

INFORSE-Europe Sustainable Energy Seminar
August 21-24, 2017
Nordic Folkecenter for Renewable Energy, Denmark

INFORSE-EUROPE
International Network for Sustainable Energy

Transition Towards Sustainable Energy – UK

by Paul Allen; August 21, 2017
Centre for Alternative Technology



See the Program and the Proceedings at: http://www.inforse.org/europe/seminar_17_DK.htm

**ZERO
CARBON
BRITAIN**

**Rethinking
the Future**

**Transition of Western European Country to
Renewable Energy – How to Make it Happen**



Centre for Alternative Technology
Canolfan y Dechnoleg Amgen

Begins with the recognition that our living systems have been deliberately designed to make us use more energy

" Our whole economy is based on
Planned Obsolescence...
We make good products, we induce people to buy them, and then next year we deliberately introduce something that will make those products old fashioned, out of date, obsolete.

We do this for the soundest reason... to Make Money! "

— Brooks Stevens,
Industrial Designer. 1958



Brought to you by the
Post-Landfill Action Netu



TUPPERWARE!

**TRY LONG-LASTING
CONSUMERISM**

Feeling low? Down in the dumps? Blue? CONSUMERISM has what it takes to put a smile back on your face! Using a patented method of irrational buying and acute materialism, CONSUMERISM makes you happy - EVERY SINGLE TIME.

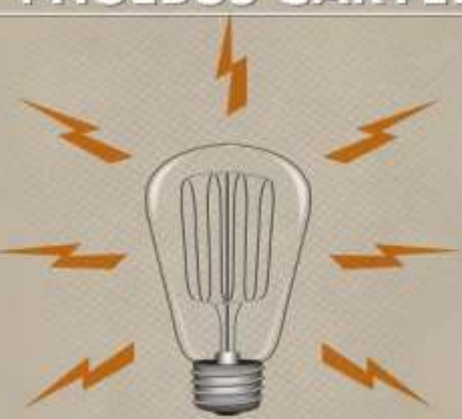


GET OUT THIS FORM, AND MAIL IT ALONG WITH TWO DOLLARS, A SELF-ADDRESSED ENVELOPE AND FIVE DOLLARS WORTH OF CASH!

FREE!
COPY OF OUR CONSUMERISM PROGRAM IN FULL COLOR!

YES! I WANT MORE INFORMATION ON HOW CONSUMERISM CAN TURN MY FROWN AROUND!
CLICK OR CASH

the **PHOEBUS CARTEL**



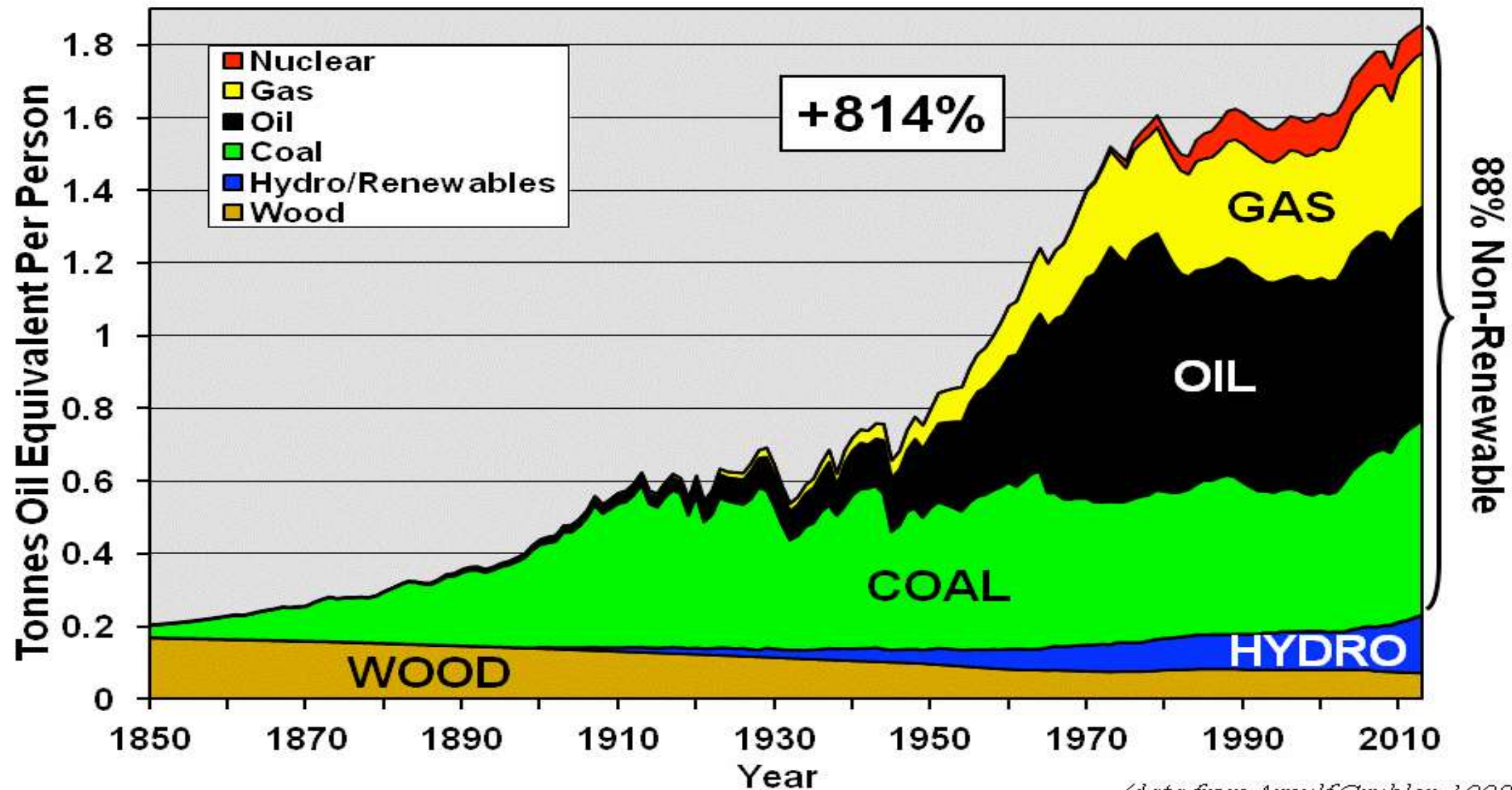
EST. **1924**

Shopping
can be Fun

'Extreme Energy Normality'



World Per Capita Annual Primary Energy Consumption by Fuel 1850-2013



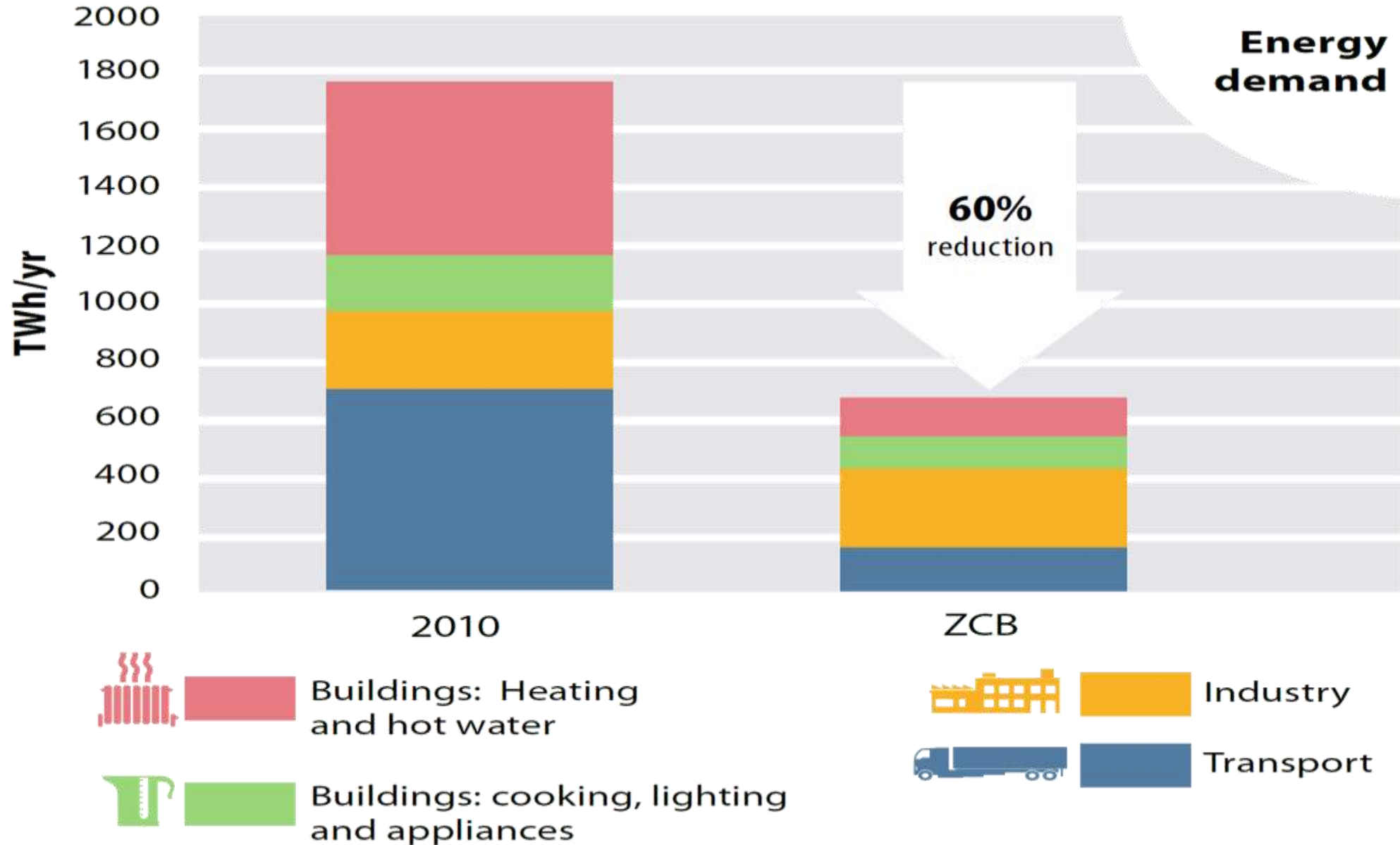
(data from Arnulf Grubler, 1998;

