

ZERO CARBON BRITAIN RISING TO THE CLIMATE EMERGENCY

A LOCAL PRESENTATION OF
ZERO CARBON BRITAIN “HOW CAN
WE ACHIEVE NET ZERO GREENHOUSE
GAS EMISSIONS USING ONLY PROVEN
TECHNOLOGY?”



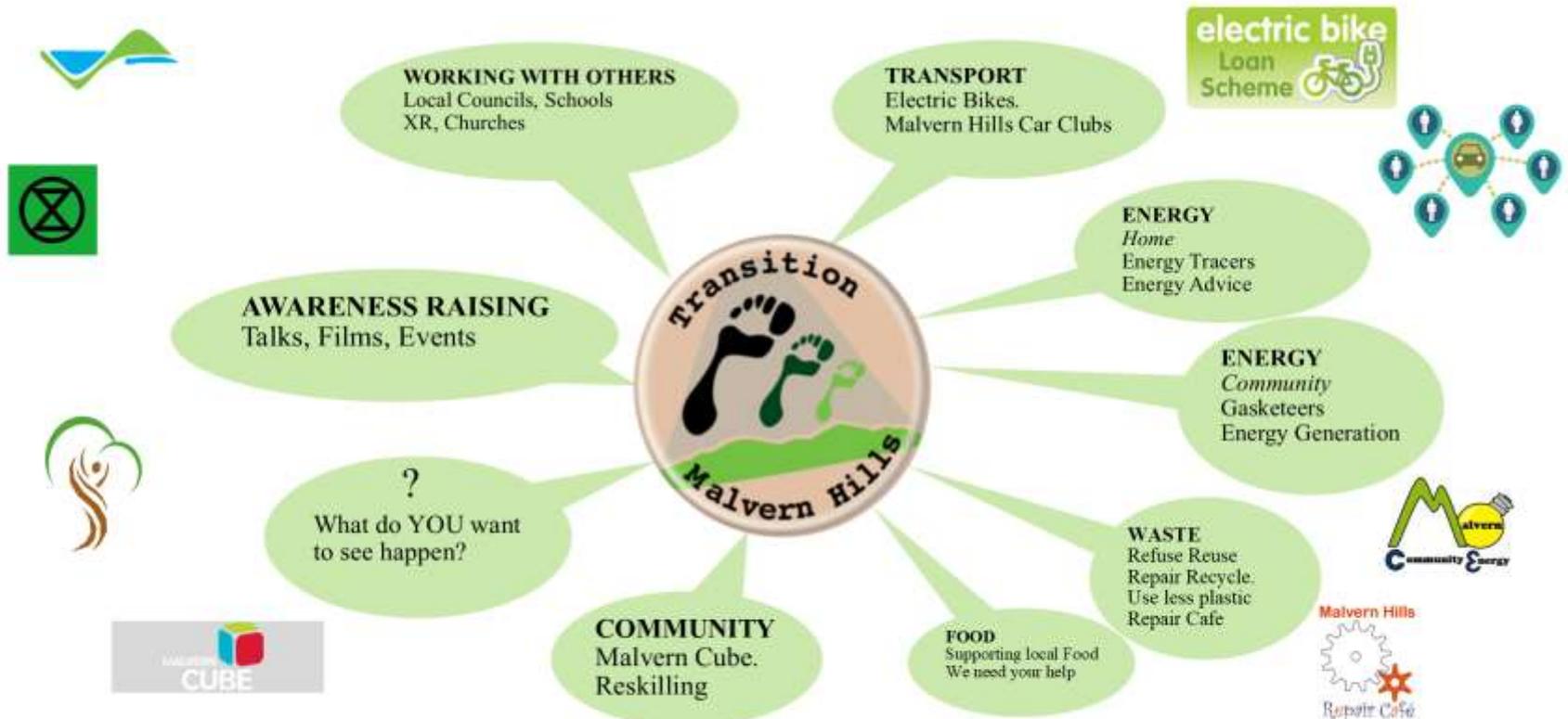
TRANSITIONMALVERNHILLS.ORG.UK

Tonight's agenda

- An Introduction to transition.
 - Robin Coates
- Zero Carbon Britain
 - Ian Caldwell
- Discussion



Transition Malvern Hills



Practical local action to tackle climate change and build a sustainable community

Four Necessary Levels of Intervention

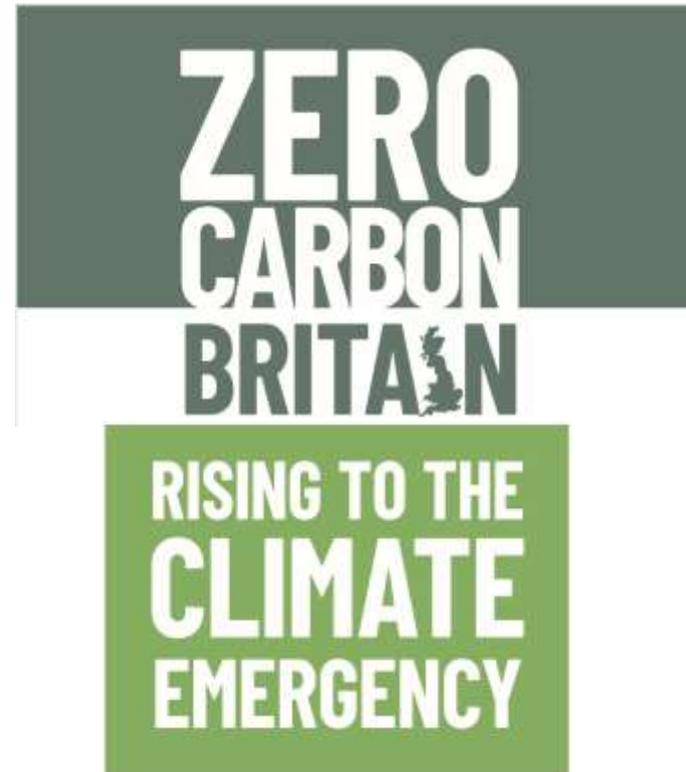
- Personal contribution
 - How I can change something in my life style e.g. change to LED lights.
 - Have an actionable plan to take another carbon reduction step each month/quarter.
- Personal influence on commercial organisations
 - What I choose to purchase
 - Informing my pension investment organisations I want them to disinvest from Fossil Fuel companies.
- Helping to create structures/processes where collaborative effort becomes possible locally
 - Car Share Clubs,
 - Community Supported Food Growing and/or distribution.
 - Working with other local groups and Authorities to create and action plans for carbon reduction.
- Campaigning both Locally and Nationally



Zero Carbon Britain

- This is a talk about the Centre for Alternative Technology's (CAT) research project that shows that a modern, zero-emissions society is possible using technology available today.
- In 2019 they released a new version of their main report. It builds on research since 2007.

When the first ZCB report was published.



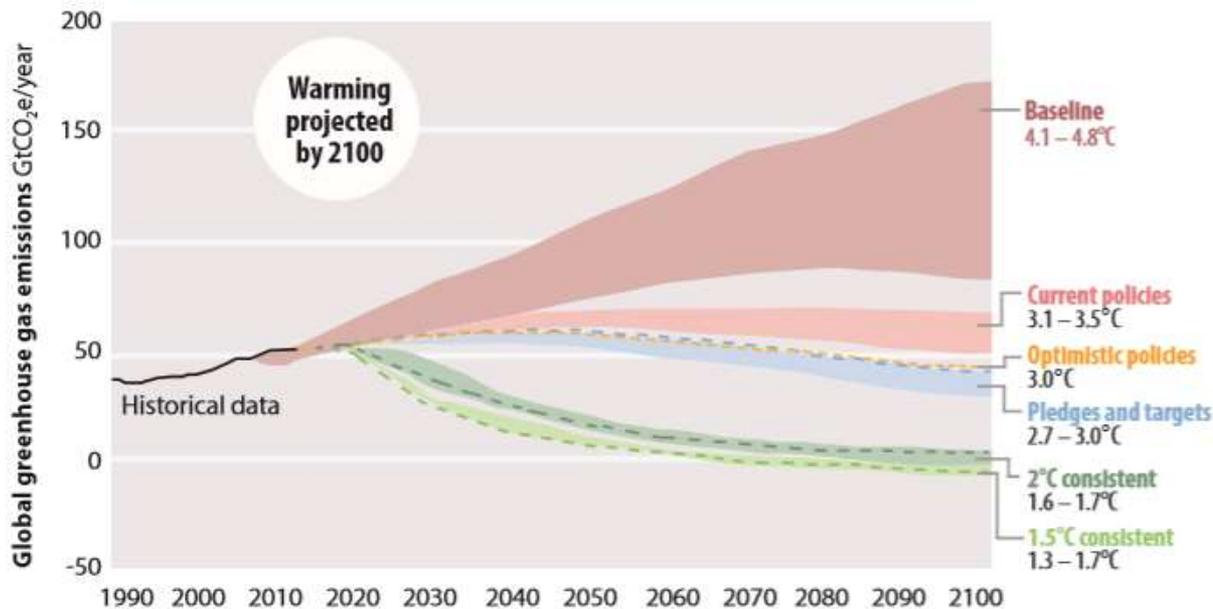
Agenda

- Climate Crisis
- Reports Aims and Rules
- Power Down
- Power Up
- Non-energy emissions
 - Land Use
- Also in Zero Carbon Britain Report
- Conclusions



Climate Crisis

- The Paris Agreement Commits to 2°C warming and *hopes* for 1.5°C.
- We are already at 1°C.



