BASELINE FOOD-GHG DATA ANALYSIS

Analysis for Copenhagen Municipality (2018) – July 30, 2019 – Draft 1

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.
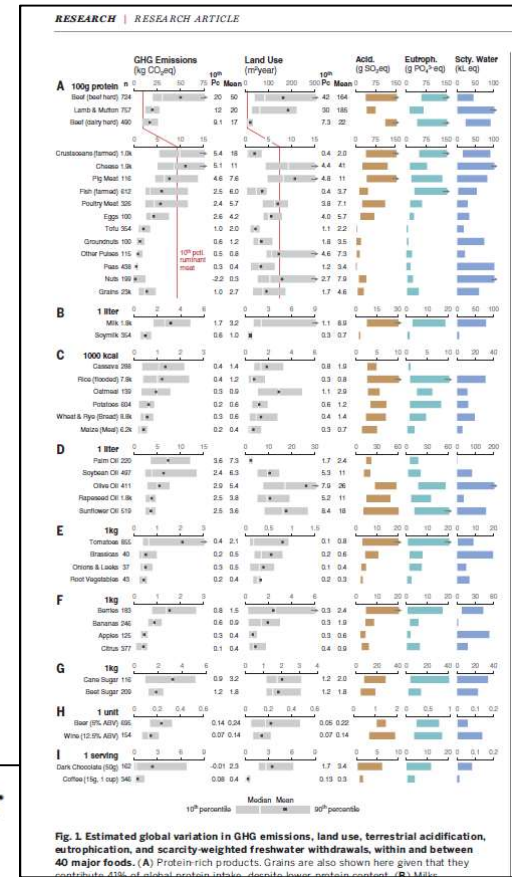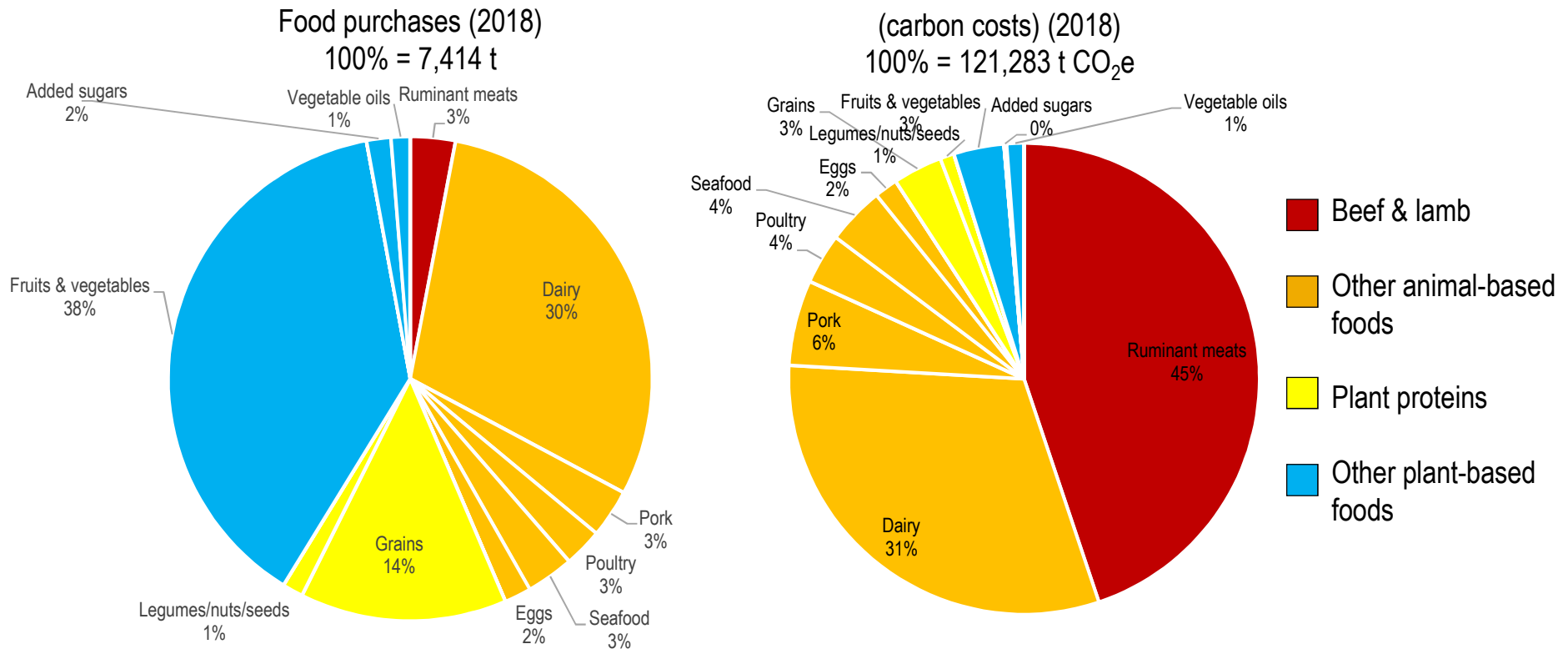
Analytical approach: multiply food purchase weights by emission factors (2018 baseline)