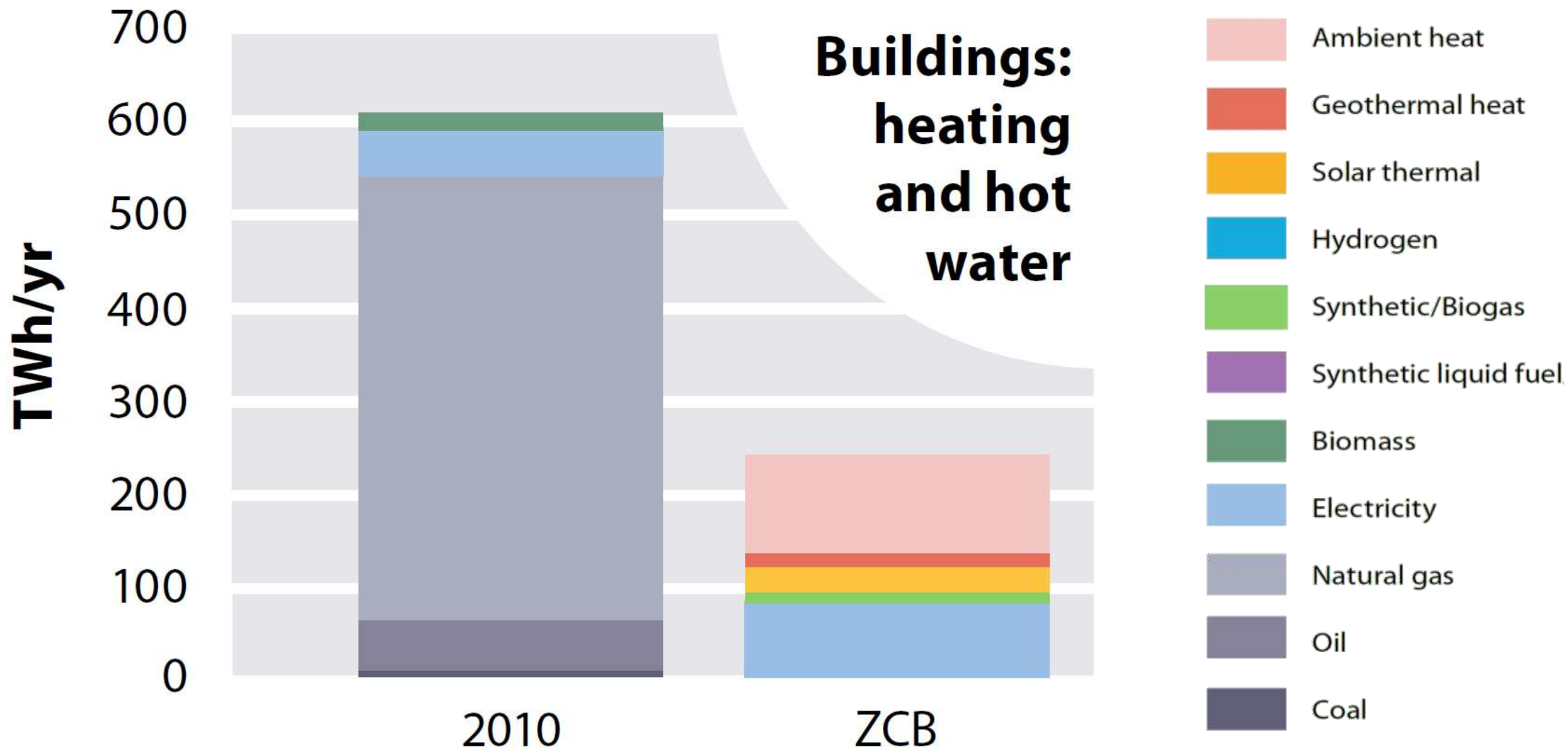
BP Statistical Review of World Energy, 2014; EIA, 2014)





Power down energy demand:





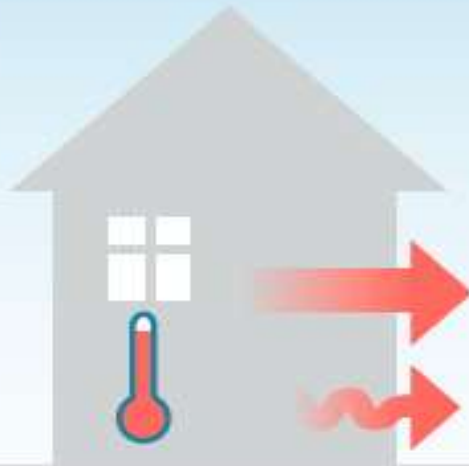
An average UK house



Fabric heat loss: 200 W/°C
Ventilation heat loss: 50 W/°C
Total heat loss: 250 W/°C

Heating demand:
10,000 kWh/yr

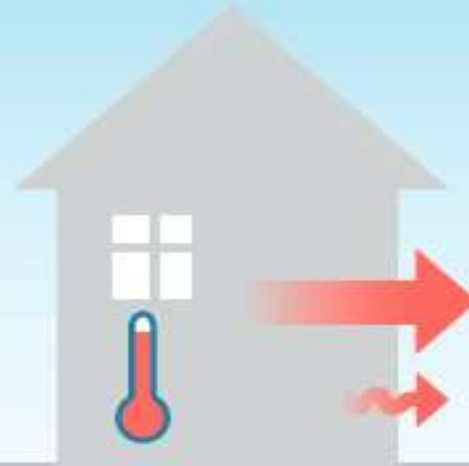
Insulate walls, roof and floor
Better windows and doors



Fabric heat loss: 85 W/°C
Ventilation heat loss: 50 W/°C
Total heat loss: 135 W/°C

Heating demand:
6,000 kWh/yr

Reduce draughts
and air leakage



Fabric heat loss: 85 W/°C
Ventilation heat loss: 35 W/°C
Total heat loss: 120 W/°C