To stop a Climate catastrophe of over 2°C we need Zero Carbon Emissions

Figure 2.4: Temperature changes expected in 2100 under different emissions scenarios. Source: CAT (2019).



Zero Carbon Britain Aims

- Keep the lights on and keep everyone warm, providing enough energy to meet demand at all times.
- Make sure we all eat enough, and eat well.
- Keep a decent standard of living, with the benefits of a modern society.
- Support biodiversity – making space for the natural world we rely on.
- Look at how to help adapt to a changing climate – building resilience into our systems to be able to respond to the foreseen and unforeseen effects of climate change.
- Weigh up the costs and benefits (not just monetarily) of our options.



Zero Carbon Britain Rules

- Use only technology available now and currently in use, or technologies which have been demonstrated to work. We don't rely on silver bullets. We need to act now on climate change, and so we must present solutions that could be implemented immediately.
- Only rely on renewable energy sources inside the UK (including UK offshore waters)
- Must ensure that the food we produce feeds the UK population sufficiently and healthily
- Must not increase the area of land managed by us
- Choose solutions that help us adapt to a changing climate, where possible.



Power Down

- Power Down is the reduction of our energy demand using efficient technology and making changes to the way we live.
- This is a vital part of the process of reducing greenhouse gas emissions from the energy system that powers our buildings, industry and transport.



Reduce Energy Demand

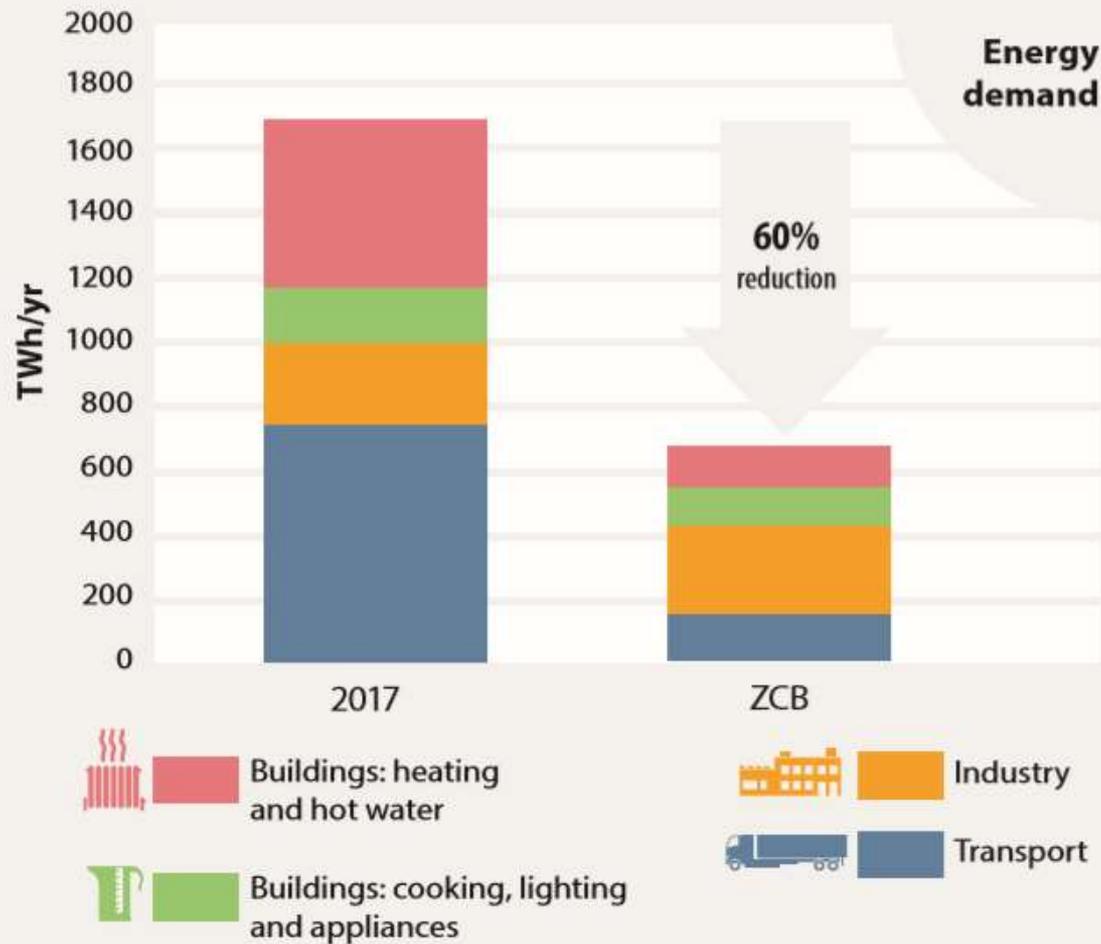


Figure 3.4: Total annual energy demand by sector in the UK in 2017 (BEIS, 2018) and in our scenario.



Heating Buildings

- The step to reduce buildings energy use

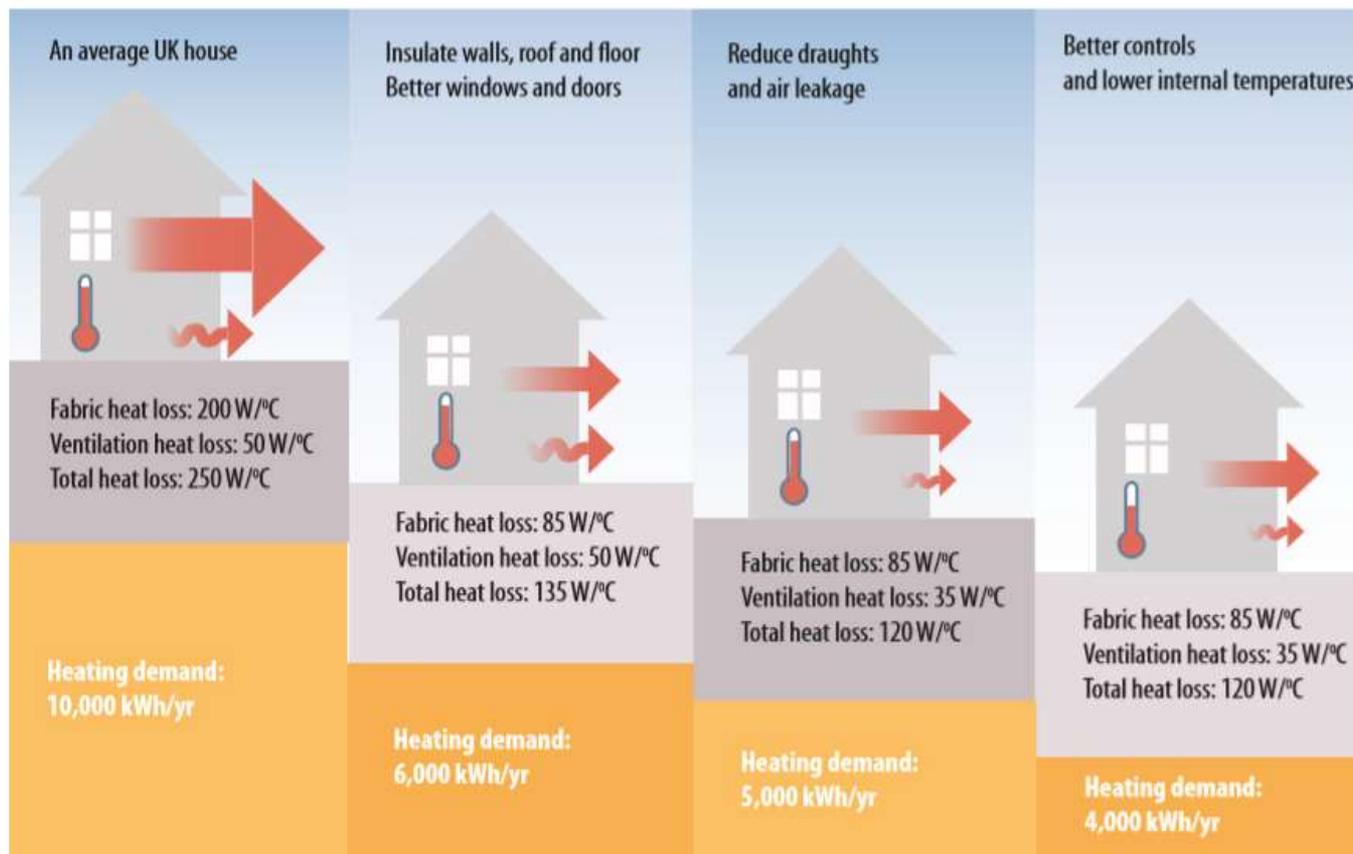


Figure 3.7: The impact of measures that reduce a building's heat loss and heating demand.