	Amount of food purchased by Copenhagen Municipality (kg) (bone-free equivalent) (2018)	GHG emissions (kg CO_2e / kg bone-free meat or produce)	Total GHG emissions from agricultural supply chains (t CO_2e) (2018)
Ruminant meats	222,774	38.73	8,629
Dairy	2,208,773	3.64	8,029
Pork	239,082	8.66	2,070
Poultry	191,314	7.22	1,381
Seafood	235,563	5.67	1,337
Eggs	133,231	3.93	523
Grains	1,024,047	2.11	2,163
Legumes, nuts, seeds	102,698	1.18	121
Fruits, vegetables, roots, tubers	2,841,410	0.47	1,335
Added sugars	121,453	1.64	200
Vegetable oils	94,008	3.85	362
Total	**7,414,353**	**3.53**	**26,149**

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Copenhagen: total food-related GHG emissions (carbon costs)

Food purchases (2018)
100% = 7,414 t

- Added sugars 2%
- Vegetable oils 1%
- Ruminant meats 3%
- Dairy 30%
- Pork 3%
- Poultry 3%
- Seafood 3%
- Eggs 2%
- Grains 14%
- Legumes/nuts/seeds 1%
- Fruits & vegetables 38%

Food-related GHG emissions (carbon costs) (2018)
100% = 121,283 t CO$_2$e

- Grains 3%
- Fruits & vegetables 3%
- Legumes/nuts/seeds 1%
- Added sugars 0%
- Vegetable oils 1%
- Eggs 2%
- Seafood 4%
- Poultry 4%
- Pork 6%
- Dairy 31%
- Ruminant meats 45%

