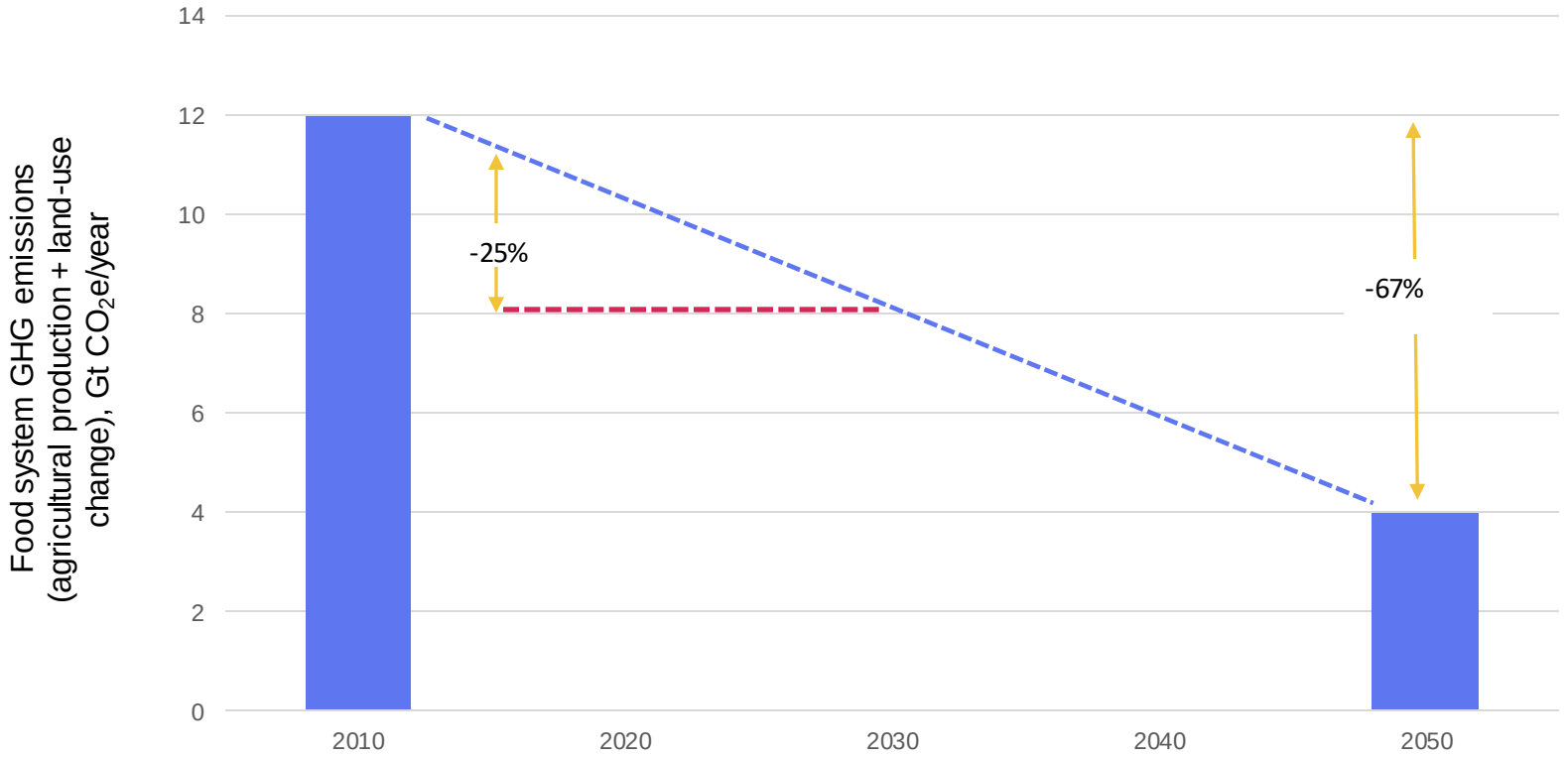
2022 Climate Impact Report: City of Copenhagen

October 23, 2023

Collective target: reduce food-related emissions by 25% by 2030



coolfood

Sources: Searchinger et al. (2019), Science Based Targets Initiative (2019).

Methods and data

GHG calculator uses emission factors from two global databases (Poore and Nemecek, Science, 2018; Searchinger et al., Nature, 2018) to estimate GHG emissions associated with production of food purchased.

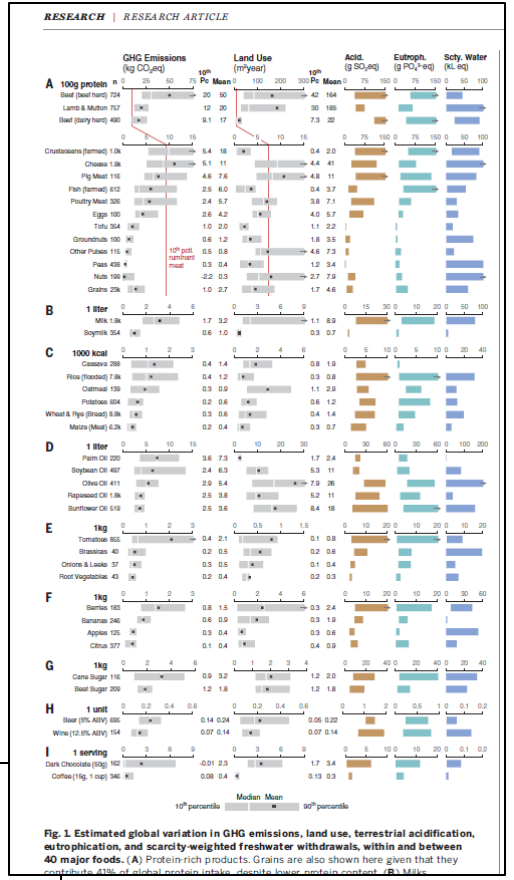


Fig. 1. Estimated global variation in GHG emissions, land use, terrestrial acidification, eutrophication, and scarcity-weighted freshwater withdrawals, within and between 40 major foods. (A) Protein-rich products. Grains are also shown here given that they

RESEARCH

SUSTAINABILITY

Reducing food's environmental impacts through producers and consumers

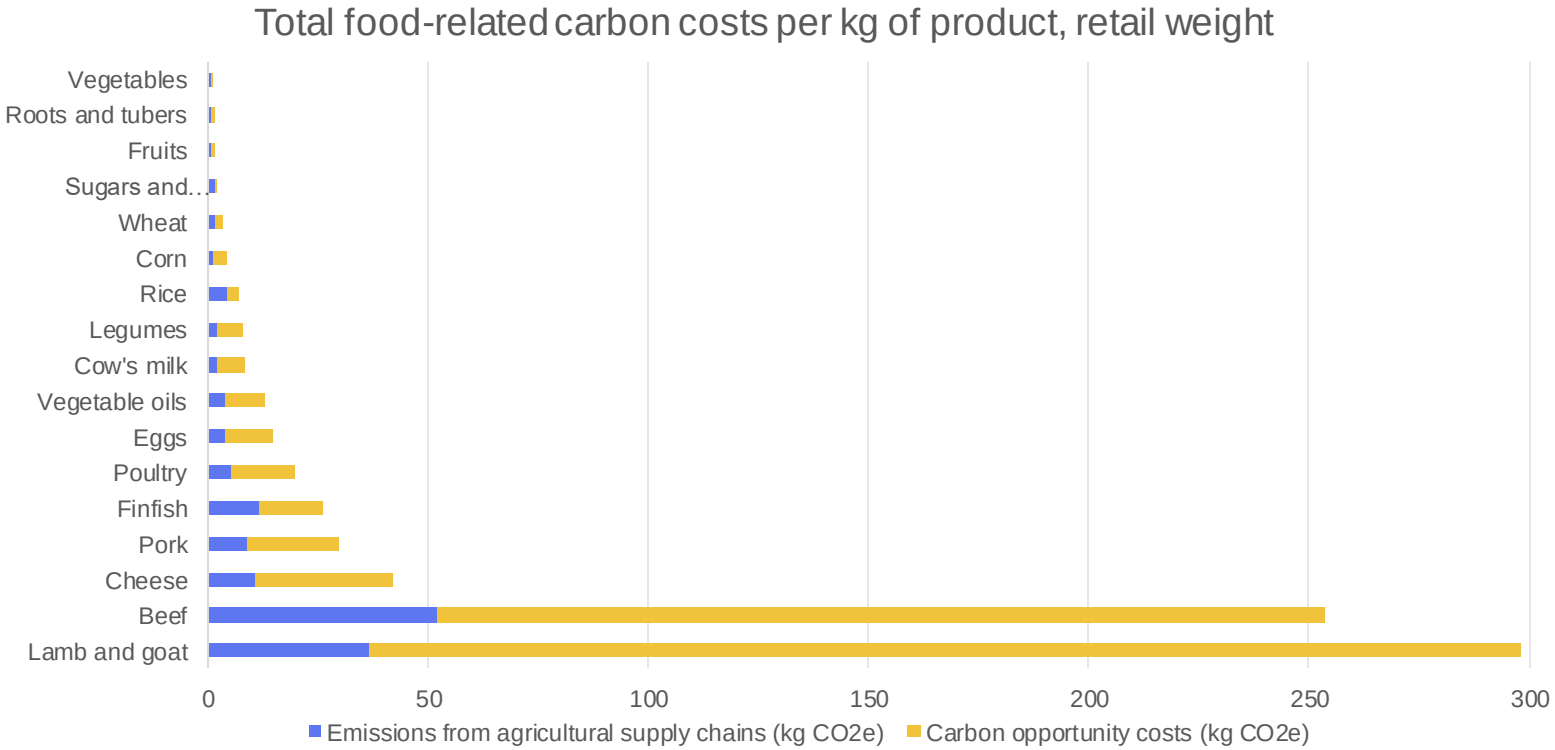
J. Poore[1,2]* and T. Nemecek[3]

Assessing the efficiency of changes in land use for mitigating climate change

Timothy D. Searchinger[1,2]*, Stefan Wirsenius[3], Tim Beringer[4] & Patrice Dumas[5,6]

coolfood

Methods and data



Note: Global average factors shown here.
Sources: Poore and Nemecek (2018); Searchinger et al. (2018).

coolfood

What's included in the annual emissions estimates?

GHG emissions from agricultural supply chains: This includes emissions from production of food and animal feed (enteric fermentation, manure management, soil fertilization, rice methane, energy use on farms and for manufacturing inputs), transport of food and animal feed, food processing, food packaging, and losses during these supply chain stages (cradle to point of purchase).
Data source: Poore and Nemecek (2018).

Carbon opportunity costs of agricultural land use: This includes total historical carbon losses from plants and soils on lands used to produce the sourced food. Because carbon losses from clearing native ecosystems to expand food production occur quickly, but food production on a cleared plot of land can continue well into the future, this metric is annualized over a period of 33 years.
Data source: Searchinger et al. (2018).

