Intro

A science based, data-driven approach to simulate, scenario plan & accelerate reduction of climate impact in the beef industry.

Summary

What you will learn

This report provides comprehensive guidelines with a ranking order determined based upon several key science based insights that influence the balance between reducing carbon emissions, land-use and achieving cost efficiency within the beef production industry.

This ranking aims to guide sustainability teams, innovation, R&D, finance, supply chain, procurement & manufacturing/ processing teams to collaborate and priorities an efficient and adaptable roadmap towards investments that balance environmental benefits with economic viability. Evaluating trade-offs in projects that offer direct, measurable impacts on emissions reduction and have clear pathways to enhancing operational efficiency and cost savings towards the Science Based Targets & Net Zero commitments will be key to win in the market towards 2030.

Who is it for?

- **Food industry & retailers who want to create an transparent & actionable pathway**
- **Sustainability teams, innovations, manufacturing, procurement , sales & marketing who want to collaborate more efficiently**
- **SBTi/Net Zero committeed companies or companies planning to commit**

What's the big planetary challenge?

Even after accounting for improvements in the beef production efficiency, pastureland could expand by an estimated 400 million hectares, an area of land larger than the size of India, between 2010 and 2050. The resulting deforestation could increase global emissions enough to put the global goal of limiting temperature rise to 1.5-2 degrees C (2.7-3.6 degrees F) out of reach.

Background

The health of our planet is deeply intertwined with our own well-being. This link extends to how consumers behave, often showing a gap between what they say they'll do and what they actually do.

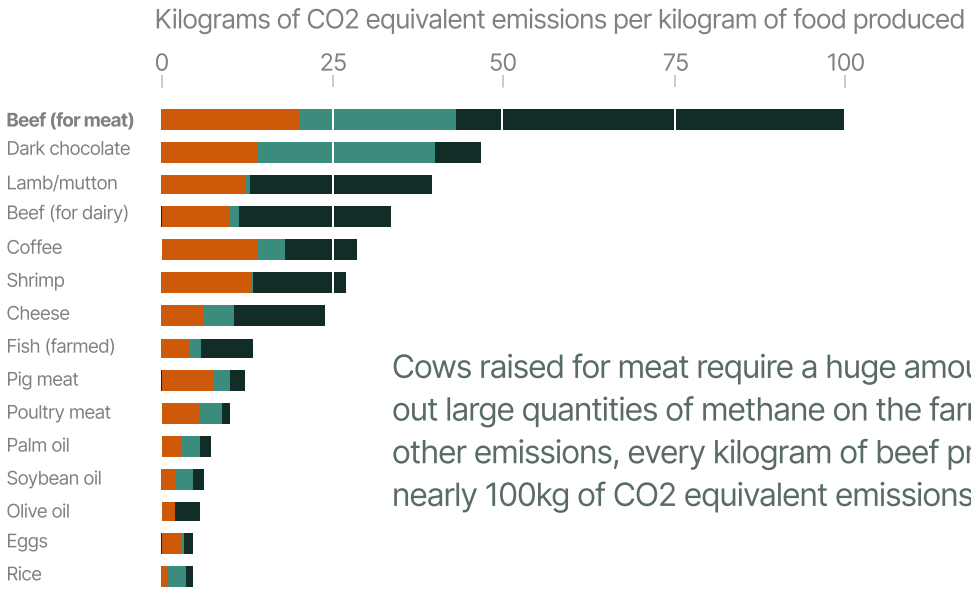
Companies now face a crucial decision: should they follow consumer believes or make independent choices based on what's truly best for the planet? Some necessary actions and investments are too complex to explain to consumers or track through traditional methods. But the beef industry has to start being forward thinking and bold in their transition.

Recent events from an article in the Guardian, like New York's lawsuit against JBS, the world's biggest meat company, show how urgent transparency & real climate transition action plans are in the beef industry.

Cows and other animals emit methane, a potent greenhouse gas, mostly through digestion and manure. Since methane warming potential is 28 times higher over 100 years than carbon dioxide's, every ton of methane emitted impacts the climate over two dozen times more than a ton of carbon dioxide.

When measured in a shorter time frame, over the course of just 20 years, methane's impact is even more dramatic, causing about 85 times more warming a ton than CO2. Increased beef demand requires also more land-use & feed which are drivers of emission.