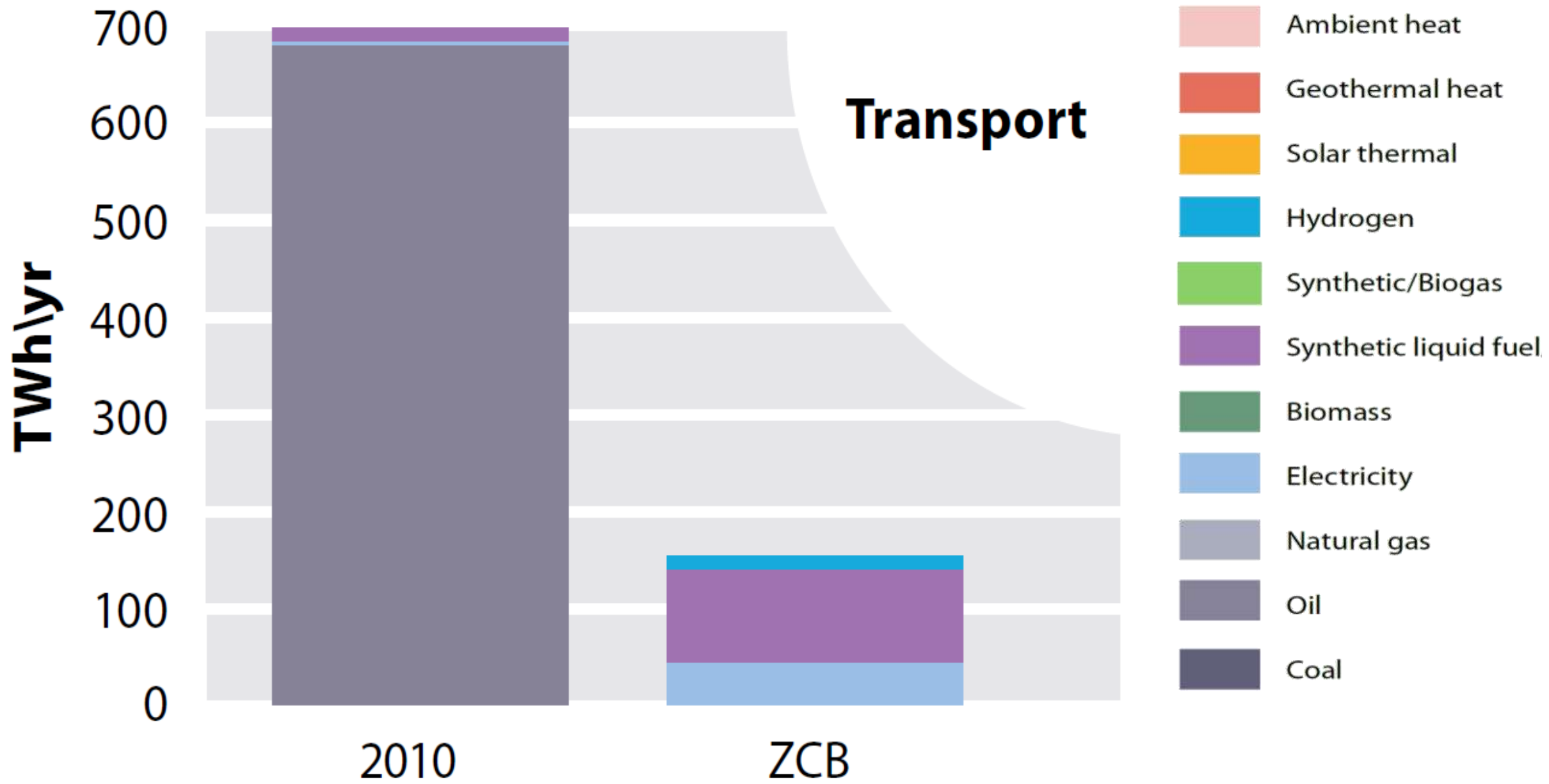
Heating demand:
5,000 kWh/yr

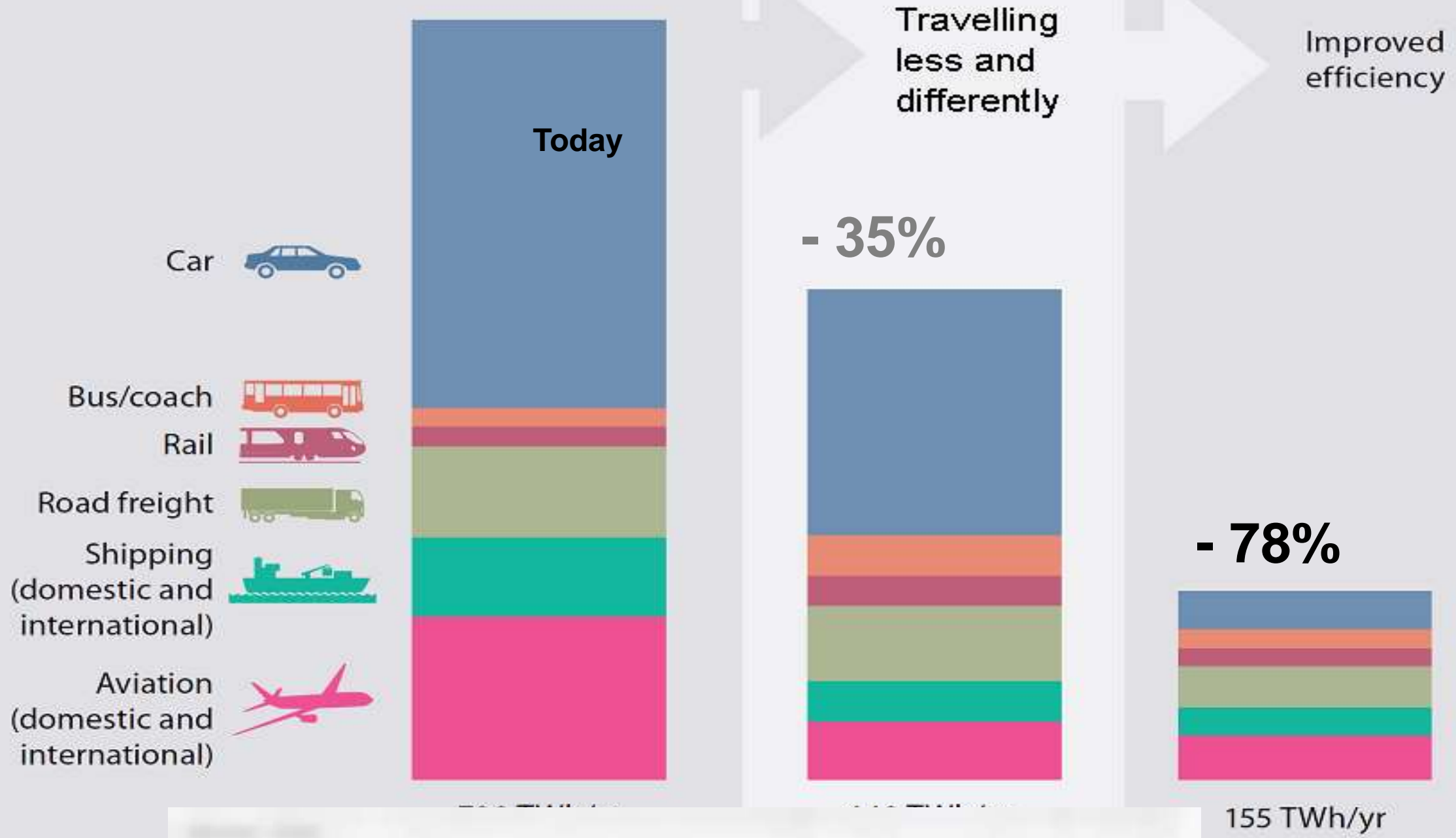
Better controls
and lower internal temperatures



Fabric heat loss: 85 W/°C
Ventilation heat loss: 35 W/°C
Total heat loss: 120 W/°C

