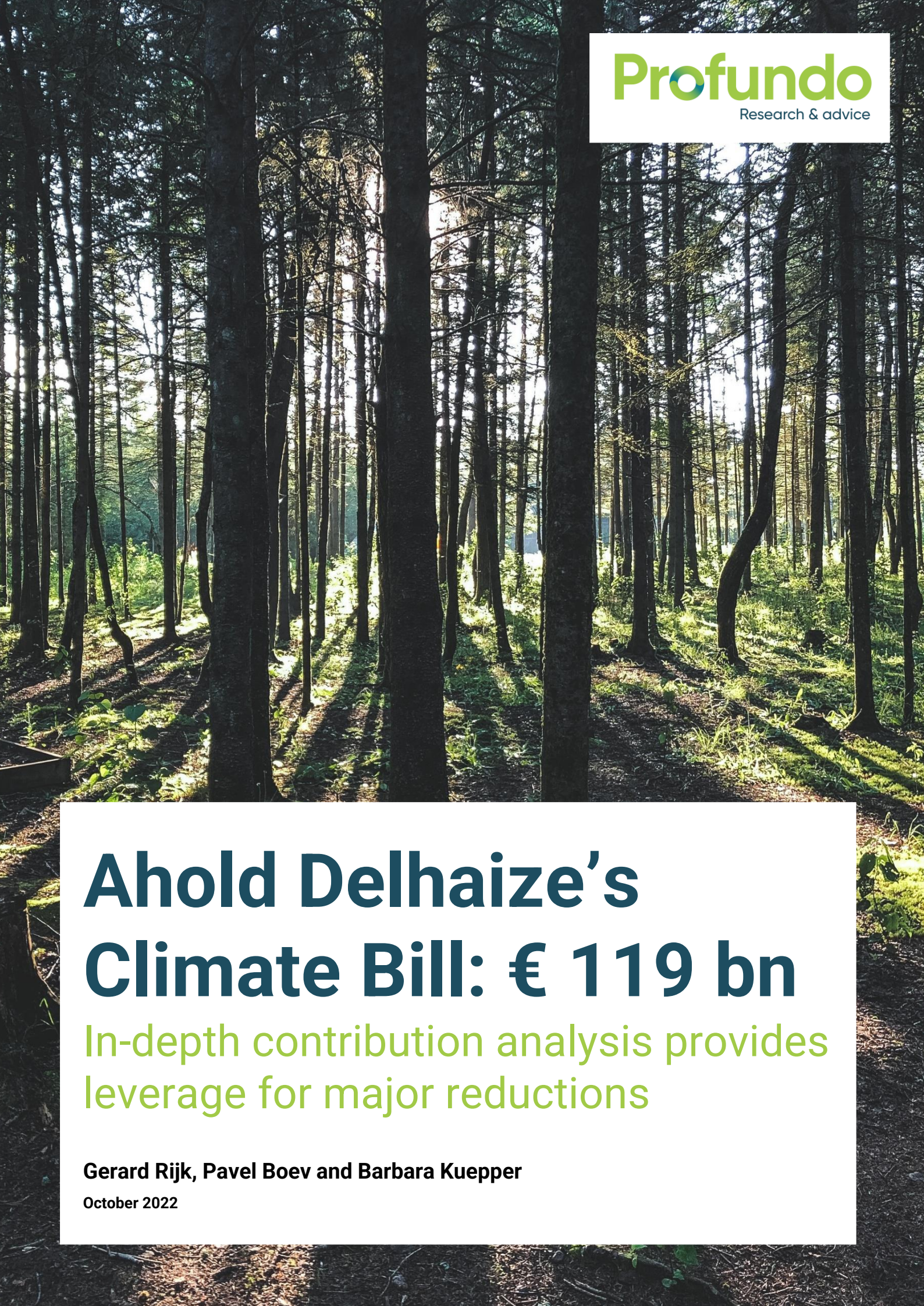

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Ahold Delhaize's Climate Bill: € 119 bn

In-depth contribution analysis provides leverage for major reductions

Gerard Rijk, Pavel Boev and Barbara Kuepper

October 2022

About this report

This report has been commissioned by Milieudefensie.

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Summary

Ahold Delhaize is one of the leading food retailers globally. Its activities are connected to large emissions of greenhouse gases. Currently, Ahold Delhaize's profit & loss account and its balance sheet do not reveal any costs item related to GHG emissions or climate damage. The reason is that in all jurisdictions the focus for GHG emission trading systems and certificates is centred on energy-intensive sectors. This occurs while Ahold Delhaize's 2020 GHG emissions were 69 million tons, of which 96% scope 3. The company has plans to achieve net-zero emission for scope 1 & 2 in 2040 (-50% in 2030 versus base 2018), and for scope 3 in 2050 (-15% in 2030).

The methodology for the valuation of climate damage costs and liability is through valuing the CO_2-emission cost on the current price of $C0_2$-equivalent (CO_2e) emissions, which is in 2022 around € 80 per ton. With Ahold Delhaize's existing plans for emission reduction towards 2050, the company will have accumulated a climate damage liability of € 119 billion until 2050. The starting year is set at 2015, in line with the international community's agreement to GHG reduction targets in the famous Paris 2015 agreements. A delay by Ahold Delhaize in reaching this target or postponing measures to the latter part of the 2022-2050 period, would raise this bill further.

The liability of € 119 billion is more than four times Ahold Delhaize's current market capitalisation. The annual climate damage costs in 2022-2040 significantly exceed the 2021 net profit level.

The significance of an acceleration of the scope 3 zero-emission target to 2040 is revealed by recalculated outcomes for the total GHG emissions in 2015-2050. The accumulated emissions would decline by 29% versus the existing scenario and the climate damage liability would decline to € 84 billion. The annual climate damage costs versus net profit would also be considerably mitigated.

Ahold Delhaize uses several data sources to extrapolate supply chain emission data to arrive at its total estimated scope 3 emissions. This study uses one of these tools in combination with various estimates on country-level market shares in food sales and consumption of animal products. The study at hand arrives at a similar total volume of CO_2e emissions as Ahold Delhaize. It results in annual scope 3 CO_2e emissions of 27.9 million tons linked to animal product sales across all the retailer's geographies, or around 42% of its total reported scope 3 emissions in 2020. Out of this volume, an estimated 2.0 million tons (7.2% of emissions related to animal products or 3.0% of total scope 3 emissions) is linked to indirect land use change (iLUC). This includes the production of feed crops, which is often connected to deforestation and biodiversity loss. This estimate is conservative as no iLUC was included in the emission factors for the U.S., assuming that land conversion to produce soy and other protein crops is more relevant in South America (the U.S. meat and dairy industry relies mostly on domestic commodities).

The breakdown by type of animal product suggests a large role for meat products, accounting for an estimated 80% of these emissions (13% for dairy). While many factors influence these approximates and insecurities remain especially in relation to geographic influences, this value confirms the important role of a reduction especially of meat in aiming to cut scope 3 emissions on the short term.

Ahold Delhaize's emissions face material contributions from its gas stations at U.S. supermarkets, and from plastic packaging globally. Fuel has a large scope 3 footprint, contributing an estimated 6.4-8.1% to total emissions of Ahold Delhaize. The company has no specific reduction targets for this large category. Plastic packaging forms another large category in emissions due to its production and its (lack of) waste handling, contributing an estimated 3.5% to total emissions

Ahold Delhaize's suppliers demonstrate different levels of climate maturity. Relying purely on their efforts for reaching the retailer's scope 3 emissions reduction goals may not be realistic. More engagement and clearer guidance may be required. For retailers, scope 3 emissions predominantly are derived from their upstream (purchased goods and services) and to a somewhat lesser extent downstream (use of sold products) value chain. Thus, in an effort to achieve tangible GHG emissions reductions results, it is crucial to ensure that the commitments of and their implementation by key suppliers are in line with the retailer's goals.

Twenty key suppliers of Ahold Delhaize's (selected depending on their product portfolio, global presence or regional importance) demonstrate different patterns in terms of their climate plans. Although 50% already report on scope 1, 2 and 3 emissions, 60% at least on scopes 1 and 2, and the majority are committed to net-zero by 2050, just three have ambitious interim targets, envisaging a reduction of at least 45% by 2030 against a 2019 baseline. Whether net-zero commitments are based purely on absolute emissions reduction or also include offsetting is often open to speculations. Few suppliers boldly state that offsetting will be used as a supplementary measure, not counting towards their net-zero targets. The majority of companies do not mention offsetting at all, which, however, does not mean that they will not resort to it later on, in particular if closer to the 2030/2050 deadlines they realise that the progress has been slower than anticipated.

It is also important that the bar is raised for the entire retail sector, and that best practices in climate reporting and commitments are adopted by the major players. The study therefore compares some of the major retailers in the EU, the UK, and the U.S. which in terms of their size, product mix and geographical coverage may be considered as Ahold Delhaize's peers. These include Tesco, Walmart, Casino Group, Kroger, Aldi, and others. Overall, based on their strategies and disclosures, we can assume that Ahold Delhaize is on par with the industry benchmarks. Its reported scope 3 emissions (65.93 million tons of CO_2e) are comparable with those of Carrefour and Walmart, considering their size and geography of operations.

Many retailers already have programmes in place focusing on protein transition, either by developing less carbon-intensive insect-based feedstock (Tesco) or supporting the transition to a more plant-based human diet and are committed to further expanding the plant-based range and bringing the consumption of more plant-based products to the attention of customers (Jumbo). Moreover, it has been reported that 40% of leading food firms (including peers like Kroger and Tesco as well as Ahold Delhaize suppliers (Nestlé and Unilever)), now have dedicated teams for plant-based products. Thus, in the near future more attention to and practical actions on animal-based protein consumption and related GHG emission can be expected.

Ahold Delhaize's approach and scope of reporting is overall on par with the sector benchmark. However, the sector as a whole has still to improve granularity and to make its commitments and reporting more standardized, as well as more ambitious, if it is to become net-zero by 2050 or earlier. Considerable ambiguity persists in the actual calculations for the upstream scope 3 emissions, as many retailers fail to coherently explain which emission factors are used for the calculations, and why. Factors from databases like Big Climate, Agribalyse, and tools like Cool Farm and the Fieldprint Platform are often extrapolated over larger segments, geographies, or business units, which may lead to under- or overestimations of the reported value chain emissions.

Samenvatting

Ahold Delhaize is een van de toonaangevende supermarktketens wereldwijd. Hun activiteiten gaan gepaard met grote uitstoot van broeikasgassen. Momenteel bieden de winst- en verliesrekening en de balans van Ahold Delhaize geen transparantie ten aanzien van de kosten van broeikasgasemissie (in Engels: 'greenhouse gas' of GHG) of klimaatschade. De reden is dat in alle jurisdicties de GHG-emissiehandelssystemen en -certificaten zijn gericht op energie-intensieve sectoren; dit terwijl de GHG-emissies van Ahold Delhaize in 2020 69 miljoen ton bedroegen, waarvan 96% scope 3. Het bedrijf heeft plannen om in 2040 een net-zero (netto-nul)-emissie te bereiken voor scope 1 & 2 (-50% in 2030 versus basisjaar 2018), en voor scope 3 in 2050 (-15% in 2030).

De methodiek voor de waardering van klimaatschade en aansprakelijkheid is door de CO_2-emissiekosten te waarderen op de huidige prijs van $C0_2$-equivalente emissies, die in 2022 rond de € 80 per ton ligt. Met de bestaande plannen van Ahold Delhaize voor emissiereductie tot 2050, zal het bedrijf een aansprakelijkheid voor klimaatschade hebben opgebouwd van € 119 miljard tot 2050. Het startjaar is vastgesteld op 2015. Dit is in lijn met het jaar waarin de internationale gemeenschapde doelstellingen voor broeikasgasreductie op de klimaatconferentie in Parijs in 2015 ondertekend heeft. Als Ahold Delhaize vertraging oploopt in het bereiken van deze doelstelling, of als het bedrijf maatregelen richting het einde van de 2022-2050 periode uitstelt, worden de kosten voor Ahold Delhaize verder verhoogd.

De klimaatschade of aansprakelijkheid van € 119 miljard is meer dan vier keer de huidige marktkapitalisatie van Ahold Delhaize. De jaarlijkse klimaatschadekosten in 2022-2040 overtreffen de nettowinst van 2021 ruimschoots.

Het belang van een versnelling van de scope 3 net-zero emissiedoelstelling naar 2040 blijkt uit de herberekende uitkomsten voor de totale GHG-emissies in 2015-2050. De geaccumuleerde emissies zouden 29% lager zijn ten opzichte van Ahold Delhaize's bestaande doelstelling en de aansprakelijkheid voor klimaatschade zou uitkomen op € 84 miljard (versus € 119 miljard). Ook zouden de jaarlijkse klimaatschadekosten versus de nettowinst aanzienlijk lager zijn.

Ahold Delhaize gebruikt verschillende data-bronnen om emissiegegevens van de toeleveringsketen te extrapoleren om tot de totale geschatte scope 3-emissies te komen. Deze studie gebruikt één van deze databanken in combinatie met schattingen van marktaandelen op landniveau in voedselverkoop en -consumptie van dierlijke producten. De huidige studie heeft als eindresultaat een vergelijkbaar totaal volume aan CO_2e-uitstoot als Ahold Delhaize zelf presenteert. Het resulteert in een jaarlijkse scope 3 CO_2e-uitstoot van 27,9 miljoen ton die gelinkt is aan de verkoop van dierlijke producten in alle regio's waar de retailer zit, of ongeveer 42% van de totale gerapporteerde scope 3-emissies in 2020. Van dit volume is naar schatting 2,0 miljoen ton (7,2% van de emissies gerelateerd aan dierlijke producten, of 3,0% van de totale scope 3 emissies) gelinkt aan veranderingen in landgebruik (indirect Land Use Change (iLUC)). Dit omvat de productie van voedergewassen, die vaak in verband worden gebracht met ontbossing en verlies van biodiversiteit. Deze schatting is conservatief aangezien er geen iLUC is opgenomen in de emissiefactoren voor de VS, ervan uitgaande dat landconversie voor de productie van soja en andere eiwithoudende gewassen relevanter is in Zuid-Amerika (de vlees- en zuivelindustrie van de VS gebruikt voornamelijk binnenlandse grondstoffen).

De uitsplitsing naar type dierlijk product suggereert een grote rol van vleesproducten, die naar schatting 80% van deze emissies voor hun rekening nemen (versus 13% door zuivel). Hoewel veel factoren deze benaderingen beïnvloeden en er onzekerheden blijven bestaan, vooral met betrekking tot geografische invloeden, bevestigt deze waarde de belangrijke rol van een vermindering van met name vlees bij het streven naar vermindering van de scope 3-emissies op korte termijn.

Aan Ahold Delhaize's emissies wordt materieel bijgedragen door de tankstations bij de supermarkten in de VS, en door plastic verpakkingen, wereldwijd. Brandstof heeft een grote scope 3-voetafdruk en draagt naar schatting 6,4-8,1% bij aan de totale uitstoot van Ahold Delhaize. Het

bedrijf heeft geen specifieke doelstellingen voor reducties voor deze grote categorie. Plastic verpakkingen vormen een andere grote categorie in emissies vanwege de productie en de afvalverwerking daarvan (of het gebrek daaraan). Plastic verpakkingsmateriaal draagt naar schatting 3,5% bij aan de totale uitstoot van Ahold Delhaize.

De leveranciers van Ahold Delhaize vertonen verschillende niveaus van vooruitgang in klimaatbewustzijn. Louter vertrouwen op hun inspanningen om de doelstellingen voor scope 3 emissiereducties van Ahold Delhaize te bereiken, is wellicht niet realistisch. Meer betrokkenheid door Ahold Delhaize en duidelijkere begeleiding kan nodig zijn. Bij supermarkten worden scope 3-emissies voornamelijk veroorzaakt in hun upstream waardeketen (ingekochte goederen en diensten) en in mindere mate downstream (gebruik van verkochte producten). Om tastbare resultaten op het gebied van vermindering van de uitstoot van broeikasgassen te bereiken, is het dus van cruciaal belang ervoor te zorgen dat de doelstellingen van, en de uitvoering van maatregelen door, de belangrijkste leveranciers in overeenstemming zijn met de doelstellingen van Ahold Delhaize.