Land-use and farm activities account for the largest share of emissions for most animal products, including beef



Cows raised for meat require a huge amount of land and burp out large quantities of methane on the farm. Combined with other emissions, every kilogram of beef produced accounts for nearly 100kg of CO2 equivalent emissions

Source: Poore and Nemecek, 2018, "Reducing food's environmental impacts through producers and consumers" via Our World in Data.

At COP26, global leaders pledged to cut methane emissions by 30% and stop deforestation by 2030. Tackling beef-related emissions is vital to meeting these goals and fighting climate change.

But conversations about beef and sustainability can get tricky. While meat is nutritious and crucial for many diets, it also uses resources poorly and harms the environment. Understanding these trade-offs is hard, which is why we need close collaboration, transparency through digital tools and investments to make real progress.

Given all this complexity, it's crucial to provide guidance that everyone can understand, whether they're experts or not. This guide aims to answer common questions from people across the industry, helping everyone make informed decisions and work towards a more sustainable future.

The implications of inaction

Inaction in the beef industry towards Science Based Targets (SBT) and Net Zero emissions carries significant operational implications. However, if global livestock enteric methane emissions are cut in half from 2019 to 2039—as might be possible through improved breeding, using feed additives, and other practices—about 6.4 gigatons of CO2-warming equivalent would be eliminated.

Regulatory Compliance: The new CSRD regulations and commitment to emission reduction targets could result in non-compliance with evolving environmental regulations, leading to potential fines and penalties.

Supply Chain Resilience: With increasing consumer demand for sustainable products, failure to adapt operations to reduce emissions may result in supply chain disruptions.

Market Access: Companies that do not meet SBT and Net Zero targets may face barriers to market access as retailers set higher requirements on suppliers and consumers prioritise products with lower environmental footprints, impacting sales and market share.

Reputation Management: Lack of action on emissions reduction may damage the reputation of beef producers, leading to loss of consumer trust and negative brand perception, affecting long-term viability and profitability.

Innovation and Efficiency: Embracing & integrating SBT and Net Zero goals can drive innovation and efficiency improvements within the beef industry, leading to cost savings and competitive advantages in a rapidly evolving market landscape.

Overall, proactive measures to address emissions, land-use, water & waste in the beef industry are crucial for ensuring regulatory compliance, maintaining supply chain resilience, accessing markets, managing reputation, and driving innovation and efficiency.

The key steps towards a transparent plan to sustainable actions

STEP 1: Set strategy towards Science Based Targets & financial targets.

STEP 2: Impact analysis: Simulation & scenario plan

STEP 3: Compare, choose & plan projects.

STEP 4: Collaborate across departments , optimise investments & cost savings.

STEP 5: Decide, act and measure progress.

Step 1: Set strategy towards Science Based Targets & financial targets

1

Establish clear Science Based Targets including your FLAG targets (SBTs) for emissions reduction across the value chain, focusing on key areas such as methane emissions from cattle, energy transformation and carbon emissions from feed production.

2

Implement sustainable farming practices, including regenerative agriculture techniques, to reduce emissions intensity per unit of beef produced and enhance soil carbon sequestration.

3

Invest in research and development to innovate new technologies and practices for emissions reduction, such as feed additives to reduce methane emissions from cattle and alternative feed sources with lower carbon footprints.

4

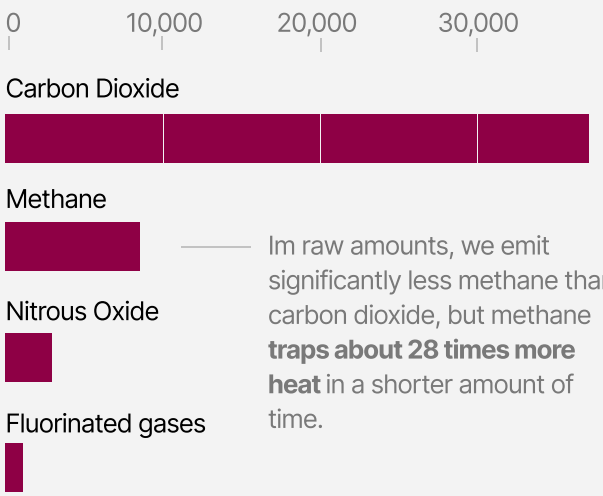
Collaborate with stakeholders across the supply chain, including farmers, processors, retailers, and consumers, to drive collective action towards SBTs and foster transparency and accountability in emissions reporting and reduction efforts.

5

Educate and incentivise farmers to adopt sustainable practices through training programs, financial incentives, and certification schemes, fostering a culture of continuous improvement towards science-based aligned practices in the beef industry.

