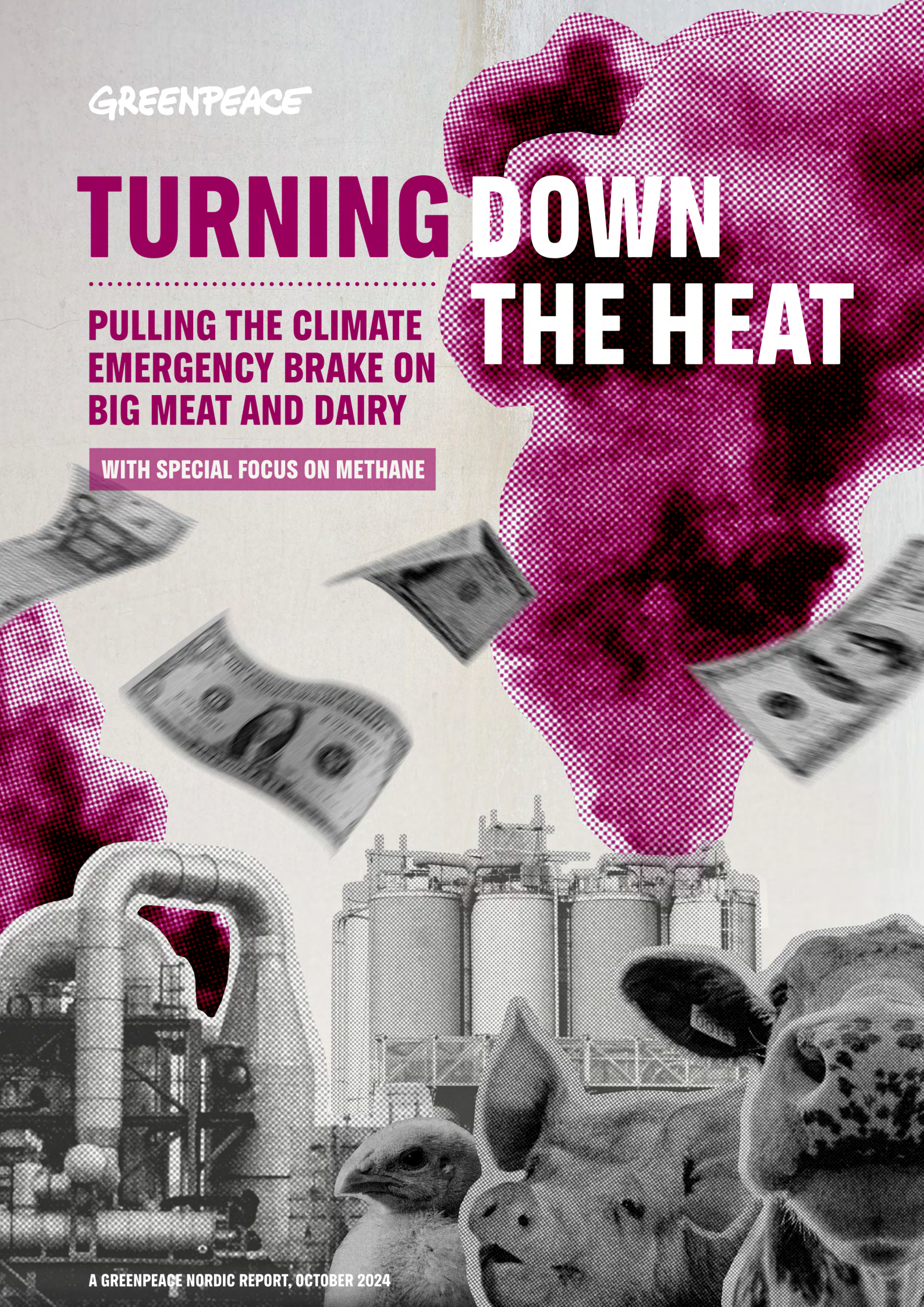
GREENPEACE

TURNING DOWN THE HEAT

PULLING THE CLIMATE EMERGENCY BRAKE ON BIG MEAT AND DAIRY

WITH SPECIAL FOCUS ON METHANE



A GREENPEACE NORDIC REPORT, OCTOBER 2024

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EXECUTIVE SUMMARY

The meat and dairy industry is sitting on a big dirty secret: its massive methane emissions. Between 1910 and 2015, there was an enormous increase in both the production and consumption of meat and dairy. Livestock is the single biggest source of human-made methane. Reducing methane associated with meat and dairy is therefore a critical lever that will influence how quickly or slowly the world heats up in the near-term. Cutting large amounts of methane through a prompt transformation of our meat and dairy sector could be key, together with a fossil fuel phaseout, for an iconic victory against catastrophic climate change.

The increase of livestock production represented one of the most important drivers of emissions increase in the global food system in the last decades. This report shows different pathways we could take between 2025 and 2050 as humanity to either speed up or slow down global heating through the meat and dairy sector, with profound consequences for the survival of millions of human lives and the resilience of all life on Earth.

Modelling the UN FAO's business as usual scenario for the future of food, our findings show that we would add an additional warming of 0.32°C by 2050 (compared to 2015 levels) from the meat and dairy sector alone (see Section 1 & Figure 2) . Methane would be responsible for more than three quarters of this warming (Figure 3). Neglecting prompt action in this sector would mean increasing average global temperatures by an additional 0.16°C as soon as 2030 from meat and dairy expansion alone.

They may seem like small numbers, but when we're talking about climate change, each fraction of a degree of global warming will impact millions of lives and livelihoods. Scientists predict that each 0.3°C warming we prevent by the end of the century could reduce exposure to extreme heat for 410 million people. Each 0.1°C of warming we prevent could mean that around 2% less ice mass on global glaciers will melt, significantly improving water availability, reducing sea level rise and flood risks for millions of people in coastal areas.

THERE IS HOPE!

In this report we show how changes in overproduction and overconsumption of meat and dairy could avert such a scenario.

We include a 'Hopeful Projection' in which high- and middle-income countries reduce production and consumption of meat and dairy in line with the EAT–Lancet Planetary Health diet. This would lead to **0.12°C less warming by 2050** compared to business as usual, providing a 'cooling effect' on global temperature rise.* In effect it amounts to a 37% reduction in livestock related warming by 2050 compared to business-as-usual and could help slow planetary heating.** Prompt action by governments from high- and middle-income countries to shift away from industrial meat and dairy production in line with the EAT–Lancet Planetary Health diet gives us a real chance to slow down warming.

* 'Cooling effect' refers to the effect of reducing the rise of temperatures when compared to the resulting warming under a baseline livestock projection (due mostly to the short-lived nature of methane). It does not imply that global temperatures will actually fall.

** Projection 1 in Section 1 presents warming effects of livestock under (BAU) with population growth and projected increase in production/consumption of livestock set by FAO (2018a). Projection 2 is the "hope projection" presenting warming effects of livestock under conditions of same population growth but reduced livestock production and consumption in high- and middle-income countries in line with the EAT-Lancet diet guidance for planetary health.

Our results in Chapter 1 confirm that a more equitable and ecological approach to meat and dairy production and dietary changes through the *"shrink and share"* approach outlined in Greenpeace International's 2018 *"Less is More"* publication, constitutes effective climate change mitigation. It would mean high-consuming societies, mostly in high- and middle-income countries, would reduce their meat and dairy production and consumption, whereas low-consuming societies and low-income regions could increase their meat and dairy production and consumption levels[1].

But big meat and dairy corporations are standing in the way of these hopeful changes. And there is no apparent evidence that they are willing to allow a transformation of the current trends. Chapter 2 of this report shows that the estimated methane emissions of 29 major meat and dairy companies calculated for this report, rival those of the 100 biggest corporations in the fossil fuel sector (Table 1). **These companies' methane emissions rival Big Oil's.** Yet it is largely unknown by the public and overlooked by governments. This is despite the massive role that meat and dairy companies are bound to play in driving the projected increase in global heating.

According to our estimates, these meat and dairy companies emit 20 million tonnes of methane per year, accounting for a fifth of total global methane emissions from livestock, as reported by the UN[2].

- JBS, the largest meat producer in the world, is already known for its terrible record on deforestation. According to our estimates, it is also responsible for more methane emissions than are attributed to ExxonMobil and Shell combined. In fact, the company would rank 5th in comparison to the biggest methane emitting corporations in the fossil fuel sector (Table 1).

- The five largest meat and dairy methane emitters according to our estimates (JBS, Marfrig, Minerva, Cargill and Dairy Farmers of America) exceed the combined reported methane emissions of big fossil fuel giants such as ExxonMobil, Shell, TotalEnergies, Chevron and BP (Figure 6).

- The estimated methane emissions of the top 3 dairy processors - Dairy Farmers of America, France's Lactalis and New Zealand's Fonterra - combined, would surpass some of the largest fossil fuel companies such as ExxonMobil (Figure 7).

The lack of transparency endemic in the industry means that many meat and dairy corporations do not publish livestock production or milk processing figures or report on their CO_2 and methane emissions, let alone independently verify them.* The 29 companies whose emissions we estimated are therefore only an indicative list of the meat and dairy rivals of Big Oil. There are likely several more.

In Chapter 2.2 of this report, we show that instead of a transition away from livestock overproduction and consumption, meat and dairy companies and their lobbies have doubled down on blocking efforts to make an ecological and healthy shift to diets based more on diverse plant-based foods and protein. Chapter 2.3 addresses Big Meat and Dairy's numerous tricks and tactics to greenwash their climate mitigation efforts.

A special inset in the report explores

***** This lack of transparency endemic to the industry prevents a more comprehensive assessment of Big Meat and Dairy's real impact on near term heating, which may in effect be much larger.

in more detail the insufficient climate action plans of 10 corporations. Together, these ten corporate profiles demonstrate a flawed approach to accountability for climate mitigation. This is systemic across geographies. The climate plans lack consistent and harmonised benchmarks and targets across companies and their self-reported data lacks independent verification. This makes it impossible to compare companies and their progress towards real climate action.

A majority of governments have signed the Global Methane Pledge (GMP) to cut this powerful greenhouse gas so critical in preventing the worst impacts of climate change. By COP30 in Brazil, governments are meant to increase their ambition of their 2035 climate targets. Yet in agriculture, governments are thus far only tinkering around the edges of a problematic model of meat and dairy production, while the planet burns.

Our findings in this report bolster the demands of climate justice and food and agriculture activists: a fossil fuel phase out, combined with a transition away from excessive production and consumption of industrial meat and dairy gives us a fighting chance to limit global warming to 1.5°C. Doing so would save millions of lives from the ravages of rising global temperatures.

So much can be done at all levels of government in each country and globally to facilitate a just transition to agroecology – a system that respects the right to food and food sovereignty - and helps provide more diverse plant-based foods and less animal-based protein for a planetary health diet. **It is time to slow down warming by turning up the heat on Big Meat and Dairy.**

RECOMMENDATIONS

Greenpeace calls on policymakers to:

1

Set binding regulations on meat and dairy companies to report their full Scope of emissions (separately reporting methane, nitrous oxide and carbon dioxide) with companies responsible for their total supply chain emissions. The reporting must be globally harmonised across all companies with an independent system of verification.

2

Update or introduce binding legislation for reducing agricultural emissions (including methane) with concrete targets that reduce livestock numbers, ruling out offsets and unproven short-term technological solutions. Governments must do the following as first steps:

- Stop the expansion of industrial livestock production (no new factory farms or expansion of existing factory farms).
- Stop the expansion of industrial animal feed production and prioritise diverse food for people over animal feed.

3

Create a time-bound strategy and implementation plan to shift public funds away from large-scale animal agriculture (including feed) to incentivizing and expanding a food system based on agroecology that adequately supports farmers and workers in that transition.

4

Introduce policies that eliminate overconsumption of animal products and shift dietary patterns towards healthy ecological plant-based foods.

INTRODUCTION

"Lower methane concentrations would rapidly reduce the rate of warming, making methane mitigation one of the best ways of limiting warming in this and subsequent decades. Doing so would also help limit dangerous climate feedback loops, while simultaneously delivering important health and economic benefits from reducing ground-level ozone." (UNEP & CCAC, 2021)[3]

We know that the biggest driver of climate change is accumulated and increasing CO_2 emissions from fossil fuels. We have already reached a minimum of 1.1°C warming from pre-industrial levels.[4] Less well-known, is that the global food system contributes 21-37% of our total global greenhouse gas (GHG) emissions.[5] By bringing down food-related emissions and proactively restoring nature through the transformation of the current food system, we can slow down global heating. With this transformation and in conjunction with a fossil fuel phaseout this decade, humanity still has a fighting chance to limit global heating to 1.5°C.

Within the food system, livestock - through production and consumption of meat and dairy - is by far the biggest emitter of GHGs and responsible for 12[6] -19%[7] of humanity's total GHG emissions.

From 1910 to 2015, it is estimated that the enormous increase in the production of livestock has led to a related increase in greenhouse gases emissions - carbon dioxide, nitrous oxide and methane - by a factor of 2.9.[8] Nitrous oxide and methane are both potent greenhouse gases. Over 100 years, nitrous oxide's global warming potential (GWP) is 273 times higher than CO_2, and methane's is 27 times higher than CO_2. However, if we look at a near term timeframe, Methane's GWP is 80 times more than CO_2 over 20 years.[9] Livestock is the single biggest source of methane emissions related to human activity (Figure 1).