Transport has had a big growth

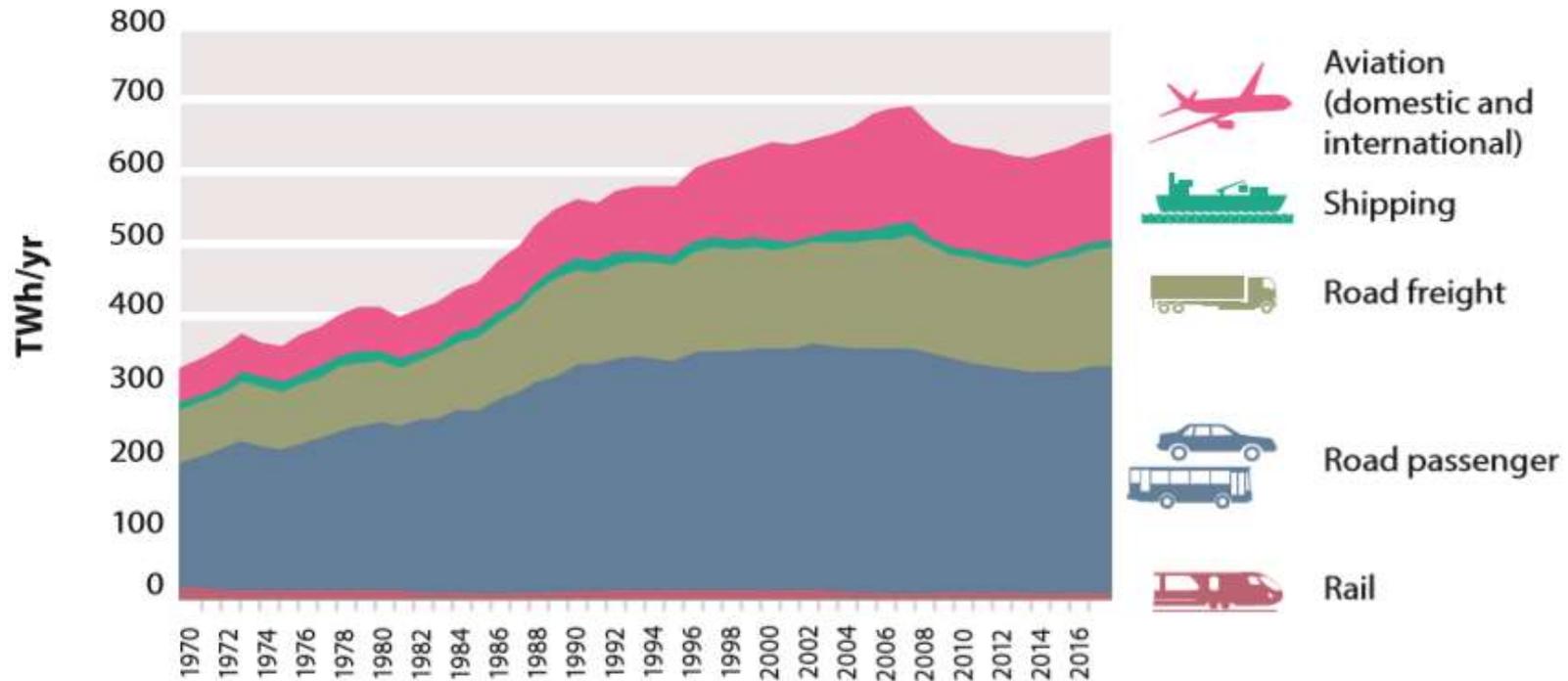
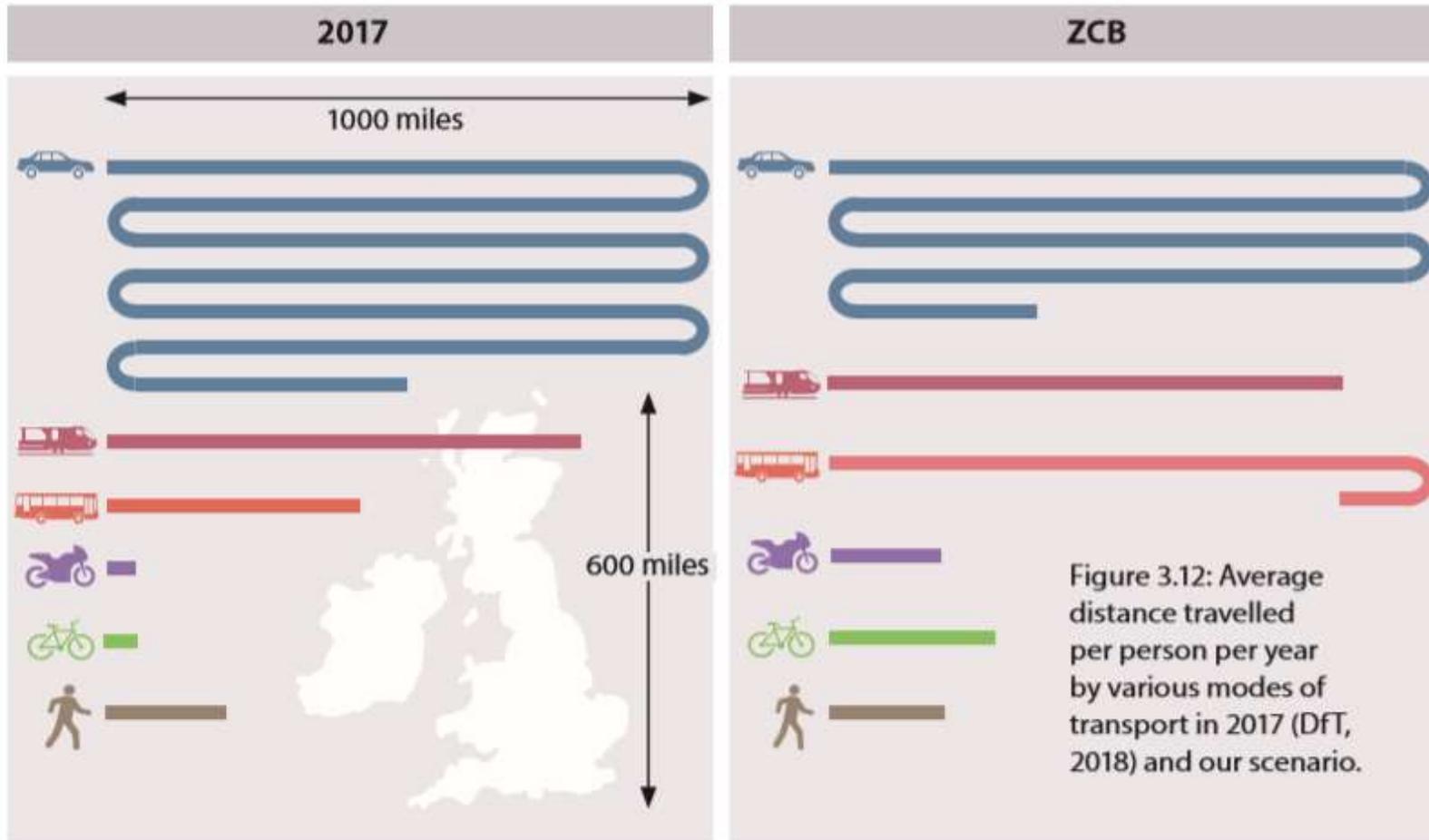


Figure 3.11: Energy demand for UK transport over recent decades (excludes international shipping (BEIS, 2018)).



