



Environment and Spatial Planning  
*Ministry of Housing, Spatial Planning and  
the Environment*

From value chain to

System Change



Robbert Droop

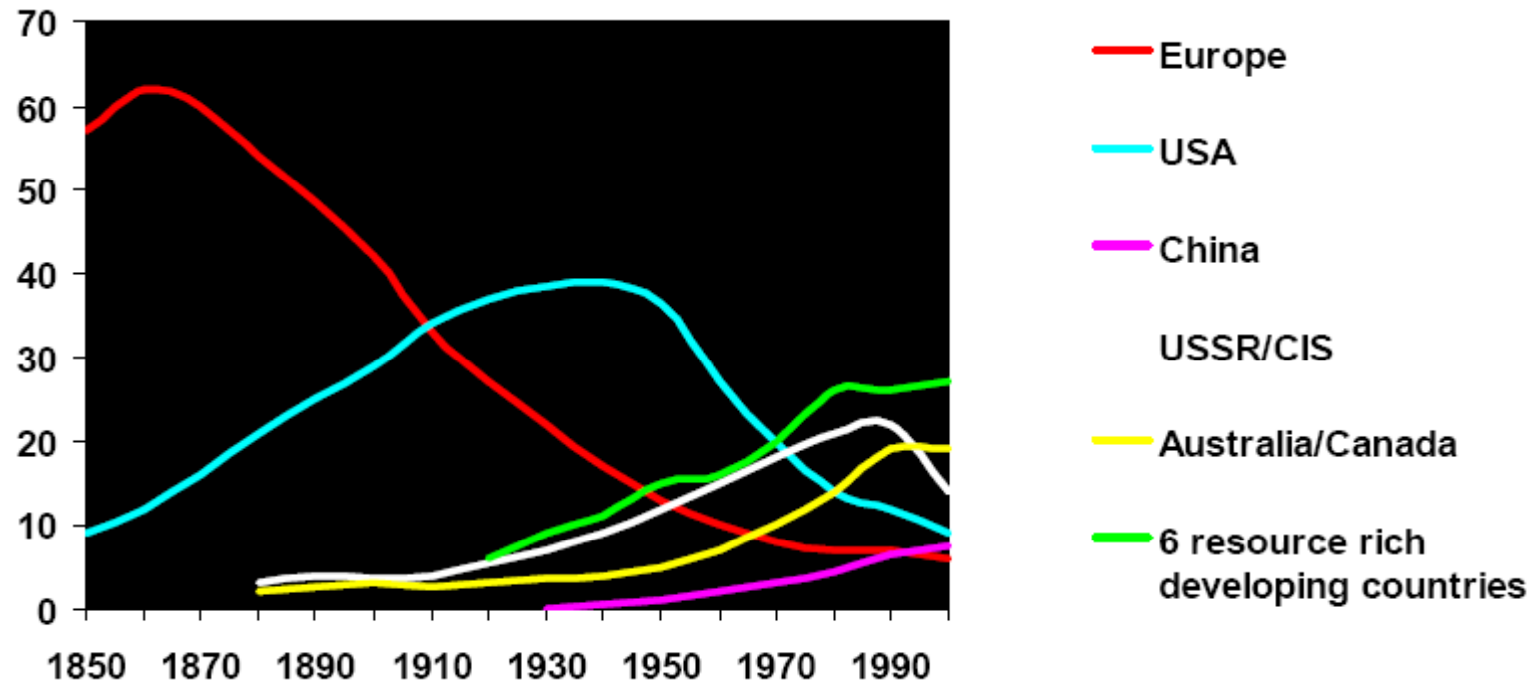
FONA – Designing Europe's  
Future for I & SD in FP8

