

# The Evolving Energy Landscape!

Morten Dahlen, University of Oslo

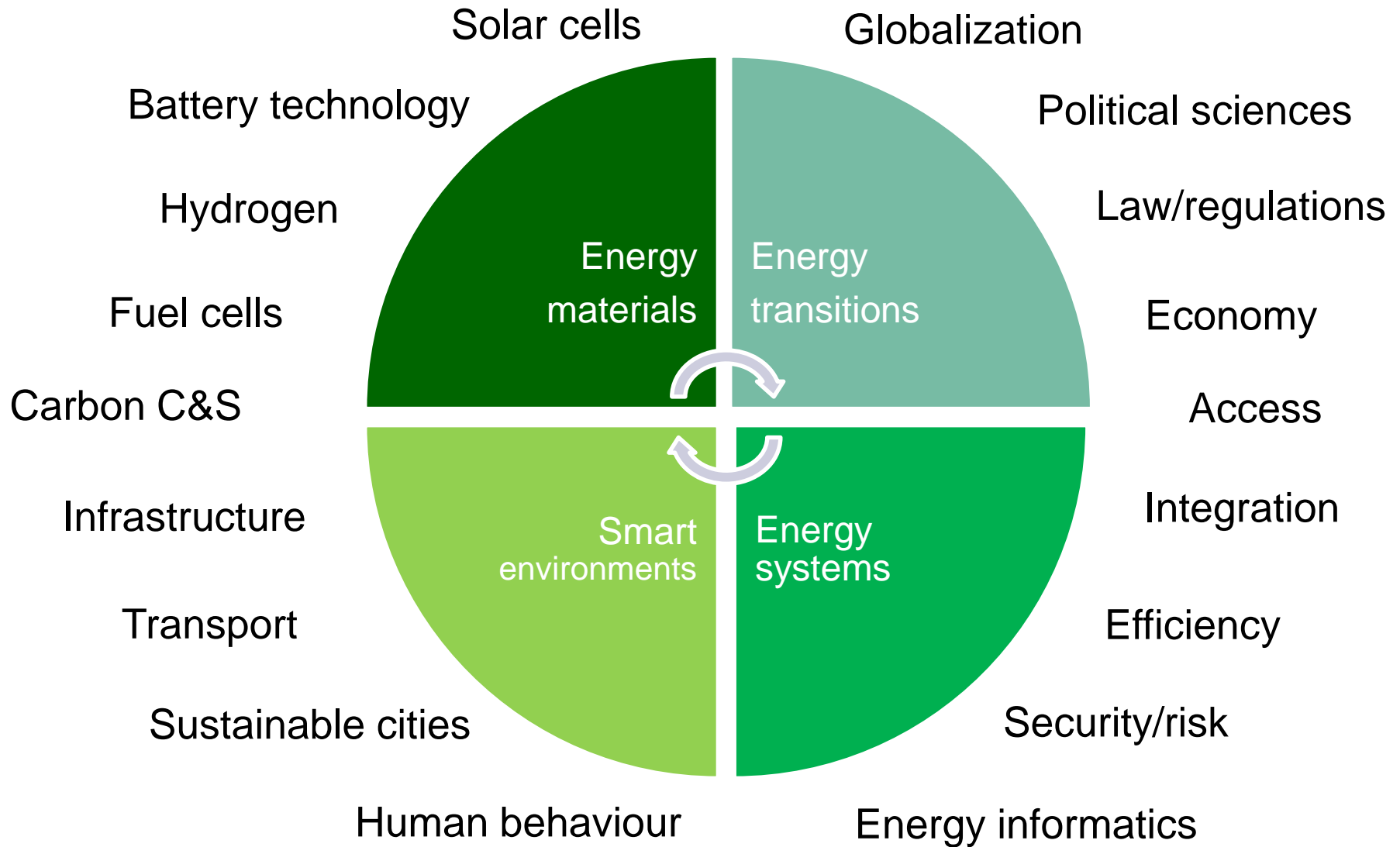


UiO • University of Oslo

*UiO Energy, University of Oslo*



# UiO: Energy (strategy at a