How transport should change



Transport

- Reduce Demand for energy - by half
- Increase Efficiency – double it

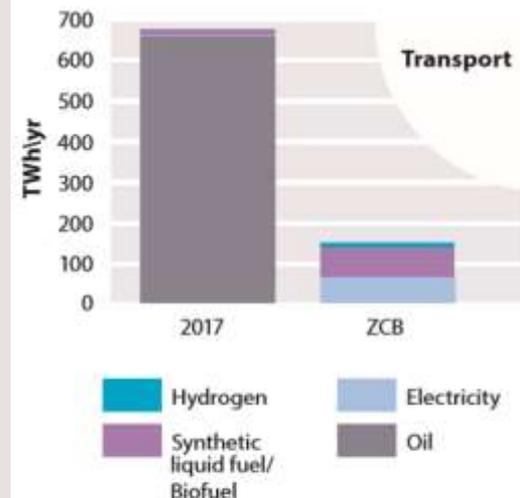
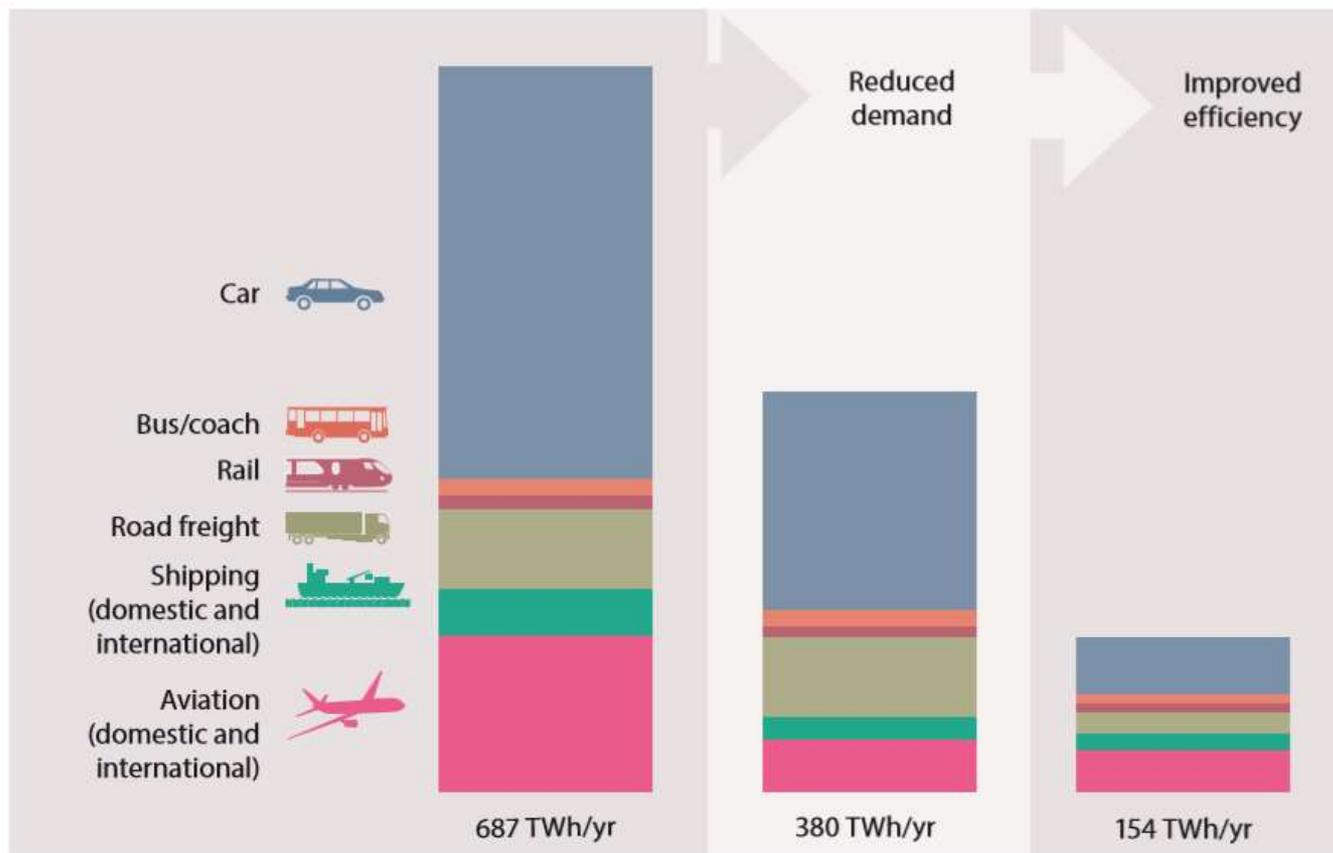


Figure 3.14: Change in total energy demand for transport and the types of fuel required in 2017 (BEIS, 2018) and our scenario.

Figure 3.13: Reduction in energy demand for transport in our scenario, shown in two stages: firstly with only the impact of reduced distances travelled and higher occupancy levels; secondly, adding the impact of higher vehicle efficiencies (initial figures from BEIS, 2018; DfT, 2018).

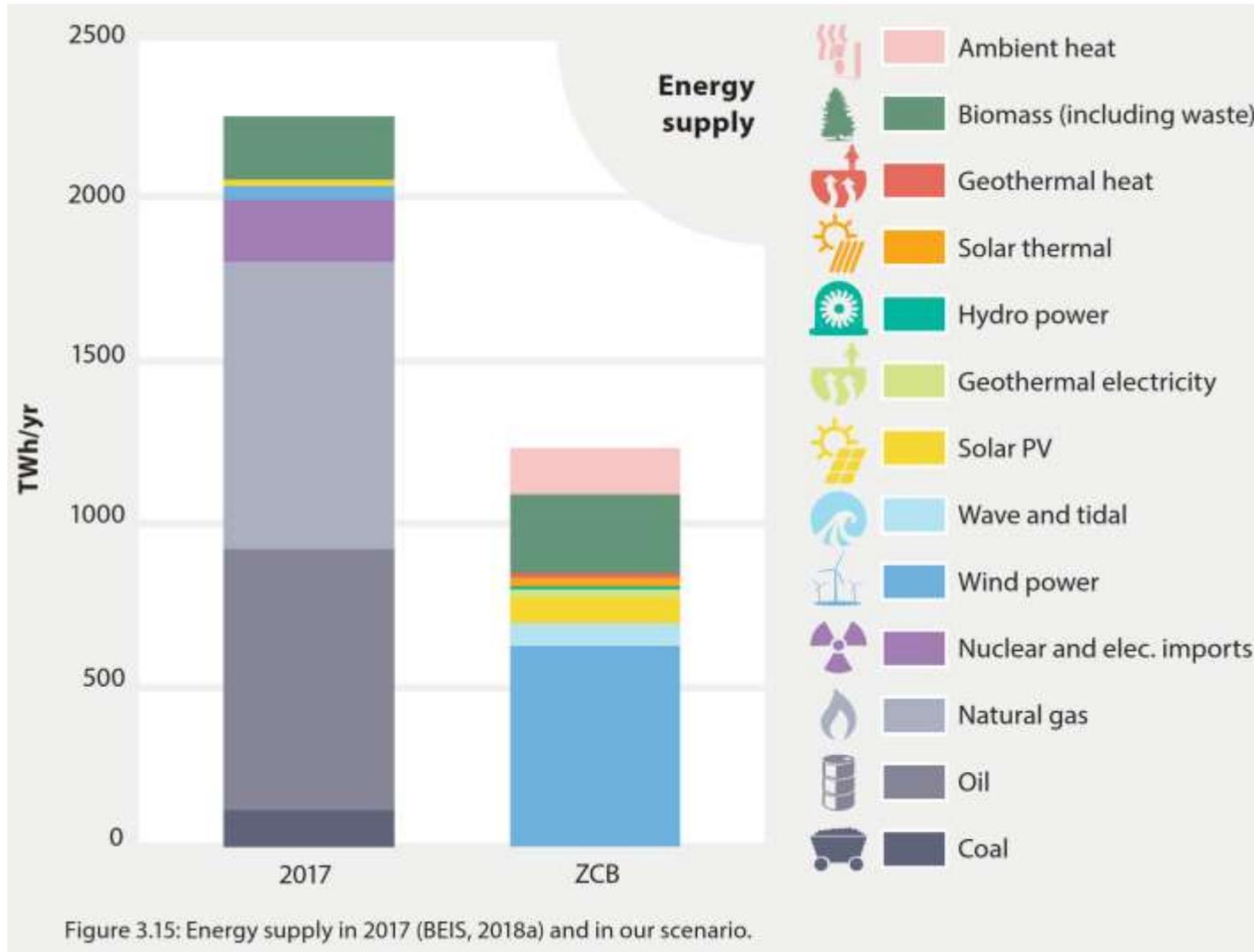


Power Up

- Power Down outlined how we can reduce our energy demand (what we use), and this means we can reduce the amount of energy we produce
- However it is important not to underestimate how much energy is still required.
- About 50% of current energy is needed.
- Power Up outlines how renewable energy sources can meet 100% of this energy demand, reducing the greenhouse gas emissions from our energy production to zero.



Overview of Energy Supply



All energy
not just
Electricity.



