

COOL FOOD 

2018-21 Climate Impact Report:
City of Copenhagen

June 17, 2022 – FINAL

COOL FOOD

The Cool Food Pledge helps dining facilities – from hotels and restaurants to city governments, universities, schools, and hospitals – cut their food-related greenhouse gas emissions by shifting toward climate-friendly foods.



City of Copenhagen 2018-21 Climate Impact Report - Overview

- **Page 5-8** show the methodology used by the Cool Food Team when producing this report.
- **Page 9 and 10** show Copenhagen's total food purchases and total food related GHG emissions for 2018 (baseline year) and 2021. Total food-related GHG emissions declined by -11% between 2018 and 2021, although total amount of food purchased also declined by -4% (presumably due to COVID). The category beef/lamb still accounts for >40% of Copenhagen's total GHG profile, and dairy nearly another 30%. Hence there is potential to reach further GHG reductions by shifting from these categories and toward plant-based foods.
- **Page 11** shows a breakdown in the change of the total food purchase per category. Looking at the % changes in purchasing in the different foods we can identify some tendencies for changes in procurement, for example purchases of beef and lamb decreased -19% and pork -18%, with other meats/dairy decreasing by -4% to -6%. Purchases of eggs went up +15%, legumes +8%, and plant-based milks +43% (these shifts are also reflected in slide 9 and 10 although more subtle).
- **Page 12** shows the reduction in GHG emissions per kg of food. The shift away from beef and lamb (and to a lesser extent, the other meats and dairy) led to a disproportionate decline in GHG emissions between 2018-21 – even while purchases declined -4%, emissions per kg declined by -7.5% between 2018-21.
- **Page 13** shows Copenhagen's progress against the target of -25% GHG emissions per kg of food by 2025.
- **Page 14** shows the splits between the various city administrations, and the percentage GHG reduction per kg food for each administration. You can also see how the % of beef/lamb purchased correlates to emissions per kg food.

Methods and data

The Cool Food Pledge 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.

INDICATOR	DESCRIPTION	COMMENT ON SPECIFIC DATA SET IN COOL FOOD CALCULATOR		
		Poore and Nemecek (2018)	Searchinger et al. (2018)	Signatories' food purchase data
Technological representativeness	This is the degree to which the data set reflects the actual technology or technologies used.	Regional emissions data come from more than 38,000 farms in 119 countries, and 40 food types representing approximately 90 percent of global calorie and protein consumption.	Data come from a new global model based on data sets on vegetation, soils, crops, and livestock products, covering more than 50 food types.	Data are drawn from current year (or recent year if conducting historical baseline), organized into food types that match the two emission factor data sets.
Temporal representativeness	This is the degree to which the data set reflects the actual time (e.g., year) or age of the activity.	Median reference year is 2010.	Reference year is 2005.	Data are drawn from current year (or recent year if conducting historical baseline).
Geographical representativeness	This is the degree to which the data set reflects the actual geographic location of the activity (e.g., country or site).	Emission factors that are available at global, regional, or country level; each observation (primary study) is weighted by share of national agricultural production it represents, and each country by share of global production.	Emission factors are global, reflecting the global nature of total food demand.	Signatories record majority region of origin of each food type.
Completeness	This is the degree to which the data are statistically representative of the relevant activity. Includes the percentage of locations for which data are available and used out of the total number that relate to a specific activity, and seasonal and other normal fluctuations in data.	See "Technological representativeness," above.	See "Technological representativeness," above.	See "Technological representativeness," above.
Reliability	This is the degree to which the sources, data collection methods, and verification procedures used to obtain the data are dependable.	Data come from a peer-reviewed academic source.	Data come from a peer-reviewed academic source.	Signatories make a good-faith effort to accurately provide all mandatory food purchase data.

Source: Based on WRI and WBCSD 2011; Weidema and Wesnaes 1996, modified by WRI.

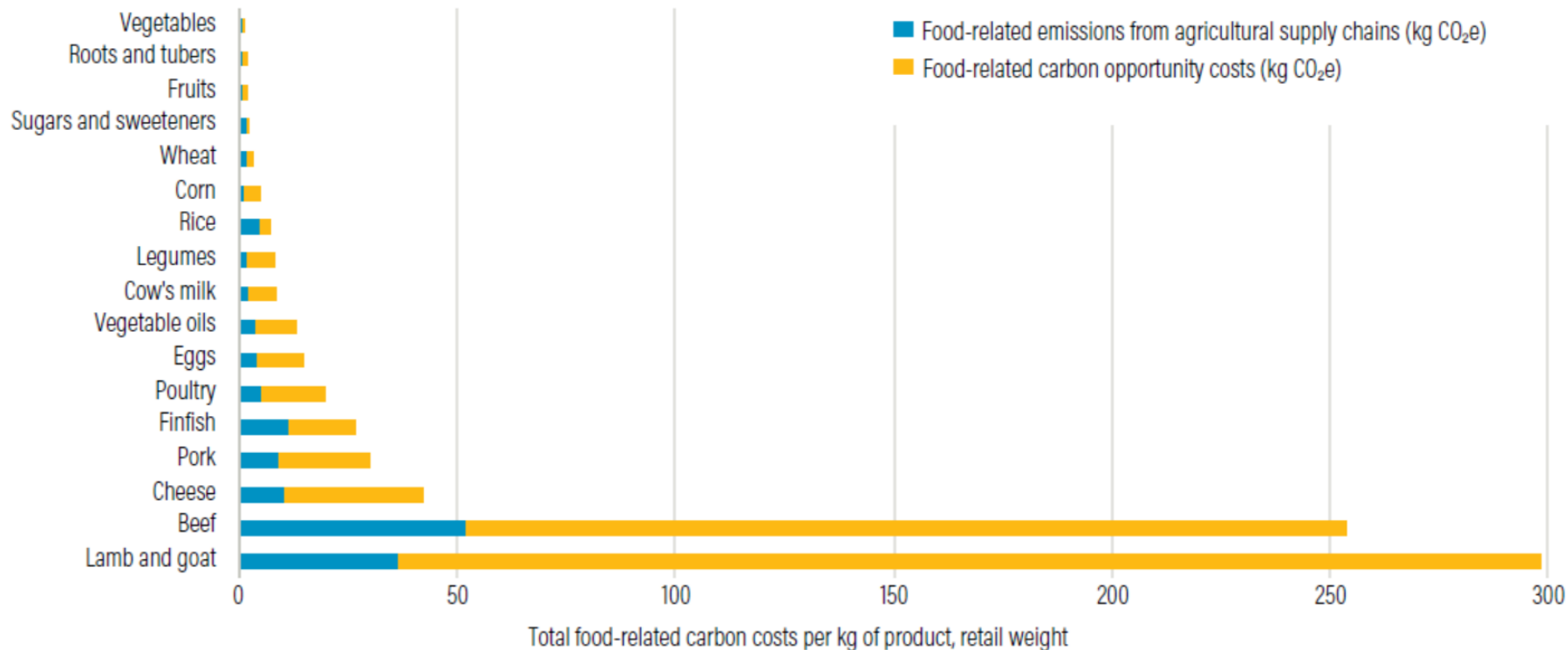
Methods and data

Metric	Agricultural supply chain emissions (kg CO ₂ e/kg retail weight)	Carbon opportunity costs (kg CO ₂ e/kg retail weight)
Region	Europe	Global
Food type	Poore and Nemecek (2018)	Searchinger et al. (2018)
Vegetables	0.67	0.71
Fruits	0.41	1.03
Roots and tubers	0.36	1.12
Sugars and sweeteners	1.53	1.74
Wheat	1.87	1.83
Corn	0.95	3.18
Rice	4.29	2.61
Cow's milk	1.77	6.20
Soybeans/Tofu	2.23	5.85
Legumes	1.94	6.30
Vegetable oils	4.10	9.08
Eggs	3.85	10.66
Fish	4.76	14.81
Poultry	6.73	14.70
Pork	8.06	21.10
Cheese	8.62	31.60
Beef	37.44	201.65
Lamb and goat	39.62	262.03

Note: A selection of emission factors are shown here.

Sources: Poore and Nemecek (2018); Searchinger et al. (2018).

Methods and data



Note: Global average factors shown here.

Sources: Poore and Nemecek (2018); Searchinger et al. (2018).

What's included in the annual emissions estimates?

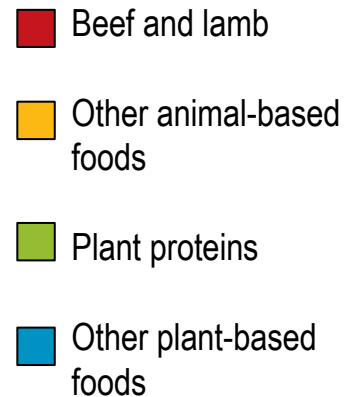
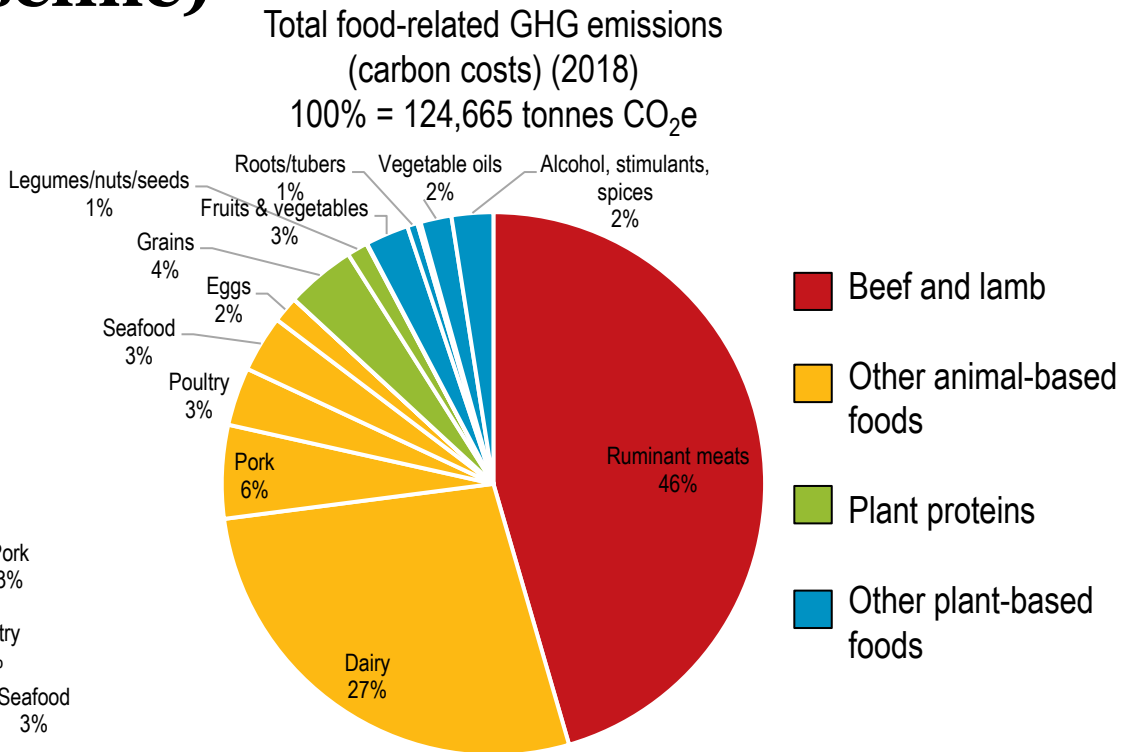
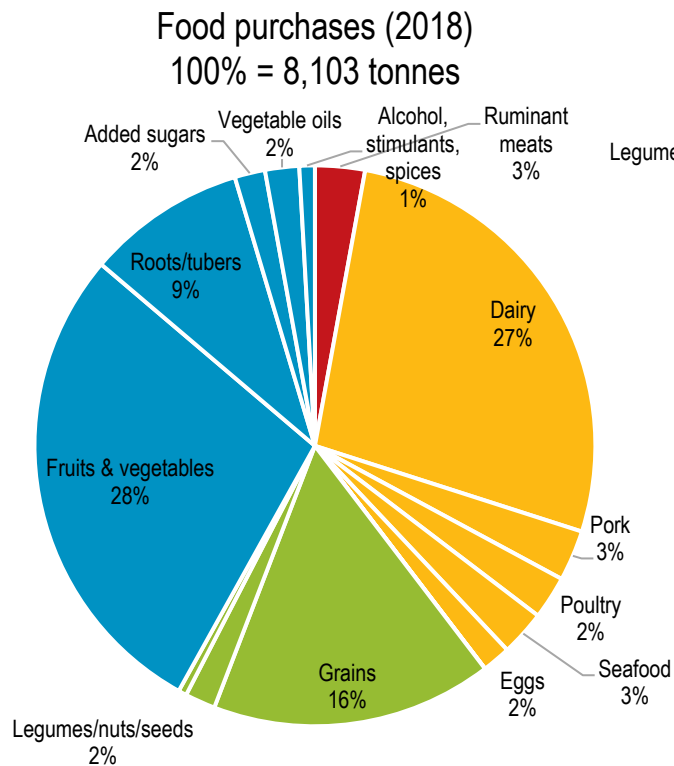
GHG emissions from agricultural supply chains: This includes emissions from production of food and animal feed (enteric fermentation, manure management, soil fertilization, rice methane, energy use on farms and for manufacturing inputs), transport of food and animal feed, food processing, food packaging,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

