

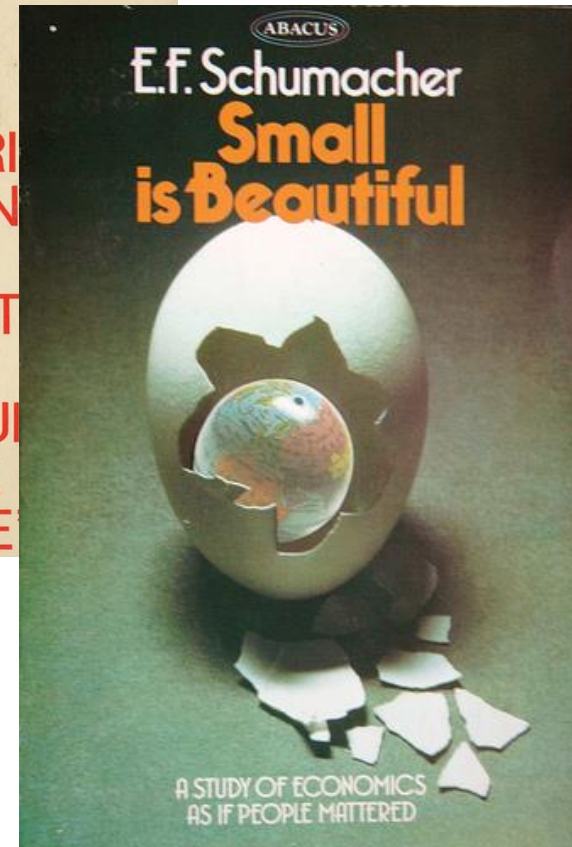
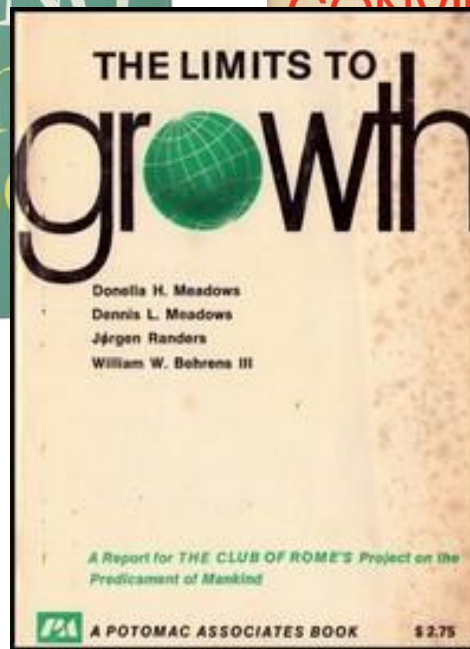
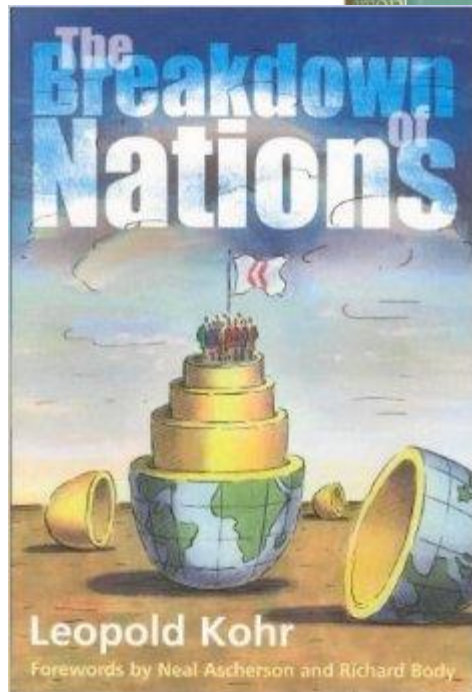
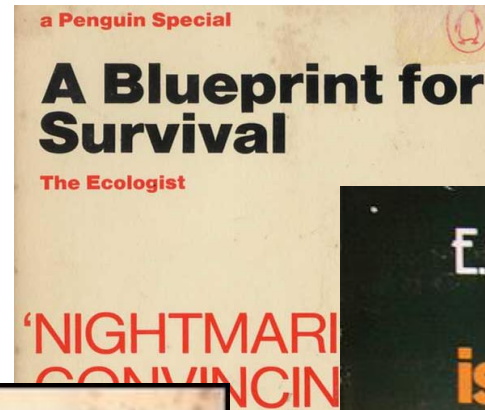
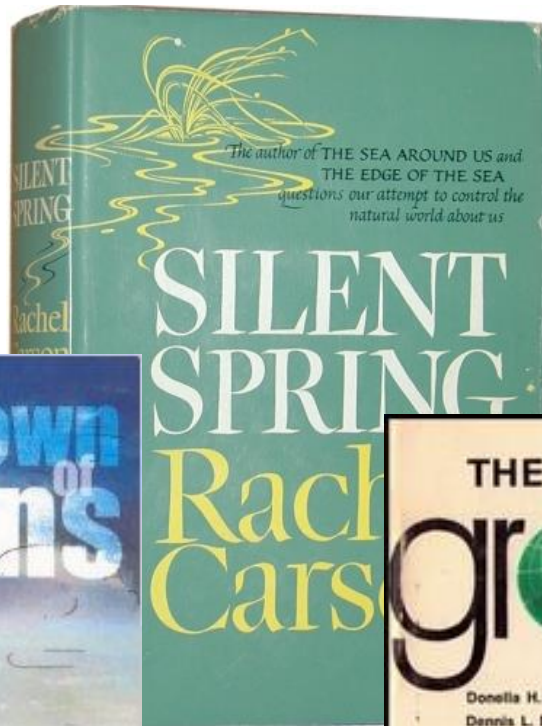
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Canolfan y Dechnoleg Amgen

*Responding to the imperatives of  
Climate Change*

*Dr Jane Fisher*

[jane.fisher@cat.org.uk](mailto:jane.fisher@cat.org.uk)

1960s and 1970s -shocks to the system.  
Humans are not as good at environmental  
management as we thought we were





# Set in a beauty spot



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Graduate school  
of the Environment







## Site: Llwyngwern Quarry, Machynlleth











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*CAT today*



# Pioneering low carbon building techniques





## UK's largest solar thermal roof





# Low-carbon building design





# Over 30 spin-out enterprises



## ecodyfi newsletter and annual review 2004



### Annual review for the year 2004-5 from ecodyfi Co-Chair, Aled Griffiths



Farmer Aled Griffiths, ecodyfi Co-Chair

What is it that makes the Dyfi Valley special? I'm sure we all have our own take on this – landscape, culture, language, Owain Glyndŵr, CAT... and a growing reputation for bringing these things together. Ecodyfi is at the heart of this and it's important work.

At one level it's about bringing people, natural resources and business activity together to

improve our quality of life for the long term. Articles in this newsletter illustrate some of our effective work in specific communities and with particular issues and projects.

It's also about bringing people together. The valley's strengths include the expertise and new ideas that have arrived in the area during the last 30 years – and how many of these fit well with traditional values such as respect for the land. But there is much work to be done in breaking down the barriers that still exist between the different parts of our community.

One highlight of 2004 for me was the conference we organised in June about the proposed Dyfi Biosphere Reserve. At first sight this looks like an environmental initiative, but we discovered that we can use this

prestigious UNESCO designation to help farmers and strengthen the Welsh language locally as well as protecting our habitats and encouraging responsible tourism.

We said goodbye to Co-Chair Nic Dunkley, one of ecodyfi's most active board members, this year. I'd like to say a big thank you to her for so much hard work.

We're delighted that the Welsh Development Agency and Environment Wales have agreed to continue backing us for another three years. Perhaps what they see as special is a community keen to benefit from protecting and using its environmental and cultural assets. That's what we call sustainable community regeneration. Join us.

March 2005

### What is ecodyfi?

- The community regeneration group for the Dyfi Valley
- With projects in waste, renewable energy, tourism, community planning, transport and more
- Committed to strengthening the local economy through careful stewardship of natural and cultural resources
- Managed by a Board of 17 local farmers, business people and other volunteers
- Supported by the Welsh Development Agency



Farmers Gwen Lloyd and Charles Arch discussing horticulture at the Dyfi Biosphere Conference.

### Horticulture culture

In 2004 we began a project to stimulate horticulture amongst farmers of the Dyfi Valley. Ecodyfi directors Charles Arch and Aled Griffiths have been working with Tom O'Kane of Farming Connect. The aim is to increase locally grown fruit &

vegetables in order to reduce wasteful transport, keep money in the local economy, encourage farm diversification and improve local diets. Throughout the year we ran a series of farm visits and continue to seek ways of encouraging local growing.



### Sustained support for sustainable transport

Ecodyfi have been busy taking the fuss out of the bus! Following on from our Getting around the Dyfi Valley, we began a three year Dyfi Travel Guide Project this year, aimed at promoting car free travel options to both local people and visitors to the

Gwynedd and Powys Council and Lloyds coaches are all enthusiastic and willing to provide financial assistance. Joy Jones of Machynlleth Tourist Information Centre says "It's one of our most popular leaflets"

### Ecodyfi Board

Aled Griffiths, Glantwymyn, Co-Chair 2003-

Alun Jones, Cadfarch  
Andy Rowland, Machynlleth  
Charles Arch, Pennal  
Ellen ap Gwynn, Ceulanmaes-mawr

Gill Jones, Glantwymyn  
Guy Pargeter, Llangynfelin  
Jonathan Hill, Machynlleth  
Marit Olsson, Corris

Martin Ashby, Glantwymyn, Co-Chair 2005-

Nick Smyth  
Nicola Dunkley, Llangynfelin, Co-Chair 2003-5

Paul Allen, Corris  
Peter Jones, Cadfarch  
Ruth Owen, Corris  
Teresa Walters, Borth  
Tom O'Kane, Llangynfelin  
Ursula Byrne, Ysgubor y Coed



CAT receives around 25,000 vis





## Accredited technical short courses

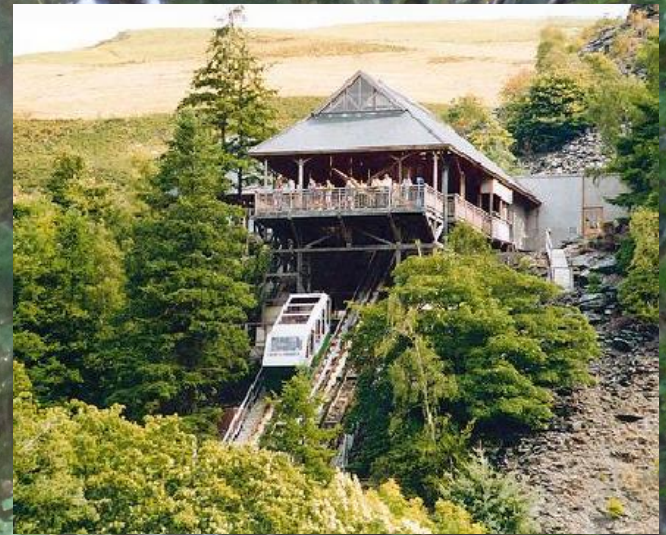




# Information Centre, shop, CAT publications & mail-order, membership









# WISE - opened in July 2010







- Oral History project
- Archive at National Library of Wales



**BBC Radio 4 - 'The Reunion'**





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*Graduate School for the Environment*

# Graduate School of the Environment

- MSc Programmes:
  - Sustainability and Adaptation;
  - Sustainability & Adaptation Planning;
  - Sustainability & Adaption in the Built Environment;
  - Renewable Energy & the Built Environment.
- Part II in Architecture (Professional Diploma)





# Graduate School of the Environment (new programmes)

- MSc Programmes:
  - Sustainable Food and Natural Resources;
  - Sustainability and Ecology;
  - Sustainability and Behaviour Change
  - Sustainable Energy Provision and Demand Management
  - Green Building
- Masters in Architecture





# Experiential learning





# Facilitative and peer-learning





# Graduates go on to do amazing things







**Nick, MSc Renewable Energy**  
– Research project on a novel solar thermal irrigation pump in the Rift Valley of East Africa. “My thesis recommendations fed into the R&D. I have since set up *Futurepump* to install new pumps in Kenya”



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of the Environment

Rufus, MSc in Architecture, Advanced Environmental and Energy Studies – Research & Development Manager for Scottish and Southern Energy. Sits on the board of Scottish Renewables.