Methane accounts for a quarter of the warning of carbon dioxide

Emissions measured in millions of tonnes of CO_2 equivalent, which is the amount of CO_2 that would generate the same amount of warming for each gas



Im raw amounts, we emit significantly less methane than carbon dioxide, but methane **traps about 28 times more heat** in a shorter amount of time.

Source: Climate Watch, 2019 data.

Step 2: Impact analysis: Simulation & scenario plan (3 examples)

1 Technology & Method: Low-Methane Feed Formulation

Description: Implementing a low-methane feed formulation involves incorporating specific additives into cattle diets that are proven to reduce methane emissions from enteric fermentation. Key additives include fats, oils (rich in poly-unsaturated fatty acids), and other compounds such as 3-Nitrooxypropanol (3-NOP), nitrate, and seaweed, particularly Asparagopsis taxiformis. This approach can be applied in both large-scale and small-scale operations, making it a versatile solution for reducing carbon emissions.

Impacts:

Environmental Impact: Significant reduction in methane emissions from cattle, contributing to lower greenhouse gas emissions from beef production.

Operational Impact: Potential improvements in feed efficiency and animal health, which could lead to lower feed costs and improved productivity.

Improved Efficiency and Productivity in Beef Production follows closely, as it encompasses a broad range of practices (feed optimization, genetic selection, etc.) that not only reduce emissions but also enhance production efficiency, offering tangible economic benefits alongside environmental ones.

Supports with Numerical or Statistical Values:

3-NOP has been shown to reduce methane emissions by approximately 30% in beef cattle on a grass silage-based diet

Seaweed (Asparagopsis taxiformis) supplementation can reduce methane emissions by more than 80% in controlled trials

Incorporating fats and oils into the diet has also been recognized for their methane reduction potential, with specific results varying based on the type and amount used.

2 Technology & Method: Enhanced Efficiency and Productivity Practices

Description: This approach involves adopting a suite of practices aimed at improving the overall efficiency of beef production processes. These practices include but are not limited to advanced feed formulations, genetic selection for higher growth rates, improved grazing and pasture management, and precision agriculture technologies. The goal is to reduce the greenhouse gas emissions per unit of beef produced by increasing the amount of beef produced per input (feed, water, land) and reducing methane emissions from enteric fermentation and manure.

Impacts:

Environmental Impact: Significant reduction in methane and nitrous oxide emissions through improved feed efficiency, better manure management, and enhanced grazing practices.

Operational Impact: Higher productivity and efficiency can lead to reduced costs per unit of beef produced, potentially increasing profitability for producers.

Supports with Numerical or Statistical Values:

Methane Reduction: By optimising feed efficiency and adopting enteric methane inhibitors, methane emissions can be reduced by up to 20% to 98%, depending on the specific additive and its application.

Productivity and Efficiency: Improved grazing management and feed efficiency can enhance beef production efficiency, with studies indicating potential reductions in emissions intensity over time.
However, absolute emissions can continue to rise if overall production expands without additional land conservation measures.

Cost Implications: While the article did not provide specific numerical values for cost savings, the implication is that improved efficiency leads to better use of resources, which can translate into cost savings. For instance, more efficient feed use reduces the amount of feed needed, and improved animal health decreases veterinary costs.

3 Technology & Method: Enhanced Grazing Management

Description: Enhanced Grazing Management (EGM) involves implementing strategic grazing practices that optimize pasture utilization, improve livestock health, and increase soil carbon sequestration. Techniques such as rotational or mob grazing are used to mimic natural grazing patterns, allowing vegetation recovery, enhancing biodiversity, and improving soil structure and health. This approach is tailored to European landscapes, considering the region's diverse climates and pasture systems.

Impacts:

Environmental Impact: EGM can lead to increased carbon sequestration in soil, reduced erosion, and improved water retention. By enhancing soil health and vegetation cover, these practices contribute to biodiversity conservation and resilience against climate change. Implementing EGM in Europe's varied agricultural regions can demonstrate a commitment to sustainability and environmental stewardship.

Operational Impact: Higher productivity and efficiency can lead to reduced costs per unit of beef produced, potentially increasing profitability for producers.