LIVESTOCK IS THE SINGLE LARGEST EMITTER OF METHANE

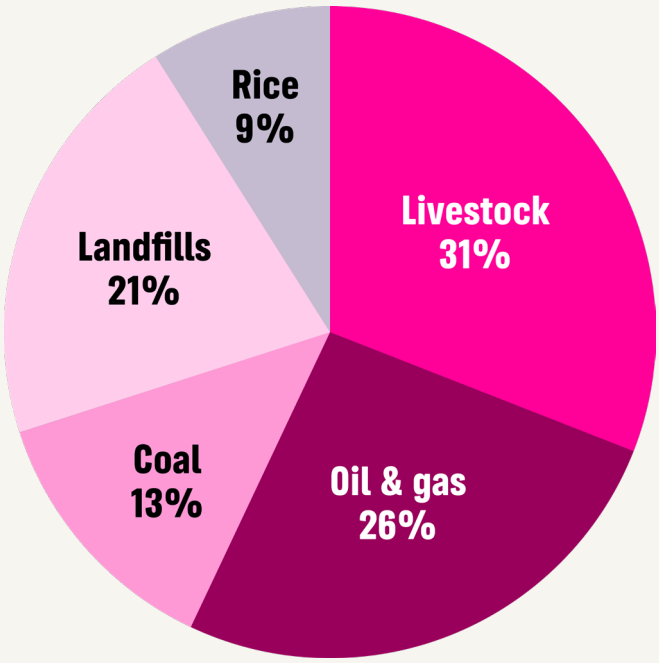


Figure 1: Share of estimated annual methane emissions by sector (2017, excl. Oceania, reproduced from UNEP (2022), citing Saunois et al. 2020)

METHANE: THE KEY TO LIMITING CLIMATE CHAOS

Methane has an enormous warming potential in the near term. It has a short lifespan, in that it disappears from the atmosphere in only 12 years if we do not continue emitting it. That is very different from CO_2 or N_2O, which stay for centuries or even millennia in the atmosphere.[10] **These unique properties of methane give us a chance to limit temperature increases now in order to slow down warming by 2050 and limit climate chaos in our lifetime.** According to the first ever global assessment on methane by UNEP and CCAC in 2021, a 45% reduction of methane emissions by 2030 (from all sectors) could avoid nearly 0.3°C of warming by 2040.[11]

1. METHANE EMISSIONS FROM THE MEAT AND DAIRY SECTOR

Nearly 80% of agricultural methane comes from the digestion process (burps and farts) of ruminants such as cattle, goats and sheep and from the manure of all livestock, including pigs and poultry. About 20% of the remaining emissions come from rice cultivation.[12]

Livestock production and consumption is projected to continue to grow globally.[13] This will, in turn, increase GHG emissions from the meat and dairy sector, including methane emissions that affect how much more warming happens in the near term and into the future.

WHAT HAPPENS NEXT IS CRITICAL FOR GLOBAL HEATING

The choices that we as a society make on changes in meat and dairy production and consumption, through their impact on methane emissions, can act as an important lever for humanity's survival on Earth: They will have a significant influence on temperature increases in the next few decades. To explore how changes in the meat and dairy sector will affect the level of warming we will be subjected to, we modelled three projections of meat and dairy production and consumption from 2025 until 2050:

In **projection 1 (Business as Usual)**, we explore what the global mean **temperature increase** from meat and dairy production and consumption would be, using UN FAO projections[14] that take into account growth in the global population as well as per capita consumption, with the assumption that products will be produced exactly as they are today.

In **projection 2 (high- and middle-income countries)**, we estimate the **avoided warming** that would result from reducing global per capita meat and dairy production and consumption in line with the EAT–Lancet Planetary Health diet[15] **only in high- and middle-income countries** (following definitions by the World Bank[16]). This would amount to roughly a 50% reduction globally, with regions converging to a healthy diet in a *'shrink and share'* approach: depending on current consumption levels, some regions decrease, while other regions could increase meat and dairy consumption to the level of a 'Planetary health Diet'. This is also in line with the approach taken in Greenpeace International "Less is More" report from 2018.[17]

In **projection 3 (all countries)**, we look into the avoided warming that would result from reducing global per capita meat and dairy production and consumption in line with the EAT–Lancet Planetary Health diet in all countries.[18]

PROJECTION 1

Business as usual - global warming from projected increase in meat and dairy production and consumption

This projection is based on the 2018 UN Food and Agriculture Organisation (FAO) Business as Usual (BAU) projections for the increase in global population, as well as the increase in per capita meat and dairy production and consumption by 2050. Here, the FAO predicts production and consumption of animal products to rise in tandem with low-

and medium-income levels, resulting in a 52% increase in global livestock production compared to 2012, including an increase of over 60% for methane-emitting beef and veal by 2050. It should be noted that major industry players build their business strategy on even larger growth expectations - 70% in the case of JBS, e.g..[19]

According to Projection 1, BAU means growth in meat and dairy production and consumption that would translate into increased warming of 0.16°C global mean temperature levels by 2030, 0.26°C by 2040, and 0.32°C by 2050 relative to 2015 (Figure 2). Methane associated with these increases is responsible for more than three quarters of this warming in the short-term up until 2050 (Figure 3).

This is the effect of *only* meat and dairy increases, without accounting for other changes in food systems. These values are in-line with findings from Ivanovich et al (2023)[20] for warming (roughly 0.4°C by 2050) linked to the whole global food system, if dietary patterns are kept unchanged from present day. This points to the significant effect that increasing livestock production and consumption will have on near-term and future warming.

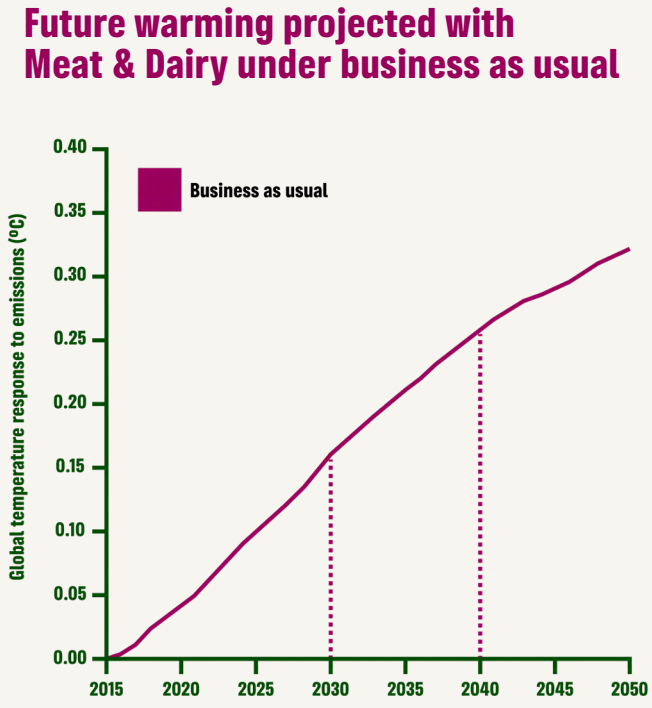


Figure 2: Global mean surface air temperature response to projected emissions associated with global meat and dairy production and consumption. Projections are based on emissions projections under Business as Usual (BAU) as outlined by FAO (2018). Vertical lines indicate warming levels projected in 2030 and 2040.

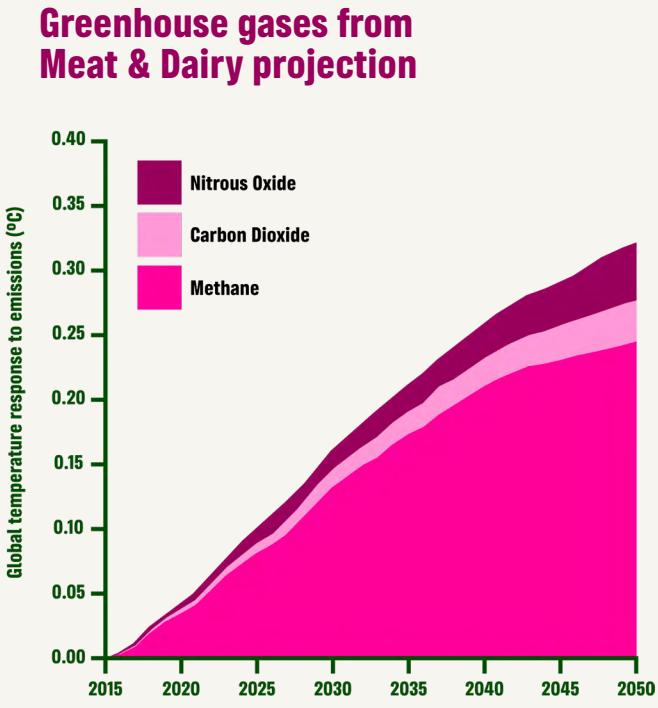


Figure 3: Share of warming under Business As Usual projection from CO_2, CH_4, and N_2O emissions associated with future global meat and dairy production and consumption.

As our results show, the increase in emissions due to increasing meat and dairy production and consumption will have very significant impacts on future global warming. With a world nearing the 1.5°C average warming limit considered safer for humanity, there is little chance of achieving a safe climate by 2050, or even 2030, without strongly acting on livestock production.[21]

Particularly in the short-term, neglecting action in the livestock sector would mean an increase in average temperatures of 0.16°C by 2030. In a changing climate, even a fraction of a degree matters greatly for life on Earth **(See BOX A)**.

BOX A Why a fraction of a degree warming matters for life on Earth

As the planet warms due to increasing GHG emissions, small differences in the amount of warming will have large consequences for life on Earth, directly impacting millions of human's lives. Several scientific studies have shown that even a fraction of a degree of warming that can be prevented will reduce significant harmful impacts on humanity. For instance, each 0.1°C of warming we prevent could mean that around 2% less ice mass on global glaciers will melt. This would significantly improve water availability, reduce sea level rise and flood risks for millions of people.[22] Each 0.3°C decline in end-of-century projected warming could reduce 'hot exposure'* by 4.3% or spare 410 million people, according to another study.[23] This study also points to reports linking high temperatures with increased deaths, declining productivity at work, decreased cognitive ability, difficulty in learning, negative impacts on pregnancies, decreased crop yields and many other impacts. Some of the key impacts on humanity of a 1.5°C world compared to one that has increased warming to 2°C - a difference of 0.5°C - are the following according to the IPCC:[24]

* 'Hot exposure' is defined in this study as mean annual temperature exceeding 29°C.

- Up to **10 million fewer** people would be exposed to sea-level rise risks at 1.5°C vs 2°C.
- Around **420 million fewer** people would be exposed to frequent and extreme heatwaves.
- **50% less of the world population** would be exposed to a climate-induced water scarcity.

The number of people faced with climate-related risks and risk of poverty would be **reduced by several hundred million by 2050.**

Last, but not least, at 1.5°C, governments would potentially avert 10-44% of the escalating climate risks by 2100, sparing the world from an economic catastrophe amounting to $22 trillion.[25]

THE HOPEFUL PROJECTION

The positive potential of reducing livestock production in line with a healthy diet in high- and middle-income countries

According to the IPCC[26] and an increasing body of scientific evidence,[27] reducing livestock numbers is key to maintaining a safe climate on Earth. In 2019, The EAT–Lancet Commission on Healthy Diets from Sustainable Food Systems, [28] proposed a global reference diet, called the Planetary Health Diet, *"mainly including plant-based foods, some fish, and limited dairy and meat, which at a global level was estimated to keep the environmental impact within planetary boundaries while still providing adequate amounts of nutrients in accordance with established reference values."* [29]

Recent analyses have estimated that shifting to the EAT–Lancet diet could prevent 54–63% of premature deaths, while lowering GHG emissions by up to 50% and land use by up to 62%.[30] The EAT–Lancet diet recommends that less than 40% of the daily intake of protein comes from animal-based foods, while the other 60% comes from legumes and nuts.[31] Regionally, adopting the EAT–Lancet diet will translate into reductions in meat production and consumption in some countries (i.e. USA, EU, Brazil, China) and increases in other countries with low meat consumption currently (i.e. India, and many African countries). For example, the 2022 meat consumption in the United States was 123 kg per capita, compared to India with just 6.6 kg per capita, according to the FAO.[32]

PROJECTION 2

The hope for slowing warming from action in high- and middle-income countries

Given that levels of meat and dairy production and consumption correlate with economic development,[33] projection 2 looks at the implementation of the EAT–Lancet diet in high- and middle-income countries. **The result of implementing meat and dairy reductions in line with the EAT–Lancet diet only in high- and middle-income countries would result in a warming decrease of**

PROJECTION 3

Cooling Effect from action in all countries

In our modelling for projection 3, the result of reducing meat and dairy consumption in line with recommendations from the EAT–Lancet healthy diet across all countries globally would result in a warming decrease of 0.13°C by 2050, 0.09°C by 2040 and 0.06°C by 2035 (Figure 5). This amounts to a 39% reduction of the anticipated mid-century warming under projected business-as-usual diets.

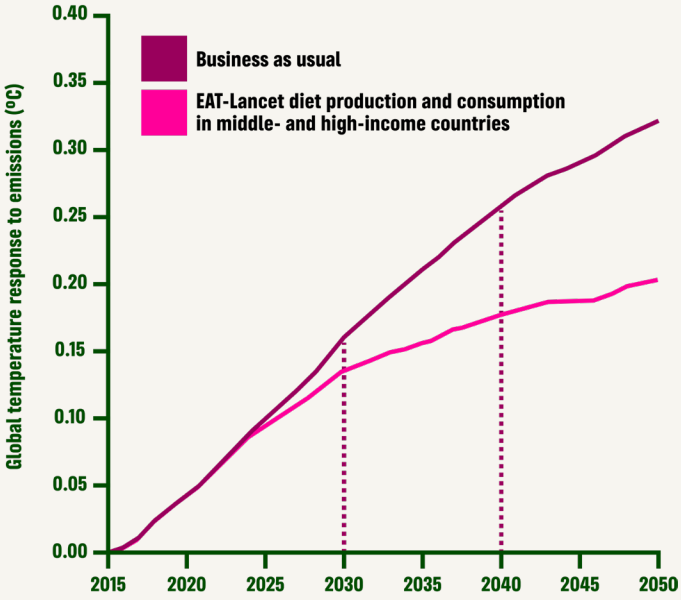
This reduction is almost identical to projection 2 above in which the changes are only applied to high- and middle-income countries. Hence, focusing the reductions

Future warming projected with Meat & Dairy reductions in middle- and high-income countries

0.12°C by 2050, 0.08°C by 2040 and 0.06°C by 2035 (Figure 4). This amounts to a 37% reduction of the anticipated mid-century warming of 0.32°C under the business-as-usual projection.

In other words, rather than contributing to rapid heating, reducing meat and dairy in high- and middle-income countries could actually contribute to keeping temperatures down.

Figure 4 (on the right): Avoided warming associated with reductions to meat and dairy production and consumption in line with the EAT–Lancet diet in middle- and high-income countries. Vertical lines indicate warming levels projected in 2030 and 2040.



Future warming projected with Meat & Dairy reductions in all countries

of livestock production and consumption only in high and middle-income economies, without implementing changes in low-income ones, would have almost the same effect as focusing on the whole world population.