FONA, Berlin, 4 November 2010



## Decrease of mining in EU and USA

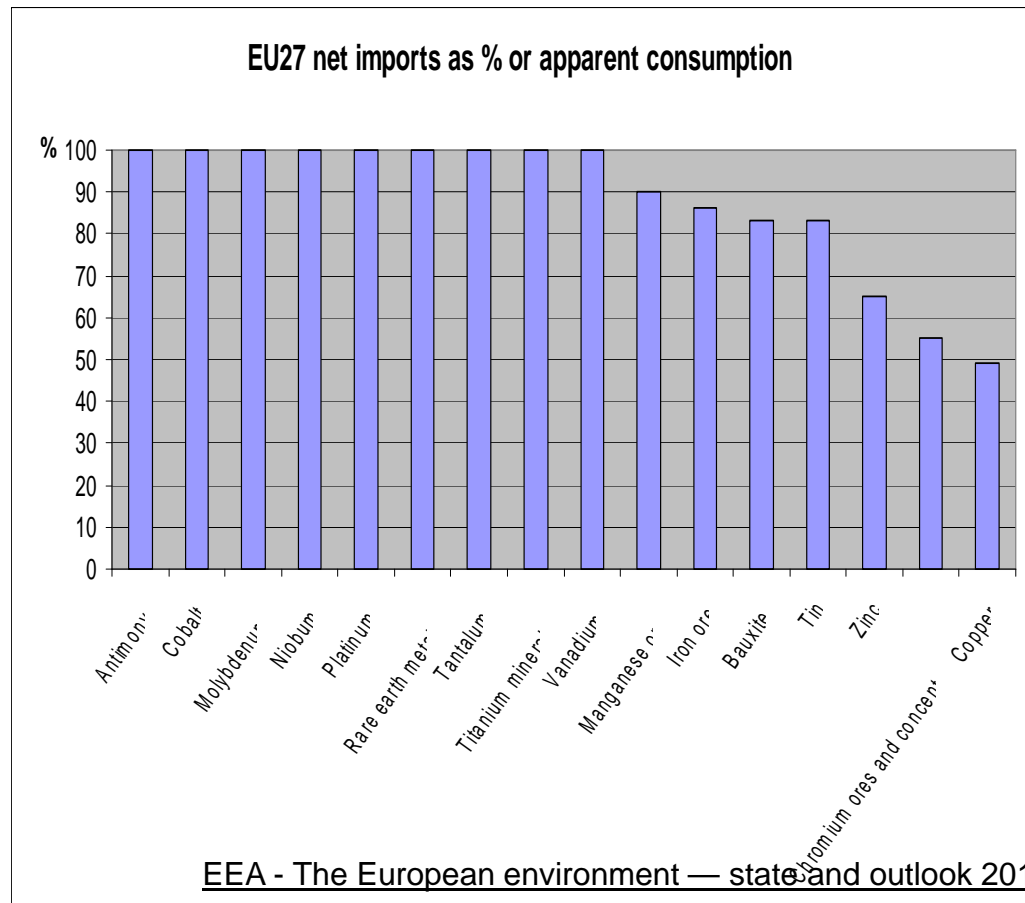
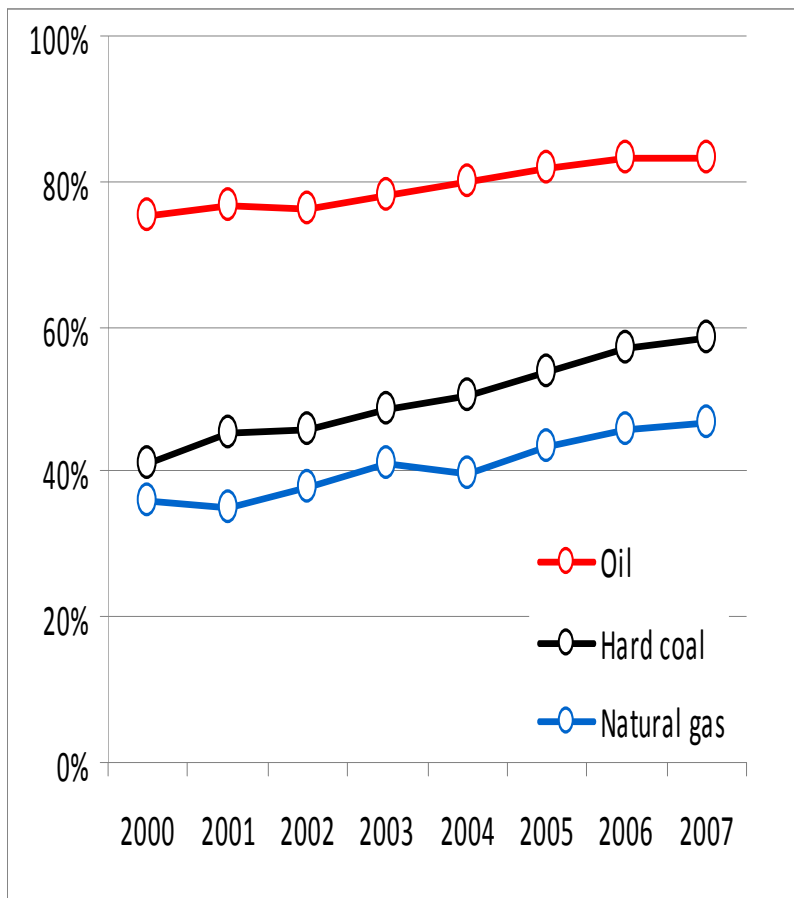
% of global mining



