

ZERO CARBON BRITAIN

Rethinking the Future

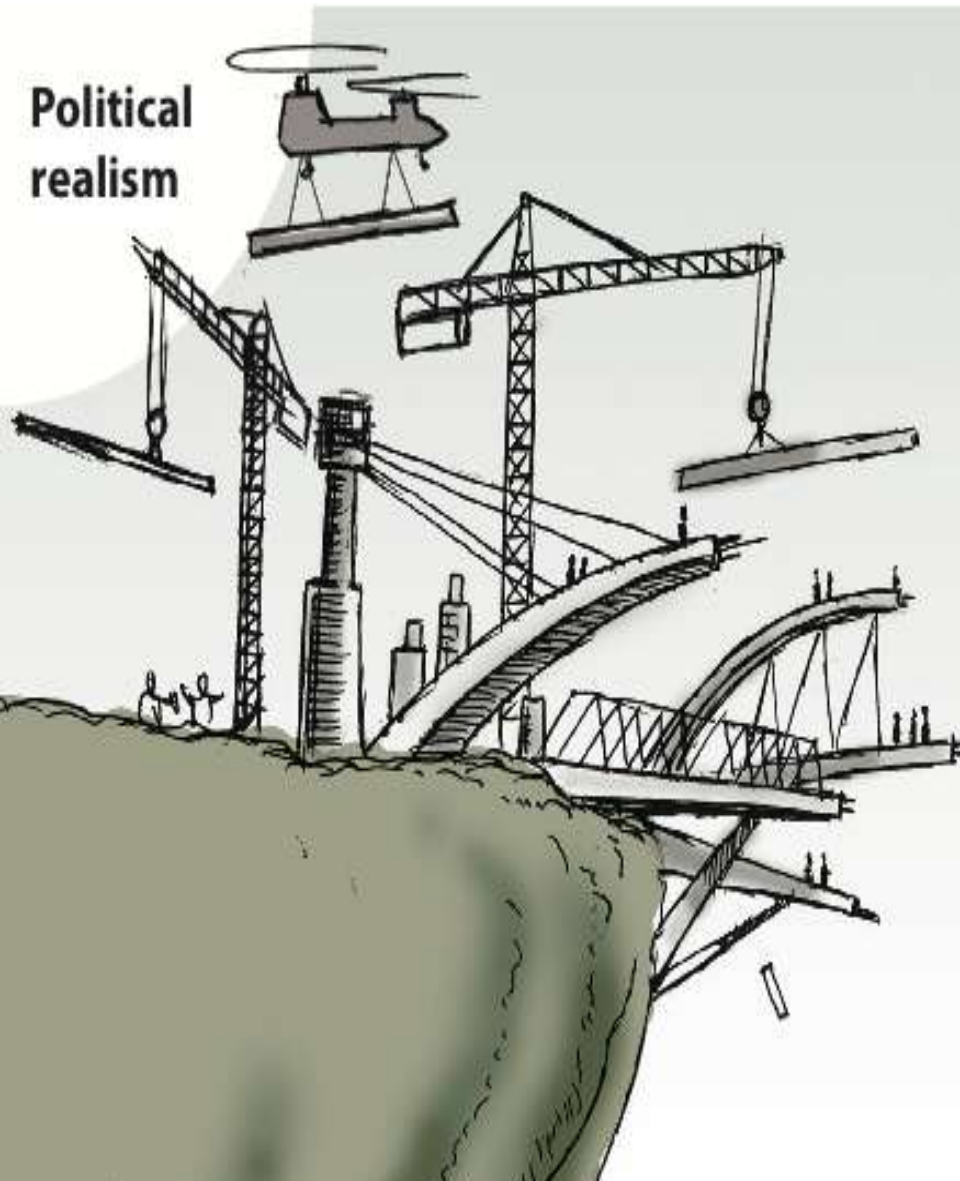


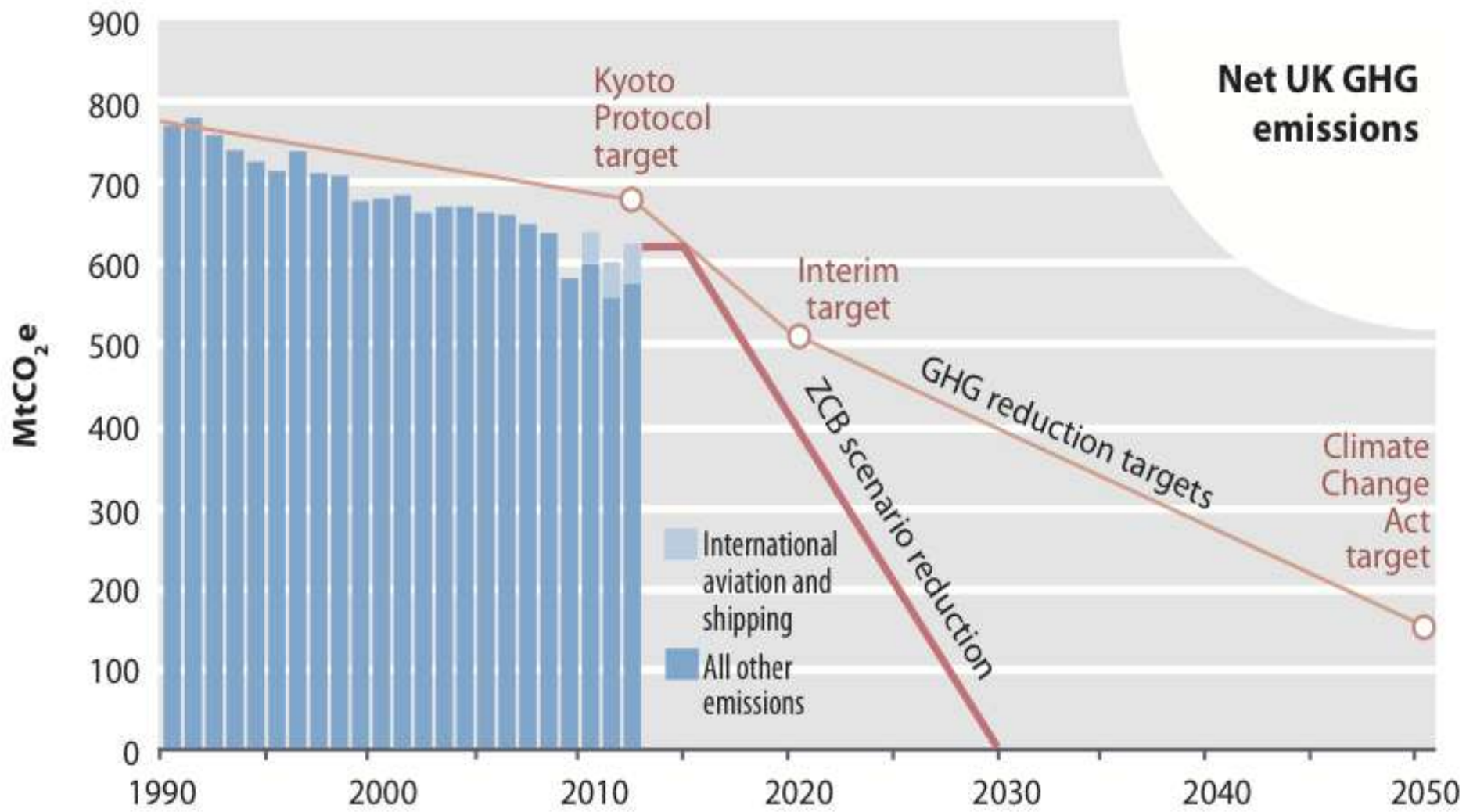
Centre for Alternative Technology
Canolfan y Dechnoleg Amgen

ZERO CARBON BRITAIN

Rethinking the Future



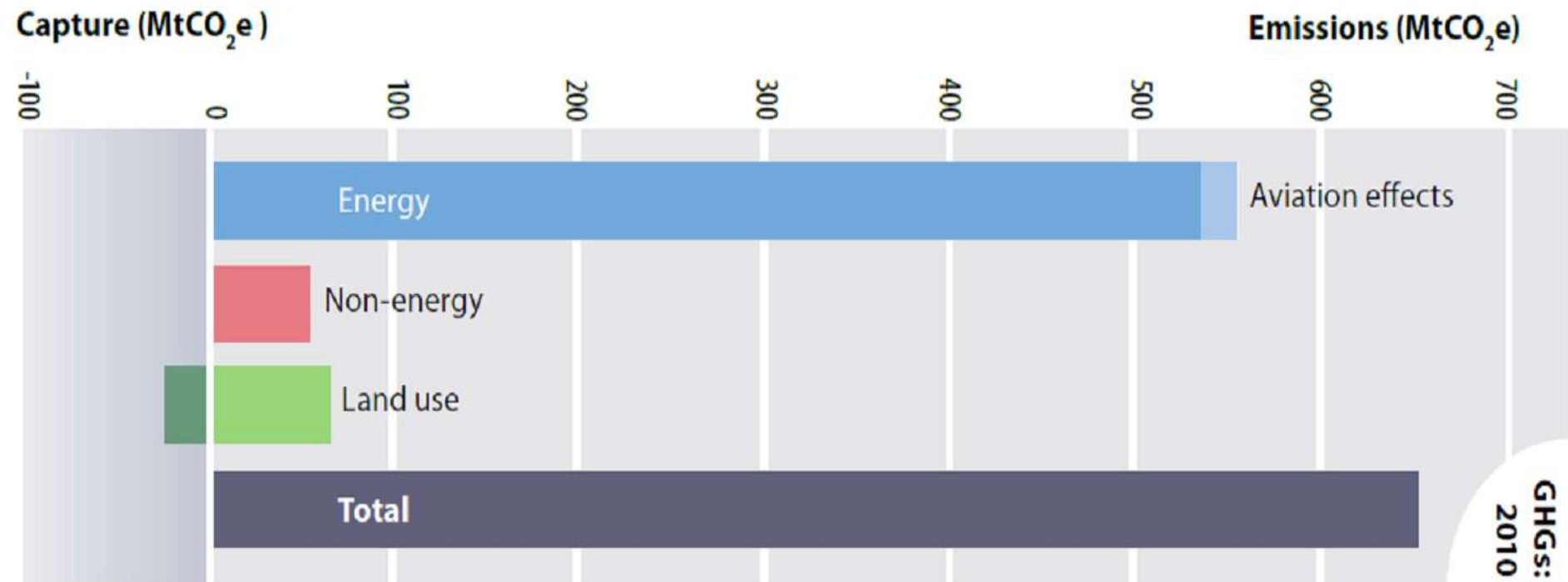




ZCB shows that UK greenhouse gas emissions can be reduced to net zero.

- Without relying on future technology.
- Without major impacts on quality of life.

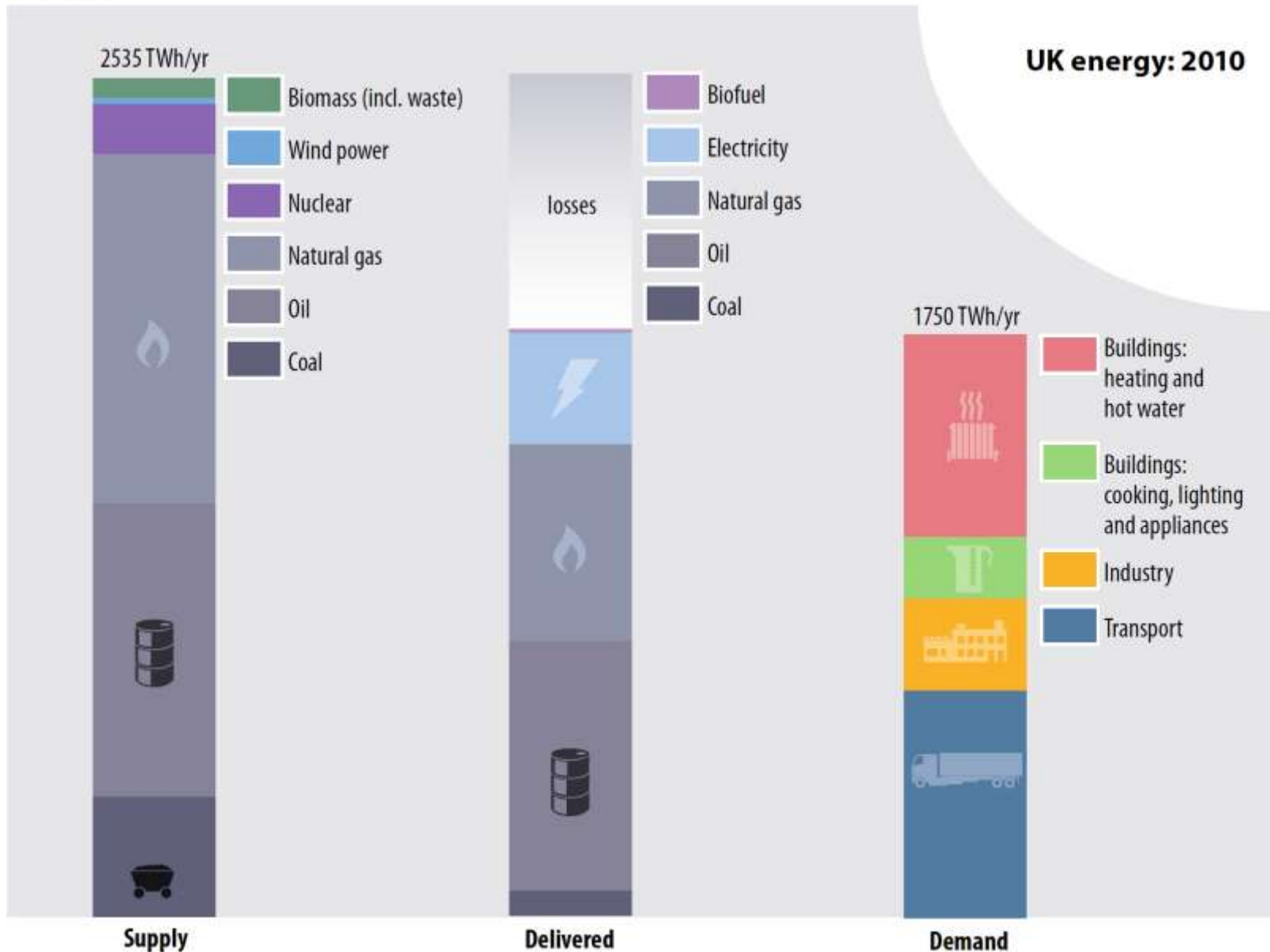
How?