glance)

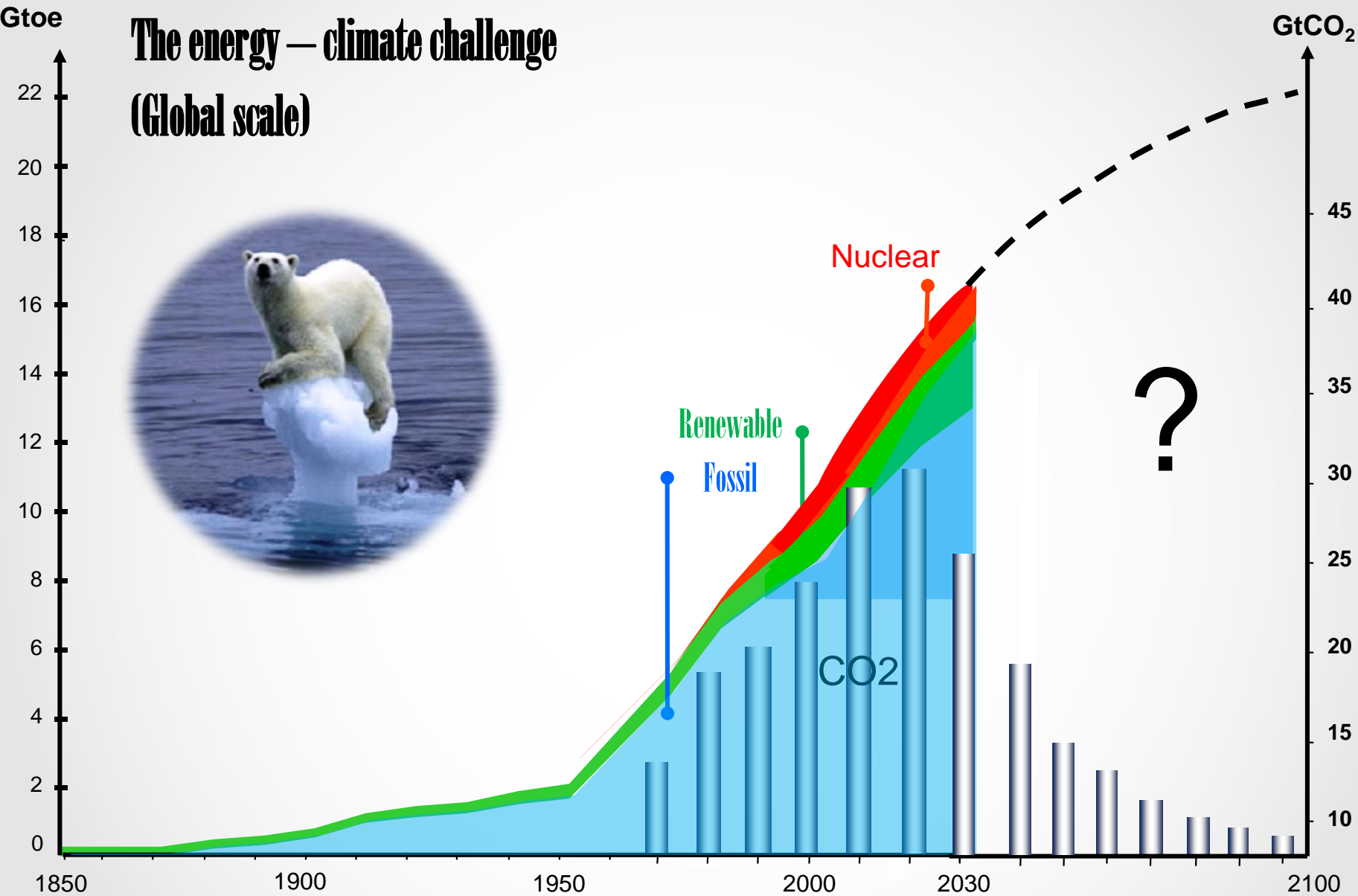


# *The global challenge!*

- Affordable energy
- Secure energy
- Sustainable energy

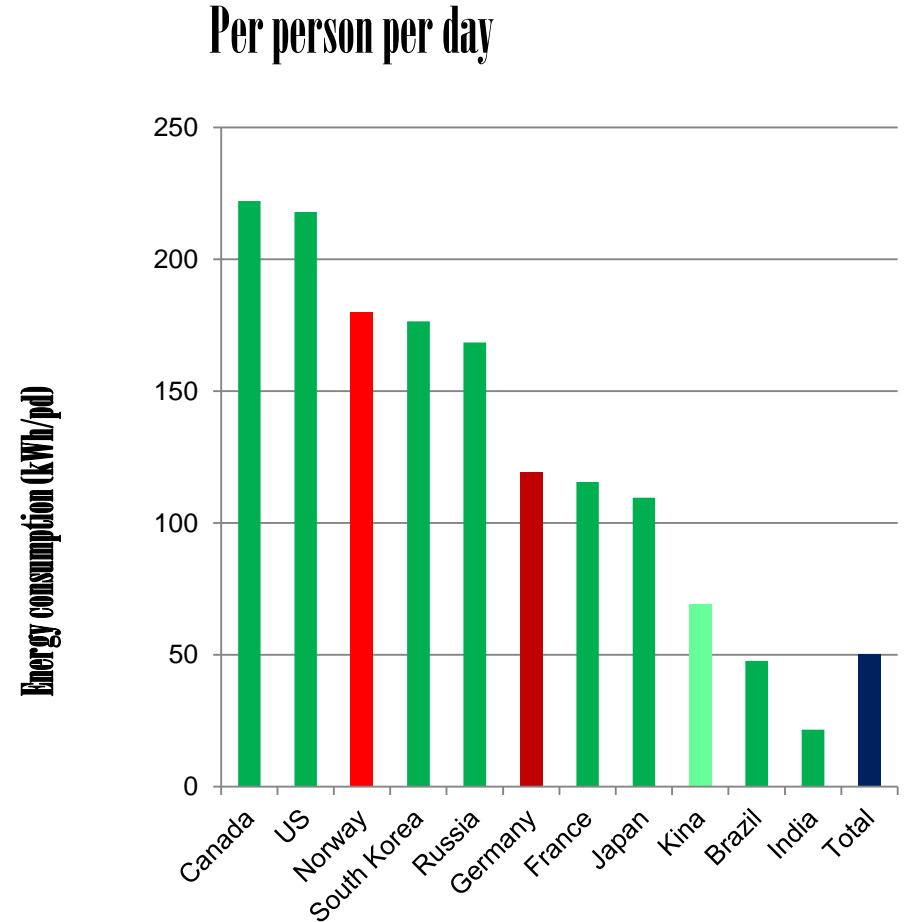
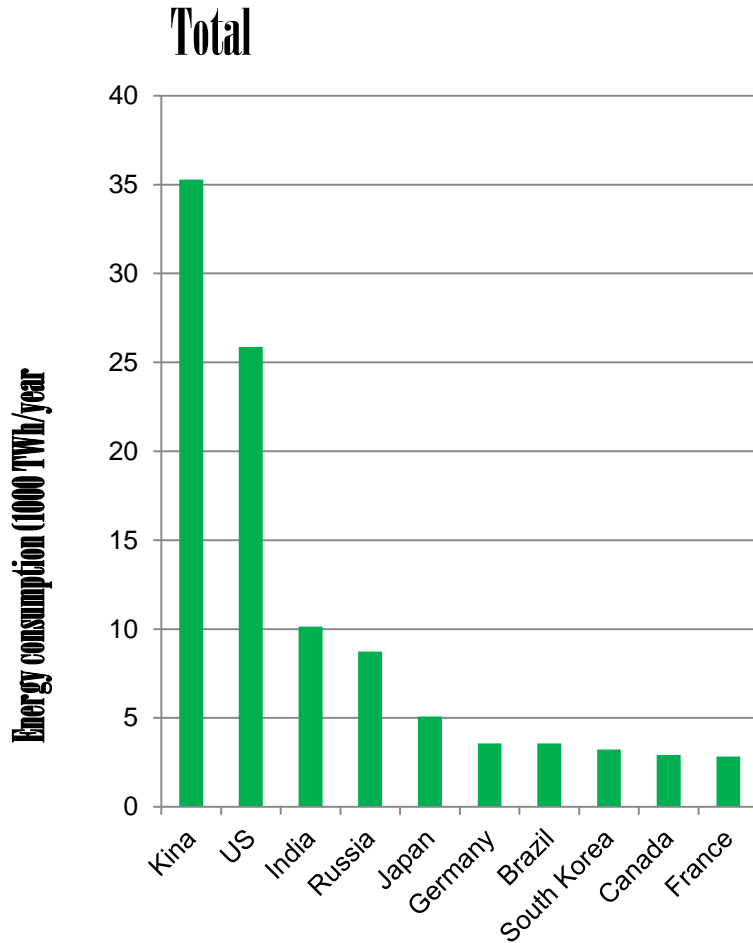
*“Sustainable energy is powering equity — energy for all”*

# The energy — climate challenge (Global scale)



Paris Agreement ([United Nations Framework Convention on Climate Change \(UNFCCC\)](#))