Source: Waite et al. (2019) (Cool Food Pledge technical note).

coolfood

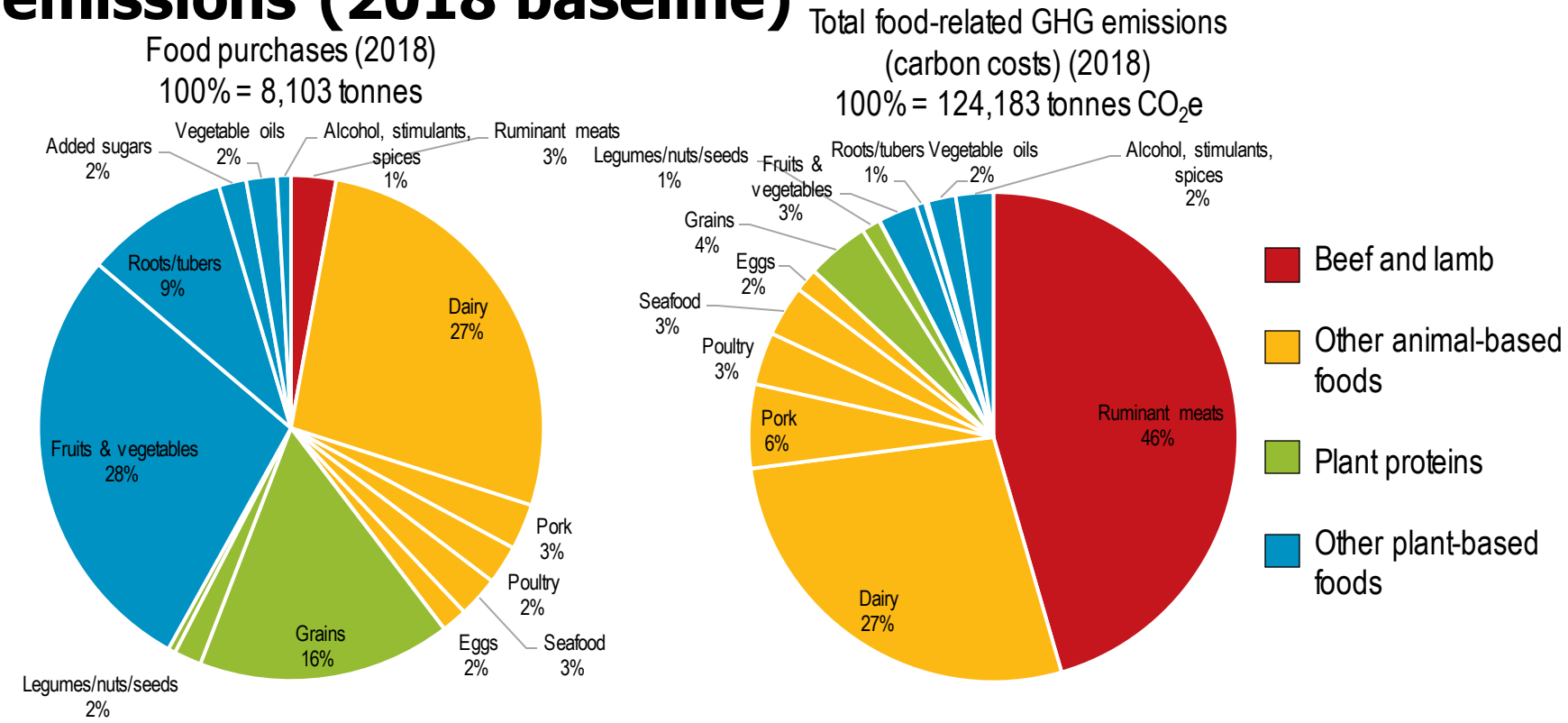
City of Copenhagen 2022 Climate Impact Report - Overview

- **Page 3-5** shows the methodology used by the Coolfood Team when producing this report.
- **Page 7-8** shows Copenhagen's total food purchases and total food related GHG emissions for 2018 (baseline year) and 2022.
- **Page 9** shows a breakdown in the change of the total food purchases per category. Looking at the %-changes in purchasing in the different foods, we can identify some tendencies for changes in procurement since the baseline year. For example, purchases of ruminant meat (beef/lamb) decreased with -36 % and pork -15 %. Purchasing of eggs went up +23 %, legumes, nuts, and seeds +37 % and plant-based milks +79 %.
- **Page 10** shows the reduction in GHG emissions per kg of food purchased.
- **Page 11** shows Copenhagen's progress against the Coolfood absolute 25 % target by 2030.
- **Page 12** shows Copenhagen's progress against the target of -25 % GHG emissions per kg of food by 2025
- **Page 13** shows the splits between the various city administrations, and the percentage GHG reduction per kg food for each administration. It also shows how the % of beef/lamb procured correlates to emission levels per kg food.
- **Page 14-34** shows a breakdown of the climate impact by city administration.

Note: Due to an update to the emission factors in the Calculator, the 2018-21 numbers also reflect slight changes.

coolfood

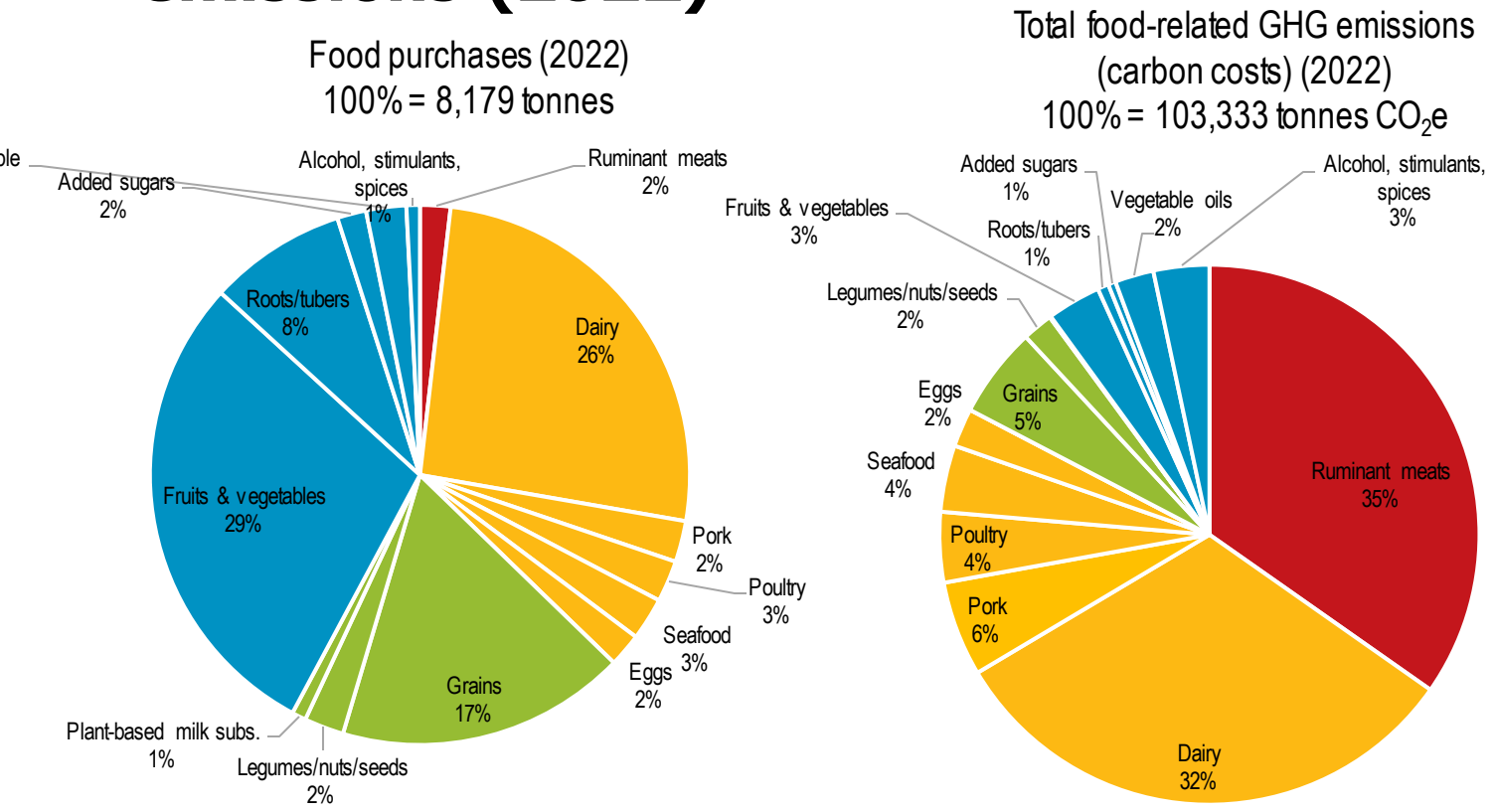
Copenhagen (TOTAL): total food-related GHG emissions (2018 baseline)



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

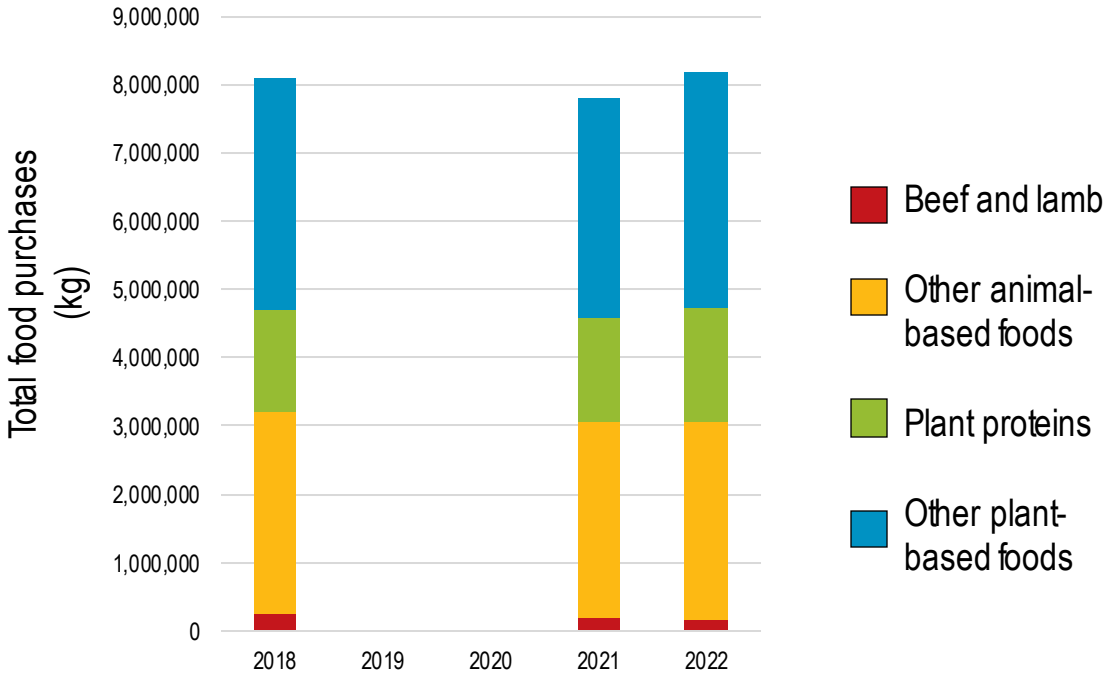
Copenhagen (TOTAL): total food-related GHG emissions (2022)



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (TOTAL): total food purchases (2018-22)



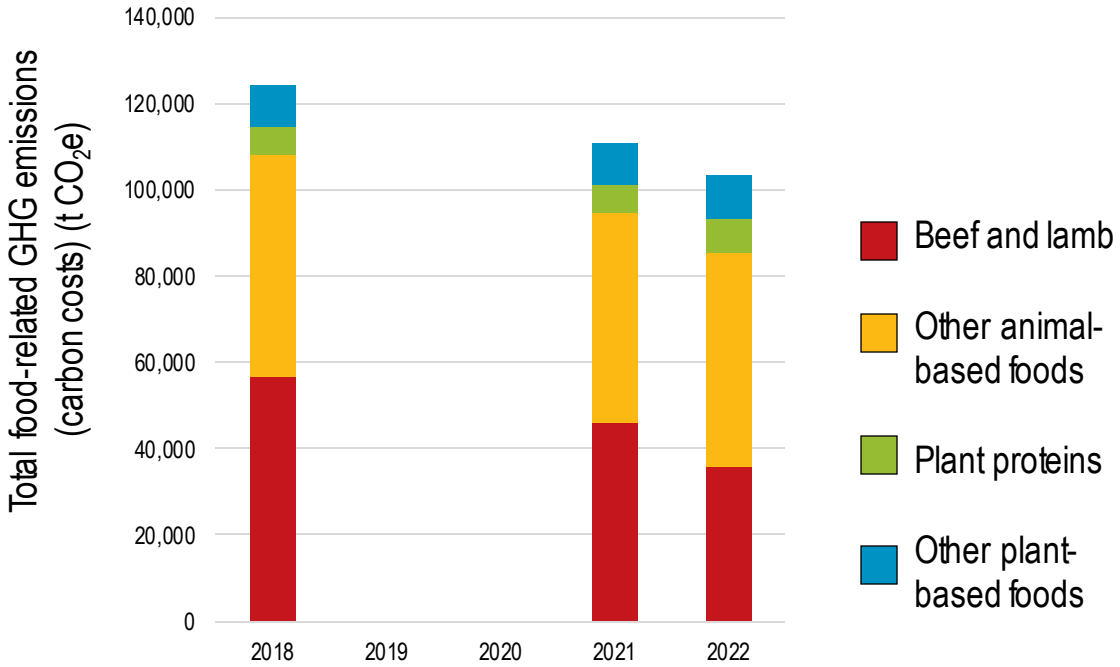
Food type	% change (2018-22)
Beef and lamb	-36.10%
Dairy	-3.45%
Pork	-15.02%
Poultry	+0.81%
Seafood	-1.74%
Eggs	+22.60%
Grains	+7.96%
Legumes, nuts, seeds	+36.73%
Plant-based milks	+79.12%
Fruits and vegetables	+3.84%
Roots/tubers	-9.32%
Added sugars	-0.16%
Vegetable oils	+23.41%
Alcohol, stimulants, spices	+1.73%
Total	**+0.94%**

Source: Purchase data provided by member.