Twintig belangrijke leveranciers van Ahold Delhaize (geselecteerd op basis van hun productportefeuille of hun wereldwijde en regionale aanwezigheid) vertonen verschillende doelstellingen in hun klimaatplannen. Hoewel 50% rapporteert over alle drie de emissies (scope 1, 2 en 3), 60% ten minste over scope 1 en 2, en de meerderheid streeft naar net-zero (netto-nul) emissies in 2050, hebben slechts drie leveranciers ambitieuze tussentijdse doelstellingen, die een reductie van ten minste 45% tegen 2030 beogen (versus basisjaar 2019). Het is vaak onduidelijk of de nul-doelstellingen puur gebaseerd zijn op absolute emissiereductie of ook compensatie omvatten. Er zijn maar weinig leveranciers die verklaren dat compensatie zal worden gebruikt als een aanvullende maatregel, die niet meetelt voor hun net-zero doelstelling. De meerderheid van de bedrijven spreekt geheel niet over compensatie, wat echter niet betekent dat ze er later geen toevlucht toe zullen nemen, met name dichter bij de deadlines voor 2030/2050 als ze beseffen dat de voortgang langzamer is dan verwacht.

Ook is het van belang dat de lat voor de gehele supermarktsector hoger wordt gelegd en dat de leidende spelers voorgaan in ‘best-practices’ op het gebied van klimaatrapportage en -doelstellingen. De huidige studie vergelijkt daartoe enkele grote retailers in de EU, het VK en de VS die qua omvang, productmix en geografische dekking kunnen worden beschouwd als concurrenten van Ahold Delhaize, waaronder Tesco, Walmart, Casino Groep, Kroger, en Aldi. Op basis van hun strategieën en publicaties lijkt Ahold Delhaize niet uit de pas te lopen. De gerapporteerde scope 3-emissies (65,93 miljoen ton CO_2e bij Ahold Delhaize) zijn vergelijkbaar met die van Carrefour en Walmart, hun omvang en geografische positie in aanmerking genomen.

Veel retailers hebben al programma's die gericht zijn op de ‘eiwittransitie’, hetzij door minder CO_2e-intensieve, op insecten gebaseerde grondstoffen (Tesco) te ontwikkelen, of door de overgang naar een meer plantaardig dieet te ondersteunen, of zijn vastbesloten om het plantaardige assortiment verder uit te breiden en onder de aandacht te brengen (Jumbo). Circa 40% van de toonaangevende voedingsbedrijven (waaronder concurrenten zoals Kroger en Tesco en leveranciers van Ahold Delhaize (Nestlé en Unilever)) hebben speciale teams voor plantaardige producten. In de nabije toekomst zal er meer aandacht zijn voor praktische acties ten aanzien van dierlijke eiwitconsumptie en gerelateerde GHG-emissies.

De benadering en reikwijdte van de rapportage van Ahold Delhaize is over het algemeen vergelijkbaar met de hier gekozen sector-benchmark. De sector als geheel moet echter nog steeds gedetailleerder rapporteren en haar verplichtingen en rapportage meer gestandaardiseerd en ambitieuzer maken, wil ze tegen 2050 of eerder ‘net-zero’ bereiken. Er blijft grote onduidelijkheid bestaan over de feitelijke berekeningen voor de upstream scope 3-emissies, omdat veel retailers niet op coherente wijze uitleggen welke emissiefactoren voor de berekeningen worden gebruikt, en waarom. Factoren uit databanken zoals Big Climate, Agribalyse en tools zoals Cool Farm en het Fieldprint Platform worden vaak geëxtrapoleerd naar grotere segmenten, geografische gebieden of business units, wat kan leiden tot onder- of overschattingen van de gerapporteerde keten-emissies.

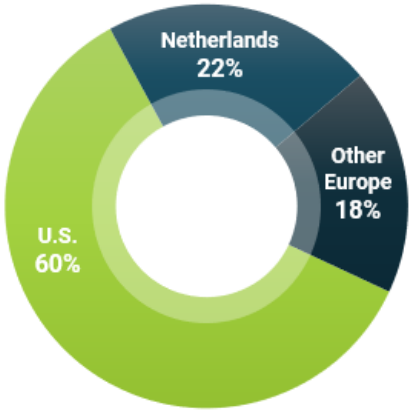
Abbreviations

CO_2e	Carbon dioxide equivalent
COP	Conference of the Parties
CSO	Civil Society Organisation
DFA	Dairy Farmers of America
EEA	European Economic Area
EPA	Environmental Protection Agency
Enterprise value	Market capitalisation + net-debt + minorities -/- associates
FAO	UN Food and Agriculture Organisation
GHG	Greenhouse Gases
GLEAM	Global Livestock Environmental Assessment Model
iLUC	Indirect Land Use Change
IMF	International Monetary Fund
Market capitalisation	Number of shares x share price
Net profit	Profit after tax
RTRS	Roundtable on Responsible Soy
SBTi	Science-based Target Initiative
SCC	Social Cost of Carbon
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

Introduction

Retailer Ahold Delhaize operates almost 7,500 stores under 19 banners in the United States, six European countries and Indonesia. With a turnover of € 75.6 billion in 2021, it is one of the largest retail groups in the world. The U.S. accounts for the largest share in turnover with 60% in 2021, followed by the Netherlands with 22% (Figure 1).

Figure 1 Ahold Delhaize turnover 2021



Note: Ahold Delhaize's joint ventures in Portugal and Indonesia are not consolidated.
Source: Ahold Delhaize (2022), *Annual Report 2021*..

The company's activities in these different countries are connected to large emissions of greenhouse gases (GHG). According to the company's own estimates, emissions totalled 69.5 million metric tons CO_2-equivalents (CO_2e) in 2020. The company currently strives to achieve net-zero emissions by 2050. An analysis by the New Climate Institute from July 2022 evaluated Ahold Delhaize's climate plans to have overall moderate transparency and low integrity. The latter refers especially to the lack of ambitious targets for reductions in the important scope 3 emissions. At the same time, a significant increase of these emissions over the last years has been recorded.[1] This while scope 3 emissions account for around 95% of the company's overall carbon emissions, especially from purchased goods and services linked to land-use related emissions for food production.[2]

Milieudefensie strives for a realistic climate plan by Ahold Delhaize to achieve net-zero emissions in 2050 in the context of a 1.5 degree scenario. Achieving net-zero would require a significant increase in vegetable protein consumption by 2030. In its requirements for a realistic climate plan, Milieudefensie has put the following requests to Ahold Delhaize:

- By 2030, 70% of Ahold Delhaize's protein turnover will be plant-based.
- By 2025, 80% of Ahold Delhaize's suppliers, including the 200 largest suppliers, will have a climate plan that complies with the Paris Agreement on climate change.
- By 2030, 50% of all Ahold Delhaize products will have a low carbon footprint and customers will be able to see the CO_2 emissions linked to purchases on their receipt.
- In 2023, Ahold Delhaize suppliers will no longer contribute to deforestation.

This report analyses Ahold Delhaize's carbon emissions. The overall approach to emission calculations and reduction targets is included in the analysis but the focus lies on scope 3 emissions, with animal products (meat, fish, dairy, and eggs) as key segments.

A summary of the findings of this report can be found on the first pages of this report.

1

Climate damage costs by Ahold Delhaize

Ahold Delhaize generates 69 million tons of GHG emissions annually, of which more than 95% scope 3 emissions. These emissions add up to high annual externalised costs and a large climate damage liability until 2050. In that year, Ahold Delhaize plans to achieve net-zero for scope 3 emissions. For scope 1 & 2, the net-zero target is 2040. This section concludes that Ahold Delhaize is facing an accumulated climate damage cost, or liability, of € 119 billion for the period 2015-2050. This is much higher than the retailer's current market capitalisation and enterprise value. The annual climate damage costs also exceed the annual net profit level. In the coming decades, sales prices would need to increase mid-single digit to pay for climate damage. A ten-year acceleration of the net-zero emission path for scope 3 to 2040 would significantly reduce its climate damage liability.

1.1 Current status of climate cost and/or liability reporting

Ahold Delhaize's profit & loss account and its balance sheet currently contain no item related to carbon cost, carbon liability or climate change. In the EU and globally, none of the carbon emission trading systems in operation are focussed on food retailers but rather on energy-intensive industry sectors. Energy-intensive sectors in the EU include oil refineries, steel works, and the production of iron, aluminium, other metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals, as well as commercial aviation within the European Economic Area (EEA).[3]

As retailing is not seen as an energy-intensive sector, Ahold Delhaize currently faces no direct climate costs. This occurs while through its scope 3 emissions, the company belongs to one of the largest emitters headquartered in the Netherlands. In the list of 29 companies included in the assessment of climate action plans commissioned by Milieudefensie, Ahold Delhaize ranks number 9 in total emissions when all global activities are taken into account and is one of the largest emitters when ranked based on the production and/or turnover of local Benelux activities.[4]

1.2 Carbon emissions: the reporting methodology is in development

A calculation of climate damage costs cannot rely on non-financial information from the leading Bloomberg database. Bloomberg consistently reports scope 1 & 2 emissions per company but publishes only limited data on scope 3 due to a lack of standardisation of emission calculations. Therefore, Bloomberg's numbers for Ahold Delhaize are lacking data on most scope 3 emissions (Table 1).

Within the food retail industry, a large part of emissions is in scope 3. While scope 1 & 2 emissions are about the operations including their energy use, scope 3 emissions calculate emissions in the supply chain of the products and services sourced by retailers and the use of these products. As a large part of the cost of goods sold by retailers consists of products produced by other companies, scope 3 accounts for a relatively high percentage.

Table 1 Bloomberg: Ahold Delhaize's GHG emissions

1,000 tons	2016	2017	2018	2019	2020	2021
GHG scope 1	1,940	1,634	1,816	1,699	1,579	1,728
GHG scope 2	2,420	2,195	1,950	1,926	1,820	1,748
market-based	2,101	1,840	1,707	1,772	1,457	1,099
GHG scope 3	144	449	449	431	488	n/a

Note: Market-based scope 2 includes the renewable energy component in electricity consumption, estimated by Ahold Delhaize based on renewable energy/low-carbon certificates. This number is used for total scope 1, 2 & 3 calculations further on.
Source: Bloomberg, viewed in September 2022.

1.3 Ahold Delhaize's approach to reporting emissions

Ahold Delhaize follows the guidelines of the World Business Council for Sustainable Development (WBCSD)/World Resources Institute (WRI) and Greenhouse Gas (GHG) Protocol regarding corporate greenhouse gas accounting and reporting to calculate its carbon footprint and specifically its scope 3 emissions.

Ahold Delhaize's sourcing relationship with more than 10,000 direct suppliers worldwide, which in turn rely on raw material and ingredients sourced from their own suppliers, creates a complex web of direct and indirect suppliers which stretches the world. This complexity is the reason given by Ahold Delhaize why data on its scope 3 carbon emissions is "*currently not consistently available*". The reliance on assumptions and estimates are also the reason why the scope 3 emissions reported by the retailer saw considerable shifts in the years since they have been published.

Ahold Delhaize's scope 3 footprint consists of ten scope 3 emission categories out of a total of 15 defined by the GHG protocol.[5] Two calculation methods were used:

- *Average-data method*: estimates emissions for goods and services by collecting volume data or other relevant units of goods or services purchased and multiplying them by the relevant secondary emission factors (e.g., average emissions per unit of good or service).
- *Spend-based method*: estimates emissions for goods and services by collecting data on the economic value of goods and services purchased and multiplying them by relevant secondary emission factors (e.g., average emissions per monetary value of goods).[6]

In 2019, Ahold Delhaize calculated that it had 70.8 million tons CO_2e emissions (probably 2018) in scope 3.[7] In its 2021 annual report, the company published 65.9 million tons CO_2e for 2020 and 57.6 million tons for 2018.[8] It also calculated scope 1 & 2 emissions, market-based and location-based. These are much lower, so that scope 3 contributes 96% of total emissions (Table 2).

Ahold Delhaize still needs to develop a consistent methodology and scope (which business units) to present the outcomes of scope 1, 2 & 3. Crucial joint ventures in Portugal and Indonesia, with sales of approximately 4% of Ahold Delhaize's consolidated global revenues, are not included in scope 3. Finally, there is no consistent pattern of annual numbers, with only 2018 and 2020 available in scope 3 reporting.

Of the 65.9 million tons CO_2e emissions reported under scope 3 for 2020, purchased goods and services accounted for the largest share with 88%, while the use of sold goods contributed 5% and eight other categories 7%.[A,9]

[A] These eight categories are: fuel- and energy-related activities, upstream transportation and distribution, waste generated in operations, business travel, employee commuting, end-of-life treatment of sold products, franchises, and investments.

Table 2 Ahold Delhaize: Reporting on GHG emissions

1,000 tons	2015	2016	2017	2018	2019	2020	2021	2030 target[d]	2040	2050
Scope 1, 2 market-based approach[a]	3,905	3,905	3,473	4,073	3,593	3,148	2,827	2,037	0	
Scope 3[b,c]	57,605	57,605	57,605	57,605	61,768	65,930	65,930	48,964		0
Total emissions	**61,510**	**61,510**	**61,078**	**61,678**	**65,361**	**69,078**	**68,757**	**51,001**		**0**

Notes: Missing numbers are filled-in by averaging available numbers. [a] Except FreshDirect, bol.com, Etos and Gall & Gall before 2020; [b] Including Etos, Gall & Gall and Bol.com; [c] The 2020 number of 65.9 million tons CO_2e (Annual Report 2020) probably excludes associates in Portugal and Indonesia. While AD reported 70.8 million tons CO_2e emissions in 2019, the company said in an interview that the 2020 number of 65.9 million tons CO_2e is a better base; [d] Base 2018.
Source: Profundo based on Ahold Delhaize.

To estimate its scope 3 emissions, the average-data method calculations for products with weight (32%) assigned specific emission factors to retail-specific product categories based on two sources:

- the Big Climate Database for all brands except for Delhaize Belgium.[10] Assumptions in this database are related to products sold on the Danish market.
- Agribalyse for Delhaize Belgium, which is based on the French market.[11]

For the spend-based method (68%), the emission intensities were taken from two sources and multiplied by products sold corrected for margin and waste:

- for food industries an emission factor of 1.06 based on UK Department for Environment, Food & Rural Affairs (Defra); and
- for non-food industries from Base Carbone.

Use of sold products, which accounted for 5% of the company's total estimated scope 3 emissions in 2020, is strongly impacted by gasoline sales in the U.S. Emissions are calculated using an average data method, by multiplying the total volume of petrol sold to customers by the relevant emission factor from the U.S. EPA. The emission calculations of all other categories are based on an average-data method and publicly available emission factors for each category.[12]

For the purpose of this research, it is assumed that Ahold Delhaize's emissions estimates and breakdowns are realistic. The focus is rather on identifying the role of different products and origins in these emissions. For its 2018 emissions, the company provided a breakdown of scope 3 emissions for different goods. This breakdown showed that animal products like meat, fish, dairy and eggs are key categories contributing to emissions. This important role is owed to direct emissions from enteric fermentation and manure, while indirect emissions are associated with animal feed, transport, processing, or on farm energy use. The direct and indirect land-use and farm stages of producing animal products are considerably more important than transportation, processing, packaging, and retail. Differences are also observed between different types of livestock.[13]

Ahold Delhaize's 2021 reporting does not provide a breakdown of the purchased goods and services reported at 88% of scope 3 emissions in 2020. Therefore, this study uses the split given for 2018 as a proxy for the scope 3 emission distribution between different goods in 2020 (Table 3).[14]

Table 3 Ahold Delhaize: Estimates for scope 3 emissions

Scope 3 categories shares	2018	2020 estimates
Purchased goods & services, of which:	90.77%	88%
Meat & fish	22%	19%
Dairy & eggs	20%	18%
Fruits & vegetables	5%	4%
Other food	39%	34%
Other non-food	12%	11%
Indirect spend	2%	2%
Upstream transportation & distribution	0.39%	-
Waste generated in operations	0.21%	-
Business travel	0.03%	-
Use of sold products	5.52%	5%
Other	3.08%	7%
Total	**100%**	**100%**

Source: Ahold Delhaize (2020, July), *Climate Strategy*, p. 4; Ahold Delhaize (2022), *Annual Report 2021*, p. 263; own calculations.

1.4 Environmental/climate damage valuation via carbon pricing: the methodology

The development of methodologies to value climate damage is still in process. There is no internationally accepted standard yet. The International Monetary Fund (IMF) has adopted the approach that carbon pricing per ton is a good proxy to value the climate damage, or the Social Costs of Carbon (SCC). The IMF states that based on the development of literature, the SCC is a measure that is conditional on the level of CO_2 in the atmosphere. The higher that level, the more powerful is the greenhouse effect and therefore the higher are the expected physical damages. For simplicity reasons, a constant SCC (or carbon price) per ton was assumed in their analysis, as the real growth in costs every year (3%) would be nearly 'neutralised' by the need to use a discount rate to calculate a present value of future costs.[15] This approach is followed in the current report.