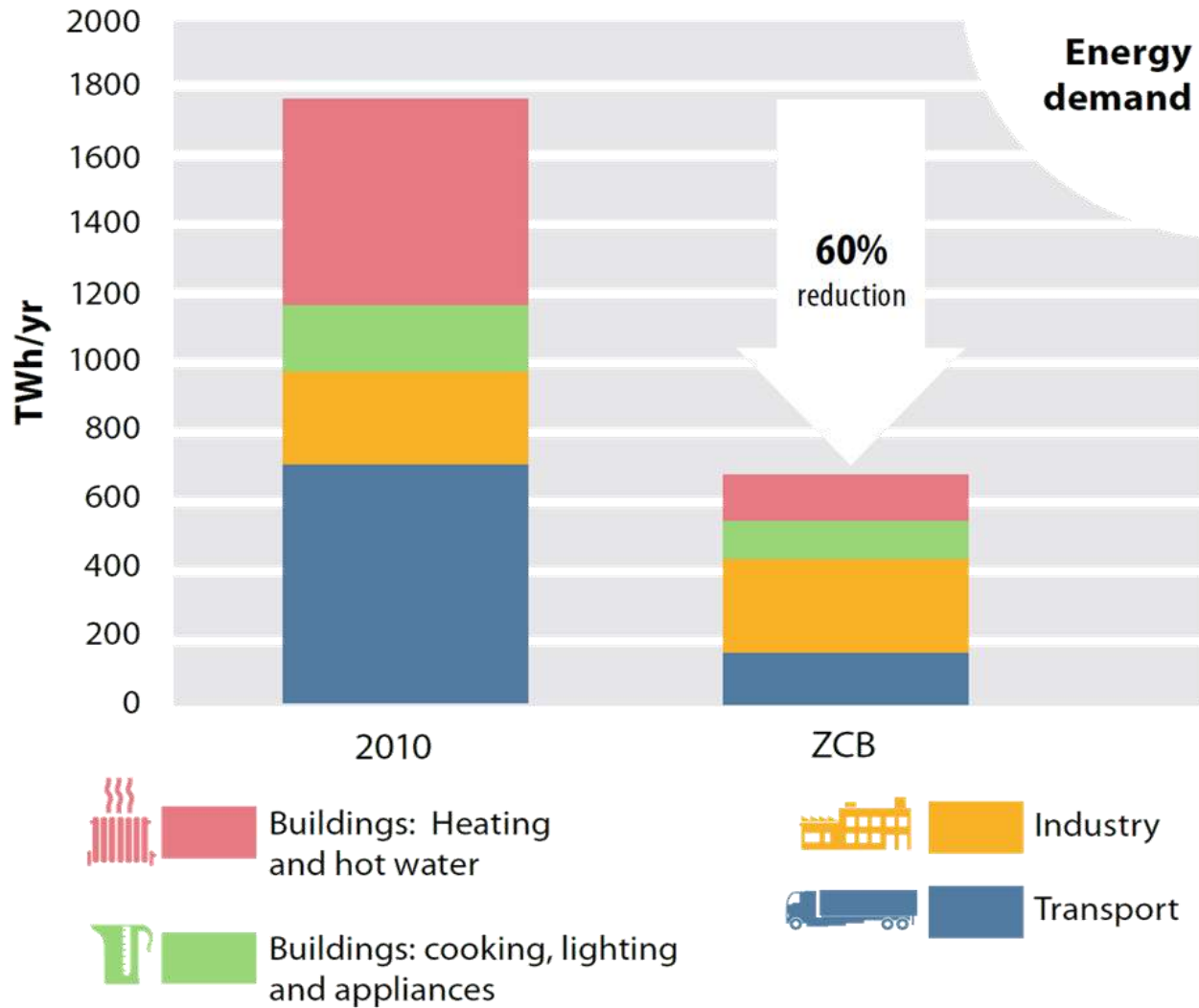


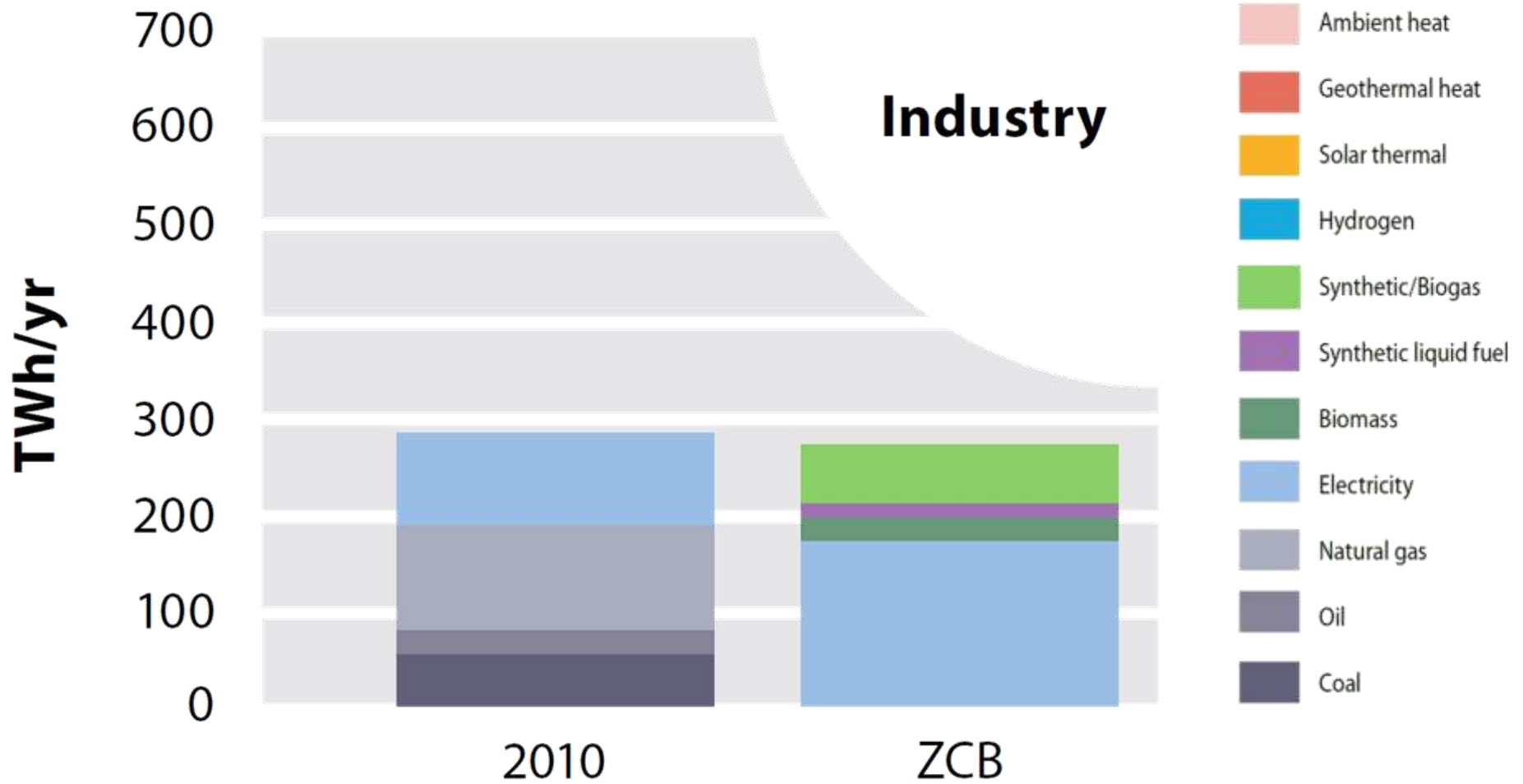
Energy in ZCB

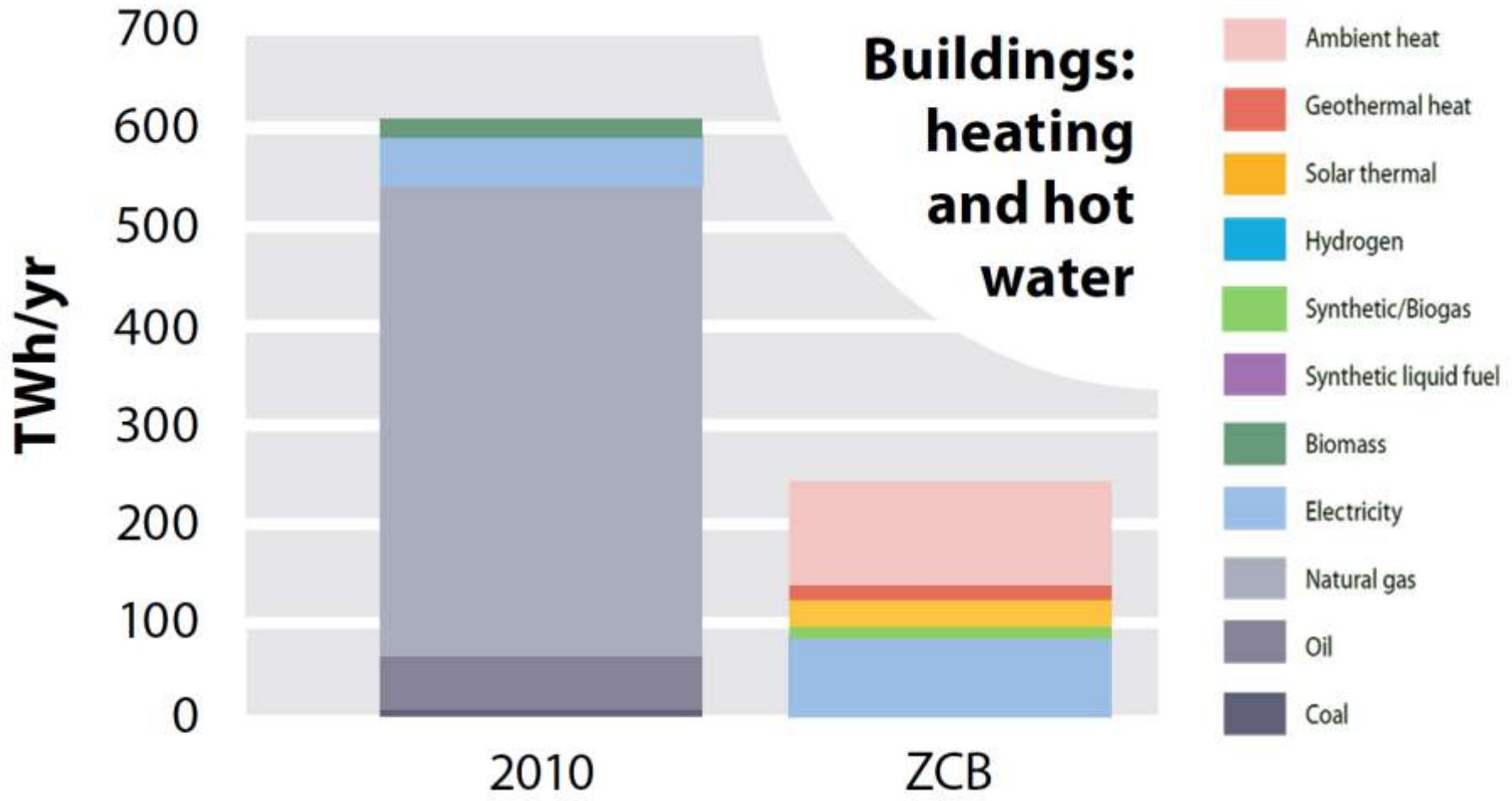


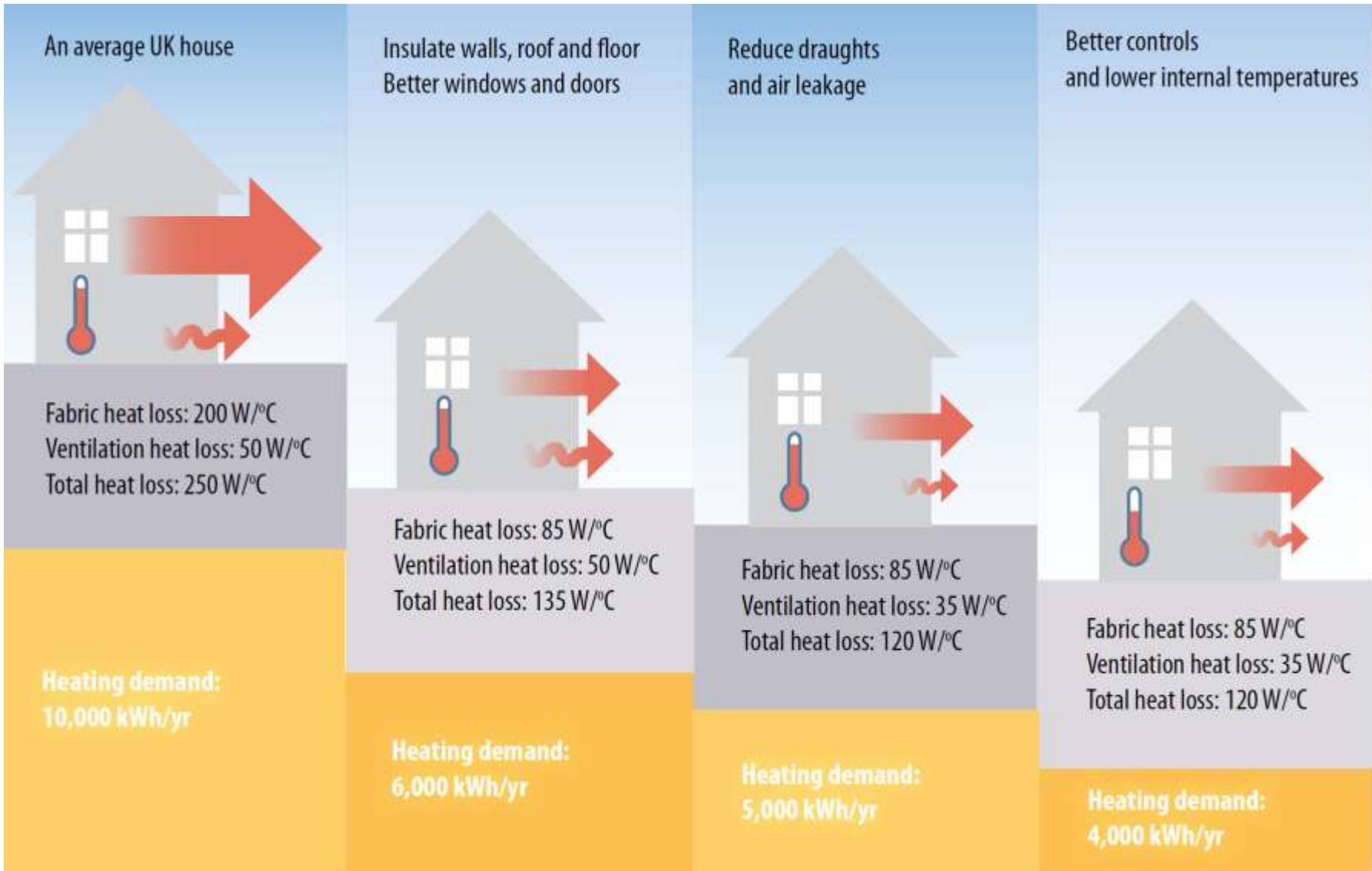