These results emphasise that a more equitable approach to production and dietary changes – allowing the convergence of the global diet to a healthy one with a 'shrink and share' approach[34] – is also effective climate change mitigation. It would mean high-consuming societies reduce their meat and dairy production and consumption more significantly, and low-consuming societies and low-income regions could increase their meat and dairy production and consumption levels in line with healthy dietary guidance.

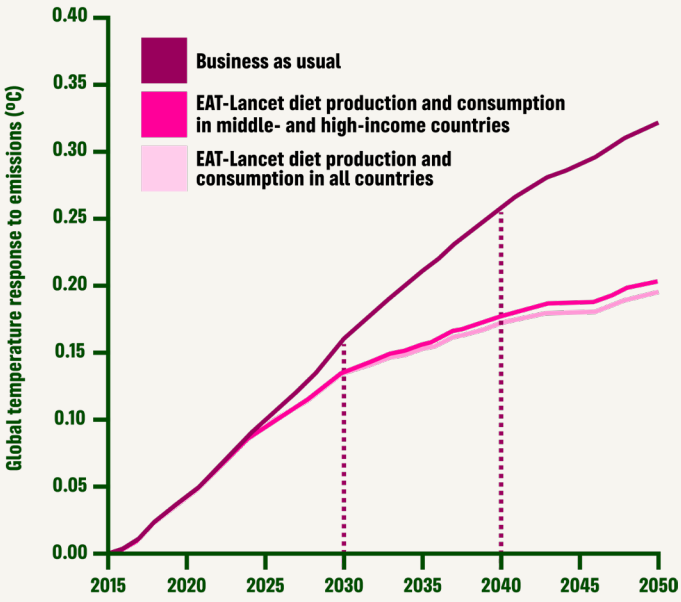


Figure 5: Avoided warming associated with reductions to meat and dairy production and consumption in line with the EAT-Lancet diet in all countries. Vertical lines indicate warming levels projected in 2030 and 2040.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CONCLUSION

The increase of livestock production represented the second most important driver of emissions increase in the global food system after population growth in the last decades.[35] In Chapter 1, we have shown that reducing methane emissions associated with meat and dairy is a critical lever to influence near-term warming and the well being of all life on Earth.

The data presented show that if we continue the current trends of overproduction and consumption of meat and dairy, the livestock sector alone would lead to an increase in warming of 0.32°C by 2050. The methane emitted would be responsible for more than three quarters of this warming (Figure 3). On the other hand, prompt action by state and corporate actors from high- and middle-income countries to shift away from livestock overproduction and overconsumption in line with the EAT–Lancet Planetary Health diet would lead to a "cooling effect" of the meat and dairy related warming by 0.12°C by 2050 (Figure 4). **In effect, our hopeful projection amounts to a 37% reduction of the anticipated mid-century warming under FAO's business-as-usual scenario.**

2. BIG MEAT & DAIRY COMPANIES RIVAL FOSSIL FUEL COMPANIES IN EMITTING METHANE

2.1 METHANE EMISSIONS - MEAT & DAIRY VS FOSSIL FUEL

Oil and gas giants rightfully dominate the conversation about the biggest climate polluters, including those around methane reductions. However, Greenpeace Nordic looked at polluters in the meat and dairy industry, with a special focus on methane in this report, calculating the estimated emissions of 29 companies.* As we now know, methane is a key player in the fight to slow climate change in the near-term, given its potency and the relatively short time that it heats up our atmosphere if we stop polluting and start cutting it. We found that methane emissions of every one of the 29 companies we analysed would feature amongst the global top 100 corporate methane emitters in the fossil fuel sector (Table 1).[36] If there were transparency requirements giving the public and investors the right to know the number of animals each company slaughters year on year, it is likely that many more companies especially from the meat sector would be listed amongst the largest methane emitting corporations of the world. **Despite the massive role that meat and dairy companies play in driving the projected increase in global heating, their impact is largely unknown by the public and overlooked by governments.**

The Global Methane Pledge (GMP) signed by 158 governments to cut methane emissions, has largely focused on fossil fuel methane, treading cautiously on targeting the meat and dairy industry's corporate polluters.[37] The Pledge commits countries to reduce their **combined** methane emissions by at least 30% by 2030 (from 2020 levels).[38] For agriculture, the Pledge is limited to supporting technological innovation and partnerships with farmers, failing to commit to transition away from large-scale livestock and overconsumption or to justly support farmers and workers in that transition.[39]

Big meat and dairy companies' methane emissions rival Big Oil's

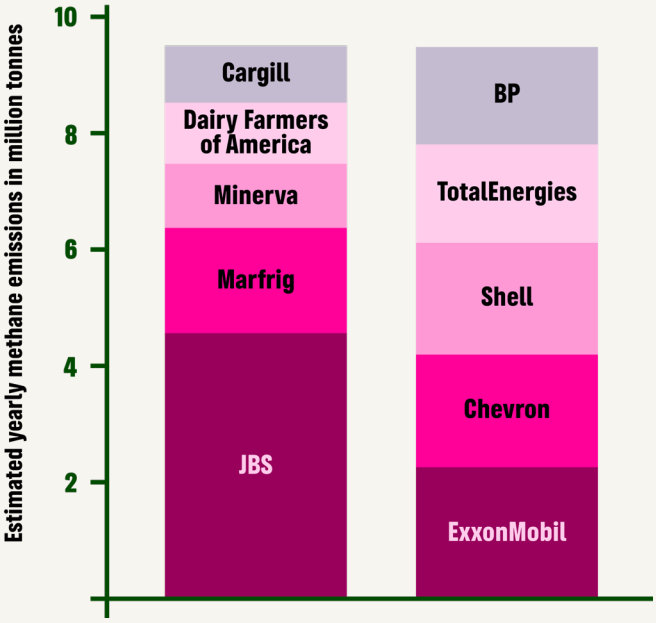

Figure 6: Estimated methane emissions of leading meat & dairy companies, compared to the combined estimated emissions attributed to leading fossil fuel companies (Source: Influence Map (2024), Greenpeace Nordic own estimates presented in this report)

Yet, according to our estimates, just five big meat and dairy companies (JBS, Marfrig, Minerva, Cargill and Dairy Farmers of America) together exceed the combined methane emissions of the five fossil fuel giants ExxonMobil, Shell, TotalEnergies, Chevron and BP, as reported in the Carbon Majors database[40] (Figure 6). In terms of

* Greenpeace Nordic estimated the methane emissions of 29 meat and dairy companies, based on their milk or meat production figures, using the FAO's GLEAM model. For an understanding of our methodology, see Annex 2.

the volume of milk they process, the three largest dairy companies world-wide are Dairy Farmers of America, France's Lactalis and New Zealand's Fonterra.[41] Their estimated methane emissions combined, would surpass those of some of the largest fossil fuel companies such as ExxonMobil (Figure 7).

Big dairy companies' methane emissions rival Big Oil's

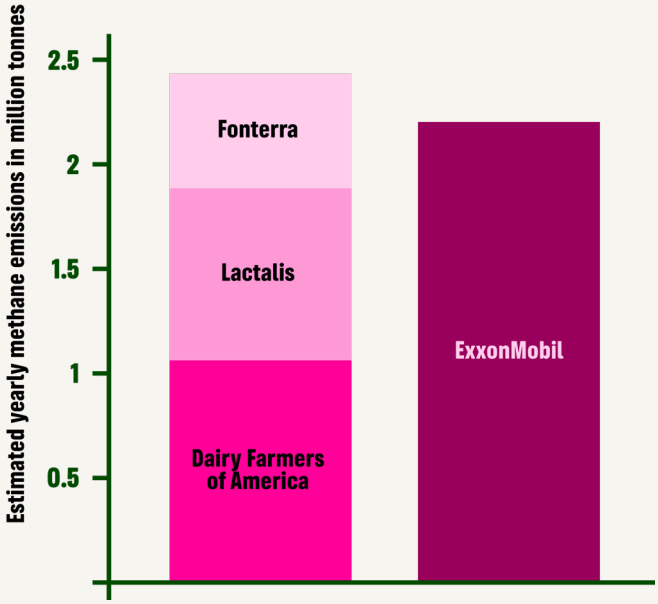

Figure 7: Estimated methane emissions of leading dairy companies, compared to the emissions attributed to ExxonMobil, a leading fossil fuel company (Source: Greenpeace Nordic own estimates presented in this report; Influence Map (2024))

JBS, the largest meat producer in the world, is already known for its terrible record on deforestation.[42] It would rank 5th in a list of the 100 most methane-emitting corporations in the fossil fuel sector.[43] **According to our estimates, JBS is responsible for more methane emissions than those attributed to major oil companies ExxonMobil and Shell combined (Figure 8).**

JBS' emissions rival major oil companies

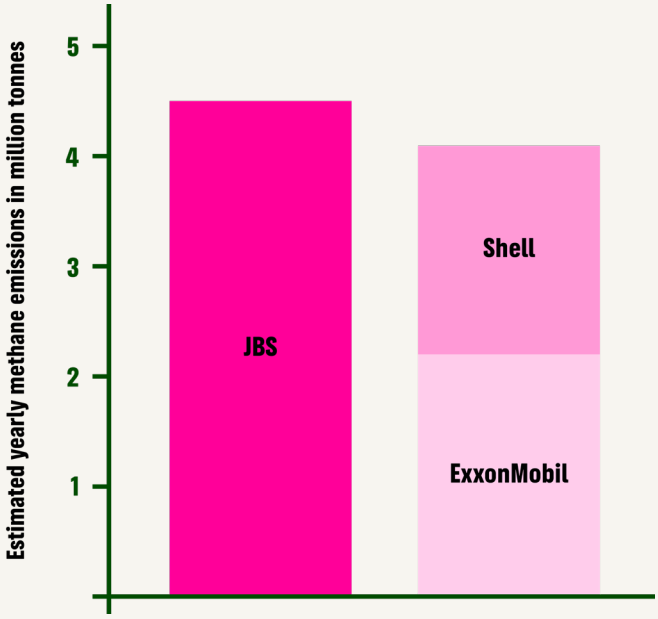

Figure 8: Estimated methane emissions of JBS compared to the combined emissions attributed to two carbon majors, ExxonMobil and Shell (Source: Greenpeace Nordic own estimates presented in this report; Influence Map (2024))

BOX B

Methane from fossil fuels is not the end of the story

According to the Carbon Majors database, methane is a significant contributor to the climate impact of major oil and gas companies (11% of their total emissions on average across all the 100 companies considered in this report).[44] Their methane emissions from fossil fuel production and use - often through leakage from infrastructure, venting or incomplete flaring or combustion - are a serious problem. In this highly concentrated sector, the responsibility for addressing it lies

mainly in the hands of a few state- or investor-owned companies.[45] It is right that this sector is targeted as part of the Global Methane Pledge. However, a large part of global production of livestock for food also lies in the hands of a limited number of big corporations. They must also take responsibility for the massive contribution they make to methane emissions.

2.2 BIG MEAT & DAIRY HAVE EFFECTIVELY NO PLANS FOR A JUST TRANSITION PATHWAY

The energy sector has an obligation to provide energy and to transition away from fossil fuels towards renewable energy sources such as wind and solar. The call for a fossil fuel phaseout is getting louder, including governments agreeing at COP28 in 2023 to *"transition away from fossil fuels"*.[46] The same momentum is needed to transition out of large-scale industrial livestock production with governments committing to enabling the provision of ecological and nutritious food, shifting to more plant-based (and less animal-based) protein supply with a just, credible and time bound transition. Meat and dairy companies on their own have not been willing to begin such a transition.

Instead the meat industry is fighting against change and its giants are pushing for major growth. In its 2023 *'Results'* presentation, JBS reported to have invested R$800 million* into its Friboi cattle unit in the Brazilian Cerrado to *"triple the plant's production capacity, making it the largest in Latin America."*[47] The company is banking on a 70% increase in meat demand by 2050.[48] The dairy industry appears to be similar. According to a survey released by consultancy McKinsey in 2024, *"Dairy executives were most excited about growth,"* and *"expect future growth to be propelled more by volume"*.[49]

Both industries invest considerable efforts to fend off policy changes that threaten 'business as usual.' For instance, the Changing Markets Foundation report *'New Merchants of Doubt'* documented industry lobbying efforts to block measures to regulate methane in three EU regulations, the National Emissions Ceiling (NEC) directive, Effort Sharing Regulation and Industrial Emissions Directive, arguing that including methane reduction obligations would lead to *"double regulation"*.[50] The report states: *"In the end, not a single one of these regulates agricultural methane, and the fear mongering of double regulation designed to kill any regulation succeeded. The EDA's internal background document on the 'Dairy sector and the Green Deal' even stated that: 'With regards to clean air, the ammonia targets of the NEC are still under implementation [Methane targets thankfully were ejected out of the deal – we may need to make sure they do not come in again]'"*.[51] The EDA is the umbrella organisation for European national dairy associations, hence either directly or indirectly representing companies such as Nestlé, FrieslandCampina, Lactalis, Arla and others, according to the Changing Markets report.[52]

* ~US$160 million, based on the average 2023 exchange rate, retrieved from IRS (2024).

