

# How to start off on the right foot?

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University of Ljubljana

## 2 basic goals of the project

- Change the energy mix (more RE)
- Consume less energy

# General approach various methods



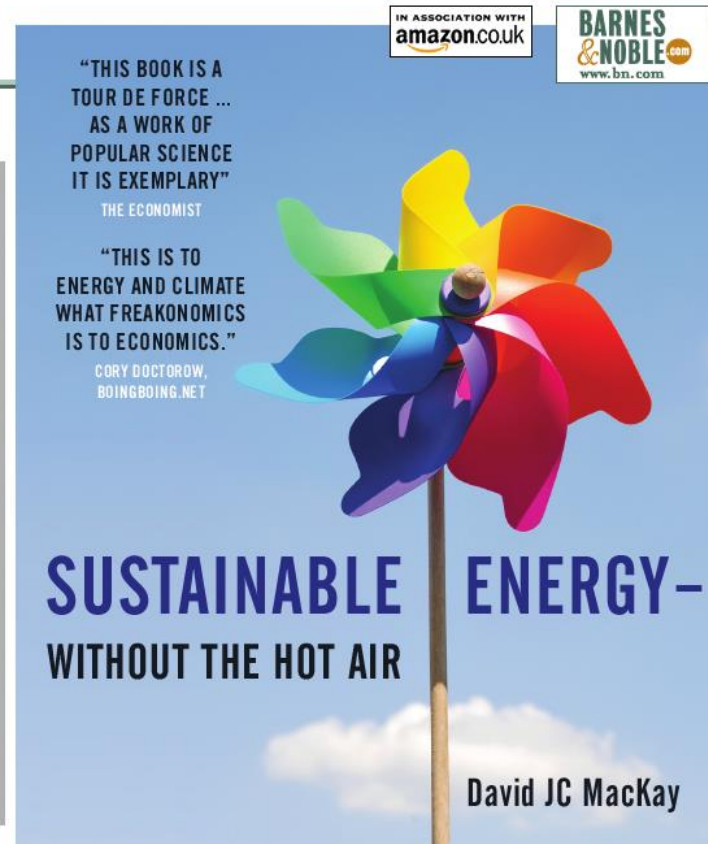
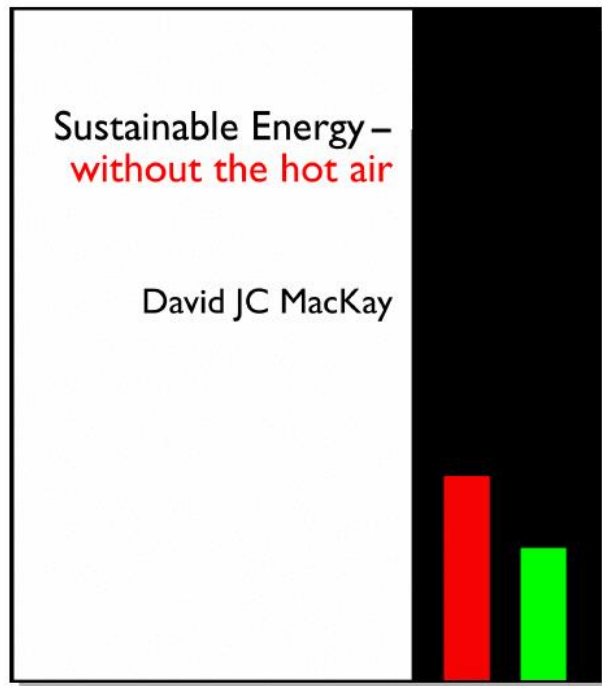
Let us try  
to use the same  
blocks

... for different results



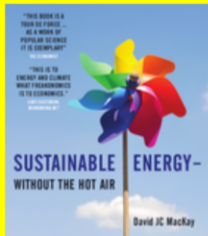
# Update your energy knowledge

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# Translations exist: Italian, French, Slovene...