UK energy: 2010

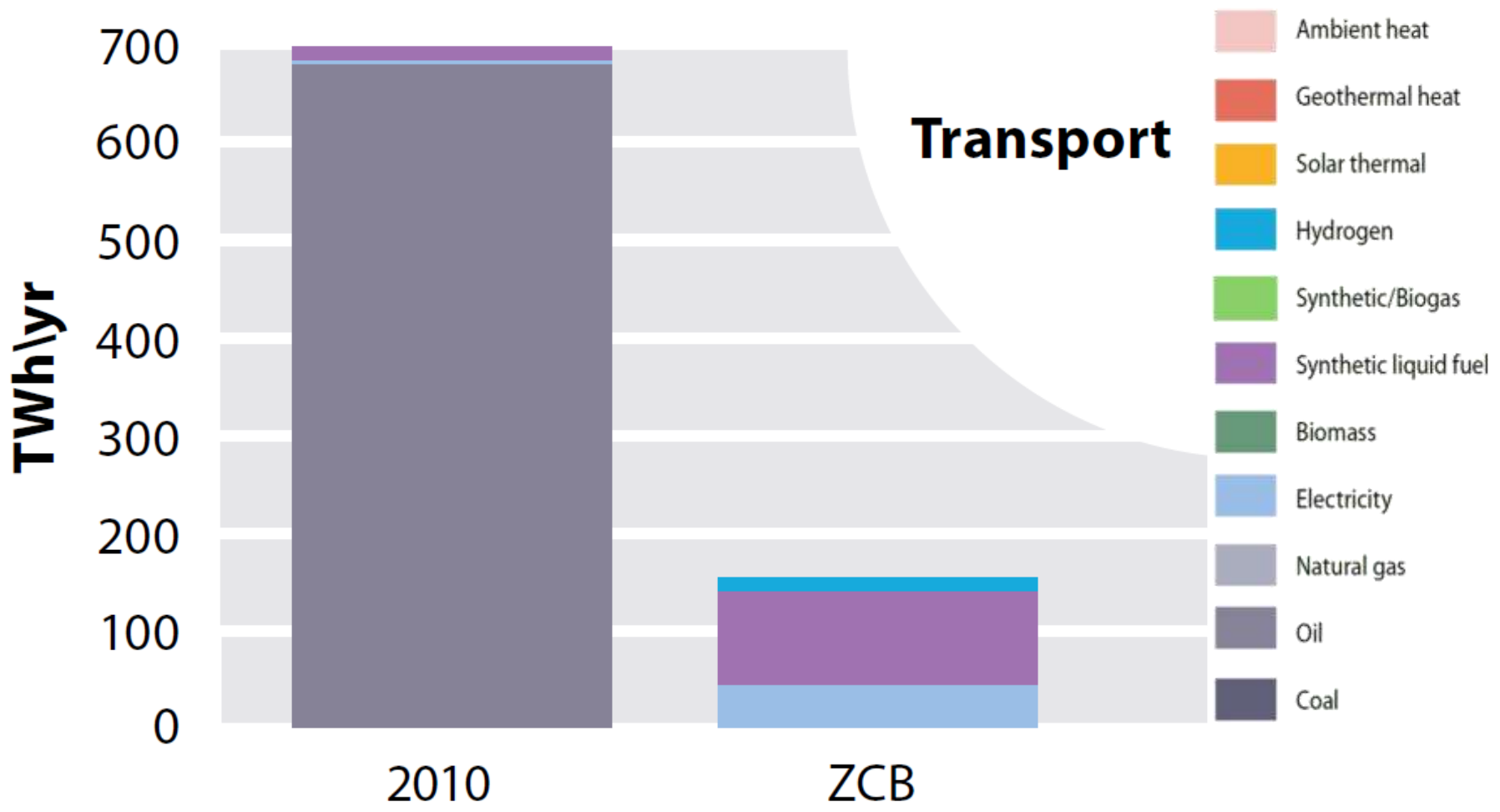


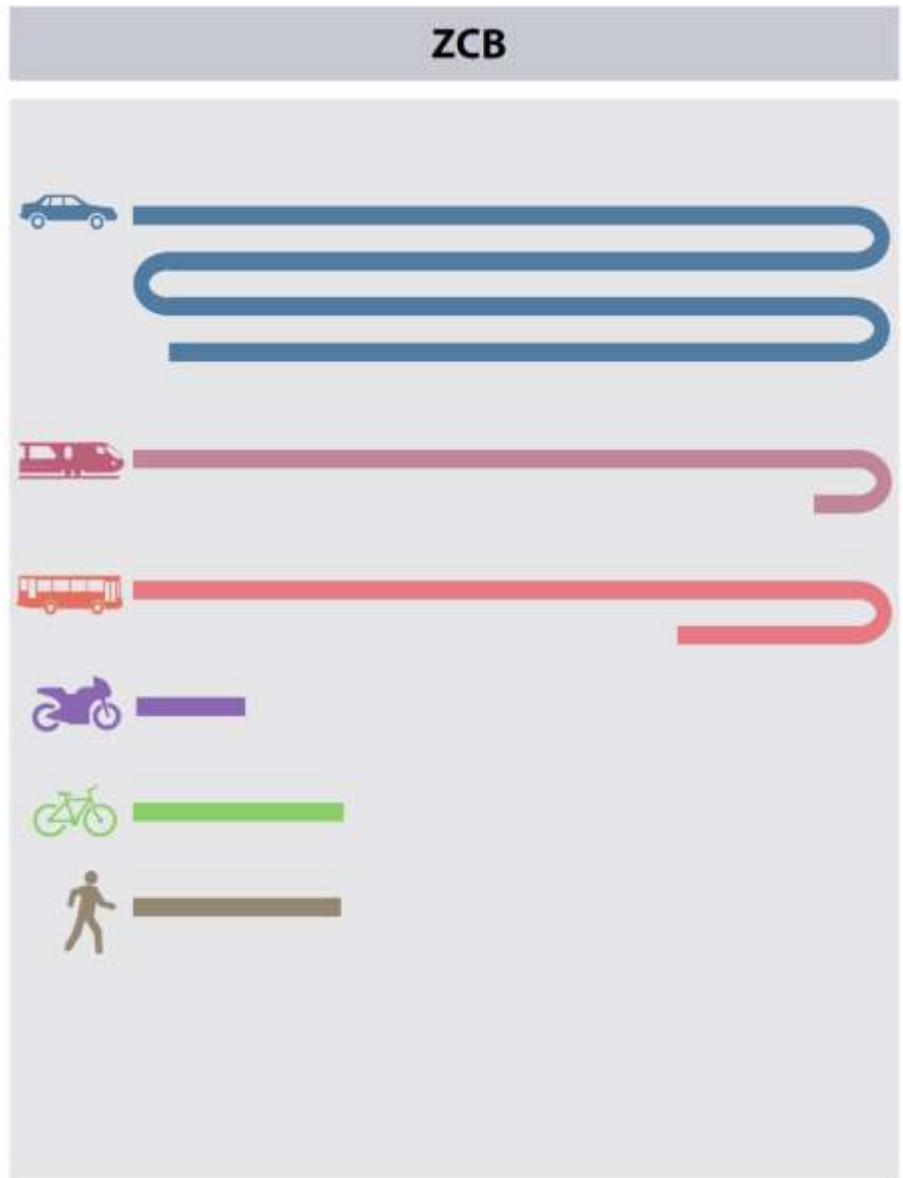
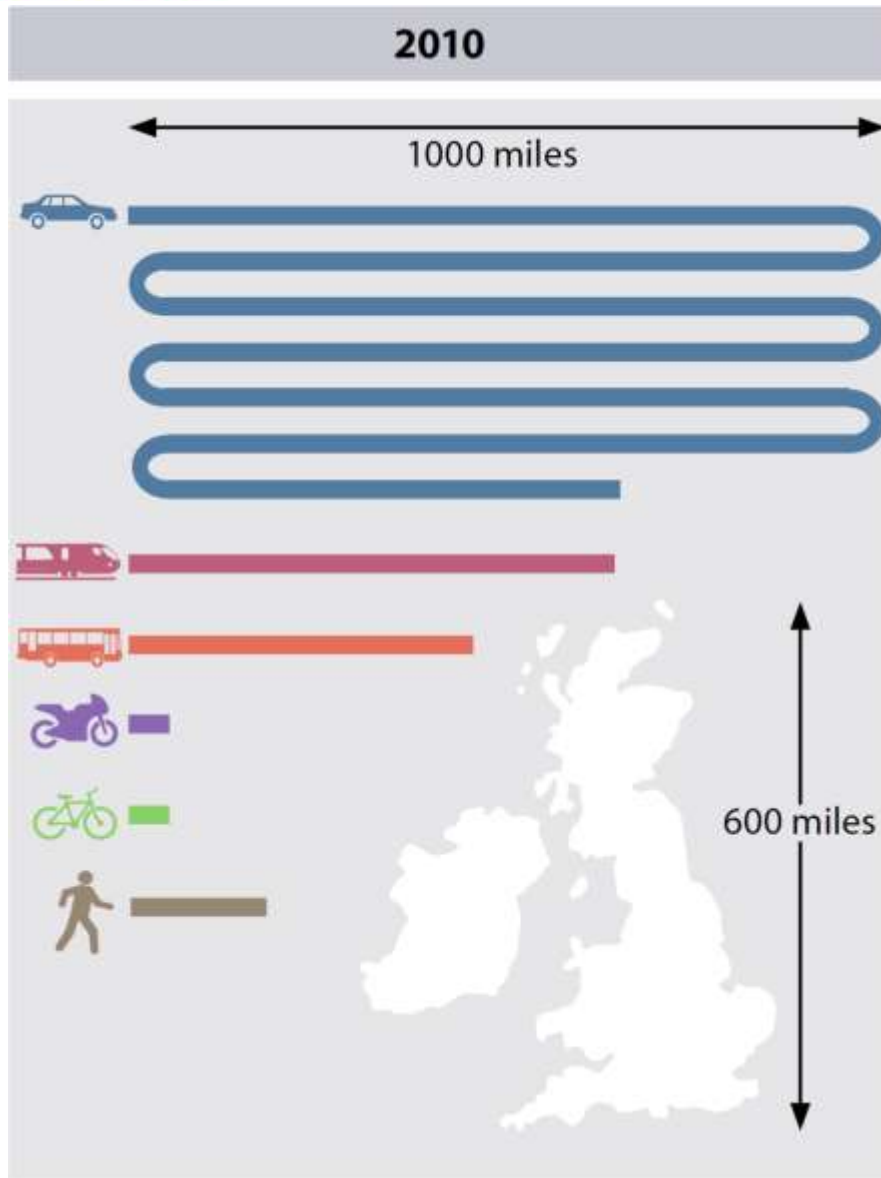