Tactics to avoid transition

A classic tactic in fighting against change is discrediting scientific research. In 2019, a team of world-leading scientists published the EAT–Lancet report (referred to in Chapter 1), with the aim of providing a scientific answer to the question of how to feed 10 billion people with a "planetary" healthy diet thattakes into account both health and environmental sustainability.[53] The report recommended a diet rich in plant-based food, supplemented *"(optionally)* [with] *modest amounts of animal sources of protein."*[54]

The EAT–Lancet report rightly garnered a lot of attention, and backlash from the industry followed suit. Formally a University institute, the 'Clarity and Leadership for Environmental Awareness and Research (CLEAR) Center' reportedly led a massive online campaign under the hashtag #yes2meat.[55] According to a later scientific analysis, the campaign resulted in *"highly polarised debates online including misinformation, conspiracy theories and personal attacks"*.[56] According to investigative journalists, CLEAR was far from an independent research institute. It reportedly received millions of dollars from industry groups like the American Feed Industry Association (AFIA), representing some of the world's biggest livestock and feed producers, including Cargill, Tyson Foods and JBS.[57]

Attacking science and discrediting results can happen at the highest levels of power where governments are aligned with the agribusiness lobby. In 2006, Henning Steinfeld, former head of the UN Food andAgriculture Organization's livestock analysis unit, co-authored the first emissions estimates of livestock's contribution to climate change as 18% of all GHGs in *"Livestock's Long Shadow"*. In an interview with the Financial Times (FT) in August 2024, Steinfeld said that his team was " *'diminished' and 'defamed'... for more than a decade"* within the UN and contended that government diplomats *"indirectly lobby on behalf of the agrifood industry"* at the FAO.[58]

Public funds for protein

In some high- and middle-income countries, it has been documented that public funds have been used to promote the consumption of industrial meat and dairy products, as animal protein from industrial agriculture dominates daily meals. In Europe, between 2016 and 2020, more than EUR250 million of taxpayers money were invested in marketing European meat and dairy products.[59] These funds were also used to bolster mythsthat sustain levels of production and consumption of industrial meat in society.[60] In Germany, meat and dairy products are subsidised through reduced value-added tax (VAT) rates, amounting to EUR5 billion a year - one of the largest environmentally harmful subsidies in the country, and more than the VAT exemption for international flights.[61] In Brazil, legislators are currently debating a consumption tax reform. If passed, value-added tax (VAT) for meat products would be reduced to zero,[62] hence incentivising further consumption.[63]

There are opposite examples of more progressive public initiatives, like those in Scandinavia,[64] Austria[65] or Spain,[66] that call on consumers to shift their diets toward a reduction of animal proteins, but they fail to provide any incentives, such as reduced taxes on vegetables or plant-based products. An emergency brake is needed from governments given that corporations will not willingly transition from a polluting model that favours large-scale meat and dairy overproduction and consumption.

2.3 GREENWASHING: TRICKS AND TACTICS OF THE LIVESTOCK INDUSTRY REVISITED

In recent years, many organisations have published evidence of livestock's climate impacts, and the tricks and tactics major corporations use to greenwash their fully inadequate climate mitigation plans.[67] We revisit some of the most common 'solutions' promoted by the industry to account for methane reductions without fundamentally altering their production plans or transitioning out of large-scale livestock farming. We group them into two broad categories, 'Creative Carbon Accounting' and 'Technological Fixes'.

CREATIVE ACCOUNTING

1. Intensity vs Absolute Emissions

Our planet heats up because of an increase in absolute greenhouse gas emissions. In their reporting (if they are reporting), companies largely focus on emission intensities.Emissions intensity is a measure of emissions per kilo of meat or litre of milk. Any reduction in emissions intensity can easily be negated by an increase in overall production of meat and dairy products. For instance, the dairy industry reduced its emissions intensity by 11% in 10 years (2005-2015), but increased its absolute emissions by 18% in those same years, according to a joint publication of the biggest industry group (the Global Dairy Platform) and the UN Food and Agriculture Organisation (FAO).[68]

Danish dairy giant Arla, e.g., claims to have reduced Scope 3 emission intensity from their milk (and whey) intake by 12% in 2023, compared to a 2015 baseline. But its total emissions were reduced by only 1.3% in the same period. This is because reductions were *"partly offset by higher milk volumes"*.[69] The data behind the figures provided by Arla and similar companies are not open for public scrutiny. In the case of Arla, emission data are *"calculated based on climate data from farms where the data has been validated by external climate experts"*.[70] A common problem with 'external experts' is that they are contracted by the company and hence not independent.[71]

Many companies' future climate reduction plans are largely based on emissions intensity, rather than absolute emissions reductions. Typically, over 90% of these companies emissions stem from the livestock in their supply chains, yet most companies only pledge to reduce emissions intensity for this huge share of their total emissions (see Company Profiles section). Yet, gains in emissions intensity that have occurred in the livestock sector until 2015 have been offset by the rapid increase in large-scale livestock production since the 1950s, confirms a recent study: *"reducing emissions intensity never resulted in declining agricultural emissions in absolute terms: Instead, increases in agricultural production - particularly livestock production - consistently overcompensated efficiency gains."* [72]

BOX C

‘Science-based targets’ - major PR for Big Meat and Dairy

As livestock companies face greater scrutiny on their climate impacts, and governments fail to regulate them, the number of meat and dairy companies committing to ‘science-based targets’ to reduce emissions has risen exponentially. The Science-Based Targets initiative (SBTi) is a non-profit organisation providing a platform for these corporations by setting standards for an *“independent assessment of corporate net-zero target setting”*.[73] SBTi charges a fee to corporations for reviewing target submissions and issuing a formal target validation and receives nearly half of its income from these services.[74] Once a company commits to setting such targets, it gets listed in the SBTi database and has two years to get its actual reduction targets approved by the SBTi.[75] In practice, companies have used their SBTi commitment status to greenwash while delaying actual climate action (see corporate profiles below). SBTi’s standards reportedly also have serious shortcomings, like allowing food and agriculture companies to count assumed carbon storage in soils, trees or other vegetation in their own supply chain - so called ‘insets’ - against their actual emissions.[76]

GWP* - more creative accounting

GWP* is a metric that some scientists have put forward to emphasise the declining impact of short-lived gases such as methane over time. This is based on the understanding that the levels of methane emissions remain stable in the very long term, while also pointing out that the *“near- to medium-term climate impacts… remain important”*.[77] Changing Markets Foundation (CMF) has done an extensive critique of the livestock industry and industry funded academics’ manipulation of this idea to get governments to adopt GWP* for livestock methane accounting.[78] The CMF findings show that using the GWP* concept, instead of IPCC’s accepted metrics, would make it much easier for livestock companies to claim that they have met their net zero targets without really changing much in terms of their business model. Despite calls from industry, the IPCC discussed, but **did not** adopt GWP* as the official approach for methane accounting in its latest 6th Assessment Report.[79]

2. *"Yesterday's 'degenerative' is today's 'regenerative'"* [80]

In contrast to 'agroecology'[81], 'regenerative agriculture' has no widely agreed definition, making it an ideal term for being hijacked by industry for the purpose of greenwashing.

Now widely promoted by large food and agriculture companies as an important element to achieve their Net Zero commitments, the advocated measures are often unclear, and their outcomes uncertain and reported to potentially exaggerate carbon sequestration potentials, in particular when soil carbon saturation is ignored[82]. A 2023 study concludes *"that solely relying on carbon sequestration in grasslands to offset the warming effect of emissions from current ruminant systems is not feasible"*.[83]

3. Offsets and Insets: Two sides of the same coin

Climate plans of companies often centre around the concept of 'Net Zero' - meaning, emissions that a company does not eliminate are to be compensated - in technical terms 'offset' - by carbon uptake elsewhere.
A common type of such 'offsetting' is calculating carbon that is removed from the atmosphere through tree growth or increased uptake in soils against real emissions from the companies' operations and supply chains. 'Insets' are simply 'offsets' within a company's supply chain. Greenpeace rejects offsets[84] as we need to increase carbon sinks in **addition** to, not as a **replacement** for reducing real emissions. 'Offsetting' also does not work, as it puts real and long lasting emissions from fossil fuels, deforestation, livestock, etc., into the same equation as projected carbon uptake through plant growth or soils. This is not adequate, as there is no guarantee for this projected uptake to materialise and to last.

Another prominent and emerging offsetting scheme for livestock companies is 'avoided emissions' through techno-fixes which they could claim as an 'inset'. Despite doubts about feed additives (see below), their application to reduce methane production from digestion in cattle, has already been turned into 'verified carbon credits' for avoided emissions. The Dairy Farmers of America (DFA), by far the biggest milk processor globally, celebrated its purchase of *"first verified carbon credits"* in January 2024 sold over the first livestock 'inset marketplace' Athian.[85]

TECHNOLOGICAL FIXES

1. Biogas - 'renewable' in name only

Managing methane emissions from manure is often highlighted in companies' climate plans. According to the FAO, however, this part of livestock's methane emissions accounts for only 9%, with methane from the ruminant's digestive system accounting for the remaining 91%.[86] Methane generated from manure can be captured and turned into so-called "biogas" that can be used as fuel or for heating. Meat and dairy companies call this 'renewable energy'. However, many US environmental,[87] progressive food[88] and farm[89] and animal welfare[90] organisations have strongly criticised biogas as the opposite of renewable, calling it 'factory farm gas' for several reasons:

1. Biogas production from manure adds to the incentives for large-scale livestock operations. However, they not only generate methane from this manure, but also polluting nitrates and harmful air particles.[91] They have also been reported to be laden with residues of additives fed to animals which can contaminate soil and water sources.[92]

2. Heavily promoted by the US[93] and the EU[94], the generation of biogas strengthens the fossil gas industry because of additional gas infrastructure required. Shell is reportedly constructing *"manure to gas"* facilities in several US states[95] and has bought the biggest biogas distributor in Denmark[96], which sources from the intensive Danish livestock industry[97].

3. Methane losses, largely from digestate handling, but also along the whole biogas supply chain (which includes anaerobic digesters, storage, transmission and distribution) reportedly result in *"much higher CH_4 loss rates than the oil and natural-gas supply chain"*.[98]

Finally, biogas production from manure does not address the much larger share of methane from ruminant's digestion processes.

2. Feed Additives - an unproven avenue for more meat and dairy industry offsets

Feed additives are supposed to reduce methane production from ruminants when digesting their food, a process called 'enteric fermentation'. One such additive is '3-NOP'* marketed under the name 'Bovaer.' Bovaer is the only methane inhibitor that has been approved in over 57 countries.[99] In short-term studies *"...under controlled research conditions"* it has been found to reduce methane by 30% in a ruminant's gut on average, with results in animal trials varying from 4% to 76% reduction in methane *"depending on animal type, diet and dose"*.[100]

The Expert Panel on Livestock Methane, a group of scientists and academics,[101] examined literature on 3-NOP and other feed additives in its 2024 briefing,[102] and came to these conclusions:

- There are *"no effective means of providing a regular supply of methane inhibitors to animals on pasture."*

- All proposed additives are more compatible with feedlots than grass fed cattle, given that they are feed supplements.

- There are concerns about the long term efficiency of 'methane inhibitors' as microbes in the digestive tracts of ruminants may adapt to these feed additives.

Swiss researchers have found that such additives can *"also attack or inhibit the beneficial microorganisms"* in the ruminant's gut, making the animal less efficient in milk or meat production thereby releasing no fewer greenhouse gases per litre or kilo of meat.[103]

To summarise, in the words of the Expert Panel, *"All feed additives tested to date show highly variable methane reduction potential. This makes it difficult to confidently say how much methane they will be able to mitigate."* The experts consequently called for more long-term studies into the "mitigation potential….costs, benefits and risks" of methane reducing feed additives.[104]

* '3-nitrooxypropanol'

3. Selective Breeding - too little, too late

In principle, selective breeding could result in cattle and other ruminants that produce less methane per litre of milk or kilogram of meat. The expected reduction in methane emissions appears to be rather modest (1-15%) and might take decades.[105] Time that we do not have to avoid the worst effects of climate heating.

In Conclusion

Chapter 2 of this report shows that the estimated methane emissions of 29 major meat and dairy companies calculated for this report, rival those of the 100 biggest corporations in the fossil fuel sector (Table 1). This is only an indicative list of the meat and dairy rivals of Big Oil. There are likely several more. These companies' methane emissions rival Big Oil's. Yet it is largely unknown by the public and overlooked by governments. This is despite the massive role that meat and dairy companies are bound to play in driving the projected increase in global heating.

As such, big meat and dairy corporations are standing in the way of the hopeful potential of cutting methane described in Chapter 1. Section 2.2 shows that instead of a transition away from excessive livestock production and consumption, meat and dairy companies and their lobbies have doubled down on blocking efforts to make an ecological and healthy shift to diets based more on diverse plant-based foods and protein. Section 2.3. profiles Big Meat and Dairy's dominant tricks and tactics to greenwash their climate mitigation efforts.

A **special inset in the report** explores in more detail the insufficient climate action plans of 10 corporations. Together, these profiles provide a glimpse of the 'the wild west' nature of these companies' climate plans; demonstrating the flawed approach to climate mitigation of meat and dairy companies which is systemic across geographies. These plans lack consistent and harmonised benchmarks and targets across companies. Their self reported data lacks independent verification. This makes it impossible to compare companies and their progress towards real climate action. They reveal that their climate plans, based on self-reported emissions data, remain largely a public relations exercise.

CONCLUSION: HOPE AND THE PATH FORWARD

Drastic reductions of methane from agriculture are achievable in our lifetime. This study shows that a shift away from overproduction and overconsumption of livestock to more plant-based sources in high- and middle-income countries could mean avoiding 0.12°C of additional global heating by 2050. In fact, these efforts have the potential to deliver significant life-saving results in the next 10 years. Business as usual would have us add a whole 0.32°C of global heating from the meat and dairy sector alone, increasing the suffering of millions of lives by several orders of magnitude.

Big meat and dairy corporations are standing in the way of transformation. According to industry analysts, just 20 companies account for about a quarter of global milk processing.[106] JBS, the largest meat producer in the world, accounted for about 7-9% of all cattle slaughtered worldwide in 2022.* Our findings have shown that industrial meat and dairy giants' methane emissions rival those of Big Oil. These corporations hold immense political and economic power. And they are using both to fight change in their business strategy, including by promoting false solutions and blocking regulations that could create a sea change (for the better) in the way we produce and consume food on this planet.

A majority of governments have signed the Global Methane Pledge to cut this powerful greenhouse gas. By COP30 in Brazil, many governments will have increased their ambition of their 2035 climate targets. In agriculture, governments are thus far tinkering around the edges of a deeply problematic industrial model of food production, while the planet burns. But Governments can and have taken steps to support an ecological transformation of the sector with positive outcomes. In 2012, Brazil introduced the National Policy on Agroecology and Organic Production (Pnapo) together with the National Plans on Agroecology and Organic Production (Planapo), in order to facilitate and fund hundreds of agroecology projects across the country.[107] So much more can be done at all levels of government in each country around the world and at the global level to facilitate a just transition. Together, these efforts can enable a meaningful food system transformation to agroecology – a system that respects the right to food and food sovereignty- and helps provide more diverse plant-based foods, less animal-based protein for a planetary health diet.