Heating demand:
4,000 kWh/yr

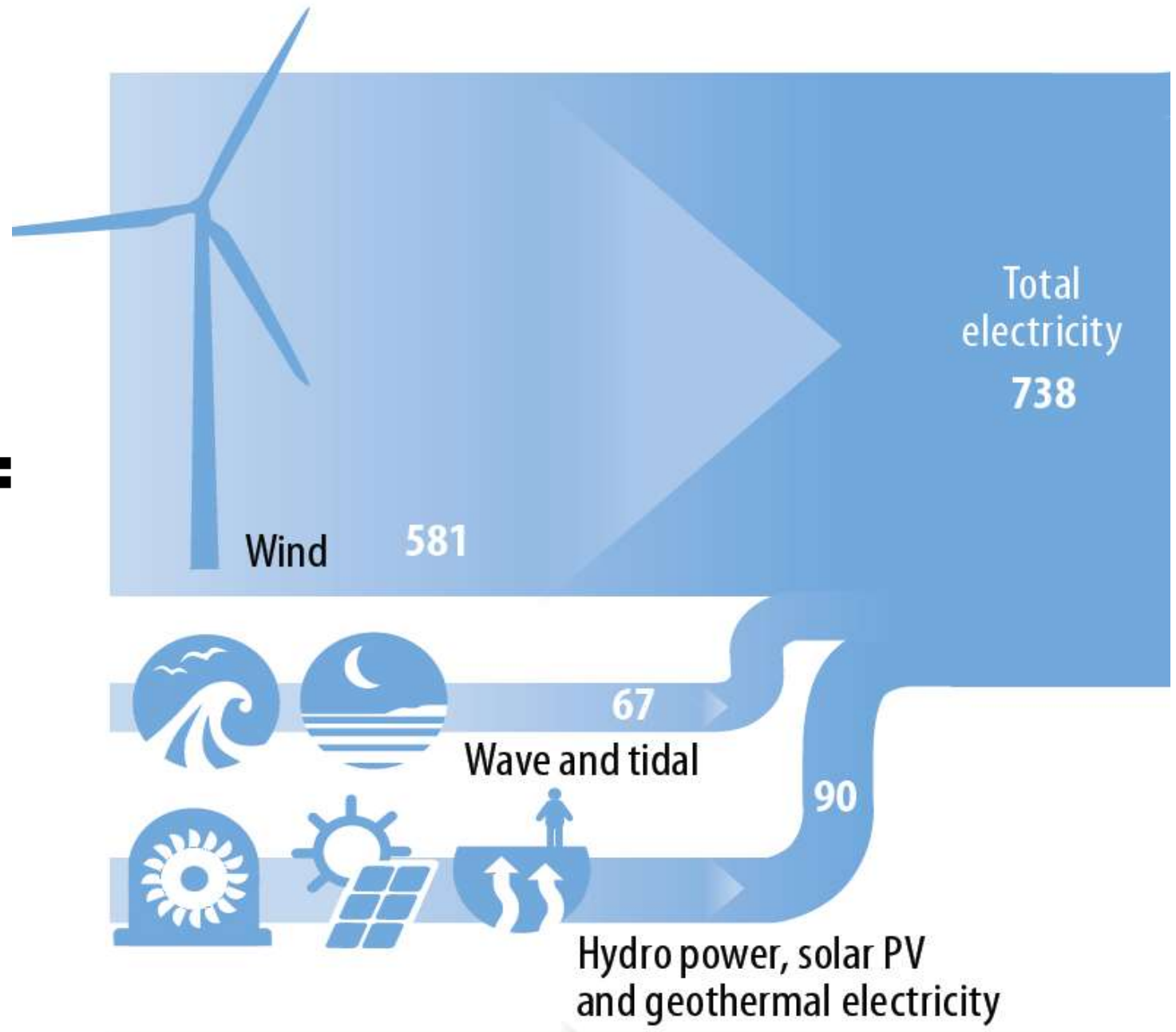


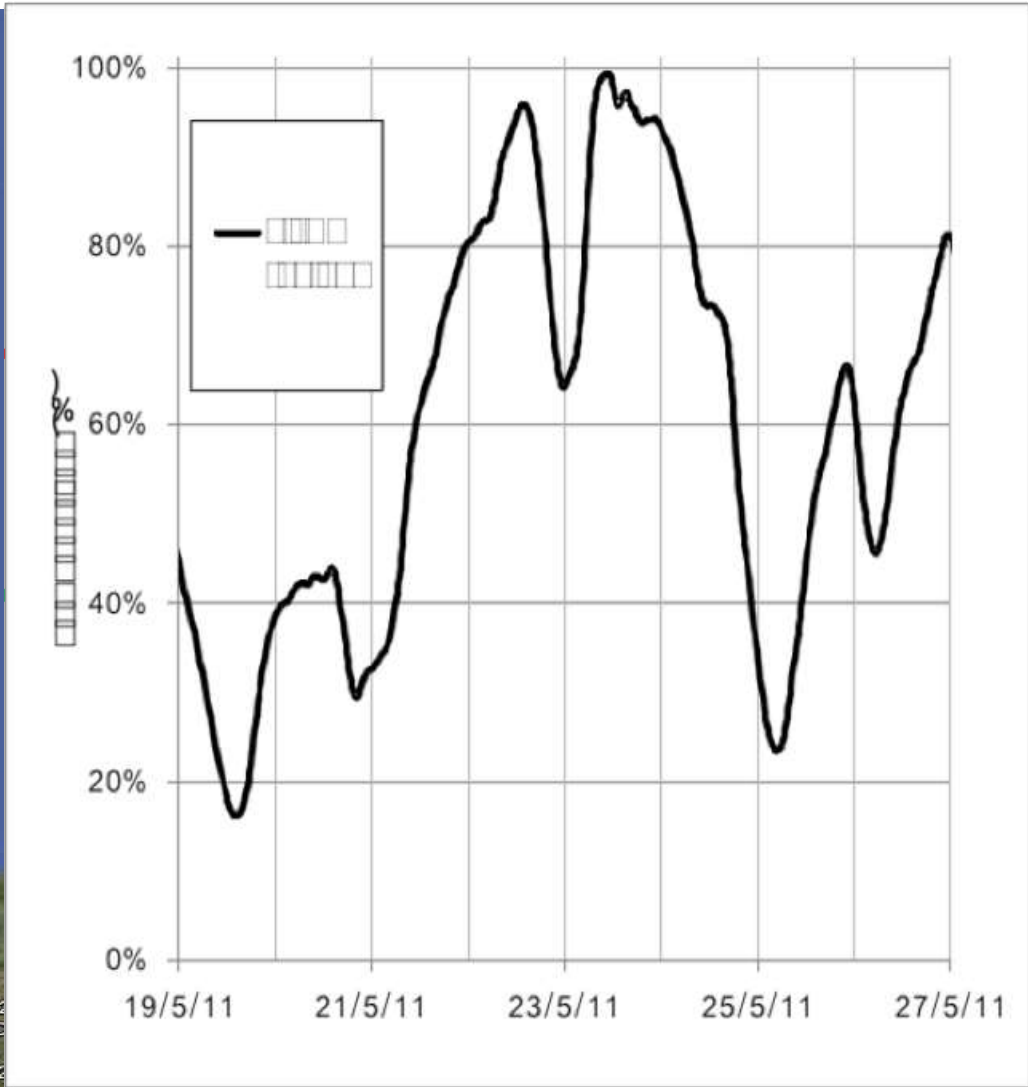
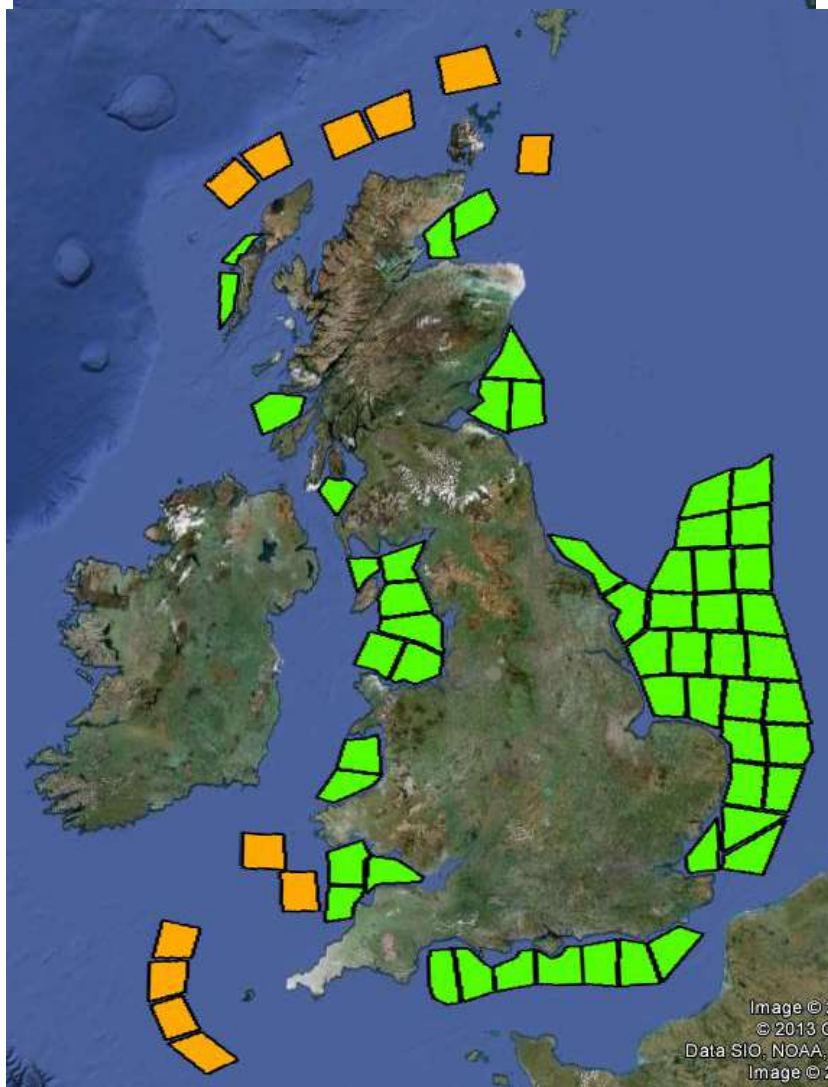


