clean Air Coalition, Canada, New Zealand Government, and USAID.

GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES

NEW ZEALAND AGRICULTURAL GREENHOUSE GAS Research Centre

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CCAFS

An evaluation of evidence for efficacy and applicability of methane inhibiting feed additives for livestock

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CLIMATE & CLEAN AIR COALITION
TO REDUCE EMISSIONS
FROM LIVESTOCK

Canada

New Zealand Government

USAID
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

- No negative impacts on farm management and animals
- Scientifically proved
- Recognized by public authorities
- Monitoring
- Existing cost model

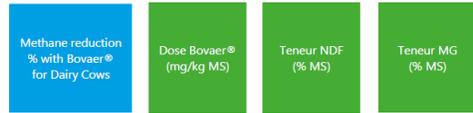


Bel and DSM partnership to test Bovaer®

Quel réduction du CH4 avec Bovaer® pour les vaches laitières Méta analyse publiée en avril 2022



*For Beef we will follow the same process and the meta-analysis will be completed later in 2022



$$\text{Dairy Formula \% Methane Reduction} = -32.36 - 0.282 \times (\text{Bovaer@dose} - 70.5) + 0.915 \times (\text{NDF} - 32.9) + 3.08 \times (\text{Fat} - 4.2)$$

Cette formule sera utilisée par les outils internationaux et nationaux comme Kringloopwijzer, Cool Farm Tool et Sustell pour calculer le % de réduction de méthane

[1] E. Kebreab, A. Bannink, E. M. Pressman, N. Walker, A. Karagiannis, S. van Gastelen, J. Dijkstra, A meta-analysis of effects of 3-nitrooxypropanol on methane production, yield and intensity in dairy cattle, 2022, submitted for publication.



A clear and scientifically validated formula to estimate methane reduction:

Its reduction depends on:

- Bovaer® dosis
- NDF: neutral detergent fiber of the ration
- Lipids of the ration

Feed additives

Where applicable, enter any feed additive that has been given to an animal category for the purpose of reducing enteric fermentation. The percentage of animal category should not sum to more than 100% for additives given to the same animal category.

1 X Remove

Animal category: Milk cows (lactating di)

Type: 3NOP Bovaer

Dose of additive per kg of feed DM: 53 mg / kg

NDF (% DM): 41.9 %

Crude fat (% DM): 3.6 %

Number of days: 365

Percentage of animal category: 100 %

GHG emissions

Total: 1,521,362 kg CO2e

Category	Percentage
Grazing	0%
Grassland fertilisation	0%
Feed production	31%
Enteric fermentation	48%
Manure management	13%
Energy & Processing	6%
Transport	1%

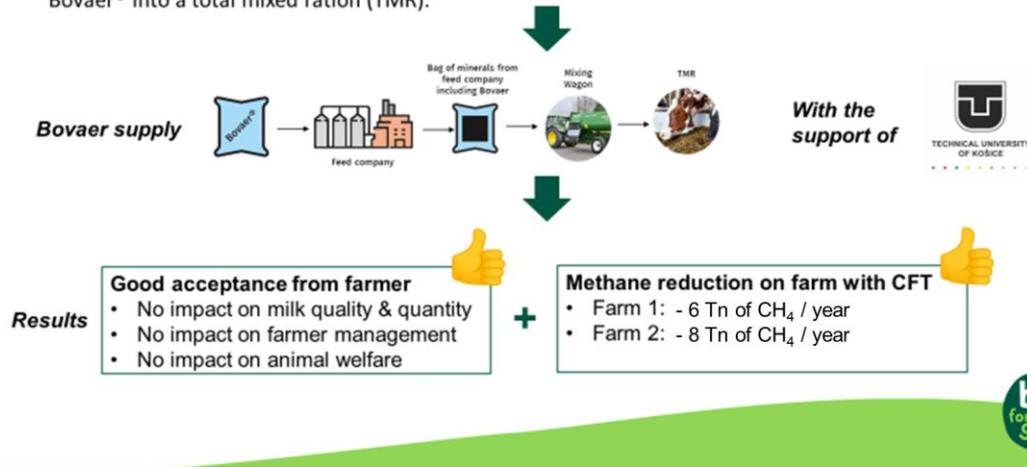
Since October 22, Bovaer® can be used in the CoolFarmTool and methane reduction can be measured in the carbon diagnostic



Leading to trials in Slovakia and France...

Outputs of the Slovakian trial...

- Bel and DSM set up an on-farm demonstration of Bovaer® at two farms in eastern Slovakia in 2022.
- The major objectives were to determine how well the farmers could mix the mineral feed containing Bovaer® into a total mixed ration (TMR).