An Overview

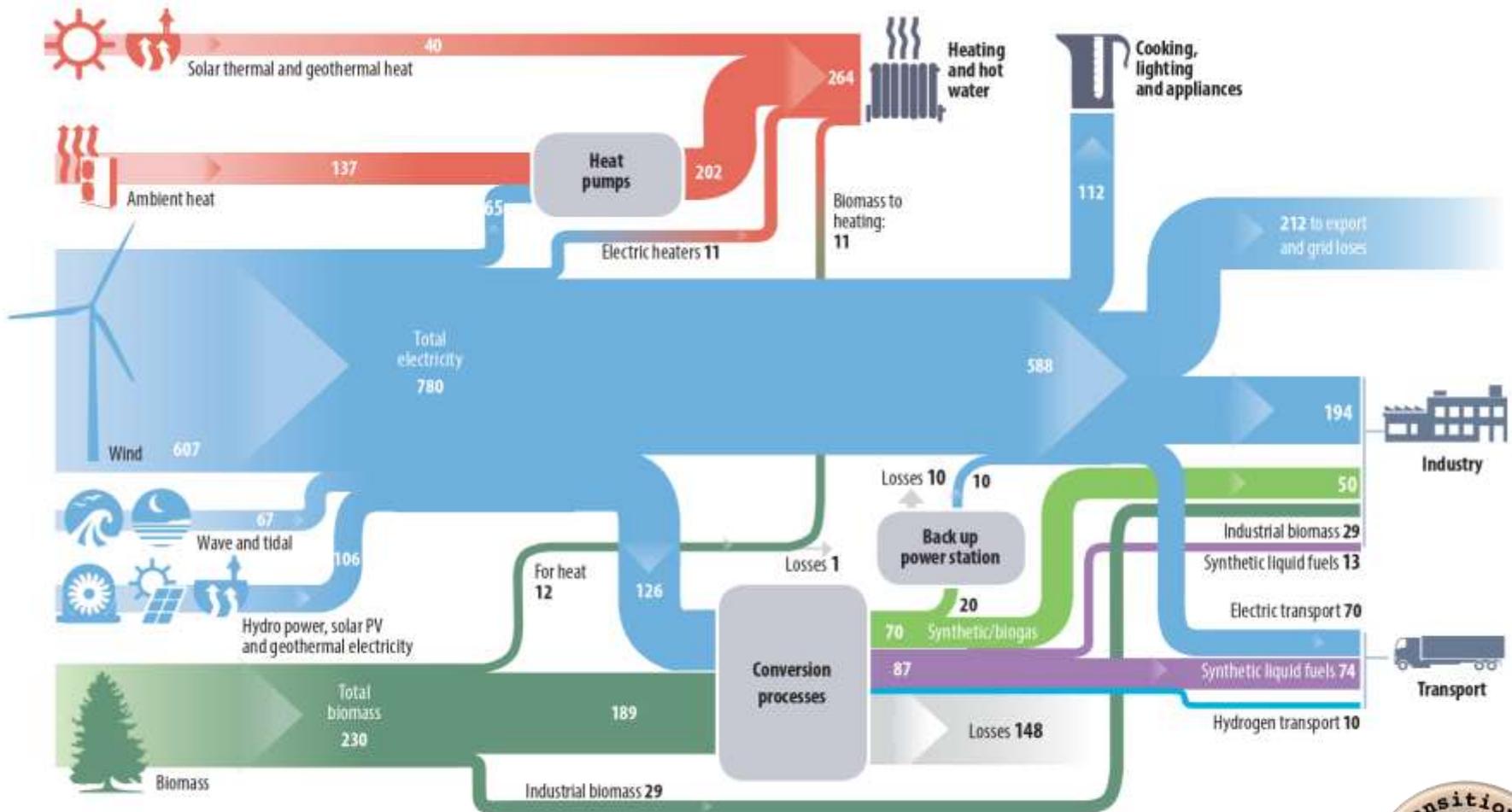


Figure 3.18: Energy flows in our scenario – from supply to demand. Numbers used here are rounded up or down to the nearest TWh and so inputs and outputs may not add up exactly.



Balancing supply and demand for Electricity

- The Problem

Renewable energy supply is variable

- The Solutions

- Shifting demand to match supply
- Storing energy

For hours or days:

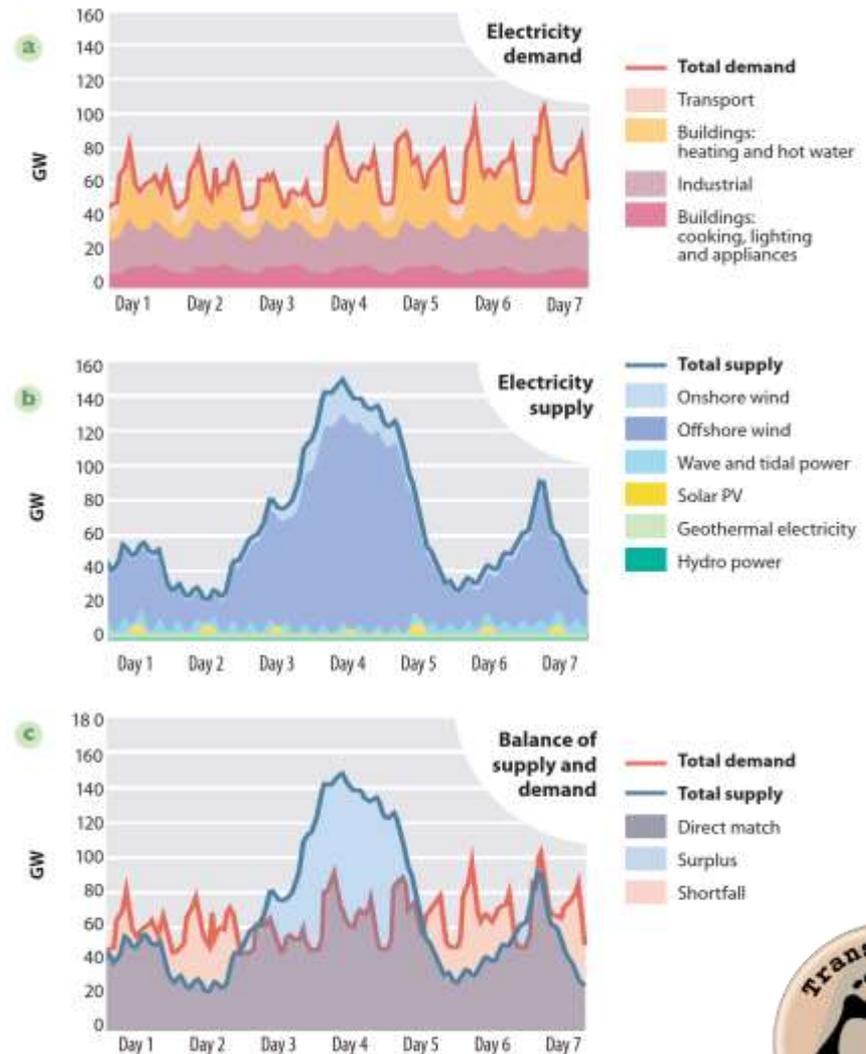
Pumped storage

Batteries

Heat storage

For weeks or months:

Biogas and synthetic gas and fuel



Transport and industrial fuels

- Although much of our transport can be electrified, there are some transport needs that can't be met by electricity.
- Same applies to industrial processes.

- Solutions

- Hydrogen
- Biofuels
- Carbon neutral synthetic liquid fuel

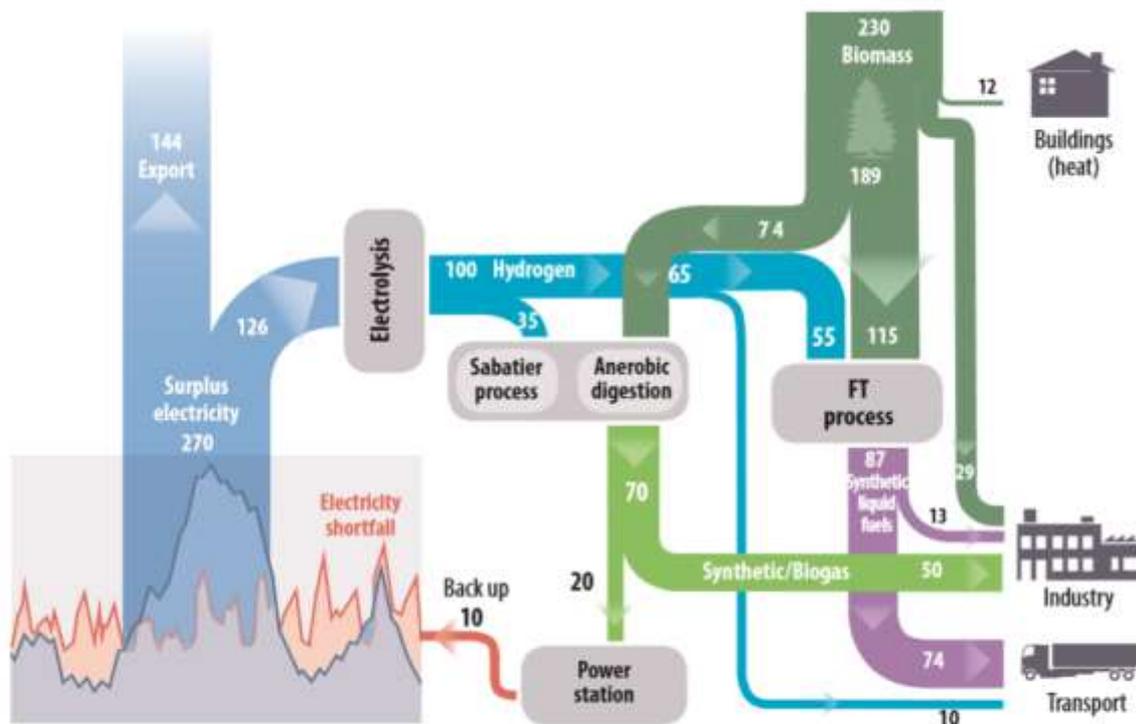


Figure 3.20: From surplus electricity and biomass to synthetic fuels for industry, transport and energy system back up. Losses are not shown in this figure.