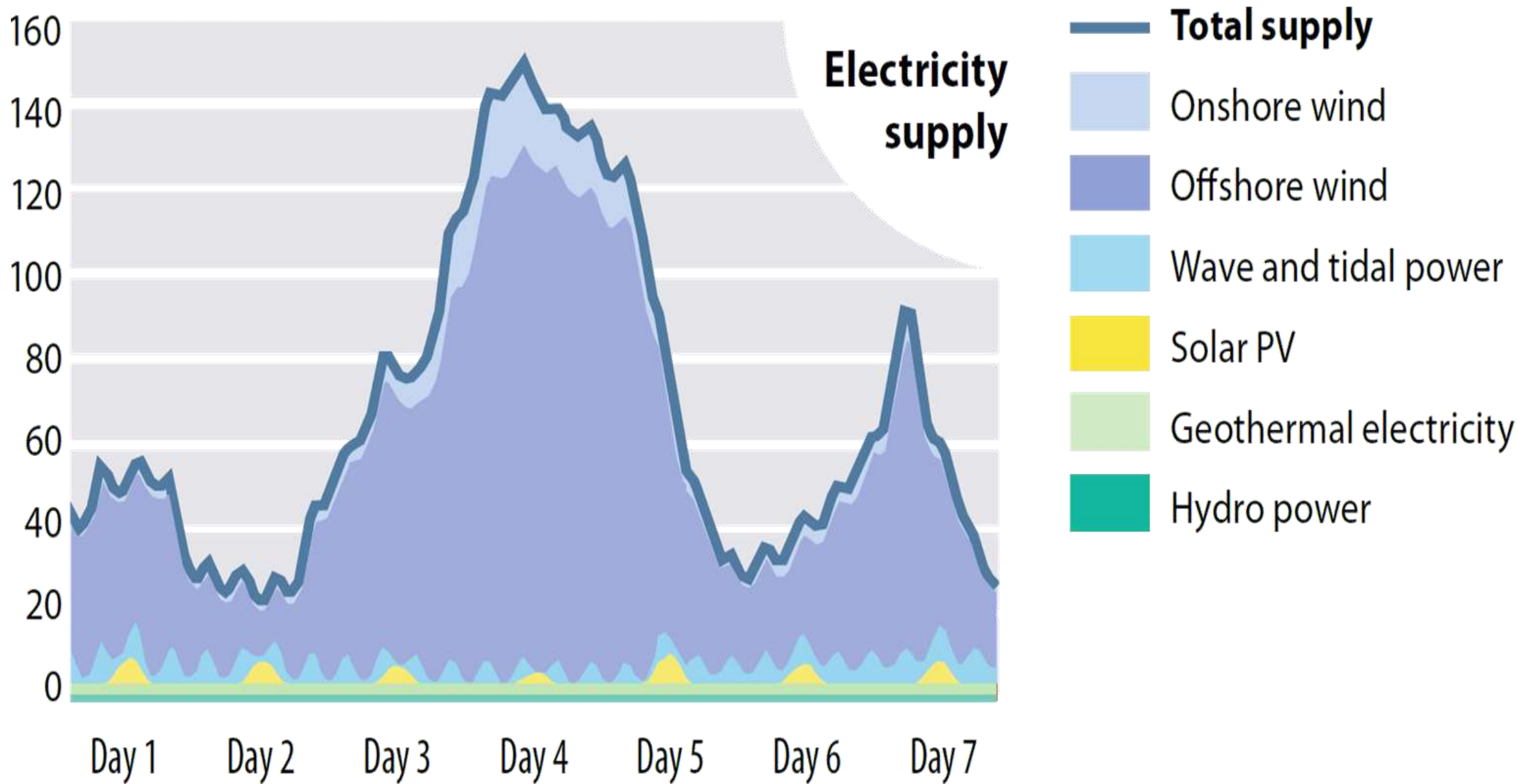
**Can we
“keep the lights on”?**

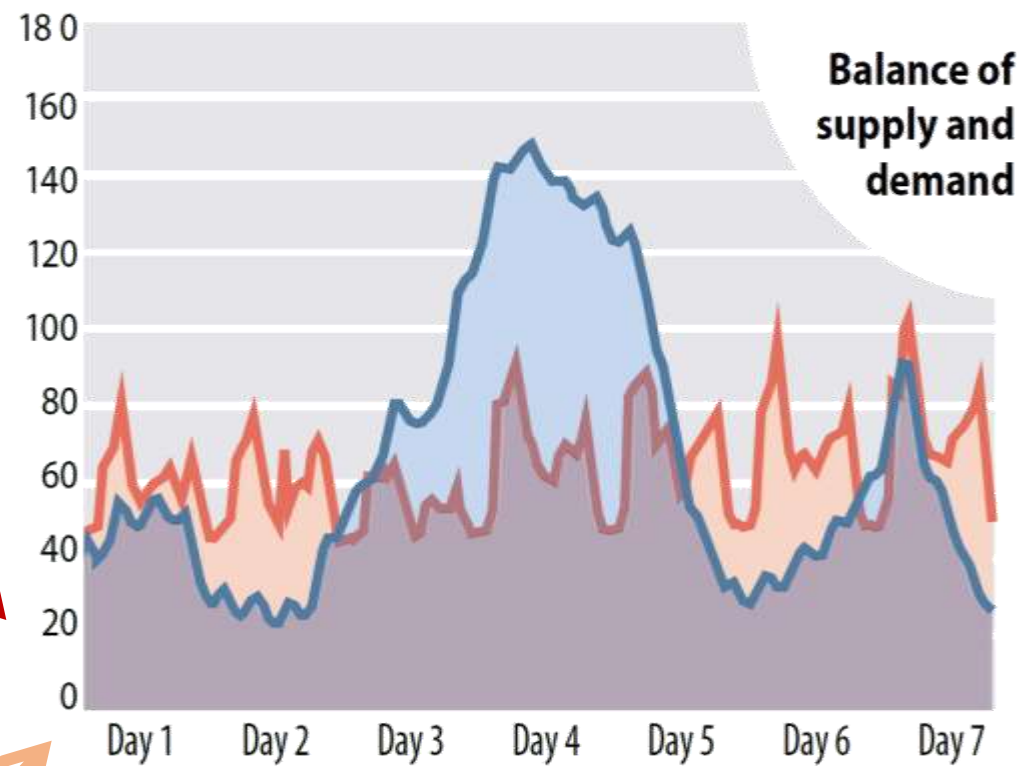
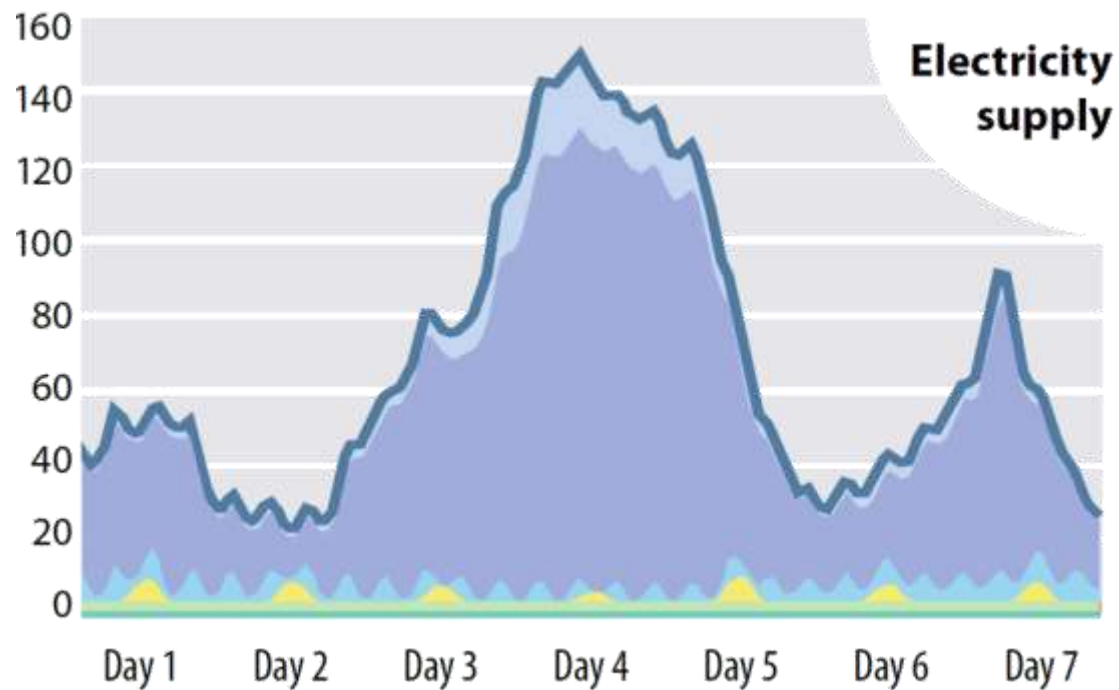
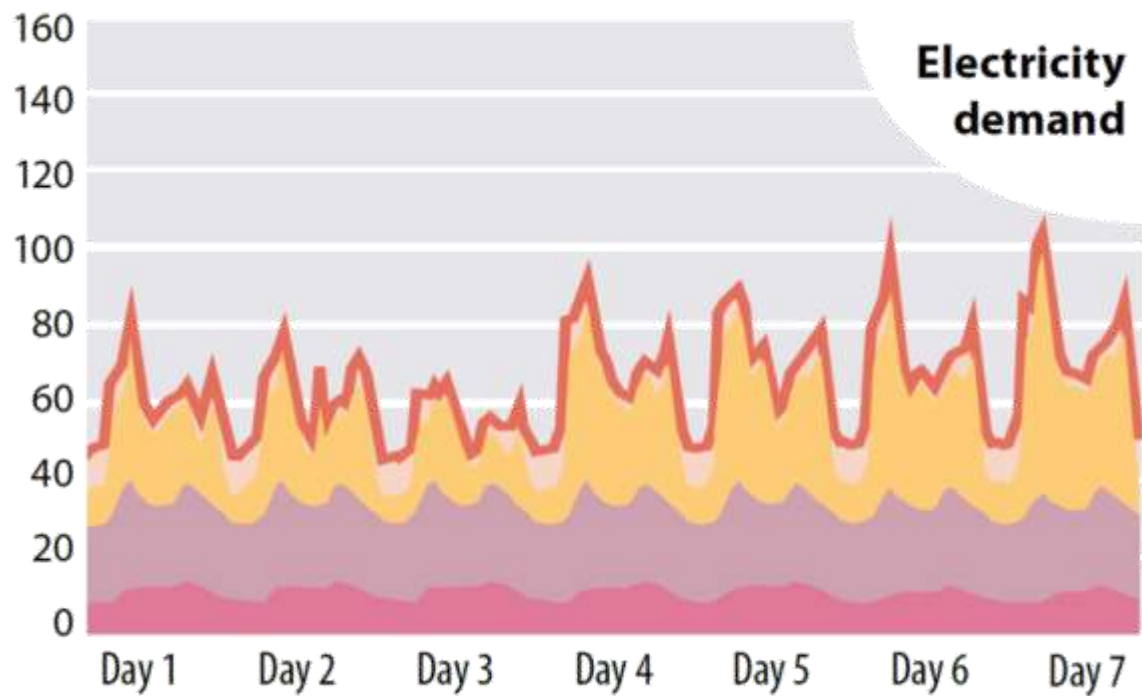
Yes we can!