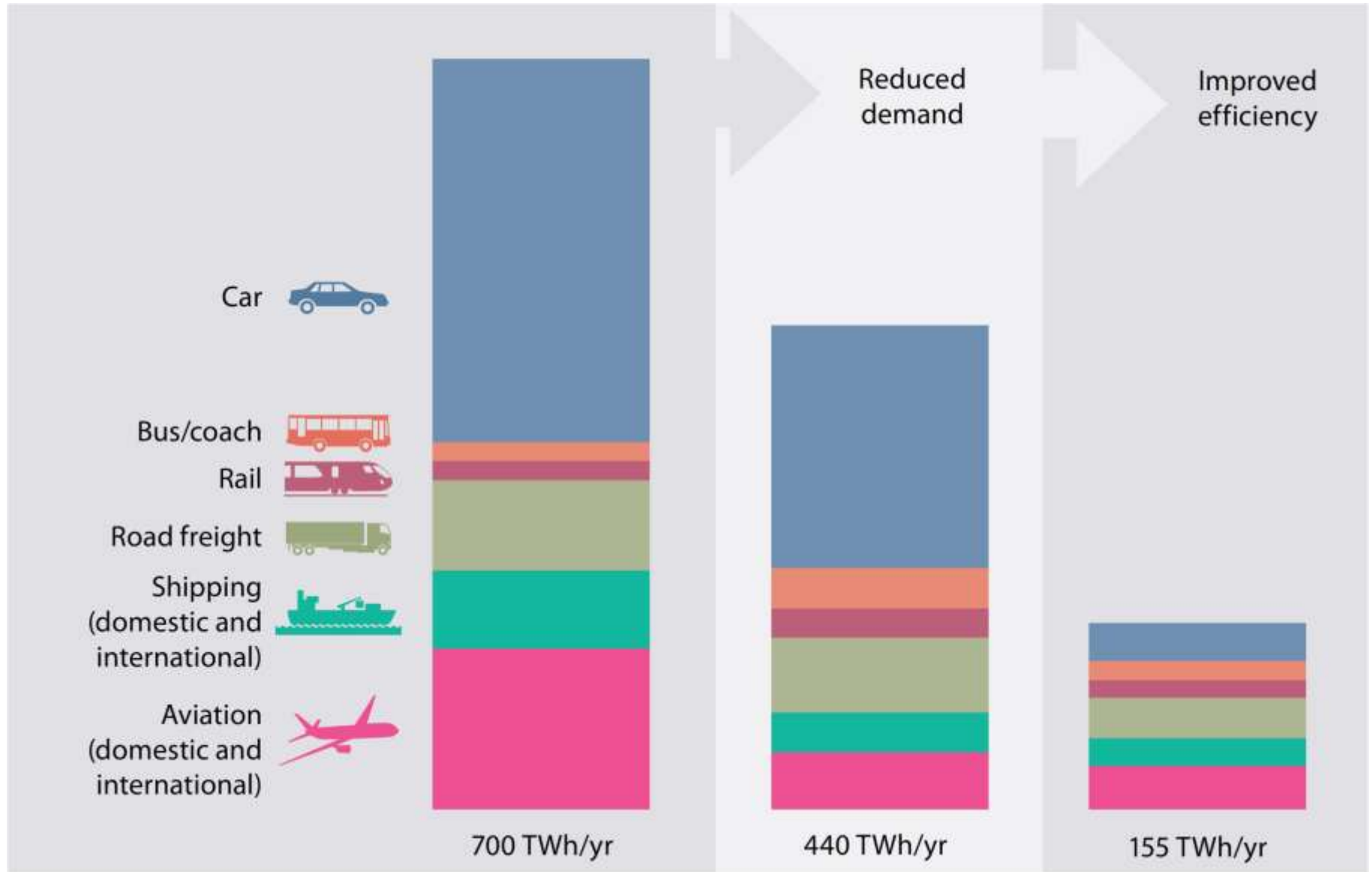


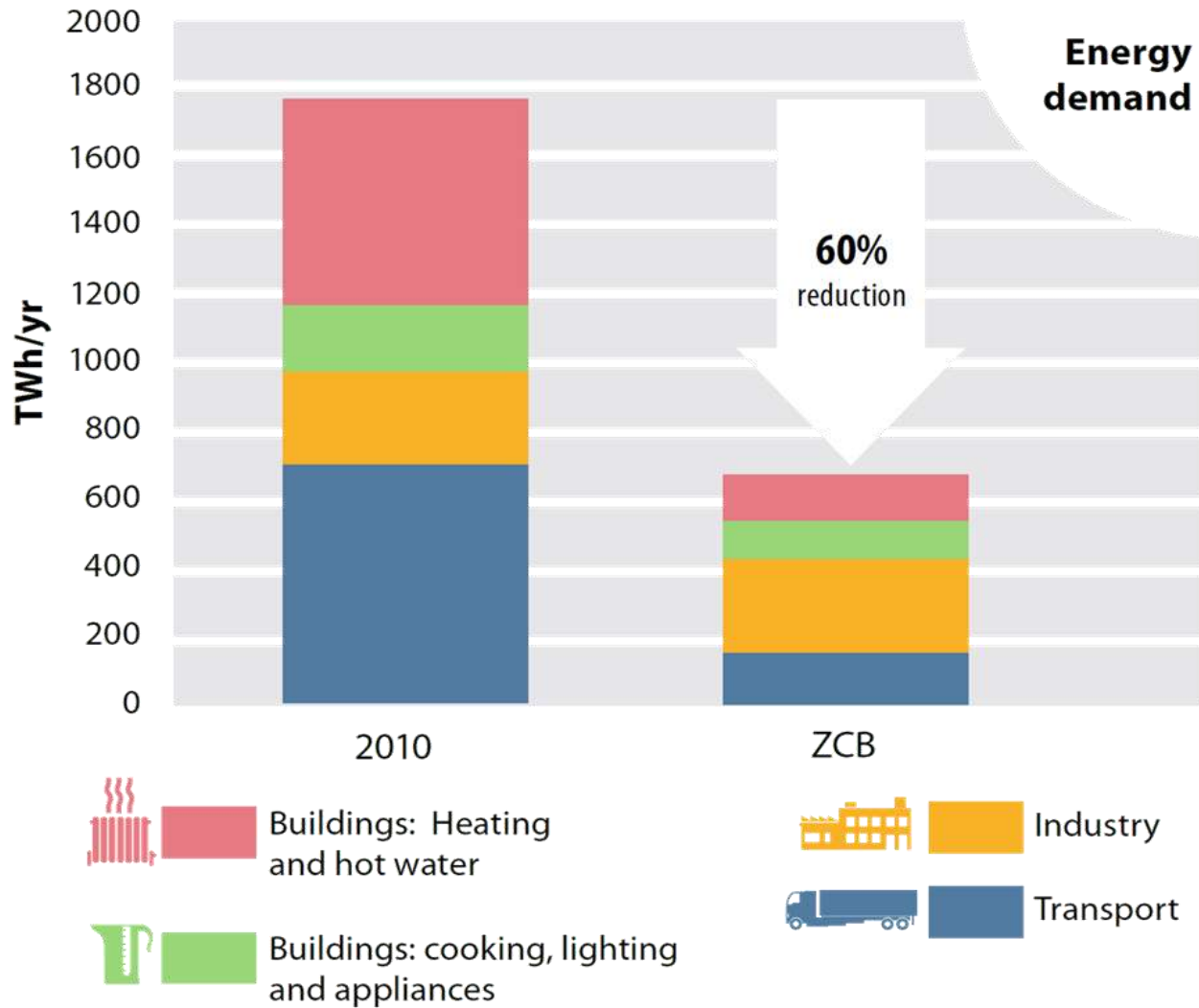


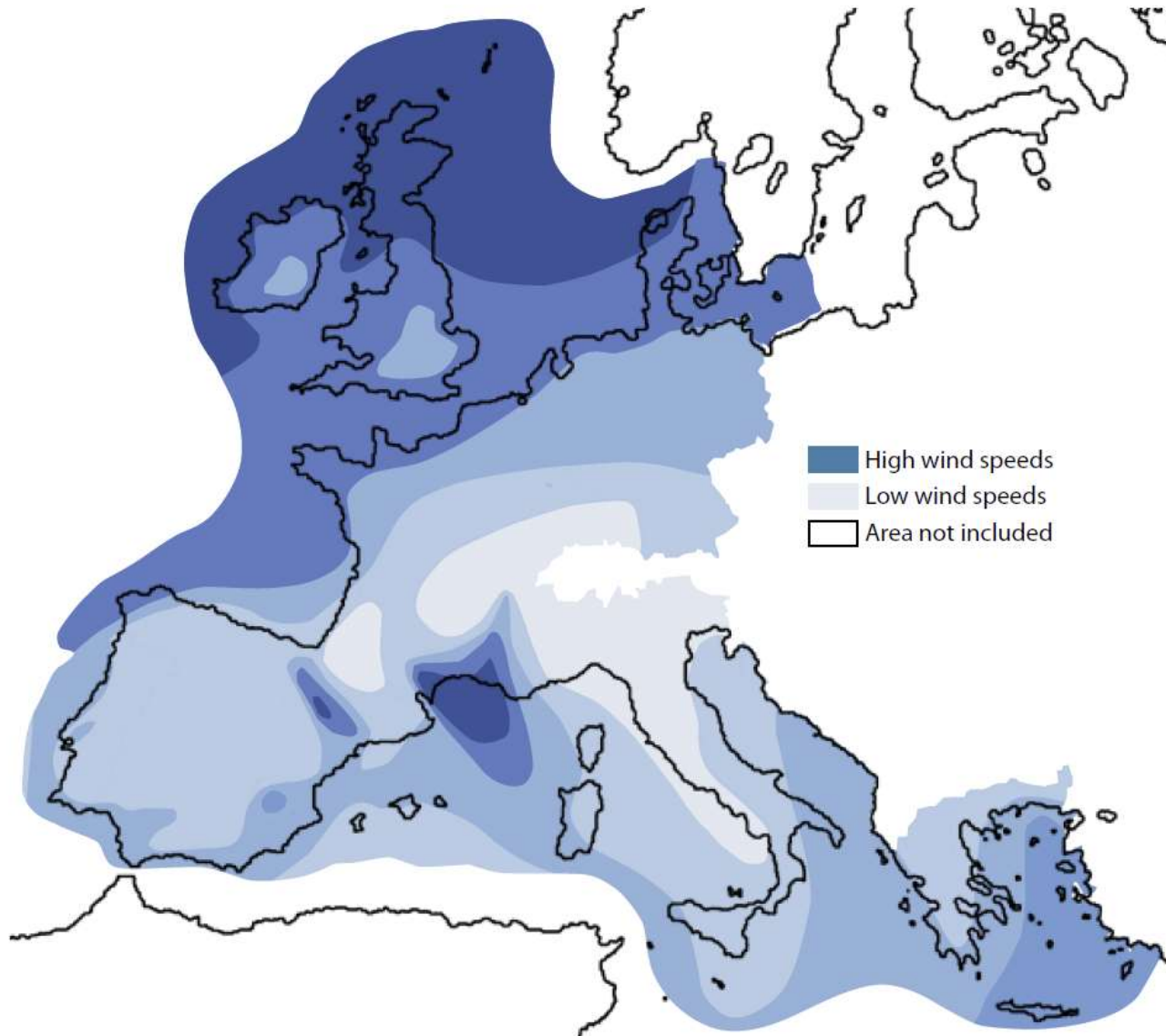




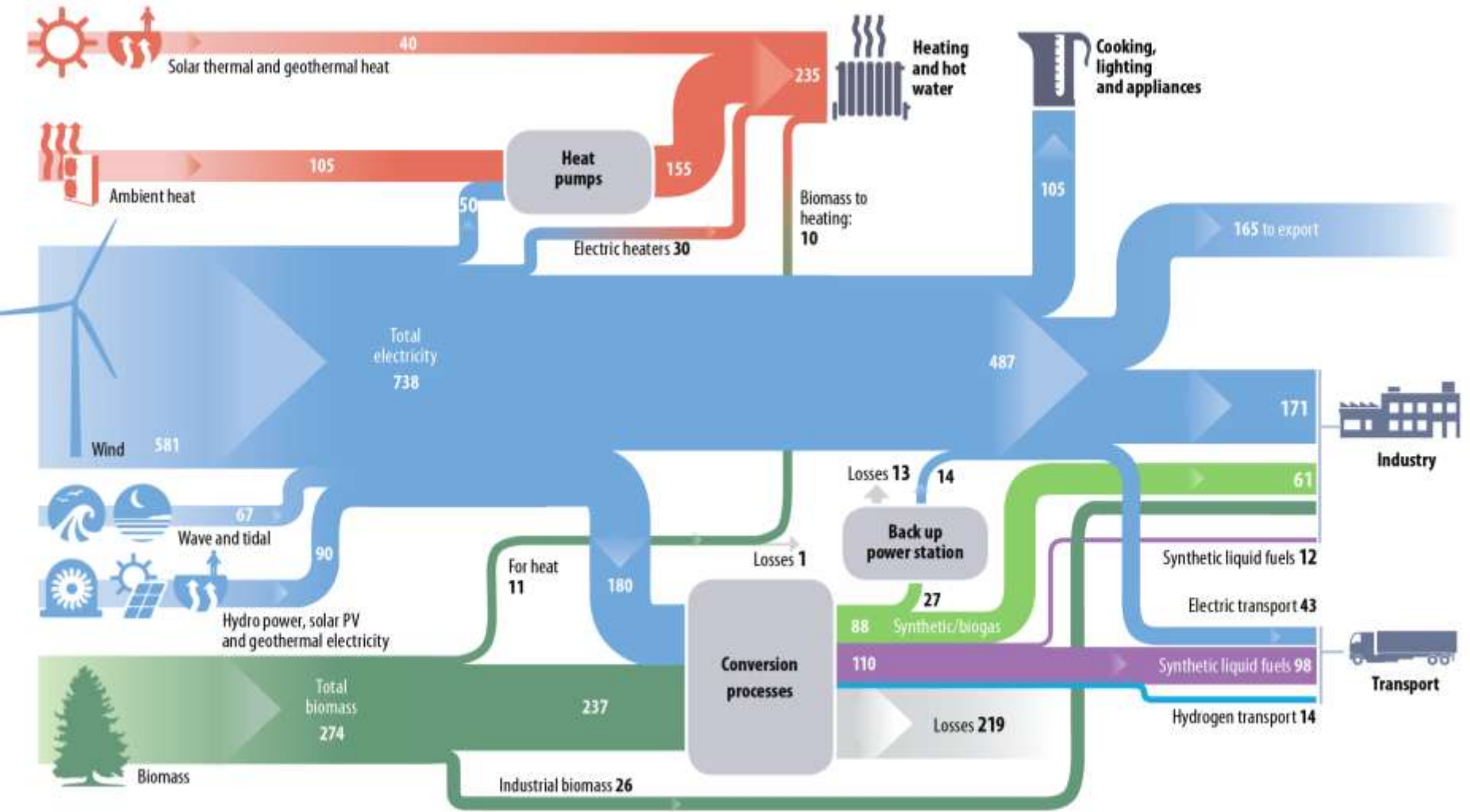






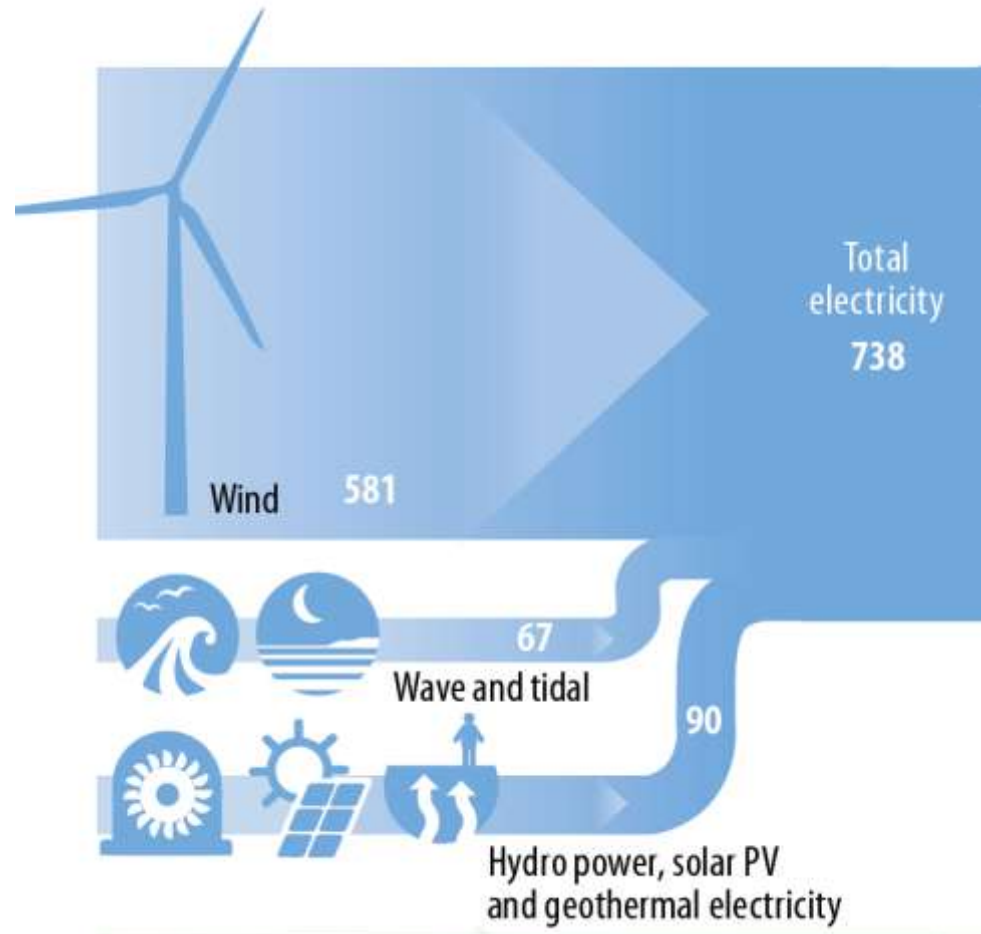


ZERO CARBON BRITAIN



Key Question:

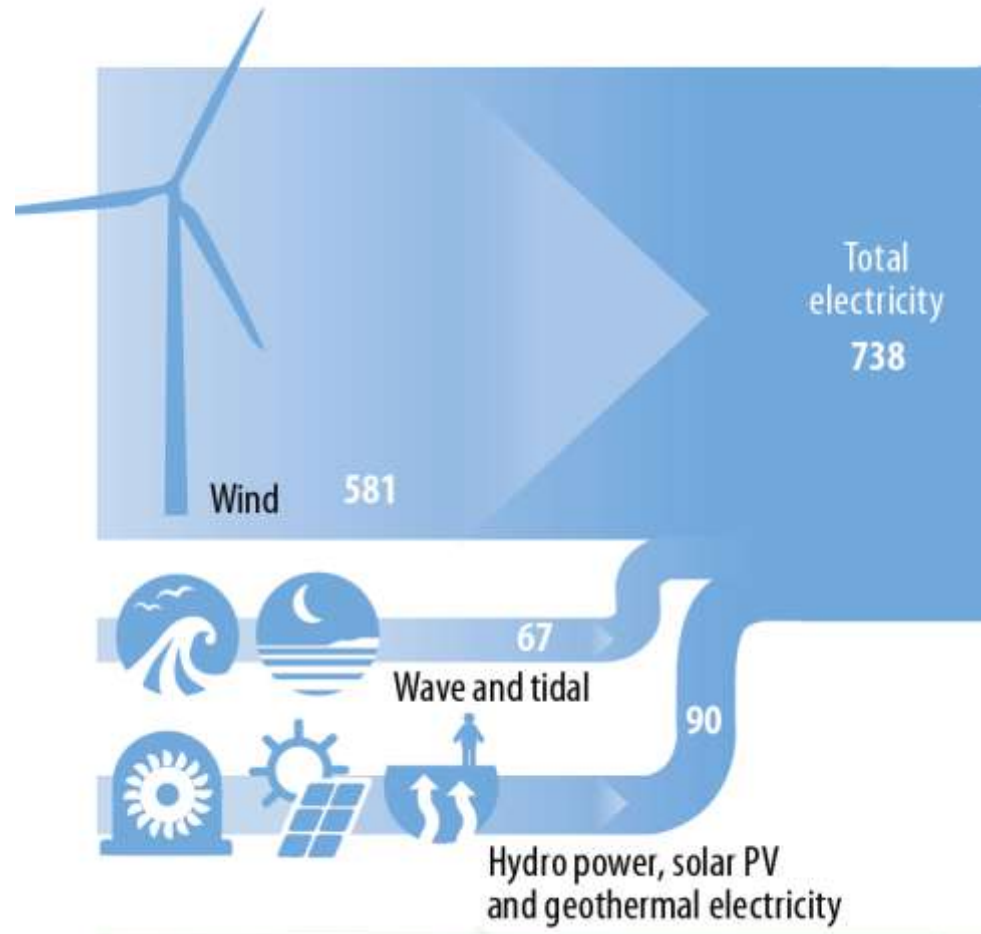
Can we
“keep the
lights on”?