Supports with Numerical or Statistical Values:

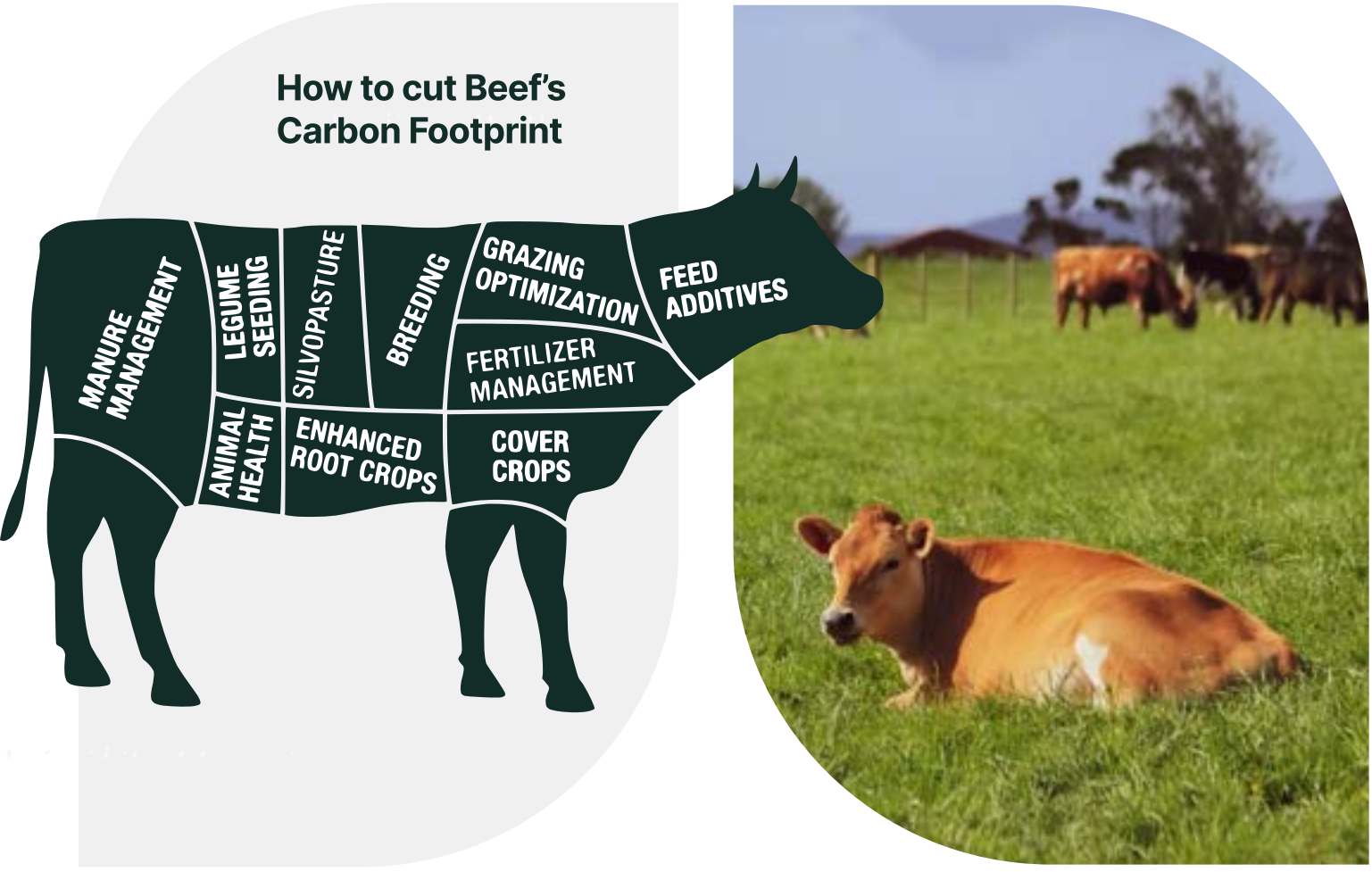
While specific figures vary by implementation and region, studies indicate that well-managed grazing systems can significantly enhance soil carbon stocks. For example, rotational grazing practices have been shown to improve soil organic matter, which is crucial for carbon storage. The adoption of EGM practices across Europe's beef production systems can play a crucial role in achieving the agricultural emission reduction targets set by the European Union's Green Deal.

Step 3: Compare, choose & plan projects
(a sample of ideas)

How to prioritise, simulate impact and make the right trade offs everyday are key challenges for companies today. Usually we hear it is a “gut feel” for the decision and planning is done in spreadsheet or in powerpoints with ad hoc budget allocated and results usually analysed at the end of the year. We brought in 8 science based validated project areas which can be analysed and planned out to transform the business towards more sustainable practices.