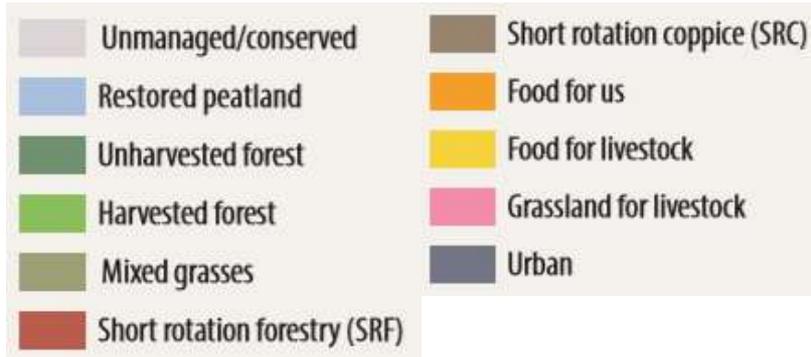


Non-energy emissions

- Three Non-energy emissions
 - Industry, businesses and households
 - Waste
 - Land Use
 - About 10% of current emissions are associated with agricultural food production, land use changes
- Industry, businesses and households and Waste
 - These produce CO² and other greenhouse emissions
 - The report details how these can be reduced to 1/3rd but not eliminated.
 - For these to get net zero carbon these emissions have to be balanced by using land for carbon capture. This is different to energy where ZCB does get down to zero emissions.



Land Use



Comparison of four different high protein food sources

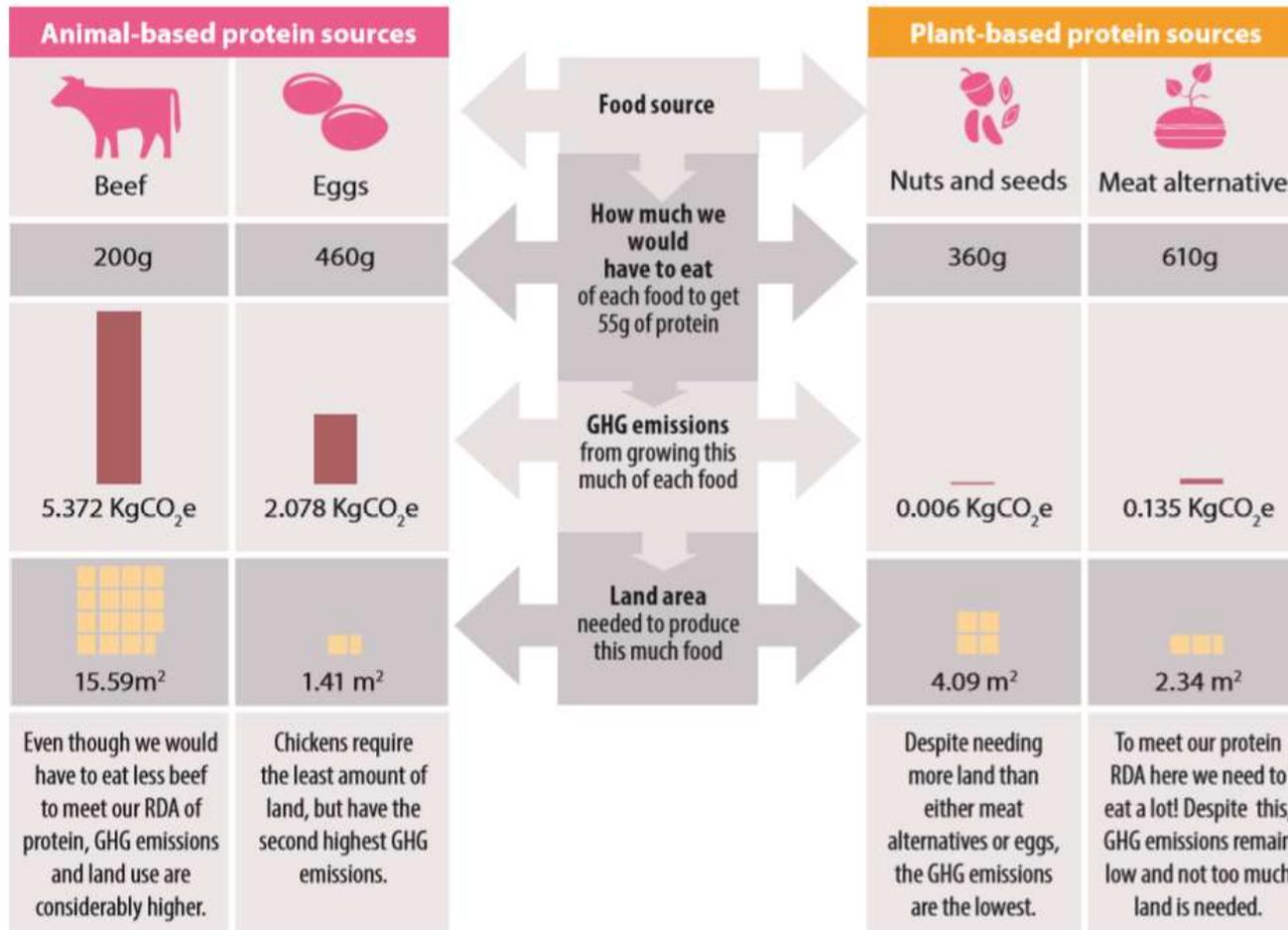
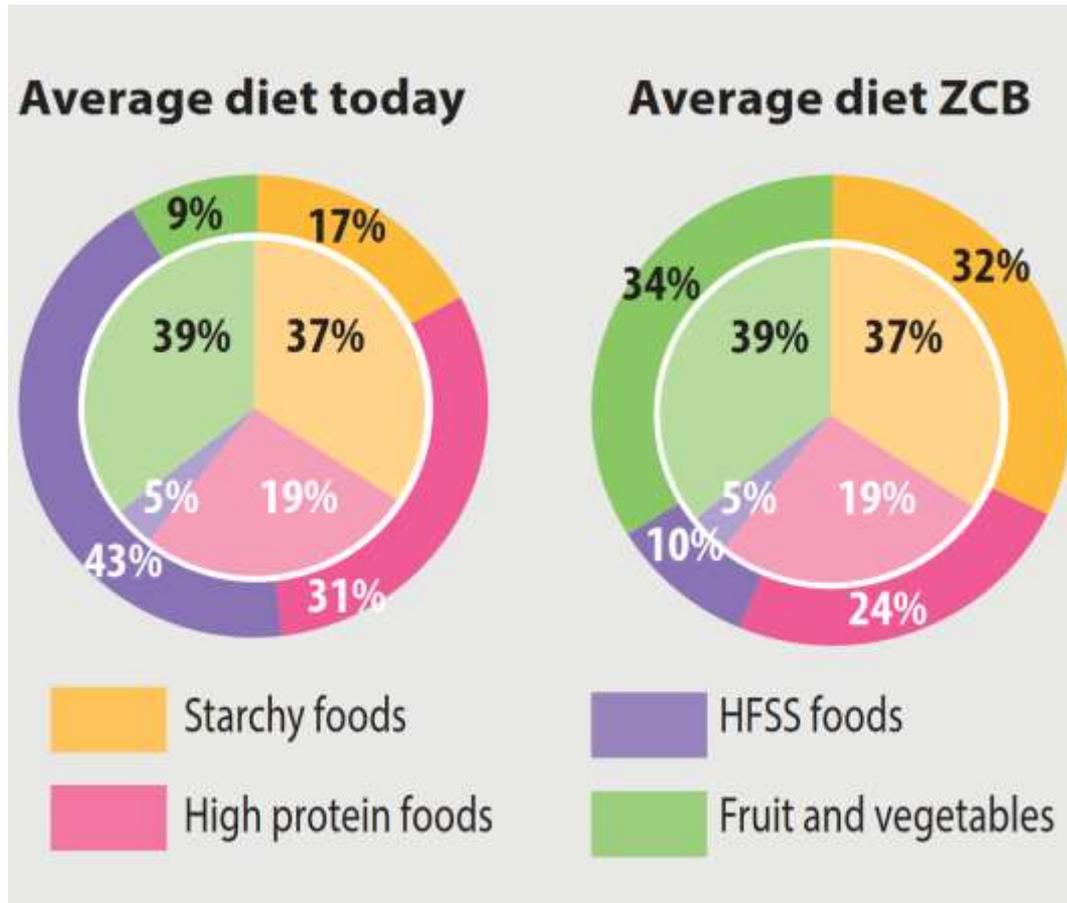


Fig 3.26: Comparison of four different high protein food sources: how much would need to be eaten to meet the recommended daily amount (RDA), the associated GHG emissions and land used.