coolfood

Copenhagen (TOTAL): total food-related emissions (2018-22)

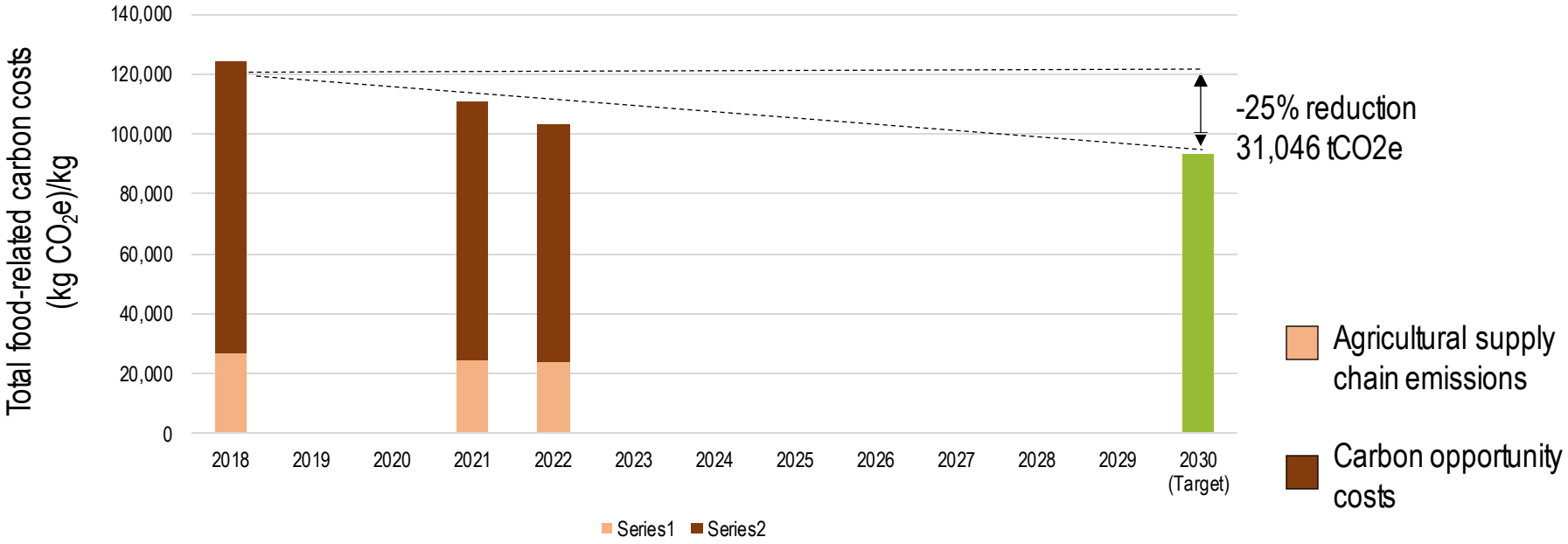
	% change (2018-22)
Emissions per kg	-17.57%
Total food-related GHG emissions	-16.79%



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

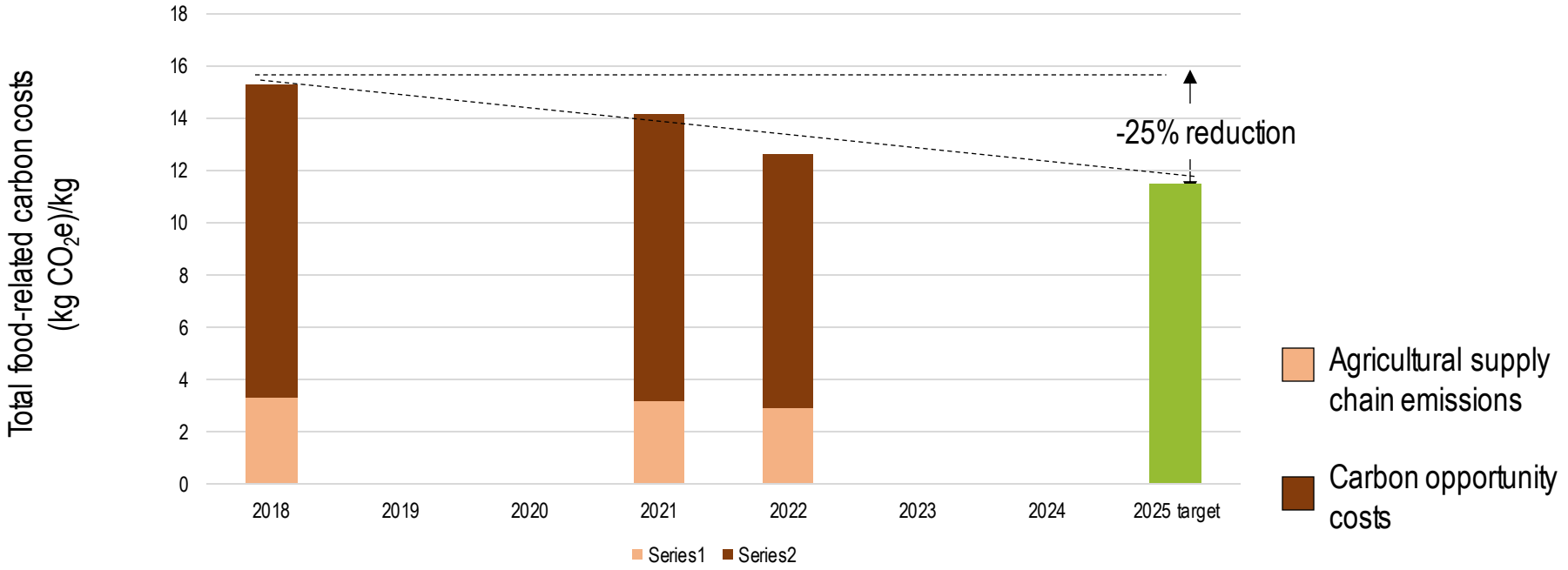
coolfood

Copenhagen (TOTAL): Progress against absolute 25% target



Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

Copenhagen (TOTAL): Progress against city target of 25% reduction in GHG emissions per kg food



Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Splits between city administrations

Agency	Year	Food purchases (kg)	Beef/lamb purchases (kg)	Beef/lamb purchases as % of total	Agricultural supply chain emissions (t CO_2e)	Carbon opportunity costs (t CO_2e)	Total emissions (carbon costs) (t CO_2e)	Total emissions (kg CO_2e)/ kg	% change (2018-22)
BUF	2018	4,159,663	89,429	2.2%	11,393	38,858	50,251	12.08	
BUF	2021	4,113,366	65,507	1.6%	10,469	33,737	44,206	10.75	-11.04%
BUF	2022	4,426,139	55,369	1.3%	10,672	32,902	43,574	9.84	-18.51%
SUF	2018	2,828,446	99,520	3.5%	11,370	42,149	53,520	18.93	
SUF	2021	2,637,690	86,656	3.3%	10,344	37,934	48,278	18.30	-3.27%
SUF	2022	2,604,131	61,190	2.4%	9,337	32,434	41,771	16.04	-15.23%
SOF	2018	993,863	40,487	4.1%	3,878	14,710	18,588	18.70	
SOF	2021	1,020,856	35,467	3.5%	3,758	13,880	17,638	17.28	-7.62%
SOF	2022	1,018,157	29,008	2.9%	3,510	12,519	16,029	15.74	-15.82%
Others*	2018	121,073	3,739	3.1%	393	1,430	1,824	15.06	
Others*	2021	41,477	1,483	3.6%	150	552	703	16.94	+12.47%
Others*	2022	130,979	3,440	3.6%	439	1,521	1,959	14.96	-0.70%
TOTAL – Copenhagen	**2018**	**8,103,045**	**233,176**	**2.9%**	**27,035**	**97,148**	**124,183**	**15.33**	
TOTAL – Copenhagen	**2021**	**7,813,390**	**189,112**	**2.4%**	**24,722**	**86,103**	**110,825**	**14.18**	**-7.45%**
TOTAL – Copenhagen	**2022**	**8,179,406**	**149,008**	**1.8%**	**23,958**	**79,375**	**103,333**	**12.63**	**-17.57%**

*BIF, KFF, TMF, ØKF

coolfood

City of Copenhagen 2018-22 Climate Impact Report - Breakdown by city administration

The following pages include a breakdown of the climate impact by city administration.
BUF: The Children and Youth Administration
SUF: The Health and Care Administration
SOF: The Social Services Administration
Others:

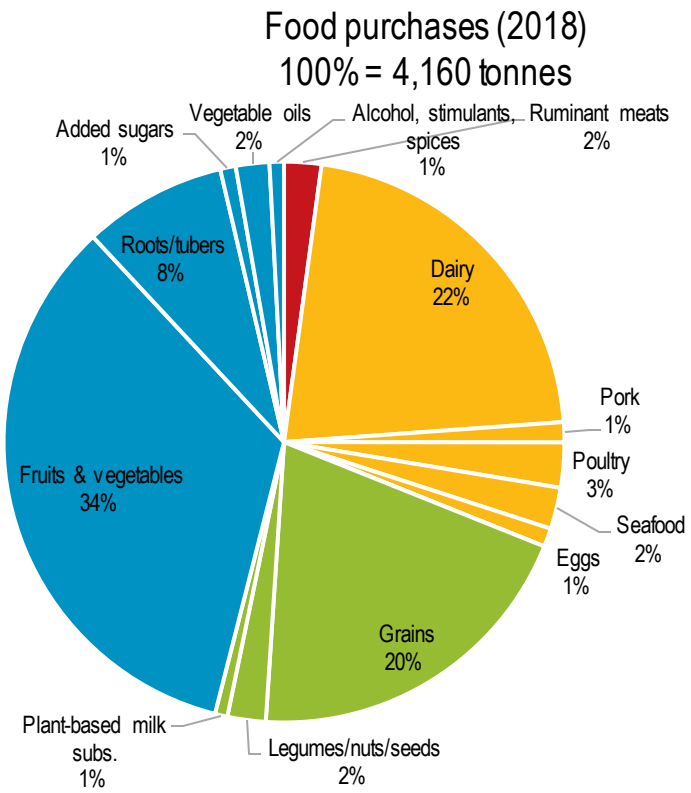
- BIF: The Employment and Integration Administration
- KFF: The Culture and Leisure Administration
- TMF: The Technical and Environmental Administration
- ØKF: The Finance Administration

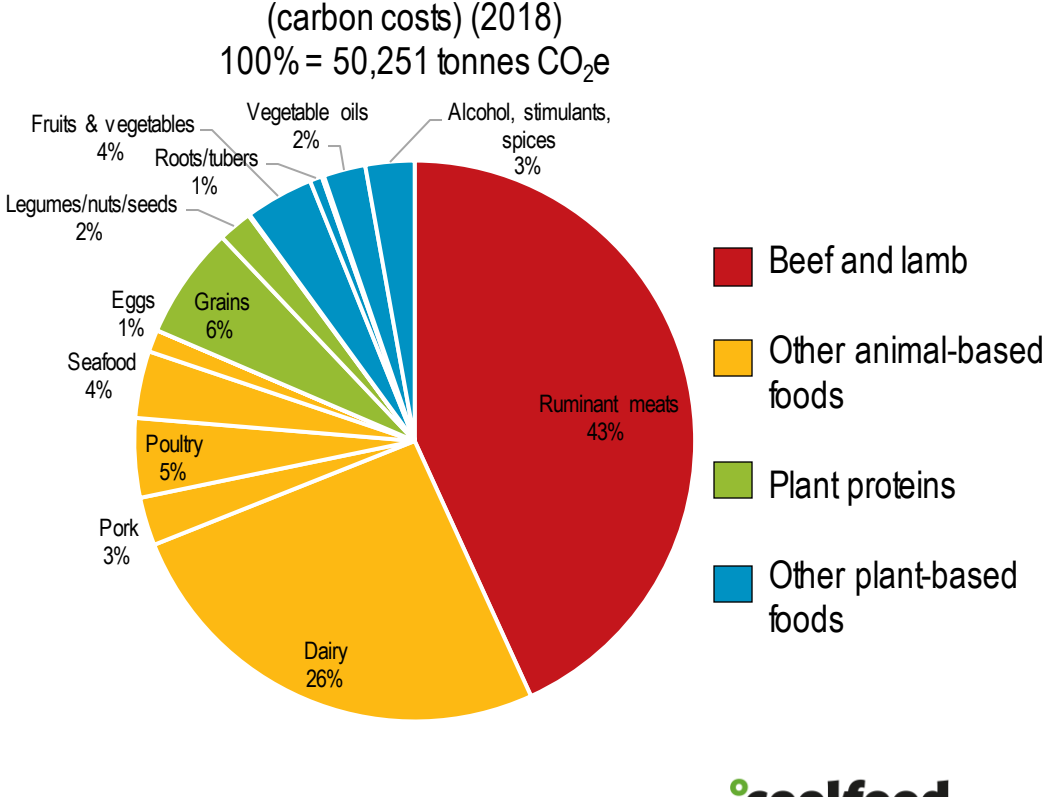
2022 percentage of total emissions by administration:

BUF: 42.16%
SUF: 40.42%
SOF: 15.51%
Others: 1.89%

coolfood

Copenhagen (BUF): total food-related GHG emissions (2018 baseline)

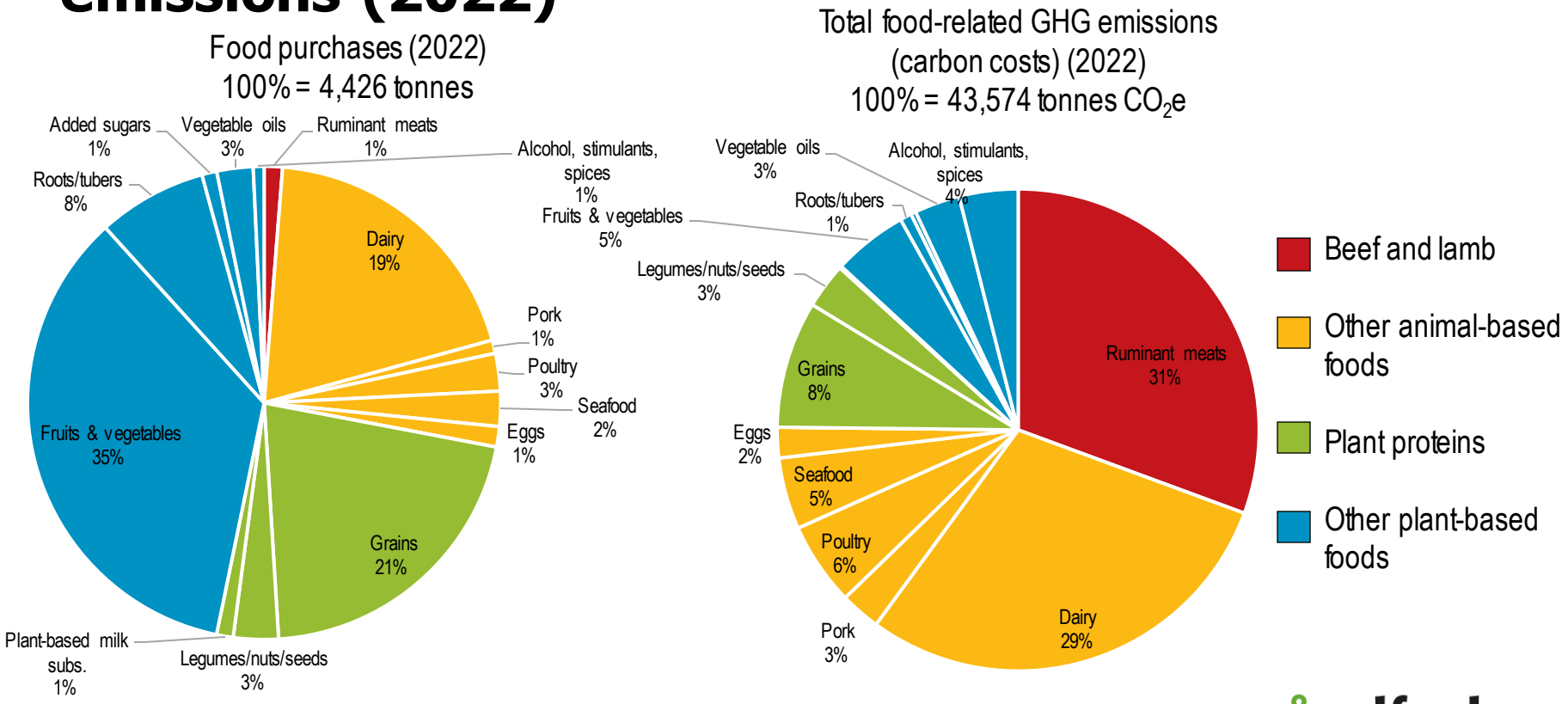




Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

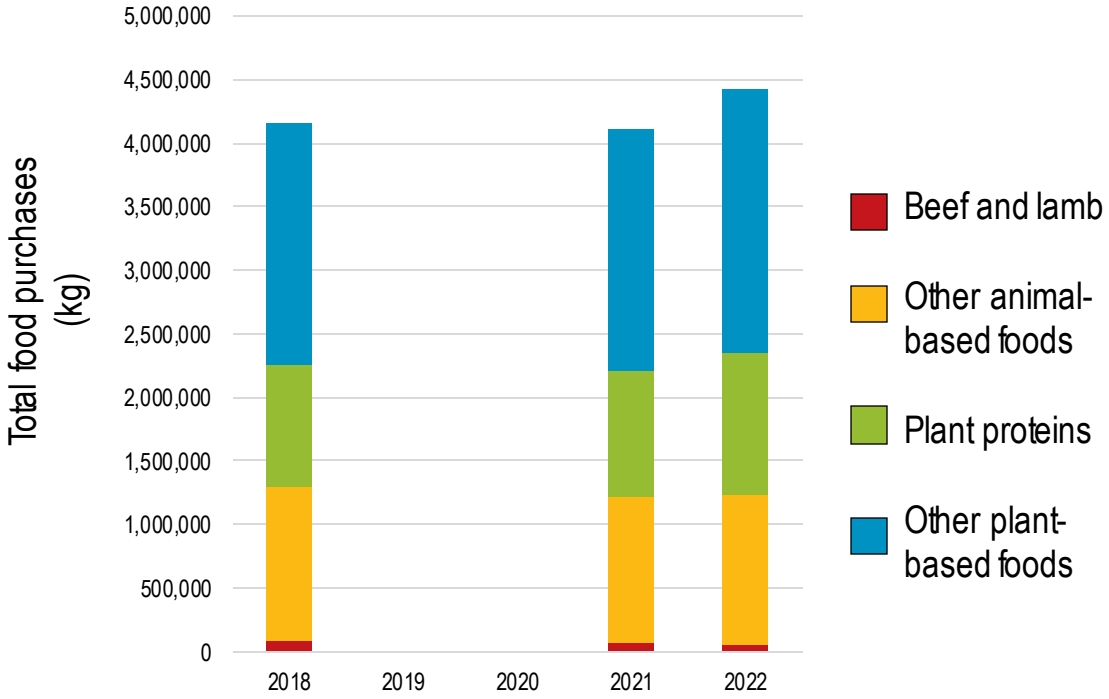
Copenhagen (BUF): total food-related GHG emissions (2022)



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (BUF): total food purchases (2018-22)



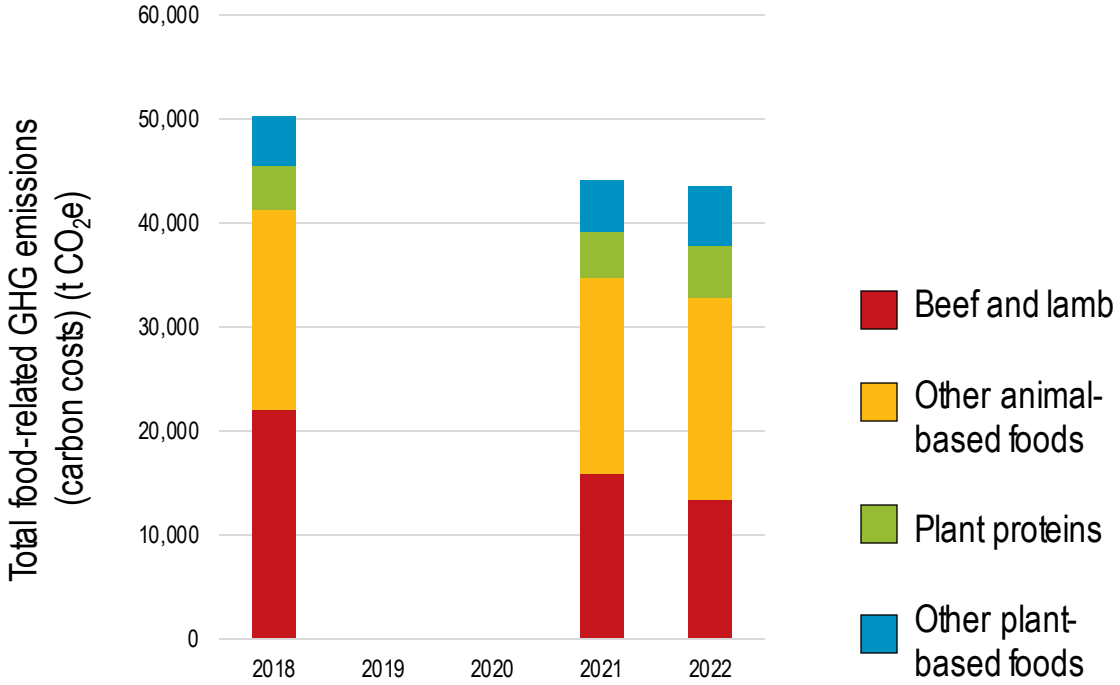
Food type	% change (2018-22)
Beef and lamb	-38.09%
Dairy	-4.69%
Pork	-16.61%
Poultry	+5.06%
Seafood	+7.17%
Eggs	+38.02%
Grains	+11.90%
Legumes/nuts/seeds	+48.09%
Plant-based milk subs.	+67.56%
Fruits & vegetables	+9.24%
Roots/tubers	-3.95%
Added sugars	+21.02%
Vegetable oils	+36.24%
Alcohol, stimulants, spices	+11.68%
Total	**+6.41%**

Source: Purchase data provided by member.

coolfood

Copenhagen (BUF): total food-related emissions (2018-22)

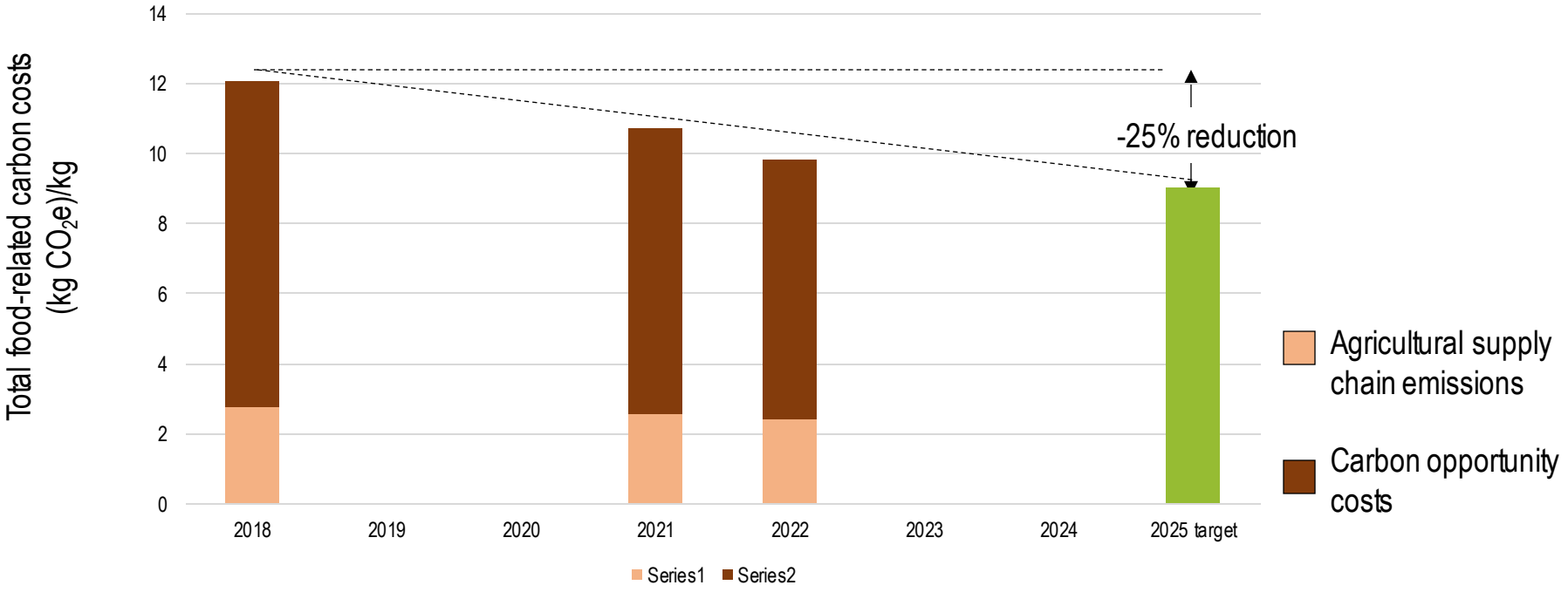
	% change (2018-22)
Emissions per kg	-18.51%