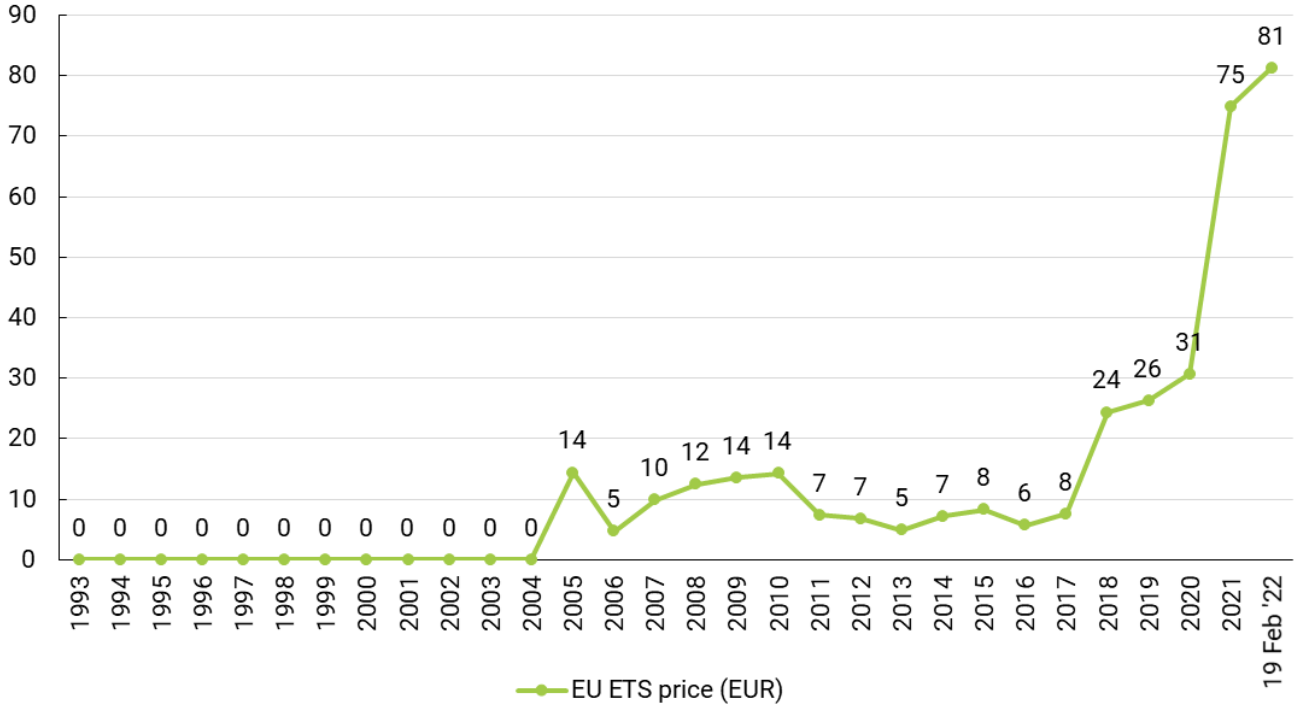
The carbon price as a proxy for damage has also been used in other studies. For an analysis of five European big oil companies, the damage since the Rio Summit in 1992 was calculated. In that year, authorities agreed to be aware of environmental and climate damage by fossil fuel. In that specific study, 2020 was the end date.[16]

Consultancy firms start to see the need to integrate climate accounting into balance sheets. Climate change and actions to de-carbonise will fundamentally change the balance sheet. Today, many companies have an unrecognised carbon liability, Boston Consulting Group (BCG) states. BCG estimates these liabilities at 5% of the global economy. Even if a company is not subject to a carbon levy, it should be anticipated that more countries will introduce a carbon tax in the next 5-10 years.[17] This approach is followed in the current report.

Currently, most jurisdictions where Ahold Delhaize is active do not charge carbon costs related to scope 1, 2 & 3 emissions. The EU is moving forward with scope 1 emissions rights and pricing for various industries (linked to the operations), but most scope 2 as well as all scope 3 emissions are still not considered.

While the EU and many industries with them are neglecting a major part of emissions (scope 3), the EU ETS price has shown an upward moving trend (Figure 2).

Figure 2 EU ETS end of year prices



Source: Transport & Environment (2022, 25 April), *European Big Oil – Big Liability in Carbon, Pollution and Health Care Costs*, based on Bloomberg, European Climate Exchange OTC 1st year CO_2 Emission EU ETS Px.

1.5 Period 2015-2050 most relevant for accumulated emissions

For a certain period, the (accumulated) GHG emissions can be calculated and priced versus the annual carbon price in specific jurisdictions. The choice of the period and the starting date depends on a company's recognition that climate change is a major issue. In the fossil fuel sector, one could decide for the 1992 Rio Summit, when authorities and companies recognised that burning fossil fuels had a negative impact on the environment and led to (air) pollution.[18] The negative impact of the meat industry was already recognised in 2006, when the FAO released an in-depth report "*[…] to help raise the attention of both the technical and the general public to the very substantial contribution of animal agriculture to climate change and air pollution, to land, soil and water degradation and to the reduction of biodiversity*."[19]

For Ahold Delhaize, the starting date 2015 is taken. During the Conference of Parties (COP) 21 in Paris 2015, global and national targets were set for the reduction of GHG emissions (versus 2010).[20] The calculation of Ahold Delhaize's climate damage costs ends in the year for which Ahold Delhaize has indicated to have achieved a net-zero CO_2e position. The commitment by Ahold Delhaize, and its local brands, is to reach net-zero carbon emissions across all operations by 2040 (scope 1 & 2), and to become net-zero businesses across the brands' entire supply chains, products and services no later than 2050 (scope 3).[21]

1.6 Calculation of climate damage costs for Ahold Delhaize

For Ahold Delhaize, the following assumptions and scenarios are applied for calculating climate damage:

- Carbon price is € 80 per ton, in line with recent EU ETS price.[22]
- By using one price, the value comparison between the various periods' contribution can be better analysed.

- The basis of emissions is formed by the statements of Ahold Delhaize about the reduction of scope 1 & 2 reduction to 2030 (-50%), and the net-zero position in 2040. For scope 3, 2030 (target: -15%) and 2050 (net-zero) are the relevant end dates. Ahold Delhaize's base year is 2018.[23] This 2018 base year has no impact on the calculation of climate damage at hand.
- The time period for climate damage is 2015-2050. For 2015-2021, data from Ahold Delhaize is used and when not available, estimates are made by averaging available data. These data should not deviate materially versus the development of global revenues. For the years after 2021, a linear reduction is assumed towards the specific target dates/years set by Ahold Delhaize.
- A discount rate is not applied. At the same time, no annual growth in the carbon price is applied. By applying this methodology, a 'nullifying' mechanism is introduced.

In a period of reduction to net-zero in 2040 (scope 1 & 2) and 2050 (scope 3), total cost of emissions, or climate damage costs, would amount to € 119 billion (Table 4). In the period 2015-2021, 30.2% of the total damage costs have been realised. Based on the emission reduction targets set by Ahold Delhaize, the period 2022-2030 would still contribute 36.2% of the total climate damage in 2015-2050. In 2031-2040, the contribution would remain on a high level, 25.4%. Climate costs of € 9.8 billion (8.2% of the total) would still occur in 2041-2050.

While scope 1 & 2 emissions contribute only 3.8% to climate costs in 2015-2050 (see last column, Table 4), scope 3 contributes 96.2%. In 2015-2021, the contribution of scope 3 was 94.1% and in 2041-2050 it is 100%. This escalation is due to the late phasing-out of scope 3 emissions.

A delay in reaching the 2050 net-zero target, or postponing measures to the latter part of the 2022-2050 period, would raise the € 119 billion climate damage costs further.

Table 4 Ahold Delhaize: Carbon emissions until 2050 and climate damage cost

	2015-2021	2022-2030	2031-2040	2041-2050	Total	% of total
Scope 1 & 2 accumulated per period (million tons)[a]	24.9	21.9	10.2	0.0	57.0	3.8%
Scope 3 accumulated per period (million tons)	424.0	517.0	367.2	122.4	1,430.7	96.2%
Total	449.0	538.9	377.4	122.4	1,487.7	100.0%
Carbon costs per ton (€)	80.0	80.0	80.0	80.0	80.0	
Total carbon/climate damage cost (€ million)	35,917.7	43,112.8	30,193.2	9,792.9	119,016.5	
% of total	30.2%	36.2%	25.4%	8.2%	100.0%	

Note: [a] Market-based.
Source: Profundo, based on Ahold Delhaize.

1.7 Climate damage liability versus current market value Ahold Delhaize

The accumulated climate damage cost or liability in 2015-2050, € 119 billion, is 453% versus the current market capitalisation (or equity value) of Ahold Delhaize (Table 5). This means that the climate damage value is more than four times larger than the current market capitalisation. Assuming that the current equity valuation does not discount any climate damage value yet, the conclusion is that the equity value could be wiped out completely if all stock market participants would agree on the introduction of carbon pricing. Not only shareholders would risk their invested value, also the debt-owners (banks, investors) and lease-owners could face a risk of losing their invested money. This conclusion is based on the € 92.7 billion not covered by the value of equity. This € 92.7 billion is much larger than net-debt, at nearly 6 times (581%; Table 5).

Table 5 Ahold Delhaize: Climate damage costs versus equity and enterprise value

€ million	2015-2021	2022-2030	2031-2040	2041-2050	Total
Total carbon/climate damage cost	35,918	43,113	30,193	9,793	119,017
Equity value					26,276
Net-debt, and other					15,950
Enterprise value					42,226
Climate damage cost as % versus equity value					453%
Climate damage cost as % versus enterprise value					282%
Climate damage cost not covered by equity					92,741
Remaining Climate damage cost as % of net-debt + other					581%

Source: Profundo, partly based on Bloomberg data, viewed in September 2022.

When the climate damage costs are annualised, they exceed the level of net profit (2021 is taken as a reference year; Table 6) for every year in every period. The calculation assumes that the climate damage costs are not tax-deductible like mainstream/normal costs.

The last row in Table 6 calculates the annual climate damage costs, in each period, versus net revenues (2021 is taken as reference year). Climate damage costs as percentage of net revenues are in a range of 1.3%-6.8%. This means that if Ahold Delhaize would increase its prices by these ranges, the net profit could be kept intact, assuming customers will remain loyal. While the prices would need to be 6.3% higher than the current level in the 2022-2030 period, the necessary price increase would decline in the periods towards 2050.

Table 6 Ahold Delhaize: Annual climate damage costs versus 2021 net profit

€ million	2015-2021	2022-2030	2031-2040	2041-2050
Annual climate damage costs	5,131	4,790	3,019	979
Net profit 2021	2,246	2,246	2,246	2,246
Climate damage costs as % versus net profit 2021	228.5%	213.3%	134.4%	43.6%
Net revenues 2021	75,601	75,601	75,601	75,601
Climate damage costs as % versus net revenues 2021	6.8%	6.3%	4.0%	1.3%
Sales price increase to compensate for climate damage costs	6.8%	6.3%	4.0%	1.3%

Source: Profundo, partly based on Bloomberg data, viewed in September 2022.

1.8 Acceleration of scope 3 emission reduction would be a game-changer

If Ahold Delhaize would accelerate its scope 3 GHG reduction towards 2030 (-50% instead of -15%) and reach net-zero already in 2040 (instead of 2050), the scope 3 emissions would be adjusted to the path outlined in Table 7.

Table 7 Ahold Delhaize accelerated scenario: Scope 3 emissions reduction

1,000 tons	2015	2016	2017	2018	2019	2020	2021	2030 target[a]	2040	2050
CO_2e	57,605	57,605	57,605	57,605	61,768	65,930	65,930	28,803	0	0

Note: [a] Base 2018;
Source: Profundo based on Ahold Delhaize for the years to 2021. For 2030-2050, Profundo filled in an alternative scenario.

In this scenario, the company would be able to reach a more mitigated outcome for the climate liability than the 'existing' scenario (based on current targets). The total emissions in 2015-2050 would be 1,053 million tons (versus 1,488 million in existing plan) and the climate damage liability would be € 84.2 billion (versus € 119.0 billion in the planned reduction schedule) (Table 8).

Table 8 Ahold Delhaize accelerated scenario: Carbon emissions reduction

	2015-2021	2022-2030	2031-2040	2041-2050	Total	% of total
Scope 1 & 2 accumulated per period (million tons)[a]	26.6	21.9	10.2	0.0	58.7	5.6%
Scope 3 accumulated per period (million tons)	424.0	426.3	144.0	0.0	994.4	94.4%
Total	450.6	448.2	154.2	0.0	1,053.0	100.0%
Carbon costs per ton (€)	80.0	80.0	80.0	80.0	80.0	
Total carbon/climate damage cost (€ million)	36,050.8	35,854.6	12,335.6	0.0	84,240.9	
% of total	42.8%	42.6%	14.6%	0.0%	100.0%	

Source: Profundo, based on Ahold Delhaize; [a] Market-based.

An accelerated scenario would lead to lower relative outcomes versus equity value and enterprise value (Table 9).

Table 9 Ahold Delhaize accelerated scenario: Climate costs vs. equity/enterprise value

€ million	2015-2021	2022-2030	2031-2040	2041-2050	Total
Total carbon/climate damage cost	36,050.8	35,854.6	12,335.6	0.0	84,240.9
Equity value					26,276
Net-debt, and other					15,950
Enterprise value					42,226
Climate damage cost as % versus equity value					321%
Climate damage cost as % versus enterprise value					200%
Climate damage cost not covered by equity					57,965
Remaining Climate damage cost as % of net-debt + other					363%

Source: Profundo, partly based on Bloomberg data, viewed in September 2022.

The annual climate damage costs can also be evaluated versus net profit and net revenues (Table 10). The relative impact would be lower. In 2031-2040, the annual costs versus sales would be 1.6% versus 4.0% in the existing scenario.

Table 10 Ahold Delhaize: Annual climate damage costs versus 2021 net profit

€ million	2015-2021	2022-2030	2031-2040	2041-2050
Annual climate damage cost	5,150	3,984	1,234	0
Net profit 2021	2,246	2,246	2,246	2,246
Climate damage cost as % versus net profit 2021	229.3%	177.4%	54.9%	0.0%
Net revenues 2021	75,601	75,601	75,601	75,601
Climate damage costs as % versus net revenues 2021	6.8%	5.3%	1.6%	0.0%
Sales price increase to compensate climate damage costs		5.3%	1.6%	0.0%

Source: Profundo, partly based on Bloomberg data, September 29, 2022.

This acceleration would reduce the total emissions by 29.2% (third column, Table 11). It would also have much better outcomes for value impact. In 2031-2040, the annual climate damage costs would impact annual net profit much less (54.9% versus 134.4%) and would leave a part of net profit intact, assuming no sales price increase and no impact on consumer loyalty. In other words, an accelerated scenario would require only 1.6% higher prices in 2031-2040 versus 4.0% to compensate the climate damage cost (last row, Table 11).

Table 11 Ahold Delhaize: Comparison of existing and accelerated target

	Existing (2015-2050)	Accelerated (2015-2050)	Change (%)	Existing (2022-2050)	Accelerated (2022-2050)	Change (%)
Scope 1 & 2 accumulated per period (million tons)	57.0	58.7	2.9%	32.1	32.1	0.0%
Scope 3 accumulated per period (million tons)	1,430.7	994.4	-30.5%	1,006.7	570.3	-43.3%
Total	1,487.7	1,053.0	-29.2%	1,038.7	602.4	-42.0%
Carbon costs per ton (€)	80.0	80.0		80.0	80.0	
Total carbon/climate damage cost (€ million)	119,016.5	84,240.9	-29.2%	83,098.8	48,190.2	-42.0%
Value impacts:						
Climate damage cost as % versus equity value	453%	321%		316%	183%	
Remaining climate damage cost as % of net-debt+other	581%	363%		356%	137%	
Annual climate damage cost 2031-2040 as % versus net profit 2021	134.4%	54.9%				
Annual climate damage cost 2031-2040 as % versus net revenue 2021	4.0%	1.6%				

Source: Profundo.

2

Ahold Delhaize's scope 3 emissions: contribution of animal products

Animal products are major contributors of scope 3 emissions by Ahold Delhaize. Based on estimates for different geographies in which the retailer operates and estimated CO_2e emission caused per unit of product, it can be concluded that animal products account for an estimated 27.9 million tons of CO_2e emissions, with meat as the key contributing segment. Using emission models that pay more attention to geographic differences would allow Ahold Delhaize to adapt its emission calculations better to the real situation.

2.1 Animal products as key carbon emission source

Ahold Delhaize is active in various countries with local retail banners and various business activities. In the Benelux, the company operates bol.com, a non-food online retailer, as well as Gall & Gall alcohol stores and Etos drugstores. In the U.S., there are several grocery retail banners as well as a large online supermarket unit. Due to the complexity of the business and the lack of detailed data disclosure it is impossible to map the distribution of scope 3 emissions in detail.