Average diet



Inner Circle is
Government
recommendations

HFSS :
high in fat, salt and sugar

Fig 3.29: Government recommendations for a healthy balanced diet. Both today's average diet and the average diet in our scenario are shown (outside circle) relative to the Eatwell guide recommendations (central circle).



Land use for Energy Crops

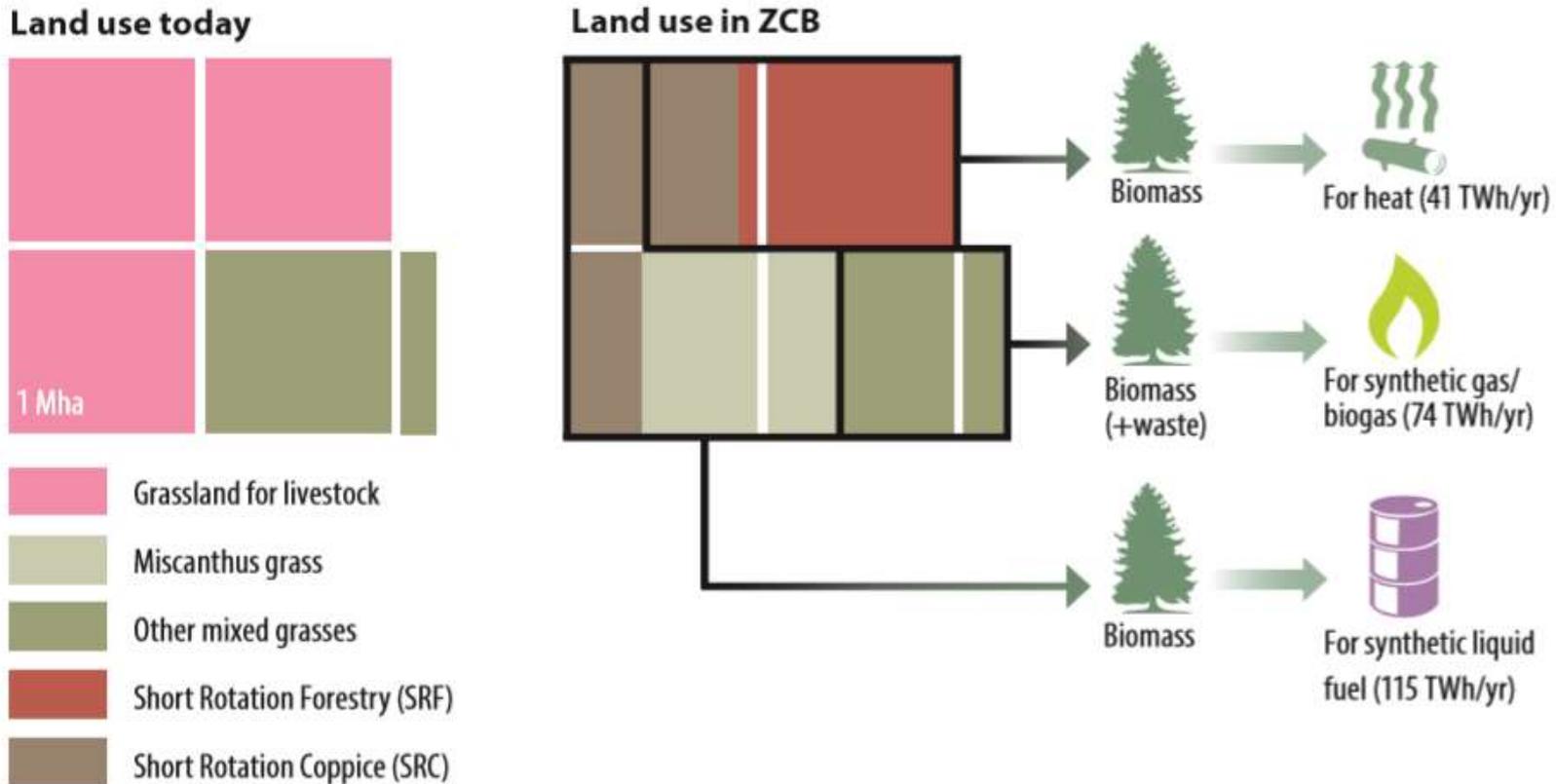


Figure 3.30: Area of land used today (DEFRA, 2012) that is used for energy crops in our scenario, the types of crop grown, and the amount and use of the biomass produced.

Land use for Carbon Storage

Relative sizes of various estimated UK carbon stores, compared to the land area they cover

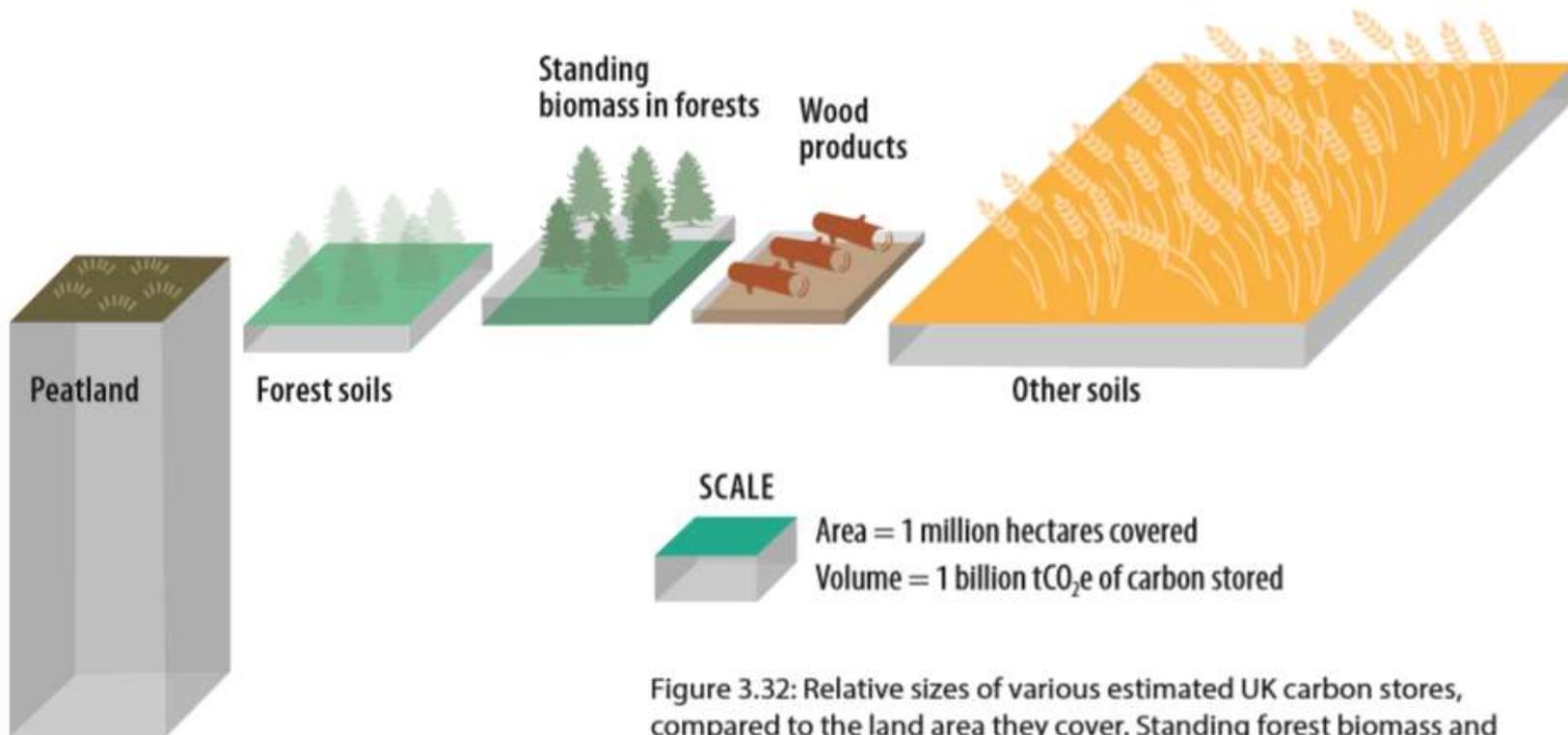


Figure 3.32: Relative sizes of various estimated UK carbon stores, compared to the land area they cover. Standing forest biomass and wood products show the carbon store above the ground level.