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Howard, MSc sustainable architecture - Set up an architecture practice after graduating in 2014. Now lectures p/t at the University of Liverpool.



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*Zero Carbon Britain research*



# Zero Carbon Britain



**Zero Carbon Britain's new report *Making it Happen* is a toolbox of good ideas for how to create change**

Science says we must  
Technology says we can  
Time to say we will



[zerocarbonbritain.org](http://zerocarbonbritain.org) #ZCB



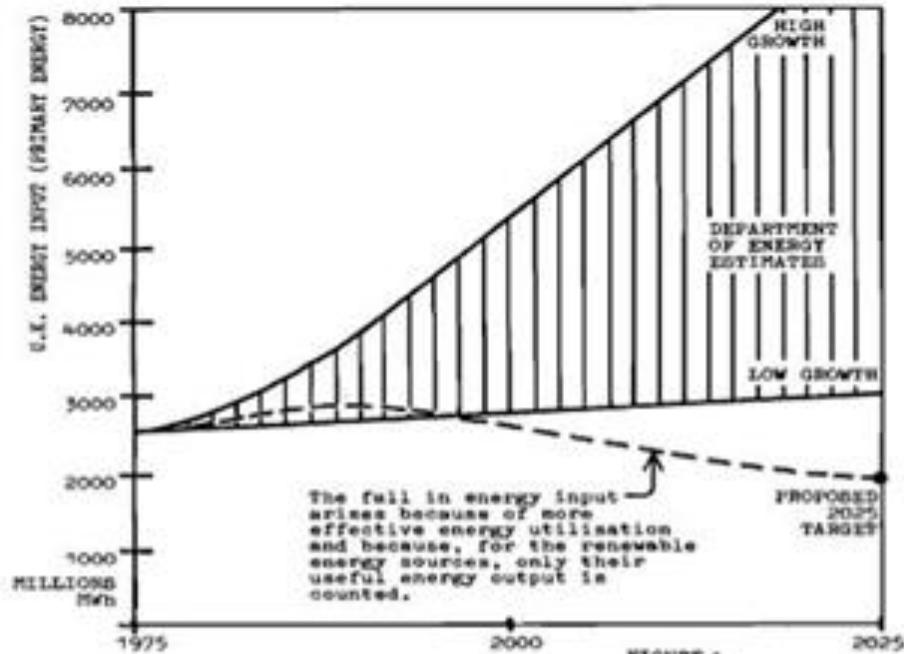
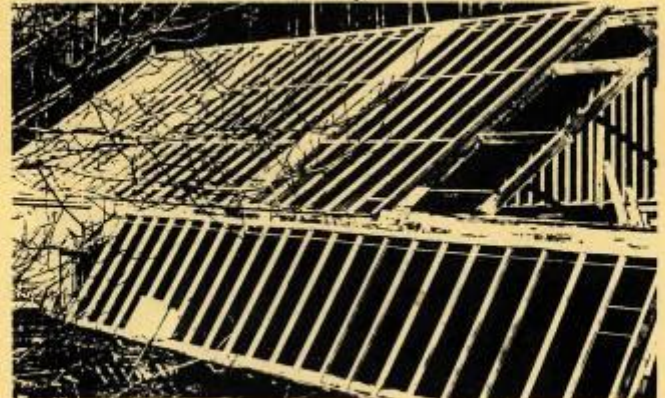
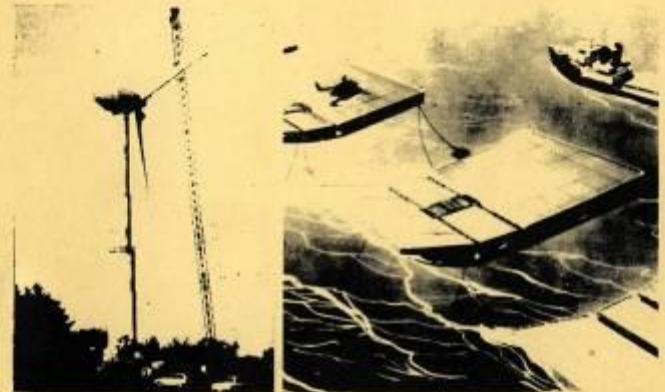


FIGURE 1

more efficient in their use of fuel but they involve the storage, handling and transportation of substantial quantities of plutonium, which is highly toxic and of military significance. Both types of reactor produce waste products which remain dangerous for very long periods of time. The Royal Commission on Environmental Pollution in its Sixth Report has drawn attention to the hazards of a large-scale nuclear power programme based on breeder reactors, mentioning the risks associated with accidents within reactors, the political risks involved in the so-called "plutonium economy" and the problems of the safe disposal of radioactive waste. On this last point the report recommends that there should be no commitment to such a programme until it has been demonstrated beyond reasonable doubt that a method exists to ensure the safe containment of long-lived, highly radioactive waste for the indefinite future.

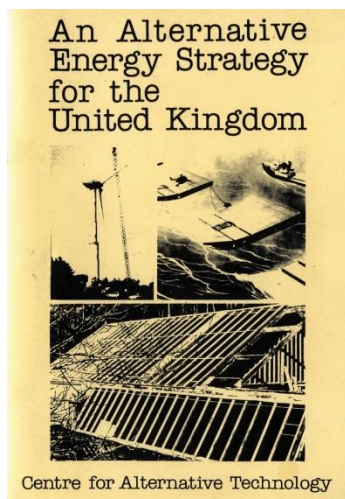
# An Alternative Energy Strategy for the United Kingdom



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Centre for Alternative Technology





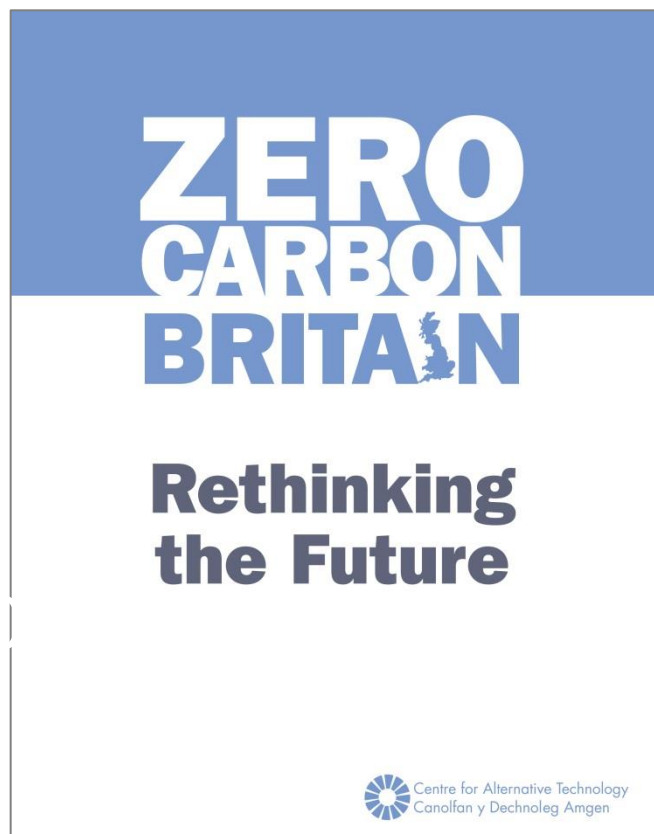
1977



2015

zerocarbonbritain  
an alternative energy strategy  
publicinterestresearchcentre