Our findings bolster the demands of climate justice and food and agriculture activists: a fossil fuel phase out, combined with a transition away from excessive production and consumption of industrial meat and dairy give us a fighting chance to limit global heating to 1.5°C. Doing so would save millions of lives from the ravages of rising global temperatures. Policy makers need to stop listening to special interests driven by shareholder value, and start listening to science and those on the frontlines of climate impacts. **It is time to slow down warming for our and future generations by turning up the heat on Big Meat & Dairy.**

***** In 2022, the global number of cattle slaughtered for beef production amounted to 308.6 million animals, acc. to the FAO (FAOStat (2024) Crops and Livestock products, United Nations Food and Agriculture Organisation, database accessed Jul 18, 2024). In the same year, JBS reported a slaughtering capacity for cattle of 75,741 heads/day (JBS (2023) 2022 Sustainability Report, JBS S.A.). If fully used (100% at 365 days/year) this capacity would be sufficient to slaughter 27.6 million cattle. With the lower capacity utilisation rate assumed by the model used for emissions estimates in this report (0.91% at 302 days/year), the total number of cattle slaughtered would amount to 20.8 million. JBS itself does not report annual slaughter numbers to the best of our knowledge.

RECOMMENDATIONS

Greenpeace calls on policymakers to:

1

Set binding regulations on meat and dairy companies to report their full Scope of emissions (separately reporting methane, nitrous oxide and carbon dioxide) with companies responsible for their total supply chain emissions. The reporting must be globally harmonised across all companies with an independent system of verification.

2

Update or introduce binding legislation for reducing agricultural emissions (including methane) with concrete targets that reduce livestock numbers, ruling out offsets and unproven short-term technological solutions. Governments must do the following as first steps:

- Stop the expansion of industrial livestock production (no new factory farms or expansion of existing factory farms).
- Stop the expansion of industrial animal feed production and prioritise diverse food for people over animal feed.

3

Create a time-bound strategy and implementation plan to shift public funds away from large-scale animal agriculture (including feed) to incentivizing and expanding a food system based on agroecology that adequately supports farmers and workers in that transition.

4

Introduce policies that eliminate overconsumption of animal products and shift dietary patterns towards healthy ecological plant-based foods.

CORPORATE PROFILES: LACK OF REAL ACTION IN BIG MEAT AND DAIRY CLIMATE PLANS

INTRODUCTION

The meat and dairy sectors' focus on 'corporate social responsibility' efforts give their current business a green makeover, even as investor networks such as FAIRR are highlighting increased climate risks for large scale intensive livestock operations.[108] Instead of embracing the inevitable, a shift to a healthy, more plant based diet, companies are working hard to preserve the status quo as shown in section 2.3 of the report.

This **special inset of the report** explores in more detail the insufficient climate change mitigation plans of 10 corporations, some operating globally, but also some that are of national or regional relevance. The profiles are divided by sector (meat companies followed by dairy) and ranked by methane emissions starting from the largest emitters. Together, these profiles provide a glimpse of 'the wild west' nature of these companies' climate plans; demonstrating the flawed approach to climate mitigation of meat and dairy companies which is systemic across geographies. These plans lack consistent and harmonised benchmarks and targets across companies. Their self reported data lacks independent verification. This makes it impossible to compare companies and their progress towards real climate action. They reveal that their climate plans remain largely a public relations exercise, particularly since the bulk of these companies' emissions lie under Scope 3 which are the emissions stemming from the animal products they process in their supply chains.

MEAT COMPANIES

JBS S.A.

HEADQUARTES	BRAZIL		
ANNUAL TURNOVER (2023)	US$ 72.9bn[109]		
CEO	GILBERTO TOMAZONI		
PRODUCTION CAPACITY (HEADS/DAY, 2023)[110]	CATTLE: 75,741	PIGS: 131,500	CHICKEN: 13,800,000

The group

JBS claims to be the largest meat producer globally[111], number 1 in beef and poultry production and number 2 for pork[112]. It also engages in aquaculture, prepared foods, and, more recently, in plant-based protein alternatives.[113] In its 2023 results presentation to investors[114], the company lists massive investments into expanding meat production, amounting to over US$600 million*, with its business strategy for future expansion clearly set on growth in the meat sector.

"Our future growth story is supported by global industry growth indicators that project … a 70% increase in demand for animal protein." (JBS, 2023)[115]

No such investments are listed in this report for their production of plant-based protein though the company claims to be the number 1 producer of plant-based protein in Brazil and number 3 in Europe.[116] Their main vegan brand is Netherlands-based Vivera.[117] When JBS took over Vivera in 2021, that company's turnover reportedly amounted to US$100 million, corresponding to 0.2% of JBS's global turnover in the same year.[118]

The Group's climate action

JBS released a 'Net Zero Pledge' in March 2021,** committing to reduce its Scope 1

* New Seara factory with lines for breaded chicken and sausages, in Rolândia (PR), Brazil: R$1bn (~US$200)
New Principe Foods factory, in Columbia (MO), USA (for Italian meats and charcuterie): US$200mil
Expansion of the lamb unit in Cobram, Australia: US$20mil
Expansion of the cattle unit of Friboi in Diamantino (MT), Brazil: R$800mil (US$160mil)
Modernization of the largest chick hatchery in Brazil, located in Rolândia (PR): R$135mil (US$27mil)

** As of the writing of this report, this pledge has been taken offline, the JBS web-site dedicated to this pledge now refers back to the company's homepage. This

and 2 emissions by at least 30%, compared to those of 2019, with all 'residual' emissions to be offset. In its subsequent Sustainability Report for 2022[119] and also in that for 2023[120], this goal was further clarified to apply to a reduction of 30% of emission **intensity**, only. No evidence was found for a reduction commitment on the company's Scope 3 emissions in its Net Zero Pledge or in any of the two subsequent Sustainability Reports. The 2023 Sustainability Report, again not including concrete reduction targets on Scope 3, states on this: *"...we strive to achieve our goal to reduce the intensity of Scope 3 emissions through collaborative initiatives that improve both the environmental and financial performance of our supplier partners."*[121]

In its 2022 Sustainability Report, JBS announced plans to develop *"a robust Net Zero Roadmap that outlines our priorities and guides our actions over the next 17 years."*[122] The Net Zero Roadmap is not mentioned in its most recent 2023 Sustainability Report. Also an extensive search of publicly available data in September 2024 by the authors failed to reveal any such roadmap.

In its 2022 Sustainability Report,[123] JBS reported investments into the reduction of Scope 1 & 2 emissions amounting to US$123 million. In 2023, the company reported to have increased this investment to US$150 million,[124] i.e. adding a mere US$27 million in one year. According to JBS, 97% of its total emissions come from its Scope 3 supply chain emissions.[125] Yet investments into Scope 3 climate action were limited to a mere US$5 million in 2022[126], with no increase in 2023[127]. This investment in the reduction of Scope 3 emissions thus represents 4% of their investments in the reduction of Scope 1 & 2 emissions, 1.5% of their advertising budget and 0.06% of the company's gross profit in 2023.[128]

In its 2023 Sustainability Report[129] JBS finally released absolute emission numbers for Scope 1, 2 and 3, claiming decreases against the 2019 baseline across all three Scopes. JBS notes on the reported emission estimates, that it omits to include *"emissions associated with land use change as those calculations are currently being improved."*

might well be related to recent decisions from bodies in the US and a lawsuit on JBS's misleading claims (see Box "Company challenged on misleading environmental claims"). The actual pledge can still be accessed via archive.org. Quote from this pledge: "até 2030, a JBS reduzirá em pelo menos 30% as suas emissões dos escopos 1 e 2, em comparação com as de 2019."

!

Company challenged on misleading environmental claims

In April 2024, the State of New York sued JBS for violating the state's consumer protection rules.[130] JBS had allegedly ignored a recommendation by an industry advertising board* - also subsequently upheld by this board's appellate body[131] - to cease making *"unsubstantiated and misleading"*[132] claims to become net-zero by 2040. The state noted that the JBS Group planned to *"substantially increase its meat production over the coming years"* and therefore cannot *"feasibly meet its pledge because there are no proven agricultural practices to reduce its greenhouse gas emissions to net zero at the JBS Group's current scale, and offsetting those emissions would be a costly undertaking of an unprecedented degree."*[133] The state is demanding both civil penalties and *"all profits and ill-gotten gains"* from the violations[134] and could set an important and costly precedent in holding livestock companies accountable for their greenwashing.

* The National Advertising Division ("NAD") of the Better Business Bureau in the United States

The only measure to reduce emissions from livestock addressed extensively in JBS' 2022 sustainability report is feed additives. The company presents at length its financial contribution to research into 'scalable feed additives', at a time when the first such additive ('Bovaer') had already been approved by Brazil's regulatory authorities.[135] As of 2023, JBS continues *"to research and trial the best available enteric methane reducing technology in its feedlot operations"*.[136] In its reporting, JBS seems to fail to explain how feed additives could be distributed to the free-ranging cattle that much of JBS's production, for example in Brazil, is based on.[137] More recently, JBS reportedly has also focused on the production of biogas from livestock manure as part of its climate initiatives.[138]

In conclusion, it appears that JBS has yet to start tackling its Scope 3 emissions which stem from the number of livestock the company processes and which are the lionshare of its emissions. This might be due to the fact that JBS regards them as *"resulting from other activities in a supply chain and outside the direct management and influence* [of JBS]*"*.[139] Reducing the number of livestock that the company processes is under its direct influence, but JBS provides no indication of intent to move away from animal-protein based products, for instance, to those based on plant-protein. To the contrary, in recent years, JBS, alongside other companies, is reported to have invested millions into marketing to embed livestock farming and eating meat even deeper into the Brazilian culture, under the slogan - *"Agro is tech, Agro is pop, Agro is everything"*.[140]

BIGARD

HEADQUARTES	FRANCE	
ANNUAL TURNOVER (2023)	US$ 5.95bn[141]	
CEO	JEAN-PAUL BIGARD	
PRODUCTION (T/YR, 2023)[142]	BEEF: 455,040	PORK: 474,000

The group

Bigard claims to be the *"1st beef"* and *"3rd meat processor"* in Europe, marketing under well-known brands such as Charal, Bigard, and Socopa. Bigard also exports globally, to over 30 countries in Europe, Asia and Africa.[143]

The Group's climate action

Bigard's corporate social responsibility report from 2023 includes an emission reduction target only for Scope 1 & 2 - 10% *"in the next 4 years"*. In this report, Bigard also claimed reductions of 28% on Scope 1 and 42% on Scope 2 in 2022, against a 2011 baseline, on average, 2.8% per year for both Scopes combined. Bigard's commitment for the next 4 years (2.5% reduction per year) thus represents a continuation of this trajectory if not declining ambitions. No action plan has been presented in the report. Scope 3 emissions do not seem to exist for Bigard. They are not mentioned at any point in the sustainability report. To the contrary, the sustainability report stresses the need to maintain their meat production. The final section of the report is entitled *'The benefits of meat'*, highlighting the health benefits of meat and encouraging consumption. The company selectively chooses a metric different from that used in official dietary guidelines to make them more favourable for the beef industry, stating *"The current National Health Nutrition Programme recommends a maximum consumption of 700 to 750 grams of raw meat."*[144] The French National Health Nutrition Programme recommends consuming no more than 650g of meat (500g of meat (excluding poultry)[145] and 150g of 'charcuterie'[146]). Bigard's mindset is clearly not made for a 1.5°C pathway.

CREMONINI

GRUPPO CREMONINI

HEADQUARTES	ITALY	
ANNUAL TURNOVER (2022)	US$ 4.9bn[147]	
CEO	VINCENZO CREMONINI	
PRODUCTION (T/YR, 2022)[148]	BEEF: 439,251	PORK: 40,000

The Group

The Cremonini Group (Cremonini S.p.A) mainly operates through three majority-owned subsidiaries: Inalca S.p.A., Chef Express S.p.A., and MARR S.p.A., covering production, catering, and distribution, respectively.[149] Cremonini, through Inalca, claims to be the leading processor of beef in Italy, and a major one in Europe, with the capacity to raise 180,000 cattle per year in Italy.[150] It also claims to be a leading operator in the pork, bacon, cured meats & snacks sector in Italy.[151] In 2018, Inalca signed a supply chain agreement with McDonald's Italia to increase quality across the entire supply chain, from breeders to the final beef burger in McDonald's then 670 restaurants in Italy.[152]

The Group's climate action

In its 165-pages-long Sustainability Report 2022, Inalca dedicates four pages to its impact on climate change: two pages for how they measure emissions, and two pages for tables and charts detailing its Scope 1-3 emissions. Commitments to reduce these emissions are not listed. Inalca points to having signed the commitment for the establishment of a near-term target under the Science-Based Target Initiative. According to the SBTi's database, it did indeed sign on to such a commitment on January 1st, 2023, but as of writing this report, 21 months into that commitment, the company still hasn't got any near-term targets registered with the SBTi.[153] Inalca's 'Energy & Emissions' website does not provide any targets or detailed plans for reducing their emissions either, but talks about a new biogas plant.[154] Biogas also features high on Cremonini's sustainability webpage, which again fails to lay out the company's target commitments.[155]

DANISH CROWN

HEADQUARTES	DENMARK	
ANNUAL TURNOVER (2022/2023)	US$ 6.8bn[156]	
CEO	JAIS VALEUR	
PRODUCTION (HEADS/YR, 2022-2023)[157]	CATTLE: 0.8 million	PIGS & SOWS: 15.9 million

The Group

Danish Crown claims to be amongst the largest pork producers in Europe and the largest pork exporters in the world.[158] The company markets itself as a climate-ambitious company,[159] but its actual action on climate change remains highly insufficient, and the company has recently been found guilty of greenwashing by Denmark's highest court (more details below).[160]

The Group's climate action

Danish Crown has SBTi approved 2030 targets (against a 2019 baseline), including absolute emission reductions of 42% in Scope 1 & 2, emission intensity reductions of 20% in Scope 3, and a commitment to a Net Zero target by 2050.[161] Danish Crown's climate target on emissions from Scope 3, accounting for 97% of the company's emissions[162], is hence much less ambitious than its target for the remaining 3% in Scope 1 & 2. Furthermore, it is vague in that it lacks concrete measures to bring those emissions down.