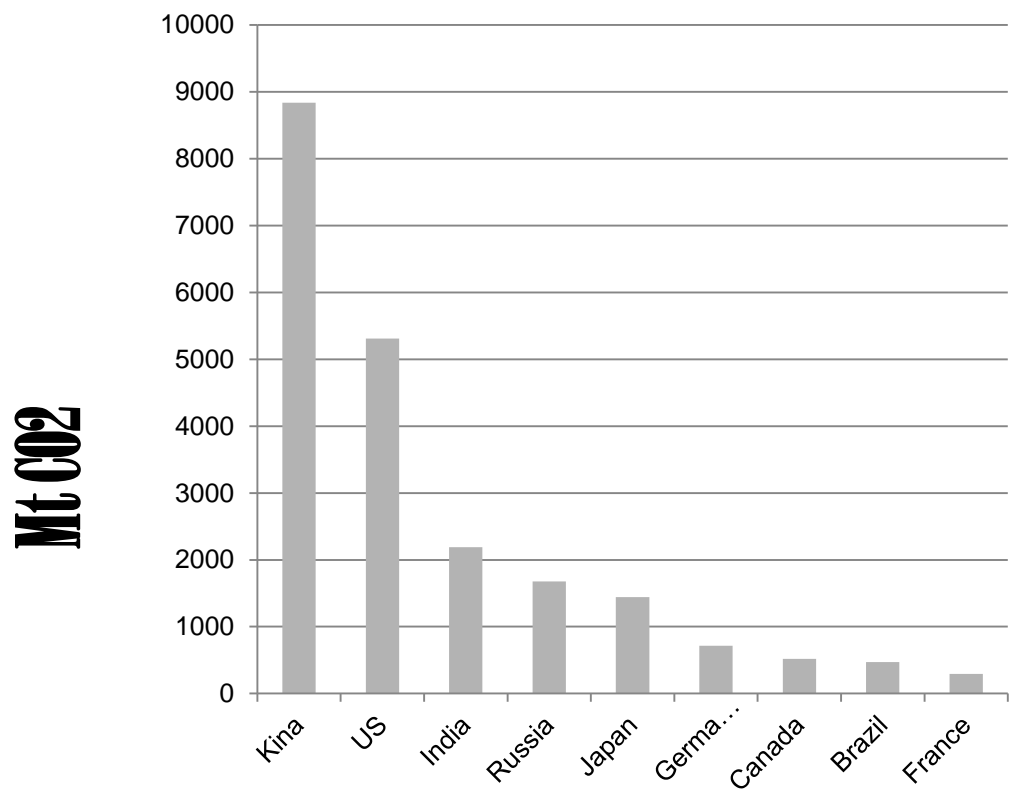
# Global energy consumption (2014)



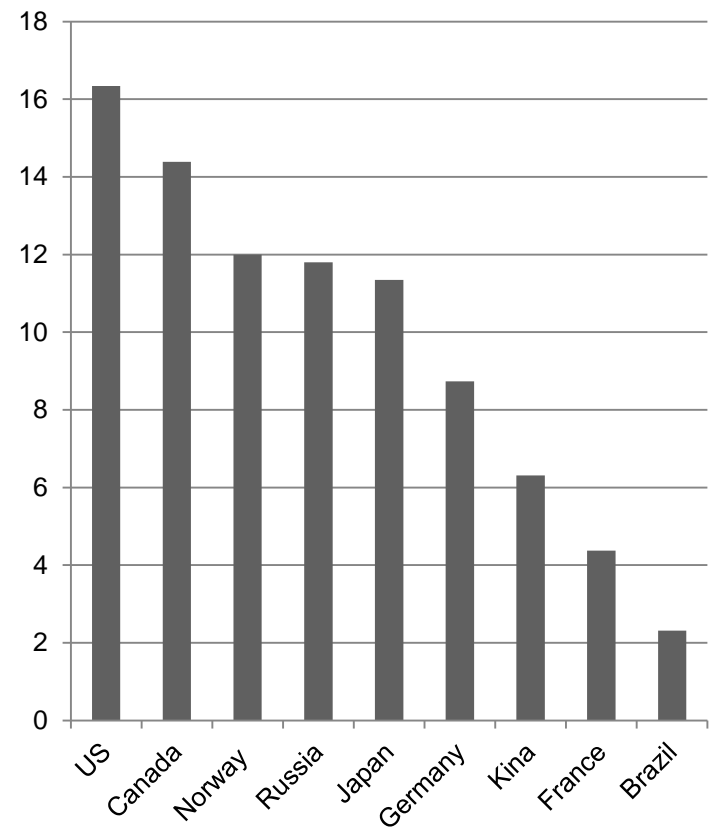
“1 kWh = 1 bread”