Legend:
- Beef & lamb
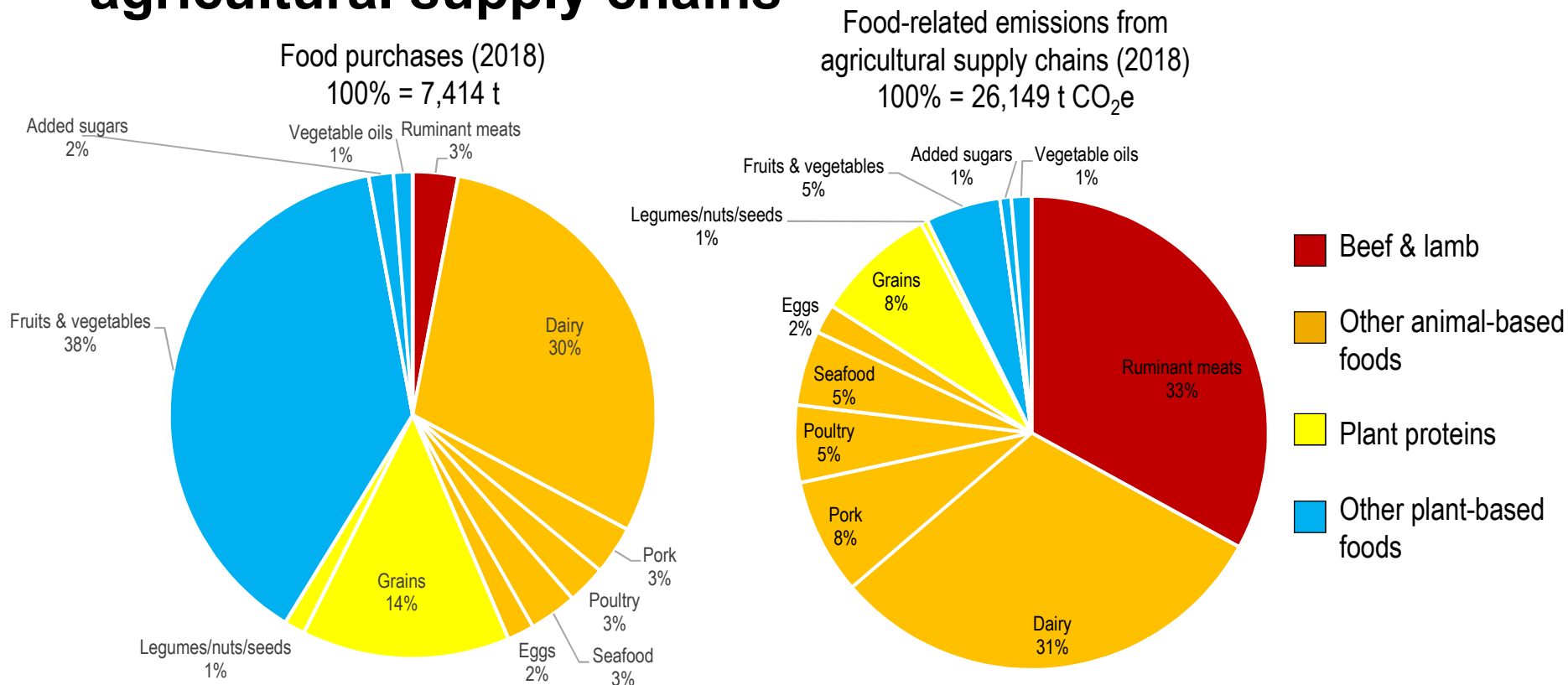- Other animal-based foods
- Plant proteins
- Other plant-based foods

Source: Emission factors from Poore and Nemecek (2018). *Notes:* Data are weighted averages for Europe. Emissions are counted from agricultural production (feed + farm), processing, transport, packaging, and upstream losses.

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Copenhagen: food-related emissions from agricultural supply chains

Food purchases (2018)
100% = 7,414 t

- Added sugars 2%
- Vegetable oils 1%
- Ruminant meats 3%
- Dairy 30%
- Pork 3%
- Poultry 3%
- Seafood 3%
- Eggs 2%
- Grains 14%
- Legumes/nuts/seeds 1%
- Fruits & vegetables 38%

Food-related emissions from agricultural supply chains (2018)
100% = 26,149 t CO_2e

- Fruits & vegetables 5%
- Added sugars 1%
- Vegetable oils 1%
- Legumes/nuts/seeds 1%
- Grains 8%
- Eggs 2%
- Seafood 5%
- Poultry 5%
- Pork 8%
- Dairy 31%
- Ruminant meats 33%