Data source: Poore and Nemecek (2018).

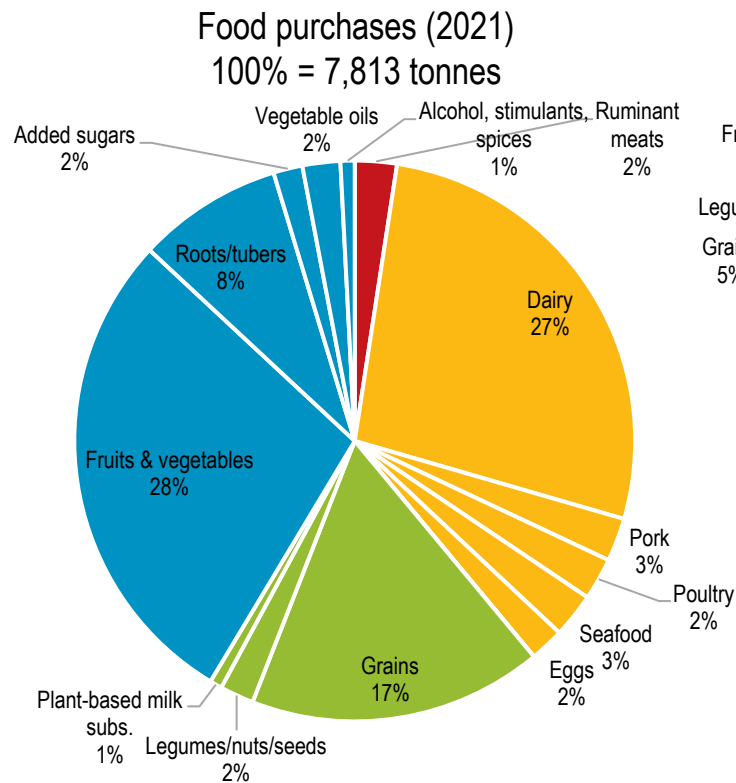
Carbon opportunity costs of agricultural land use: This includes total historical carbon losses from plants and soils on lands used to produce the sourced food. Because carbon losses from clearing native ecosystems to expand food production occur quickly, but food production on a cleared plot of land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

Data source: Searchinger et al. (2018).

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

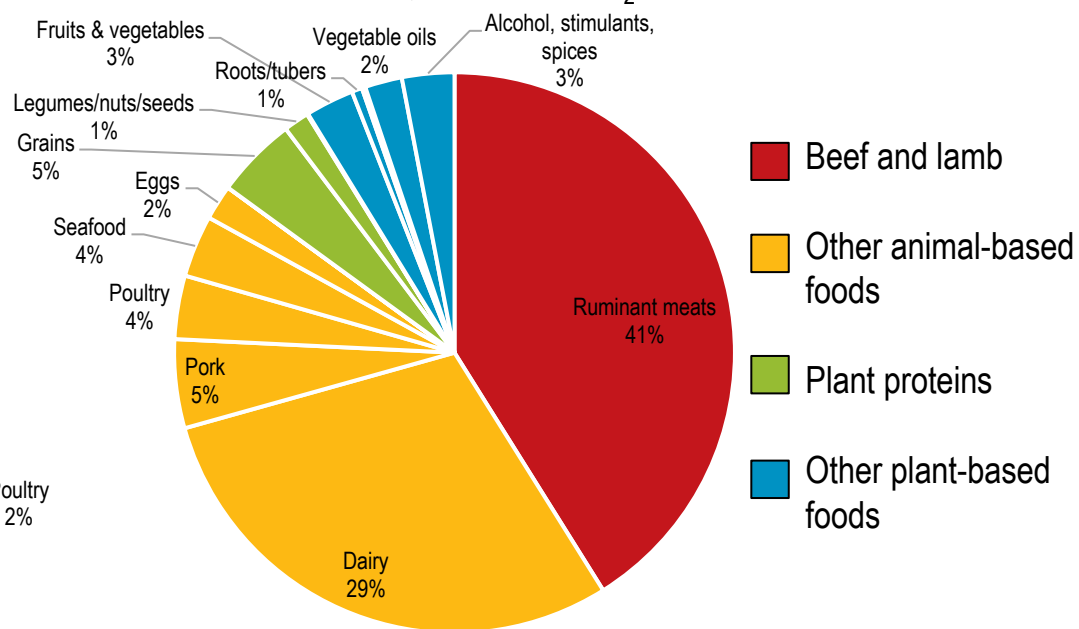


Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).



Total food-related GHG emissions (carbon costs) (2021)

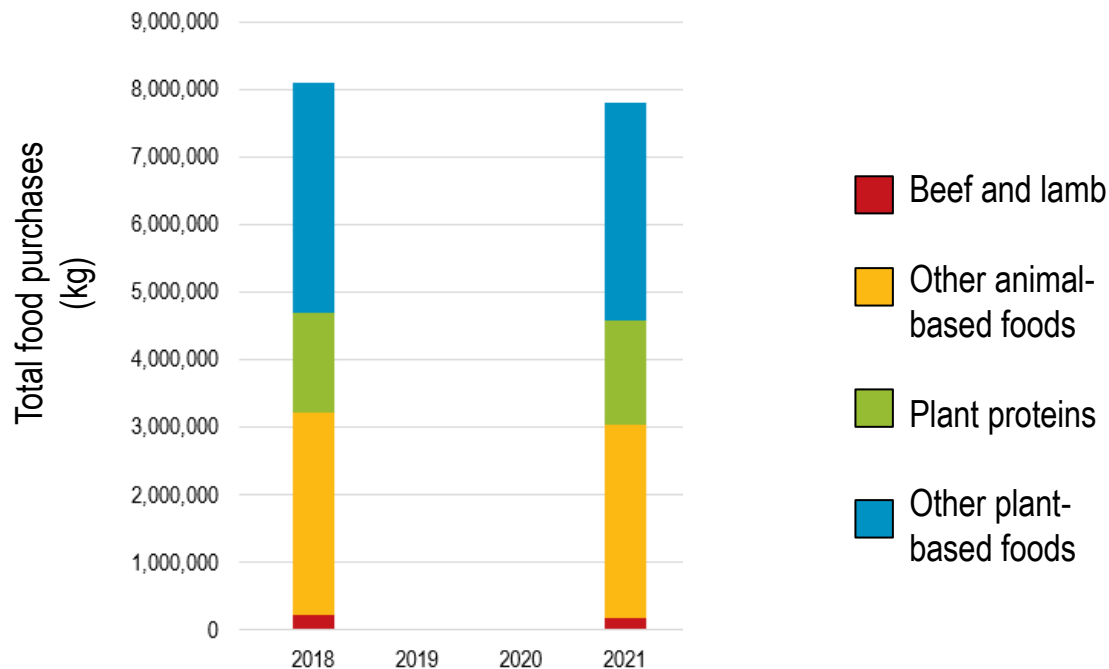
100% = 111,233 tonnes CO₂e



- 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).

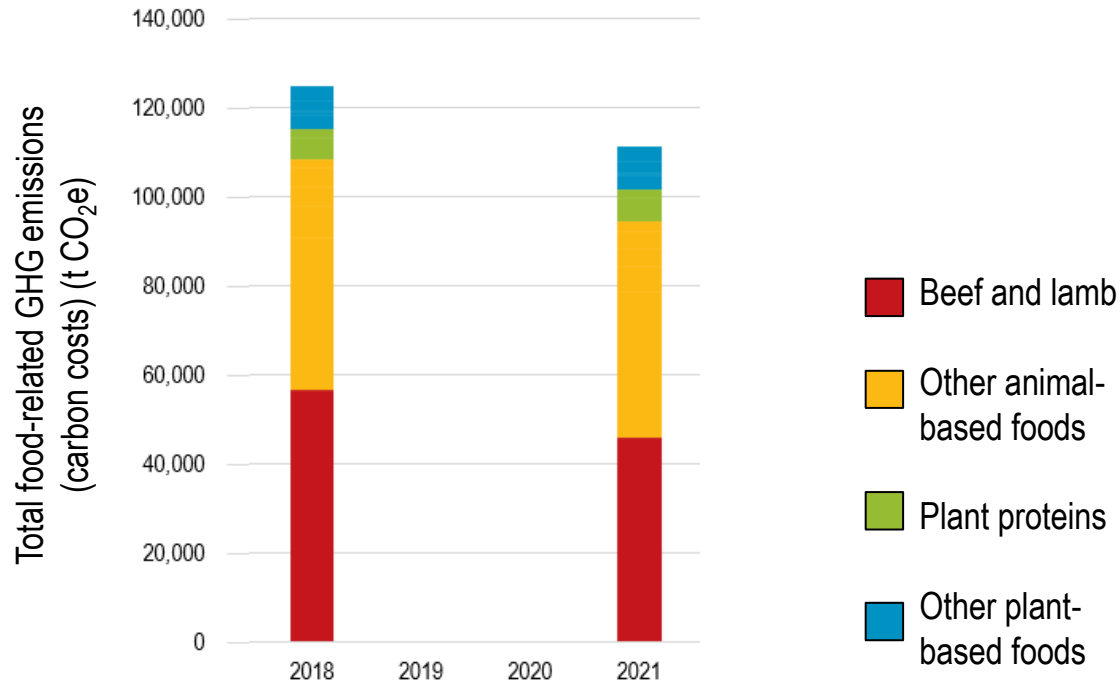
Copenhagen (TOTAL): total food purchases (2018-21)



Food type	% change (2018-21)
Beef and lamb	-18.90%
Dairy	-3.69%
Pork	-17.75%
Poultry	-5.70%
Seafood	-5.51%
Eggs	+15.72%
Grains	+0.82%
Legumes, nuts, seeds	+7.64%
Plant-based milks	+42.91%
Fruits and vegetables	-3.02%
Roots/tubers	-11.89%
Added sugars	-7.87%
Vegetable oils	+6.86%
Alcohol, stimulants, spices	-1.29%
Total	-3.57%

Source: Purchase data provided by member.