2007



2013

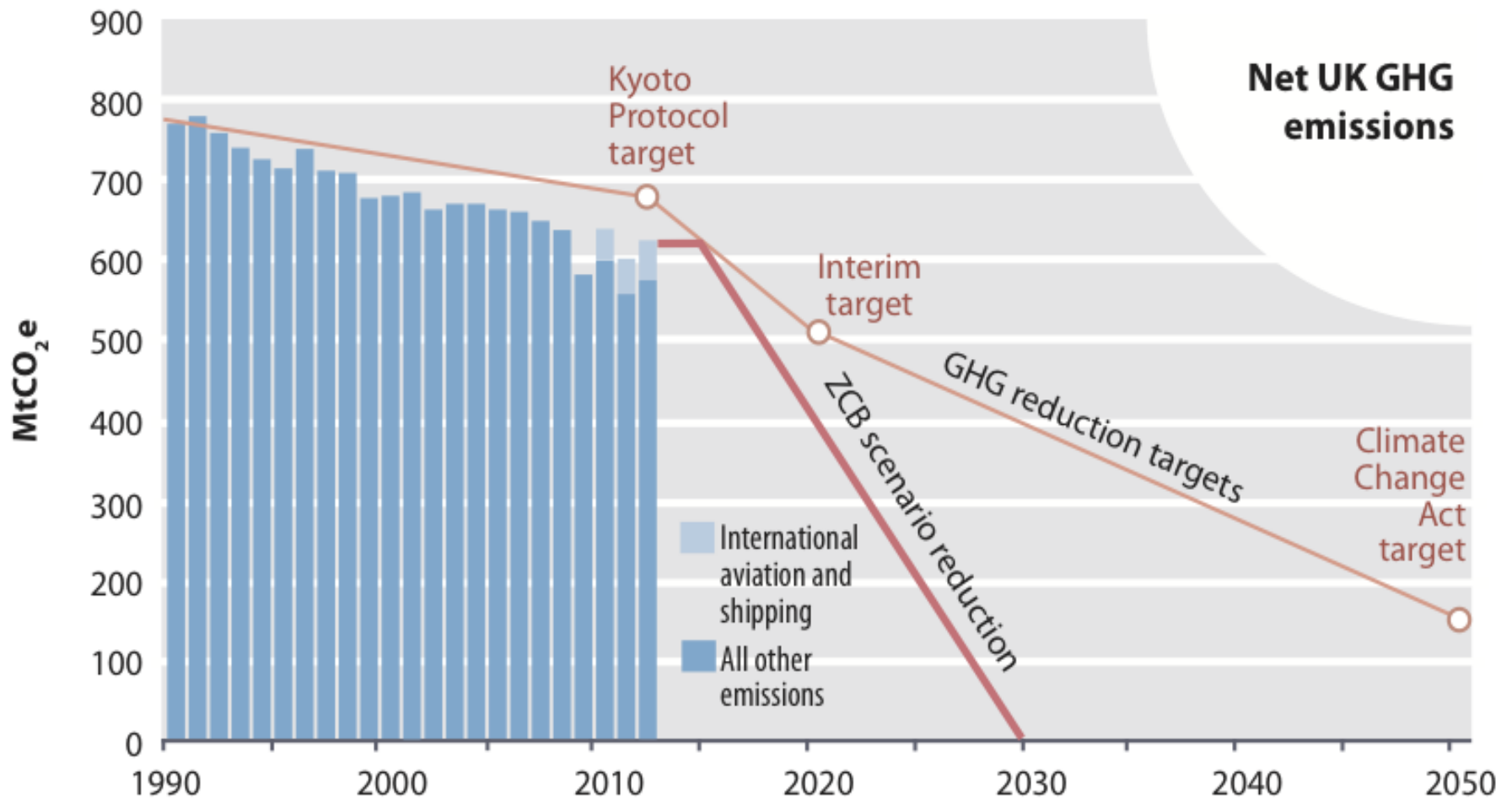


2010



2015 and beyond

# Roadmap to where we need to be





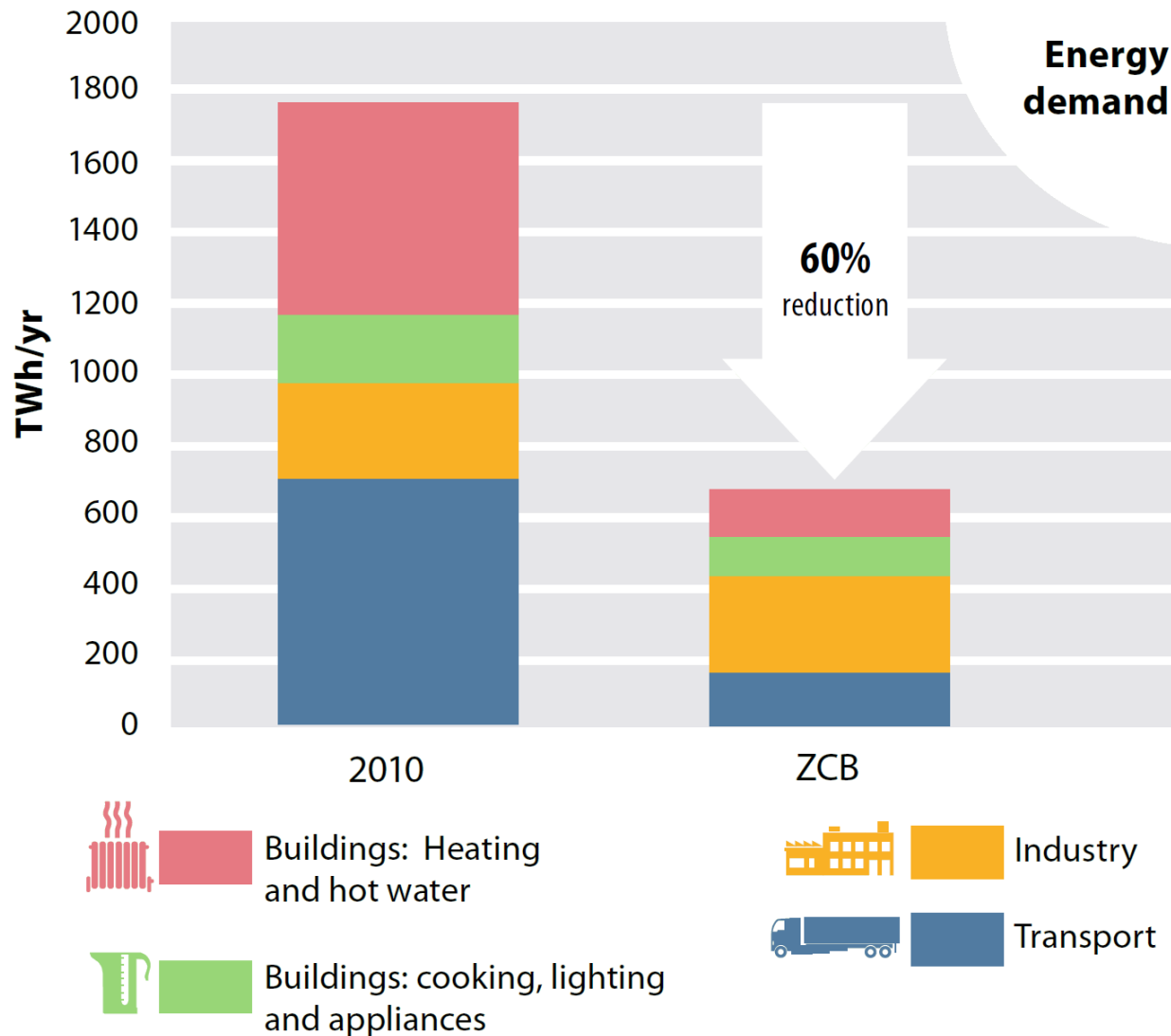
# Power-down & Power-up

Through integrating a smart approach to food, diet, buildings, transport, energy & land-use, the UK's greenhouse gas emissions **can** be reduced to net zero

- without relying on future technology
- without major impacts on quality of life