## Sustainable Energy – without the hot air



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*"For anyone with influence on energy policy, whether in government, business or a campaign group, this book should be compulsory reading."*

Tony Juniper  
Former Executive Director, Friends of the Earth

*"At last a book that comprehensively reveals the true facts about sustainable energy in a form that is both highly readable and entertaining."*

Robert Sansom  
EDF Energy

*"The Freakonomics of conservation, climate and energy."*

Cory Doctorow,  
boingboing.net

*"...a tour de force..."*

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**10-page synopsis:** [\(pdf\)](#)

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# We need the same energy units

How to express energy consumption/savings

- CO2 footprint
- Toe? Tonne of oil oil equivalent
- GigaJoules
- 
- 

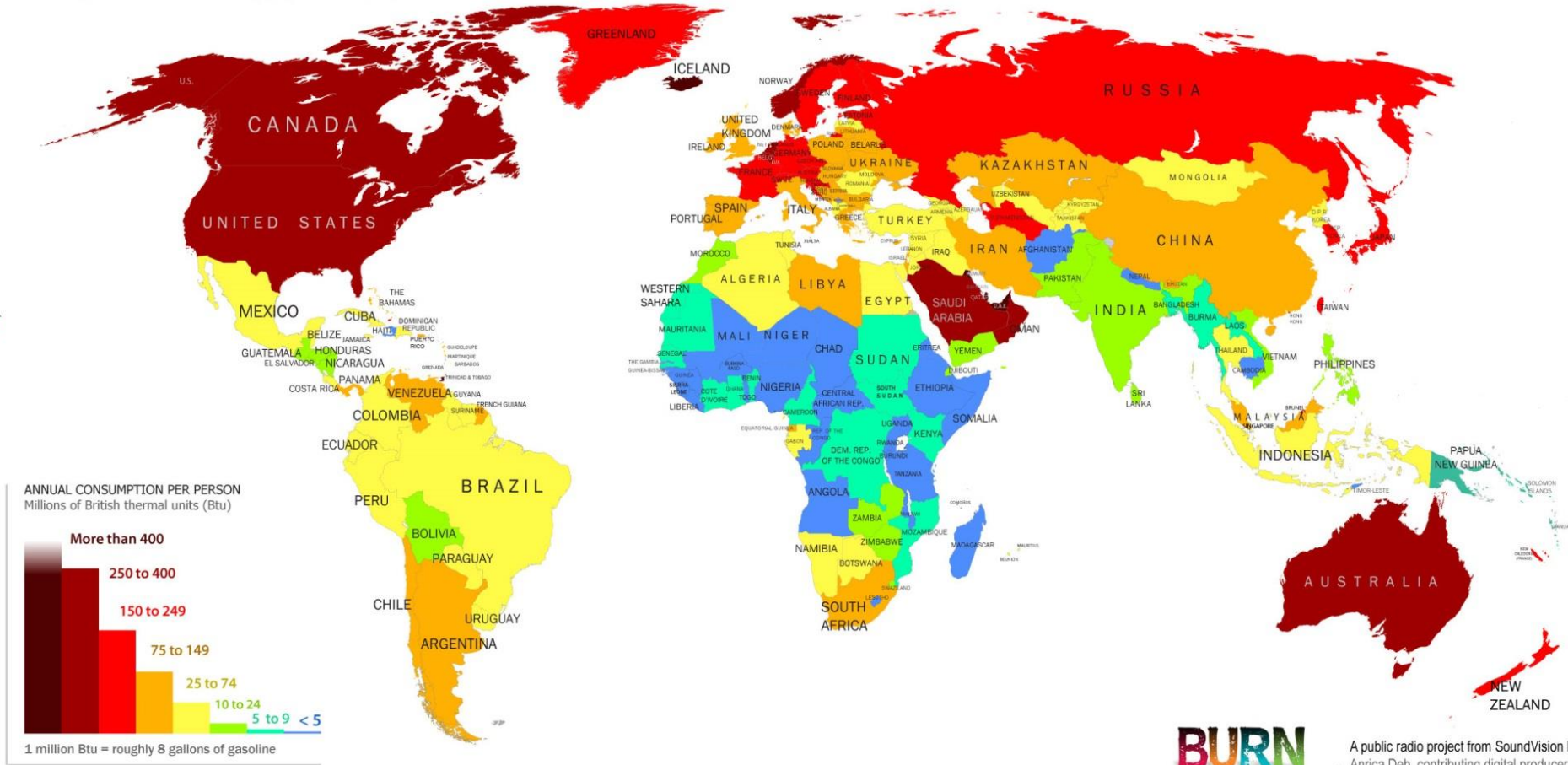
**Proposal: kWh**



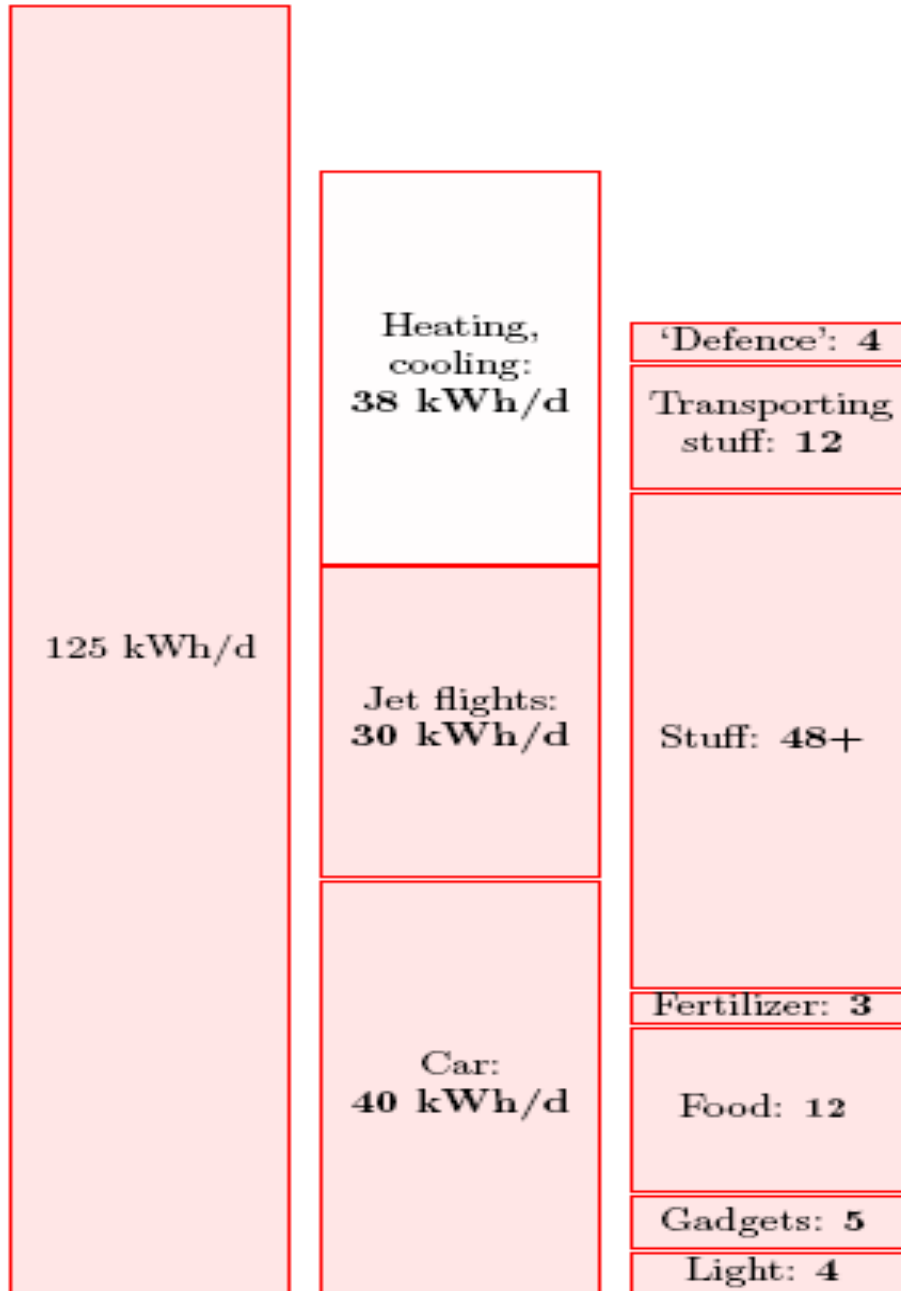
# ... the primary energy regional consumption

Energy Consumption Per Person, by country, 2010.