Types of Carbon Storage

- Two types of land use for Carbon Storage
 - One-off opportunities where the store may become full.
 - Long-term opportunities where carbon can continuously flow into a store.
- Planting new forest increases carbon stores over a period of 50-150 years depending on tree type after which it is full
- Long-term opportunities
 - **Peatland:** Currently store more than all the carbon stored in all other soils in the UK together
 - **Biochar:** Biochar is essentially charcoal made under carefully controlled conditions. This has particular properties that make it valuable as a means of storing carbon, especially in the soil. It has been found in stable condition after thousands of years.
 - **Converting landfill to silo storage:** a proportion of all wood products in landfill remains for thousands of years



land used for capturing carbon

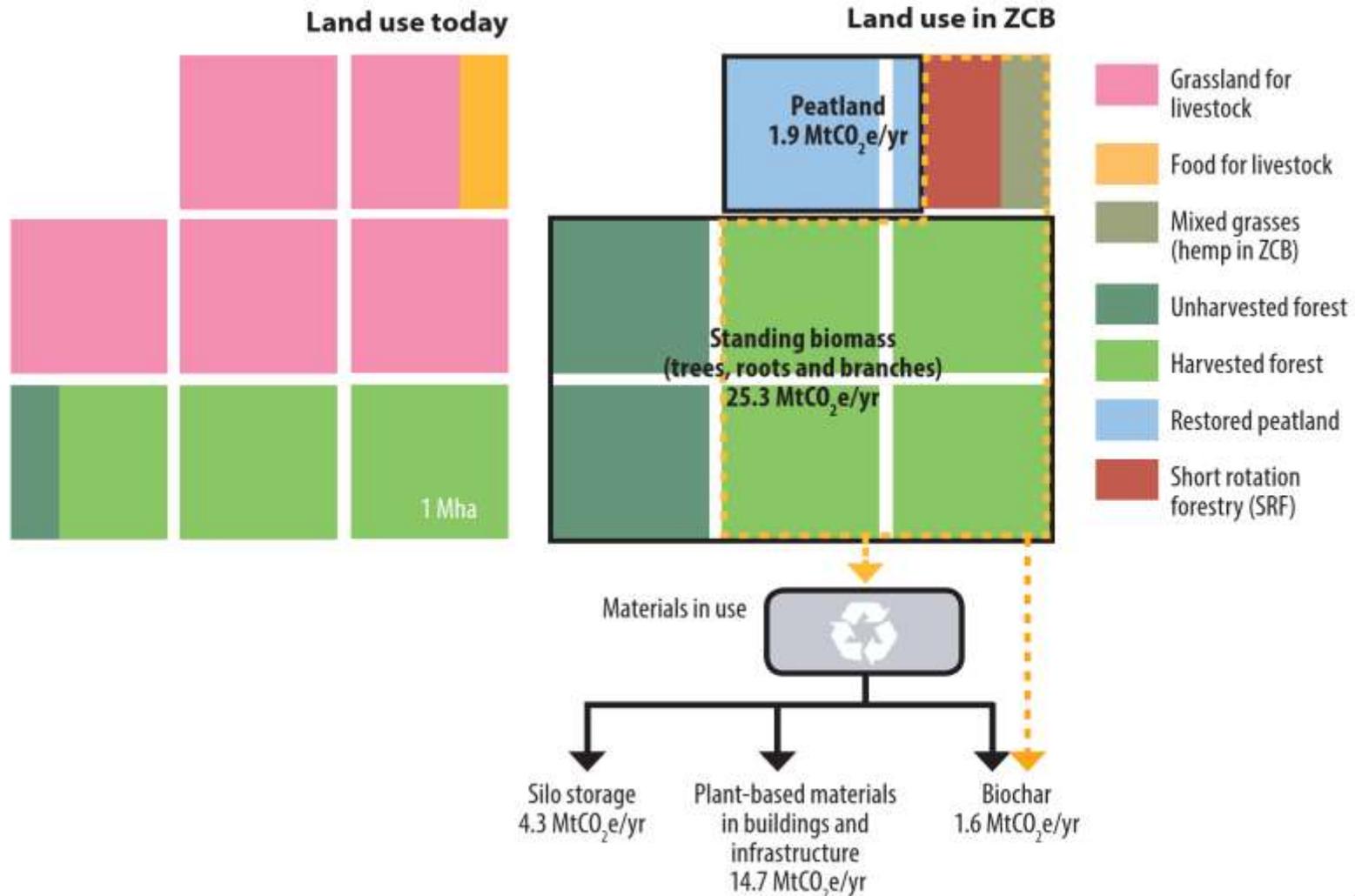


Figure 3.34: Area of land used for capturing carbon in our scenario, the methods, and how much carbon is captured as a result.



Land Use



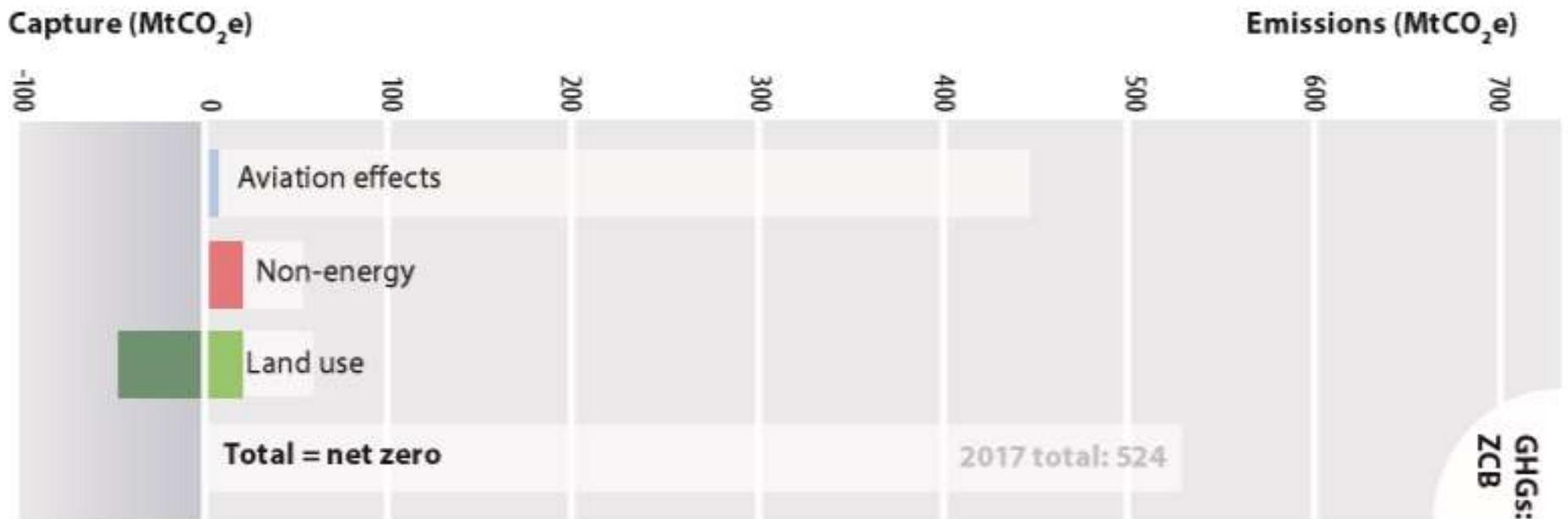
Also in Zero Carbon Britain Report

- A comparison of different policy mechanisms
- Adaptation to Climate Change
- Wellbeing measures
- Developing your local climate emergency action plan
- Reclaim the future: engaging with arts and creative practice



Conclusions

- We can get Zero Carbon Done
- Net Zero Carbon
 - Greenhouse Gas Emissions under Zero Carbon Britain



ZERO CARBON BRITAIN

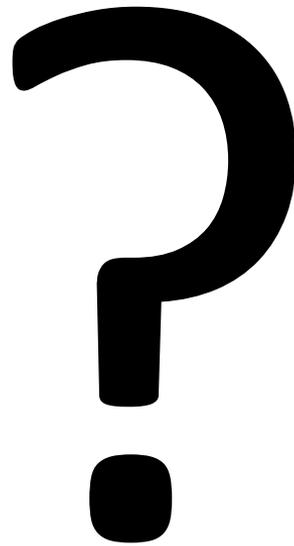
- It's a 200 page report.
 - This has been just a short overview
 - I suggest you download and read it
- These slides and links to CAT are on our website
transitionmalvern hills.org.uk
- Thanks to CAT for all their work
- Thanks to Andy for helping with the slides



Centre for Alternative Technology
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Any Questions



Need more help and information

- Go to CAT's website
 - <https://www.cat.org.uk/info-resources/zero-carbon-britain/>
- Contact me through Transition Malvern Hills website
 - transitionmalvern hills.org.uk
- [Eco-Chat, Thoughts and Action](#)
 - **11:00 on Wednesday, 8 April**
 - Topic: Zero Carbon Britain, my Thoughts
 - See <https://transitionmalvern hills.org.uk/chat/>