Legend:
- Beef & lamb
- Other animal-based foods
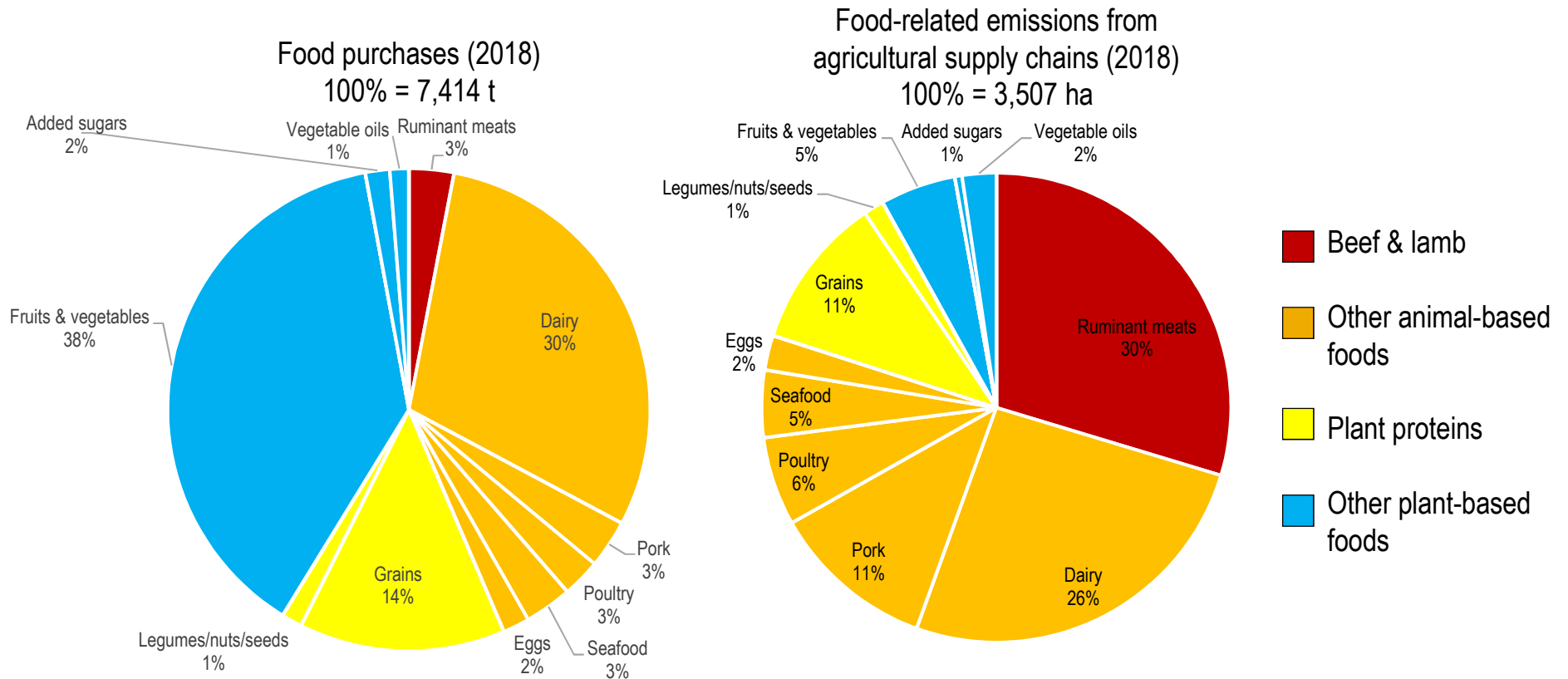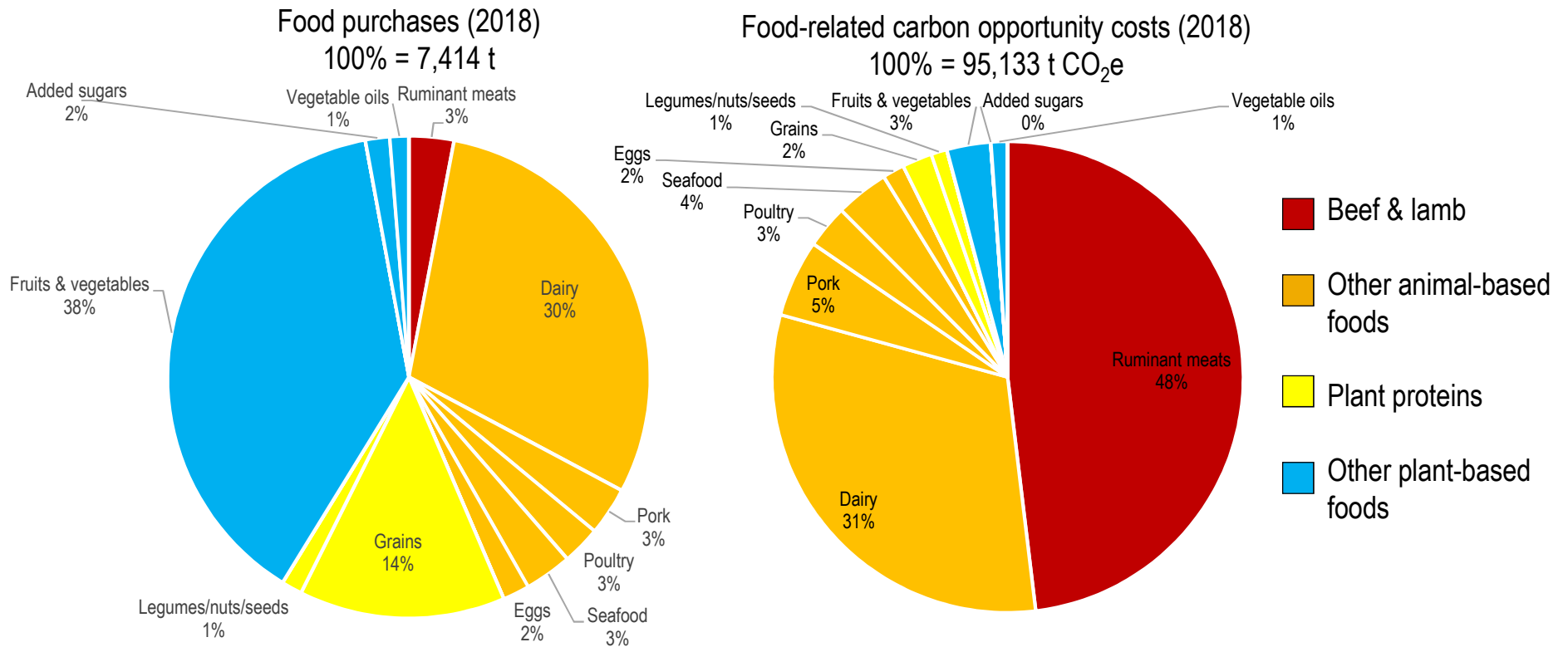- Plant proteins
- Other plant-based foods