Globally, direct and indirect GHG emissions connected to animal products contribute around 14% to 16% of the total human emissions.[24] The relative share is much higher when looking at a retailer like Ahold Delhaize, where the sale of food products forms the key business. Based on the disclosure by the retailer, animal products accounted for around 37% of its scope 3 emissions in 2020 (see section 1.3). As it is of interest to obtain a better understanding of where the sources of global emissions of Ahold Delhaize occur, this study focusses the analyses on animal products like meat, fish, dairy, and eggs as major contributors to the retailer's scope 3 emissions.

The scope 3 emissions of animal-linked proteins are mainly upstream, with animal products from different regions showing differing emission patterns. Key factors include the type of production systems which influence land use intensity and conversion, as well as differing sourcing patterns for animal feed ingredients. Animal feed requires the cultivation and processing of large volumes of agricultural crops. These are often linked to GHG emissions from land-use change. In feed, a key role comes to soy, which serves as an important source of high-quality protein in animal feeds. Soy cultivation is linked to large-scale land conversion and deforestation, especially in South America.

The following section estimates the distribution of Co_2e emissions in Ahold Delhaize's supply chain among different animal product segments based on the Big Climate Database footprint methodology. It also highlights the impact of different calculation methods on the outcome.

2.2 Distribution of scope 3 emissions from animal products

As explained in section 1.3, Ahold Delhaize uses a combination of different approaches to estimate its carbon emissions, depending on the location and availability of supplier data. As the study at hand could not access detailed supplier or product sales data, a different approach must be used to estimate the role of different animal product segments in the retailer's portfolio. While it is aimed to use 2021 figures, the overall lack of information means that, for example, Ahold Delhaize's share in country-level food sales – consisting of grocery retailing and food service - or

the consumption of animal products per capita has to rely on differing years. It is assumed that these numbers remained stable in recent years.

Ahold Delhaize's retail market share in individual geographies is drawn from market research reports. To estimate the share of Ahold Delhaize in the total domestic sale of certain products, its market share is extrapolated to total food sales, including food service. Figures for these calculations are drawn from various sources which may not use comparable methodologies. For its joint ventures in Portugal and Indonesia, the share of Ahold Delhaize's participation is applied. The average per capita consumption of animal products like meat, dairy, eggs, and fish, in combination with total population size and relevant food market shares is used to calculate the volumes sold by Ahold Delhaize. Where necessary, meat consumption is converted from carcass to retail weight based on average conversion factors.

The resulting volumes of animal products sold on an annual basis under Ahold Delhaize's banners are then combined with average CO_2e emissions per category as provided in the Big Climate Database to estimate emissions per animal product category.[25] As no breakdown of sales per specific product category are known, averages across product categories are used as presented in the database (e.g. average emissions across all beef product categories). Certain corrections are made, including applying iLUC only to the estimated shares of aquaculture seafood in total seafood volumes. Aquaculture production is the most likely source of iLUC in this sector due to, for example, the conversion of mangroves and the embedded soy in animal feed.

The lack of detailed data means that especially dairy consumption figures are often only available for selected categories. The 'other' category may include a wide range of differing dairy products which at times may use larger volumes of milk per unit of product. It is not possible to correct for such insecurities based on the available information.

The emission factors from the Big Climate Database allow to split out the contribution of iLUC emissions in total emission volumes per product. It is assumed here that these emissions are predominantly linked to the production of crops for animal feed, with soy from South America as a key contributor to land conversion.[B] Soy embedded in meat exports from South America to Ahold Delhaize's key markets (U.S., Benelux, south-eastern Europe) plays a comparatively small role, as all these regions rely mostly on domestic meat production. However, Europe as well as Southeast Asia import large volumes of soy from South America, particularly Brazil and Argentina, for use in animal feed. Therefore, the calculations for Ahold Delhaize's operation in European countries and Indonesia calculate CO_2e emissions including iLUC (Table 12).[C]

The calculations result in total estimated annual scope 3 CO_2e emissions of 27.9 million tons linked to animal product sales by Ahold Delhaize across all its geographies. These estimated CO_2e emissions are 14% higher than Ahold Delhaize's own estimate for this product group. The volume represents around 42% of the retailer's total scope 3 emissions of 65.9 million tons in 2020. One factor in this is the inclusion of the relative emission shares of the Indonesian and Portuguese joint ventures.

Out of the 27.9 million tons of emissions linked to animal products, an estimated 2.0 million tons or 7.2% is linked to iLUC (or 3.0% of total scope 3 emissions). This estimate is conservative as no iLUC was included in the meat-related emission factors for the U.S., assuming that land conversion for the production of soy and other protein crops is more relevant in South America. It should, however, be kept in mind that expansion of agricultural land is also causing loss of biodiversity and carbon storage in North America.[26] When only looking at the retailer's European operations, the

[B] The IPCC (2020) estimates that 11% of global GHG emissions were linked to LUC in 2007-2016. Modelling LUC is complicated by the difficulty of attributing the effects to their drivers. The Big Climate Database uses an iLUC model (Schmidt et al. (2015)) that considers many factors applicable to all crops in all regions of the world. The assumption used in the study at hand that iLUC emissions are only relevant for non-U.S. animal products is therefore a simplification that may underestimate these emissions.

[C] For the U.S., iLUC is included for the estimated share of aquaculture produce in imported seafood.

iLUC-share in the estimated scope 3 emissions linked to animal products equalled around 14% (2.0 out of 14.1 million tons).

Table 12 Ahold Delhaize: Estimated scope 3 emissions from animal products

Country	AD share in total food sales (est., %)	CO_2e emissions (est., 1,000 tons)					
		Meat	Dairy	Eggs	Fish	Total	o/w iLUC
U.S.[a]	2.8%	11,883	1,456	112	285	13,737	
Netherlands	27.8%	3,697	1,184	20	235	5,137	707
Belgium	20.0%	1,956	322	16	173	2,467	366
Czech Rep.	9.7%	555	151	12	44	761	103
Greece	19.0%	1,969	172	14	295	2,450	364
Portugal[b]	16.0%	829	120	7	362	1,319	158
Romania	4.4%	469	137	8	46	660	92
Serbia	16.5%	914	128	11	48	1,100	191
Indonesia[b]	0.3%	61	5	2	166	234	15
Total		**22,332**	**3,675**	**204**	**1,654**	**27,865**	**1,995**
% of total		**80%**	**13%**	**1%**	**6%**		

Note: [a] iLUC only considered for the estimated volume of seafood imports from aquaculture; [b] For Indonesia and Portugal, CO_2e emissions adjusted for Ahold Delhaize's share in joint ventures.
Source: see Appendix 1.

With a share of 80%, these estimates suggest the highest emissions of animal product-related scope 3 emissions linked to meat. Dairy contributed 13%, fish 6% and eggs 1%. Table 13 provides a more detailed breakdown of the estimated contribution of different types of meat across the retailer's geographies.

Table 13 Ahold Delhaize: Breakdown of estimated meat-related scope 3 emissions

Country	Pork (1,000 tons)		Poultry (1,000 tons)		Beef (1,000 tons)		Other meat (1,000 tons)		Total (1,000 tons)		CO_2e share by country (est., %)
	CO_2e	o/w iLUC	CO_2e	o/w iLUC	CO_2e	o/w iLUC	CO_2e	o/w iLUC	CO_2e	o/w iLUC	
U.S.[a]	718		611		10,494		60		11,883		53.2%
Netherlands	560	75	243	46	2,727	459	167	40	3,697	619	16.6%
Belgium	305	41	81	15	1,303	219	268	63	1,956	339	8.8%
Czech Rep.	142	19	69	13	339	57	5	1	555	90	2.5%
Greece	180	24	133	25	1,429	241	227	54	1,969	343	8.8%
Portugal[b]	107	14	79	15	616	104	27	6	829	139	3.7%
Romania	130	17	59	11	228	38	52	12	469	79	2.1%
Serbia	85	11	55	10	374	63	399	95	914	179	4.1%
Indonesia[b]	2	0	9	2	50	8	-	-	61	10	0.3%
Total	**2,227**	**203**	**1,339**	**136**	**17,561**	**1,189**	**1,206**	**271**	**22,332**	**1,800**	
% of total	**10%**		**6%**		**79%**		**5%**				

Note: [a]no iLUC considered; [b]for Indonesia and Portugal, CO_2e emissions adjusted for Ahold Delhaize's share in joint ventures.
Source: see Appendix 1.

2.3 Role of land use change linked to soy in animal feed

A large share of the meat, fish, dairy, and eggs consumed in the analysed geographies is sourced from domestic production. Next to emissions that are directly linked to the raising of these animals, indirect emissions from embedded soy contribute especially to iLUC emissions. This is less relevant in the U.S. market, where soy is almost completely sourced from domestic production. However, in Europe and Indonesia most of the soy used in animal feed is sourced from Brazil and Argentina.[D,27] The reliance on the supply of protein crops for the large production and consumption of animal products has been connected to the large-scale conversion of unique habitats in South America through deforestation and fires, and massively contributed to GHG emissions and biodiversity loss.

Ahold Delhaize itself reported a soy consumption of 839,509 tons for direct and indirect use in 2021, of which direct use of soy and derivatives accounted for approximately 1%. The indirect use through embedded soy in animal products is estimated at 69% for meat and 30% for dairy. On average, the soymeal share in European animal feed varies between around 3% in feed for beef cattle and 26% for broiler chickens. Feed for aquaculture fish also contains high soy concentrations.[28] The 280,412 tons or 33% of the soy volume in the retailer's supply chain identified as high-risk is offset with RTRS credits, either through direct purchases by Ahold Delhaize or through its suppliers.[29] It can be assumed that the risk factor is mostly applied in relation to the role of soybean cultivation in land conversion and land use change. However, such offsetting through credits does not allow to identify the origin of the physical soy that is embedded in the animal products sold in Ahold Delhaize's stores, as soy from destructive production methods can still leak into the supply chain.

2.4 Alternative approaches to estimating carbon footprints

As explained in section 1.3, Ahold Delhaize points itself to the fact that it has no comprehensive overview of information on volumes sold per product, and therefore uses a mix of different approaches to estimating its carbon footprint. In this mix, the Big Climate Database plays an important role as it is used for the known volumes (accounting for a share of 32%), except for Delhaize in Belgium. Influencing factors include the region, animal feed composition, transportation distances and other variables. The available footprint models all have certain shortcomings, but it must be considered that the use of proxies may lead to over- or underestimations.

There are undoubtedly pros and cons as well as insecurities attached to all approaches of estimating CO_2e emissions. It is though notable that the Big Climate Database has comparatively low estimates for various key animal products when comparing with other sources. For example, Agribalyse reports considerably higher emission factors for products such as chicken meat or eggs.

The Global Livestock Environmental Assessment Model (GLEAM) database by the Food and Agricultural Organization (FAO) works with different emission factors for animal products depending on the geography. A case in point is beef, which in Western Europe is mostly coming from dairy herds linked to lower emission intensities. Meanwhile, production in the U.S. relies on feed with high emission intensities and manure management in intensive dairy units and feedlots.[30]

It is advisable for Ahold Delhaize to increase the coverage of volume-based supply chain tracing for individual products. Moreover, country-specific emission factors are strongly advisable due to the, at times considerable, differences.

[D] In European countries, Brazil is a key origin with a share of around 50% based on soybean equivalents, followed by Argentina with 25%. The U.S. and Canada only had a much smaller share of around 20% in 2021. In Indonesia, only around 25% of soy imports originate from North America, while almost 70% are linked to production in South America, particularly Argentina (in 2021, 42% based on soybean equivalents) and Brazil (27%).

3

Ahold Delhaize's scope 3 emissions: Fuel and plastics

In the U.S., Ahold Delhaize operates gas stations at its supermarkets to attract customers. Fuel has a large scope 3 footprint, contributing an estimated 6.4-8.1% to total 2021 emissions of Ahold Delhaize. The company has no specific reduction targets for this large category. Plastic packaging forms another large category in emissions due to its production and (lack of) waste handling, contributing an estimated 3.5% to total emissions. Ahold Delhaize has ambitious targets for plastic related to sourcing recycled material for packaging, and for waste in relation to recyclable, reusable, and compostable packaging. If targets are met, this would reduce emissions in plastics by 48% in 2025. However, this requires various stringent requirements for plastic production and the waste handling by Ahold Delhaize's customers.

3.1 Emissions of gasoline sales in the USA are material, no plan for reduction

In the U.S., Ahold Delhaize generates fuel sales. These sales do not occur in the European activities. Ahold Delhaize reports separately about the size of these sales and the impact on comparable sales growth numbers. In 2021, Ahold Delhaize reported net fuel sales of € 901 million. Based on average retail price and federal and state tax on fuel, AD will have sold 2,107 million litres gasoline/diesel. The division between gasoline and diesel is also unclear.

In relation to scope 3 emissions, the company reports that in 2020, 88% came from purchased goods and services, 5% from the use of sold products, and 7% from 'other' categories. The sale of fuel is included in the 5% of the 'use of sold products', which caused approximately 3.297 million tons CO_2e (Table 14). This category is, according to the company, impacted by the gas stations that some of its banners operate. The emissions are calculated using an average data method, by multiplying the total volume of fuel sold to customers by the relevant emission factor from EPA.

Table 14 Ahold Delhaize: Scope 3 emissions (2020)

Sub-categories	%	CO_2e (million tons)
Purchased goods and services	88%	58.018
Use of sold products	5%	3.297
Other	7%	4.615
Total	100%	65.930

Source: Profundo, based on Ahold Delhaize (2022), *Annual Report 2021*, p. 263.

In 2021, the scope 3 emissions linked to fuel will have reached 4.411 million tons, based on the EPA data, or 6.4% of total emissions (Table 15). Based on data from the UK government, which include the burning as well as the production and transportation of fuel, the fuel sales by Ahold Delhaize in the USA generated 5.552 million tons CO_2e, or a material 8.1% of Ahold Delhaize's total emissions.

While the GHG contribution levels by fuel sales to consumers are material, Ahold Delhaize has no specific targets to reduce these emissions.

Table 15 Ahold Delhaize: Fuel scope 3 emissions (2021)

	2021 - EPA – Scope 3	2021 - UK gov. – Scope 3
Net sales (€ million)	901	901
Average gasoline price per litre (Retail, in €)	0.53	0.53
Taxes per litre (in €)	0.10	0.10
Net sales price per litre (€)	0.43	0.43
Litres (million)	2,107	2,107
GHG emissions/litre (kg)	2.09	2.64
GHG emissions (million tons)	4.411	5.552
AD global emissions (million tons)	68.8	68.8
% of global	6.4%	8.1%
Emission conversion factors		
Kg per litre gasoline	1.95	2.76
Kg per litre diesel	2.24	2.51
Average	2.09	2.64

Source: Profundo, Ahold Delhaize (2022), *Annual Report 2021*; UK Government (2021), *GHG Conversion Factors for Company Reporting*.

3.2 Plastics contribute 3.5% to emissions, require ambitious targets

Plastics do not only generate waste, but also health effects (particulate emissions) and GHG emissions. These emissions occur during the production of plastic, and in the waste handling, burning and/or composting of the remaining material.

The emissions per kilogram of plastic show wide differences in the literature. The global annual plastics production of 380 million tons could have caused GHG emissions between 860 - 2,590 million tons per year (2-5% of global GHG emissions). This equals between 2.26 kg and 6.8 kg GHG emissions per kg of plastic.[31] The high outcome of 6.8 kg GHG is a result of increasing use of coal in China to produce plastics.

Ahold Delhaize's own-brands use 158,000 tons of primary plastic packaging (2021). As the own-brands generate 36.6% of Ahold Delhaize's global sales, the branded third-party sales might lead to total plastic packaging of 432,000 tons.

Table 16 assumes that Ahold Delhaize can achieve its targets of 25% plastic packaging from recycled material, and 100% reusable, recyclable or compostable plastic packaging. The additional assumption is that in 2025 no volumes will disappear anymore to an unknown destination, as this has the largest total emission footprint. Note that the GHG emission of 'unknown destination' (3.7 kg) needs to be added to production/origin (3.12 or 2.33) and would lead to a total life-cycle GHG footprint of a potential 6.8 kg, which is the worst outcome. Also, the emissions of reusable,

recyclable and compostable plastic are not in the account of Ahold Delhaize, as these are attributed to the recycling company.

In total, Ahold Delhaize's plastic-related GHG emissions are 2.42 million tons, or 3.5% of its total emissions. If Ahold Delhaize achieves its targets, meaning that 100% is really reused, recycled or composted, and is not produced by factories using coal (for instance in China, but probably also increasingly in Europe), then the GHG reduction would be 47.8% in 2025. This result fits into the retailer's 2030 emission reduction targets for scope 3 (-15%). However, if the company has no proof of the right destination of the plastic waste at the consumer level, then the GHG reduction will be minimal. The main targeted reduction is based on an assumed transition from 'unknown destination' to 100% reused, recycled, or composted.