... taken into account for the French trial

5 FARMS SELECTED

- 4 with robots & 1 with milking machine
- 5 different ways to mix and distribute cows ration



Start – December
End – February

with the support of



Publication of a monography by Idele about the results
Basis for integration of Bovaer into CAP2er (French carbon diagnostic tool)



=> And a roll-out in Europe today would mean...

A reduction of **4.000 tons of CH₄**



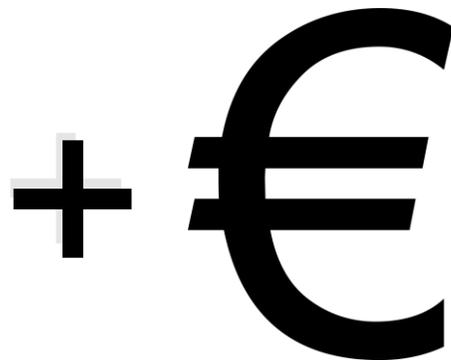
... so far, we need to keep in mind

Benefits

- Easy to add to the cows ration
- **Certainty of reduction**
- Instant reduction
- **No drawbacks** for the farmer from a production POV
- Push the farmer to better know its feeding system

Challenges

- Dose of Bovaer[®] is based of feed quality/ration which can be variable each month/year
- Feed analyse are necessary
- **No benefit beyond methane reduction**
- **100% extra-cost** with no additional advantage



Farmers
Dairy industry
Governments
Consumers



Multi-levers approach to reach 50% carbon footprint reduction!!!

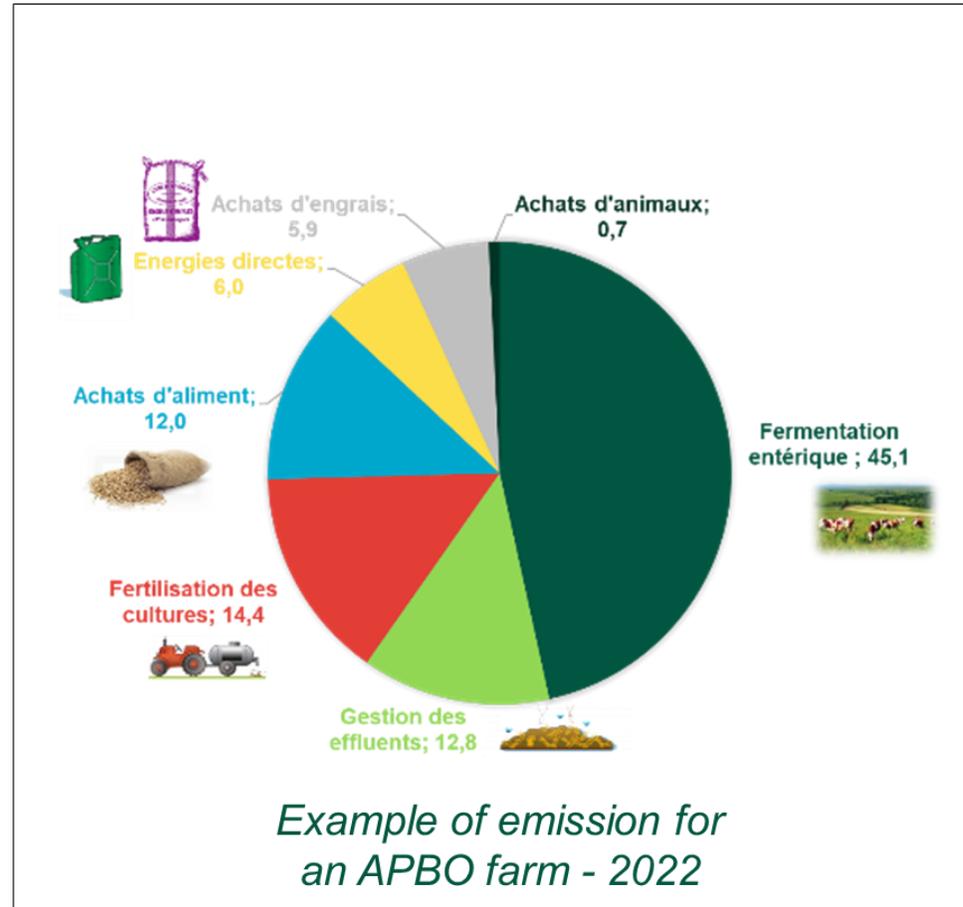
Herd management

Ration optimization

Protein autonomy

Regenerative agriculture practices

Etc.



25,000 tons of CH₄ coming from enteric fermentation



4,000 tons of CH₄ reduction with Bovaer®