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









- Direct match
- Surplus
- Shortfall

Synthetic gas storage = Demand met **100%** of time

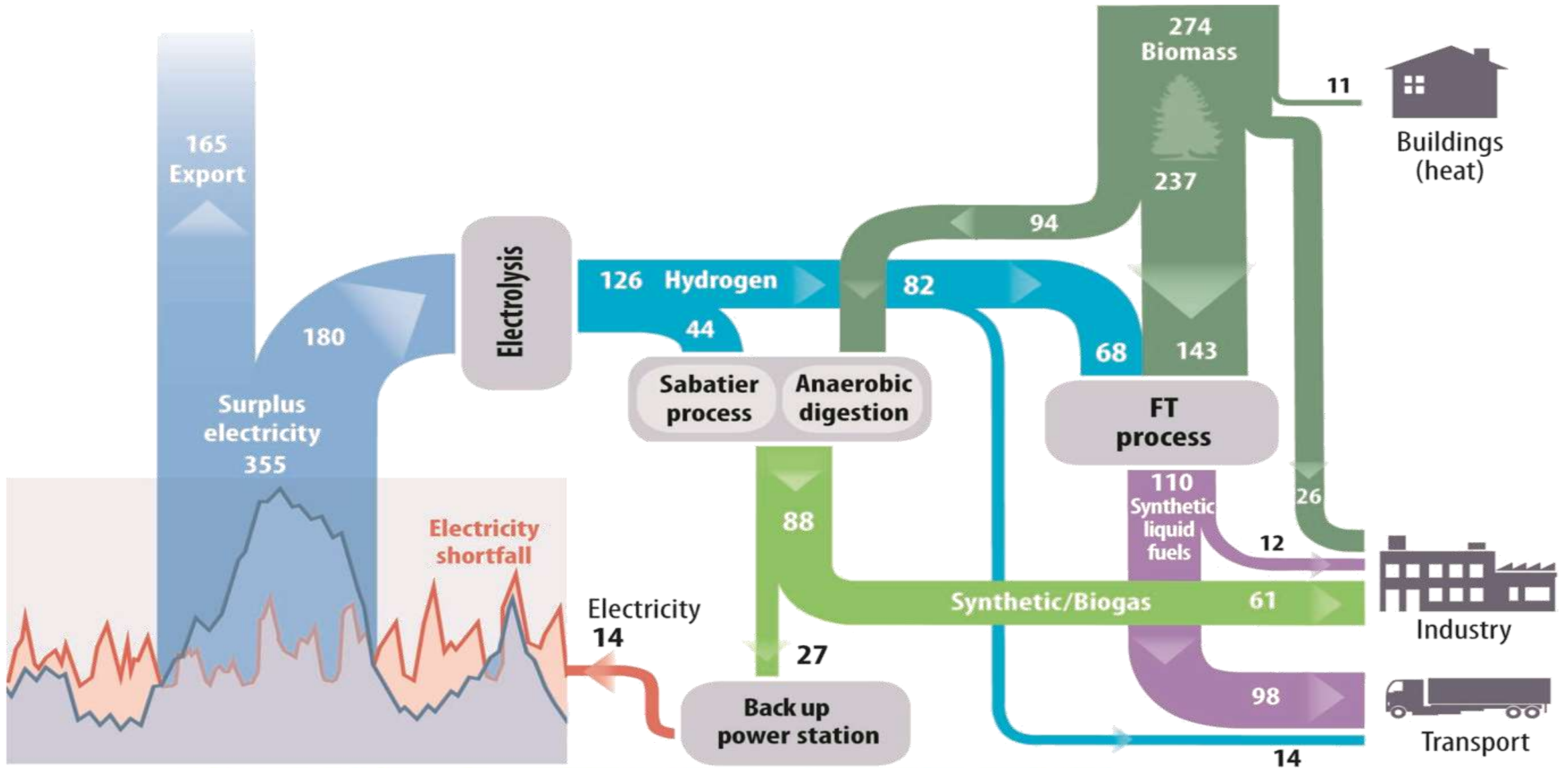


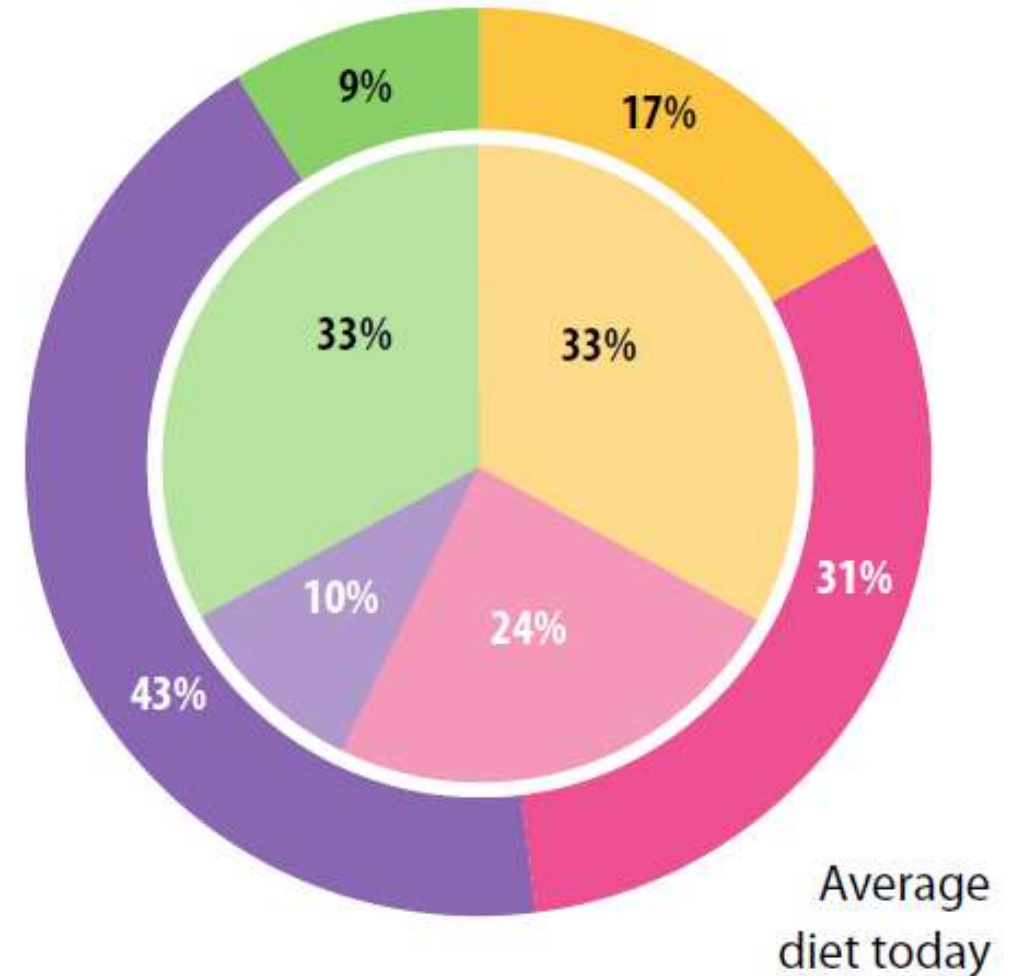
Figure 3.20: From surplus electricity and biomass to synthetic fuels for industry, transport, and energy system backup. Losses are not shown in this figure.