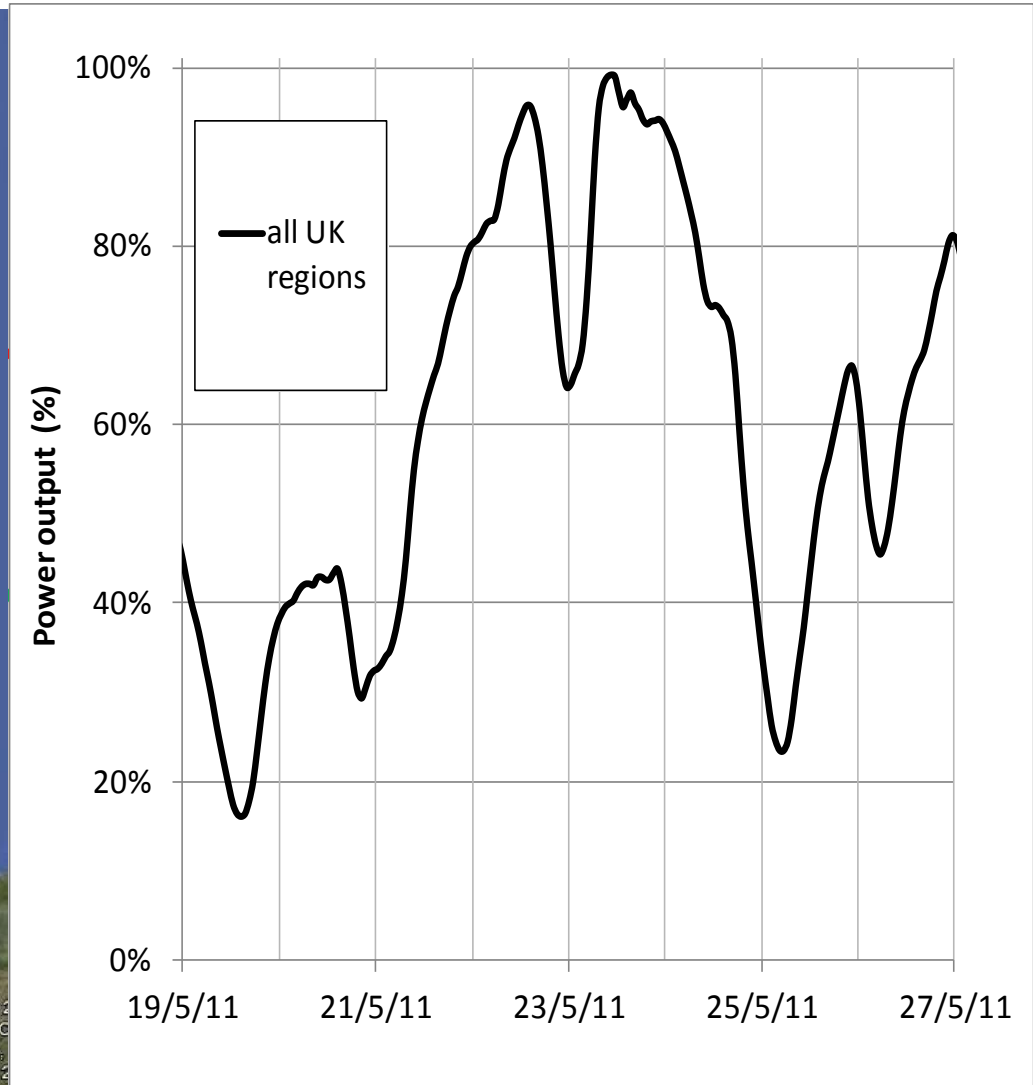
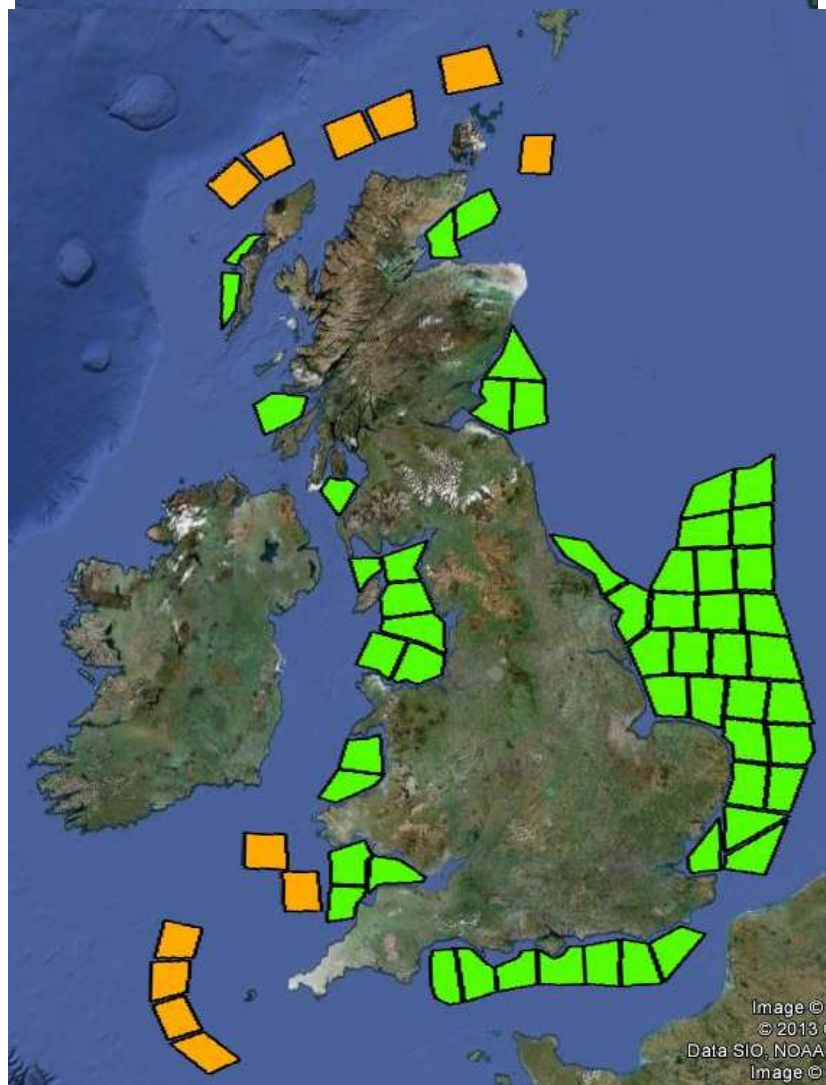


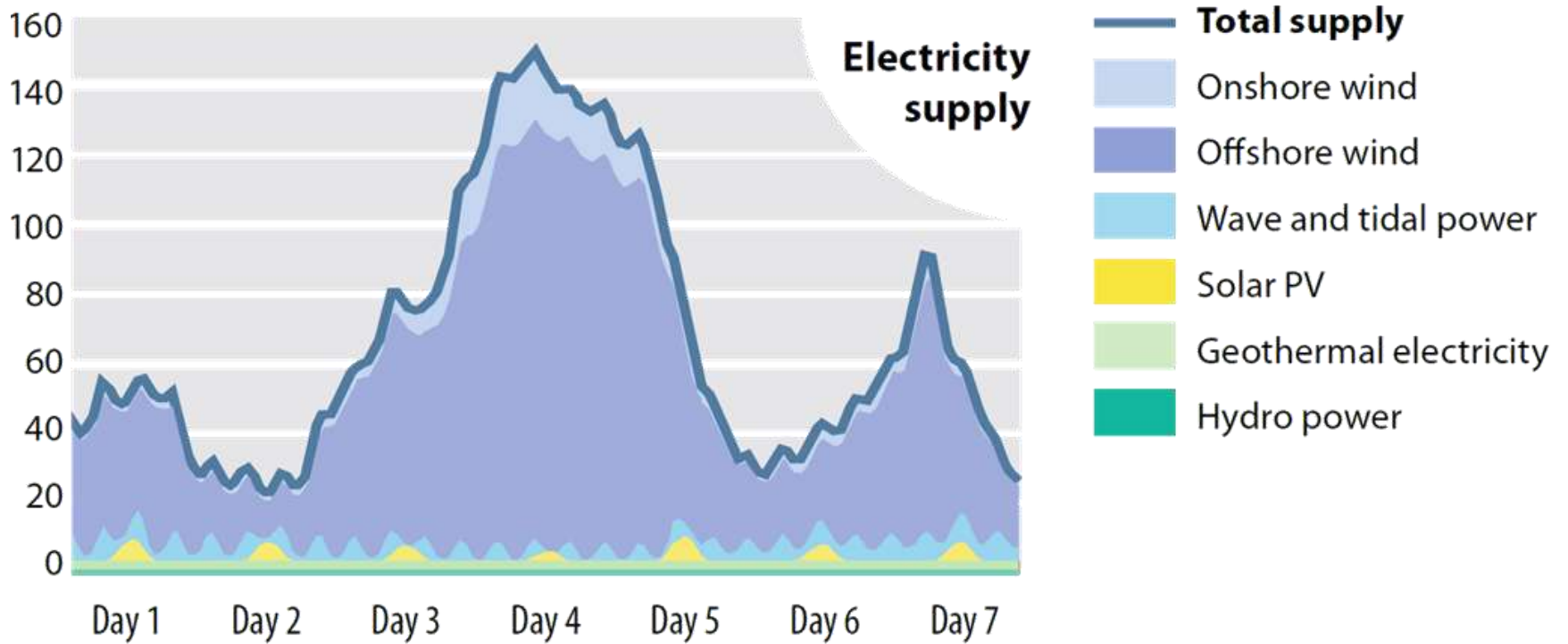
The ZCB Energy Model:

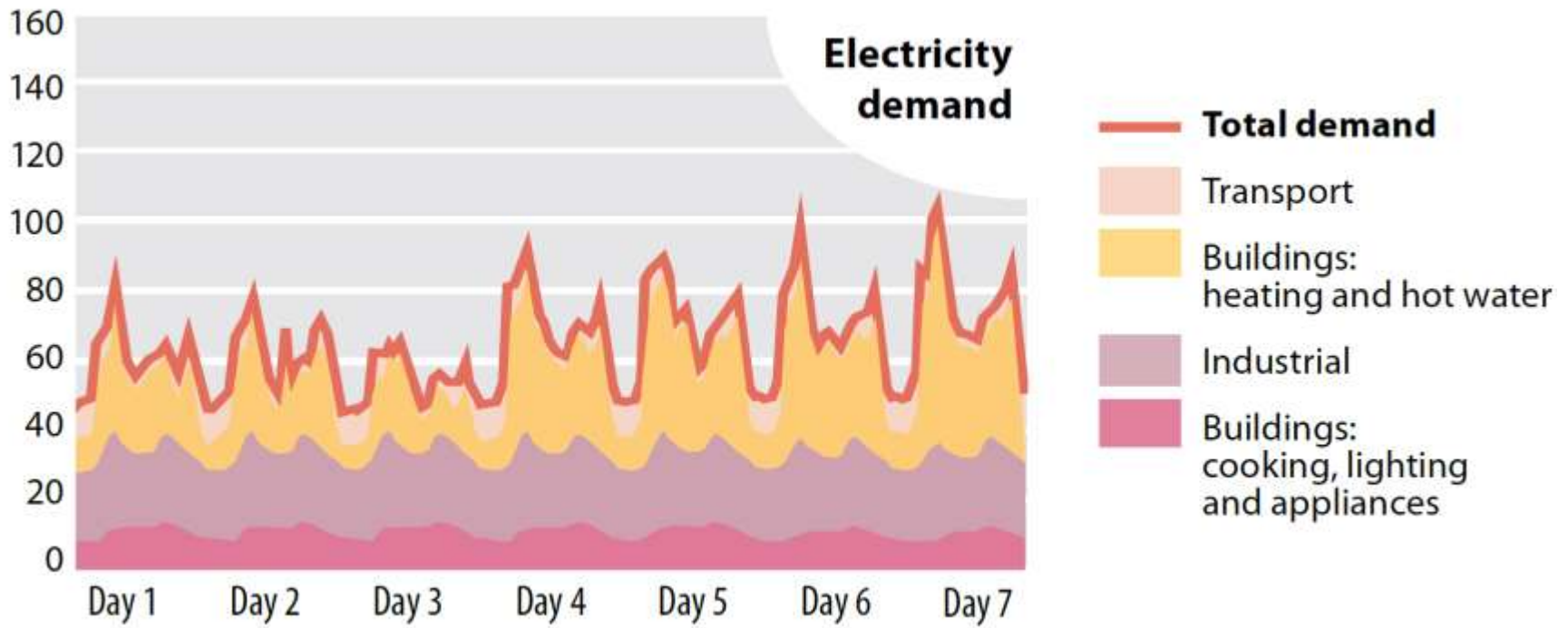
**Based on ten
years of
real-world
hourly data**

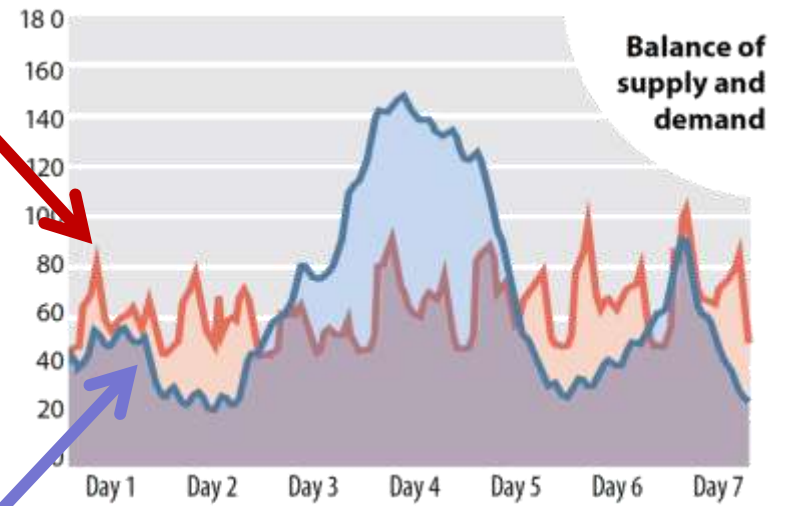
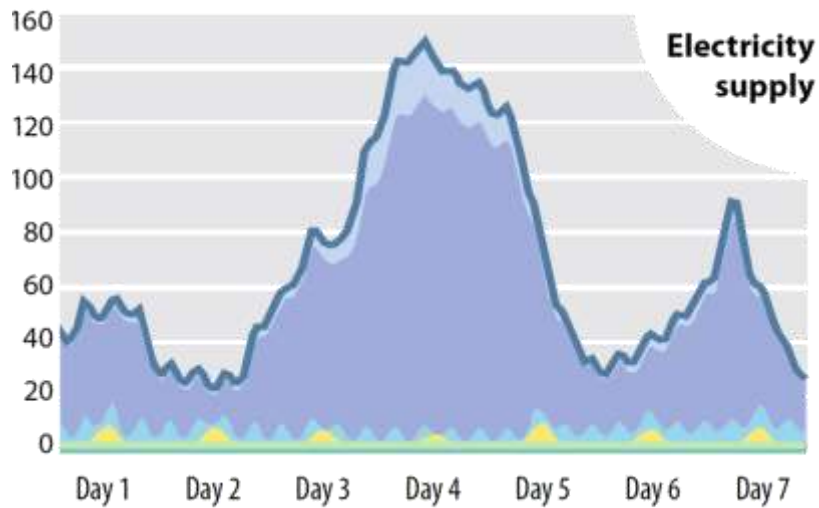
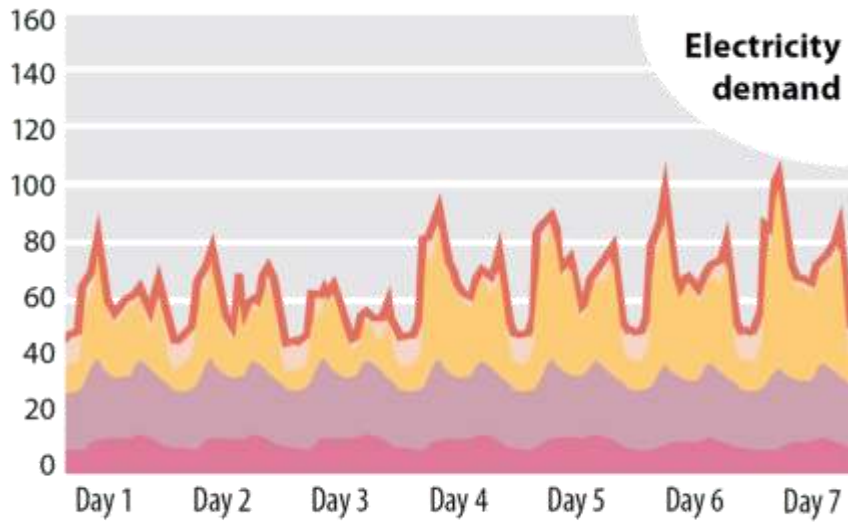
**2002 - 2011
87,648 hours**