Table 16 Ahold Delhaize: Plastic scope 3 emissions

million tons	2021	Production / origin (no use)	Production recycled content	Unknown destination	Recycled by others	2025 target
Primary plastic product packaging, own-brands (A)	0.158					
Reusable, recyclable, compostable				64.0%	36.0%	100%
% post-consumer recycled content	<5%					25%
Emission calculation:						
AD's private label/own-brand sales % (B)	36.6%					
Primary plastic product packaging including third-party brands (A/B)	0.43					
% division of origin and final destination	100%	95%	5.0%	64.0%	36.0%	
Plastic packaging volume AD		0.43	0.02	0.28	17.7%	0.43
GHG Emission per kg plastic, Scope 3, kg		3.12	2.33	3.70	0.00	2.92
GHG emissions (million tons)	2.42	1.35	0.05	1.02	0.00	1.26[a]
AD's global emissions	68.8					68.8
% of global	3.5%					1.8%
2025 reduction in emissions						47.8%

Note: [a] Assumption that there is no unknown destination and plastic is not produced with coal as energy feedstock.
Source: Profundo, based on Ahold Delhaize (n.d.), "Plastic waste", viewed in September 2022; UK Government (2021), *GHG Conversion Factors for Company Reporting*.

4

Scope 3 emissions of Ahold Delhaize peers

Ahold Delhaize's approach and scope of reporting is overall on par with the sector benchmark. However, to become net-zero by 2050 or earlier, the sector as a whole still has to make its commitments more ambitious, standardise reporting, and improve granularity. Considerable ambiguity persists in the actual calculations for the upstream scope 3 emissions, as many retailers fail to coherently explain which emission factors are used for the calculations, and why.

Most major retailers are already measuring and reporting their scope 3 emissions and realise that the vast majority of these emissions (80% to 97%) comes from their supply chain. However, many companies still only report a fraction of these emissions (business travel or own logistics), and only plan to assess and report on supply chain emissions in the future. At the same time, more ESG-mature companies, including Carrefour and Walmart, have already measured and are reporting on their supply chain footprint data. Their disclosures (55.4 and 154.3 million tons of CO_2e, respectively) seem comparable with Ahold Delhaize's data (65.93 million tons of CO_2e), taking into account their size and geography of operations.

Many retailers already have programmes in place focussing on a protein transition. This involves developing less carbon-intensive insect-based feedstock (Tesco) or supporting the transition to a more plant-based human diet. Commitments include a further expansion of the plant-based range and bringing the consumption of plant-based products to the attention of customers (Jumbo). It has been reported that 40% of leading food firms, including Kroger, Tesco, Nestlé and Unilever, now have dedicated teams for plant-based products.[32] This is not always directly linked to their scope 3 reduction targets, but it is to be expected that such connections will be established.

The final scope 3 calculation results depend to a large extent on what emissions factors a company applies (see also Chapter 2). Recognising that emission factors for animal-based-proteins may differ depending on the region, animal feed patterns, transportation distances and other variables, and understanding that these may not yet be available for specific products, it should be considered that using proxies may lead to considerable over- or underestimations, in particular when applying emissions factors designed for Europe to the US market, or vice versa.

For example, for beef, it is assumed by Walmart that "*[…] the volume sold at the company's stores represents a fraction (38%) of the total weight of a cow at slaughter and of that percentage on average 50% of the weight is gained on pasture. This weight is then compared to a weighted average of stocking rates in wet and dry regions of the US to determine an average MT of beef/acre conversion factor. Global numbers are still being developed, so in the current calculator the US number is used as a proxy*"[33] For other food commodities Walmart uses Cool Farm Tool, The Fieldprint Platform, and other tools and databases.

Many retailers fail to report on which methodologies and emission factors databases they use for their emission calculations (or only report the sources for electricity and fuel combustion, but not for soft commodities along the value chain), which undermines the reliability of calculations and the overall credibility of their reporting.

Table 17 Benchmark of Ahold Delhaize peers

Name	Scope 3 definition	Reported Scope 3 emissions	Targets	Animal-protein reduction
Carrefour	The Group has evaluated its GHG emissions as follows: • 97% fall into scope 3 (indirect emissions, from upstream activities, as opposed to scopes 1 & 2, direct emissions); • 76% of the Group's scope 3 emissions are from products and packaging sold in stores; and • 12% from the use of fuel sold.[34]	**55.46 million tons CO_2e (2020)** No absolute values for scope 3 emissions reported. Based on the reported Scope 1 & 2 data (1,663,797 tons CO_2 in 2020)[35] and company reports that scope 3 makes up 97% of all emissions, the absolute value of Carrefour's scope 3 emissions can be estimated at 55,459,900 tons.	Scope 3: reduce CO_2 emissions by 29% by 2030, compared to 2019, including: • Purchase of products and services: reduce emissions associated with purchases of goods and services by 30% by 2030 compared with 2019 levels (well below the 2°C scenario) • Product use: cut emissions resulting from the way in which products are used – fuels and electronic products – by 27.5% between now and 2030, compared with 2019 (2°C scenario); • Transport: reduce transport-related CO_2 emissions by 20% by 2030, compared with 2019 levels (2°C scenario).[36]	Not known
Walmart	Walmart has been reporting estimated scope 3 emissions in its two largest categories — (1) purchased goods and services and (2) use of sold products.[37]	**154.3 million tons CO_2e (2020)** For 2020, Walmart reported that its estimated emissions for Walmart U.S. were 130.2 (for purchased goods and services) and 32.213 million tons of CO_2e (use of sold products), respectively.[38] Note on methodology: CDP reports that based on scaling up to 100% the emissions self-assessment data of 228 companies representing roughly 20% of total Walmart's sales in FY20 its total scope 3 emissions are estimated at 130.2 million tons CO_2e. Walmart and CDP also state that they understand this is supplier self-reported data and there is a high degree of uncertainty when allocating emissions to other companies.[39]	Reduce or avoid 1 billion tons of scope 3 CO_2e emissions by 2030. The company does not indicate a %-reduction for 2030 versus the base year. The extent to which avoidance and sequestration are expected to contribute to the overall 1 billion goal remains unclear.[E] A reduction by 1 billion tons over 10 years versus 154 million in 2021 seems very ambitious.	Not known

[E] Walmart uses the following definitions:
Avoided emissions are emissions that did not occur when compared to a business as usual or baseline scenario because a specific action was taken or an intervention occurred. From an organization's perspective, an avoided emission occurs when the total emissions within the defined accounting boundary are not proven to be lower year-over-year; organizations can still have emissions reductions at a project-level in this scenario provided sufficient evidence has been collected.
Sequestered emissions reductions occur when emissions are removed from the atmosphere and stored elsewhere, e.g. through GHG storage in soil or forests. For an organization's perspective, a sequestered emission reduction occurs when an asset within the defined accounting boundary removes atmospheric greenhouse gases.

Kroger	Scope 3 emissions reflect the following categories: • Fuel- and energy-related activities (not included in scope 1 or 2); • upstream transportation and distribution; • waste generated in operations; and • business travel and employee commuting. Supply chain is not yet in scope but is planned to be included from 2023.[40]	**1.502 million tons CO_2e (2020)[41]** The figure represents only a fraction of the actual scope 3 emissions, as it only reflects upstream transportation and distribution; waste generated in operations; and business travel and employee commuting, and not purchased goods and services, nor end-of-use emissions. Due to limited scope, the figure is subject to significant fluctuations. Kroger reported that Scope 3 emissions declined by more than 30% vs 2019 because of significant decline in travel during the COVID-19 pandemic.[42]	Supply chain engagement in ESG targets, including sustainable packaging and scope 3 emissions reduction is planned to commence in 2023.[43]	Unclear[44]
Jumbo[F]	Only own emissions (scope 1 & 2) are currently disclosed.	Not publicly reported.	Jumbo aims for its business operations to be CO_2 neutral by 2030. This encompasses reducing energy consumption, making its real estate more sustainable and using green energy, as well as using a more sustainable fleet and smart routes (i.e. only covering Scope 1 & 2). No Scope 3 targets have been disclosed[45].	Yes
Casino Group	For Scope 3, Casino accounts for "purchased products and services" and "use of products sold" categories, representing more than 65% and 13% of indirect emissions, respectively.[46]	**20 million tons CO_2e (2021)** The Group estimated that in 2021, its scope 3 emissions made up around 20 million tons CO_2e.[47]	The Group aims to reduce GHG emissions by 10% on Scope 3 by 2025 with respect to 2018.[48] To achieve this goal, Casino is also planning to change its product mix and ensure that "*the French consume less animal protein and more fruits, vegetables and legumes*."[49]	Yes
Lidl	Schwarz Group, Lidl's parent company, includes emissions with regard to the use of fuels sold and supply chain emissions, which account for 78 percent of product-related emissions[50],	**155.04 million tons CO_2e (2020) at group level, of which 87% account for the purchased goods and services category.** In the NL, e.g., Lidl reported total emissions of 4,819,683 tons of CO_2e, of which 95% were scope 3.[51]	At Schwarz Group level, suppliers, which are responsible for 78 percent of product-based emissions are encouraged to set themselves climate targets in line with SBTi criteria by 2026. In addition, the Schwarz Group commits to reduce absolute scope 3 emissions from use of sold products covering sold fuels, by 27.5 percent by 2030 compared to 2019 levels.[52]	No

[F] Though not directly linked to climate, Jumbo has a special program aimed at reducing animal-based-protein consumption – 'protein transition'. Thus, Jumbo states that it "*supports the transition to a more plant-based diet. At the moment, the average Dutch person gets 60% of his proteins from animal sources and 40% from vegetable sources. It has been agreed in the Climate Agreement that these percentages must be reversed by 2030. A varied diet with more vegetable and less animal proteins is good for the environment in connection with CO2 reduction. [Jumbo is] committed to further expanding the plant-based range and bringing the consumption of more plant-based products to the attention of customers*." (Jumbo (n.d.), "Duurzame keten", viewed in August, 2022.

Aldi South	Indirect emissions due to the company's activities, covering the corporate value chain, including supplier and customer emissions.[53] Overall, about 98% of the company's total GHG emissions are attributable to corporate value chain emissions.[54]	**0.332 million tons of CO_2e (2020)** Currently (2020), only a fraction of Scope 3 (external logistics) is reported. The scope of reporting encompasses 11 countries where Aldi South operates, including the U.S..	Most of Aldi South's scope 3 emissions (more than 92%) relate to products it buys from suppliers. For this reason, the focus of emission reduction activities for corporate value chain emissions lies on product supply chain emissions. For product emissions, the entire upstream supply chain, from land use change and farming to processing and finishing of the product has to be considered. Aldi South has set a supplier engagement target (SBTi approved) and is committed to encouraging its strategic suppliers (75% of product-related emissions) to work towards setting science-based emissions targets by 2024.	Unclear[55]
Aldi North	No definition at Group Level	**26.7 million tons CO2e (2020)** Aldi Nord's scope 3 emissions in 2020 made up 26.7 million tons CO_2e, including 25.6 million tons from purchases of goods and services.[56]	No targets at Group level	No
Tesco	The emissions categories covered by the scope 3 SBTi target are purchased goods and services (supply chain), fuel and energy related activities, upstream transportation and distribution, and waste generated in operations.[57] At the same time, currently (as of May 2022), Tesco only reported on selected scope 3 disclosure	**0.593 million tons CO2e (2020/2021)** In its 2021/2022 report, Tesco only disclosed 'selected' Scope 3 categories, which include: third-party logistics that Tesco would otherwise fulfil; transmission and distribution losses and well-to-tank; business travel and water consumption.[58]	Tesco has committed to reduce its scope 3 GHG emissions by 17% by 2030, using a 2015 base-year.[59] Tesco is actively engaged in exploring the use of insects as an alternative protein for animal feed (but not yet for humans) to cut down on imbedded soy and related land conversion in South America.[60] Tesco was also praised by investors for their commitment to shifting food portfolios to more sustainable protein sources, demonstrating board-level support for a climate-aligned protein transition (the shift away from animal proteins towards plant-based and new protein sources).[61]	Yes

5

Climate commitments of 20 key suppliers

Ahold Delhaize's key suppliers vary considerably in terms of their ESG maturity. Even though 60% report at least on scope 1 & 2 emissions, and 50% also for scope 3, and though many have committed to net-zero by 2050, very few have set ambitious interim targets. Most companies are also ambiguous about carbon offsetting. Thus, Ahold Delhaize cannot simply rely on its suppliers' commitments, and has to work more closely with them in order to achieve its goals.

This subsection deals with a group of key animal-based protein suppliers that are likely part of Ahold Delhaize's supplier group in one or more geographies. The supplier selection is based on their product portfolio, size, and coverage. Though a preference went to global multi-brand companies, locally significant suppliers of specific products important in key geographies (dairy in Benelux and Greece, beef and pork in the U.S., eggs in the EU) are included in the scope.

The selected suppliers are assessed against four criteria:

1. Carbon footprint is regularly and consistently disclosed both for own operations and value chain
2. Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019, across all scopes and including a scope 3 target.
3. Offsetting used only as a support measure to complement emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)

The assessment has been based on a traffic-light color-coding system (Table 18).

Table 18 Scoring methodology for climate commitments

Scoring justification	Assessment
The element is fully present in the policy or reporting	Yes
The element is partially present in the policy or reporting	Partial
The element is mentioned or implied in the policy or in other corporate documents or communications, but the implication for effective implementation is unclear	Unclear
The element is not present in the policy or reporting	No

Based on the assessment, several trends can be identified. Of the analysed 20 suppliers, 50% already report on all three emission scopes, while 60% report at least on scopes 1 & 2. Committing to net-zero by 2050 or earlier is becoming a market norm; however, most companies still fail to come up with ambitious interim targets by 2030. Only three companies (Nestlé, Unilever and Kraft Heinz) have pledged to achieve a more than 45% emissions reduction by 2030. Many suppliers do not mention offsetting in their climate plans; however, it often remains unclear if it is not mentioned because it is not part of the plan, or because a company has not considered using offsetting yet. Thus, a green rating for criteria 3 is only awarded in cases where a company has deliberately stated that offsetting will not be used at all or will only be employed as a supplementary measure (and not counting towards net-zero).

Overall, multinational companies appear to have more robust commitments than national or regional suppliers (particularly in the U.S., Greece, and Asia). Publicly traded companies tend to be more mature in terms of climate change than privately owned. Consumer-facing brands, presumably through higher awareness and more pressure from consumers and civil society organisations (CSOs), also tend to have stronger commitments than B2B companies. Among the different sectors, egg producers seem to be lagging behind in their emissions reporting and climate commitments. Both Cal-Maine and Interovo received a red rating for almost all criteria, with no consistent climate disclosures and targets. Multi-product companies and meat suppliers (in particular, beef) have more detailed reporting and better commitments. This may be the result of a better understanding of the role of cattle farming in global GHG emissions through continuous information campaigns.

In terms of reporting, most companies recognise that scope 3 emissions from the value chain constitute the most significant part of their footprint. However, this understanding doesn't always translate into concrete reduction measures. This is where both pressure and advice from the CSO sector may contribute to change.

5.1.1 Arla

Arla is a cooperative dairy company owned by 8,956 dairy farmer owners in seven countries: Denmark, Sweden, UK, Germany, Belgium, Luxembourg, and the Netherlands. In 2021, it reported € 11.2 billion revenue compared to € 10.6 billion in the previous year. The profit for the year was € 332 million, compared to € 352 million in 2020.[62] Though its interim 2030 targets lack ambition, in all other respects, including emissions reduction scope and exclusion of offsetting measures from its climate impact accounting, Arla demonstrates high maturity in terms of its climate agenda.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Arla discloses its absolute emissions for all three scopes in its Sustainability Reports. According to the 2021 report, scope 1 emissions amounted to 447 million kilograms, scope 2 to 286 million kilograms, and scope 3 to 19,050 million kilograms.[63] Scope 3 is defined as "*indirect emissions from purchased goods and services (e.g raw milk from […] farmer owners, packaging and external transport) and from waste handling (e.g. recycling) at [Arla's] sites*."[64]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Arla's ambition is to become carbon net-zero by 2050. "*On the way to net zero emissions, [Arla] have committed to reduce absolute scope 1 and 2 greenhouse gas emissions by 63 per cent by 2030 from a 2015 base year. [Arla] also commit to reduce scope 3 greenhouse gas emissions by 30 per cent per tonne of standardised raw milk and whey intake by 2030 from a 2015 base year.*[65] It falls short of committing to a 45% reduction across scopes by 2030, and the 30% scope 3 reduction is calculated per production unit, not in absolute terms. Arla's climate targets encompass all three scopes.[66] The company recognises that its farmer owners will need to make significant investments individually to reduce the greenhouse gas emissions at farm level. Arla states that its scope 3 targets are to be reviewed in 2022. "*Whilst the SBTi has classified Arla's new 63 per cent target for scopes 1 and 2 as consistent with a 1.5°C trajectory, the existing 30% target for scope 3, covering among other things the Arla farms, continues to meet the SBTi's criteria for ambitious value chain goals in line with current best practice. The SBTi is expected to launch a new sector guidance in 2022 for Forest, Land and Agriculture with more detailed requirements for setting science-based targets than previously available for companies in land-intensive sectors*."[67]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero goal)**

In its 2021 Sustainability Report Arla claims that it '*do[es] not use offsetting to reach the science-based targets [it] have set for 2030 or in any other corporate reporting of [its] climate impact*'.[68]

The analysis of Arla's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero goal).	