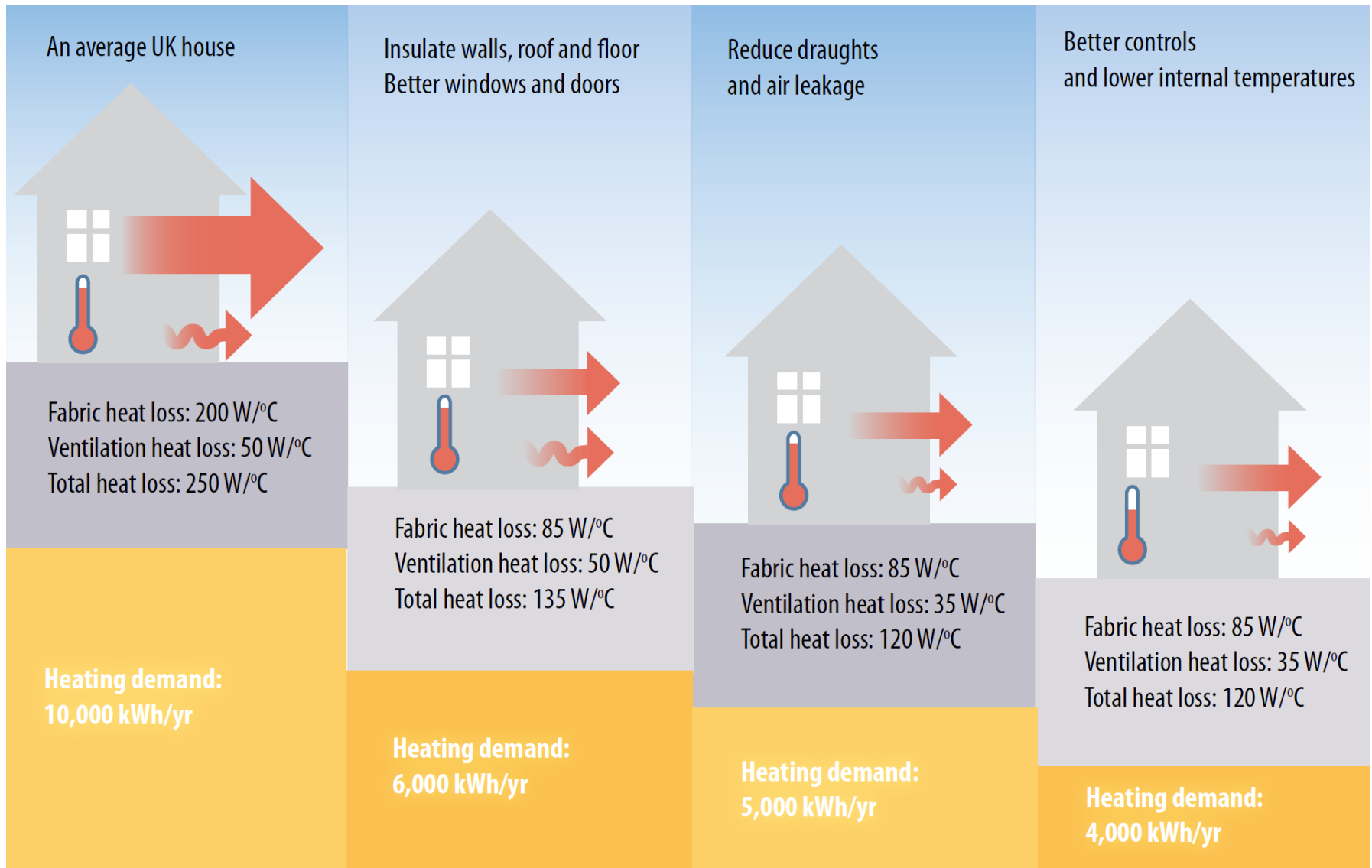


# Power down energy demand:

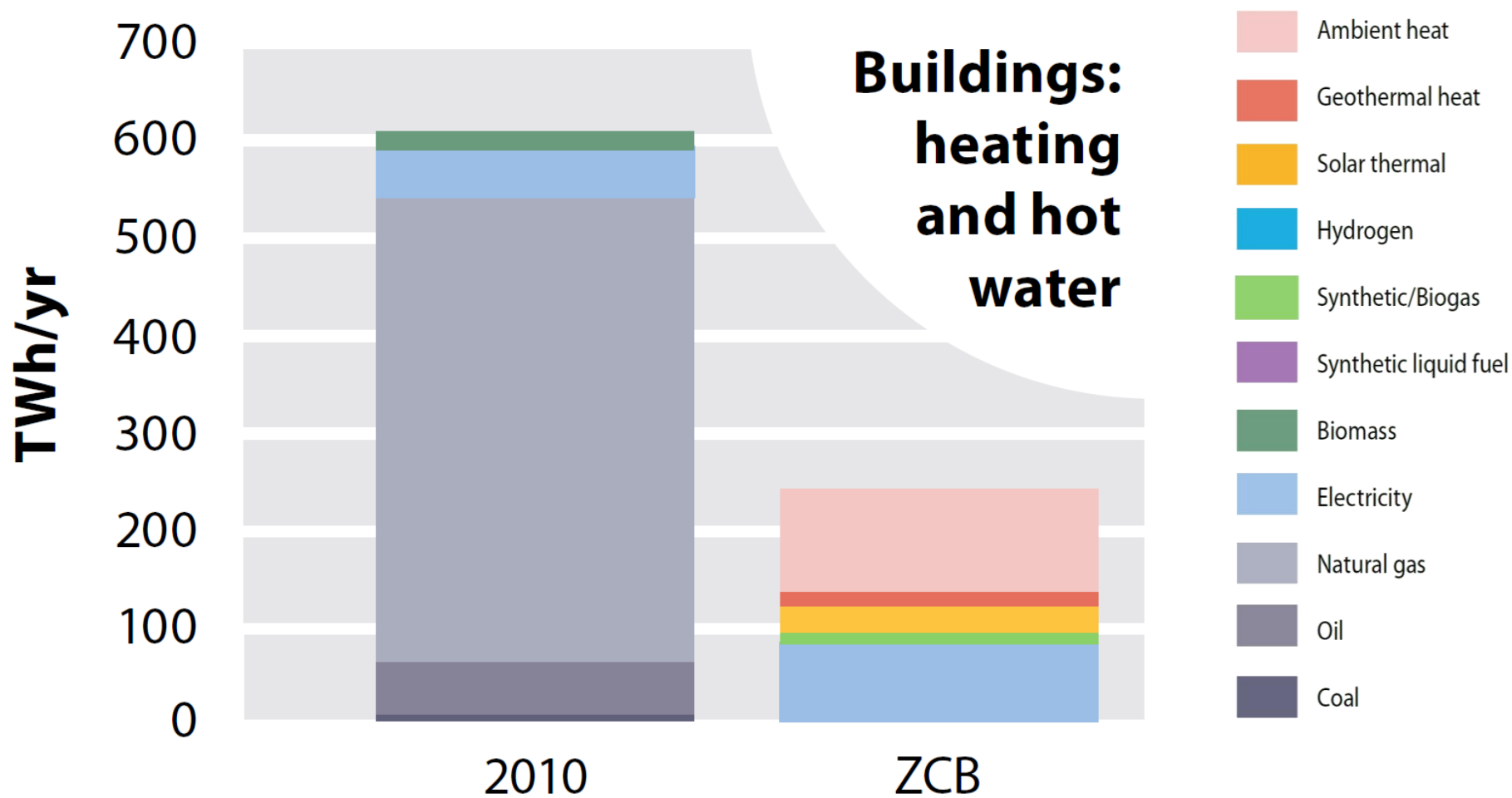




# Buildings: heating and hot water



# Buildings: heating and hot water





# Transport

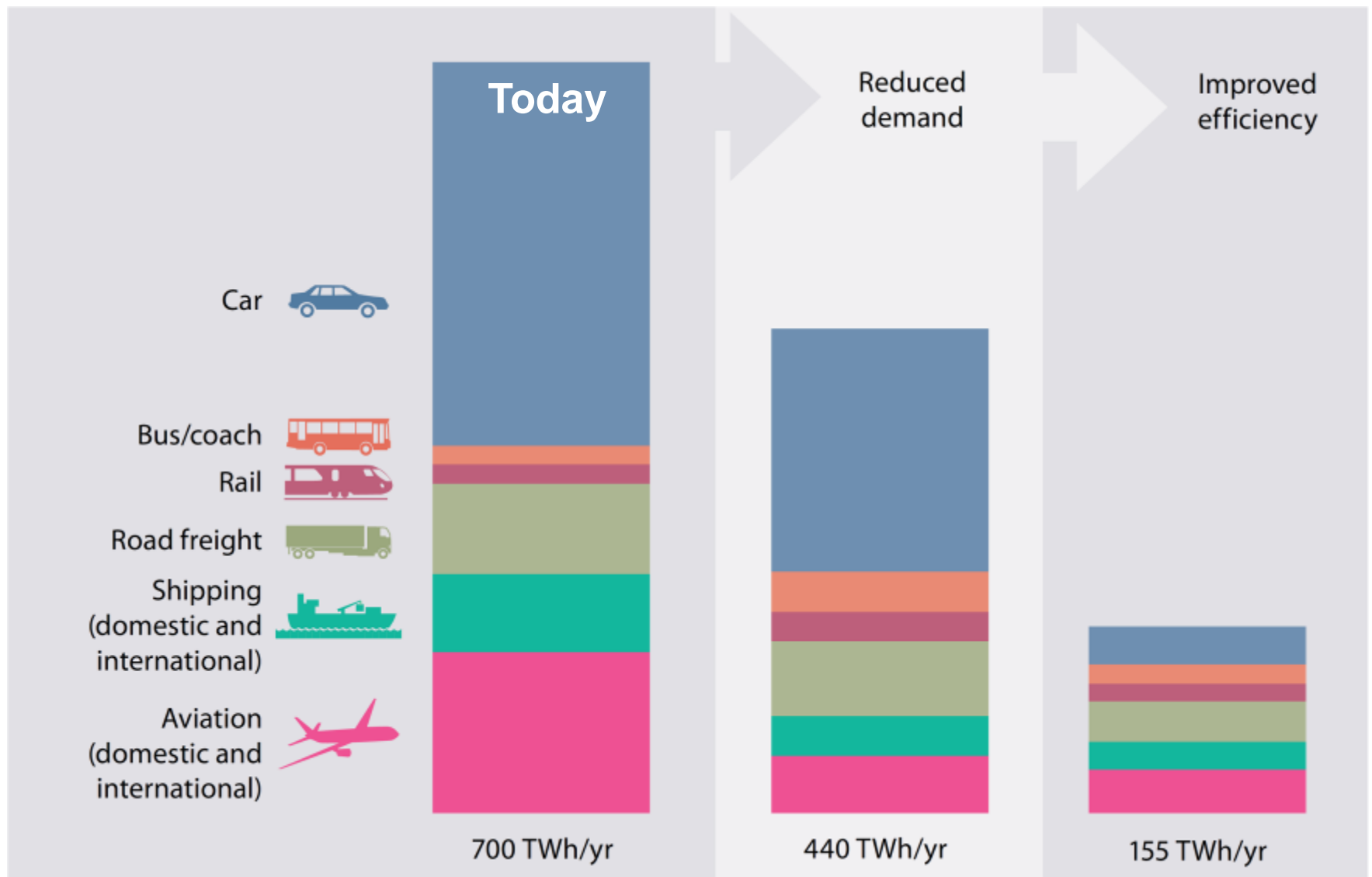
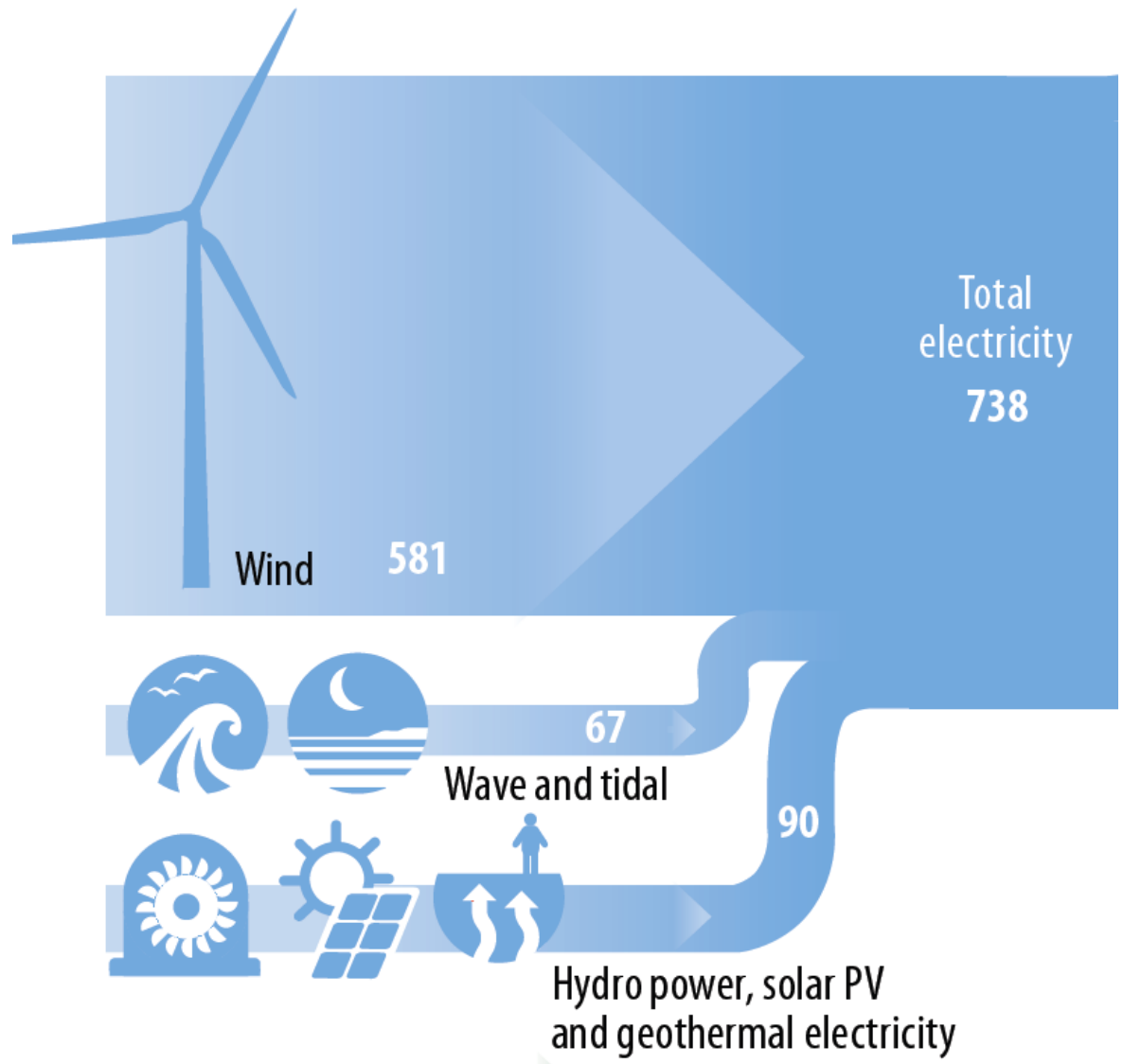


Figure 3.13: Reduction in energy demand for personal and commercial (freight) transport in our scenario (with initial figures from DECC, 2012).

# Powering up Britain with renewables:

Can we  
“keep the  
lights on”?