Project Prioritisation

The ranking order was determined based on several key factors that influence the balance between reducing carbon emissions and achieving cost efficiency within the beef production industry. This ranking aims to guide clients towards investments that balance environmental benefits with economic viability, prioritizing projects that offer direct, measurable impacts on emissions reduction and have clear pathways to enhancing operational efficiency and cost savings.



1

Low-Methane Feed Formulation

was ranked highest due to its direct impact on reducing methane emissions—a potent greenhouse gas—while being relatively easy to implement within existing feed systems. The potential for significant GHG reduction with additives that are already available and tested provides a clear path for immediate improvements.

2

Enhanced Grazing Management Systems

Is prioritised for its dual benefit of improving soil carbon sequestration and enhancing pasture management, which translates into better livestock health and potentially lower feed costs, making it a practical and eco-friendly choice for producers.

3

Integrated Livestock Management System (ILMS)

Combines several approaches (precision agriculture, feed optimization, manure management) that together can significantly lower emissions and improve farm productivity, although it may require substantial initial investment and reorganisation.

4

Precision Agriculture Technologies in Beef Production

Ranks in the middle due to the potential for significant efficiency gains and emissions reductions through optimised input use. However, the cost and complexity of implementing advanced technologies can be barriers to adoption.

5

Renewable Energy Integration

Offers a long-term strategy for reducing reliance on fossil fuels and lowering GHG emissions. Its lower ranking reflects the higher initial investment costs and longer timeframe for realizing cost savings and environmental benefits.

6

Carbon Capture Utilisation and Storage (CCUS)

Is recognized for its potential to drastically reduce emissions. However, its complexity, regulatory hurdles, and high implementation costs place it lower in terms of immediate cost efficiency for the agriculture sector.

7

Manure Management Technologies

Are critical for emissions reduction but are ranked lower due to the specific conditions required for optimal efficiency and the varying economic returns based on the scale of application and the ability to utilise byproducts effectively.

8

Feed Additives for Methane Reduction

Appears again at the bottom of the list, similar to project 1, due to its specific focus on a wider range of additives. It's a crucial area for emission reduction but requires careful consideration of the cost-benefit ratio and the impact on livestock productivity.

Step 4: Collaborate across departments, optimise investments & cost savings

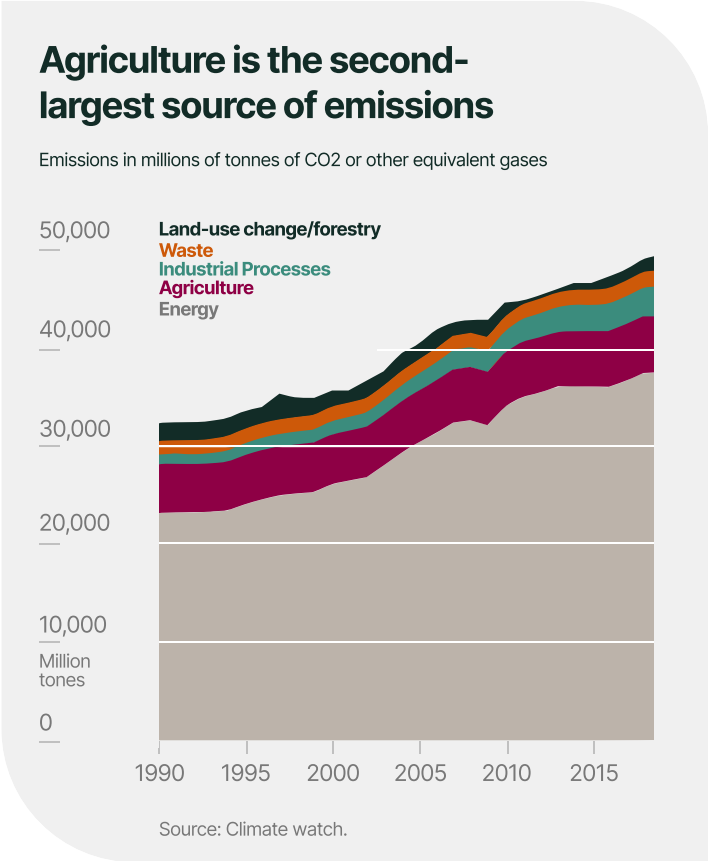
Practical implementation examples for collaborating with stakeholders and educating farmers in the beef industry to adopt science-based aligned practices:

Supply Chain Collaboration:

- Establish industry-wide working groups or committees involving farmers, processors, retailers, and consumer representatives to develop and implement emission reduction strategies.
- Host regular stakeholder meetings or forums to share best practices, discuss challenges, and coordinate efforts towards achieving Science Based Targets (SBTs).
- Implement traceability systems in the supply chain to track emissions data and ensure transparency in reporting and progress towards targets or learnings of what didn't work.