# CO<sub>2</sub> emissions

## Total

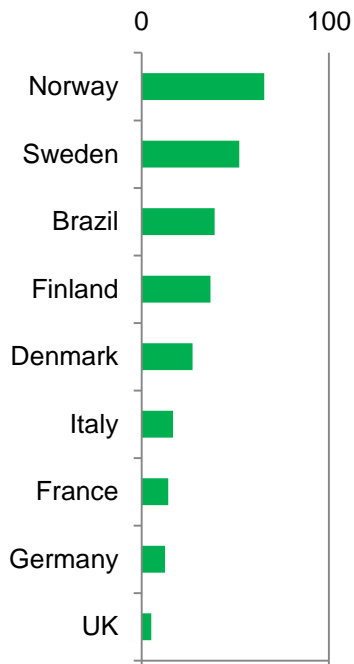


## CO<sub>2</sub> emissions per capita

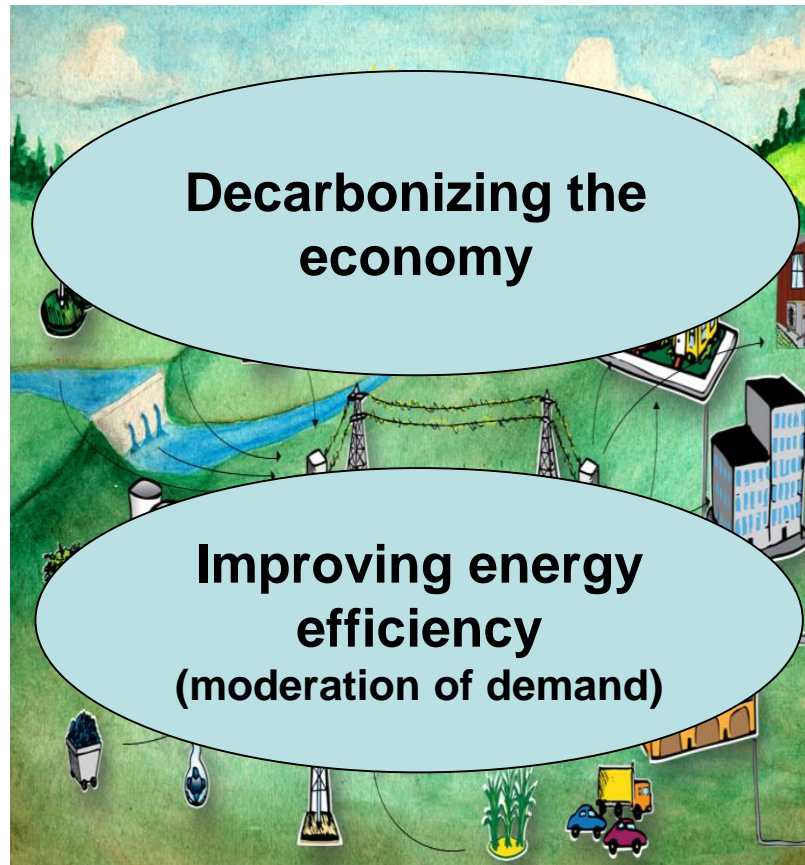


# Energy landscape — resources and usage

% share of renewable energy in gross final energy consumption Year 2015 (Enerdata)