On Scope 1 & 2 emissions, the only activities reported for 2022/2023 by Danish Crown are getting these targets approved and establishing new policies on 'carbon insetting' and genetically modified organisms (GMOs).[163] On Scope 3 emissions, the company's 2022/2023 activities are reported as getting more farmers enrolled in their 'Climate Track' programme and developing roadmaps for emission reductions at farm-level.[164] 'Climate Track' is primarily a data exchange programme between Danish Crown and its farmer suppliers, aiming to lower emissions through supporting best practices. It is a completely voluntary programme with no enforcement measures, and has shown limited success.[165]

The company appears to have no strategy to shift away from its meat-centric production towards more plant-based alternatives. To the contrary, its stated goal is *"Maintaining a sustainable production level for Danish pigs at the current level of 10-13 million."*[166] The report does not mention a target for increasing the production of plant-based alternatives.

In 2020, to achieve its pig production goals, Danish Crown launched a campaign promoting 'Climate Controlled Pork'[167], claiming a 25% reduction in emissions intensity since 2005.[168] According to the Danish NGO Danwatch, this claim was supported by a life cycle assessment (LCA) by Aarhus University, commissioned by Danish Crown.[169] According to subsequent investigations by Danwatch[170]:

1) The LCA did not adhere to ISO standards, omitting crucial factors like land use emissions, leading to underestimating Danish pork's climate impact.

2) Experts concluded that the 25% reduction claim was statistically unreliable and that it was within reasonable uncertainty that there had been no reductions at all.

3) Danish Crown heavily influenced the report, dictating content and downplaying the role of soy feed emissions.

In April 2024, the highest court in Denmark ruled that the statement 'climate-controlled' was misleading, violating Denmark's marketing act.[171]

CHAROEN POKPHAND (CP)

HEADQUARTES	THAILAND	
ANNUAL TURNOVER (2023)	US$ 1.68bn[172]	
CEO	PRASIT BOONDOUNGPRASERT	
PRODUCTION (HEADS/YR)	CHICKEN: [173] 685 Mio.	PIGS (partial coverage):[174] 5 Mio.

The Group

Charoen Pokphand (CP) ranks amongst the largest animal feed[175] and pig producers in the world[176], focussing in its pig business on the production of sows and piglets as opposed to meat. It is also a major global producer of chicken.[177] CP's emissions have not been calculated for this report, as the production data available for the company in the public domain are too incomplete. Contacted by Greenpeace Southeast Asia in August 2024, the company refused to provide complete production data for their global operation.

The Group's climate action

In 2021, CP published a report titled, *'Towards Net Zero'*[178] which lists 6 areas of climate action: renewable energy (incl. bioenergy), energy efficiency, waste management, afforestation, agriculture,

and transportation, without providing much detail on what action will be taken and what their milestones will be. Most notably, while the report lists *"reducing emissions from livestock"*, it fails to provide information on how this is to be achieved. The company's methane emissions are not addressed, except implicitly through their plans to increase the use of manure for the production of biomethane. CP's goal to achieve Net Zero Emissions by 2030 (in Scope 1 & 2) seems ambitious but entails only a 50% reduction in the company's actual emissions, the rest is to be compensated for by carbon removals elsewhere, apparently mainly by supporting communities in tree planting, i.e. offsetting.

A look at the company's 2023 Sustainability Report[179] does not paint a better picture. Where CP reports on its self-set sustainability targets, the climate section is virtually void of any progress on emission reductions. There is no reference to the target of reducing absolute Scope 1 & 2 emissions by 50% by 2030. The claimed reduction in product emission intensity of 24.1% is limited to Thailand and is not backed up with any data. Instead, the company highlights selling products with green labels that promise carbon reduction or even carbon neutrality. The climate section then goes on to talk about initiatives to reduce waste, with no apparent link to climate change.[180] In essence, CP appears to take people's trust for granted, as barely any of the stated climate achievements can be verified, without additional information being provided by the company.

Missing Accountability under the Haze

In Southeast Asia, animal feed production has been associated with local and transboundary haze pollution. According to an analysis by Greenpeace Thailand, in the lower Mekong region, 41% of the regional transboundary haze results from fire hotspots linked to industrial plantations of maize for feed.[181]

Without transparency and traceability in meat, feed and dairy companies' supply chains, it is challenging for consumers and regulators in the region to make the link between these products and the environmental and health impacts of transboundary haze on local and indigenous people. The Thai Government, under the *'The Ayeyawady - Chao Phraya - Mekong Economic Cooperation Strategy'* (ACMECS) cooperation framework, created an economic strategy in 2004 that is reported to have benefitted Charoen Pokphand[182] to invest in industrial maize for feed production under contract farming in the neighbouring countries, especially in Myanmar and Laos. A study by Greenpeace Thailand found that the expansion of maize monoculture for feed grains was responsible for over 1.9 million hectares of deforestation in the lower Mekong region from 2015-2023.[183] Greenpeace Thailand is calling for a full disclosure of business operations and traceability requirements at every step of CP's supply chains across its businesses.

DAIRY COMPANIES

LACTALIS

HEADQUARTES	FRANCE
ANNUAL TURNOVER (2023)	US$ 31.9bn[184]
CEO	EMMANUEL BESNIER
MILK INTAKE (2022)	22.6Mt[185]

The group

By volume, Lactalis is listed as the 2nd largest dairy processor in the world.[186] The company has a strong focus on the production of cheese, marketed under well-known brands such as President, Galbani, Parmalat, and Kraft.[187] Lactalis claims to operate globally in over 50 countries, marketing its products in 150 countries.[188]

The Group's climate action

In September 2024, Lactalis received approval of their emission reduction targets from the SBTi, with key elements including "to reach net-zero greenhouse gas emissions across the value chain by 2050", "to reduce absolute Scope 1 and 2 GHG emissions 46.2% by 2030 from a 2019 base year" and "to reduce Scope 3 FLAG GHG emissions 30.3% by 2030 from a 2021 base year….[and] 72% by 2050". While Lactalis' targets clearly relate to absolute emission reductions for Scope 1 and 2, no such clarification is given for the lion share of their emissions in Scope 3 (94%[189]). Their Scope 3 targets also include a reference to unspecified 'removals', which could be understood as Lactalis including carbon removals from offsetting, e.g. tree planting, in their accounting to reach their targets.[190] The description of Lactalis' targets on the SBTi dashboard does not include information on measures to reach those targets.

In their 2022 Sustainability Report, the company refers to some Scope 3 emission reduction measures, but fails to present any concrete ones. The report only mentions assessing emissions at farm level, technical support to farmers and incentivising farms to produce milk with a lower carbon footprint. It also elaborates on experimental projects with technological fixes such as feed additives - the company referring to Bovaer and linseed oil - as well as increasing carbon storage in soils. In its more recent 2023 Sustainability

Report, Lactalis states to have *"worked to refine its climate roadmap for Scope 3, which is currently being validated by the SBTi."*[191]

Lactalis appears to be banking on reducing Scope 3 emission intensities instead of actual emissions. This comes as no surprise as Lactalis increased its milk intake by a staggering 50% between 2016 and 2022, based on data provided by industry analysts' IFCN.[192] This is the strongest growth in milk intake amongst the top 20 milk processors worldwide, as reported by IFCN in the same data set. In September 2024, Lactalis announced to procure 9% less milk in France, sending shockwaves through the country's farmers community - but not out of concerns for our climate, but because of the "volatility and unpredictability" of rgw global market for milk. The company apparently did not present any transition plan for impacted farmers.[193]

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FONTERRA

HEADQUARTES	AUCKLAND, NEW ZEALAND
ANNUAL TURNOVER (2023)	US$ 15.1billion[194]
CEO	MILES HURRELL
MILK INTAKE (2022)	17.6Mt[195]

The group

Fonterra is reported to be New Zealand's largest producer of greenhouse gas emissions.[196] It is listed as the 3rd largest processor of milk in the world[197] and also one of the world's largest dairy exporters.[198] It operates as a cooperative with approximately 9,200 farmer shareholders.[199]

95% of Fonterra milk is exported overseas[200], primarily in the form of ingredients like milk powder and casein.[201] While Fonterra claims that *'milk helps feed the world'*,[202] a significant portion of these ingredients ultimately end up in confectionery, baked goods and ice cream.[203]

The Group's climate action

In November 2023, Fonterra committed itself to Net-Zero by 2050.[204] Its 2030 targets are aligned with the SBTi's requirement for 1.5°C aligned targets, and SBTi's FLAG guidance.[205] These 2030 targets include a 50% absolute reduction in Scope 1 & 2 emissions, and a 30% intensity reduction in its Scope 1 & 3 land-based emissions, using 2018 as a baseline.[206]

According to the company, Scope 3 emissions make up 93% of its emissions, methane accounting for 52% of those.[207] Yet, their Climate Roadmap contains very little on reducing methane emissions. Fonterra's use of intensity-based targets for Scope 3 emissions would allow the company to increase its greenhouse gas emissions if production were to increase. In this scenario, the company would still be able to claim that it had met the Scope 3 targets outlined in its Climate Roadmap. In their response to Greenpeace Nordic prior to the release of this report, Fonterra pointed to having achieved an *"absolute reduction of ~1.9MT of CO_2e … delivered from our baseline year of 2018"*. According to their 'Climate-related Disclosure 2023' this appears to refer to their Scope 3 emissions between 2018 and 2023[208] and would be equivalent to a 7.3% decline. According to the same report, Fonterra's Scope 3 emissions originate to 98% from 'purchased goods and services', i.e. mainly from the milk they purchase. The report also states a decline in emissions intensity of

4.2% for Scope 1-3 and 2.1% for Scope 1 & 3 FLAG* only. It appears that much of the company's claimed reductions in absolute Scope 3 emissions could be due to reduced milk intake, rather than from reductions in emission intensity. In fact, for the period 2019 to 2022, Fonterra reported a decline from 18.6 million tonnes to 17.6 million tonnes milk solids collected.[209] According to IFCN data for Fonterra from 2018 to 2022, the company's milk intake went down by 25.8%.[210]

The 30% Scope 1 & 3 on-farm reductions, are laid out in 3 categories, 'Innovating New technologies', 'Best Practice Farming', and 'Working with Nature'. Fonterra's Climate Roadmap, relies heavily on 'new technologies'[211]. 7% of the company's Scope 3 emissions reductions are planned to be met by techno-fixes.[212] These include feed additives, methane vaccines, and non-biological technological solutions (like muzzles for cows that capture methane after it has been emitted). A further 7% reduction is expected to come from what Fonterra calls 'best practice farming'.[213] This includes more efficient use of fertilisers, better nutrition for cows, minimising on-farm energy use, and selective breeding. The supplier of 'genetics' to Fonterra's farmers has a breeding programme to develop 'low emissions' cows.[214] These practices are far from what can be considered 'best practice', as long as Fonterra continues to maintain its current stocking rates of dairy cows.

A further 8% intensity reduction is expected to come from carbon removals, in the form of tree planting.[215] The final 8% is attributed to 'land-use change.' Some of Fonterra's emissions, the company reports, relate to the historic conversion of land to dairy farming, mostly through deforestation. The company banks on these emissions being considered fully accounted for by 2030: *"at the end of their 20 year responsibility window…in line with the draft GHG Protocol Land Sector and Removals Guidance"*.[216] In other words, for this final 8% percent reduction to materialise, Fonterra just has to wait until its 'responsibility window' expires. Both tree planting and land-use accounting are considered 'working with nature.'

This reliance on technological solutions avoids using known and available solutions that will have an immediate impact on methane emissions, such as a reduction in herd size. Furthermore, none of the roadmap's 'best practice farming' methods appear to be enforceable. For a company claiming that *"we need to act now to contribute to a future where global temperature increase is limited to 1.5°C"*,[217] its roadmap is gambling on future solutions to solve today's problems.

Fonterra's Climate Roadmap also includes a Zero Deforestation Commitment by 2025.[218] However, the company is still using palm kernel expeller (PKE),[219] a cheap animal feed from the palm oil industry, associated with deforestation, human rights abuses and the destruction of rare wildlife habitats. Fonterra's own 'grass-fed' standard, allows for up to 20% of a dairy cow's diet to be PKE.[220] The use of this product is likely to breach this Zero Deforestation standard, if continued into 2025. PKE is difficult to trace, because many different plantations provide kernels to the processing mills. In fact, Fonterra's main supplier of PKE, Agrifeeds, claims to only be able to trace 12% of its PKE to plantations,[221] which leaves the supply chain vulnerable to deforestation.

The Climate Roadmap also dedicates two pages to Fonterra's 'regenerative mindset'.[222] Fonterra claims that *'Many regenerative agricultural practices are inherent to the way*

***** FLAG - Forest, Land and Agriculture

we farm, with our pasture-based system and focus on improving the health and wellbeing of our animals, waterways and soil.'[223] These claims are inconsistent with the reality of ongoing animal welfare concerns,[224] and degradation of water across Aotearoa, due to intensive dairying.[225] Fonterra's major customer, Nestlé, has committed to *"20% of their key ingredients…sourced through regenerative agriculture methods by 2025, and up to 50% in 2030"*.[226] However, there is no internationally agreed definition of regenerative farming. To date, Fonterra has largely sought to rebrand existing practices as regenerative, reportedly drawing criticism from experts.[227]

Fonterra's Climate Roadmap relies heavily on techno-fixes, land-use accounting, and intensity-based targets that do not necessarily result in emission reductions. On paper, Fonterra's Climate Roadmap looks impressive, but a closer look appears to reveal the lack of meaningful reductions of methane, and a document carefully crafted to maintain business as usual.