Source: Emission factors from Poore and Nemecek (2018). *Notes:* Data are weighted averages for Europe. Emissions are counted from agricultural production (feed + farm), processing, transport, packaging, and upstream losses.

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Copenhagen: food-related land use

Food purchases (2018)
100% = 7,414 t

- Added sugars 2%
- Vegetable oils 1%
- Ruminant meats 3%
- Dairy 30%
- Pork 3%
- Poultry 3%
- Seafood 3%
- Eggs 2%
- Legumes/nuts/seeds 1%
- Grains 14%
- Fruits & vegetables 38%

Food-related emissions from agricultural supply chains (2018)
100% = 3,507 ha

- Fruits & vegetables 5%
- Added sugars 1%
- Vegetable oils 2%
- Legumes/nuts/seeds 1%
- Grains 11%
- Eggs 2%
- Seafood 5%
- Poultry 6%
- Pork 11%
- Dairy 26%
- Ruminant meats 30%

Legend:
- Beef & lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

Source: Land use factors from Poore and Nemecek (2018). *Notes:* Data are weighted averages for Europe.

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Copenhagen: food-related carbon opportunity costs

Food purchases (2018)
100% = 7,414 t

- Added sugars 2%
- Vegetable oils 1%
- Ruminant meats 3%
- Dairy 30%
- Fruits & vegetables 38%
- Legumes/nuts/seeds 1%
- Grains 14%
- Eggs 2%
- Seafood 3%
- Poultry 3%
- Pork 3%

Food-related carbon opportunity costs (2018)
100% = 95,133 t CO_2e

- Legumes/nuts/seeds 1%
- Fruits & vegetables 3%
- Added sugars 0%
- Vegetable oils 1%
- Grains 2%
- Eggs 2%
- Seafood 4%
- Poultry 3%
- Pork 5%
- Dairy 31%
- Ruminant meats 48%

Legend:
- Beef & lamb
- Other animal-based foods
- Plant proteins
- Other plant-based foods

Source: Emission factors from Searchinger et al. (2018). *Notes:* Data are weighted global averages.