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

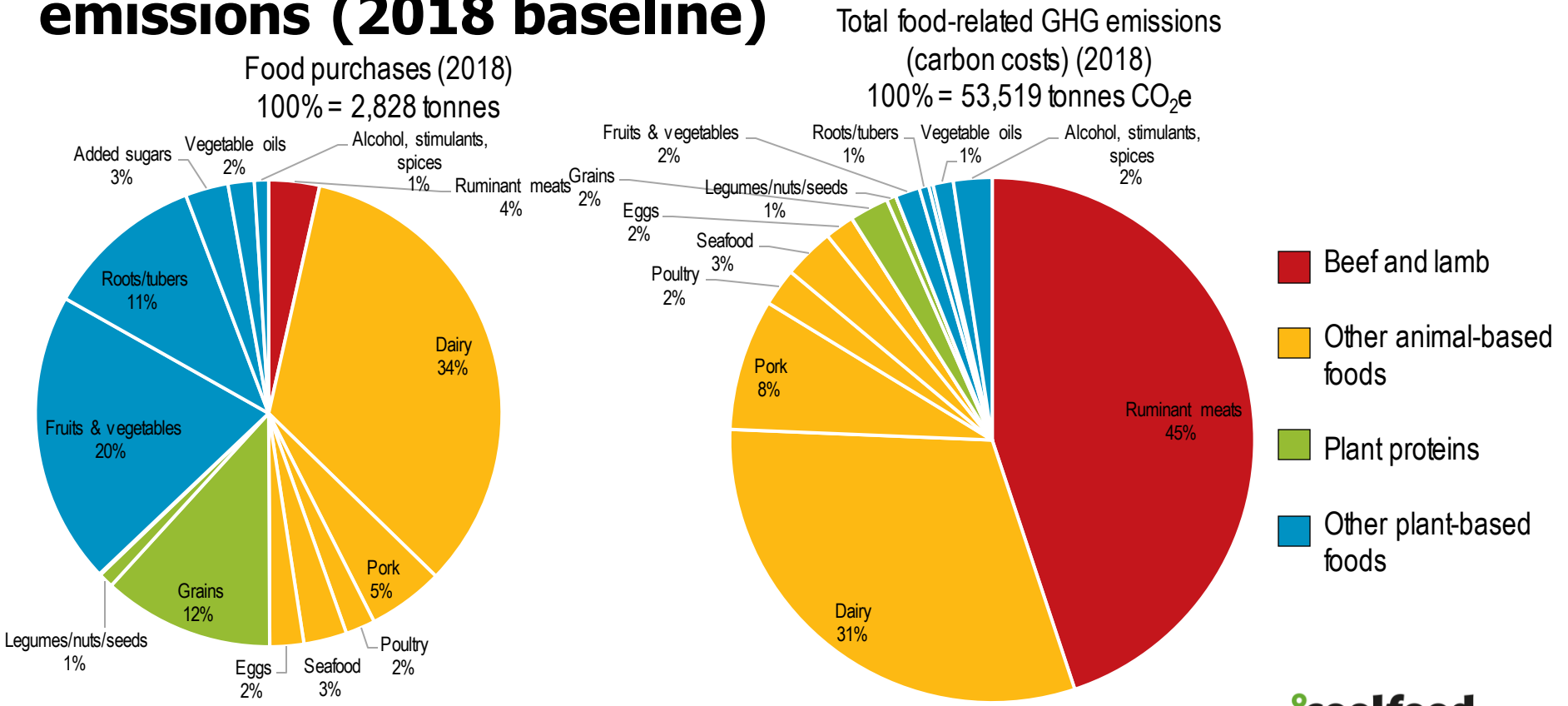
coolfood

Copenhagen (BUF): Progress against city target of 25% reduction in GHG emissions per kg food



Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

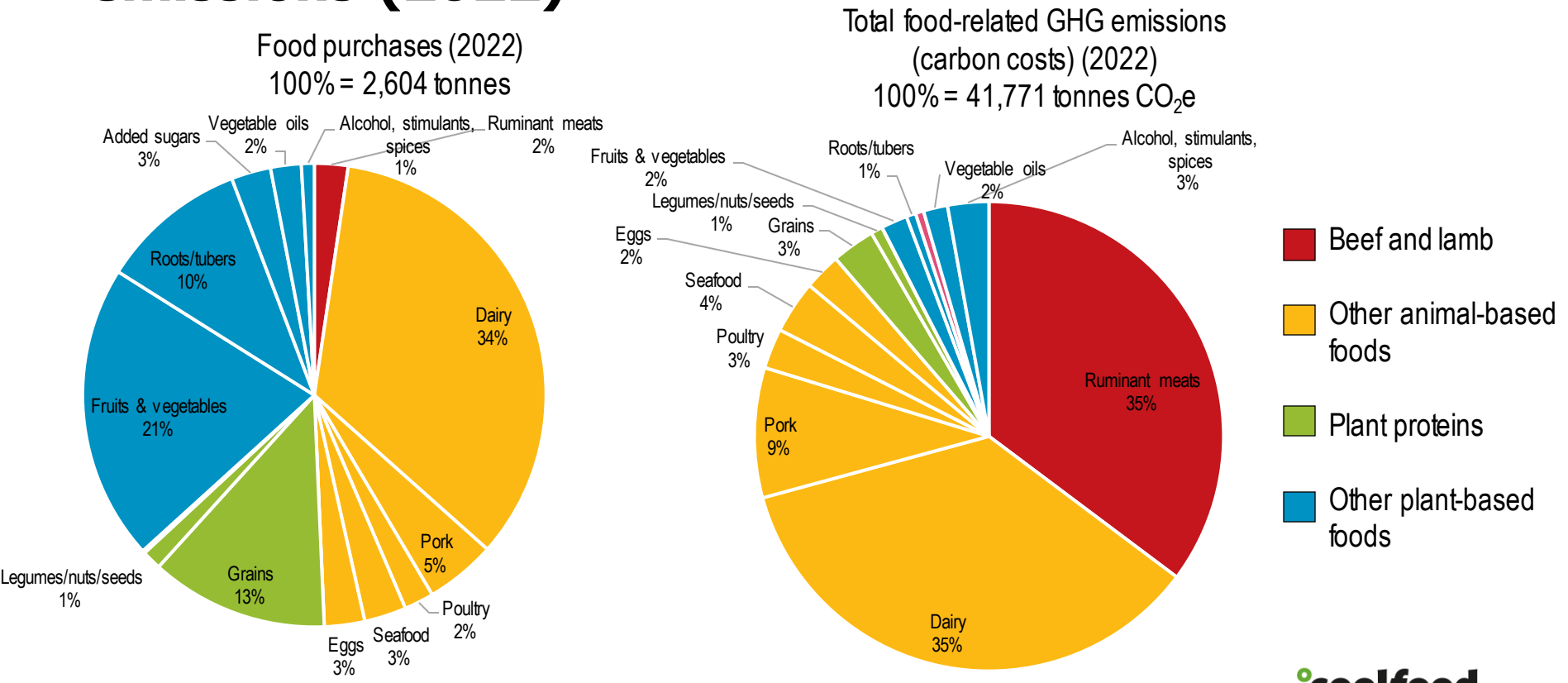
Copenhagen (SUF): total food-related GHG emissions (2018 baseline)



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

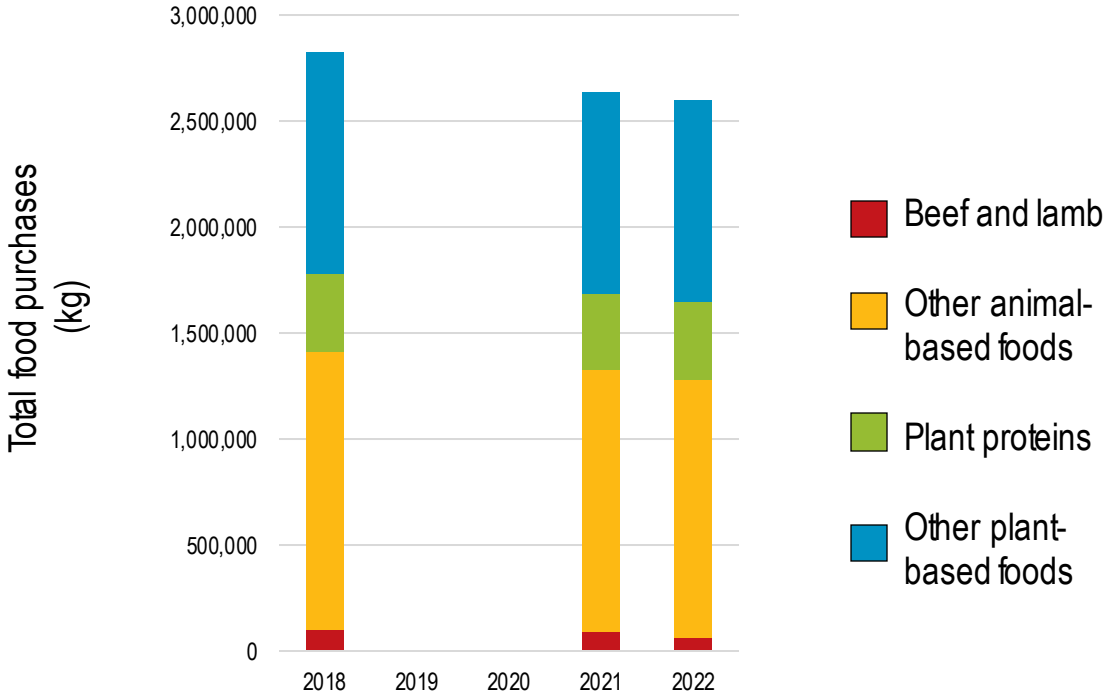
Copenhagen (SUF): total food-related GHG emissions (2022)



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (SUF): total food purchases (2018-22)



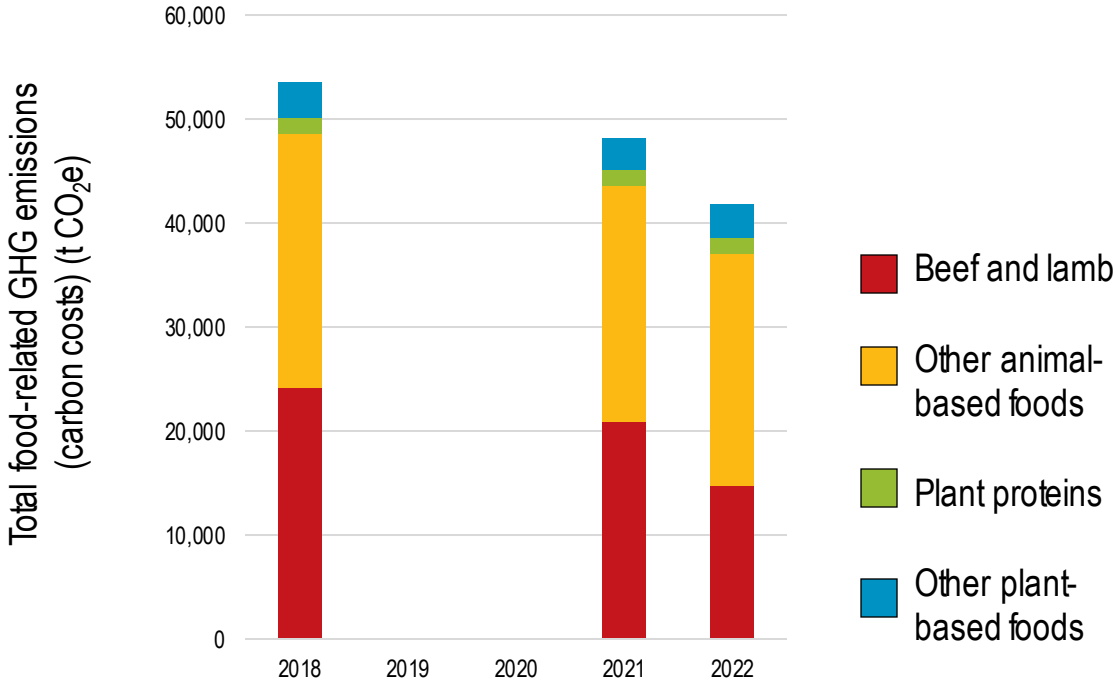
Food type	% change (2018-22)
Beef and lamb	-38.51%
Dairy	-6.71%
Pork	-13.68%
Poultry	-7.34%
Seafood	-9.78%
Eggs	+10.32%
Grains	-3.60%
Legumes, nuts, seeds	+19.38%
Plant-based milks	+97.91%
Fruits and vegetables	-6.13%
Roots/tubers	-14.43%
Added sugars	-14.78%
Vegetable oils	+8.70%
Alcohol, stimulants, spices	-12.96%
Total	**-7.93%**