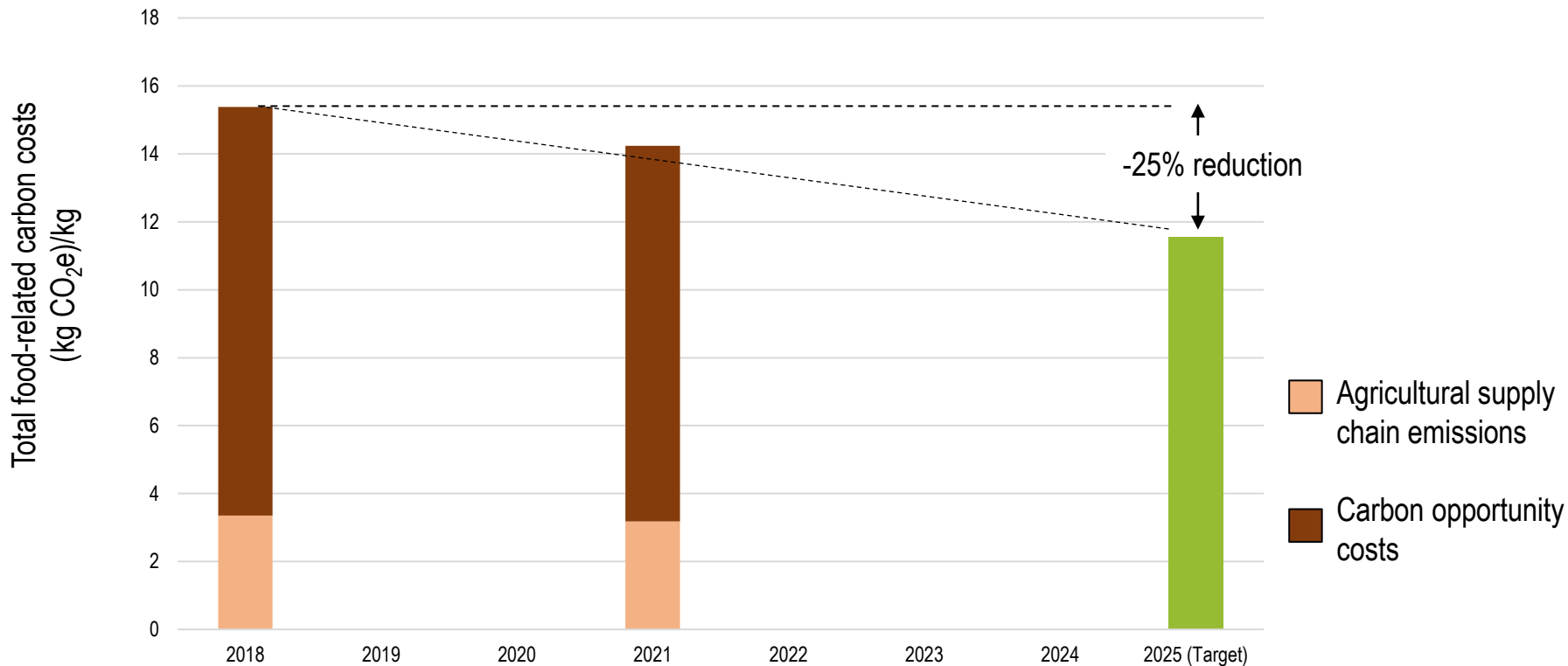
Copenhagen (TOTAL): total food-related emissions (2018-21)



	% change (2018-21)
Emissions per kg	-7.47%

Source: Purchase data provided by member. 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).

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 ₂ e)	Carbon opportunity costs (t CO ₂ e)	Total emissions (carbon costs) (t CO ₂ e)	Total emissions (kg CO ₂ e)/ kg	% change (2018-21)
BUF	2018	4,159,663	89,429	2.2%	11,435	39,189	50,624	12.17	
BUF	2021	4,113,366	65,507	1.6%	10,508	34,005	44,512	10.82	-11.08%
SUF	2018	2,828,446	99,520	3.5%	11,446	42,100	53,557	18.93	
SUF	2021	2,637,690	86,656	3.3%	10,413	37,888	48,301	18.31	-3.27%
SOF	2018	993,863	40,487	4.1%	3,894	14,756	18,650	18.77	
SOF	2021	1,020,856	35,467	3.5%	3,775	13,931	17,706	17.34	-7.57%
Others*	2018	121,073	3,739	3.1%	393	1,452	1,846	15.25	
Others*	2021	41,477	1,483	3.6%	150	564	714	17.22	+12.93%
TOTAL – Copenhagen	2018	8,103,045	233,176	2.9%	27,169	97,497	124,665	15.39	
TOTAL – Copenhagen	2021	7,813,390	189,112	2.4%	24,846	86,387	111,233	14.24	-7.47%

City of Copenhagen 2018-21 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

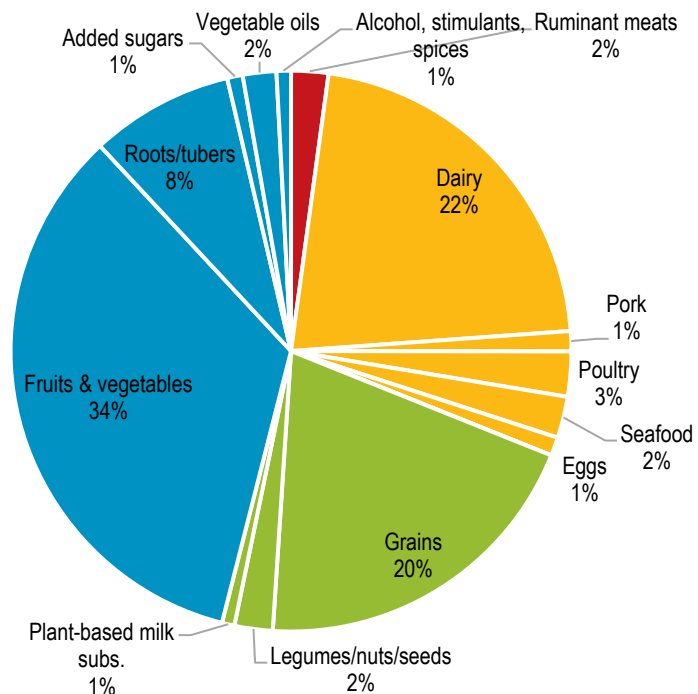
SOF: The Social Services Administration

Others:

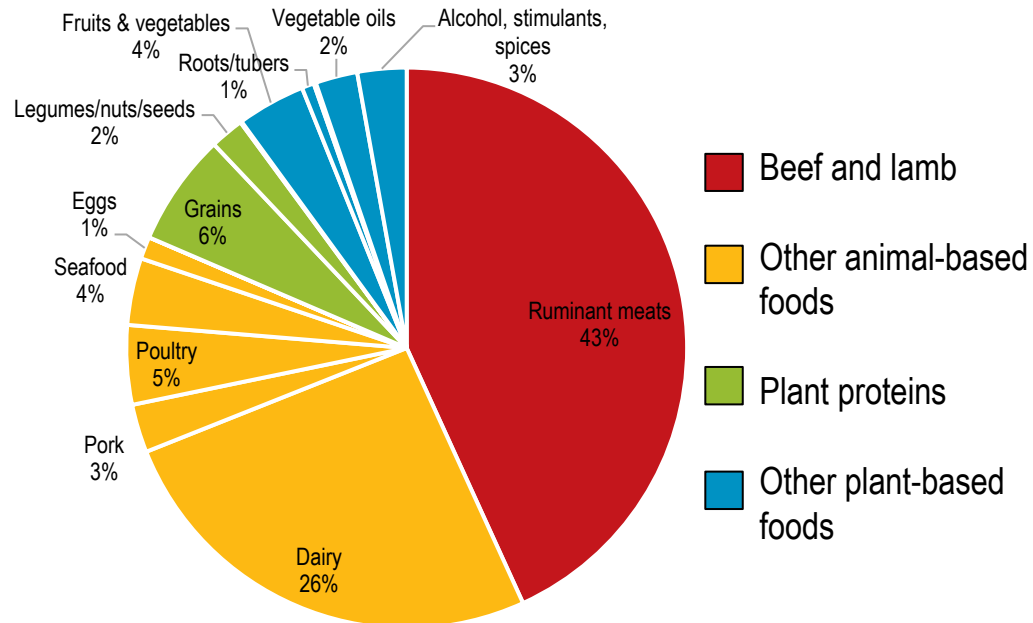
- BIF: The Employment and Integration Administration
- KFF: The Culture and Leisure Administration
- TMF: The Technical and Environmental Administration
- ØKF: The Finance Administration

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

Food purchases (2018)
100% = 4,160 tonnes



Total food-related GHG emissions
(carbon costs) (2018)
100% = 50,624 tonnes CO₂e

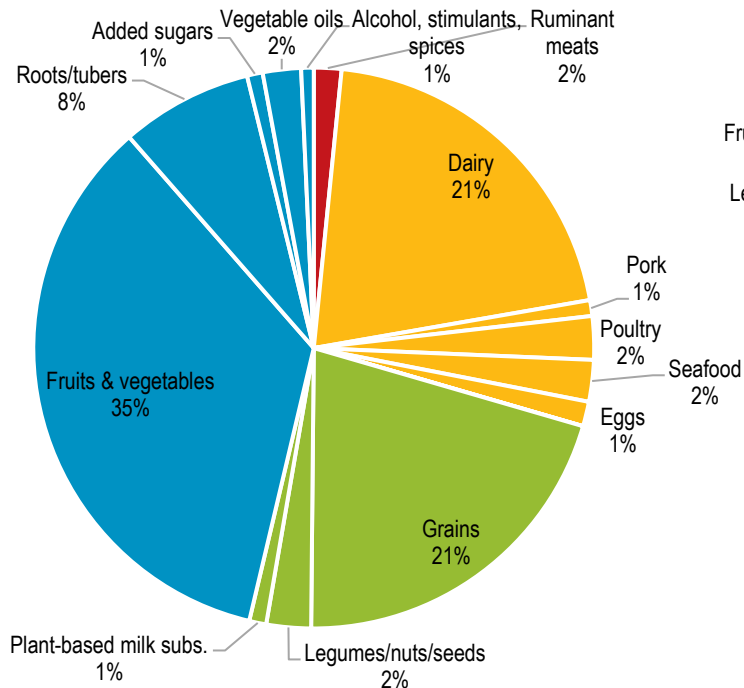


- Beef and lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

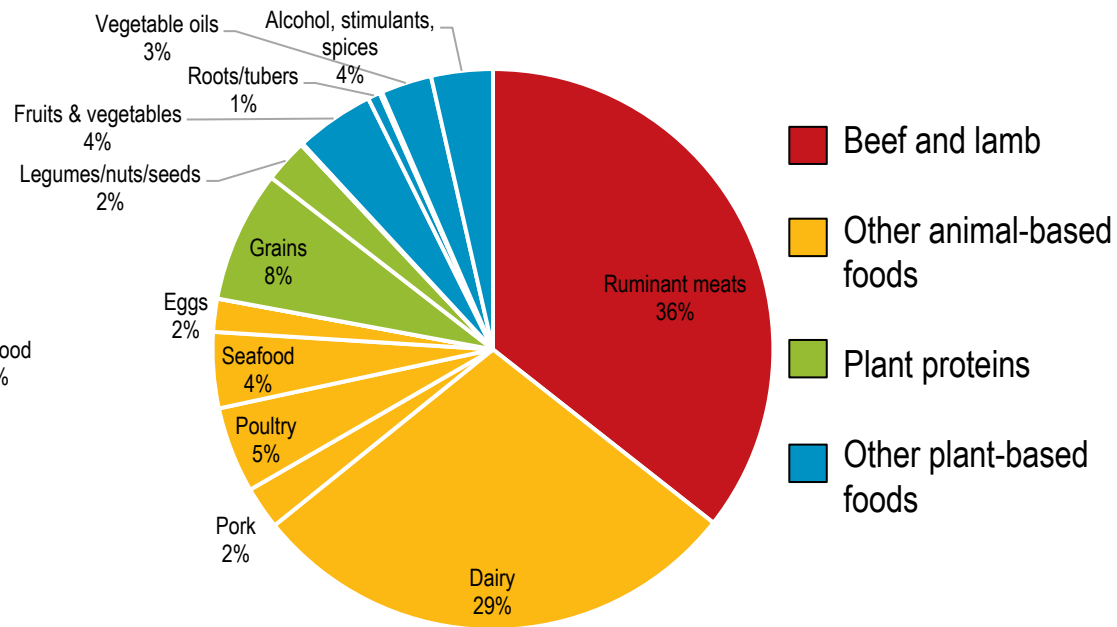
Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