**Single 3.6 MW  
wind turbine**

**10,000 MWh/yr**



**10 MW PV farm  
20 ha**

**10,000 MWh/yr**

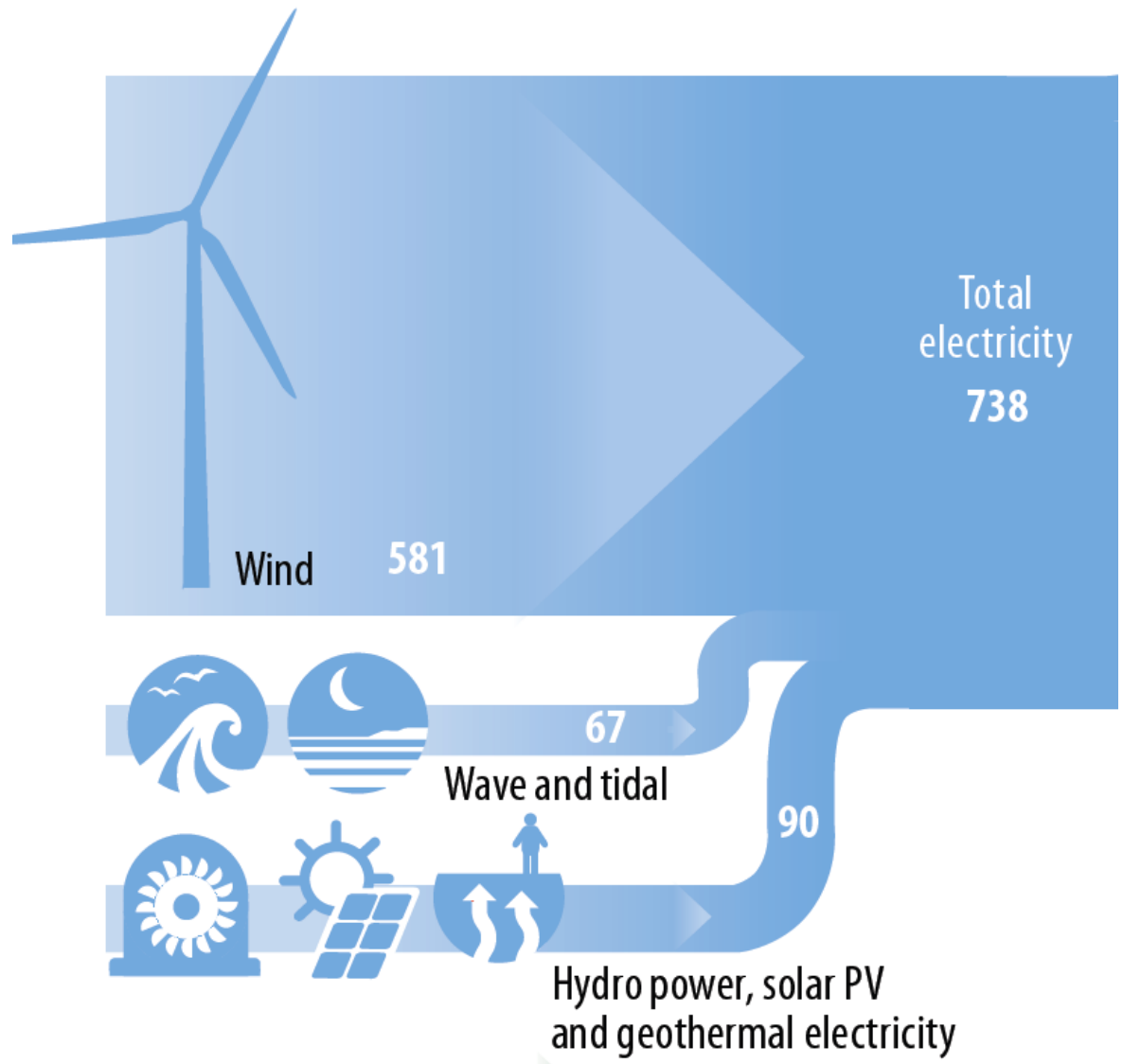


**Willow biomass  
200 ha**

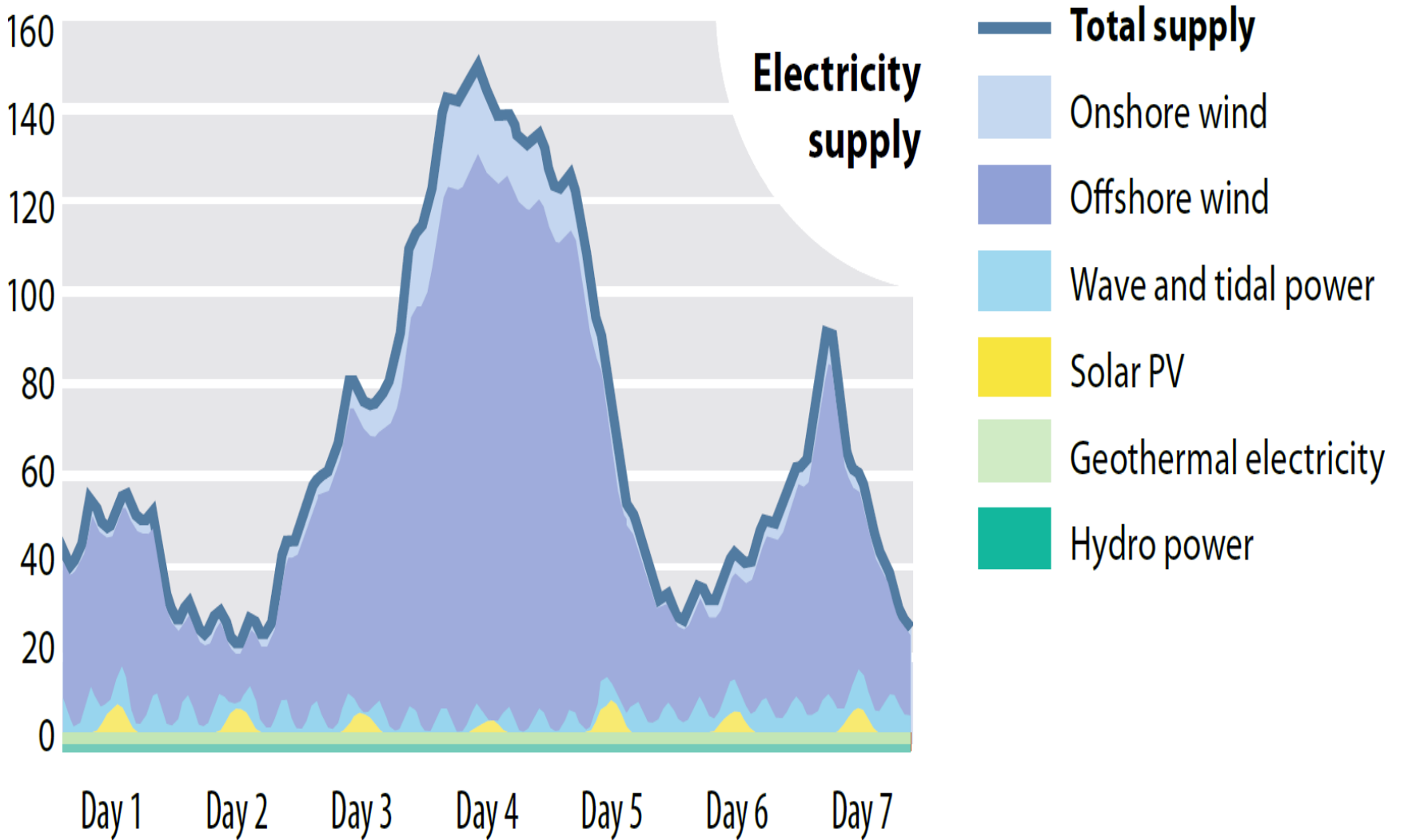
**10,000 MWh/yr**

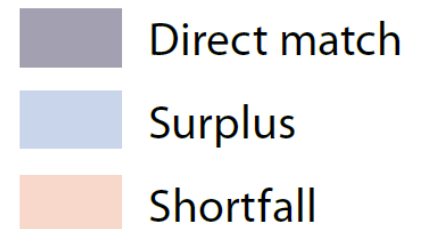
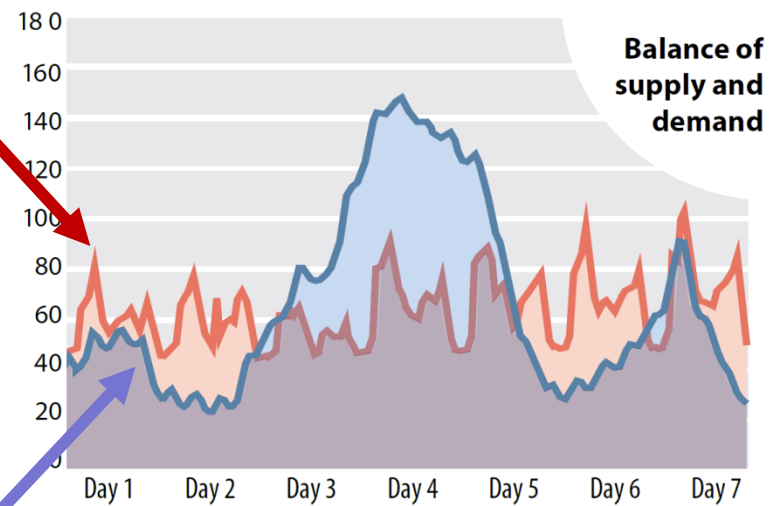
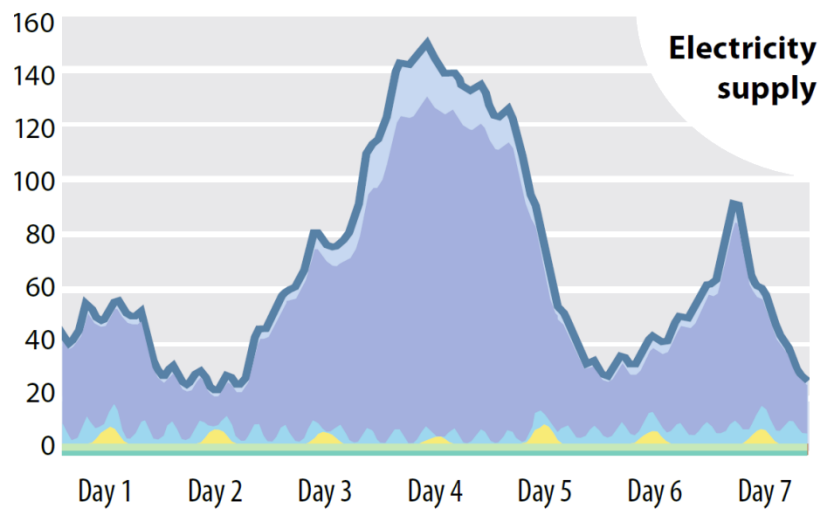
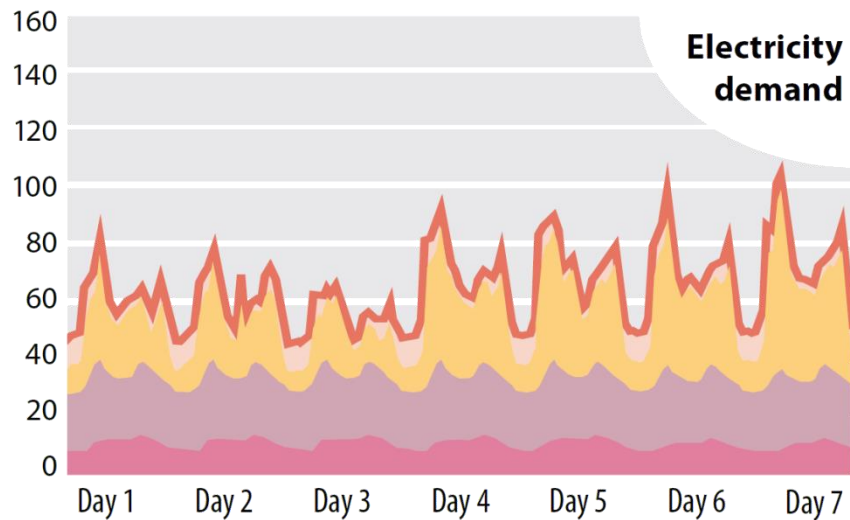
**Yes we can!**

**The ZCB  
Energy Model:  
is based on  
ten years of  
real-world  
hourly data  
from  
2002 - 2011  
87,648 hours**

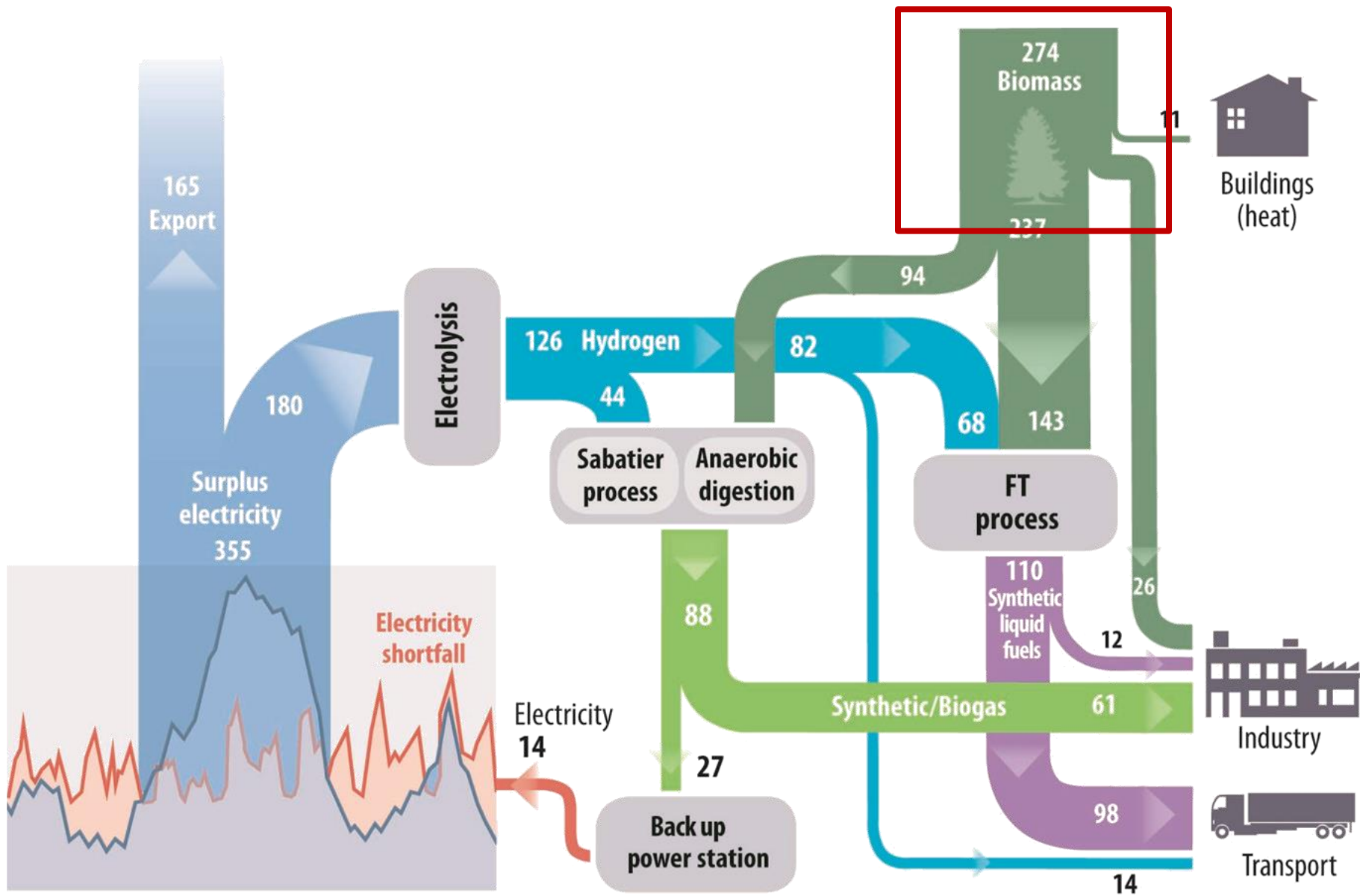












# Management of supply and demand with a 100% renewable energy system is possible with existing technology

- 82% of the time, supply exceeds demand.
- 18% of the time, supply does not fully meet demand.
- Short-term storage & load shifting reduces this to 15%.
- Carbon-neutral synthetic gas in power stations cover this.