Source: Purchase data provided by member.

coolfood

Copenhagen (SUF): total food-related emissions (2018-22)

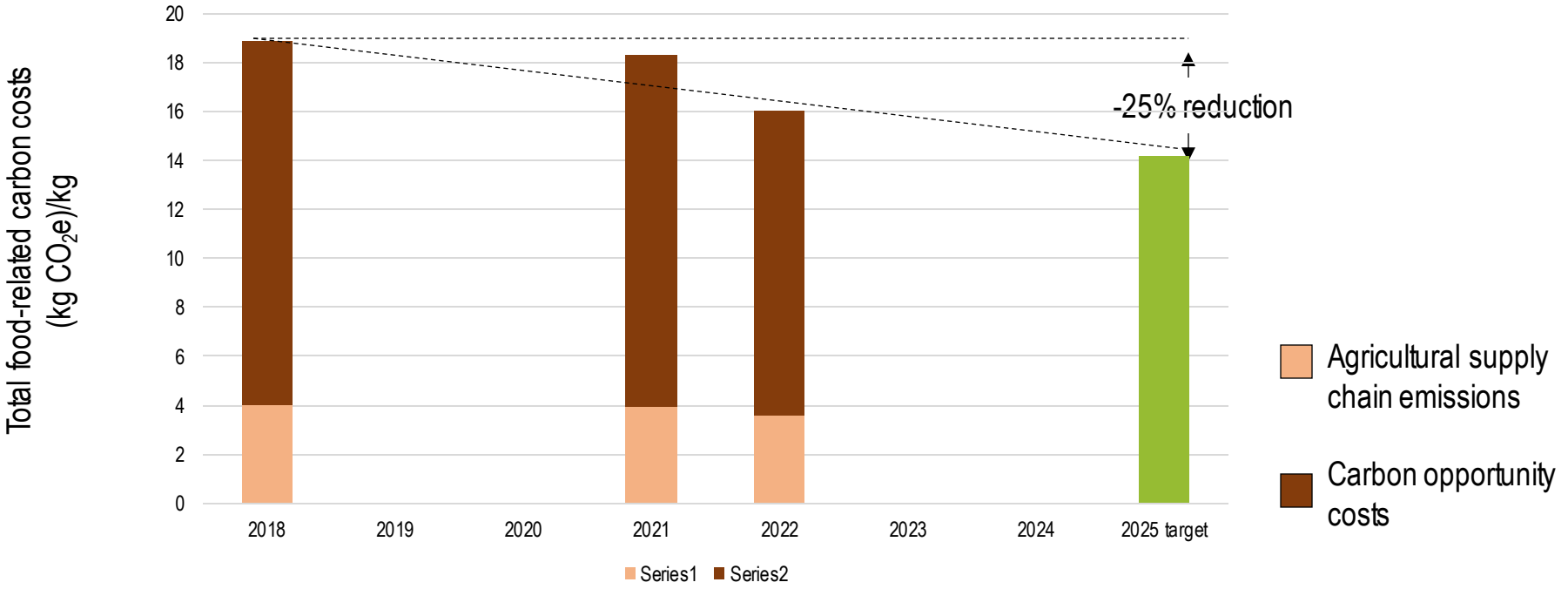
	% change (2018-22)
Emissions per kg	-15.23%



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

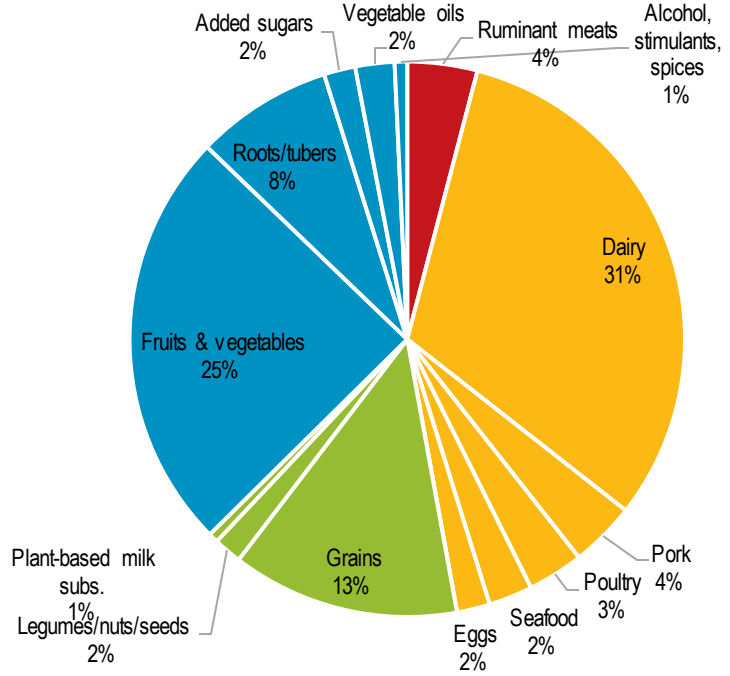
Copenhagen (SUF): Progress against city target of 25% reduction in GHG emissions per kg food



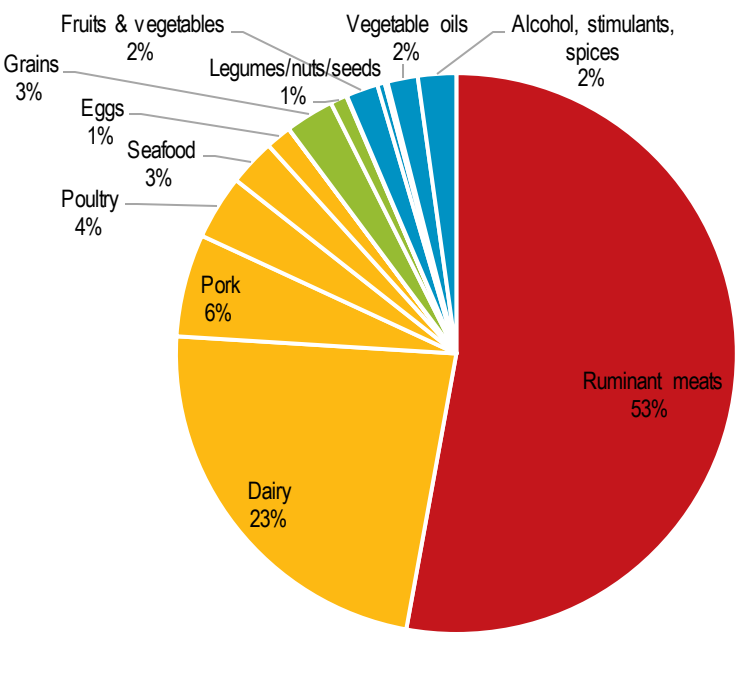
Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

Copenhagen (SOF): total food-related GHG emissions (2018 baseline)

Food purchases (2018)
100% = 994 tonnes



Total food-related GHG emissions (carbon costs) (2018)
100% = 18,588 tonnes CO_2e

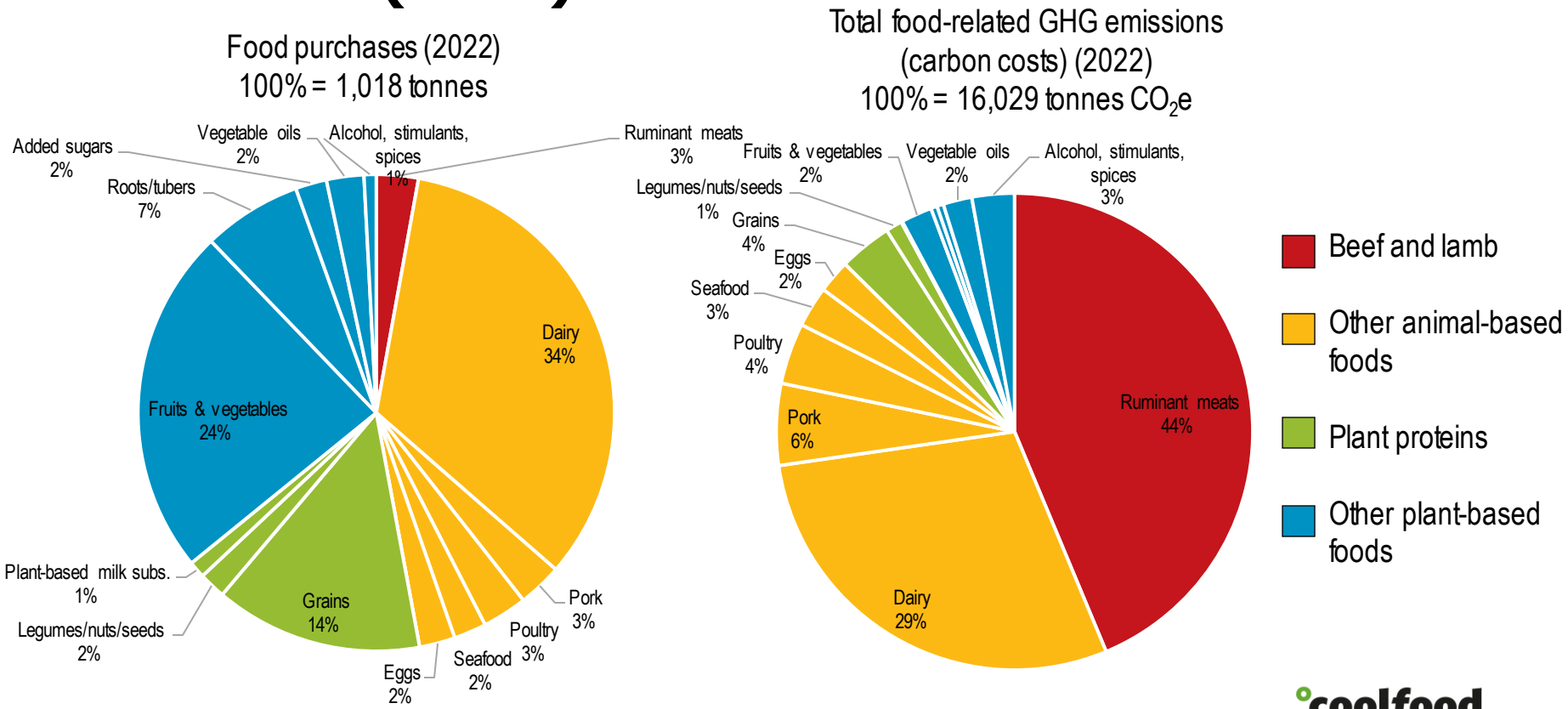


- Beef and lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

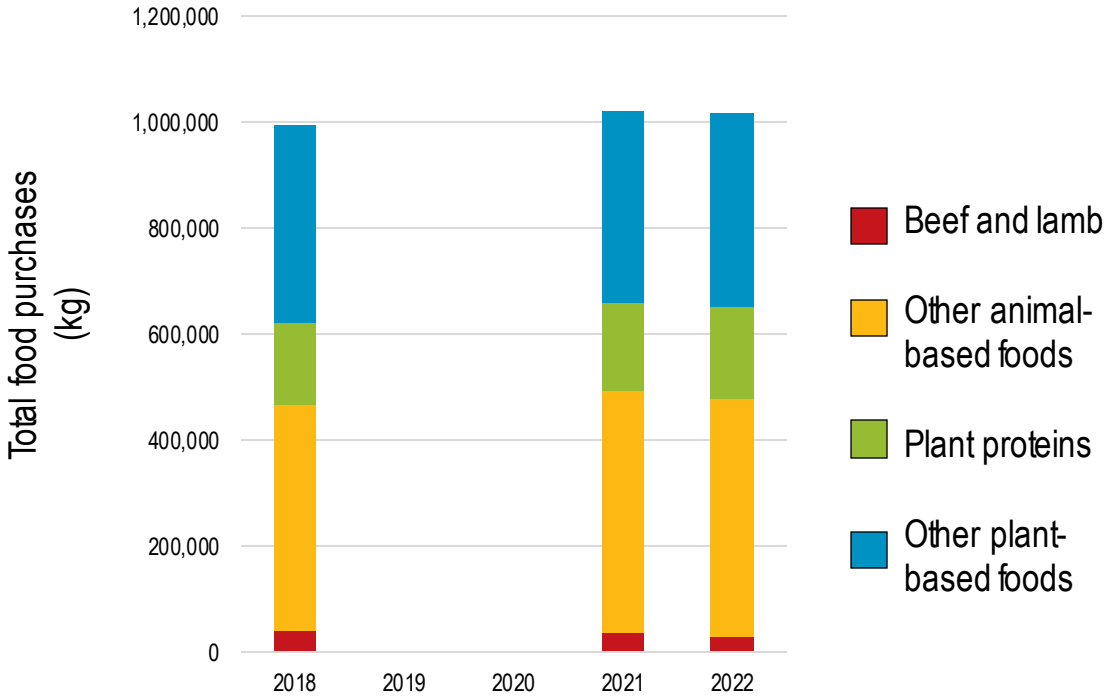
Copenhagen (SOF): total food-related GHG emissions (2022)