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NESTLÉ

HEADQUARTES	SWITZERLAND
ANNUAL TURNOVER (2023)	US$ 83.6bn[228]
CEO	ULF MARK SCHNEIDER
MILK INTAKE (2022)	13.5Mt [229]

The Group

Nestlé has been reported to be the world's largest food company,[230] and is listed as the 5th largest processor of milk globally.[231]

It processes milk into baby formulas, coffee whitener, chocolate, ice cream, and more. It sources from farmers directly, but also from many of the other large dairy companies, including Lactalis, the Dairy Farmers of America, Arla and Fonterra.[232]

The Group's climate action

Nestlé committed to reducing emissions from Scope 1, 2 & 3 by 50% by 2030, compared to a 2018 baseline, and to become Net Zero by 2050. Their commitment covers only those 81% of their total emissions, which the company regards as within the Scope of its 'UN 1.5°C pledge'.[233]

The New Climate Institute (NCI), analysing the climate strategies of 51 major global companies in 2024,[234] rated Nestlé's Net Zero Roadmap as 'poor,' due to a lack of transparency and integrity. According to this report, Nestlé's climate pledge to reduce 50% of their emissions by 2030, is backed up by only 16-24% actual emission reductions. Offsets are still a major element in closing the gap, though Nestlé no longer calls them that, partially rebranding them as 'Scope 3 removals'.[235]

While the company points to *"agroforestry, silvopasture and the restoration of forests and peatland"* as major components of 'Scope 3 removals,'[236] their main activities seem to focus on eliminating deforestation from their 'primary supply chain'[237] and promoting 'regenerative agriculture.' [238]

Excluding deforestation from a company's direct suppliers is an absolute necessity, but to have an impact it must also apply to deforestation related to Nestlé's indirect suppliers. And even then, it does not address emissions from 'leakage' - where deforestation excluded from Nestlé's supply chain continues elsewhere, and does not decrease overall. Additionally, simply cleaning deforestation from supply chains does not mean the forests are protected and emissions prevented. As a part of commodity production landscapes, forests and nature need to be protected and restored.

The idea of compensating for livestock emissions through increased carbon storage in soils under 'regenerative agriculture' has been widely shown to be a distraction from real emissions reductions (see Section 2.3 on Greenwashing for more details).[239]

The measure to shift its product portfolio from dairy to plant-based products, appears unthinkable for the company. As their Global Head of Public Affairs stated in Nestlé's 2022 Sustainability Report: *"Some stakeholders would have us diversify from dairy altogether. That is not our way."* In line with this thinking, Nestlé developed a range of lactose-free milk products to establish new markets for dairy in Asia.[240]

Trust in Nestlé's climate plans is eroded by contradicting statements in its 'Road Map to Net Zero' such as *"we're promising to be net zero based on our 2018 baseline, no matter how much our company grows"*.[241] As the finance think tank *Planet Tracker* summarised - *"Nestlé seems to lack an exhaustive plan. Instead, it presents a series of initiatives which cannot demonstrate whether net-zero will be reached"* and *"its support of industry associations with a mixed position on climate risks is undermining the impact of its own climate intentions"*.[242]

ARLA

HEADQUARTES	DENMARK
ANNUAL TURNOVER (2023)	US$ 12.7bn[243]
CEO	PEDER TUBORGH
MILK INTAKE (2022)[244]	13.5Mt

The Group

Arla is organised as a dairy cooperative, owned by the farmers supplying the milk. It is listed as the 4th largest dairy processor globally,[245] operating mainly in Europe, with activities around the globe.

The Group's climate action

Arla is committed to a target of Net Zero by 2050, and to reducing absolute Scope 1 and 2 emissions by 63% by 2030, against a 2015 baseline.[246] For its much larger supply chain emissions - 96% of its total - Arla limits its commitment to reducing *"relative Scope 3 GHG emissions by 30% per tonne of standardised raw milk and whey intake by 2030."*[247] In other words, the company plans to reduce its emission intensity, but not necessarily absolute emissions from its supply chain. Arla points to optimising milk yields, sustainable feed, renewable energy, green fertiliser, biogas, carbon farming and breeding for achieving their reduction targets. Shifting from dairy to plant-based alternatives does not feature in their plans.

In 2023, Arla introduced a new *'Sustainability Incentive Model'*, claiming it would reward farmers that reduce their climate footprint through higher milk prices.[248] However, in June 2023, Arla's Swedish cooperative farmer representatives met[249] and voted on a motion[250] to strongly criticise this so-called *'Climate Check'* point system.[251] The motion asserts that the system pushed farmers into intensification, at the disadvantage of feeding animals perennial grasses in a form of managed grazing that provides better nutrition to cows and sequesters carbon as opposed to expanding the demand for more compound feed from industrial monocultures that contribute to a myriad of environmental problems. Seasonal grazing is also regarded as an important component of biodiversity protection in Sweden. As the farmers pointed out, heavier reliance on industrial compound feed also leads to higher use of artificial fertiliser and pesticides. Fourteen out of the 17 Arla districts reportedly approved this motion, with the remaining three approving the motion on the condition that some wordings change in the statement to the board.[252] This motion by almost all Swedish Arla farmers had

reportedly been ignored by the board, raising concerns about democracy in the cooperative which appears to be in name only.[253]

To provide evidence for the benefits of industrialisation of Swedish farms, the Swedish farmers union (LRF) and Växa, stating to be Sweden's largest cattle farmers association[254] started a study in 2023 that locked dairy cows in stables for 18 months[255], to show that this practice has no negative impacts on animal welfare. According to the animal welfare organisation Djurskyddet, Arla refused to guarantee to exclude milk from this experiment in their products (agreeing only to exclude it from their fluid milk sold in supermarkets as opposed to other dairy products).[256]

UNTERNEHMENSGRUPPE THEO MÜLLER

HEADQUARTES	LUXEMBOURG / GERMANY
ANNUAL TURNOVER (2023)	US$ 9.96bn[257]
CEO	STEFAN MÜLLER
MILK INTAKE (2022)	6.7Mt[258]

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The Group

The 100% family-owned Unternehmensgruppe Theo Müller (UTM) has become the leading German dairy group (reported to rank 14th globally in 2022[259]) thanks to a series of acquisitions in recent years,* with milk and dairy products reportedly accounting for more than two-thirds of its turnover.** The Group is represented by the Müller brand and other regional brands in its home market of Germany, and is also active internationally with national brands in the Netherlands, the Czech Republic, the UK[260] and Italy.[261] Neither the amount of milk processed nor the related greenhouse gas emissions are made public by UTM. The emissions calculated by the authors for this report are likely a gross underestimate, as they are based on 2022 milk intake figures from IFCN[262], i.e. before Müller expanded massively.

The group's climate plan

UTM communicates its sustainability activities through their so-called *'Efficiency Report'*. With regards to the group's climate impact, their 2023 Efficiency Report[263] provides virtually no information. UTM does not list its emissions, nor does it provide any commitment to group-level reduction targets. It points to having signed up to the Net Zero targets of the Science Based Targets Initiative (SBTi) in the first quarter of 2023. Signatories have two years to specify targets, but the SBTi database still fails to list any for UTM as of September 2024.[264] It remains wholly unclear to what extent, and how UTM plans to reduce emissions across its entire supply chain. This makes UTM as intransparent as other leading dairy companies in Germany. In 2023, Germany's ten largest dairy companies all refused to disclose their greenhouse gas emissions in a survey conducted by Greenpeace Germany.[265] In an analysis of the German dairy industry's greenhouse gas emissions commissioned by Greenpeace Germany based on an input-output analysis, UTM and its competitor Deutsches Milchkontor (DMK) combined accounted for around 40% of the total emissions of the dairy industry in Germany (28MtCO_2eq),*** putting the dairy industry in Germany only just behind the national steel industry with 33Mt, and well ahead of the chemical industry with 14 Mt.

* UTM acquired e.g. Landliebe (Germany) in 2024 and Yew Dairy (Ireland) in 2023. See news section of UTM.

** UTM does not provide precise information on this. The Dutch Rabobank publishes annual reports on the top 20 dairy companies in the world. Müller is in 14th place in the current edition from August 2023, with a dairy product turnover of 6.2 billion euros in 2022. With total sales of EUR 8.8 billion in 2022, this would be a share of 71%. Rabobank (2023). Global Dairy Top 20: Record Revenues Provoke a Reshuffle, Rabobank, Aug 2023

*** Note: emission figures calculated for UTM in this report (see table in Annex) are based on a different methodology than those from the earlier publication by Greenpeace Germany (GPD (2024)) and are hence not comparable. A large share of the difference is due to this report using emission factors from GLEAM 3. Those from GLEAM 2 produce emissions figures closer to those from the study commissioned by Greenpeace Germany and released in 2024 (GPD (2024)).

ANNEX 1

Table 1: Estimated methane emissions of 29 meat & dairy companies, as compared to the reported ranking of the 100 largest corporate methane emitters in the fossil fuel sector (Source: Greenpeace Nordic own estimates presented in this report; Influence Map (2024)

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
1	GAZPROM	8.04
2	NATIONAL IRANIAN OIL CO.	5.84
3	COAL INDIA LTD.	5.10
4	SAUDI ARAMCO	5.05
5	JBS	4.52
5	SONATRACH	3.20
6	CNPC	3.12
7	ROSNEFT	2.40
8	ABU DHABI NATIONAL OIL COMPANY	2.33
9	EXXONMOBIL	2.21
10	CHEVRON	1.93
11	SHELL	1.91
12	MARFRIG	1.81
12	TOTALENERGIES	1.70

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
13	BP	1.68
14	NOVATEK	1.59
15	QATARENERGY	1.48
16	PETRONAS	1.40
17	TURKMENGAZ	1.34
18	EQUINOR	1.29
19	NIGERIAN NATIONAL PETROLEUM CORP.	1.29
20	PETROBRAS	1.15
21	GLENCORE	1.12
22	LUKOIL	1.11
23	MINERVA*	1.10
23	ENI	1.07
24	DAIRY FARMERS OF AMERICA	1.06
24	TYSON	1.05

* In a reply to Greenpeace Nordic prior to the release of this report, Minerva stated: “To measure GHG emissions from sources in the Brazilian agricultural sector, emission factors from the Fourth National Communication and Biennial Update Reports of Brazil to the United Nations Framework Convention on Climate Change (202 0) were used, and for purchased goods and services, Ecoinvent® (a bank of emissions factors based on life cycle studies) was used. Considering only methane gas (CH_4) emissions, in the three Scopes of the corporate inventory that include direct emission sources from own operations (Scope 1), indirect emissions related to the acquisition of electricity (Scope 2) and indirect emissions from 9 of the 15 Scope 3 categories, in 2023, 691,594.81 tons were emitted, 37% less than that disclosed in the study.”

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
24	EQT CORPORATION	0.98
25	CARGILL	0.97
25	PEABODY COAL GROUP	0.97
26	KUWAIT PETROLEUM CORP.	0.96
27	PEMEX	0.96
28	IRAQ NATIONAL OIL COMPANY	0.93
29	CONOCOPHILLIPS	0.92
30	SINOPEC	0.86
31	PETORO	0.84
32	LACTALIS	0.83
32	SOUTHWESTERN ENERGY	0.83
33	YILI	0.77
33	AMUL	0.77
33	CNOOC	0.76
34	CHINA MENGNIU DAIRY	0.75
34	BHP	0.74
35	EGYPTIAN GENERAL PETROLEUM	0.72

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
36	CHESAPEAKE ENERGY	0.71
37	CANADIAN NATURAL RESOURCES	0.65
38	PETROLEOS DE VENEZUELA	0.64
39	PERTAMINA	0.64
40	BUMI RESOURCES	0.62
41	COTERRA ENERGY	0.58
42	PETROLEUM DEVELOPMENT OMAN	0.58
43	PTTEP	0.56
44	OCCIDENTAL PETROLEUM	0.55
45	ARCH RESOURCES	0.55
46	FONTERRA*	0.55
46	BASF**	0.54
47	ONGC INDIA	0.52
48	LIBYA NATIONAL OIL CORP.	0.51
49	NESTLÉ	0.50

* In a reply to Greenpeace Nordic prior to the release of this report, Fonterra pointed out that according to their own calculation, their annual methane emissions (no year was given) amount to $0.44MtCH_4$.

** BASF is listed in the Carbon Majors database because of their ownership of Wintershall DEA. On Sep 3, 2024, however, BASF informed the public that it has sold its stakes in Wintershall DEA's exploration & production business to Harbour Energy plc, except the company's Russian activities. See BASF (2024) Sale of E&P business of Wintershall Dea to Harbour Energy completed, BASF AG, Sep 3, 2024

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
49	ARLA	0.50
49	AMERICAN CONSOLIDATED NATURAL RESOURCES	0.49
50	TOURMALINE OIL	0.49
51	SINGARENI COLLIERIES	0.49
52	ADARO ENERGY	0.47
53	REPSOL	0.47
54	SURGUTNEFTEGAS	0.47
55	ANTERO	0.47
56	EOG RESOURCES	0.46
57	BANPU	0.45
58	SERITI RESOURCES	0.45
59	EXXARO RESOURCES LTD	0.42
60	SASOL	0.39
60	FRIESLANDCAMPINA*	0.39
60	SAPUTO	0.39
61	DANONE	0.38

* In a reply to Greenpeace Nordic prior to the release of this report, FrieslandCampina contested our methane emission estimates, pointing to its Annual Report 2023 for comparison. This report, however, fails to detail CH_4 specific emissions.

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
61	WOODSIDE ENERGY	0.37
62	BAPCO ENERGIES	0.37
63	BIGARD	0.37
63	WH GROUP	0.36
63	OVINTIV	0.36
64	NAVAJO TRANSITIONAL ENERGY COMPANY	0.34
65	INPEX	0.34
66	CENOVUS ENERGY	0.33
67	ECOPETROL	0.33
67	GLANBIA*	0.33
68	ALLIANCE	0.32
68	CREMONINI**	0.32

* Glanbia informed Greenpeace Nordic prior to the release of this report, that the company sold its share of its Irish dairy processing business, Glanbia Ireland, in 2022, followed by the sale of its UK/Ireland based mozzarella business, Glanbia Cheese. Glanbia's subsequent milk intake was hence reduced to 5.6Mt. The emission estimates calculated here for the company are based on their 2022 milk intake of 9Mt, as reported by the IFCN (2022), to ensure consistency across all dairy companies assessed for this report. Glanbia disputed the accuracy of this figure, as they had sold major parts of their dairy business throughout 2022. Methane emissions resulting from their reduced milk intake of 5.6Mt would be equivalent to 0.21$MtCH_4$ according to our estimates.

