

Energy

- Scarce resources
- Climate changes CO₂
- Cities as sustainable energy promoters, not only energy consumers



Scarce resources (industry)

"A quartet":

- Accessible energy at
- Affordable prices with
- Acceptable impact and
- Adequate returns



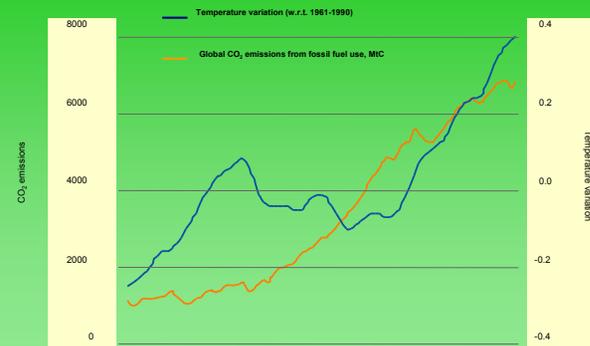
Facts & Trends

Growth, development & energy demand

- Energy is the fuel for growth, an essential requirement for economic and social development.
- Energy demand could double or triple by 2050 as a result of development.



Facts & Trends



Source: Hadley Centre and CDIAC



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Energy use and climate impacts

- Carbon dioxide levels in our atmosphere are rising, as is global temperature.
- By starting to manage carbon dioxide emissions now, we can limit the change.



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The impact on our climate could be substantial even at an achievable stabilization level, so adaptation to climate change will have to play a part of any future strategy.

Impacts will vary from region to region; much of the detail is uncertain.



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Measures might include:

- Flood defences in low-lying areas, ranging from Lisbon to Copenhagen
- Refugee planning for islands
- Improved water management (e.g. aqueducts) as rainfall patterns change



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The dynamics of technological change

- Global technological change is a lengthy process, measured in decades.
- Very large systems such as transport and energy infrastructures can take up to a century to fully develop.



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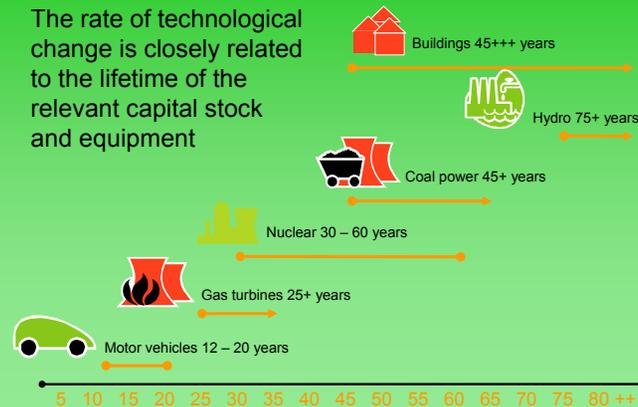
Many advocate that a rapid change in our energy infrastructure is the only solution to the threat of climate change. However:

- Major transitions at the **global level will take time** to implement
- The speed with which **new technologies diffuse** depends on many factors.



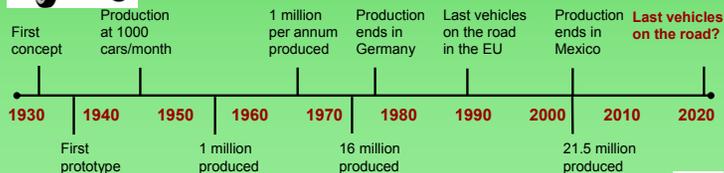
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The rate of technological change is closely related to the lifetime of the relevant capital stock and equipment



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New technologies in developed countries may arrive, mature and even decline before their widespread adoption in developing regions.



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Reshaping our energy future

- By 2050 energy demand will be sharply higher, but global carbon emissions must be no higher than today and trending downward.
- No single solution will deliver this change.

Above all, we need to start now.



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Sir Nicholas Stern (economy)

- 100 mio = environmental refugees.
 - No change: the bill estimation
€ 5,333 billions
 - Only 1 % of GNP – now!



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In EU:

EU energy supply is topical
Common EU policy in 2007?
EU focus on buildings (directive concerning energy performance demands)



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In Denmark:

No increase in energy consumption since 1975
- though the GNP has increased by 54 %
WHY??



Danish Model

Focus on

- energy savings
 - energy efficiency (heat and electricity)
 - energy substitutes, i.e. renewables
- (4 P's☺):

**People, planning, politicians
and public authorities!**



Short term change

Basics

- community involvement
- economy ("green taxation")
- information and implementation
- high standards concerning energy efficiency and savings
- **above all: planning!**



Communities

Denmark:

Strong co-operative energy sector
Experience with a range of sustainable energy technologies
Different types of energy co-ops



Types of Energy Co-ops - DK

Community-owned wind power
Community owned PV installations
Consumer-owned district heating
Consumer-owned electricity supply
Farmer-owned biogas production
Farmer-owned biomass production and heating



Co-operative Culture

Basis:

Distribution of benefits to communities through co-operative ownership (160 years)
Co-ops represent a familiar model for projects at a community scale



What is a co-op?

Independent, democratically controlled enterprise, owned and governed by their members, with the aim of meeting common social, economic and environmental needs.



Principles

- Voluntary and open membership
 - Democratic member control
 - Member economic participation
 - Autonomy and independence
- Education, training and information
 - Co-operation among co-ops
 - Concern for community



Examples

- Middelgrunden offshore windmills
 - Copenhagen Solar Co-op
 - Energy Day



Planning and Co-operation

- Buildings
 - Renewables
 - Training/Education/Information
 - "Cross the boarder"
- and do it now!