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (SOF): total food purchases (2018-22)



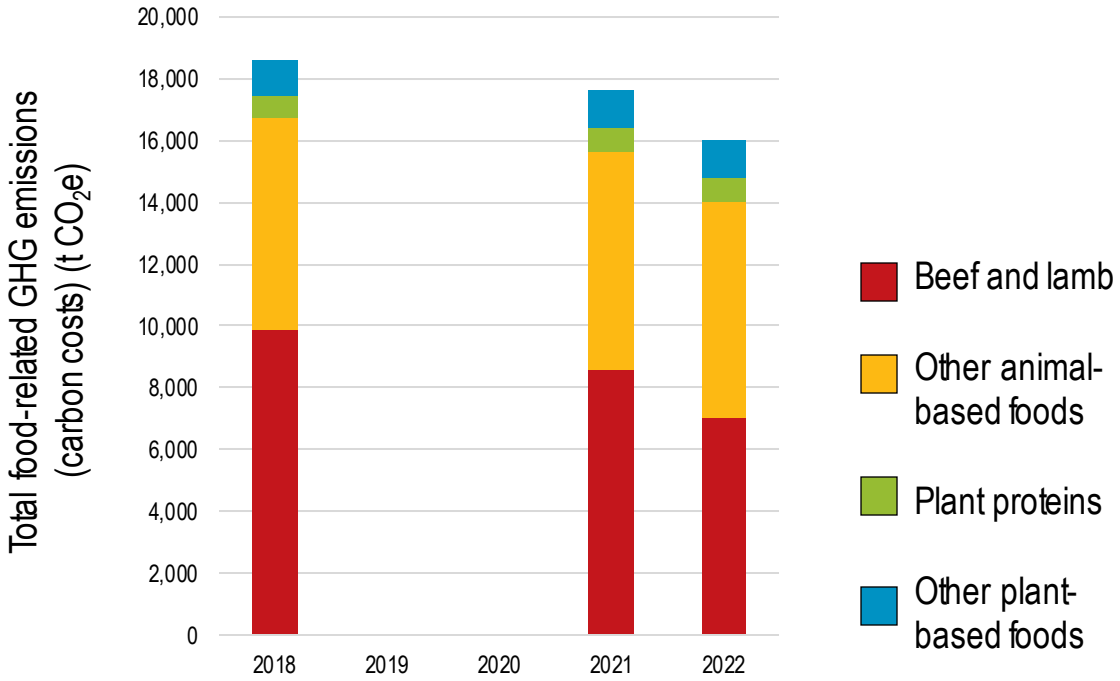
Food type	% change (2018-22)
Beef and lamb	-28.35%
Dairy	+9.15%
Pork	-19.62%
Poultry	-4.22%
Seafood	-11.61%
Eggs	+29.46%
Grains	+8.97%
Legumes/nuts/seeds	+13.39%
Plant-based milk subs.	+106.21%
Fruits & vegetables	-1.41%
Roots/tubers	-13.75%
Added sugars	+18.60%
Vegetable oils	+13.94%
Alcohol, stimulants, spices	+16.23%
Total	**+2.44%**

Source: Purchase data provided by member.

coolfood

Copenhagen (SOF): total food-related emissions (2018-22)

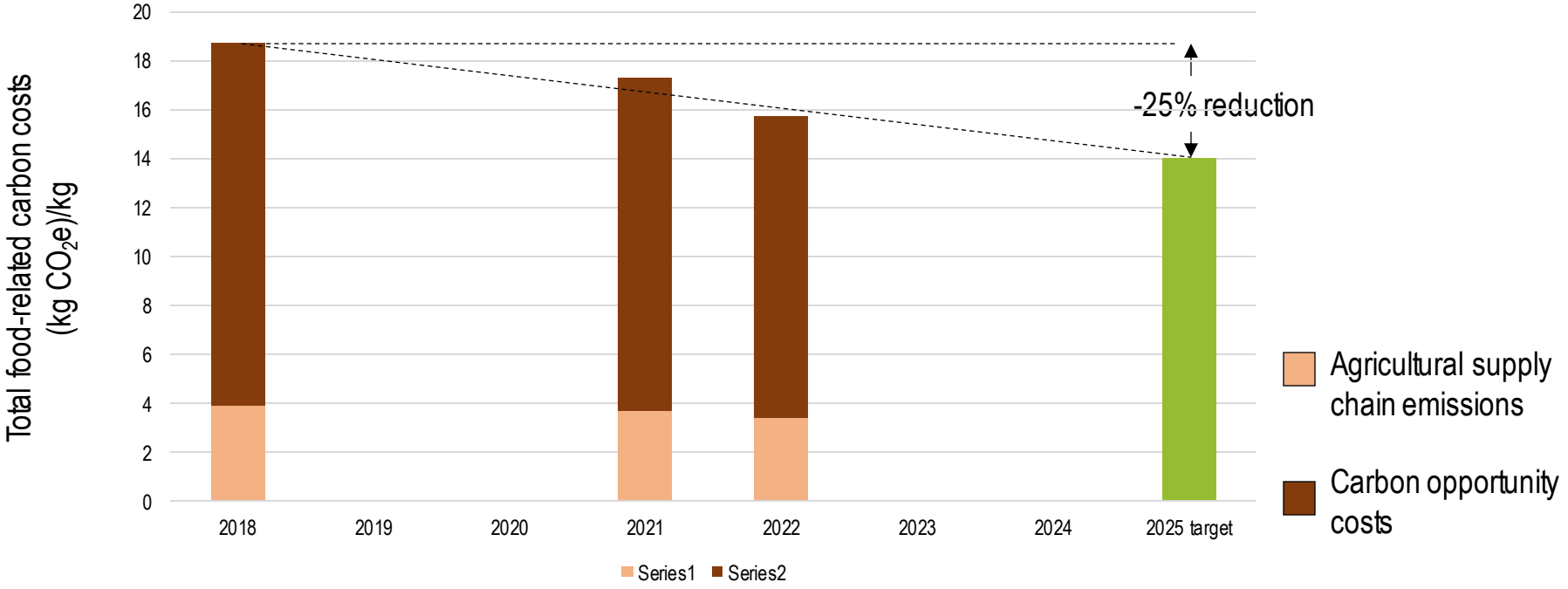
	% change (2018-22)
Emissions per kg	-15.82%



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (SOF): Progress against city target of 25% reduction in GHG emissions per kg food

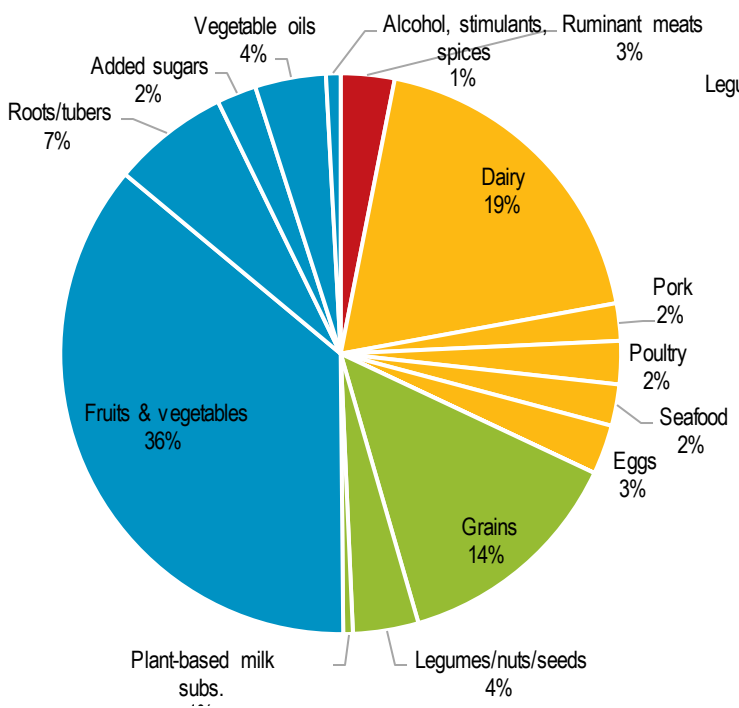


Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

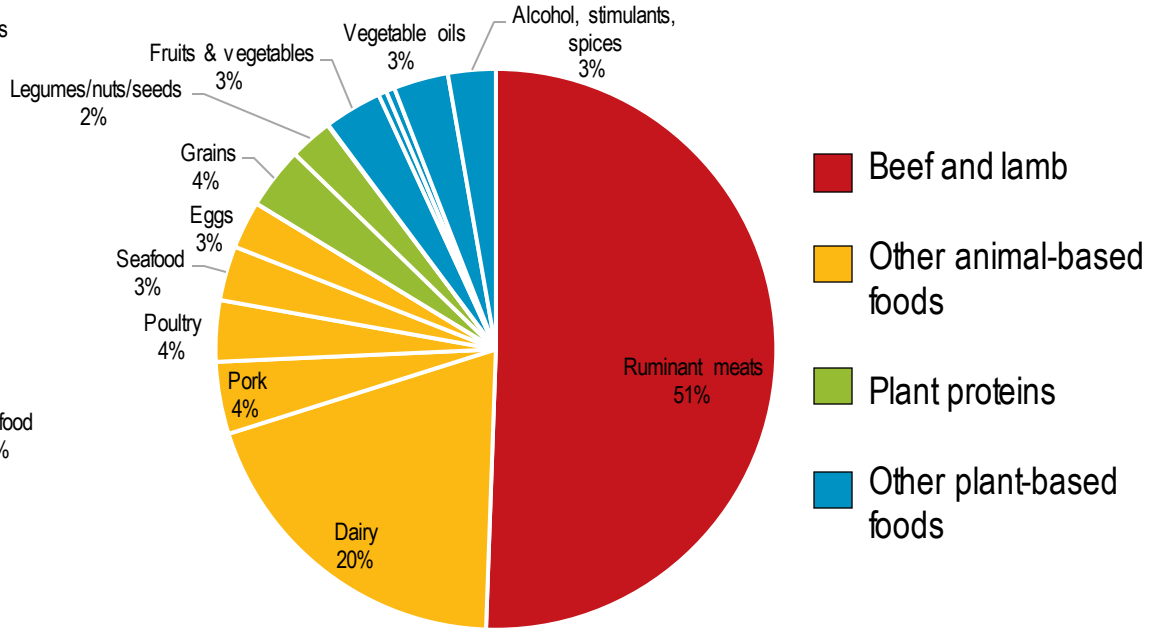
coolfood

Copenhagen (Others): total food-related GHG emissions (2018 baseline)

Food purchases (2018)
100% = 121 tonnes



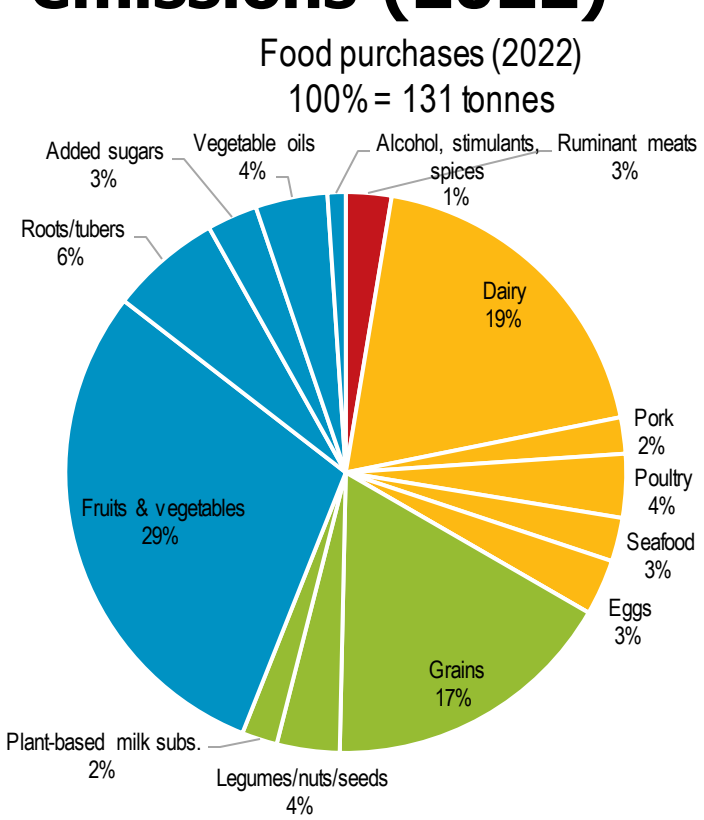
Total food-related GHG emissions (carbon costs) (2018)
100% = 1,828 tonnes CO_2e