**But this requires re-thinking land-use**



# Rethinking land-use in terms of:



**1. Food**

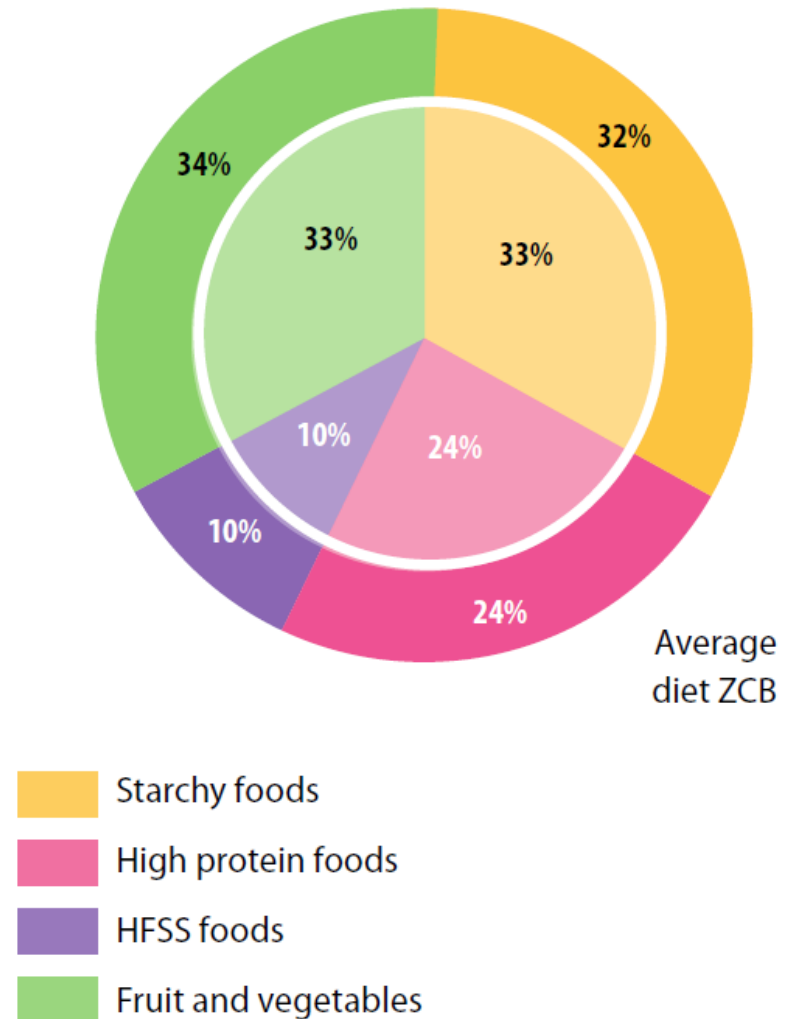


**2. Energy/fuel**



**3. Carbon capture**

# 1. Rethinking food



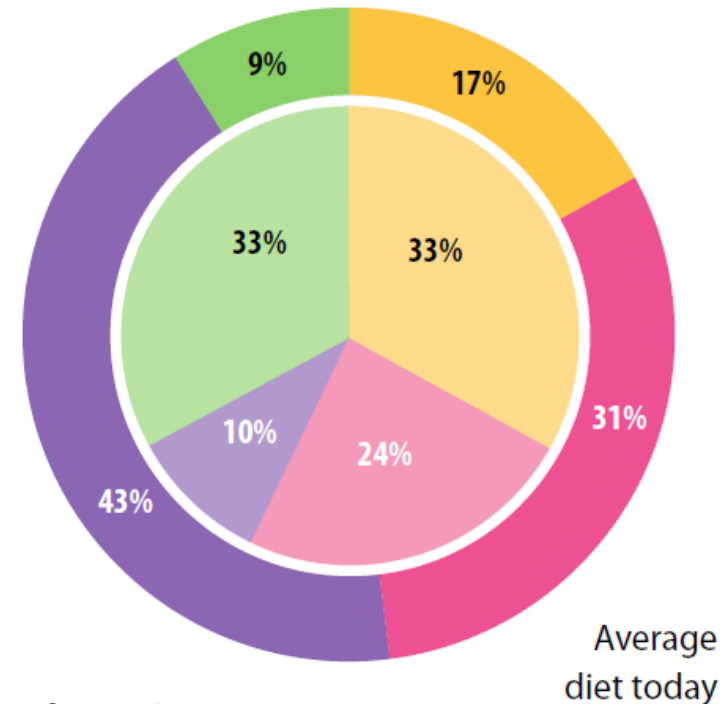


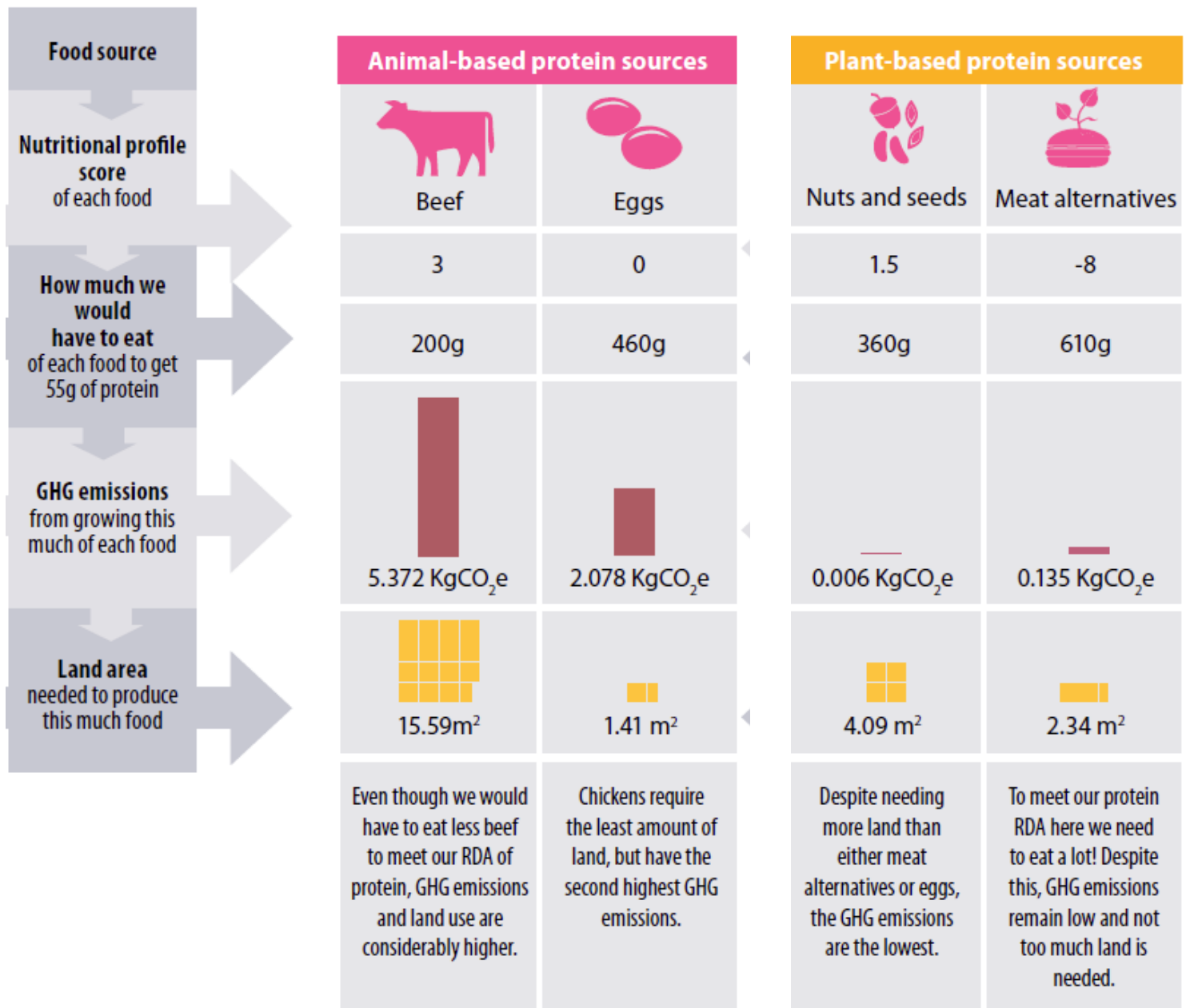
# 1. Rethinking food

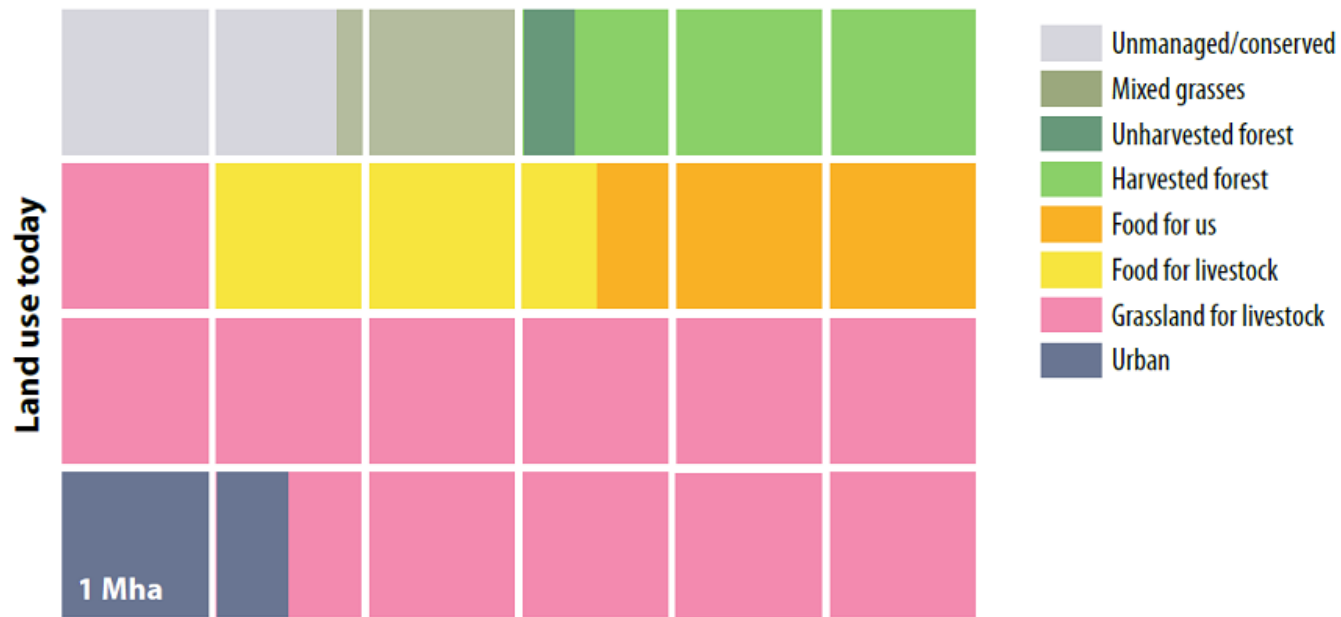
64% of adults overweight/obese  
(Bates et al, 2011).