Farmer Education and Incentives:

- Offer training programs and workshops for farmers on sustainable farming practices, such as rotational grazing, pasture management, and optimised feed formulations to reduce methane emissions.
- Host regular stakeholder meetings or forums to share best practices, discuss challenges, and coordinate efforts towards achieving Science Based Targets (SBTs).
- Implement traceability systems in the supply chain to track emissions data and ensure transparency in reporting and progress towards targets or learnings of what didn't work.



Research and Development Support:

- Invest in research partnerships with agricultural universities and institutions to develop innovative technologies and practices for emissions reduction in beef production.
- Provide funding or grants for on-farm trials and pilot projects to test the effectiveness of new emission reduction strategies in real-world conditions.
- Facilitate knowledge sharing and collaboration between farmers and researchers to ensure practical application and adoption of research findings on the ground.

Consumer Engagement:

- Educate consumers about the environmental impact of beef production and the importance of supporting sustainably produced beef and make sure it is inline with green claims regulations.
- Launch consumer-facing campaigns or initiatives to promote awareness of Science Based Targets and encourage demand for beef products from producers who are actively working towards emission reduction goals. Transparency usually wins in the long run.
- Provide consumers with transparent information about the emission footprint of beef products through labelling or online platforms, empowering them to make informed purchasing decisions that align with their values.
- By implementing these strategies, the beef industry can effectively collaborate with stakeholders, educate farmers, and drive collective action towards achieving Science Based Targets and fostering a culture of continuous improvement in emissions reduction efforts.

Step 5: Decide, act and measure progress

Strategy to action usually takes up to 36 months in the industry today, from initial analysis to final presentation with plenty of stakeholders, internal and external, who needs to give there input, usually in excel, emails and power points. End of the process when decisions are taken, many still don't know if it was the right decision or how to evaluate different scenarios towards targets, it's usually based on past information. If the industry is going to hit the targets, reduce the risk of inaction, and optimise & implement the right investments & resources towards more sustainable operations, data-driven insights & digitalisation, it is key to speed up this process.

Those data points shall be easily visualised to show the long term impact to avoid articles and risk of being sued ie the JBS in New York. Focus on streamlining the decision-making process.

Streamline Decision-Making Process:

Reduce decision-making time frames from analysis to implementation by leveraging data-driven insights and digitalisation. Aim for a more agile process to adapt quickly to changing market dynamics and sustainability goals.

Centralise Data Management:

Consolidate scattered data from various systems and stakeholders into a single, unified platform. Ensure all decision-makers have access to a centralised source of truth for informed decision-making.

Visualise Long-Term Impact:

Utilise data visualisation tools to clearly illustrate the long-term impact of decisions on sustainability targets and potential risks. Visual representations help decision-makers understand the implications and make informed choices to avoid negative outcomes.

Engage Stakeholders Early:

Involve key stakeholders early in the decision-making process to gain buy-in and alignment on sustainability goals and targets. Foster collaboration and communication to ensure all voices are heard and accounted for.

Implement Key Metrics and Track Progress:

Establish key metrics aligned with Science Based Targets Initiative (SBTi), FLAG and other climate targets. Continuously track progress against these metrics to identify gaps and adjust strategies accordingly. Regular monitoring allows for timely interventions to stay on track towards sustainability goals

Commit. Plan. Act.

About Unibloom

The predictive collaboration platform enable sustainability teams & operations to calculate & simulate projects, forecast impact, optimise cost & investments, resources & tradeoffs, towards Science Based Targets, in minutes, everyday.

Engaging all teams to collaborate & invest towards one climate action plan.

What is SBTi?

Science-based targets show businesses how much and how quickly they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change.

Why act in line with SBTi?

- **BIG RETAILERS IE IKEA, MCDONALDS, TESCO, AHOLD, ICA ET AL HAVE COMMITTED TO SBTI**
- **BUILD TRANSPARENCY & TRUST AMONG TALENTS**
- **STAY AHEAD OF REGULATIONS & MITIGATE FUTURE BUSINESS RISKS**

Contact Unibloom to find out more

Contact us if you want to learn more on how Unibloom's Platform can help you make the right trade-offs, material choices and investment allocations in the consumer goods industry.

Contact **anna.sandgren@unibloom.world**

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