Rethinking diets & land-use

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

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)).**



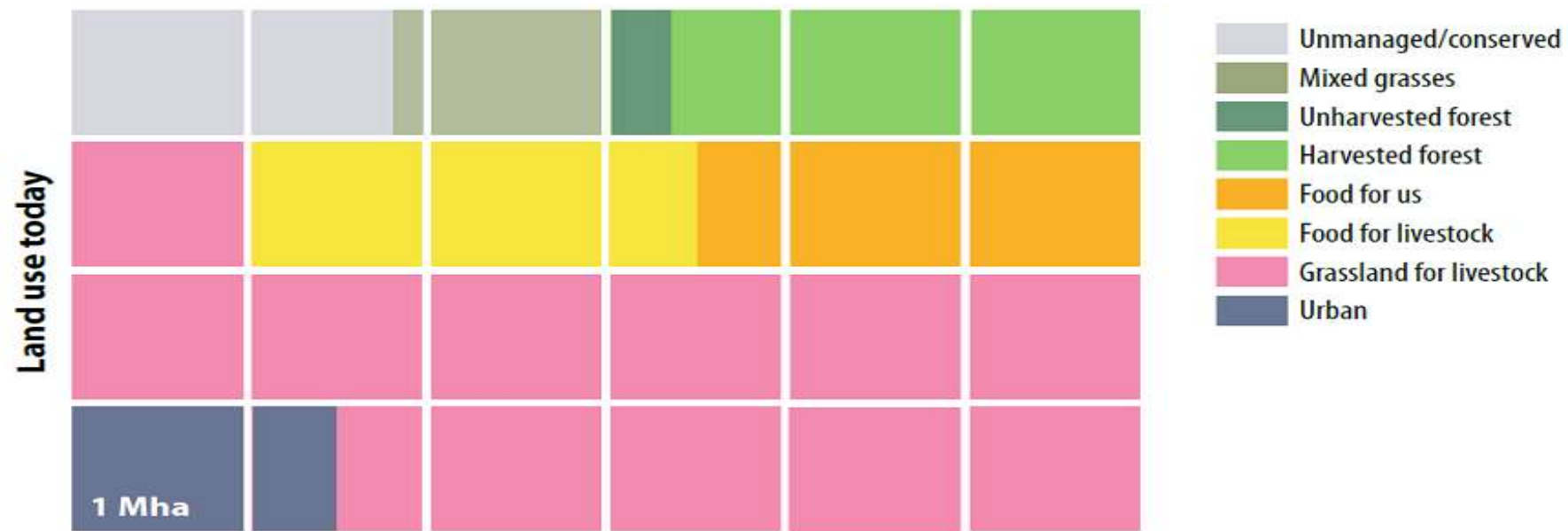


Figure 3.37: Approximate land use in our scenario (not including water courses and coastal areas). 'Mixed grasses' includes hemp, Miscanthus and other energy grass crops.

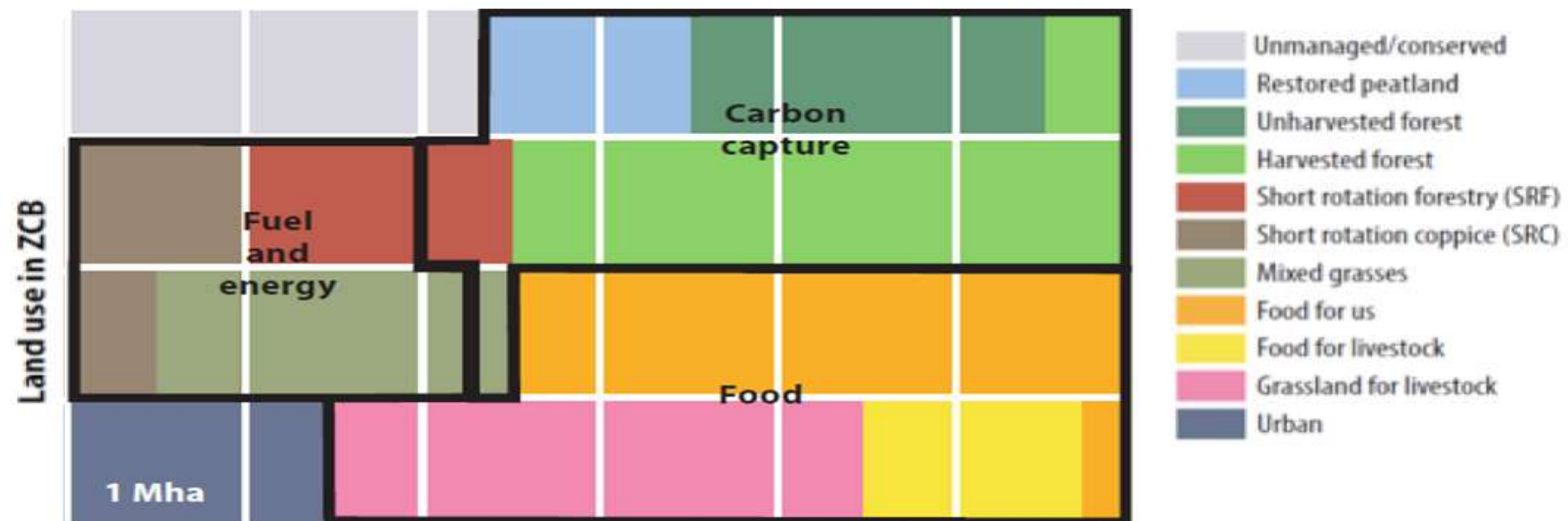


Figure 3.37: Approximate land use in our scenario (not including water courses and coastal areas). 'Mixed grasses' includes hemp, Miscanthus and other energy grass crops.

WHO'S GETTING READY FOR ZERO?



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Nations Unies
Conférence sur les Changements Climatiques 2015

Fair Low/Zero Carbon & 100% RE
Strategies, South & North Countries,
Villages, incl. Women initiatives

PARIS2015
CONFÉRENCE SUR LES CHANGEMENTS CLIMATIQUES
COP21 CMP11

Thematic Session
Breakthrough on
the climate at the
end of the road







Speaker

Panel of experts seated at a long white table with microphones and laptops.



WHO'S GETTING READY FOR ZERO?

COUNTRY SCENARIOS

	Beyond Zero Emissions	<i>Zero Carbon Australia</i>	ZERO GHG _e  NG  DDPP 
	Royal Government of Bhutan	<i>A national strategy and action plan for low carbon development</i>	ZERO GHG _e  G  
	Mitigation Action Plans & Scenarios (MAPS)	<i>MAPS Chile – Mitigation options for a low carbon development</i>	LOW GHG _e  G NG 
	Costa Rica Climate Change	<i>Carbon Neutral by 2021</i>	ZERO GHG _e  G 
	Danish Climate Commission & Energy Agency	<i>The Road to a Danish Energy System Without Fossil Fuels & 2020, 2035, 2050 Scenarios for energy decarbonisation</i>	LOW GHG _e  G  
	Vedvarende Energi & INFORSE	<i>Fast Transition to Renewable Energy by 2030</i>	LOW GHG _e  NG  
	Federal Democratic Republic of Ethiopia	<i>The path to sustainable development – Ethiopia's Climate-Resilient Green Economy Strategy</i>	ZERO GHG _e G   
	German Federal Environment Agency	<i>Germany in 2050 – a greenhouse gas-neutral country</i>	LOW GHG _e   G  DDPP 
	Greenpeace Japan	<i>The Advanced Energy [R]evolution: A sustainable energy outlook for Japan</i>	LOW GHG _e  NG  DDPP
	World Future Council	<i>100% Renewable Energy: Boosting Development in Morocco</i>	LOW CO ₂  NG  
	University of Canterbury	<i>A 100% renewable electricity generation system for New Zealand</i>	LOW  NG  
	Norwegian Env. Agency	<i>Knowledge base on low-carbon transition in Norway</i>	ZERO GHG _e   G 
	Gov. Offices of Sweden	<i>Sweden – an emissions-neutral country by 2050 (in Swedish)</i>	ZERO GHG _e   G 

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and Technology Argen

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'The trend is our friend' -

- but will we get to zero in time?