Copenhagen (BUF): total food-related GHG emissions (2021)

Food purchases (2021)
100% = 4,113 tonnes

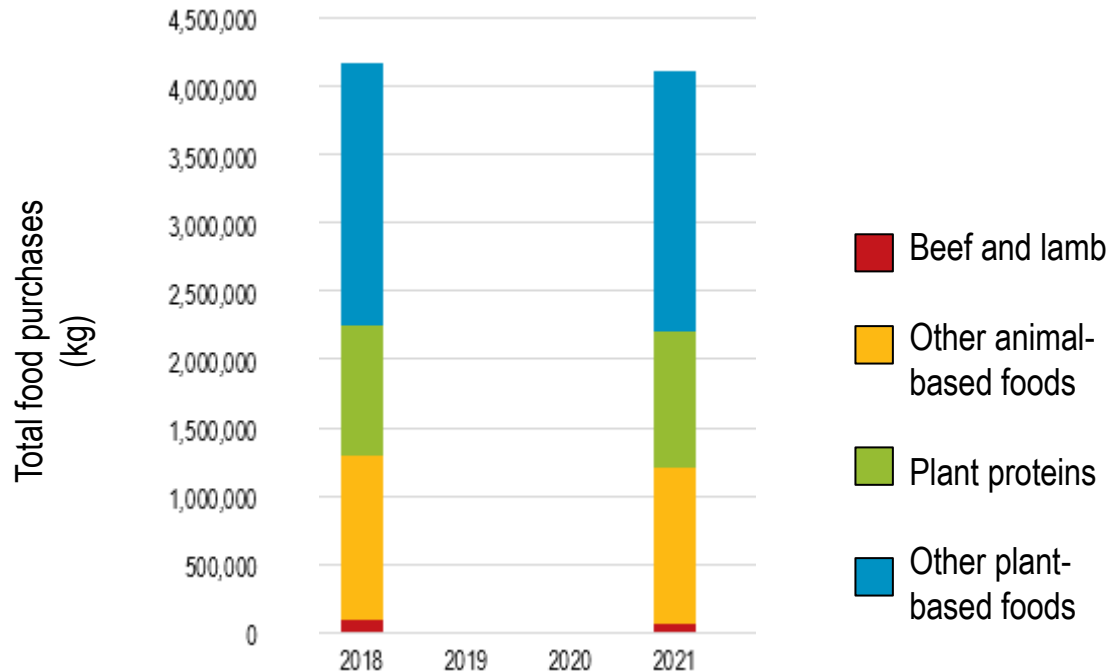


Total food-related GHG emissions
(carbon costs) (2021)
100% = 44,512 tonnes CO₂e



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

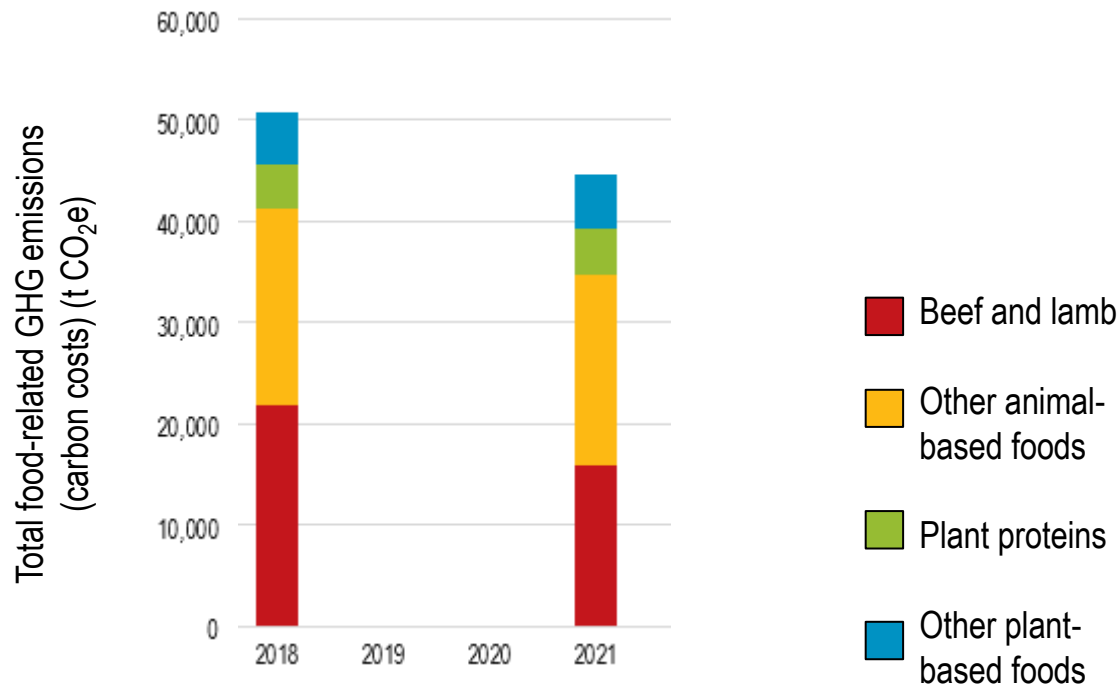
Copenhagen (BUF): total food purchases (2018-21)



Food type	% change (2018-21)
Beef and lamb	-26.75%
Dairy	-6.00%
Pork	-22.36%
Poultry	-4.66%
Seafood	-0.59%
Eggs	+30.96%
Grains	+2.14%
Legumes/nuts/seeds	+15.13%
Plant-based milk subs.	+34.55%
Fruits & vegetables	+0.95%
Roots/tubers	-9.12%
Added sugars	-0.29%
Vegetable oils	+12.53%
Alcohol, stimulants, spices	+1.25%
Total	-1.11%

Source: Purchase data provided by member.

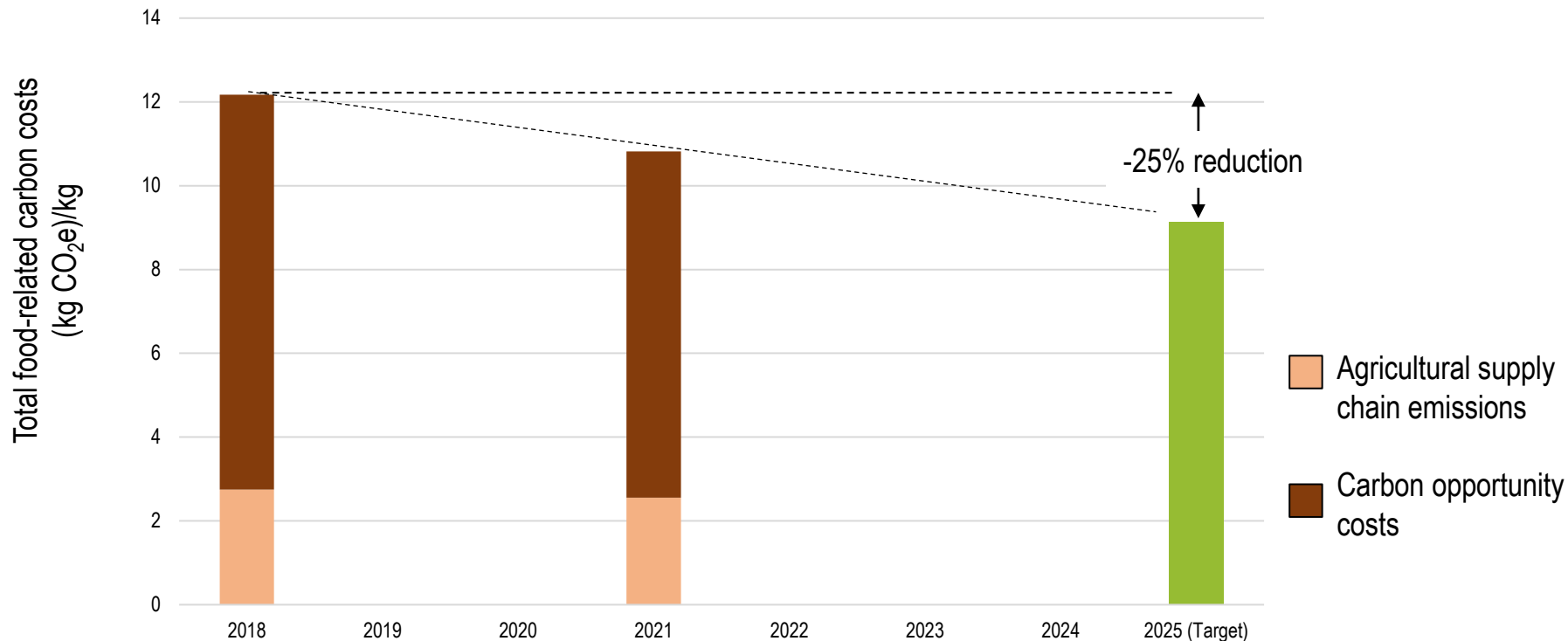
Copenhagen (BUF): total food-related emissions (2018-21)



	% change (2018-21)
Emissions per kg	-11.08%

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

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

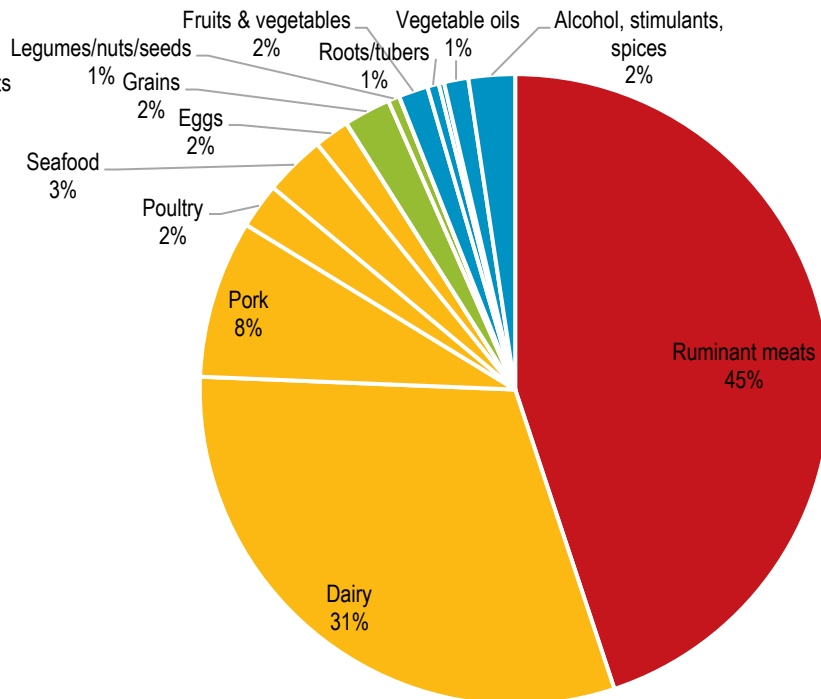
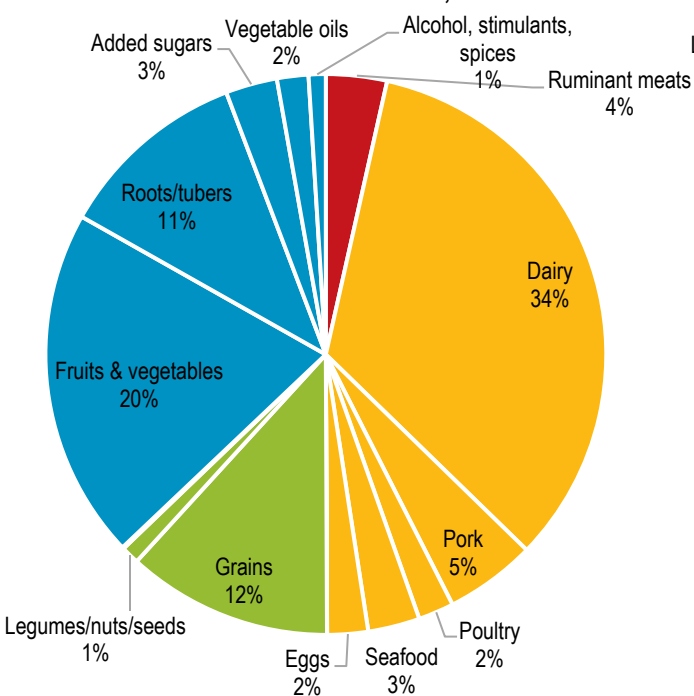


Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

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

Food purchases (2018)
100% = 2,828 tonnes

Total food-related GHG emissions
(carbon costs) (2018)
100% = 53,546 tonnes CO₂e

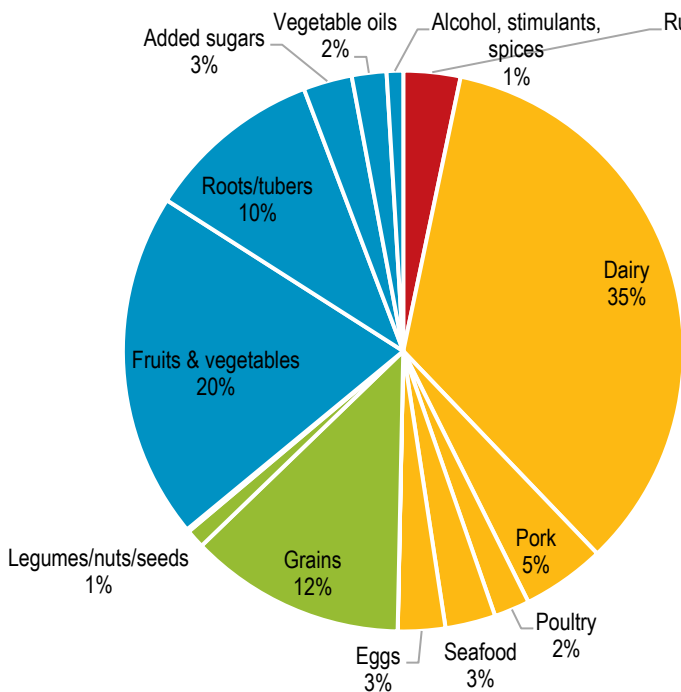


- Beef and lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

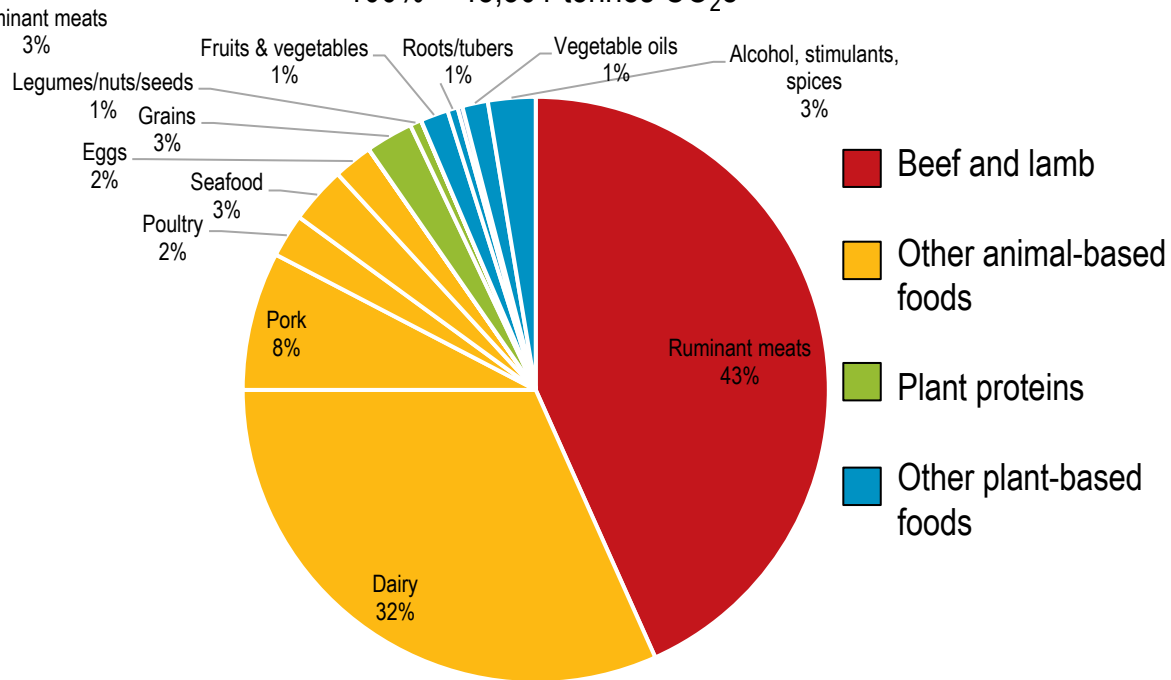
Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

Copenhagen (SUF): total food-related GHG emissions (2021)

Food purchases (2021)
100% = 2,638 tonnes

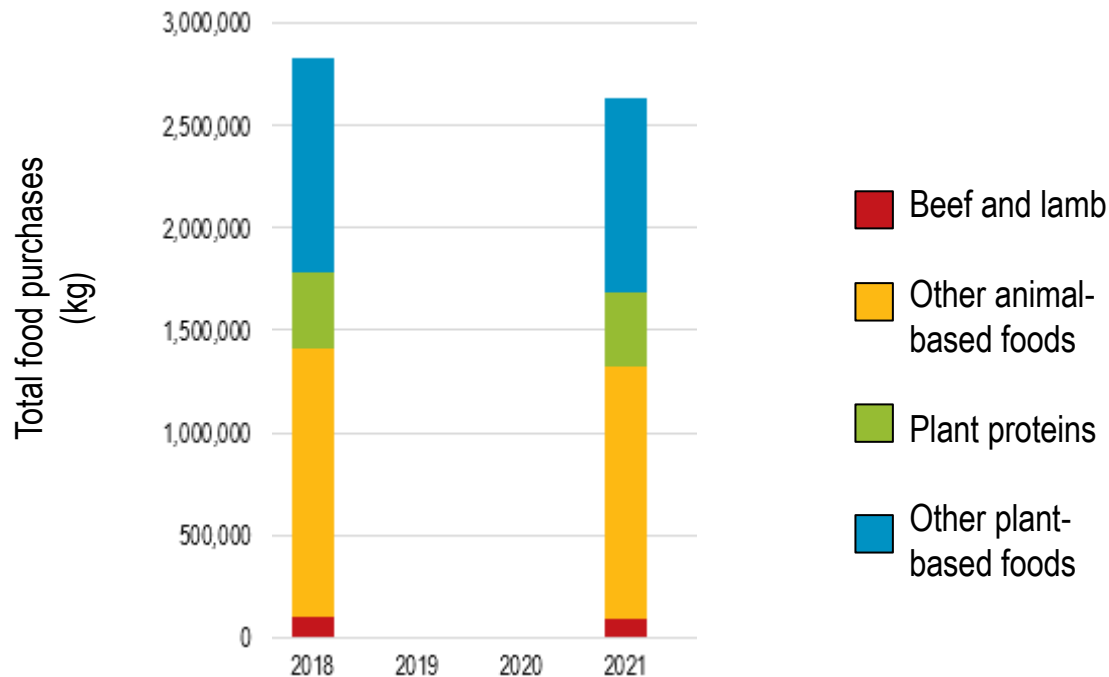


Total food-related GHG emissions
(carbon costs) (2021)
100% = 48,301 tonnes CO₂e



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

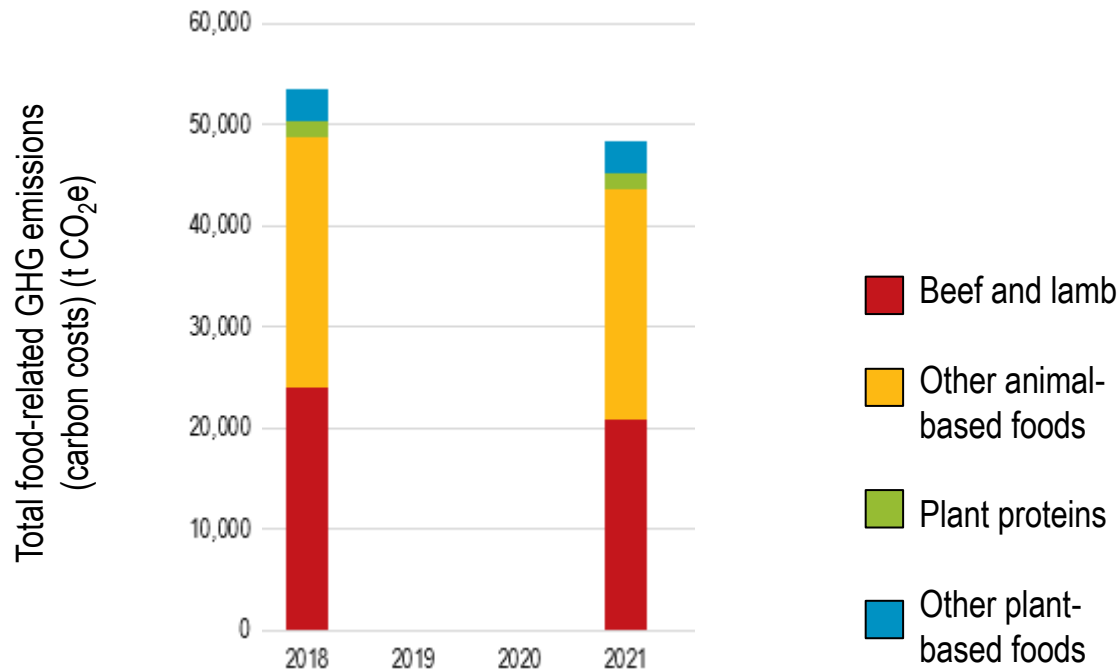
Copenhagen (SUF): total food purchases (2018-21)



Food type	% change (2018-21)
Beef and lamb	-12.93%
Dairy	-4.60%
Pork	-14.87%
Poultry	-6.84%
Seafood	-9.55%
Eggs	+8.18%
Grains	-2.01%
Legumes, nuts, seeds	-2.70%
Plant-based milks	+63.31%
Fruits and vegetables	-7.91%
Roots/tubers	-13.95%
Added sugars	-11.97%
Vegetable oils	+2.77%
Alcohol, stimulants, spices	-6.17%
Total	-6.74%

Source: Purchase data provided by member.