Source: Magnus Ericsson (Raw Materials Group), 2010



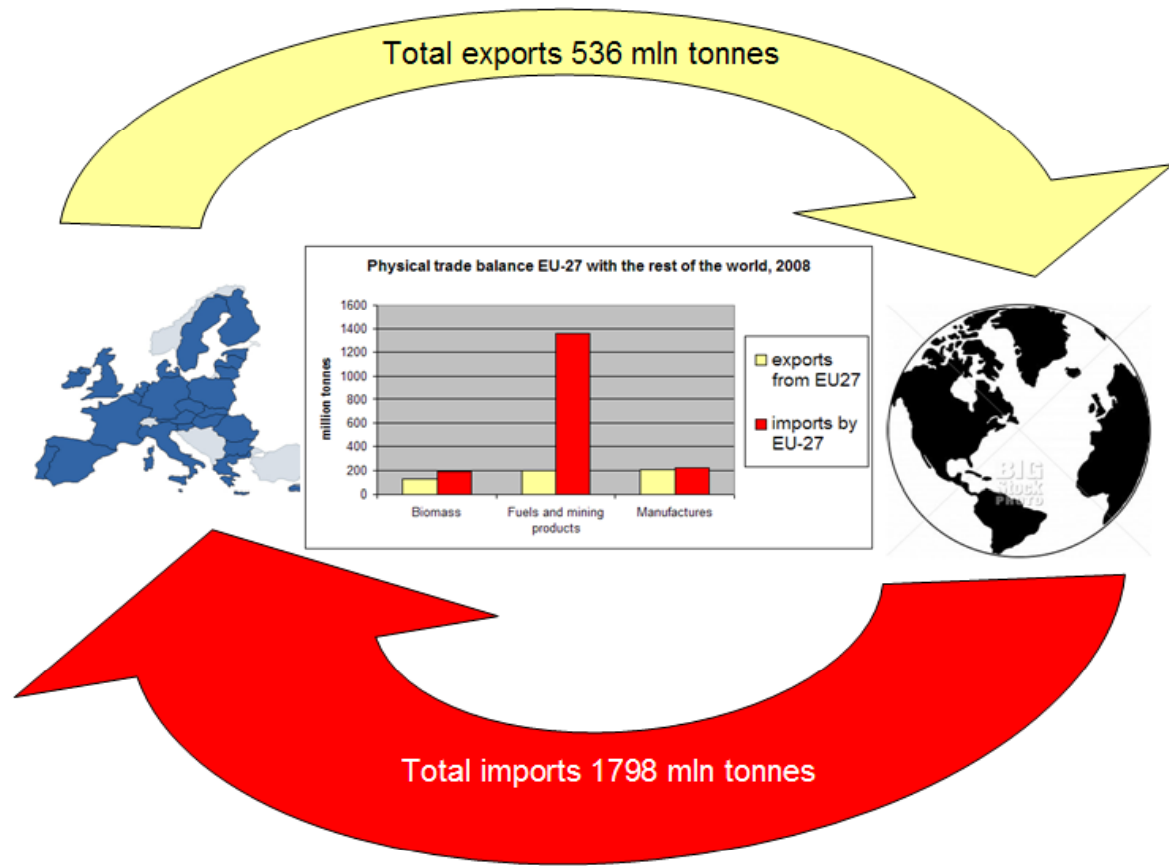
# Selected imports into the EU-27



EEA - The European environment — state and outlook 2010



# EU-27 as net importer of materials : 20-30% of what we use is imported



EEA - The European environment — state and outlook 2010



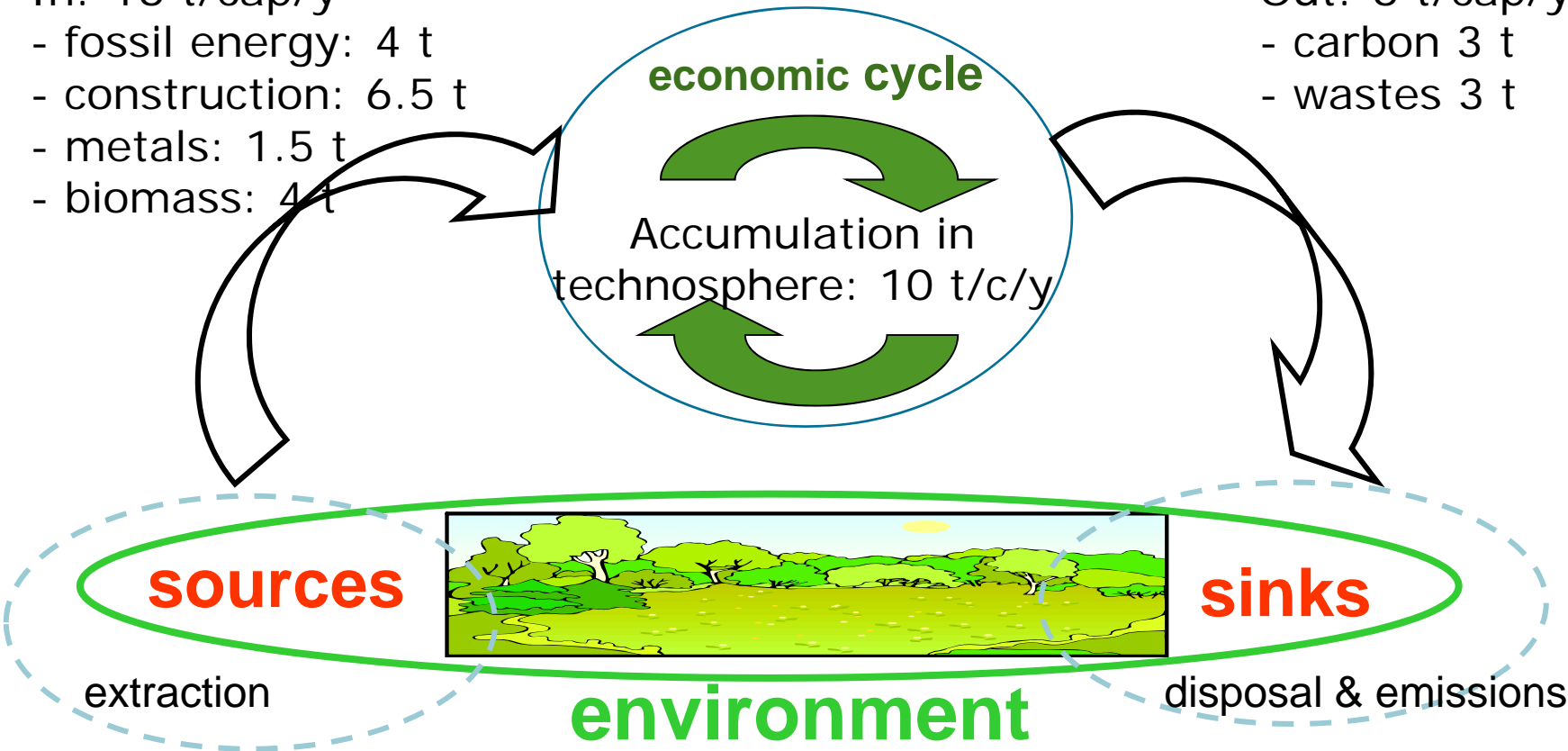