** Different from other meat companies profiled in this report, calculated emission estimates for Cremonini are based on meat production volumes, not number of animals slaughtered, as Cremonini has a strong focus on meat processing, not only on the production of meat. The model used in this report to calculate GHG emissions on company level, actually uses emissions per kg of dairy or meat products. The calculated emission figures for Cremonini are hence fully comparable with those of the other companies. For transparency - the meat processed by Inalca annually (439,251t beef and 40,000t of pork) corresponds to the slaughtering of 1.86 million cattle and 707,000 pigs. Inalca itself slaughters 756,000 cattle per year (Inalca (2023))

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
69	RWE	0.32
70	ORLEN	0.31
71	DEVON ENERGY	0.30
72	YPF	0.29
73	PIONEER NATURAL RESOURCES	0.29
74	CNX RESOURCES	0.29
75	CONTINENTAL RESOURCES	0.29
76	OMV GROUP	0.27
76	CALIFORNIA DAIRIES	0.27
77	SANTOS	0.26
78	ADANI ENTERPRISES	0.26
79	MÜLLER*	0.25
79	TECK RESOURCES	0.24
80	AGROPUR	0.24
80	NAFTOGAZ	0.23

* Emission estimates calculated for UTM in this report are based on a different methodology than those from the earlier publication by Greenpeace Germany and are hence not comparable. A large share of the difference is due to this report using emission factors from GLEAM 3. Those from GLEAM 2 produce emissions figures closer to those from the study commissioned by Greenpeace Germany and released in 2024 (GPD (2024)).

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
81	APA CORPORATION	0.23
82	LEPRINO	0.22
82	CONSOL ENERGY	0.22
83	SONANGOL	0.21
84	DANISH CROWN	0.20
84	LAND O'LAKES	0.20
84	DMK*	0.20
84	SUNCOR ENERGY	0.19
85	MARATHON OIL	0.18
85	SAVENCIA	0.18
85	SODIAAL	0.18
86	ANGLO AMERICAN	0.18
87	HESS CORPORATION	0.17
88	ALPHA METALLURGICAL RESOURCES	0.15
89	WHITEHAVEN COAL	0.15

* In a reply to Greenpeace Nordic, DMK stated that the emission intensity specific to their milk intake the company regards to be 21.53g/kg raw milk. With a milk intake of 5.5Mt (confirmed by DMK), this would result in emissions of 0.12$MtCH_4$/yr, hence lower than the estimate Greenpeace Nordic arrived at in this report (0.20$MtCH_4$/yr).

Fossil Fuel Companies
Meat & Dairy Companies
Reported Annual CH_4 emissions (in $MtCH_4$, 2022)
Estimated Annual CH_4 emissions (in $MtCH_4$, 2022)

RANK	COMPANIES	EMISSIONS
90	PETROECUADOR	0.13
91	NORTH AMERICAN COAL	0.12
92	KIEWIT MINING GROUP	0.12
93	MURPHY OIL	0.11
94	SM ENERGY	0.09
95	WESTMORELAND MINING	0.07
96	WOLVERINE FUELS	0.06
97	SYRIAN PETROLEUM	0.04
98	VISTRA	0.04
99	TULLOW OIL	0.02
100	OBSIDIAN ENERGY	0.02

ANNEX 2: METHODOLOGIES

1. MEAT AND DAIRY EMISSIONS MODELLING

For projecting future warming impacts, emission profiles modelled for this report are converted to future global mean surface air temperature change using the online version of MAGICC Model version 7,[266] with default inputs. The model is run using emissions inputs from 2015 to 2050, isolating the warming impacts associated with emissions from global meat and dairy production and consumption using the methods described in Ivanovich et al. (2023).[267] The model's translation of emissions to global average temperature rise is inclusive of climate feedbacks associated with increased greenhouse gas emissions. The background emissions profile for all emissions other than those stemming from meat and dairy production and consumption is associated with the Shared Socioeconomic Pathway (SSP) SSP585 emissions projections[268], but the effect of all other natural and anthropogenic emissions is subtracted out. While the global average temperature rise attributed to an isolated source (here, meat and dairy production and consumption) is sensitive to the historical background greenhouse gas concentrations – for example due to the logarithmic relationship between CO_2's radiative efficiency and concentration – Ivanovich et al. (2023) demonstrated that this effect is marginal and does not influence result interpretation.

Country-scale meat and dairy consumption projections are sourced from the Food and Agricultural Organization,[269] represented as the balance between food use, feed use, and other uses for each country through the mid-century. Food items included in the analysis are: 'Beef and veal', 'Pigmeat', 'Poultry meat', 'Sheep and goat meat' and 'Raw milk'. Emission rates in kg CO_2eq/kg food item and the fraction of those aggregate emissions stemming from CO_2, CH_4, and N_2O are sourced directly from Ivanovich et al. (2023). The warming impacts associated with the emissions of each gas are isolated using the same methods outlined in Ivanovich et al. (2023). Due to limitations in the small number of studies which report explicit emissions of individual greenhouse gases (in contrast to the many which report life cycle assessment results in aggregate CO_2e emissions), Ivanovich et al. (2023) does not differentiate between studies which do or do not include land use change in their life cycle assessments when calculating the percent breakdown of individual gas emissions from aggregate values reported in Poore and Nemecek (2018)[270] for each food item. This likely underestimates the share from CO_2 associated with global food consumption, and particularly for livestock emissions. As additional life cycle assessments are conducted in the future with more granular reporting on individual greenhouse gas emissions, these relationships should be analysed explicitly.

The emissions intensity for each food item used in the main analysis presented here are represented by the mean value reported in Poore and Nemecek (2018). As in Ivanovich et al. (2023), we run a sensitivity test for the Business As Usual consumption patterns using the 5th and 95th percentile emissions intensities for each meat and dairy item analysed, and find that the confidence intervals for the 2050 global average temperature rise associated with these emissions is 0.21-0.93°C. However, we note that these two extremes represent a situation in which the entire world's production of

these meat and dairy items are produced using the most efficient or least efficient methods currently employed on Earth, which is not realistic of our actual food system. They were therefore excluded from the main analysis but presented here for reference.

For projections 2 and 3: Reductions are applied against the investigated meat and dairy food items listed above based on the rates recommended by the EAT–Lancet diet.[271] Daily consumption rates of beef, lamb, and pork are split evenly between the three food items (whereas these are aggregated in the EAT–Lancet diet). For each food item, conversions from kg per food item to kcal per food item are pulled directly from Ivanovich et al. (2023)'s Dietary Consumption Emissions Database (Supplementary Materials). Population projections are pulled from the FAO database. High- and middle-income country classifications are defined by the World Bank.[272] Reductions in per capita meat and dairy consumption are applied linearly starting in 2025 and implemented by 2030 to match the EAT–Lancet Diet.

2. COMPANY LEVEL EMISSIONS ESTIMATES

This report provides calculated methane emission estimates for 29 companies, based on best publicly available production data and widely used conversion and emission intensity factors provided by the UN FAO (see below for details). As direct methane measurements for methane emissions are not feasible at scale, all such estimates depend on assumptions with varying degrees of uncertainties and geographical granularity.

Companies profiled in this report

For dairy, the report examines the 20 largest dairy producers worldwide, according to industry analysts from IFCN. For meat, the report covers 9 meat processing companies, amongst them some of the largest global producers, as well as some of more regional relevance.

Data sources

Meat and dairy production figures

Dairy: for consistency, milk intake figures by company have been sourced from IFCN[273] for all companies and refer to 2022. Note, these can differ from a company's own figure.

Meat: production figures for meat companies are based on either meat production or number of animals slaughtered, resp. slaughtering capacity, and have been taken from the respective companies' publications or from industry reports.[274] These figures cover cattle, pigs and poultry and refer to 2022 and 2023 in nearly all cases.

Note: Where we have compared our estimated emission numbers with other actors or entities, we have done so based on the fact that each meat and dairy company is responsible for its full Scope 3 emissions. Adding up the estimated emissions of multiple companies may not equate to an accurate count of tonnes of methane, but should instead be understood as a collection of responsibilities, some of which may be overlapping in terms of methane tonnes.

Calculating emissions from production figures

In 2018, The Institute for Agriculture and Trade Policy (IATP) and GRAIN developed a methodology for calculating the GHG emissions from meat and dairy companies, with the results published in the report Emissions Impossible.[275] The model these organisations set up was based on emission factors retrieved from the FAO's Global Livestock Environmental Assessment Model[276] (GLEAM, version 2.0), as well as IPCC's 5th Assessment Report (AR5) for GWP figures.[277] The GLEAM model takes into consideration multiple factors, differentiated by region. IATP and Changing Markets Foundation used this methodology in their subsequent 2022 report Emissions Impossible: Methane Edition, updating the model to AR6 GWP figures.[278] Since the release of the Emissions Impossible series of reports,[279] an updated GLEAM model (version 3.0) was published in 2022, with reference data relating to the year 2015.[280] Friends of the Earth U.S. and Profundo updated the model used by CMF and IATP with the new factors provided by FAO GLEAM 3.0, for their report 'Bull in the Climate Shop'

released in April 2024.[281] It must be noted that some of the factors used in the GLEAM model changed substantially and render direct comparison with earlier data, based on GLEAM 2.0, inappropriate. Greenpeace Nordic is grateful to all the above-mentioned organisations and thanks their authors for granting access to the latest iteration of the model.

It shall be noted here that emissions reported by the companies examined in this report, either in public or in direct response to Greenpeace Nordic prior to the release of this report, may differ from the estimated emissions calculated in this report. This is mainly due to companies using different methodologies from each other and from that used for this report (based on the FAO GLEAM 3.0 model). Some companies whose emissions we have calculated use emissions factors drawn from public national sources. In others cases, emissions factors are sourced from their suppliers, often via 3rd party service providers and platforms. For example, in their response, Minerva, e.g., pointed to Ecoinvent® as the source for their Scope 3 related factors, DMK to Agrar-Klimacheck. Data from such service providers are usually not freely available in the public domain, if at all, and hence not easily available for public scrutiny. With no consistency across companies and lack of full transparency on conversion and emission intensity factors across the meat and dairy sectors, Greenpeace Nordic regards UN FAO's GLEAM 3.0 as the best publicly available model to estimate corporate emissions based on the best available and consistent production data for those companies. All 29 companies examined in this report had the right to comment on our main findings and calculations linked to their business activities. Where those did, their responses are reflected in footnotes to Table 1 in the Annex 1. Our calculations of these companies' emissions serve as indicators of the scale of these corporations' livestock-related emissions. Precise estimates of corporate emissions can only be achieved through harmonised, full and consistent disclosure and third-party independent verification of company data, including the number of animals in their global operations. The aim of this report is to highlight the magnitude of their emissions and the urgency for governments to enact mandatory reporting and emissions reductions from the livestock industry.

The emission estimates calculated for this report cover emissions related to feed, land use change, enteric fermentation, manure

management, direct & indirect use of energy, and post-farm CO_2 emissions. They hence cover Scope 1, 2 and 3 emissions that can be described as follows:[282]

SCOPE 1

Emissions are direct emissions from owned or controlled sources.

SCOPE 2

Emissions are indirect emissions from the generation of purchased energy.

SCOPE 3

Emissions are all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

In the context of meat and dairy processing companies, this is mainly emissions from animals purchased for slaughter and milk or meat purchased for processing.

Comparison of methane emissions from meat & dairy with the fossil fuel sector

In this report, we compare the calculated emission estimates for meat and dairy companies according to the methodology outlined above, with reported methane emissions of corporate actors in the fossil fuel industry. These 2022 methane emission data from the fossil fuel industry have been taken from the 'Carbon Majors Database' compiled by the non-governmental organisation InfluenceMap.[283] For our comparison, we only included investor- or state-owned companies as listed in this database. The emissions reported in the Carbon Majors Databases for fossil fuel companies usually far exceed those reported by the companies themselves in their publications. This is mainly due to oil companies not fully including Scope 3 emissions in their self-reporting.

Our comparison is based on absolute methane emissions in million tonnes CH ($MtCH_4$). It should be noted that the global warming potential (GWP) of methane differs by source. Compared to biogenic methane from e.g. livestock, the GWP for methane from leakage in the fossil fuel sector - as reported in the Carbon Majors database - is higher by a factor of 1.1 on a 100 year timescale (GWP100; 27 (biogenic) vs 29.8 (fossil fuel - fugitive and process). On a more near-term, 20 year time scale (GWP20), this factor is reduced to 1.04 (79.7 (biogenic) vs 82.5 (fossil fuel - fugitive and process).[284]

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Image captions:

Page 7 Drôme, France. Ecological farming in France. Ecological farming relies on biodiversity, soil protection, water and climate.
© Emile Loreaux / Greenpeace

Page 18 Kisumu County, Kenya. Farmers in Kenya are effectively applying ecological farming practices that are increasing their ability to build resilience to and cope with climate change.
© Cheryl-Samantha Owen / Greenpeace

Page 29 The dairy factory farm near the town of Caparroso, Spain, has multiple rows where the calves are kept, without the possibility to move around, only standing in the same spot, deprived of any contact with their mothers. According to official numbers provided in documents from the government of Navarre, in November 2018 the farm had 5,531 adult cows, 60% more than authorised through the Environmental Integrated Authorization.
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Page 35 Dairy factory farm in Caparroso, Spain.
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Page 37 A cattle farm in Mato Grosso, Brasil. The Amazon rainforest is being deforested at an alarming pace primarily for cattle ranching.
© Daniel Beltrá / Greenpeace

Page 39 Canal structure at intensive livestock factory farm in France. Brittany is one of the French regions where a very large number of factory farms are concentrated.
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Page 45 Cows in the milking facility in a conventional dairy farm in Lower Saxony, Germany. © Fred Dott / Greenpeace

Page 48 Climate protest at Fonterra dairy giant HQ in Auckland, Aotearoa.
© Bryce Groves / Greenpeace

Page 51 Activists from Greenpeace and Djurens Rätt (Animal Rights) visit a large «kosläpp» outside Uppsala, Sweden, to inform visitors that the Christian Democrats, the Swedish Federation of Farmers (LRF) and dairy goods producer Arla are pushing to abolish the legal right of dairy cows to graze.
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Page 52 Greenpeace activists protest at the Bärenmarke dairy Hochwald in Mechernich (NRW), Germany, which processes milk from tethered cows. The cows are kept in conditions that violate animal welfare laws.
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Page 66 Demonstration against pig factory expansion in Denmark.
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Page 68 Aerial view of a pig farm near Rislev, Næstved, Denmark.
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