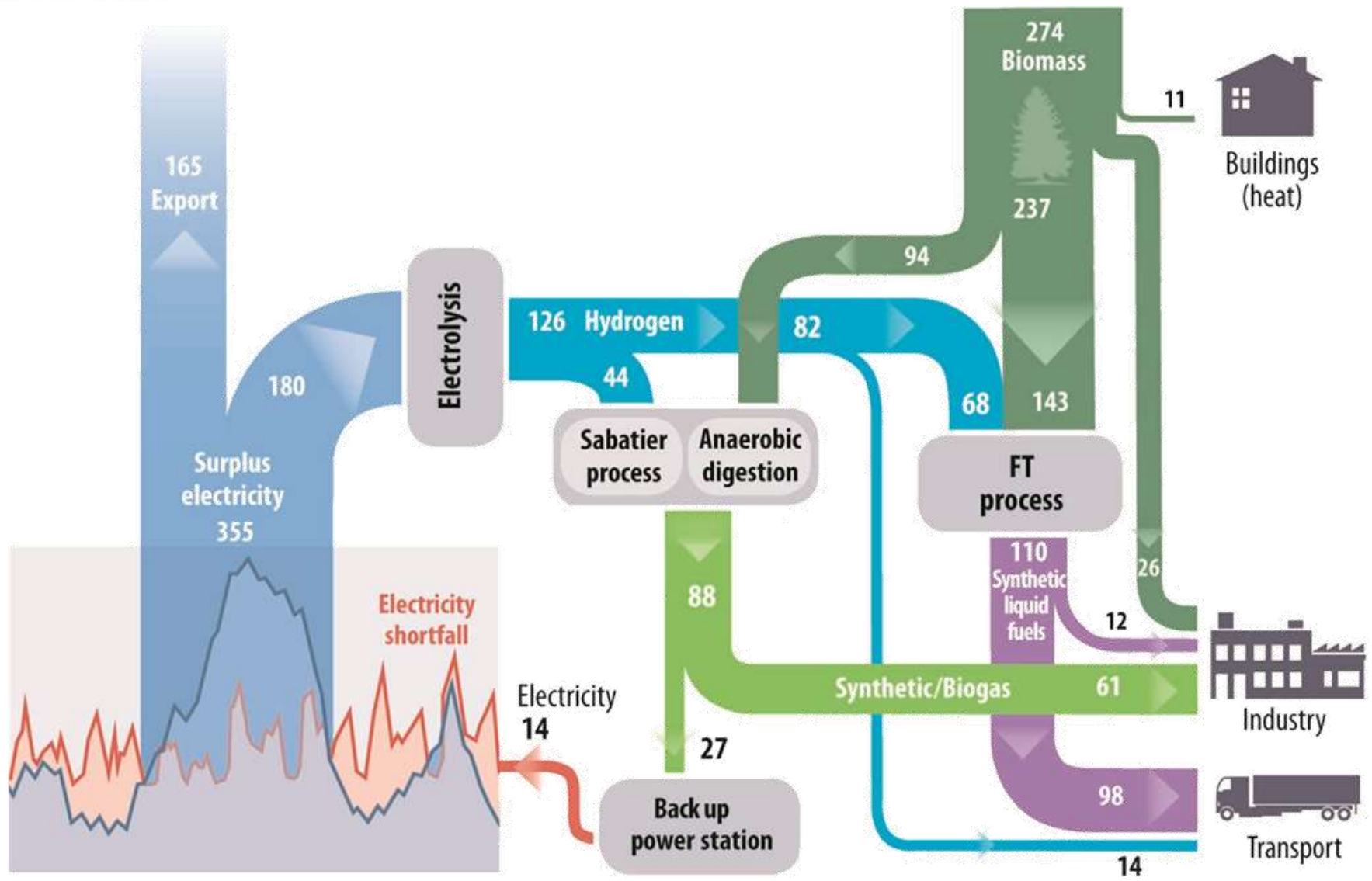






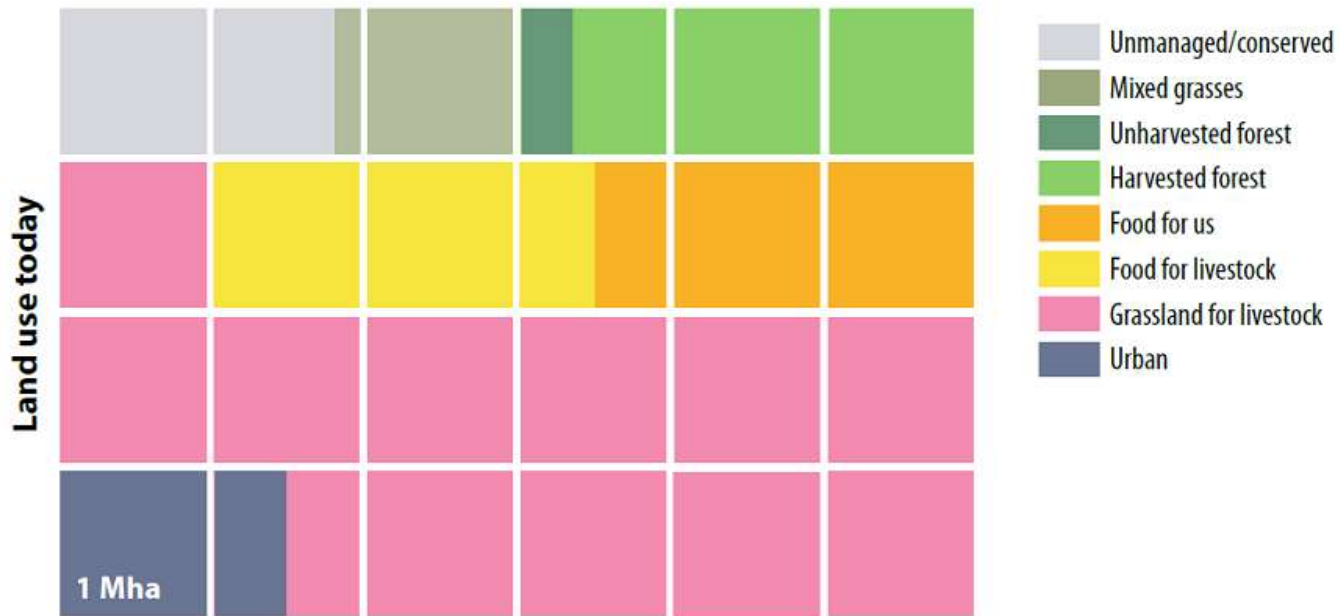


- Direct match
- Surplus
- Shortfall



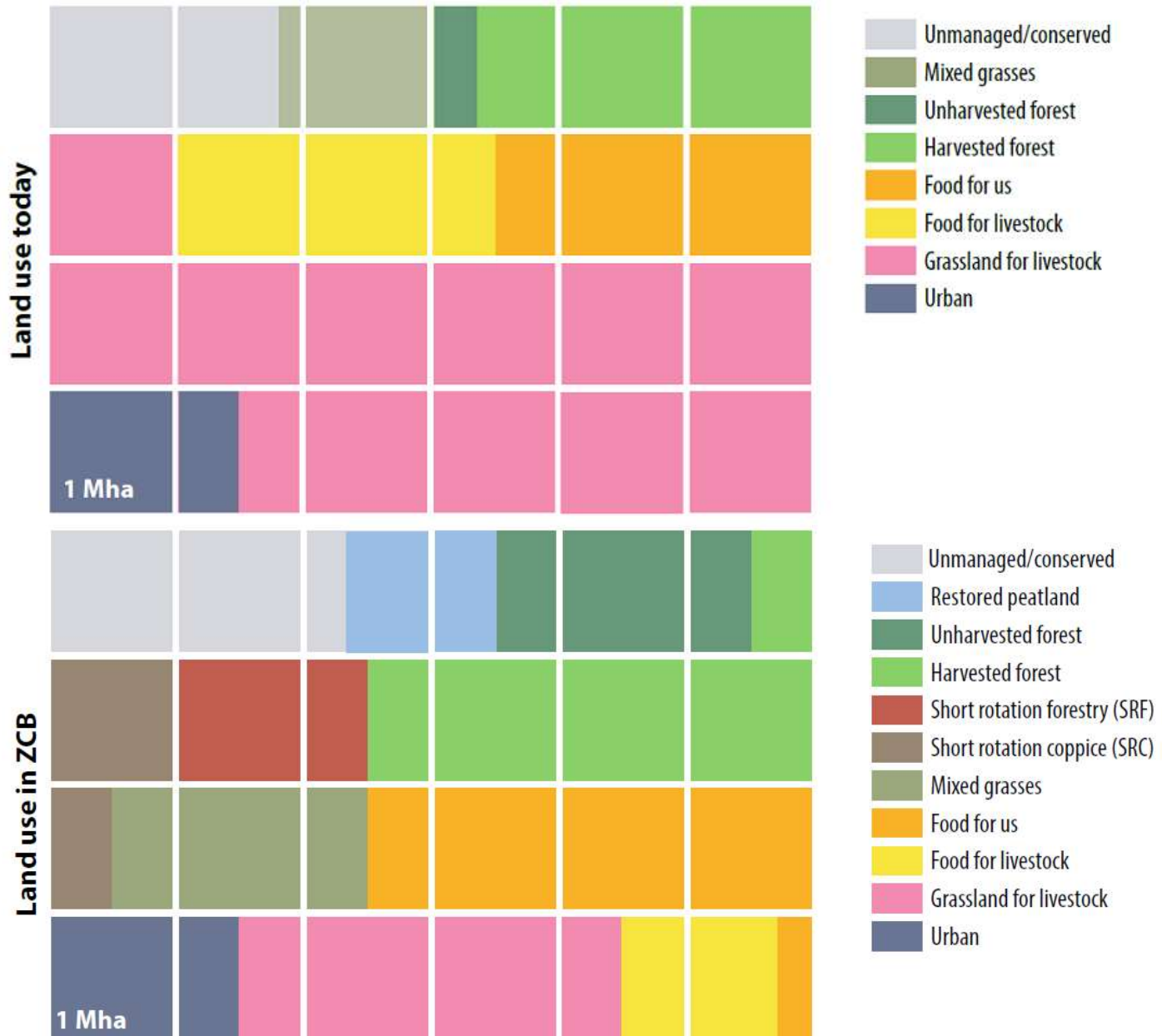
Land use in ZCB

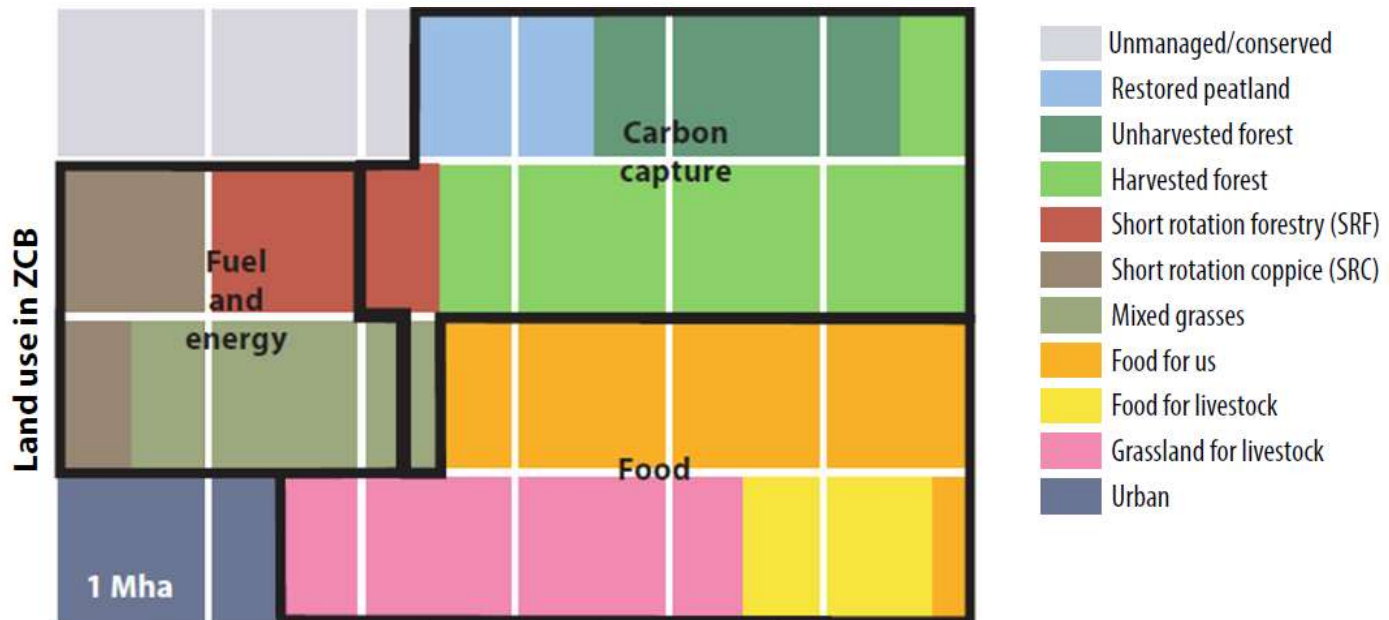
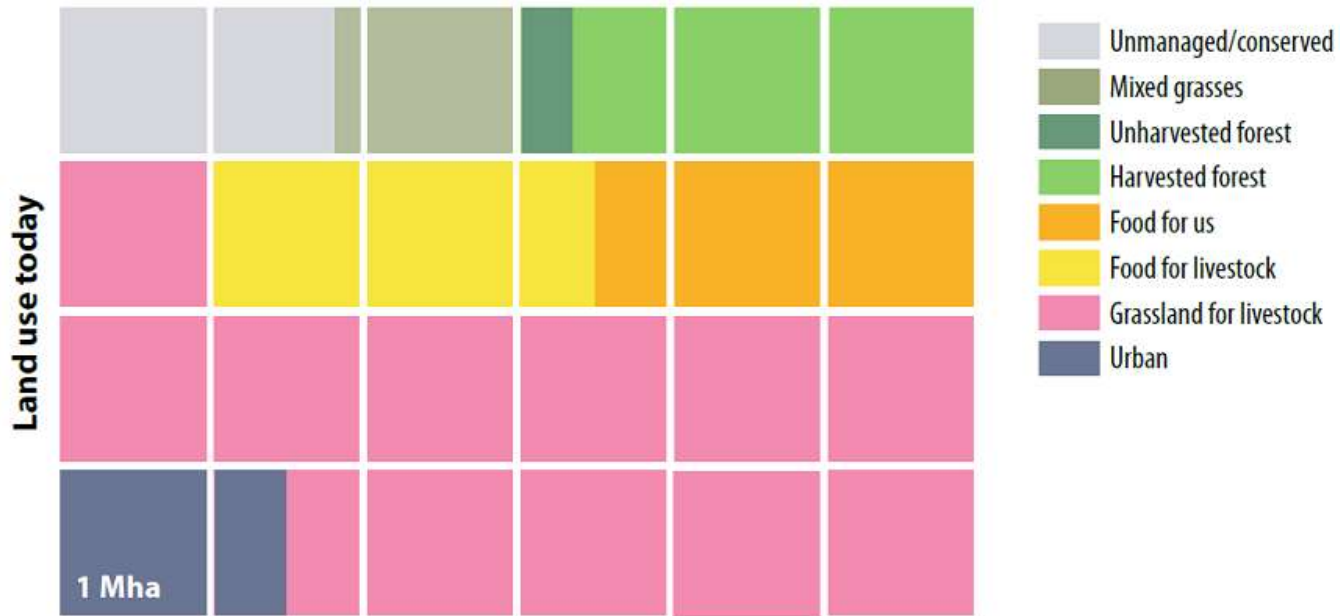




Land use today

- 65-70% = food production/agriculture (despite 42% imports).
 - 85% of agricultural land = livestock.
- About 12% = forest (European average = 37%).





Land use in ZCB



1. Food



2. Energy/fuel



3. Carbon capture

1. Food

- About a quarter of today's grazing grassland is needed.
- All cropland still used, but allocated differently.
- Imports decreased from 42% to 17%.