- Science*
- Technology*
- Culture
- Economics
- Psychology
- Politics
- Sociology
- History
- Democracy
- Law
- Spirit

Identifying barriers and overcoming them



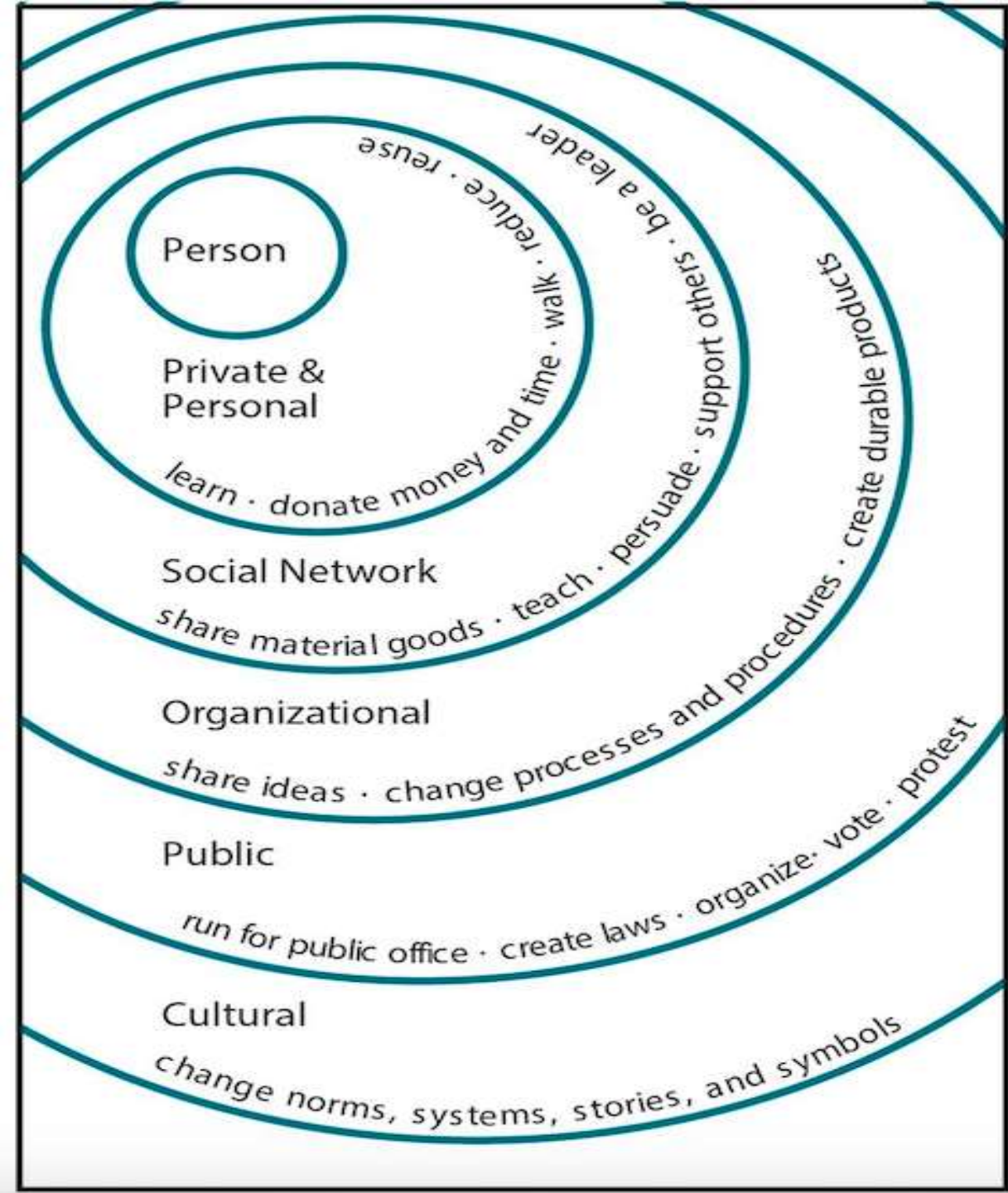


We have all the technologies; it is increasingly accepted that we actually face a mix of economic, cultural & psychological barriers.

Yet changing how millions of people think & live is a **very special** kind of problem...

... as the forces which shape our lives exist on **many different levels**

Tackling such a complex challenge requires a **new kind of approach** joining up research & practice across disciplines, borders, sectors & scales.



Tools to un-lock our 'carbon lock-in'



The historical, technical, cultural & institutional co-evolution of fossil fuels with our energy, housing, transport & agricultural systems creates persistent forces that are **hugely resistant to change**



**What are the wider 'cross-cutting barriers'
- and how do we overcome them?**

Communications

WE DID IT!

LEGO BLOCKS SHELL



Credit: Greenpeace

Economics and Finance

WP/15/105

**\$5.3 trillion
in 2015.**

IMF Working Paper

How Large Are Global Energy Subsidies?



Psychology & Behaviour

Changing Values



Making it Happen

The power of a positive vision



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



33 / 100

#100goodideas

**Take the grid
back into public
ownership to help
support more
distributed,
renewable energy**

zerocarbonbritain.org



34 / 100

#100goodideas

**Developing
'farmers' markets'
for electricity
would enable people
to buy energy
directly from local
suppliers**

zerocarbonbritain.org



Photo: TGV Hydro Ltd



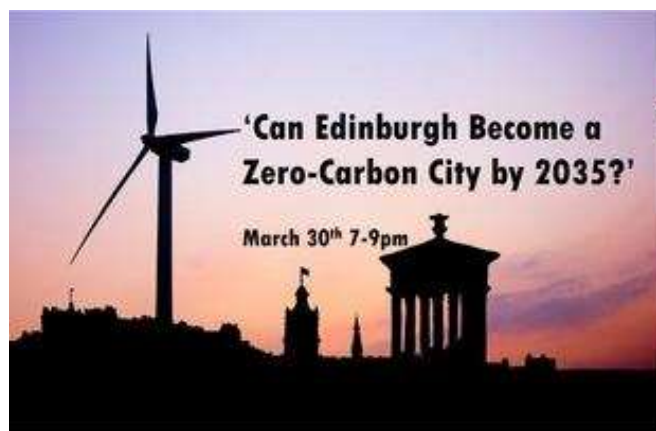
ZERO CARBON
L I V E R P O O L



ZERO
CARBON
HARROGATE



ZERO BY
2040



**'Can Edinburgh Become a
Zero-Carbon City by 2035?'**
March 30th 7-9pm



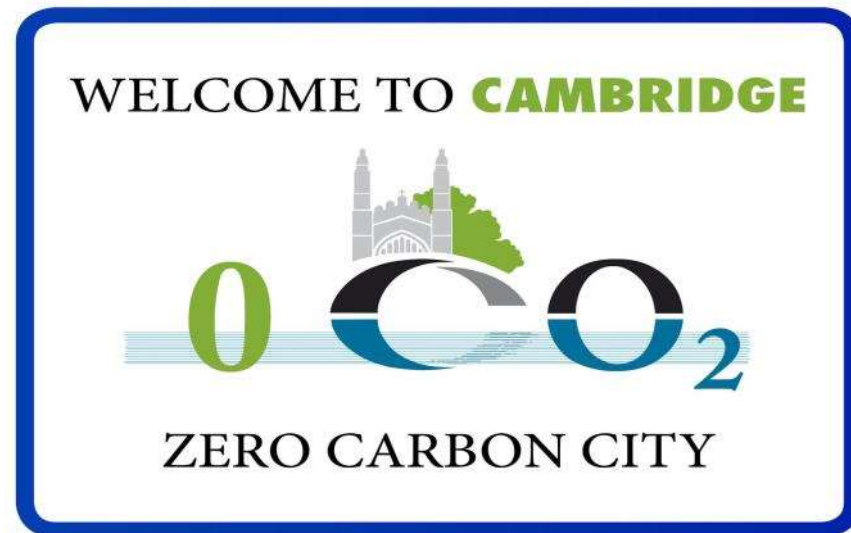
ZERO Carbon
(Scotland)



Zero Carbon
Yorkshire



ZERO CARBON
BRISTOL.NET



WELCOME TO **CAMBRIDGE**



ZERO CARBON CITY

Making it Happen: Key conclusions

1. We have **all the technologies** we need
2. Practical projects overcome barriers in **innovative ways**
3. These must be **supported & scaled up**
4. We need to **identify** and **make** systemic changes
5. Show **positive co-benefits** – health, wellbeing, NHS costs
6. Build a **mass coalition** and **shift culture**

A group of diverse people, including men and women of various ethnicities, are seated in a circle in a meeting room. They are all looking towards the left side of the frame, suggesting they are listening to a speaker. The room has wood-paneled walls and a wooden floor. The lighting is warm and focused on the participants.

**“There are many solutions,
but one overarching conclusion:
we must do this together.”**

Centre for Alternative Technology