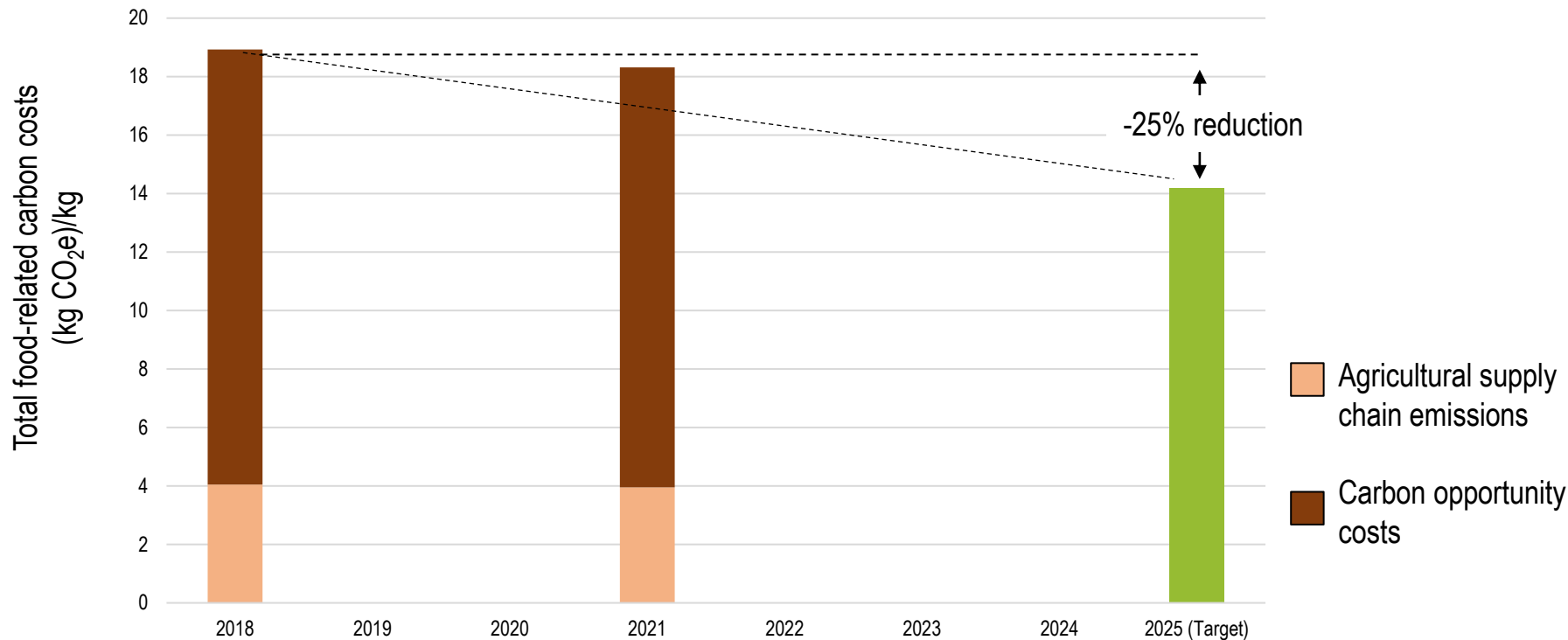
Copenhagen (SUF): total food-related emissions (2018-21)



	% change (2018-21)
Emissions per kg	-3.27%

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

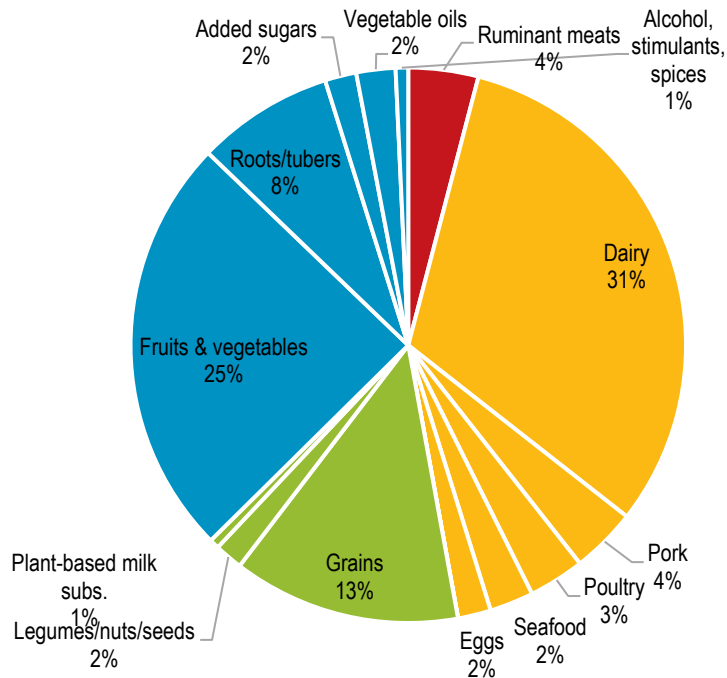
Copenhagen (SUF): Progress against city target of 25% reduction in GHG emissions per kg food



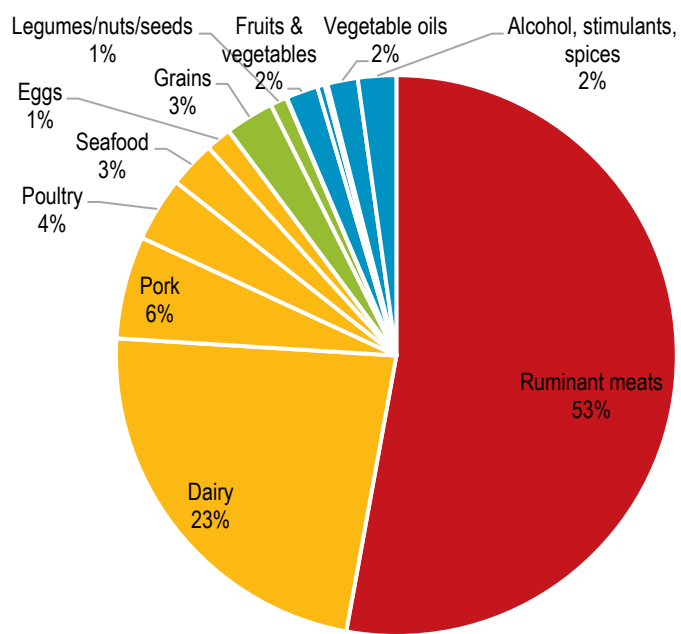
Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

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

Food purchases (2018)
100% = 994 tonnes



Total food-related GHG emissions
(carbon costs) (2018)
100% = 18,650 tonnes CO₂e

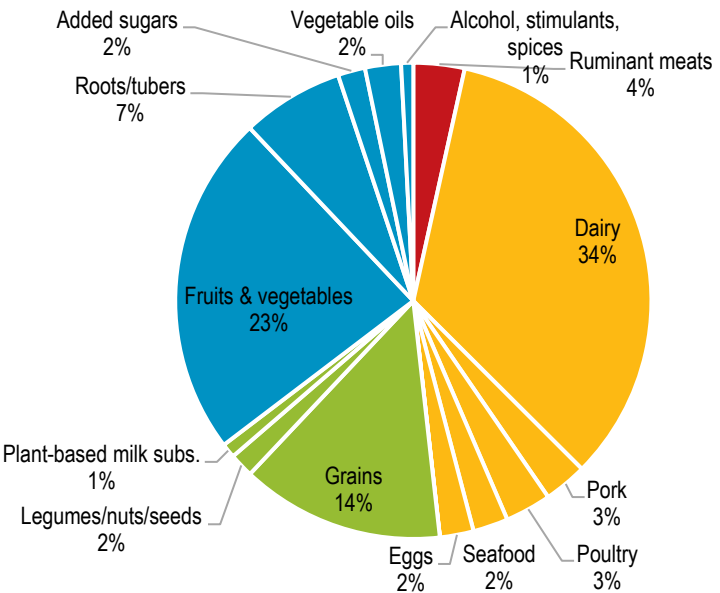


- Beef and lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

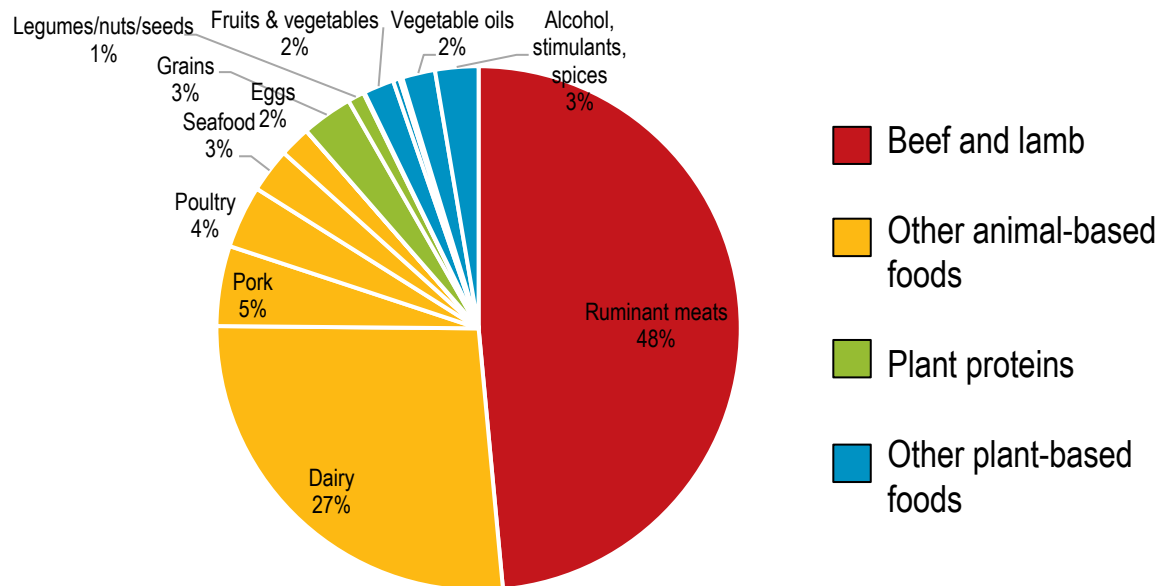
Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

Copenhagen (SOF): total food-related GHG emissions (2021)