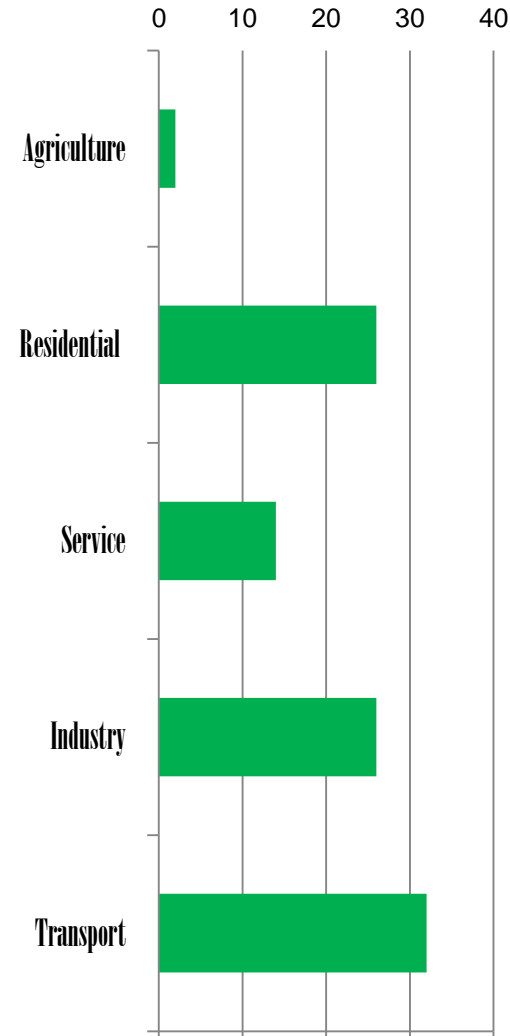


Affordable energy  
Secure energy  
Sustainable energy

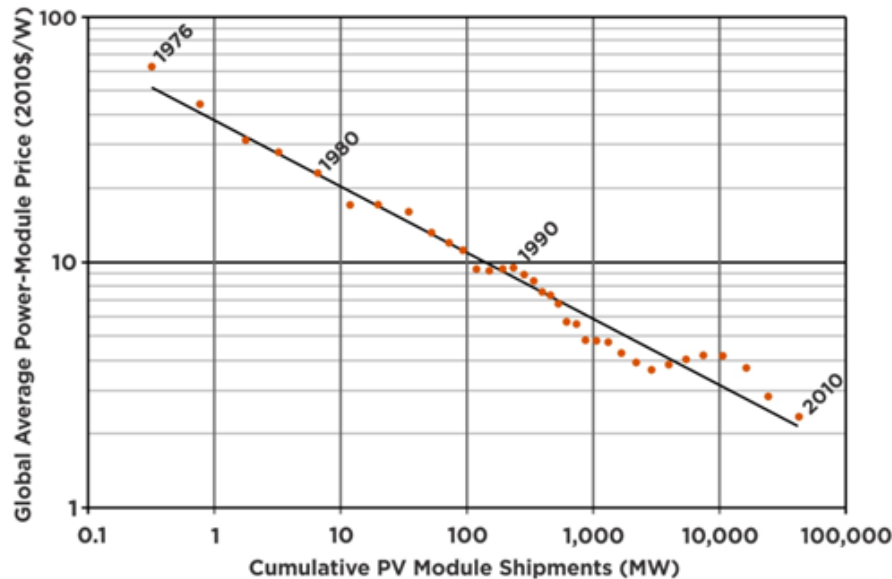


Enerdata (2015)

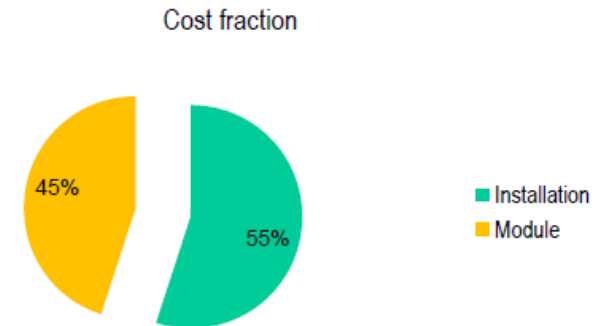
Energy consumption by sector (%)