5.1.2 Cal-Maine Foods

On its corporate website, Cal-Maine Foods state that they are "*[…] the largest producer and distributor of shell eggs in the United States. […] The Company has one operating segment, which is the production, grading, packaging, marketing and distribution of shell eggs. [Its] integrated operations consist of hatching chicks, growing and maintaining flocks of pullets, layers and breeders, manufacturing feed, and producing, processing, packaging, and distributing shell eggs. […] [Their] total flock as of May 28, 2022, consisted of approximately 42.2 million layers and 11.5 million pullets and breeders.*"[69] The company has not yet started reporting on its carbon footprint, nor has set any measurable time-bounds climate commitments.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

According to its 2021 Sustainability Report (for FY 2020), Cal Maine "*[…] are reconsidering how [they] measure and report [their] gross global Scope 1 emissions.*"[70] No data has been provided on scope 2 and scope 3 emissions, nor any indication on when it may be disclosed. The 2022 Report (for FY2021)[71] does not demonstrate any progress on disclosures.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Cal-Maine Foods states that they "*[…] are engaged to establish baselines and gross and density-based GHG targets. [The company] may also consider adopting Science-Based Targets (SBTs). [Cal-Maine Foods] will look to the Science Based Targets initiative (SBTi) Forest, Land and Agriculture project (FLAG) for guidance that will address gaps that will help inform [their] future climate-transition reporting strategy.*"[72] However, no measurable time-bound commitments on climate seem to have been made yet.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

As no reporting on emissions has been made and no commitment set, it is not possible to assess at this moment if the company may consider carbon offsetting as one of the measures to achieve its net- zero goals (if and when those are set).

The analysis Cal-Maine Foods' policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.3 Cargill

Cargill is a US-based privately-owned global food corporation. It is one of the largest privately held corporations in the United States in terms of revenue ($134.4 billion). It partners with food, agriculture, financial and industrial customers in more than 125 countries.[73]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Cargill reports emissions in line with CDP and covers all three scopes. Value chain emissions (scope 3) include purchased goods and services and end of life treatment of sold products[74] – one of the most material categories for the agrifood sector. Cargill does not seem to have committed to net zero 2050, and its 2030 targets represent relative, not absolute GHG reduction.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Cargill states that it "*[…] endorse[s] the Paris Climate Agreement and [its] Scope 1, 2 & 3 goals are approved by the Science Based Target Initiative (SBTi), the globally accepted standard for ensuring emission reduction goals are aligned with the Paris Climate Agreement*."[75] According to Cargill, in 2019, its "*[…] commitment to reduce greenhouse gas emissions (GHG) from its global supply chain by 30% per ton of product by 2030, in combination with the previously announced operational goal to reduce absolute emissions by 10%, has been approved by the Science Based Target initiative (SBTi), a collaboration between CDP, the United Nations Global Compact, World Resources Institute (WRI) and the World Wide Fund for Nature (WWF)*."[76] The previous 10% absolute reduction was planned by 2025 against the 2016 baseline. At the same time, Cargill does not seem to have committed to net zero 2050, and its 2030 targets represent relative, not absolute GHG reduction.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero goal)**

Though Cargill itself does not seem to include offsetting in its GHG reduction activities, it is facilitating offset programmes and has recently launched a new initiative (RegenConnect), which aims to advance regenerative agricultural practices and enhance additional income for farmers by connecting them to carbon offset buyers.[77]

The analysis of Cargill's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero goal).	

5.1.4 Charoen Pokphand

According to Reuters, "*Charoen Pokphand Foods […] is a Thailand-based company, which is engaged in the agro-industrial and integrated food businesses. The Company operates through two segments: livestock and aquaculture. The livestock business comprises of chicken, duck, and pigs. The aquaculture business segment comprises of shrimp and fish. The Company's integrated agro-industrial and food businesses includes animal feed production, animal breeding, animal farming, primary meat processing, food production and ready-to-eat food as well as meat and food retail outlets, all of which are conducted by placing importance on animal welfare and biosecurity system..*"[78]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

C.P. Group reports its emissions for scopes 1, 2 and 3 in its annual Sustainability Reports. In 2021, its emissions made up 1.42 million tons CO_2e for scope 1, 5.14 million tons CO_2e for scope 2, and 50.69 million tons CO_2e for scope 3 (including purchased goods and services 35,126 million tons CO_2e and use of sold products 1,919 million tons CO_2e).[79]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.**

According to C.P. Group's Climate-Related Risk Management Report, it "*[…] joined United Nation (UN) ‚Race to Zero' campaign and signed ‚Business Ambition for 1.5°C Commitment Letter', the global movement of leading companies aligning their business with the most ambitious aim of the Paris Agreement, to limit global temperature rise to 1.5°C above preindustrial levels and reach net-zero by 2050 for the best chance of avoiding the worst impacts of climate change. Charoen Pokphand Group also committed to set science-based emissions reduction targets in line with 1.5°C emissions scenarios and submit Science Based Targets (SBT) submission to ensure the strongest ambition in the short, medium to long term and align with trajectories that lead to net-zero value chain emissions by 2050, in line with the criteria and recommendations of the Science Based Targets initiative (SBTi).*"[80] C.P. also states that it is "*[…] dedicated to become Carbon Neutral Organization by setting Net Zero' goal by 2030 in the organization (Scope 1 + Scope 2) by reducing GHG emissions, promoting renewable energy programs, encouraging all employees, stakeholders and business partners to join for carbon emission reduction programs*."[81] Though C.P. Group states that it aims at a 90% scope 3 reduction as its long-term goal,[82] it has not yet disclosed any concrete steps explaining how it is going to work with its value chain emissions. Thus, though CP has committed to a 2050 net-zero goal and is on its way to SBTi-proof targets, its current interim goals for 2030 are not ambitious enough, as they only cover scopes 1 & 2.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

According to its Towards Net Zero - Climate-Related Risk Management Report, C.P. Group has "*[…] set a goal to reduce 10% of GHG emissions by 2020 with base-year on 2015. However, in 2020, C.P. Group has reduced 8.4% GHG emissions which is still not met the target, therefore C.P. Group voluntary bought carbon credits from carbon reduction projects in Thailand under TGO's T-VER (Thailand Voluntary Emission Reduction Program) scheme including renewable energy projects such as hydro power and energy generation from biomass to offset and achieve our 10% emission reduction goal or equal to 1,141,627 Thai Baht."*[83] In its 2021 Sustainability Report, C.P. Group states that it is planning to use "*neutralization actions to offset residual emissions.*"

The analysis of Charoen Pokphand's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero-goal).	

5.1.5 Dairy Farmers of America

Dairy Farmers of America (DFA) is an organisation of local family farmers from across the United Sates. Currently, it unites over 7000 member farms and operates production facilities.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Neither in its 2021 nor in the 2022 Social Responsibility Reports DFA discloses any GHG emissions data. The 2022 report provides a reference to CDP, saying that their partnership with CDP provided honesty and transparency for their sustainability goals and progress. However, no emissions figures are disclosed. A search on the CDP website returned no submissions by DFA.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

According to the company's website, "*[…] as a cooperative invested in the dairy supply chain from farm to table, DFA is taking a strong position by setting a science-based target and committing to reduce both direct and value chain greenhouse gas (GHG) emissions by 30% by 2030, from a base year of 2018. By having their targets validated by the Science Based Targets initiative (SBTi), DFA is supporting the Paris Agreement's broader goals to keep global warming below 2 degrees Celsius. Additionally, DFA's target is aligned with work of the Innovation Centre for U.S. Dairy and its goals for the U.S. dairy industry to become carbon neutral or better by 2050*."[84] In the 2021 Social Responsibility Reports, DFA provides a detailed breakdown of its scope 3 emissions by source (in %, not in absolute terms).[85] Building on this and on to its commitment to reduce both direct and value chain GHG emissions by 30% by 2030, it can be assumed that DFA is planning to employ specific measures to reduce value chain emissions. Assumingly, the concrete measures are still to be disclosed. Thus, though DFA has committed to an absolute reduction both in own operations and in value chain, the target lacks ambition (30% instead of the best-practice 45%). Moreover, DFA claims that its target is aligned with the Centre for U.S. Dairy's goals for the U.S. dairy industry to become carbon neutral or better by 2050, but it fails to publicly voice its own commitment.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Neither DFA's climate commitment nor its 2021 and 2022 CSR reports contain information on using offsetting to achieve their climate goals. However, since DFA has not stated that this measure will not be used at all or only as a supplementary activity not counting towards emission reduction targets, it cannot be assessed that it will not be used as such.

The analysis of DFA's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.6 Danone

Danone is a French food company, historically leading in dairy-based products and beverages, and today counting a number of plant-based brands under its portfolio. Danone is an early adopter of sustainability commitments, having made their net-zero commitment in 2016, at the time pledging to becoming 'carbon neutral by 2050' in their Climate Policy.[86] The targets and action plans have since been approved by the SBTi, updated in 2019 and consistently reported on. Strategies for achieving net-zero include implementing 'circular economy' principles in packaging.[87]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Danone measures the GHG emissions of its entire value in (scopes 1, 2 and 3) based on the international GHG Protocol developed by the World Resources Institute and the World Business Council for Sustainable Development. Thus, in 2021, its scope 1 emissions made up 683 $ktCO_2$, scope 2 295 $ktCO_2$, and scope 3 23,733 $ktCO_2$.[88]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Danone has committed to becoming net-zero by 2050, with the following quantifiable and time-bound targets: zero increase in GHG absolute emissions and on Danone direct responsibility (i.e. scope 1 & 2) by 2020, peak full-scope GHG absolute emissions between 2020-2025, cut full-scope emissions intensity by 50% in 2030.[89] Thus, its interim targets only aim at intensity, not absolute reduction.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Offsetting seems to be part of the net-zero strategy. Danone states that "*[a]s [it] work[s] for a carbon neutral future, [it is] committed to compensating for [its] remaining carbon emissions in a way that can also improve lives in the most vulnerable communities around the world by restoring the ecosystems they rely on for their sustenance. Along with nine other corporate partners, [Danone] invest[s] in the Livelihoods Carbon Funds to support projects for agroforestry, mangrove restoration, and fuel-efficient cooking tools for communities in Asia, South America, and Africa. Projects are*

monitored over up to 20 years, requiring a long-term commitment from the investor companies in the Livelihoods Carbon Fund."[90]

The analysis of Danone's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.7 Friesland Campina

Friesland Campina is a cooperative of dairy farmers in the Netherlands, Belgium, and Germany. According to its corporate website, "*Friesland Campina supplies consumer products, such as milk, yogurt, cheese, infant nutrition and desserts, products for the professional market, such as cream and butter products, ingredients and semi-finished products for producers of infant nutrition, the food industry and the pharmaceutical sector. [It has] branches in 32 countries and exports to more than one hundred countries worldwide. At year-end 2021, Friesland Campina employed 22,038 workers (FTEs).*"[91]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

The 2022 New Climate Institute Report states that "*Friesland Campina reports on all significant emission sources, but with limited granularity, and limited information on past emission trends. Scope 3 emissions reporting recently improved, but still limited detail.*"[92] The same report states that Friesland Campina's total emissions (subsidiaries covered) made up 26 $MtCO_2e$ (2019).

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Friesland Campina's long-term ambition is net-zero emissions by 2050.[93] Its 2030 interim targets include 63% reduction of GHG emissions in the production chain worldwide and their milk transport chain in the Netherlands, Belgium, and Germany (scope 1 & 2), 33% reduction of greenhouse gas emissions from the production of milk on member dairy farms, and 43% reduction of greenhouse gas emissions in purchased dairy products and basic dairy, packaging, selected raw materials and external production (scope 3) compared to 2015.[94] Its near-term goals have been submitted to the SBTi and Friesland Campina expects these targets to be validated in the second quarter of 2022. Presumably these will be published in the 2023 Report. According to its Climate Action Plan, Friesland Campina "*[…] have fully fleshed out roadmaps and reduction plans for both scope 1 and 2 and scope 3 member milk. [They] are currently working on fleshing out the pathway towards achieving net climate-neutral production for scope 3 - other. In line with the SBTi guidelines, [they] have established targets for more than 70 percent of the total scope 3 emissions.*"[95]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Friesland Campina states that "*[…] in [their] reduction plans [they] do not include offsetting at this point.*"[96] At the same time, according to NCI, *"[…] by 2050, FrieslandCampina wants to achieve net climate neutrality, by neutralising emissions, mainly with soil sequestration.*"[97] Thus, offsetting seems to be part of reaching the net-zero goal, though it is currently unclear to what extent.

The analysis of Friesland Campina's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.8 Hatfield Quality Meats / Clemens Food Group

Hatfield is a pork packing company based in Hatfield, Pennsylvania, producing different fresh and manufactured pork products. It is controlled by Clemens Food Group, owned by the Clemens Family which started the pork business in Pennsylvania 125 years ago[98].

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

No GHG emissions have been disclosed by either Hatfield or by Clemens, its parent company. No indication of when and if such reporting may start have been provided.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

No measurable time-bound commitments on climate seem to have been made. Some achievements are being reported, for example, a claim by Clemens that *"[…] by burning cleaner natural gas instead of oil, [they] have decreased [their] annual emissions by over 300%."*[99] However, no baseline or absolute figures are provided, leaving alone the fact that the 'progress' is about shifting from one fossil fuel type to another, which will hardly contribute to net-zero.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

As no reporting on emissions has been made and no commitment set, it is not possible to assess at this moment if the company may consider carbon offsetting as one of the measures to achieve its net-zero goals (if and when those are set).

The analysis Hatfield Quality Meats / Clemens Food Group' policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.9 Hilton Foods

Hilton Food Group is a leading specialist meat-packing business supplying major international food retailers from facilities located in the UK, Europe and Australasia.[100] Overall, Hilton Foods is active in 13 markets around the world (Including Benelux, Portugal, and Greece), operating its own processing facilities to supply partners or in joint ventures in local markets. Hilton regularly and consistently reports its CO_2 footprint both for own operations and for the value chain. It has committed to net-zero by 2050 and set interim 2030 targets which, however, lack ambition. It is unclear if and when it may use carbon offsetting.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

According to Hilton Foods, in 2021, "*[…] using more robust methodology, [they] have recalculated [their] Scope 3 emissions at 15.5 million tonnes CO_2e, in anticipation of setting more ambitious targets in 2022."*[101] Overall, Hilton Foods regularly reports all three scopes both in its sustainability reports[102] and in in their CDP reports.[103]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

According to the 2021 Sustainability Report, Hilton "*[…] signed up to the UN Race to Zero, announcing [its] commitment to achieve net zero emissions globally before 2050. […] the Science Based Target initiative approved [its] targets to reduce absolute scope 1 and 2 GHG emissions 25% by 2030 from a 2020 base year and reduce [its] absolute scope 3 GHG emissions from purchased agricultural products 12.3% within the same timeframe."*[104] Thus, though Hilton has committed to net-zero by 2050 and set interim targets for all three scopes, these targets lack ambition and are considerably lower than the expected target to achieve an at least 45% reduction by 2030 compared to 2019. Hilton Foods GHG reduction targets cover all three CDP scopes[105]. Hilton Foods claims that it has "*[…] partnered with WRAP in the development of their Scope 3 Guidance for the Food Sector and with the UNGC in the development of guidance for seafood and worked through UK CSP to deliver common industry KPIs to enable farmers to implement reductions at farm level."*[106]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

In its 2021 Sustainability Report, Hilton Foods states that "*[…] policy mechanisms will […] need to balance emissions reductions with the needs of a growing population and ensure continued levels of food security which contribute to a balanced and healthy diet. As such, there may be an increase in incentives for carbon offsetting schemes on agricultural land, or increased R&D incentives for carbon agricultural techniques. The situation is currently unclear and is likely to be implemented in different ways across different political landscapes*."[107] It is thus unclear if, and to what extent, Hilton may be planning to use carbon offsetting.