Food purchases (2021)
100% = 1,021 tonnes

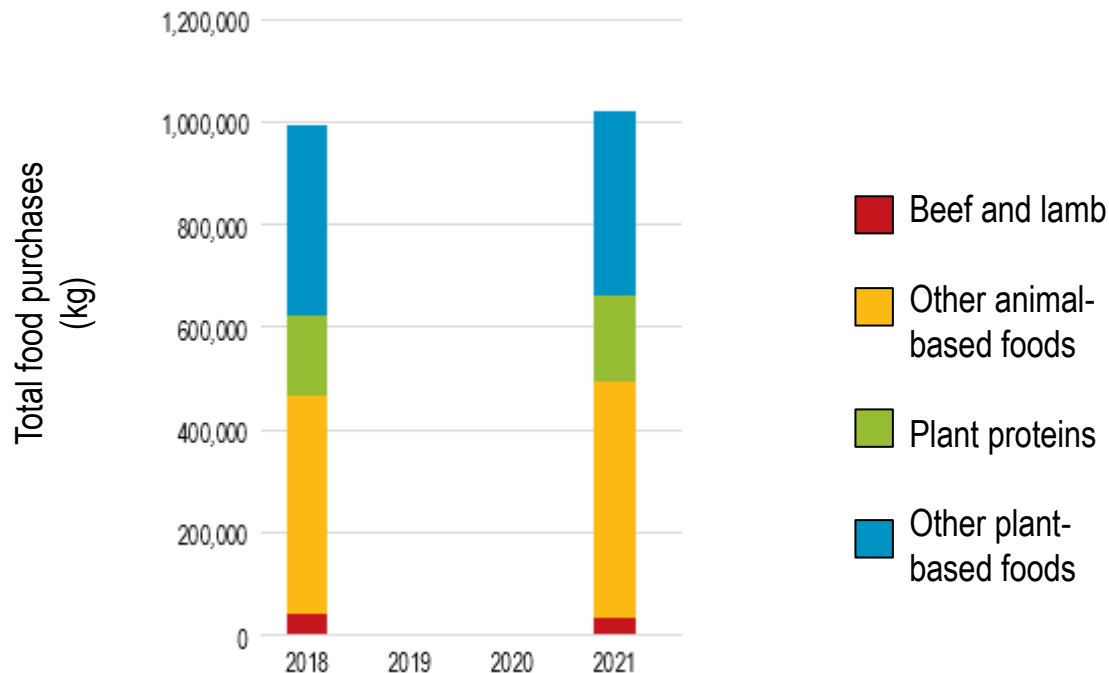


Total food-related GHG emissions (carbon costs) (2021)
100% = 17,706 tonnes CO₂e



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

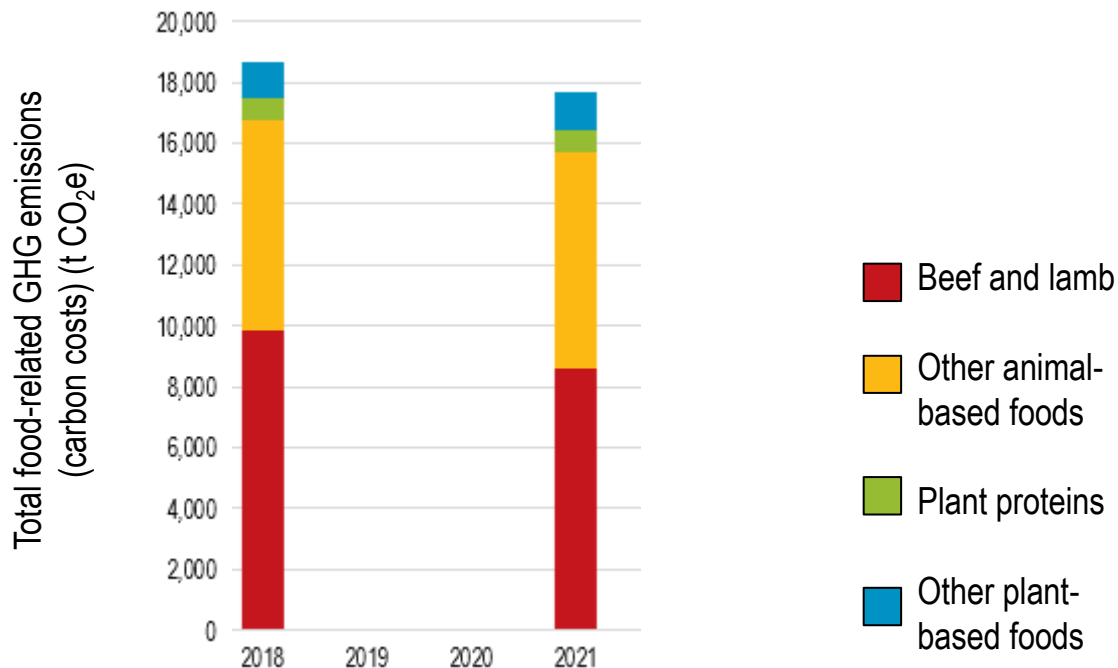
Copenhagen (SOF): total food purchases (2018-21)



Food type	% change (2018-21)
Beef and lamb	-12.40%
Dairy	+10.86%
Pork	-20.84%
Poultry	-1.34%
Seafood	-4.26%
Eggs	+22.47%
Grains	+7.02%
Legumes/nuts/seeds	+2.65%
Plant-based milk subs.	+78.87%
Fruits & vegetables	-2.74%
Roots/tubers	-10.62%
Added sugars	+4.14%
Vegetable oils	+9.97%
Alcohol, stimulants, spices	+15.95%
Total	+2.72%

Source: Purchase data provided by member.

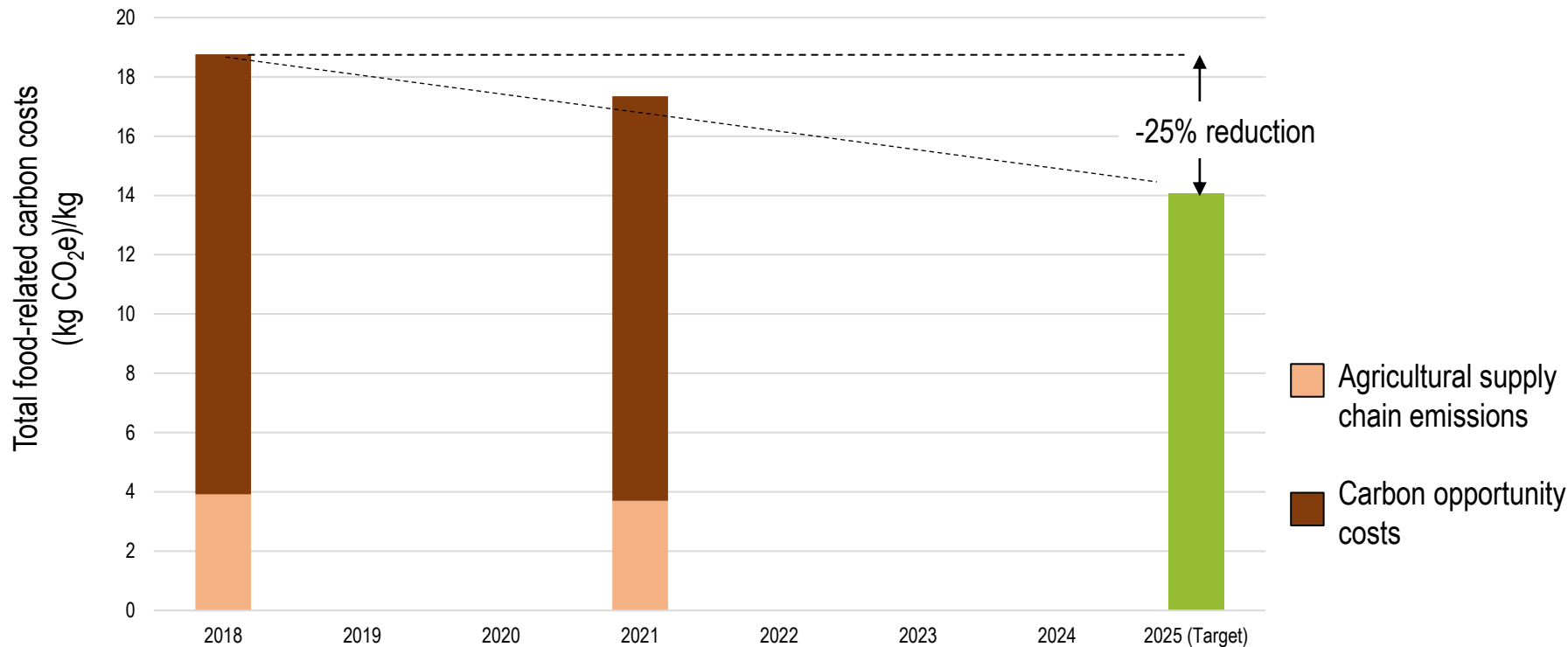
Copenhagen (SOF): total food-related emissions (2018-21)



	% change (2018-21)
Emissions per kg	-7.92%

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

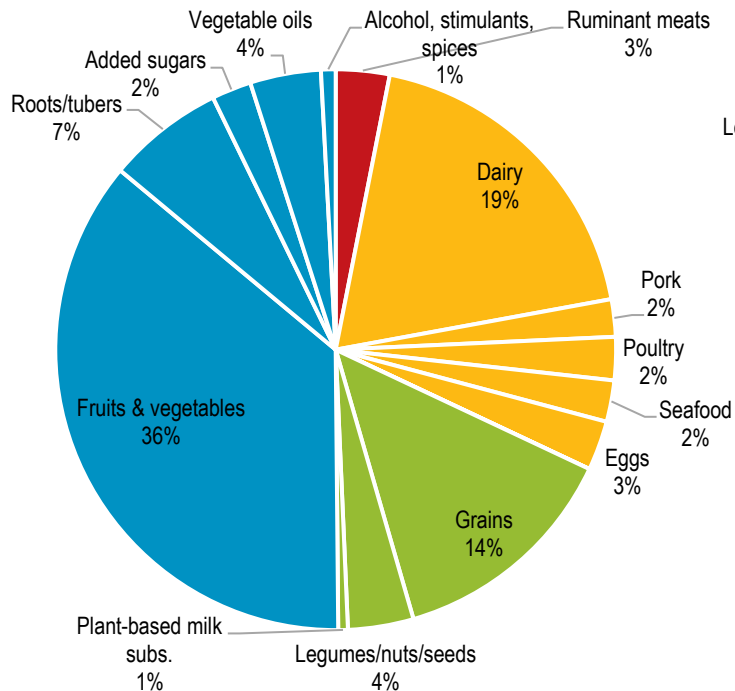
Copenhagen (SOF): Progress against city target of 25% reduction in GHG emissions per kg food



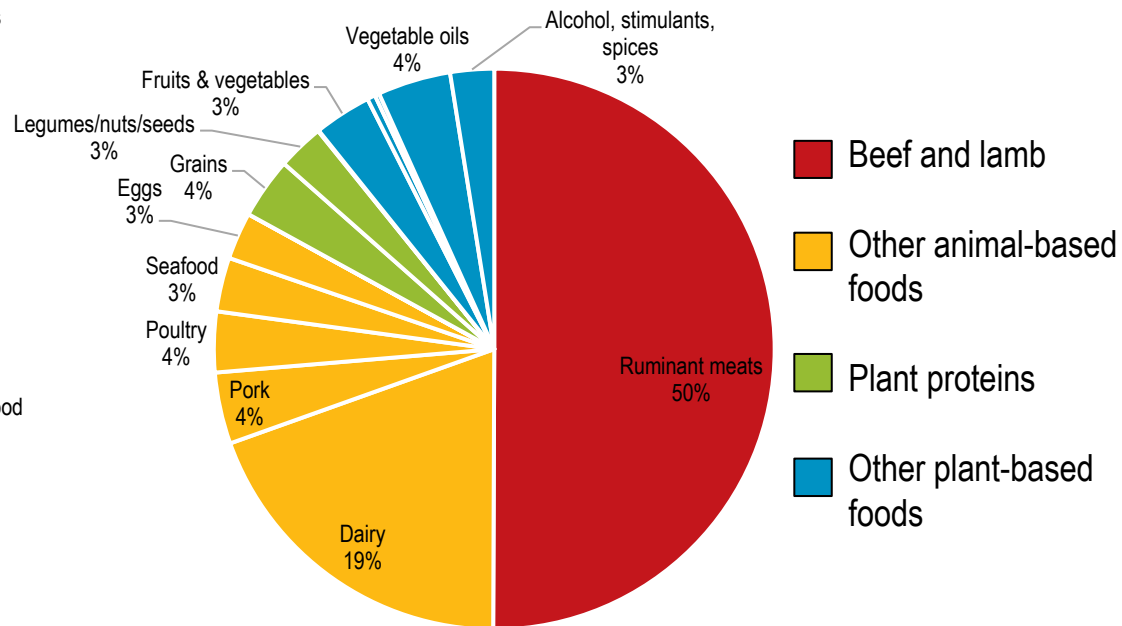
Source: Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