SOURCES: U.S. Energy Information Administration, International Energy Agency, CIA World Factbook, U.N. Dept of Economics and Social Affairs



## Consumption



- Average EU member

125 kWh/day

- Average Slovene
- 113 kWh/day

**125 kWh/day ≈ 12, 5 t CO<sub>2</sub>/ year**



	Before	What you can do	After
1,5 t CO <sub>2</sub> per year	Food: 15kWh/d	<i>eat vegetarian, six days out of seven</i>	5 kWh/d
4 t CO <sub>2</sub>	Heating: 40kWh/d (keeping a leaky home and workplace at 20 °C)	<i>put on a sweater, be creative with the thermostats, read your meters</i>	20 kWh/d
3,5 t CO <sub>2</sub>	Flying: 35kWh/d (London to Los Angeles, Rome, and Malaga, yearly)	<i>video-conference instead</i>	1 kWh/d
4 t CO <sub>2</sub>	Car: 40kWh/d (averaging 30 miles per day)	<i>join a car club, cycle, walk, and use public transport</i>	5 kWh/d
<b>13 t CO<sub>2</sub> per year</b>			<b>3,1 t CO<sub>2</sub> per year</b>



140 kWh/d  
peak 25 kW

rating photovoltaic by Amonix - Photo by David

ali



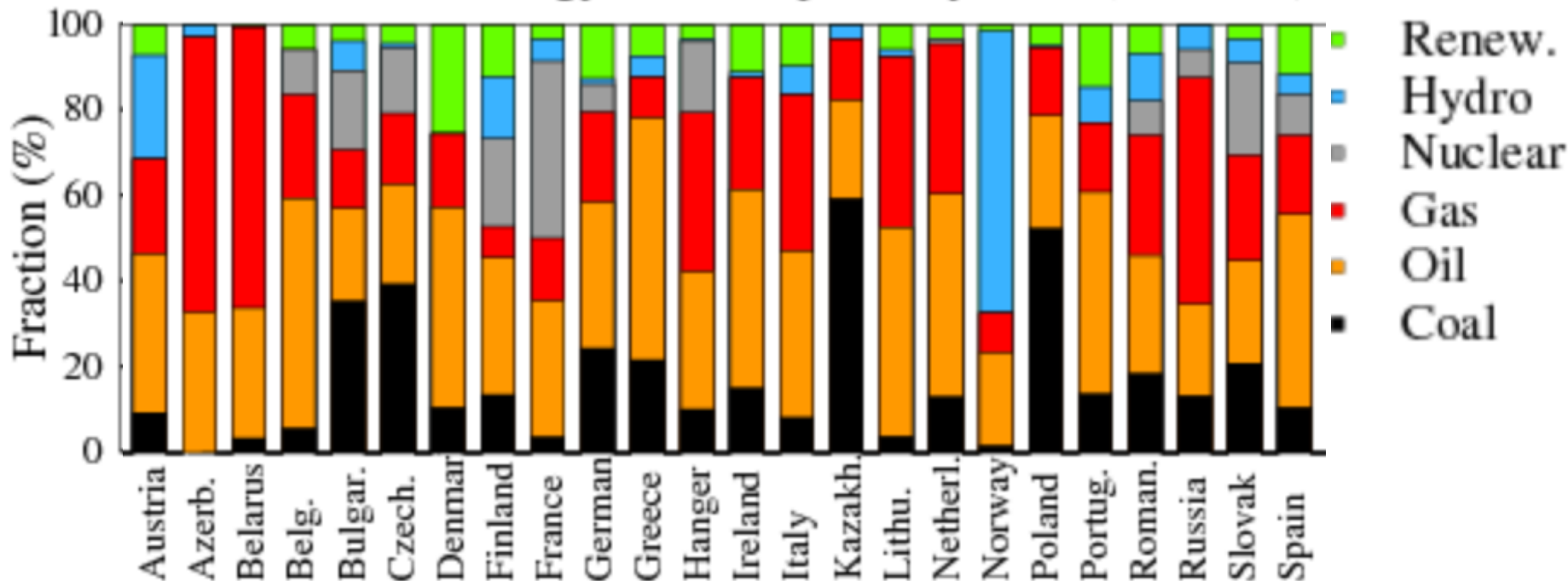
1,2 ha na  
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126  
kWh/dan