The analysis of Hilton Foods' policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3.	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.10 Interovo Egg Group

Interovo Egg Group is the umbrella organisation of various companies specialised in eggs and egg products, with offices in various European countries. Interovo Egg Group, according to Bloomberg, *"[…] offers eggs and egg products. The Company provides bakery products, confectionery, pasta, soup, salads, sauces and meat, and dairy products. Interovo Egg Group supplies its products to customers throughout the Netherlands*."[108]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

No systematic climate disclosures by Interovo are published – either on its own corporate website or in CDP resources. Interovo does not seem to publish any sustainability reporting.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Interovo does not seem to have made any public commitment on net-zero, nor has it set interim 2030 targets for any of the scopes.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Interovo has not yet published its carbon footprint, nor a climate strategy. It is therefore premature to assess whether such a strategy, if disclosed, would include any offsetting measures.

The analysis of Interovo's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.11 JBS / Pilgrim's Pride

JBS is a Brazilian multinational food industry company based in Sao Paulo and global presence in in more than 20 countries. According to its website, JBS has "*[…] a diversified product portfolio, with options ranging from fresh and frozen meats to prepared meals, commercialized through brands recognized in Brazil and other countries, such as Friboi, Swift, Seara, Pilgrim's Pride, Swift Prepared Foods, Plumrose, Primo, among others. The Company also operates with correlated businesses, such as Leather, Biodiesel, Collagen, Natural Casings for cold cuts, Hygiene & Cleaning, Metal Packaging, Transportation, and solid waste management solutions, recycling, innovative operations that also promote the sustainability of the entire business value chain.*[109]" Pilgrim's Pride is majority-owned by JBS. "*Pilgrim's is a leading global provider of […] food products, […] [known as] one of the world's largest poultry producers and a fully integrated pork producer. […]. [Its] 58,000 team members provid[e] more than 133 million daily servings of protein to retailers, restaurants, foodservice providers and consumers around the world. The company includes 39 production facilities and 27 prepared foods facilities in 14 U.S. states, the U.K., Puerto Rico, Mexico and Europe. Pilgrim's is proud to partner with more than 4,900 family farms for poultry and over 6,300 family farms for hog and lamb supplies*."[110]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

JBS consistently reports on all three emissions scopes. Thus, in 2021, total GHG emissions by weight for scope 1 amounted to 4,675,368 tons CO_2e, for scope 2 to 1,399,521 tons CO_2e, and for scope 3 to 65,032,995 tons CO_2e.[111] JBS provides a breakdown of covered scope 3 categories, of which purchased goods and services was the only one with incomplete coverage of livestock.[112] This may though be the most relevant category, as the Institute for Agriculture and Trade Policy concluded that JBS might have under-reported scope 1, 2 & 3 by 84%.[113] . As of 2021, total scope 1 & 2 emissions were estimated at 1,466,707 tons of CO_2e.[114]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

JBS states that it wants to become net-zero by 2040. JBS' interim target is to reduce scope 1 & 2 emissions by 30% from a 2019 baseline.[115] The Company will *"[…] provide a roadmap consistent with the criteria set forth by the Science-Based Targets initiative (SBTi)."*[116] Thus, JBS is committed to net-zero earlier than 2050, but its 2030 targets at the same time are not very ambitious. JBS targets seem to be cascaded down to its major subsidiaries. Thus, Pilgrim's states that it is *"[…] the first major global protein company to set a net-zero GHG emissions by 2040 target, covering scope 1, scope 2, and scope 3 emissions' and that 'its interim target is to reduce scope 1 and 2 emissions by 30% from a 2019 baseline."*[117] No target for scope 3 emissions is set.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

JBS claims that its core target is to reduce its operational and value chain emissions, while offsetting is expected to be used only to tackle "residual emissions".[118]

The analysis JBS / Pilgrim's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.12 Kraft Heinz

Formed in 2015 through the merger of Kraft Foods Group, Inc. and H.J. Heinz Holding Corporation, The Kraft Heinz Company is a producer of food and beverages. Kraft Heinz is co-headquartered in Chicago and Pittsburgh. At the end of 2020, Kraft Heinz had 78 company-owned factories, 5,550 ingredient and packaging suppliers, 210 external manufacturers, and approximately 38,000 employees around the world.[119]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

The company reports on all three emission scopes in its annual ESG Reports. According to the 2021 Report, its total scope 1 emissions amounted to 592,463 tons CO_2e, scope 2 emissions (market-based) to 704,689 tons CO_2e, and scope 3 emissions to 25,026,531 tons CO_2e.[120]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

The Kraft Heinz Company committed to achieve net-zero GHG emissions across its operational footprint (scope 1 & 2) and entire global supply chain (scope 3) by 2050. As a milestone on its path to achieving net-zero emissions, it will target a near-term emissions reduction of 50% by 2030 across all three scopes.[121] Kraft Heinz states that *"[…] its Scope 3 emissions account for approximately 95% of the Company's total emissions, so will be a primary focus of the Company's reduction efforts. The Company will work in partnership with key suppliers, including ingredient and packaging suppliers, which account for approximately 62% and 12% of Kraft Heinz's Scope 3 footprint respectively, to reduce emissions across its value chain. This follows the Company's own recently updated Supplier Guiding Principles as a north star. Other focus areas will include upstream and downstream transportation and distribution, end-of-life treatment and use of sold products."*[122]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Offsetting is not mentioned in the company's climate action statement or ESG reporting. However, as the company has not committed to refrain from it, it is unclear, if may become part of the net-zero strategy in the future.

The analysis of Kraft Heinz's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.13 Lactalis Group

Lactalis is a France-based global dairy industry corporation present across all the categories of this market. The Group claims to be the number one cheese manufacturer in the world, and the European leader within the milk, butter and cream markets. It is also a major player in the chilled dairy and dairy ingredients categories (Lactalis Ingredients being a separate business unit with its own CSR reporting), as well as the foodservice industry, and is also currently expanding in the clinical and infant nutrition industries.[123]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Though Lactalis has set a 2050 net-zero goal and is reporting some GHG emission reduction in %, it has not yet started to regularly and consistently disclose its carbon footprint. No absolute emissions data has been reported in its 2021 Annual Report, 2020 CSR Report (the latest available at the moment this report was prepared), or in the Lactalis Group Climate Policy.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

As of 2021, Lactalis Group has set the following climate commitments: (1) reduction of at least 25% of the scope 1 & 2 emissions by 2025 (base year: 2019); (2) reduction of at least 50% of scope 1 and scope 2 emissions by 2033 (base year: 2019), and (3) carbon net-zero by 2050.[124] Thus, though the company has a net-zero goal, its interim targets currently only cover scopes 1 & 2, a fraction of their actual emission.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Lactalis Group is not mentioning offsetting in its climate-related document, including its Climate Policy, CSR and Annual Reports. It is, however, unclear, if the company may or may not consider such activities in the future.

The analysis of Lactalis Group's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.14 Nestlé

Nestlé is the largest food company in the world and one of the leading FMCGs. It is considered a leader in the corporate sustainability movement and is one of the most transparent companies when it comes to sharing information about its material origins. Nestle's net-zero policy covers in detail the scope and strategies to achieving their targets.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Nestlé regularly and consistently discloses both its own emissions, and emissions from the value chain. In 2021, its scope 1 emissions amounted to 3.32 million tons of CO_2e, scope 2 to 1.61 million tons, and scope 3 to 113.72 million tons.[125]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.**

Nestlé has committed to achieving net-zero emissions by 2050 at the latest, with interim targets of 20% emissions reduction by 2025 and 50% emission reduction by 2030.[126] There are also a number of time-bound milestones and targets for supply chain net-zero initiatives.[127] Nestlé states that "*[…] emissions from [its] direct operations, known as Scope 1 and Scope 2, accounted for just 5% of [its] GHG emissions. The vast majority of GHG emissions (95%) come from activities in [its] supply chain. As a result, that is where Nestle focus[es] most of [its] efforts*."[128] At the same time, NCI believes that though "*Nestlé is certified by SBTi as 1.5°C compatible for a 50% emission reduction target by 2030 compared to a 2018 base year, [a] close inspection of Nestlé's own reports leads [NCI] to the interpretation that the company's target may be compared to a "business as usual scenario" projected from 2018, which would equate to an 18% emission reduction compared to a 2018 base year.*"[129]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Offsetting is used by Nestlé for its brand carbon neutrality targets, but not for its corporate net-zero goal. For this, offsetting is not allowed; all remaining emissions must be balanced by insetting.[130]

The analysis of Nestlé's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.15 Olympus Foods

Olympus Foods is a Greek and international food producer focusing on dairy. In addition to dairy products, it also produces natural juices, Greek tea, plant-based drinks and desserts under the OLYMPUS, TYRAS, and RODOPI brands.[131] At the moment it does not have a Paris-proof climate strategy or any consistent GHG reporting and time-bound commitments.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Olympus Foods is reporting some relative emissions reduction (in %) resulting from using biogas for heating instead of conventional fuels and from using rPET instead of virgin plastics, however, no regular and consistent emissions reporting is done either for either own operations or its value chain.[132]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

In its Corporate Social Responsibility Report, Olympus Foods claims that it "[…] *aim[s] at a zero environmental footprint, cultivating a relationship with nature based on respect*."[133] This statement, however, is not supported by a 2050 net-zero goal, nor interim targets for 2030 against 2019 baseline. Olympus Foods discloses some GHG reduction figures (4.4% between 2019 and 2020)[134] due to the use of biofuels for heating in its own factories (which covers part of scope 1), but not for purchased electricity, let alone value chain emissions (Scopes 2 and 3, respectively).

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero goal)**

Offsetting is not part of the emissions reduction strategy, as there does not seem to be a strategy in place, with only sporadic initiatives hardly covering the material emissions sources.

The analysis of Olympus Foods' policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net zero goal).	

5.1.16 Plukon Food Group

The Plukon Food Group is a major player on the European poultry market, supplying chicken products and ready meals to a wide range of European food partners. It operates 27 sites in six countries and employs 6,500 people. Plukon operates 11 poultry processors and 7 processing and packaging plants in the Netherlands, Germany, Belgium, France, and Poland, where 9 million chickens are slaughtered and processed weekly.[135] It has not yet started reporting its carbon footprint, nor communicated any measurable time-bound climate commitments.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

So far, Plukon has published two CSR reports (for 2016[136] and for 2017-2018[137]). Neither of them contains any emissions disclosures. The sustainability section on the company's website,[138] as well as its sustainability policy[139] fail to provide any details on its carbon footprint.

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Based on the analysis of Plukon Food Group's sustainability policies and reporting, no net-zero commitments can be identified.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

With no climate commitments and reporting it is not possible to assess if offsetting may become part of emissions reductions measures once they are developed and disclosed.

The analysis of Plukon Food Group's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
4	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.17 Procter & Gamble (P&G)

Procter & Gamble (P&G) is an American consumer goods company specialising in consumer health, personal care and hygiene products. Their net-zero ambitions are outlined in the comprehensive *Climate Transition Action Plan*,[140] which also includes targets and strategies to reduce emissions from their packaging. The strategies and ambitions of P&G regarding their climate action and packaging are comprehensive, and inter-linked.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

According to its Climate Transition Action Plan, P&G *"[…] annually publishes detailed information on [its] Scope 1, 2, and 3 emissions following the guidelines of the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) GHG Protocol Corporate Accounting Standard. P&G obtains 3rd party assurance of our Scope 1, 2, and portions of [its] Scope 3 inventory."*[141] Reported emissions amount to: Materials & Packaging (Supply Chain),16.8 million tons (8.5%), Transportation 3.9 million tons (2.0%), Operations, 2.6 million tons (1.3%), End of Life 9.4 million tons (4.7%), and Consumer Use 164.0 million tons (83%).[142]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

"*P&G's ambition is to reach net zero GHG emissions across [its] supply chain and operations by 2040, with science-based targets for 2030 to make meaningful progress this decade*."[143] The interim target is to achieve a 40% reduction in supply chain emissions per unit of production *"[…] for the priority categories that account for over 90% of [its] supply chain emissions – a target submitted to the Science-Based Targets Initiative (SBTi). The priority categories that account for over 90% of [its] supply chain emissions include Laundry Detergents, Fabric Enhancers, Shampoo, Conditioner, Body Wash, and Baby Diapers. While these categories are in scope for SBTi goal tracking and reporting, all categories companywide will be activating plans to reduce emissions in pursuit of net zero."*[144] Thus, though P&G has set a net-zero goal by 2040, and its targets cover all three scopes, with specific goals for scope 3, its interim target by 2030 is less than 45% and is calculated per unit of production, not in absolute terms.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Offsetting is not directly mentioned by P&G as a part of its net-zero commitment or in its Climate Transition Action Plan,[145] which regulates its 2040 goal or in its operational 2030 climate ambition document.[146] However, the Climate Transition Action Plan says that *"[P&G's] wind farm offsets 100% of the electricity used by P&G's Fabric and Home Care facilities across the US and Canada."*[147] It is currently unclear if P&G may or may not considering offsetting as part of GHG emissions reduction along the value chain.

The analysis of P&G's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
4	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.18 Tyson Foods

According to its website, "*Tyson Foods is a […] multi-national, protein-focused food company producing approximately 20% of the beef, pork, and chicken in the United States in addition to a portfolio of foods under the Tyson®, Jimmy Dean®, Hillshire Farm®, BallPark®, Wright®, Aidell's® and State Fair® brands. Tyson Foods is also the leading protein provider to many national restaurant chains, including quick service, casual, mid-scale, and fine dining restaurants. [Tyson Foods] make[s] […] food for a variety of foodservice customers, including schools, military bases, hospitals, nursing homes and international customers as well. [Tyson Foods] are also the only company that sells chicken, beef, pork, and prepared foods products through all major retail distribution channels, including club stores, grocery stores, and discount storess*."[148] The company has committed to net-zero by 2025, though its interim 2030 targets envisage only a 30% reduction. It is not reporting on its value chain emissions (scope 3). However, emission reduction plans cover all three scopes, with measures outlined for the value chain reduction.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

As of 2021, Tyson Foods has been reporting its scope 1 & 2 emissions (3.83 and 1.96 million tons CO_2e in 2021, respectively),[149] but not scope 3 emissions. According to Tyson Foods' CDP Report, scope 3 emissions are "*relevant, but not yet calculated*".[150]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

In 2021, Tyson Foods announced "*[…] its ambition to achieve net-zero greenhouse gas (GHG) emissions across its global operations and supply chain by 2050, including scopes 1, 2 and 3. […] The move to net zero is an expansion of the company's current science-based target of achieving a 30% GHG emissions reduction by 2030, which is aligned with limiting global temperature rise to 2.0°C.*"[151]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Neither Tyson Foods' climate commitment statement climate commitment nor its 2021 Sustainability Report contain any information on using offsetting to achieve their climate goals. However, since Tyson Foods has not stated that this measure will not be used at all or only as a supplementary activity not counting towards emission reduction targets, it cannot be evaluated whether it will not be used as such.

The analysis of Tyson Foods' policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.19 Unilever

Unilever is a leading consumer goods company with an enormous and wide-ranging product impact, from ice-cream to laundry detergents and personal care products. Unilever outlined all their key climate commitments, including on their packaging, in their 2021 Climate Transition Action

Plan. The plan is comprehensive and covers a number of separate issues under the umbrella of mitigating their emissions footprint.

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

Unilever regularly and consistently reports on its CO_2 footprint and provides a detailed breakdown of its scope 1, 2 & 3 GHG emissions by activity. As of 2021, its total scope 1 & 2 made up 710,740 tons CO_2e, and its scope 3 emissions amounted to 61,007,131 tons CO_2e.[152]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target**

Unilever have commitment to net-zero emissions across their value chain by 2039, and zero emissions in their operations by 2030. Their interim targets are quantifiable and time-bound, and consist of:

- Reducing scope 1 & 2 emissions by 100% by 2030 against a 2015 baseline; with an interim goal to reduce by 70% by 2025.
- Halving the full value chain emissions by 2030 against a 2010 baseline.
- Achieving net-zero emissions covering scope 1, 2 & 3 emissions by 2039.[153]

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

In its Climate Transition Action Plan, Unilever states that its "*[…] primary focus in the 2020s and 2030s will be on emissions reduction, not offsetting' and that it 'will not seek to meet [its] emissions reduction targets through the practice of purchasing and retiring carbon credits, known as offsetting*."[154] At the same time, Unilever supports its own brands to employ offsetting schmes to reach their net-positive claims, so the real extent to which offsetting is (and may be) used remans unclear.