# Solar energy (major part of the solution)



Efficiency *matters!*



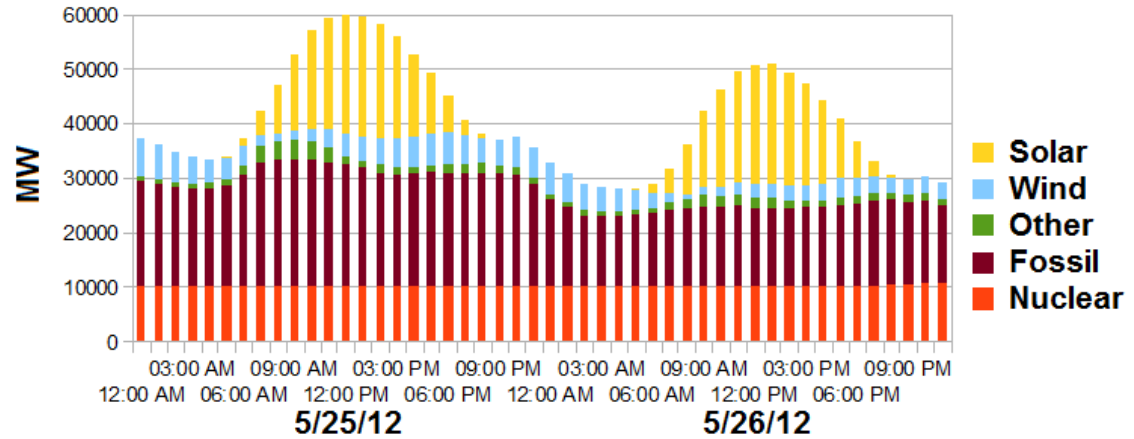
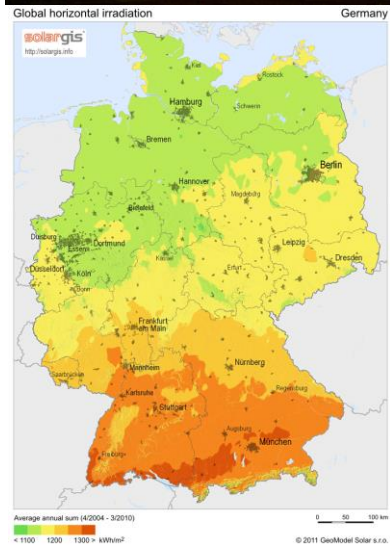
The world is facing a dramatic improvement  
in cost-efficiency of solar cell modules!



# The evolving energy landscape!

Electricity Production Germany

25th-26th May 2012



**The energy system challenge is how to combine steady base load power supply and intermittent energy sources (sun and wind)!**

**ENERGY STORAGE and DISTRIBUTION?**

# Living on other countries' renewables? Is it possible?

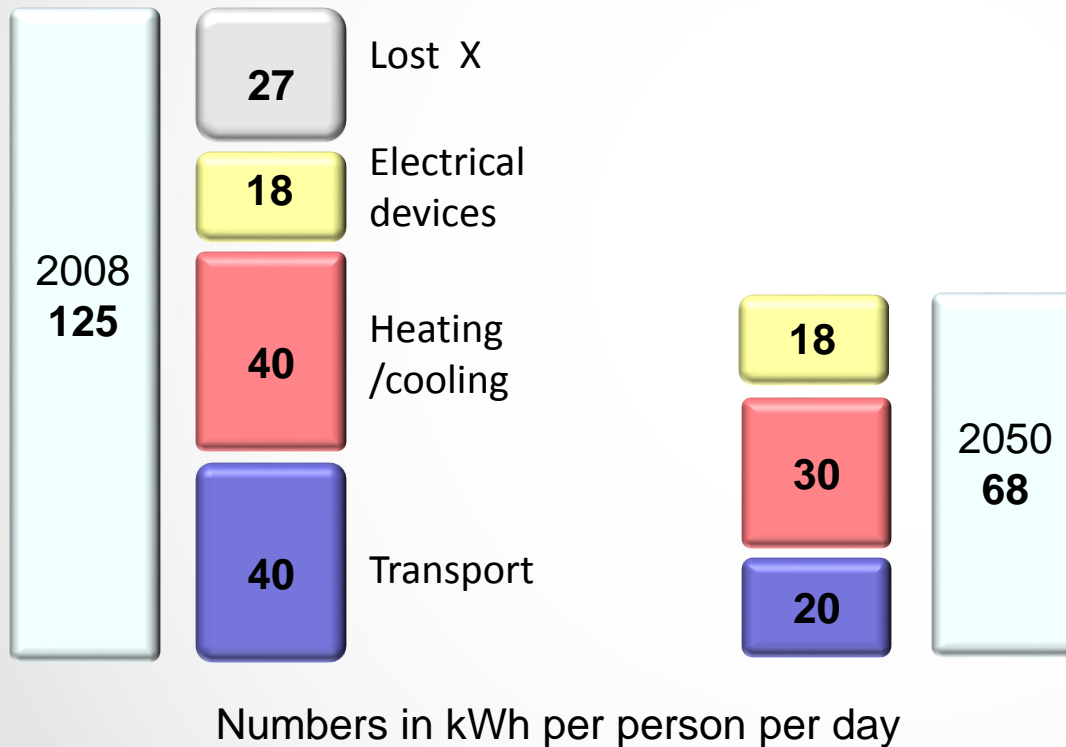


**Yellow: 125 kWh/d/p for 1 billion people**

**Red: 125 kWh/d/p for 60 million people**

# Improving energy efficiency

*Is 50% reduction possible (UK)?*



## MacKay:

*Don't be distracted by the myth that "every little helps." If everyone does a little, we'll achieve only a little. We must do a lot. What's required are big changes in **demand** and in **supply***