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Comparison across administrative levels

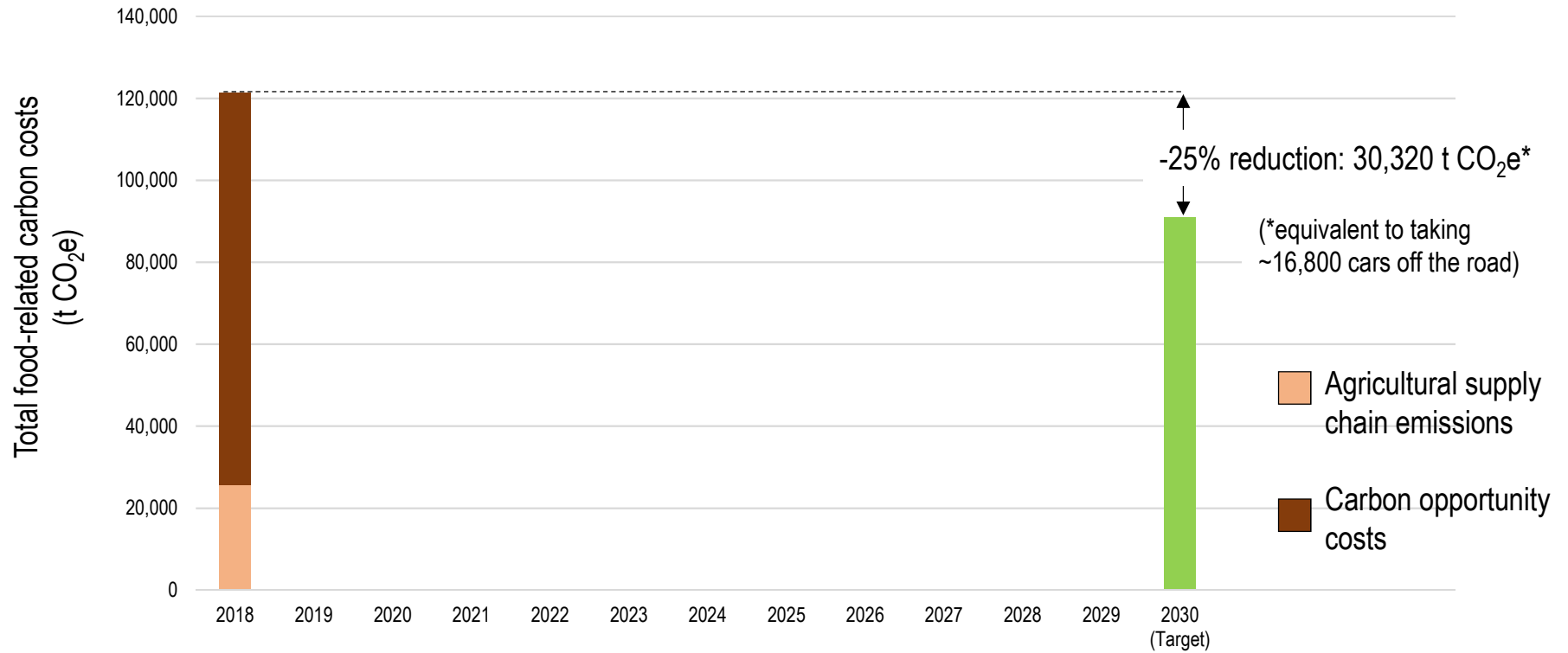| Administrative level	Metric 1: Food purchase weight (kg)	Ruminant meats as % of purchase weight	Metric 2: Food-related GHG emissions from agricultural supply chains (t CO2e)	Metric 3: Food-related land use (ha)	Metric 4: Food-related carbon opportunity costs (t CO2e)	Total food-related carbon costs (t CO2e) (Metric 2 + Metric 4)	Total food-related carbon costs (kg CO2e) (Metric 2 + Metric 4) per kg of food	Total food-related carbon costs (kg CO2e) (Metric 2 + Metric 4) per 1000 kcal of food
Health and care - elderly homes (SUF)	2,588,393	3.65%	10,820	1,423	40,316	51,136	19.76	13.75
Social services (SOF)	990,911	4.07%	3,997	532	15,299	19,295	19.47	14.21
Children and youth - schools and kindergartens (BUF)	3,731,468	2.26%	10,965	1,501	38,120	49,086	13.15	9.60
Other	103,580	3.58%	367	51	1,399	1,766	17.05	11.96
Total	**7,414,353**	**3.00%**	**26,149**	**3,507**	**95,133**	**121,283**	**16.36**	**11.73**