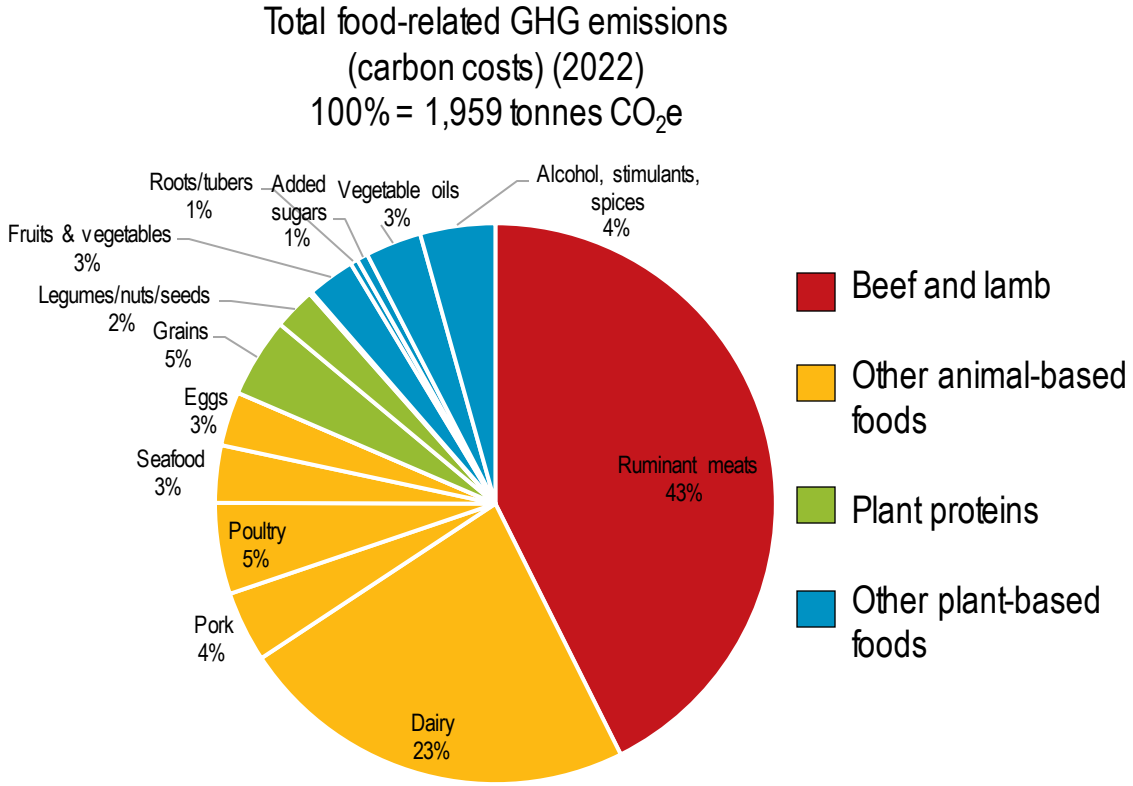


Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (Others): total food-related GHG emissions (2022)

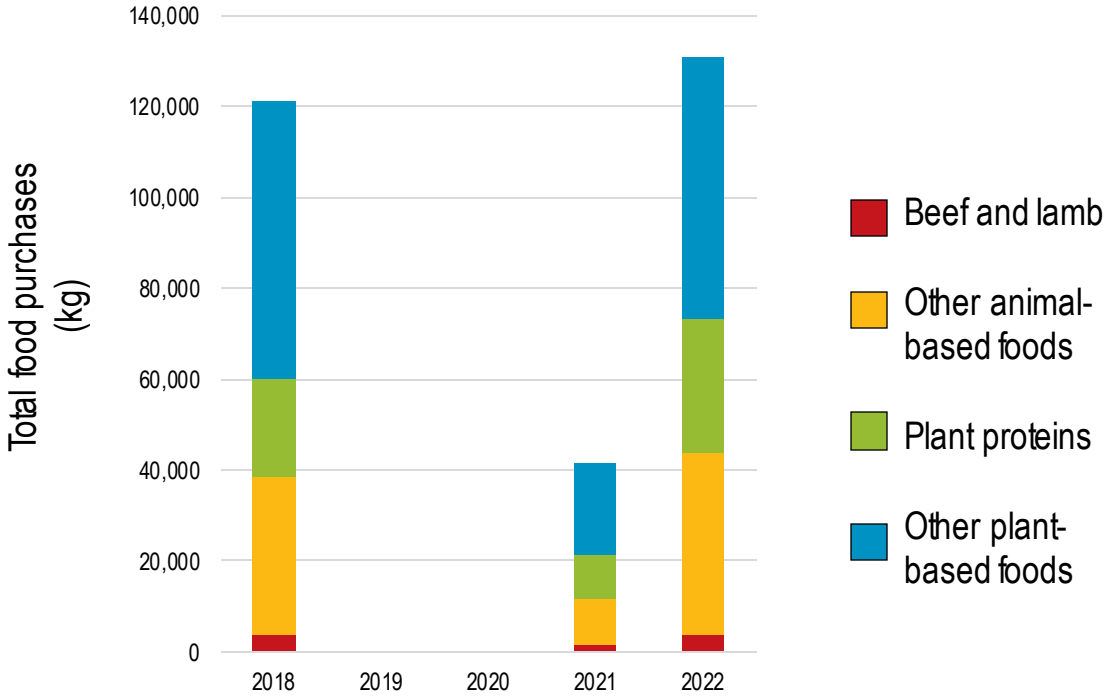




Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (Others): total food purchases (2018-22)



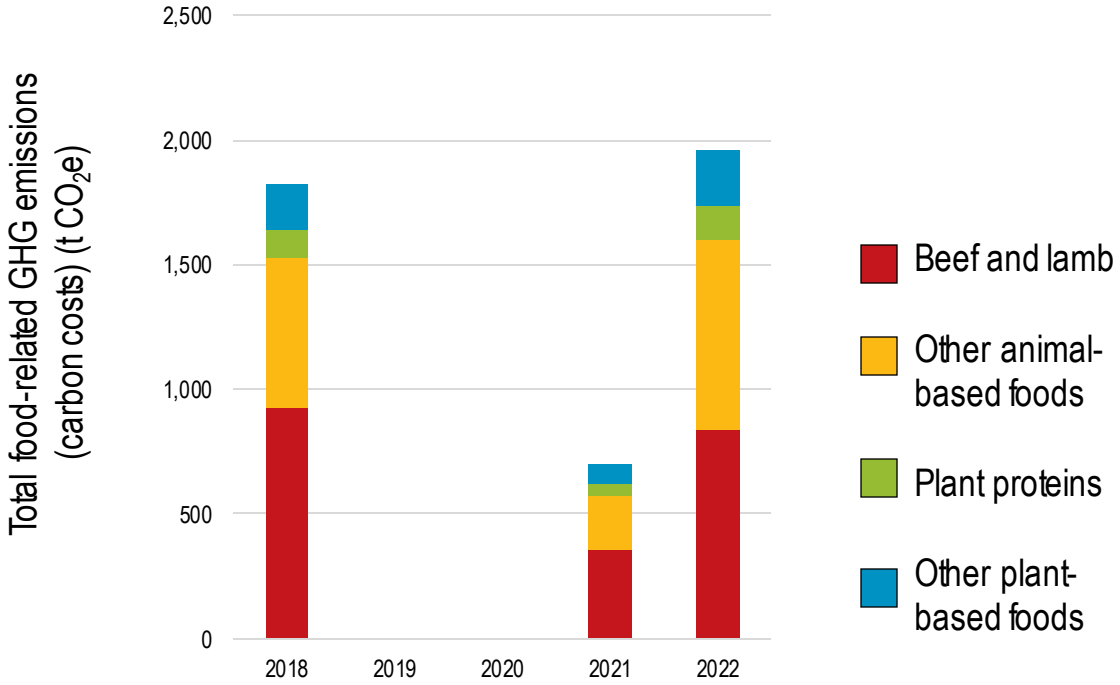
Food type	% change (2018-22)
Beef and lamb	-8.01%
Dairy	+9.64%
Pork	+5.23%
Poultry	+59.98%
Seafood	+14.58%
Eggs	+22.16%
Grains	+36.44%
Legumes/nuts/seeds	+4.07%
Plant-based milk subs.	+300.84%
Fruits & vegetables	-11.64%
Roots/tubers	+3.10%
Added sugars	+38.10%
Vegetable oils	+10.25%
Alcohol, stimulants, spices	+0.41%
Total	**+8.18%**

Source: Purchase data provided by member.

coolfood

Copenhagen (Others): total food-related emissions (2018-22)

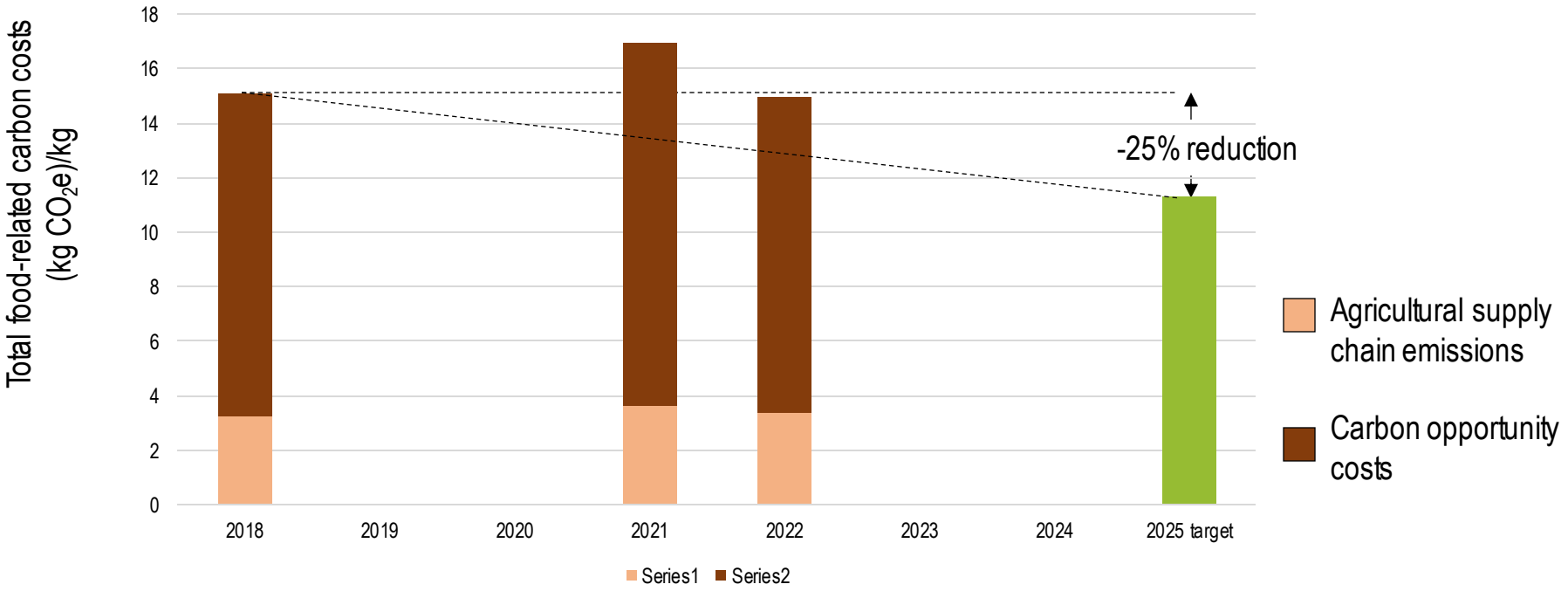
	% change (2018-22)
Emissions per kg	-0.70%



Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

coolfood

Copenhagen (Others): Progress against city target of 25% reduction in GHG emissions per kg food



Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).