**Understanding and developing the  
Sustainable Energy Landscape  
is truly an interdisciplinary and global challenge!**



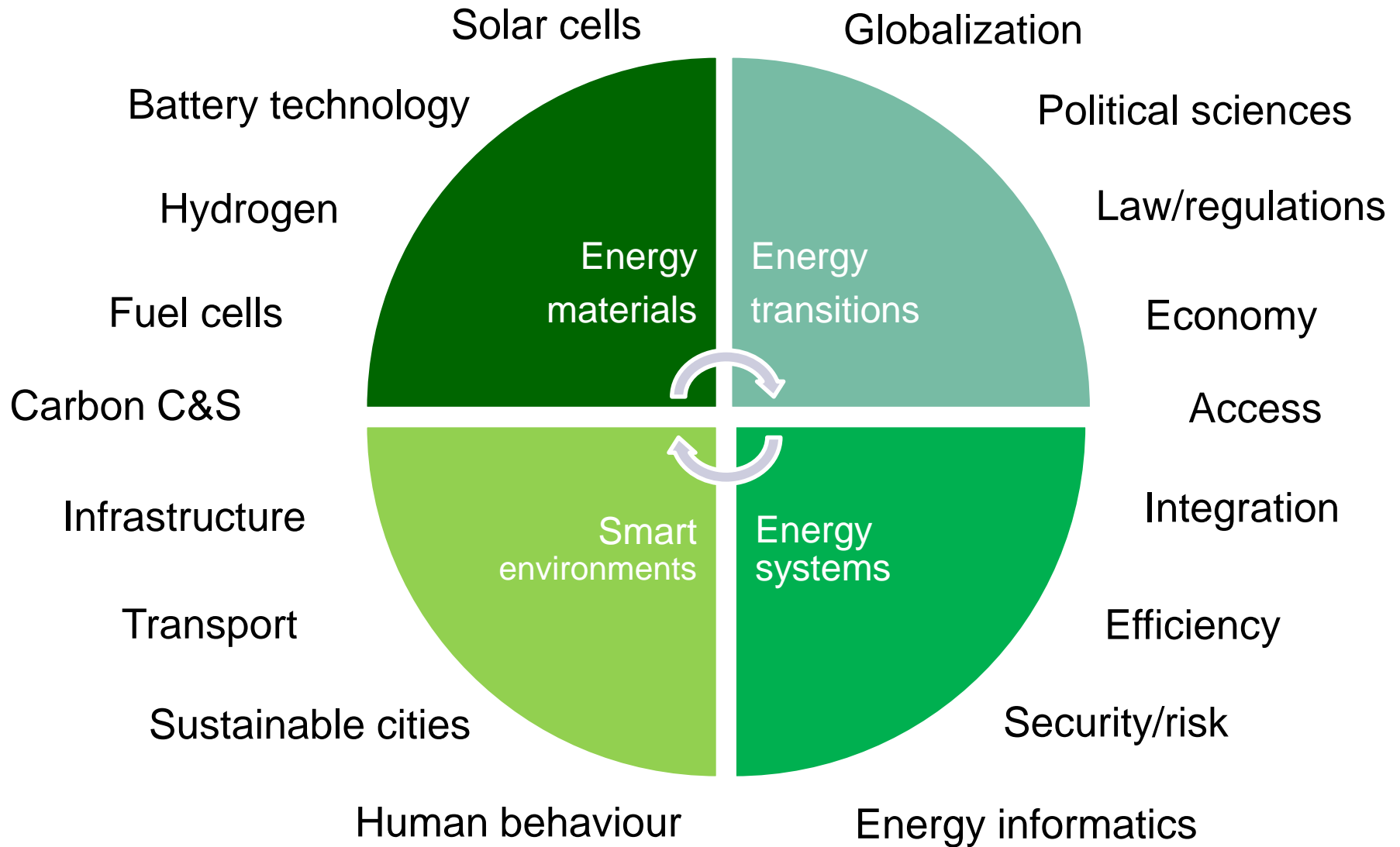
**Science and  
Technology**



**Regulation and Governance**



# UiO: Energy (strategy at a glance)





**Thank you for your attention**

*One hour with sunlight on the earth's surface  
covers the world's need of energy for an entire year.*