The analysis of Unilever's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

5.1.20 Vion Food Group

Vion is an international producer of meat, meat products and plant-based alternatives with production locations in the Netherlands, Germany, and Belgium. Vion has sales support offices and representatives in sixteen countries worldwide. Its four business units Pork, Beef, Food Service and Retail, provide fresh pork, beef, meat products, plant based alternatives and by-products for retail, foodservice and the meat processing industry.[155]

1. **Carbon footprint is regularly and consistently disclosed both for own operations and value chain**

In its most recent 2021 CSR report, Vion only reports absolute direct GHG emissions for scope 1 (59 400 tons CO_2e) and GHG emissions intensity for scopes 1 & 2 (88 kg CO_2e / ton sold).[156] Scope 3 emissions are now being calculated and are expected to be published in the next CSR report.[157]

2. **Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target.**

According to the 2021 CSR Report, *"[i]n the first quarter of 2022, [Vion] will commit […] to setting science-based targets on [its] carbon footprint (scope 1, 2 and 3) to make sure that our reduction ambitions are in line with the Paris Climate Agreement. [Vion] will develop these targets in 2022 to get them approved by the Science Based Targets initiative. Besides these short-term reduction targets, [Vion] have set the intention of having net zero emissions across the supply chain by 2045 (ultimately 2050."*[158] Thus, even though Vion has committed to net-zero by 2050, it has not yet set interim targets, and it is currently not possible to assess if these targets, once set, will include a 45% reduction by 2030 compared to its 2019 commitment. Vion has not yet reported on its 2022 progress, or any commitments made in this year. According to the 2021 CSR Report, with respect to scope 3, Vion will *"[…] facilitate the farmers of the purchased pigs and cattle with CO_2 reduction measures through communication of relevant supply chain data […]. This includes benchmarking of farms and supply of goods to farms."*[159] Vion goes on to claim that *"[…] to stay in line with <1.5ºC of global warming in 2050, scope 3 targets in 2030 should reach at least 32% physical intensity reduction compared to 2021 for pork and 26% for beef (conform SBTi draft sector programme FLAG). For purchased non-food, it should be at least 42% absolute reduction."*[160] Thus, the scope 3 targets, at least for now, refer mostly to intensity, and not to absolute reduction.

3. **Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal)**

Carbon offsetting is neither mentioned in Vion's sustainability strategy,[161] nor in its 2020 and 2021 CSR reports. It does not mean, however, that such measures are not considered, taking into account that no interim targets and reduction measures have been yet defined. According to NCI, it is currently unclear *"[…] what share of emissions will be reduced and what share will be compensated."*[162]

The analysis of Vion's policy leads to the following assessment:

	Criteria	Score
1	Carbon footprint is regularly and consistently disclosed both for own operations and value chain.	
2	Committed to net-zero by 2050, with quantifiable and time-bound interim targets aiming at an at least 45% reduction by 2030 compared to 2019 across all scopes and including a scope 3 target	
3	Offsetting used only as a support measure to compliment emission reduction strategy beyond value chain (and not counting towards emission reduction targets, i.e. the net-zero goal).	

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Appendix 1 Country analysis of Ahold Delhaize scope 3 emissions

The following tables provide a more detailed overview of the underlying calculations for Table 12. In making these calculations, several assumptions on country-level food sales shares, per capita consumption of different animal products, and shares of aquaculture production in total seafood consumption had to be made.[G]

Table 19 Animal product-related scope 3 emissions for Ahold Delhaize U.S.

Market division (est.)	**2021**	**%**		
AD turnover U.S. (US$ bln)	53.7			
Food service turnover (US$ bln)	1,060	56%		
Retail turnover (US$ bln)	830	44%		
Total food sales (US$ bln)	1,890			
Ahold Delhaize share in total	*2.8%*			
Consumption U.S. (est., kg/capita retail weight)			**AD in U.S. volume (est., tons)**	
			U.S. sales	**CO_2e w/o iLUC**
Pork	21.77		205,161	717,701
Poultry	30.71		289,362	611,081
Beef & veal	25.58		241,064	10,494,394
other	0.45		4,274	60,038
Meat total	*78.52*		*739,861*	*11,883,214*
Cheese	18.3		172,250	863,832
Milk	60.8		572,741	335,053
Yoghurt	6.5		61,121	61,732
Butter	2.9		27,782	99,460
Other dairy	15.2		143,613	96,220
Dairy total				*1,456,298*
Eggs			*158,306*	*112,397*
Fish[a]			*81,210*	*284,908*
Total				**13,736,817**

Note: [a] Aquaculture share calculated based on seafood consumption distributed among 25% domestic production of which 7% aquaculture, 75% imported seafood of which 50% aquaculture.
Source: USDA (2022), *Meat Supply & Disappearance – Historical [Excel]*; USDA (2022), *Dairy products: Per capita consumption United States (Annual) [Excel];* NOAA Fisheries (n.d.), "Aquaculture", online: https://www.fisheries.noaa.gov/national/aquaculture/us-aquaculture#:~:text=The%20most%20recent%20'Fisheries%20of,value%20of%20domestic%20seafood%20products, viewed in September 2022; Intrafish (2022, May 12), "New US data show per capita seafood consumption declining", online: https://www.intrafish.com/markets/new-us-data-show-per-capita-seafood-consumption-declining/2-1-1218494, viewed in September 2022; Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

[G] For Europe, an aquaculture share of 20% of fish & shellfish supply is applied.

Table 20 Animal product-related scope 3 emissions for Ahold Delhaize Netherlands

Market division (est.)	**2020**	**2021**	**%**			
AD retail market share NL			35.9%			
Food service turnover (US$ bln)		13.9	22.6%			
Retail turnover (US$ bln)		47.7	77.4%			
Total food sales (US$ bln)		61.6				
Ahold Delhaize share in total			*27.8%*			
Consumption NL (est., kg/capita retail weight)				**AD in Netherlands volume (est., tons)**		
				NL sales	**CO_{2e} (incl. iLUC)**	**o/w iLUC CO_{2e}**
Pork	28.1			138,471	559,586	75,182
Poultry	19.0			93,578	243,133	45,513
Beef & veal	10.6			52,103	2,727,315	459,076
other	1.8			9,078	167,102	39,593
Meat total	*59.5*			*293,230*	*3,697,136*	*619,364*
Cheese	17.4			85,771	456,299	26,160
Milk	54.0			265,995	168,242	12,635
Yoghurt	19.3			94,998	102,598	6,650
Other dairy	128.5			633,322	457,258	32,933
Dairy total					*1,184,398*	*78,377*
Eggs	*4.7*			*23,390*	*19,881*	*3,275*
Fish	*5.8*			*28,787*	*234,989*	*5,910*
Total					**5,136,405**	**706,926**

Source: Distrifood (n.d.), "Marktaandelen", online: https://www.distrifood.nl/food-data/marktaandelen, viewed in October 2022; WUR (2021), "Dossier: Vleesconsumptie"; Statista (2022),"Volume of cheese consumed per capita in the Netherlands from 2014 to 2021, with a forecast for 2022 to 2027"; Rijksinstitut voor Volksgezondheit en Milieu (n.d.), "Consumptie van voedingsmiddelen"; USDA (2022), *Meat Supply & Disappearance – Historical [Excel]*; Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 21 Animal product-related scope 3 emissions for Ahold Delhaize Belgium

Market division (est.)	**2018 (%)**	**2021**			
AD retail market share BE	25%				
Food service share in food sales	20.1%				
Retail share in food sales	79.9%				
Ahold Delhaize share in total	*20.0%*				
Consumption BE (est., kg/capita retail weight)			**AD in Belgium volume (est., tons)**		
			BE sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork		32.7	75,438	305,857	40,958
Poultry		13.5	31,141	80,911	15,146
Beef & veal		10.8	24,892	1,302,971	219,323
other		6.3	14,538	267,623	63,411
Meat total		63.2	203,201	1,956,362	338,838
Cheese		18.0	41,564	221,120	12,677
Milk		29.4	67,888	42,939	3,225
Yoghurt		13.2	30,480	32,919	2,134
Other dairy		14.8	34,175	24,674	1,777
Dairy total				*321,652*	*19,812*
Eggs		*8.0*	*18,473*	*16,702*	*2,586*
Fish		*9.2*	*21,244*	*173,412*	*4,361*
Total				**2,467,129**	**365,598**

Source: *RetailSonar* (2018, November 20), "Supermarkten in België: is er nog plaats voor Jumbo?"; StatBel (2022), "Supply balance sheets for meat"; Statista (2022, January), "Dairy consumption per capita in Belgium 2012-2026, by milk product"; USDA (2022), *Meat Supply & Disappearance – Historical [Excel];* Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 22 Animal product-related scope 3 emissions for Ahold Delhaize Czech Republic

Market division (est.)	**2018 (%)**	**2020**			
AD retail market share CZ	12%				
Food service share in food sales	19%				
Retail share in food sales	81%				
Ahold Delhaize share in total	*9.7%*				
Consumption CZ (est., kg/capita retail weight)			**AD in Czech Rep. volume (est., tons)**		
			CZ sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork		33.7	35,038	141,595	19,024
Poultry		25.6	26,632	69,194	12,953
Beef & veal		6.2	6,482	339,273	57,108
other		0.2	250	4,596	1,089
Meat total		*65.7*	*68,401*	*554,659*	*90,174*
Cheese		14.3	14,877	79,148	4,538
Milk		59.3	61,694	39,022	2,930
Other dairy		43.2	44,944	32,450	2,337
Dairy total				150,619	9,805
Eggs		*13.8*	*14,357*	*12,204*	*2,010*
Fish		*5.1*	*5,337*	*43,567*	*1,096*
Total				**761,048**	**103,085**

Source: USDA FAS (2018), *Czech Republic: Exporter Guide 2018*, GAIN Report EZ1808; Czech Statistical Office, "Food consumption – 2020", online: https://www.czso.cz/csu/czso/spotreba-potravin, viewed in August, 2022; European Commission (2020), *The EU Fish Market;* Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 23 Animal product-related scope 3 emissions for Ahold Delhaize Greece

Market division (est.)	**2020**	**%**	**2021**			
AD retail market share GR (US$ bln)	4.6	23.7				
Food service turnover (US$ bln)	4.9	20.0%				
Retail turnover (US$ bln)	19.4	80.0%				
Ahold Delhaize share in total		*19.0%*				
Consumption GR (est., kg/capita retail weight)				**AD in Greece volume (est., tons)**		
				GR sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork			22.0	44,484	179,768	24,152
Poultry			25.3	51,157	132,914	24,881
Beef & veal			13.5	27,297	1,428,849	240,511
other			6.1	12,334	227,052	53,798
Meat total			*66.9*	*135,272*	*1,968,583*	*343,342*
Cheese			9.2	18,602	98,965	5,674
Milk			31.4	63,491	40,158	3,016
Yoghurt			8.3	16,783	18,125	1,175
Other dairy			10.4	21,029	15,183	1,093
Dairy total					*172,431*	*10,958*
Eggs			*8.4*	*17,045*	*14,489*	*2,386*
Fish			*17.9*	*36,123*	*294,870*	*7,416*
Total					**2,450,373**	**364,102**

Source: USDA FAS (2020), *Retail Foods Greece*, GAIN Report GR2020-0010; Cibum (2022), "Greece: Research on meat production and consumption - Which meat do Greeks prefer?" [Greek], online: https://cibum.gr/nea/epixeiriseis/ellada-ereyna-gia-tin-paragogi-kai-tin-katanalosi-kreatos-poio-kreas-protimoyn-oi-ellines/, viewed in August 2022; Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 24 Animal product-related scope 3 emissions for Ahold Delhaize Portugal

Market division (est.)	**2021**	**%**			
AD retail market share PT		22.9%			
Retail share in food sales		70%			
Ahold Delhaize share in total		*16.0%*			
Consumption PT (est., kg/capita retail weight)			**AD in Portugal volume (est., tons)**		
			PT sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork	32.7		26,423	106,781	14,346
Poultry	37.4		30,222	78,523	14,699
Beef & veal	14.6		11,776	616,420	103,759
other	1.8		1,488	27,395	6,491
Meat total	*86.4*		*69,910*	*829,119*	*139,295*
Cheese	13.0		10,514	55,937	3,207
Milk	66.1		53,462	33,815	2,539
Yoghurt	20.6		16,661	17,994	1,166
Butter	2.0		1,618	6,341	550
Other dairy	10.5		8,492	6,132	442
Dairy total				*120,219*	*7,904*
Eggs	*10.9*		*8,816*	*7,494*	*1,234*
Fish	*54.8*		*44,345*	*361,987*	*9,104*
Total				**1,318,818**	**157,538**

Note: Ahold Delhaize's 49%-stake in Pingo Doce is considered in the calculations.
Source: USDA FAS (2021), *The Portuguese Food Retail Sector, 2021*; Statistics Portugal - the National Statistical Institute (n.d.), "Products Database", online: https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_indicadores&contecto=pi&indOcorrCod=0000211&selTab=tab0, viewed in October 2022; Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 25 Animal product-related scope 3 emissions for Ahold Delhaize Romania

Market division (est.)	**2018**	**2020**	**%**			
AD retail market share RO (US$ bln)		1.7	5.5%			
Food service turnover (US$ bln)		7.78	20%			
Retail turnover (US$ bln)		31.1	80%			
Ahold Delhaize share in total			*4.4%*			
Consumption RO (est., kg/capita retail weight)				**AD in Romania volume (est., tons)**		
				RO sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork	38.3			32,090	129,683	17,423
Poultry	26.9			22,539	58,560	10,962
Beef & veal	5.2			4,357	228,061	38,388
other	3.4			2,849	52,441	12,425
Meat total	*73.8*			*61,835*	*468,745*	*79,199*
Milk equivalents	258.0			216,171	136,728	10,268
Dairy total					*136,728*	*10,268*
Eggs	*11.8*			*9,887*	*8,404*	*1,384*
Fish	*6.7*			*5,614*	*45,825*	*1,152*
Total					**659,701**	**92,004**

Source: USDA FAS (2021, December), *Exporter Guide – Romania*; Institutul Naţional de Statistică (2020), *Disponibilităţile de Consum ale Populaţiei în Anul 2018*; Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 26 Animal product-related scope 3 emissions for Ahold Delhaize Serbia

Market division (est.)	**2019**	**%**			
AD retail market share RS		20.6%			
Food service share in food sales		80%			
Retail share in food sales		20%			
Ahold Delhaize share in total		*16.5%*			
Consumption RS (est., kg/capita retail weight)			**AD in Serbia volume (est., tons)**		
			RS sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork	18.5		21,061	85,112	11,435
Poultry	18.7		21,323	55,401	10,371
Beef & veal	6.3		7,138	373,636	62,892
other	19.1		21,699	399,436	94,642
Meat total	*62.6*		*71,221*	*913,584*	*179,340*
Cheese	9.3		10,622	56,507	3,240
Milk	36.3		41,371	26,167	1,965
Yoghurt	31.2		35,474	38,312	2,483
Other dairy	8.3		9,472	6,839	493
Dairy total				*127,824*	*8,180*
Eggs	*11.2*		12,751	10,838	1,785
Fish	*5.2*		5,905	48,199	1,212
Total				**1,100,445**	**190,518**

Source: Flanders Investment and Trade (2018), *Retail Sector in Serbia: 2018*; Statistical Office of the Republic of Serbia (2020), *Household Budget Survey, 2019;* Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

Table 27 Animal product-related scope 3 emissions for Ahold Delhaize Indonesia

Market division (est.)	**2019**	**%**	**2020**			
AD retail market share ID (US$ bln)	0.45					
Food service turnover (US$ bln)	28.7	20%				
Retail turnover (US$ bln)	115.0	80%				
Ahold Delhaize share in total		*0.3%*				
Consumption ID (est., kg/capita retail weight)				**AD in Indonesia volume (est., tons)**		
				ID sales	**CO_2e (incl. iLUC)**	**o/w iLUC CO_2e**
Pork			1.0	441	1,783	240
Poultry			7.9	3,460	8,989	1,683
Beef & veal			2.2	954	49,910	8,401
other			n/a	-	-	-
Meat total			*11.1*	4,855	60,683	10,324
Cheese			0.1	44	233	13
Milk			16.5	7,223	4,569	343
Dairy total					*4,802*	*356*
Eggs			*6.5*	*2,841*	*2,415*	*398*
Fish			*46.5*	*20,353*	*166,138*	*4,178*
Total					**234,037**	**15,256**

Note: Ahold Delhaize's 51%-stake in Superindo is considered in the calculations.
Source: USDA FAS (2021), *Indonesia: Retail Foods 2020*; OECD (n.d.), "Data, meat consumption", online: https://data.oecd.org/agroutput/meat-consumption.htm, viewed in October, 2022; Statista (n.d.), "Cheese - Indonesia", online: https://www.statista.com/outlook/cmo/food/dairy-products-eggs/cheese/indonesia, viewed in October 2022; EKONID (n.d.), "Business Indonesia - Dairy products", online: https://business-indonesia.org/dairy, viewed in October 2022;The Nature Conservancy (n.d.), "Feeding the world from Indonesia's fisheries", online: https://www.nature.org/en-us/about-us/where-we-work/asia-pacific/indonesia/stories-in-indonesia/indonesia-fisheries-feeding-world/, viewed in October 2022; Concito (n.d.), "The big climate database", online: https://denstoreklimadatabase.dk/en, viewed in October 2022; own calculations.

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