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)).**



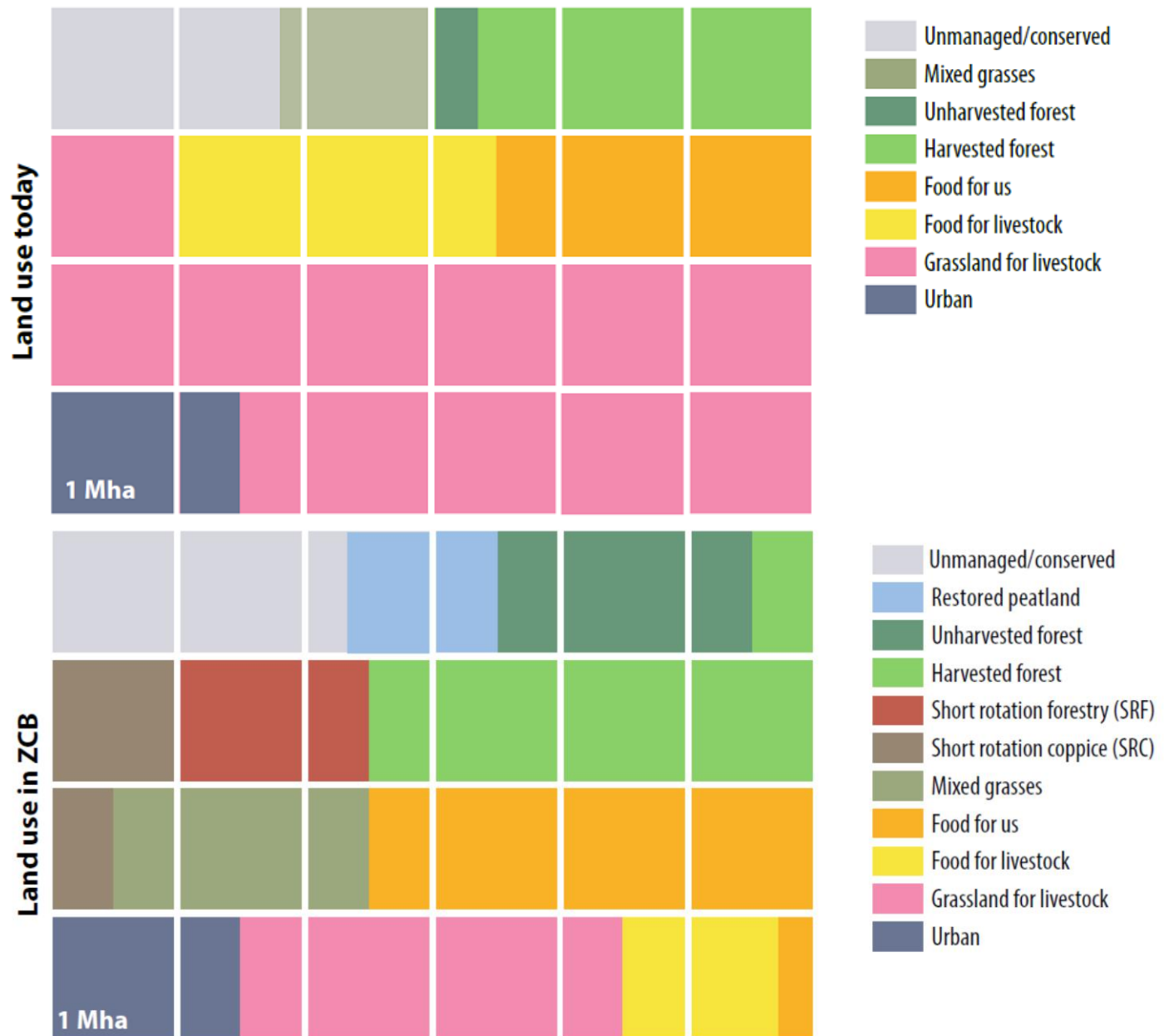


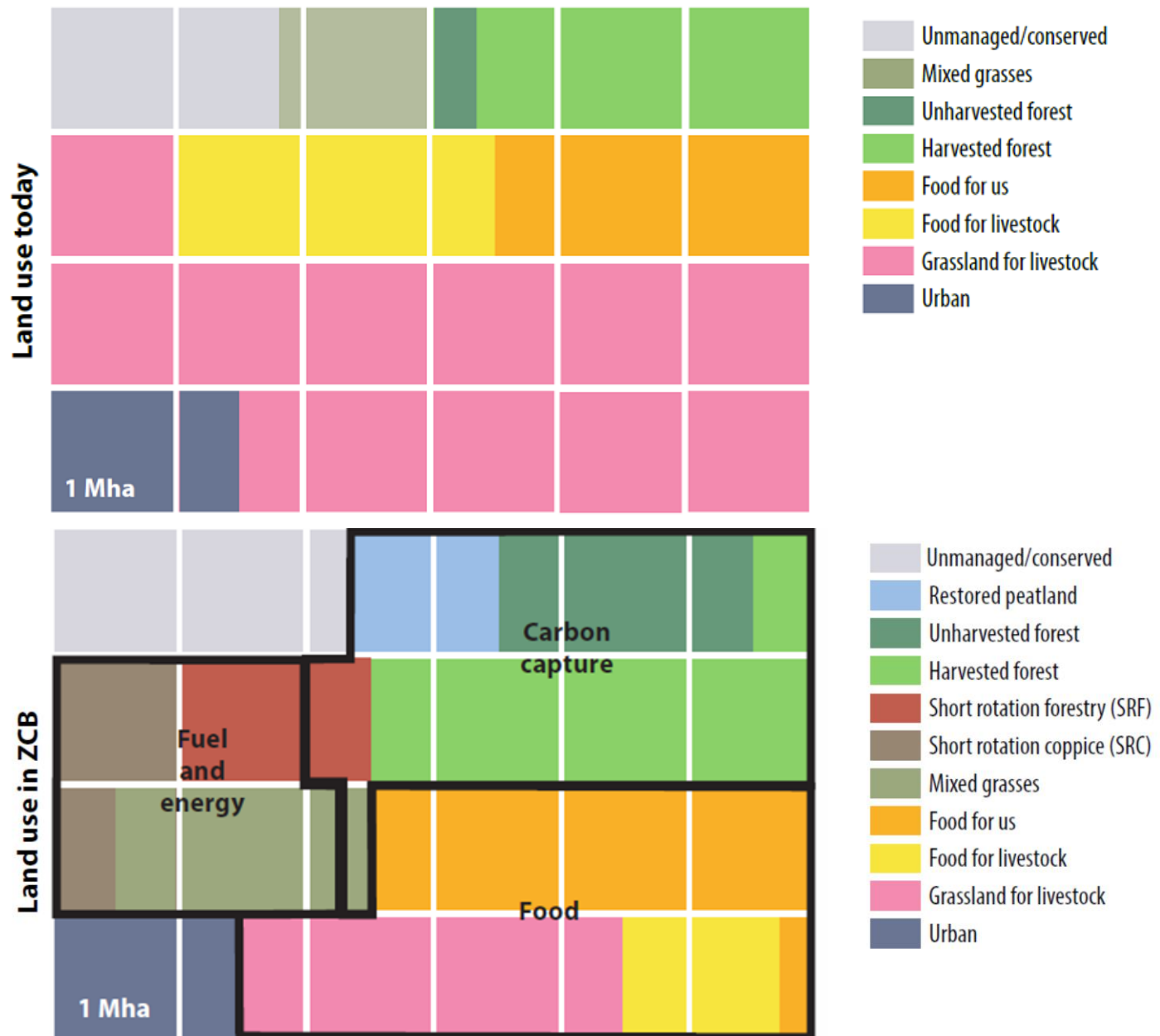


# Land use today

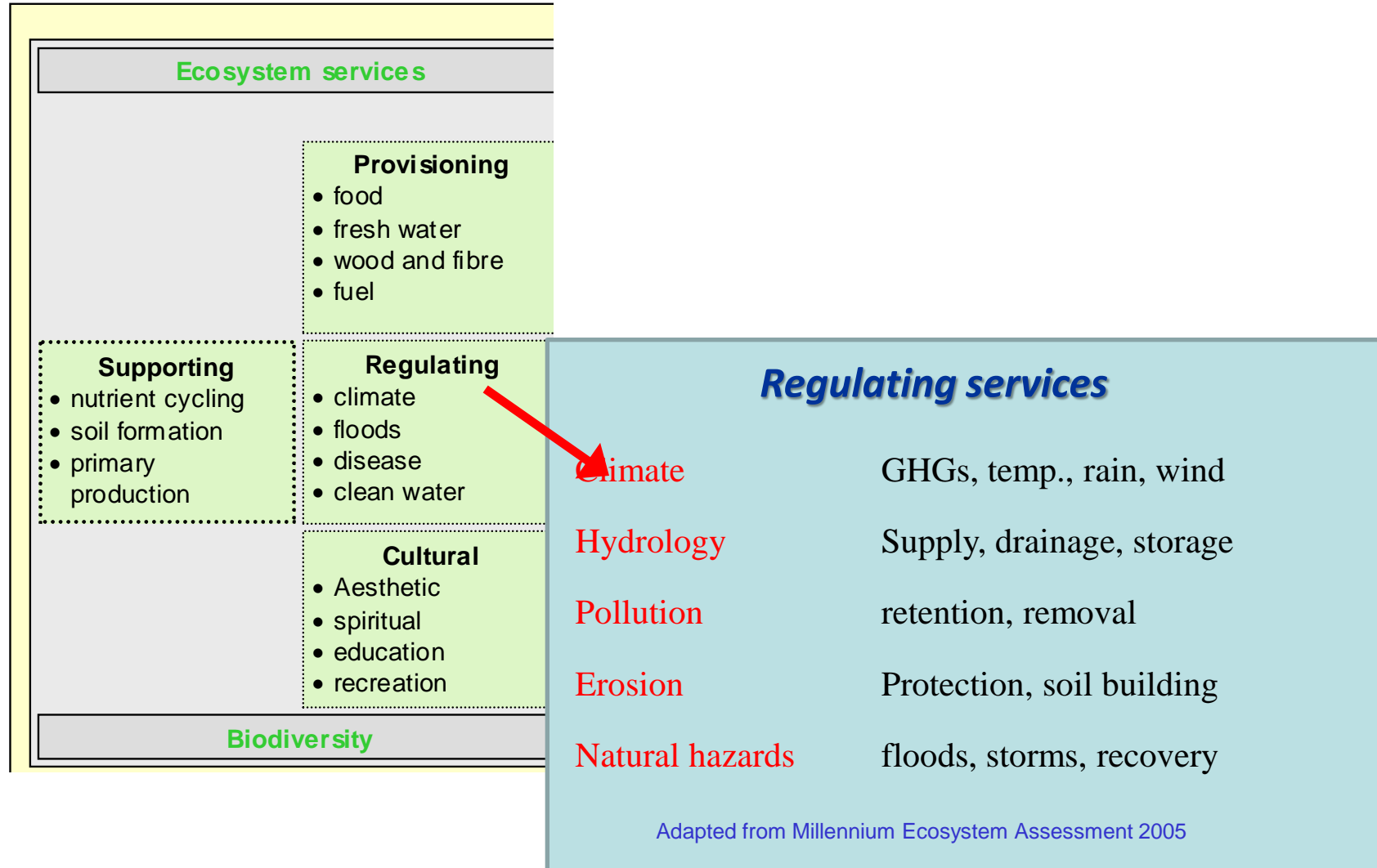
- 65-70% = food production/agriculture (despite 42% imports).
  - 85% of agricultural land = livestock.
- About 13% = forest (European average = 37%).







# New focus on Ecosystem services





# A whole system approach?

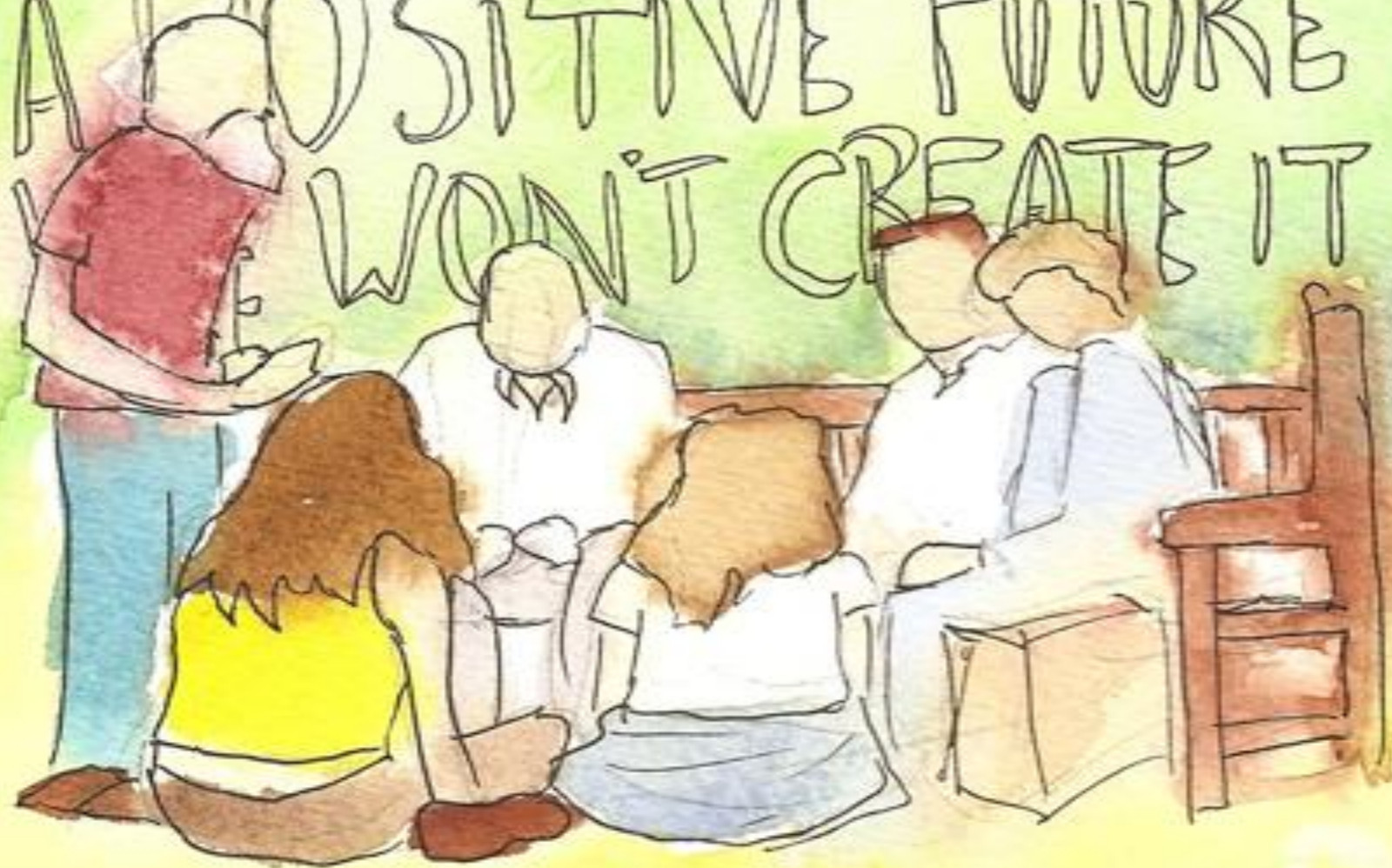
- ‘Fundamental societal **transformations** are required’  
(Eriksen et al. 2011).
- ‘Today’s environmental problems require x10 factor change, thus **deep-structural change**’ (Roggema et al. 2012);
- ‘Challenges of climate change are such that **many familiar ways of life & patterns of consumption are fundamentally unsustainable**. If there is to be any effective response, **new forms of living**, working, and playing will have to take hold across all sectors of society’ (Shove 2010).