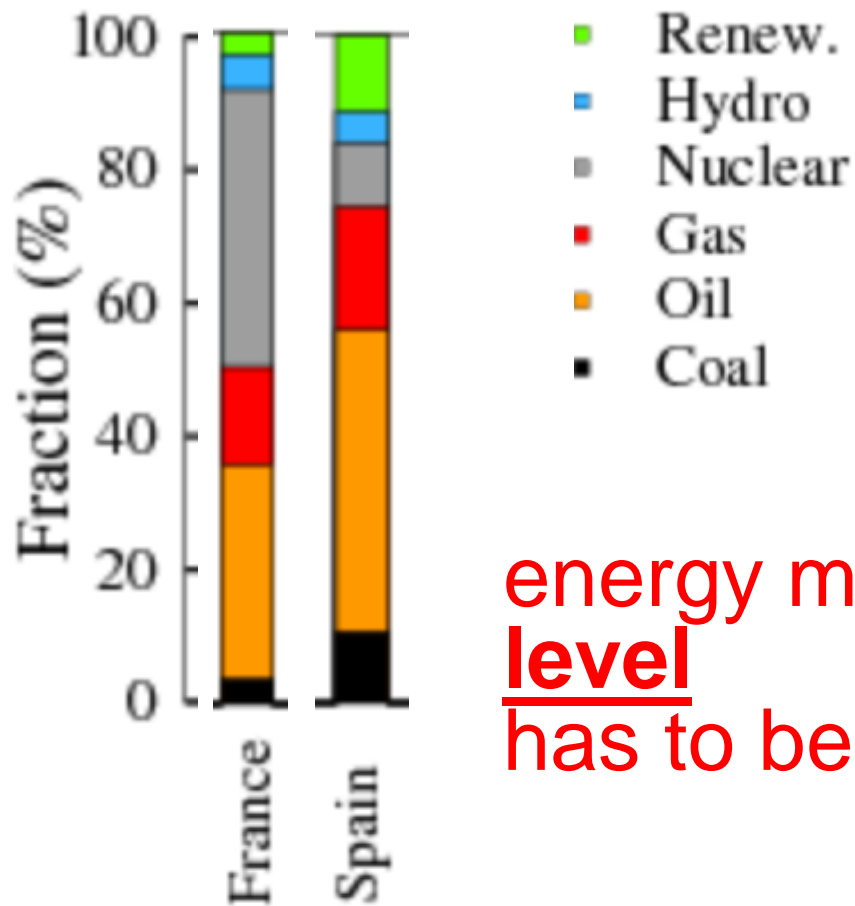


# Estimate energy mix on regional level

2015 Energy Consumption by Fuel (BP Data)

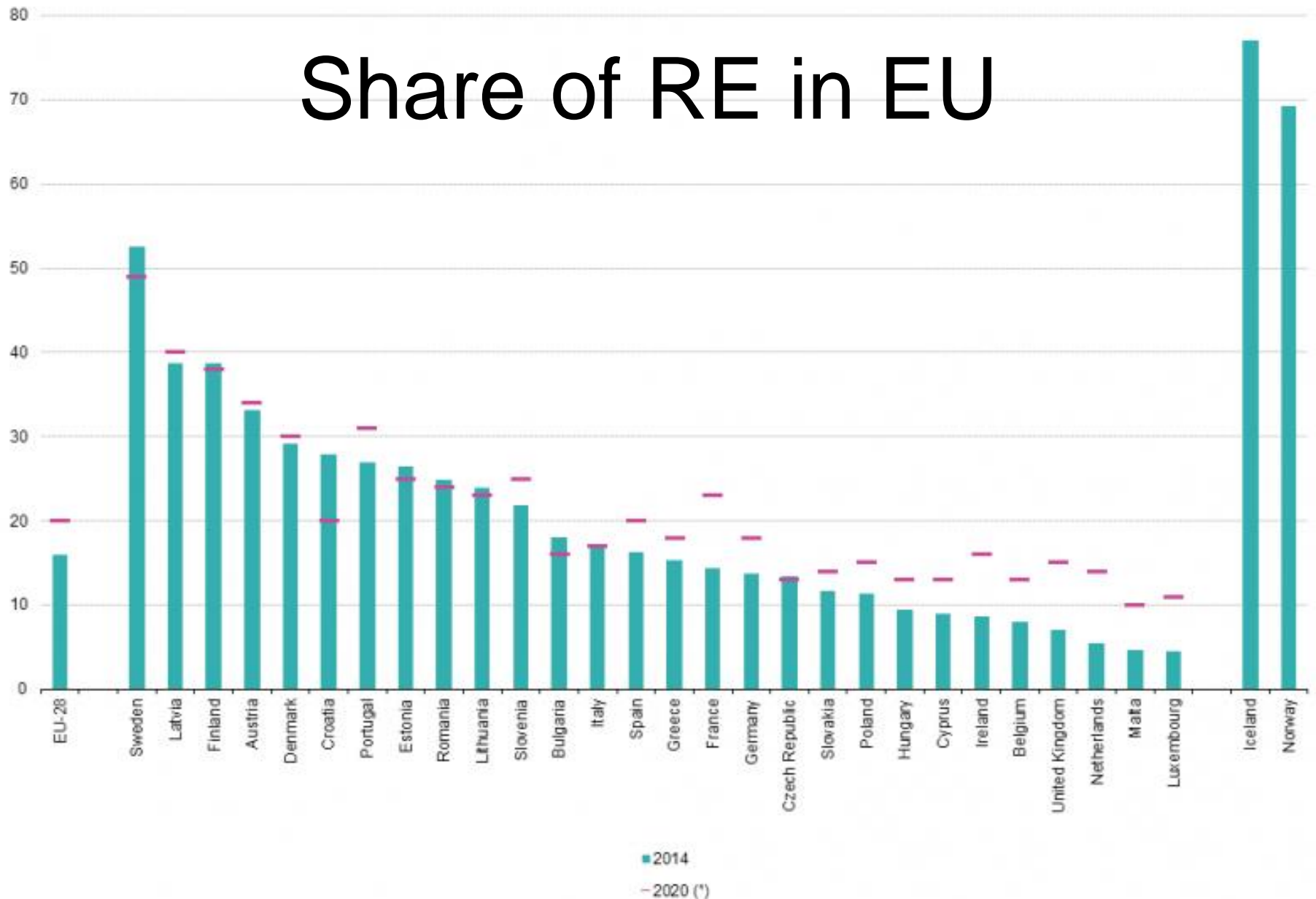


# Energy mix on state level



energy mix on local level  
has to be estimated

# Share of RE in EU



(\*) Legally binding targets for 2020. Iceland and Norway: not applicable.