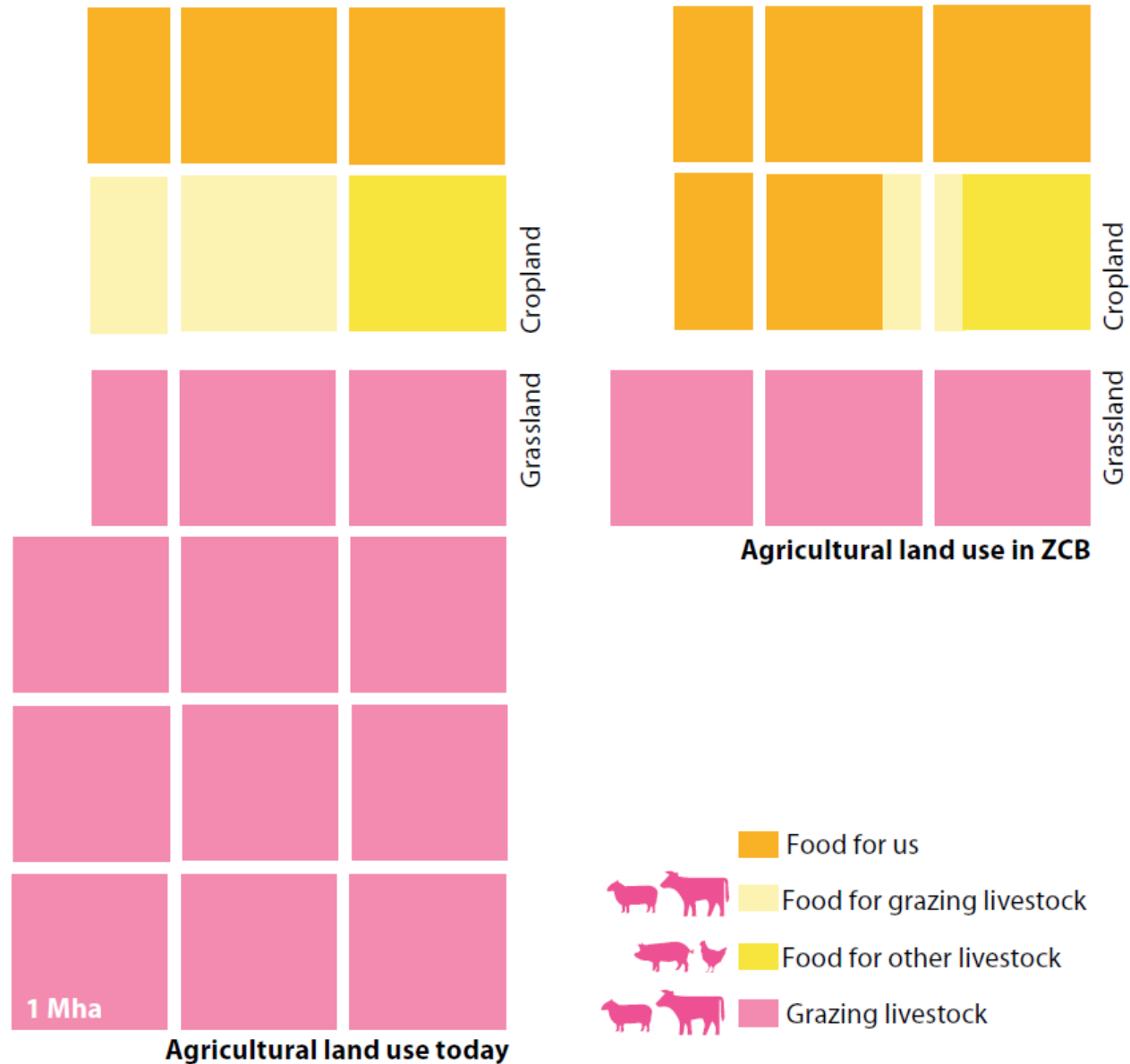


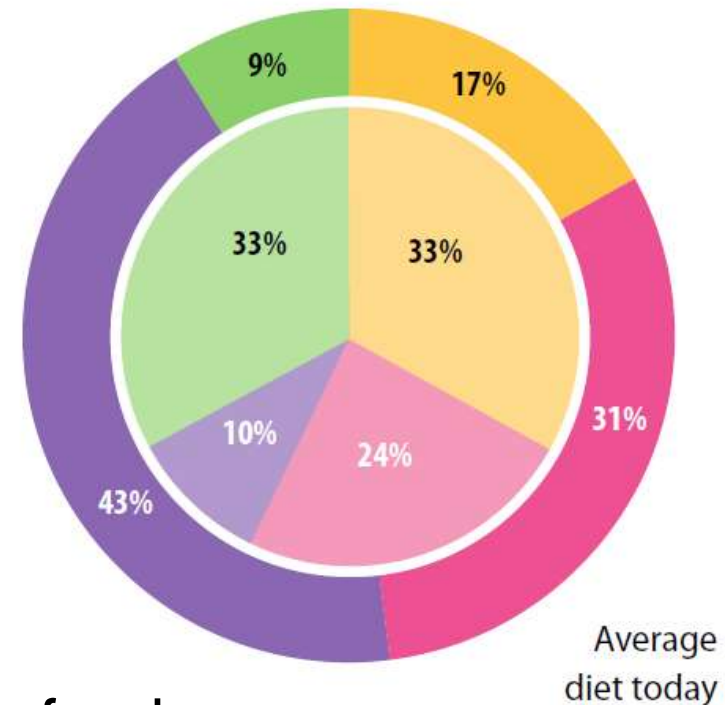
Figure 3.28: The area of cropland and grassland used for agriculture today (DEFRA, 2012) and in our scenario.

Current average UK diet

64% of adults overweight/obese
(Bates et al, 2011).

71% of deaths in 2010 from diet-
related disease (WHO, 2013).

- **Too much food.**
- **An unhealthy balance.**
 - Too much HFSS and high protein foods.
 - Too little fruit, vegetables and cereals.
- **Waste (30% in Europe (FAO, 2011)).**



Agricultural GHG emissions today

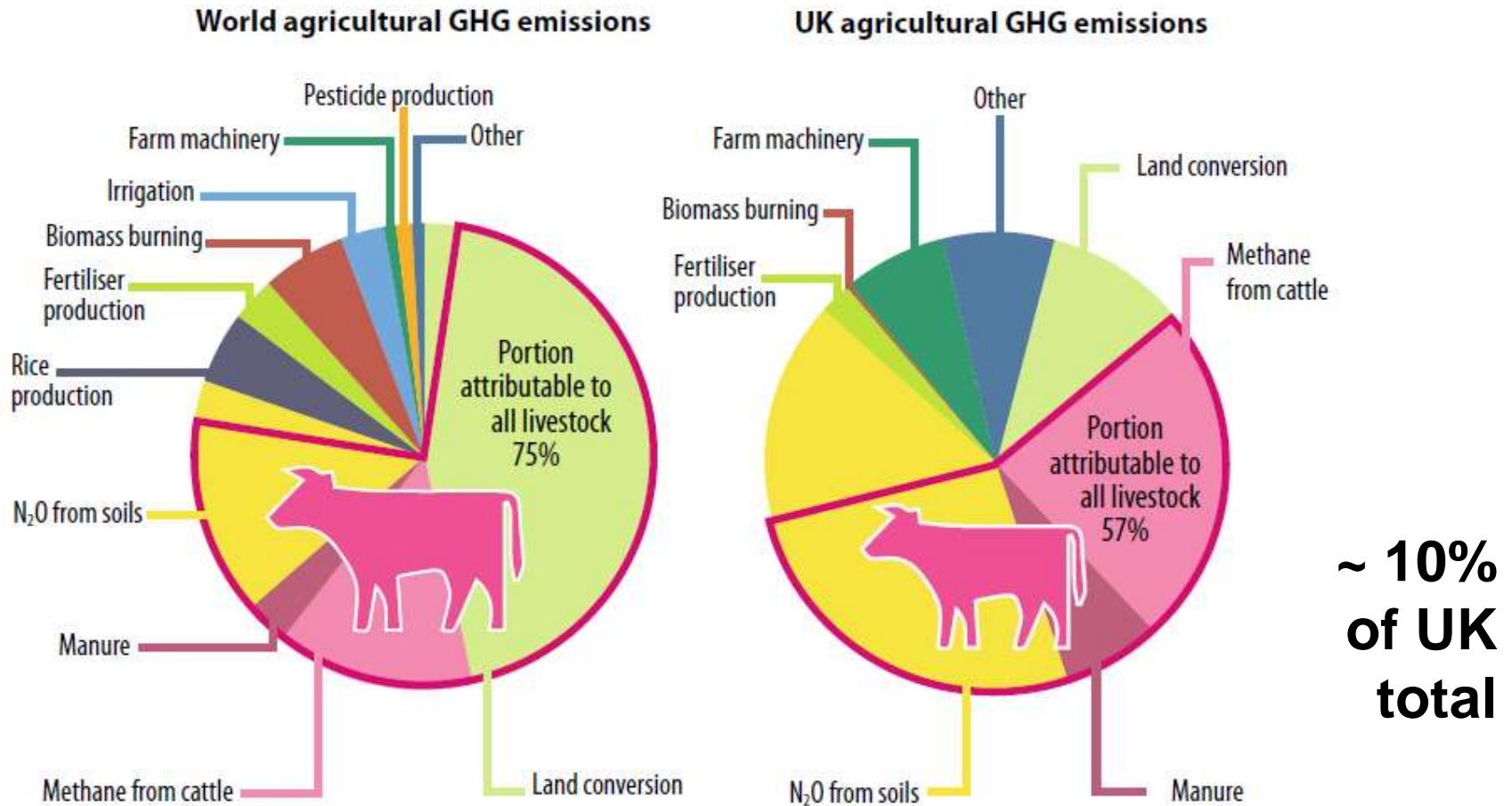


Figure 3.25: World and UK GHG emissions associated with agriculture, showing the proportions attributable to all livestock. Adapted from Garnett (2007).

Nutrition

Emissions

Land use

- Healthy, balanced diet.
- Low GHG emissions.
- No new agricultural land.

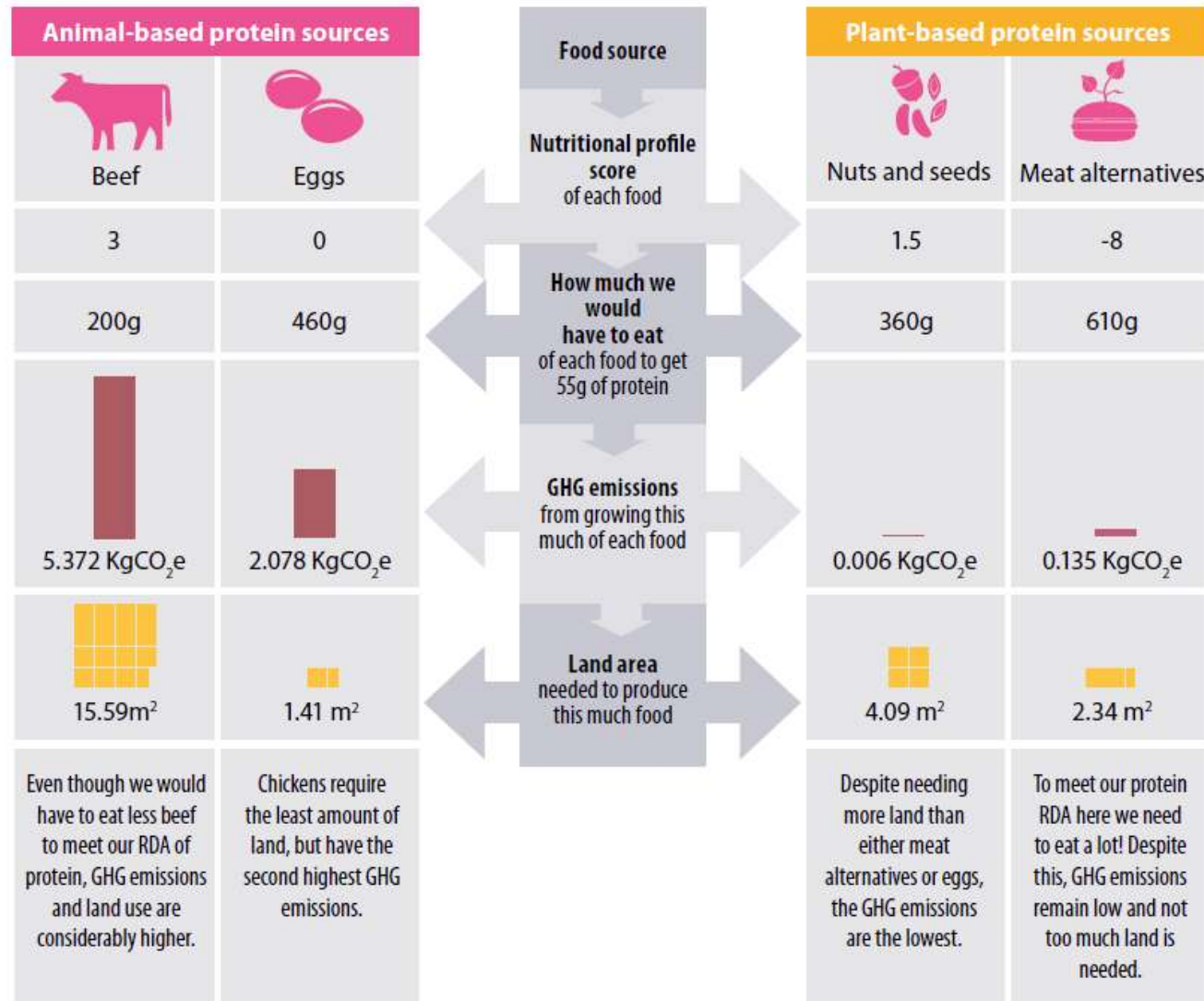


Figure 3.26: Comparison of four different high protein food sources: their Nutritional Profile Scores (NPS), how much would need to be eaten to meet the recommended daily amount (RDA) of protein, and the associated agricultural GHG emissions and land used for producing this amount of each food source.

ZCB scenario

- Eat only what we need.
 - -50% waste
 - Product switch.
 - 5-6 portions meat/dairy/eggs.
 - 4 portions pulses/tofu.
 - + Milk for tea/coffee.
 - Nitrogen inhibitors.
- Agricultural GHG emissions = -73%.**

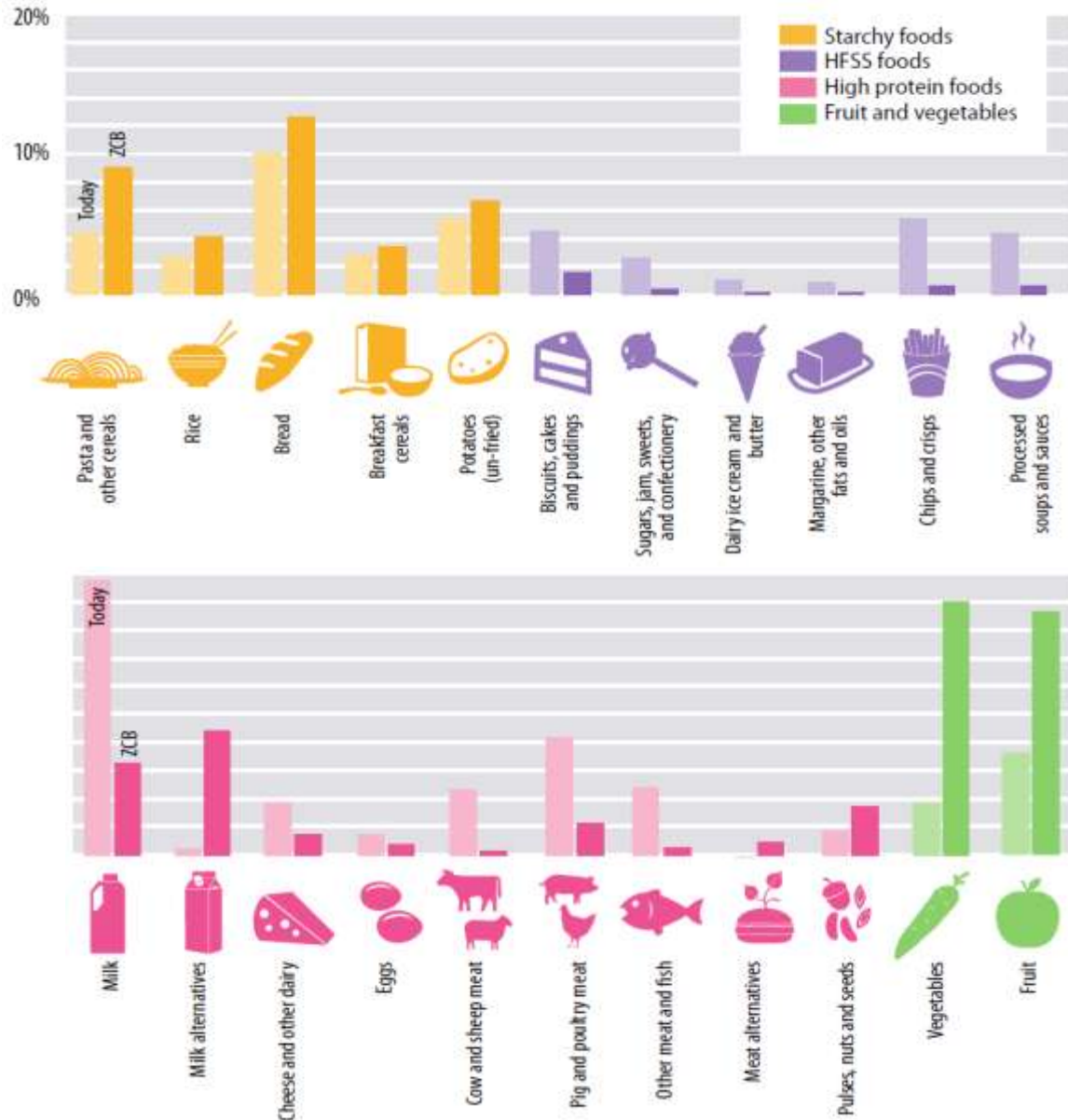


Figure 3.27: Percentage contributions of different types of foods in the diet (Bates et al., 2012) The difference between the average diet today and in our scenario is shown.