# Identifying barriers & how we overcome them

- Science\*
- Technology\*
- Culture
- Economics
- Psychology
- Philosophy
- Sociology
- Arts
- Democracy
- Law



IF WE CAN'T IMAGINE  
A POSITIVE FUTURE  
WE WON'T CREATE IT







# New hub and innovation lab to share zero carbon solutions

Share on social



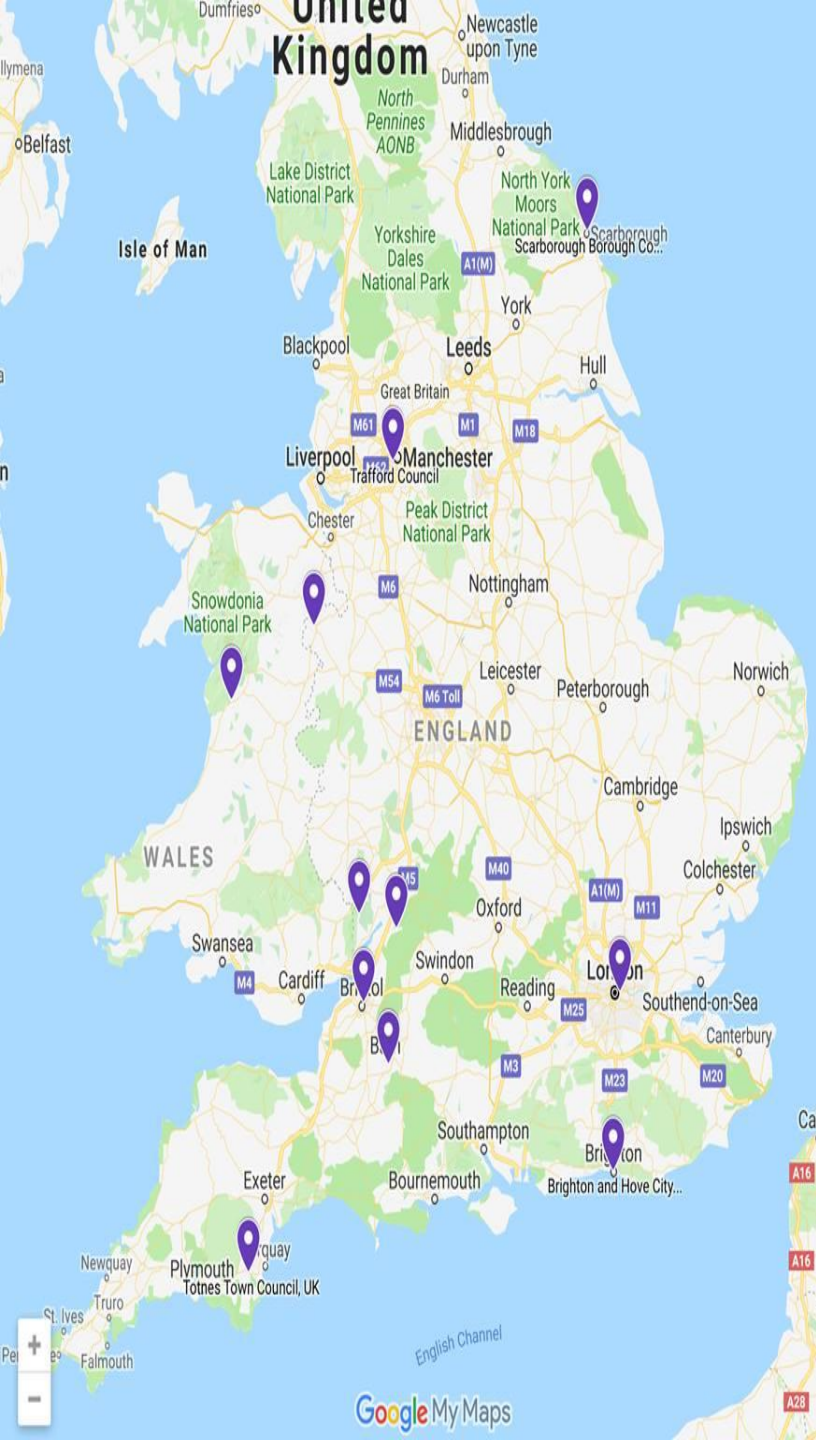
JULY 29, 2019

[Home](#) » [New hub and innovation lab to share zero carbon solutions](#)

A new *Zero Carbon Britain Hub and Innovation Lab* is being launched at CAT later this year to help communities, local authorities and policymakers to create Zero Carbon Action Plans, and to provide support for the development of innovative solutions.



RELATED PAGES



# Declare a Climate Emergency

Go Zero Carbon by 2030

Local Councils

Zero Carbon Britain

Climate Change

Resources

Solutions

Policy

DECLARE A CLIMATE EMERGENCY

Local councils can play a key role in leading the climate emergency response. Write to your Councillor & sign a petition.

UK GOVERNMENT & PARLIAMENT

Click to sign the Petition: Declare a Climate Emergency, end fossil fuel use and build community resilience

RENEWABLE ENERGY

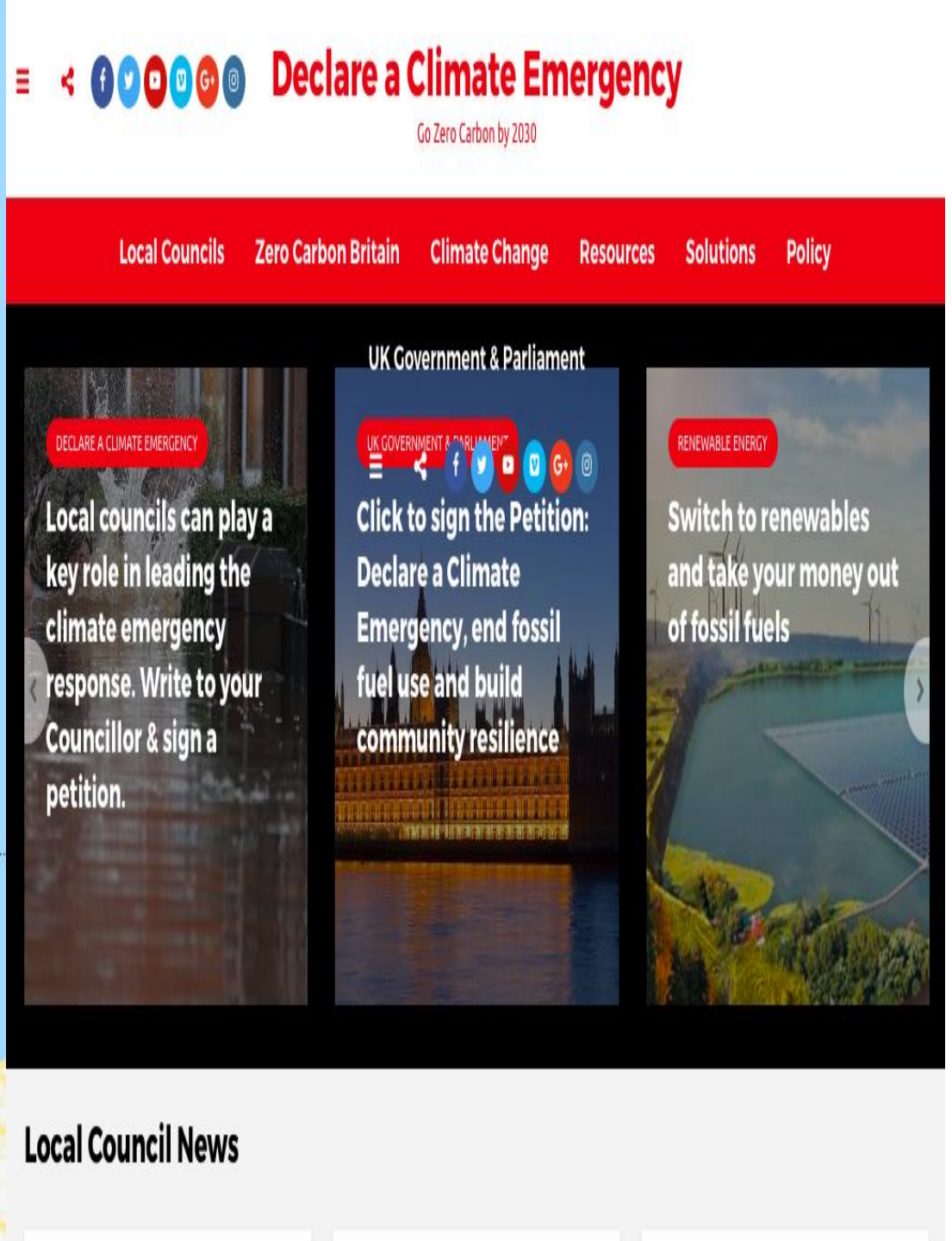
Switch to renewables and take your money out of fossil fuels

## Local Council News

















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Local Council News

# CEO Peter Tyldesley.

“Two principles that nature teaches us are the importance of edges and of connections. CAT exists at the edges between a number of different spheres – between academia and activism and between education and lobbying – and this enables us to make the connections between people and institutions that will be vital in tackling the climate emergency and the other environmental challenges that we face.”



## Multi-solving – maximising the benefits beyond carbon







### **MArch Sustainable Architecture**

Building design plays an important role in improving quality of life and human well-being whilst also helping with climate change mitigation and adaptation.



### **Sustainability in Energy Provision and Demand Management**

To tackle climate change, we need a transformation in our relationship with energy. Net zero greenhouse gas emissions can be achieved through large scale investment in renewable and low carbon...



### **Sustainability and Ecology**

Great changes have occurred in human society in the past 200 years, but much of this has come at the expense of the natural systems and species that keep us...



### **Sustainability and Behaviour Change**

It is becoming clear that major systemic, political and societal changes are necessary to move towards true sustainability to address the serious consequences of environmental and climatic change.



### **Green Building**

Develop a deep understanding and confidence around sustainable design principles and sustainable materials, their regulatory and legal requirements and their practical use.



### **Sustainable Food and Natural Resources**

Develop your knowledge and understanding of the impacts of environmental change on global and local food systems and the natural world.



### **Sustainability and Adaptation**

Immerse yourself in examining the causes, seriousness and urgency of climate change and – crucially – what changes are needed at international, national, local and individual level to help turn...



### **Sustainability and Adaptation Planning**

From spatial master-planning to politics and economics, 'Sustainability and Adaptation Planning' focuses on the key strategic and leadership challenges brought about by climate change and broader environmental issues.



### **Sustainability and Adaptation in the Built Environment**

Climate change poses two key challenges to modern architecture: how can buildings be made sustainable, and how can they be designed to take account of the effects of climate change?

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