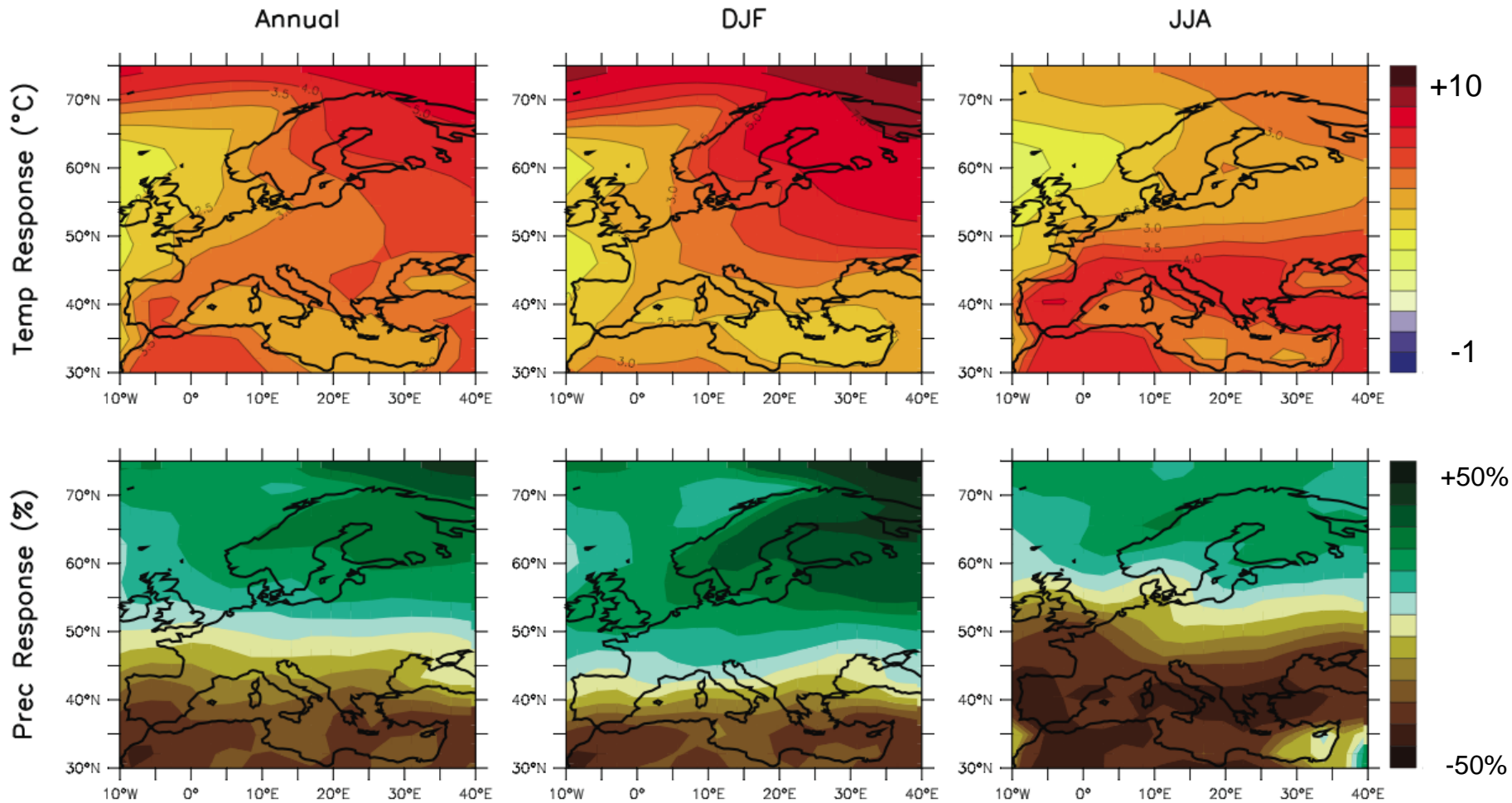
Source: Eurostat (online data code: t2020\_31)



# Define RE energy potential

- Not exactly known on regional/local level
- Will be more and more impacted by climate change (especially biomass) – not enough research

# Europe: Geographic Changes



2080-2099 Minus 1980-1999 (A1B)

# Downsides

- All renewables are diffuse
- Some cause air pollution (burning biomass)
- Visual pollution (wind turbines)
- Fossil fuels are big business (also subsidised)
- Some/most people do not like changes in general



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# All renewables are diffuse