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

Food purchases (2018)
100% = 121 tonnes



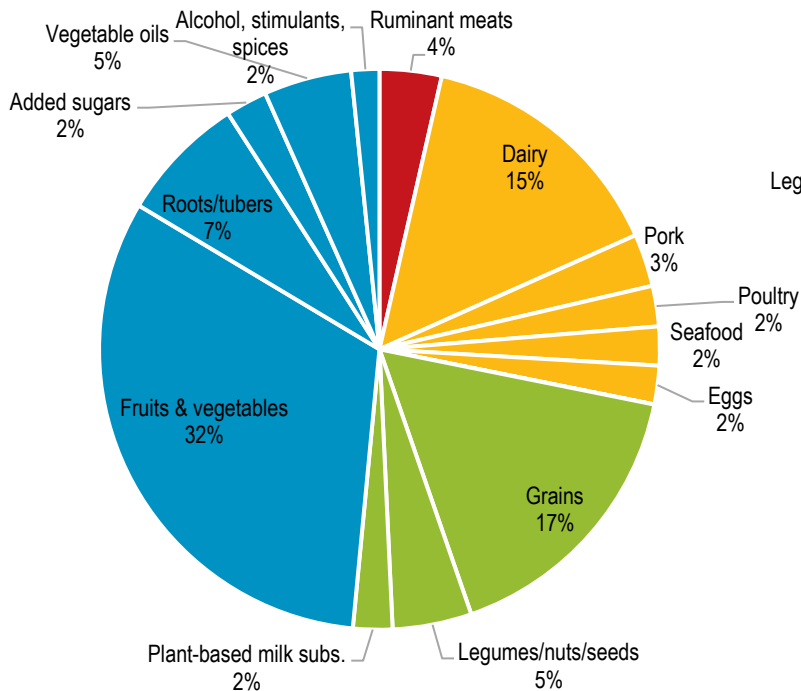
Total food-related GHG emissions (carbon costs) (2018)
100% = 1,846 tonnes CO₂e



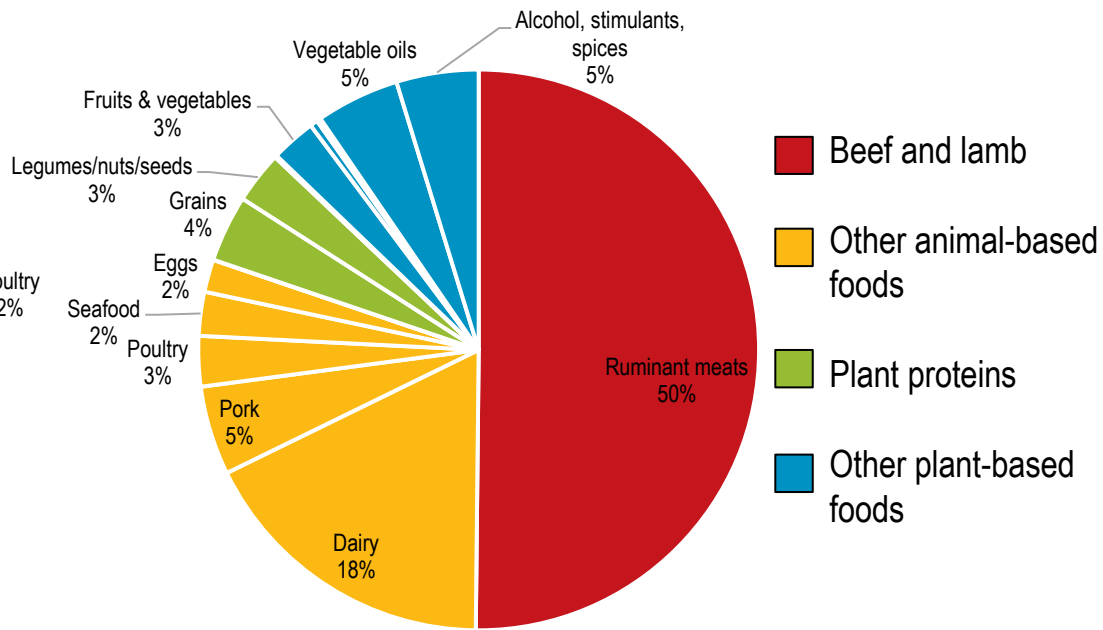
Source: Purchase data provided by member. Emission factors from Poore and Nemecek (2018) (agricultural supply chain) and Searchinger et al. (2018) (carbon opportunity costs).

Copenhagen (Others): total food-related GHG emissions (2021)

Food purchases (2021)
100% = 41 tonnes



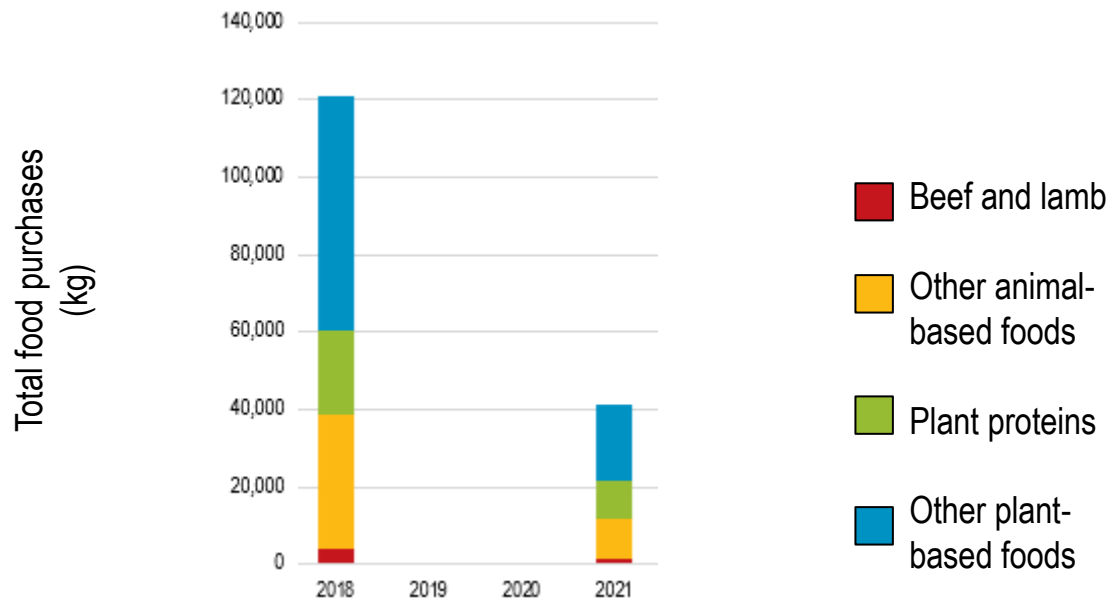
Total food-related GHG emissions
(carbon costs) (2021)
100% = 714 tonnes CO₂e



- 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).

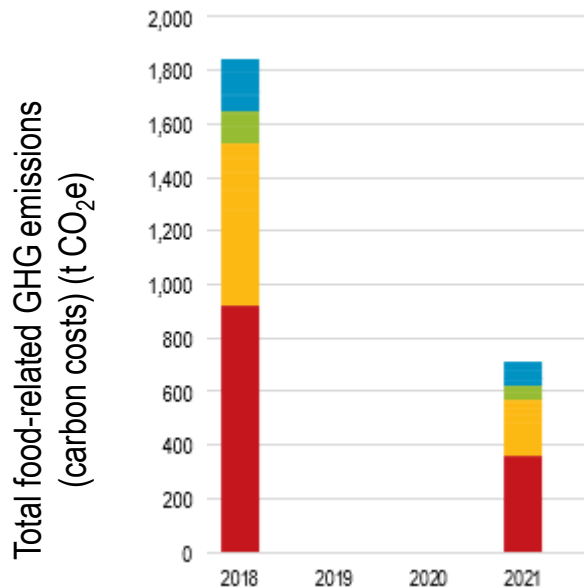
Copenhagen (Others): total food purchases (2018-21)



Food type	% change (2018-21)
Beef and lamb	-60.36%
Dairy	-73.33%
Pork	-51.73%
Poultry	-67.77%
Seafood	-67.80%
Eggs	-73.32%
Grains	-58.01%
Legumes/nuts/seeds	-58.51%
Plant-based milk subs.	40.86%
Fruits & vegetables	-69.57%
Roots/tubers	-62.61%
Added sugars	-63.77%
Vegetable oils	-57.43%
Alcohol, stimulants, spices	-51.00%
Total	-65.74%

Source: Purchase data provided by member.

Copenhagen (Others): total food-related emissions (2018-21)

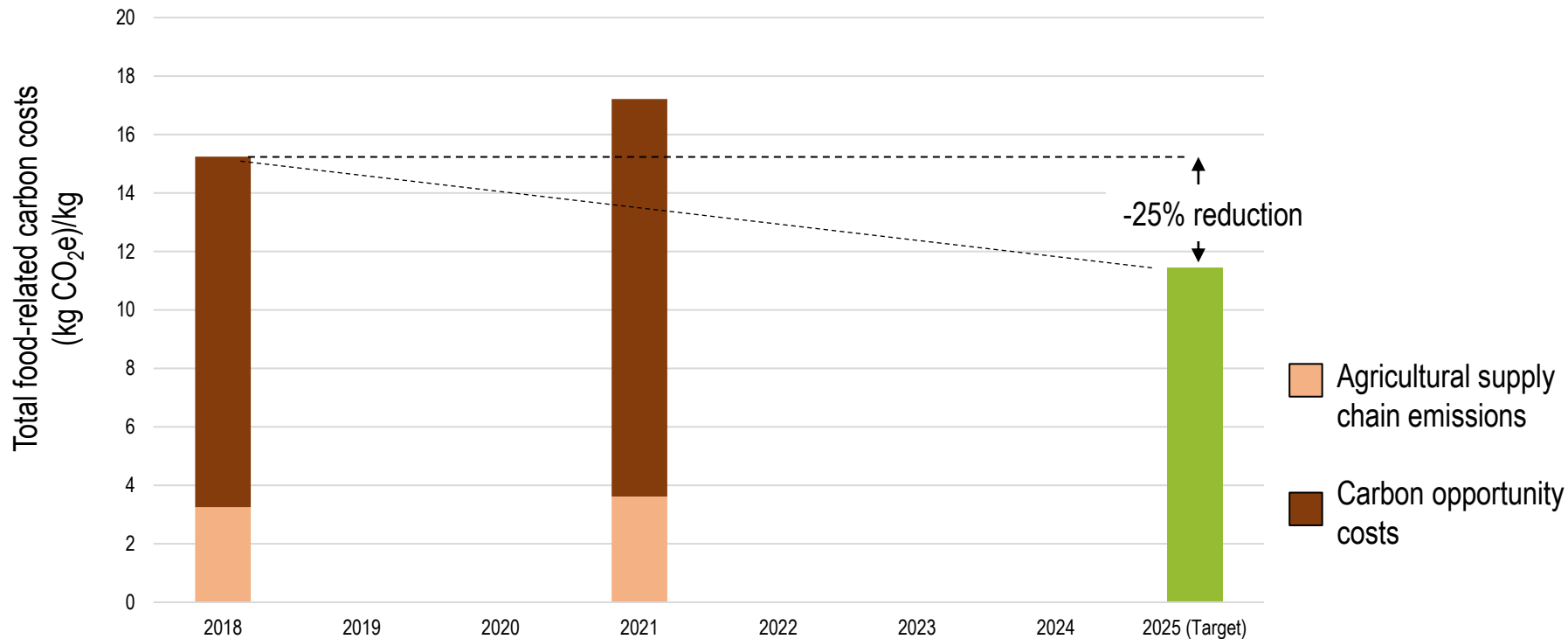


- Beef and lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

	% change (2018-21)
Emissions per kg	+12.93%

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

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).