Cool Food Pledge: collective target (2030 scenario)

Cities and companies pledge to **provide delicious food that is better for the planet** and commit to a *collective* target of reducing GHG emissions associated with the food they provide by **25 percent by 2030 relative to 2015**.

Food system GHG emissions (agricultural production + land-use change), Gt CO_2e/year

-25%

-67%
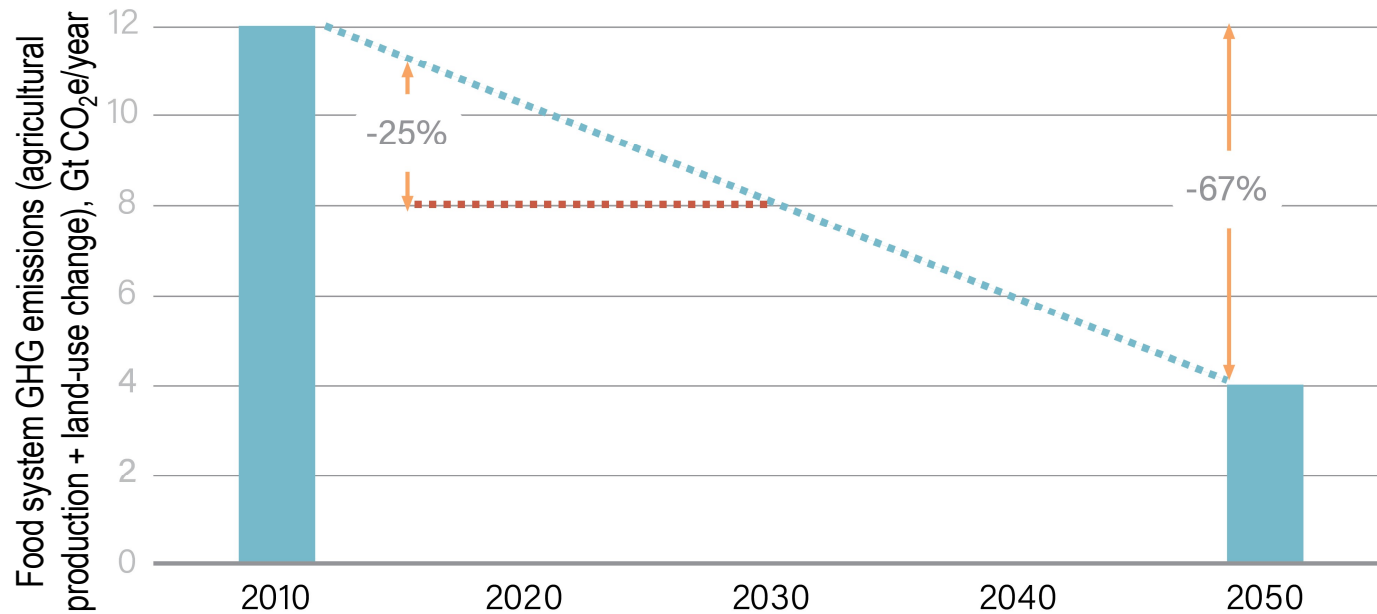
Sources: Searchinger et al. (2018), Science Based Targets Initiative (2017).

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Hypothetical 2030 scenario (Copenhagen): meeting 25% emissions reduction target

-25% reduction: 30,320 t CO_2e*

(*equivalent to taking ~16,800 cars off the road)

Agricultural supply chain emissions

Carbon opportunity costs

Total food-related carbon costs (t CO_2e)

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