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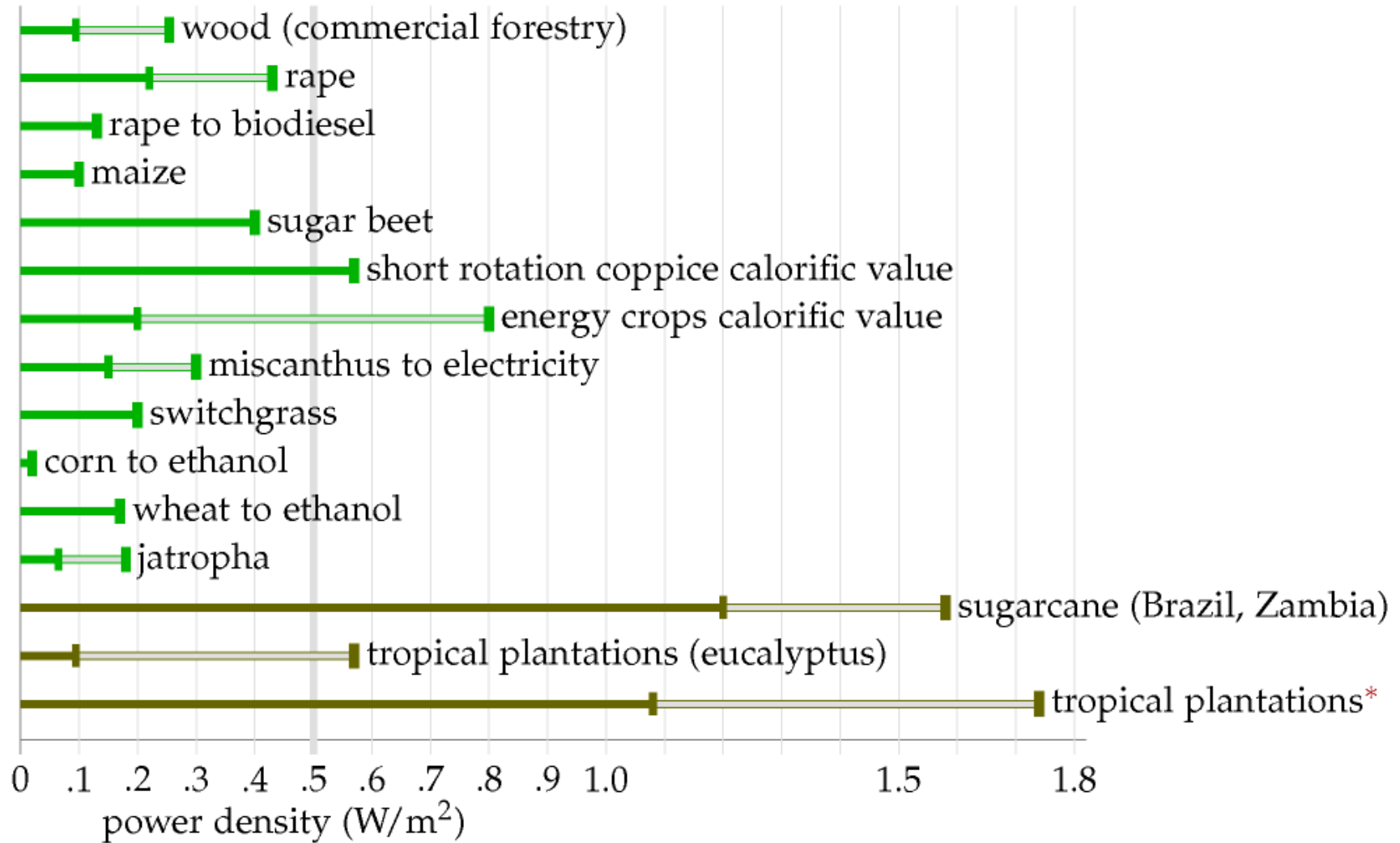
## POWER PER UNIT LAND AREA

Wind	2.5 W/m <sup>2</sup>
Plants	0.5 W/m <sup>2</sup>
Solar PV panels	5–20 W/m <sup>2</sup>
Tidal pools	3 W/m <sup>2</sup>
Tidal stream	8 W/m <sup>2</sup>
Rain-water (highlands)	0.24 W/m <sup>2</sup>
Concentrating solar power (desert)	15–20 W/m <sup>2</sup>



- To make a difference, renewable facilities have to be country-sized

# Plant power per unit area



\* assumes genetic modification, fertilizer application, and irrigation

For sources, see D J C MacKay (2008) Sustainable Energy - without the hot air



# Downsides

- All renewables are diffuse
- Some cause air pollution (burning biomass)
- Visual pollution (wind turbines)
- Fossil fuels are big business (also subsidised)
- **Some/most people do not like changes in general**
- ✓ How much RE/climate change background do people have?
- ✓ How do they view the environment—as a necessity or a luxury?
- ✓ What motivates people in the region/municipality to act?

# 50 Reasons Not To Change