ZCB average diet

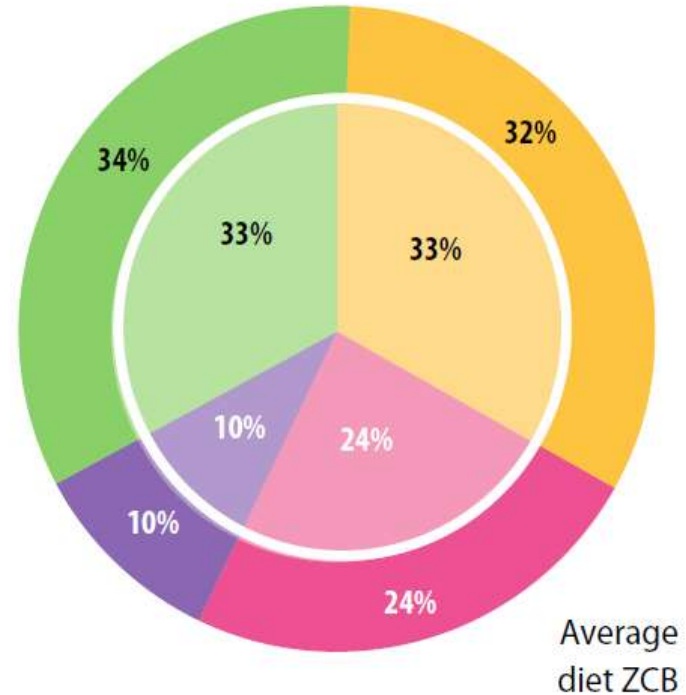
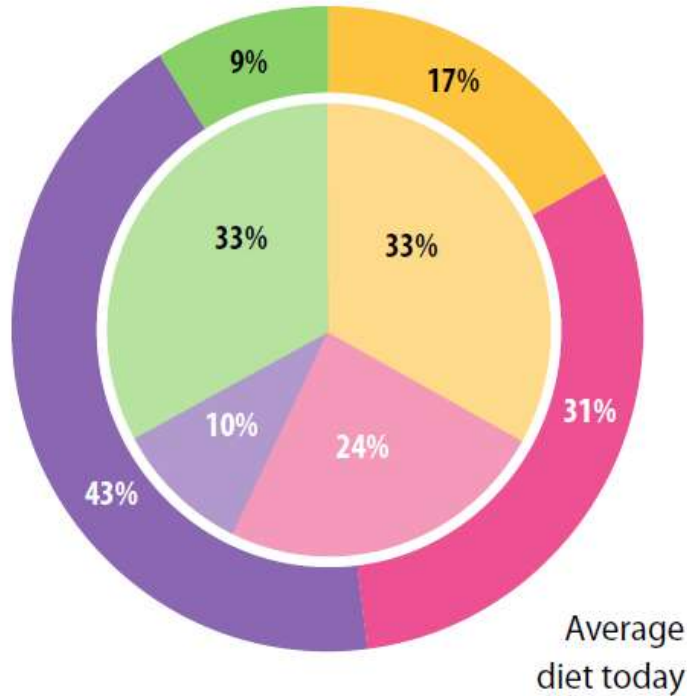


Figure 3.29: The Eatwell Plate. Government recommendations for a healthy balanced diet (FSA, 2007). Today's average diet and the average diet in our scenario are shown (outside circle) relative to the Eatwell Plate recommendations (central circle).

- Starchy foods
- High protein foods
- HFSS foods
- Fruit and vegetables

Land use in ZCB



1. Food

- Healthier
- Lower GHG emissions
- Less land



2. Energy/fuel



3. Carbon capture

Land use in ZCB



1. Food

- Healthier
- Lower GHG emissions
- **Less land**



2. Energy/fuel

- Support energy system



3. Carbon capture

Land use in ZCB



1. Food

- Healthier
- Lower GHG emissions
- Less land



2. Energy/fuel

- Support energy system



3. Carbon capture

- Safe, proven, supported
- Biodiversity benefits
- Improved resilience

2. Growing energy and fuel

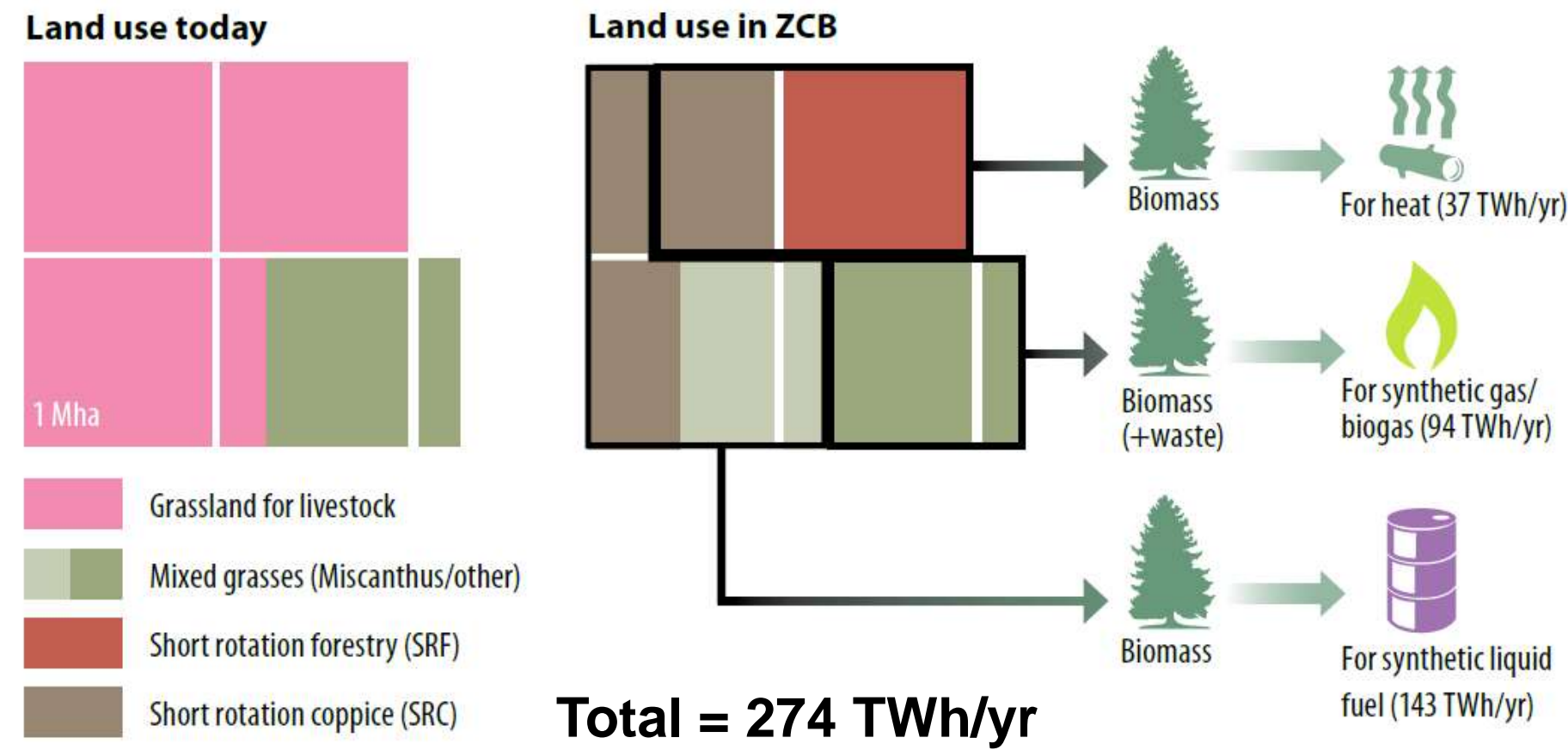


Figure 3.30: Area of land used today (DEFRA, 2012) that is used for energy crops in our scenario, the types of crop grown, and the amount and use of the biomass produced.

3. Capturing carbon

- Double forest area.
- Restore 50% of peatlands.
- Increased use of wood products.

Balance GHG emissions of
~ 45MtCO₂e/yr

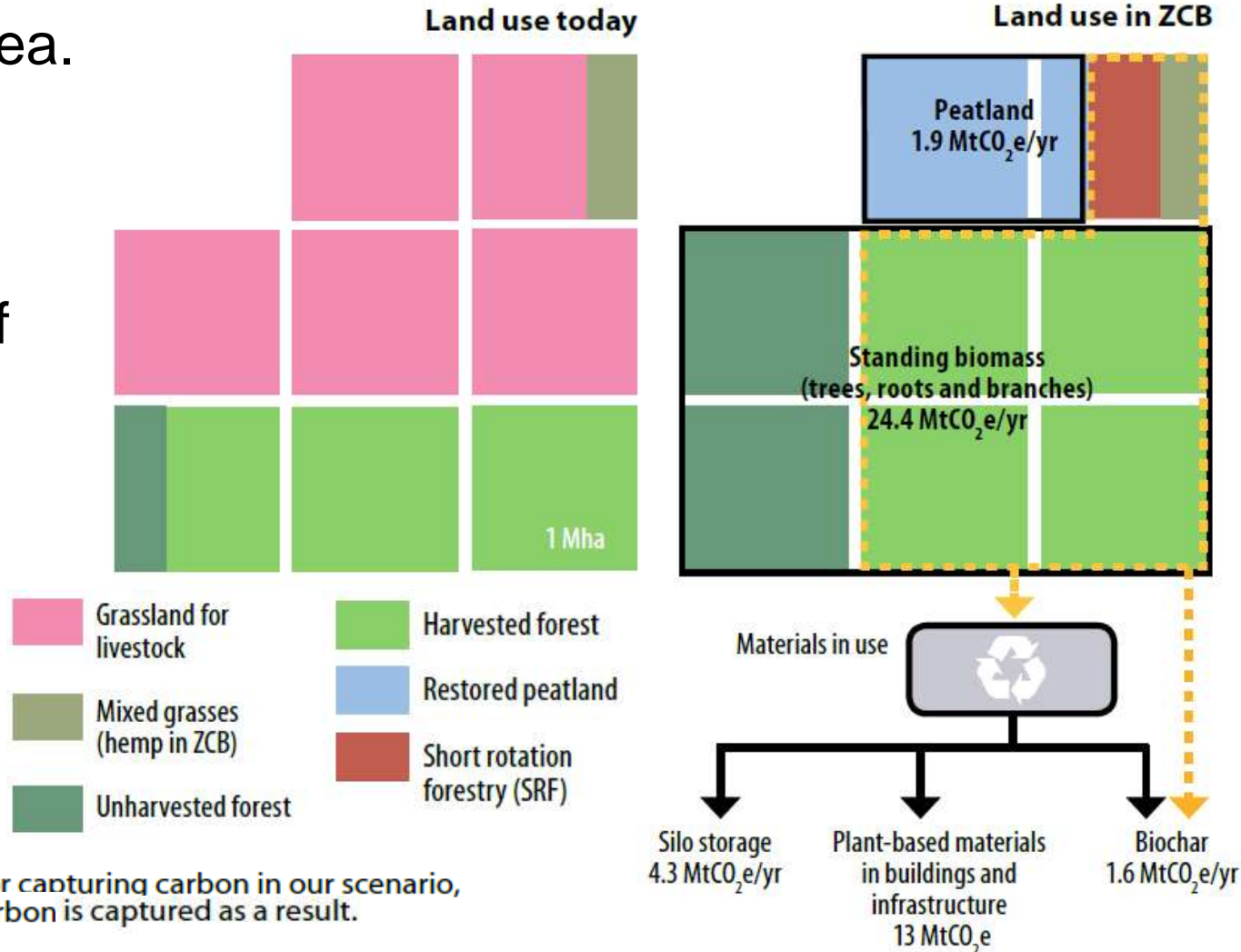
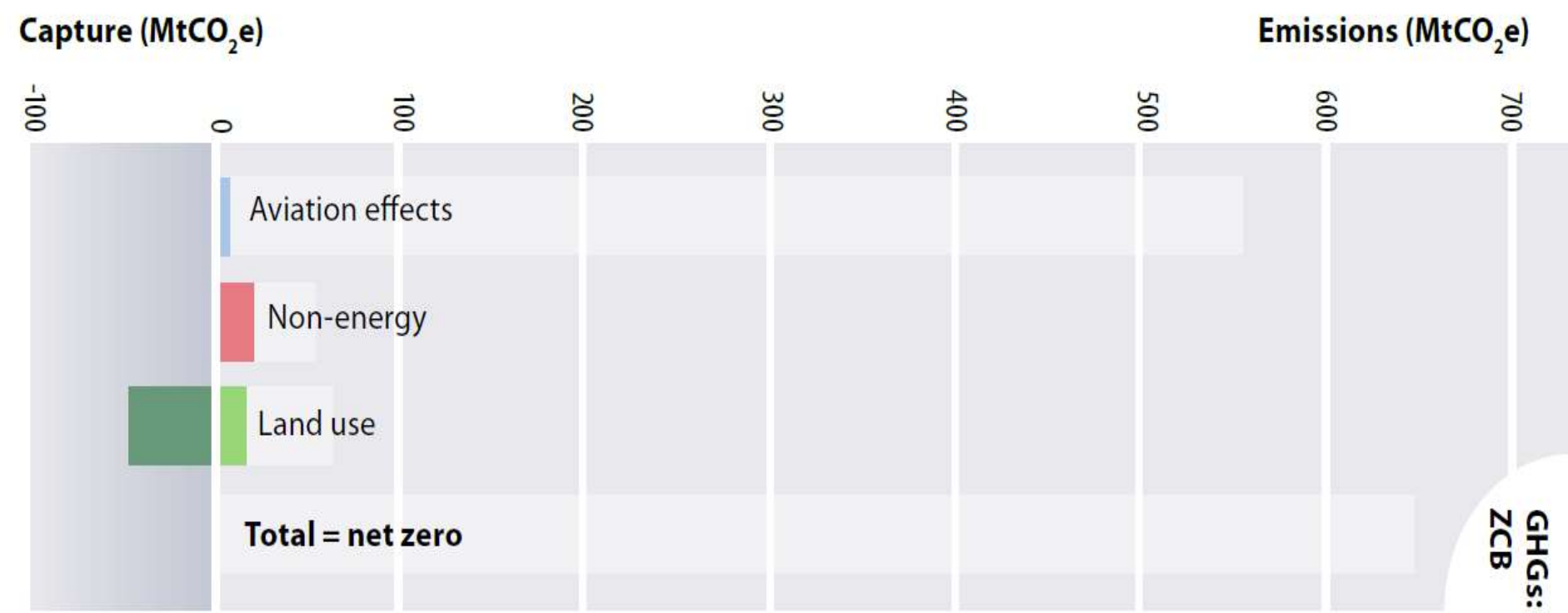


Figure 3.34: Area of land used for capturing carbon in our scenario, the methods, and how much carbon is captured as a result.

Net zero GHG emissions



Where next?





WE WANT YOU!



ZERO CARBON BRITAIN



Centre for Alternative Technology
Canolfan y Dechnoleg Amgen

www.cat.org.uk | [@centre_alt_tech](https://twitter.com/centre_alt_tech)
www.zerocarbonbritain.org | [#ZCB](https://twitter.com/ZCB)