# Materials flows - EU

In: 16 t/cap/y

- fossil energy: 4 t
- construction: 6.5 t
- metals: 1.5 t
- biomass: 4 t

Out: 6 t/cap/y

- carbon 3 t
- wastes 3 t



Ref. Wuppertal Institute



# Materials scarcity interferes with energy transition

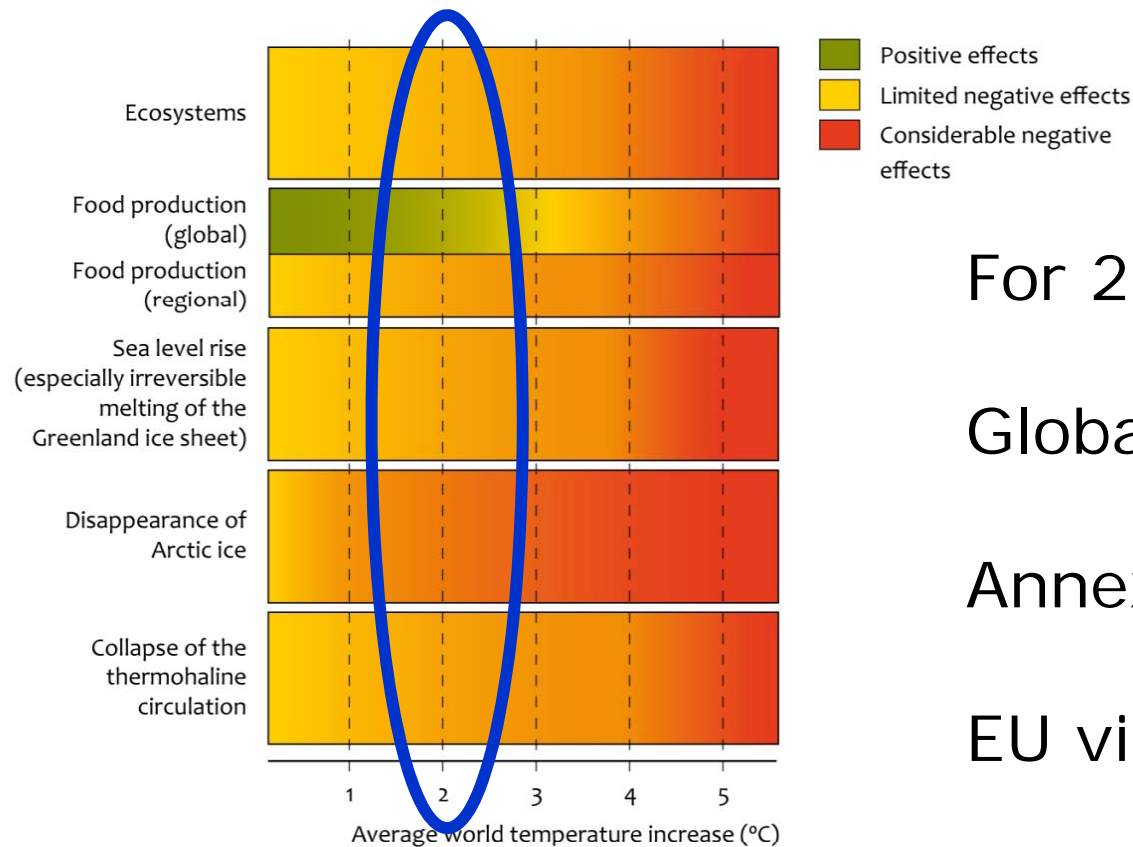


- replace ALL fossil fuels by 2030 using:
- 490,000 1MW tidal turbines
  - 5,350 100MW geothermal plants
  - 900 1,300MW hydroelectric plants
  - 3,800,000 5MW wind turbines
  - 720,000 0.75MW wave converters
  - 1,700,000,000 0.003MW rooftop photovoltaic systems
  - 49,000 300MW concentrated solar power plants
  - 40,000 300MW photovoltaic power plants

2010 



## Risk of damage due to climate change



For 2<sup>0</sup> C max.:

Global 40-60% reduction

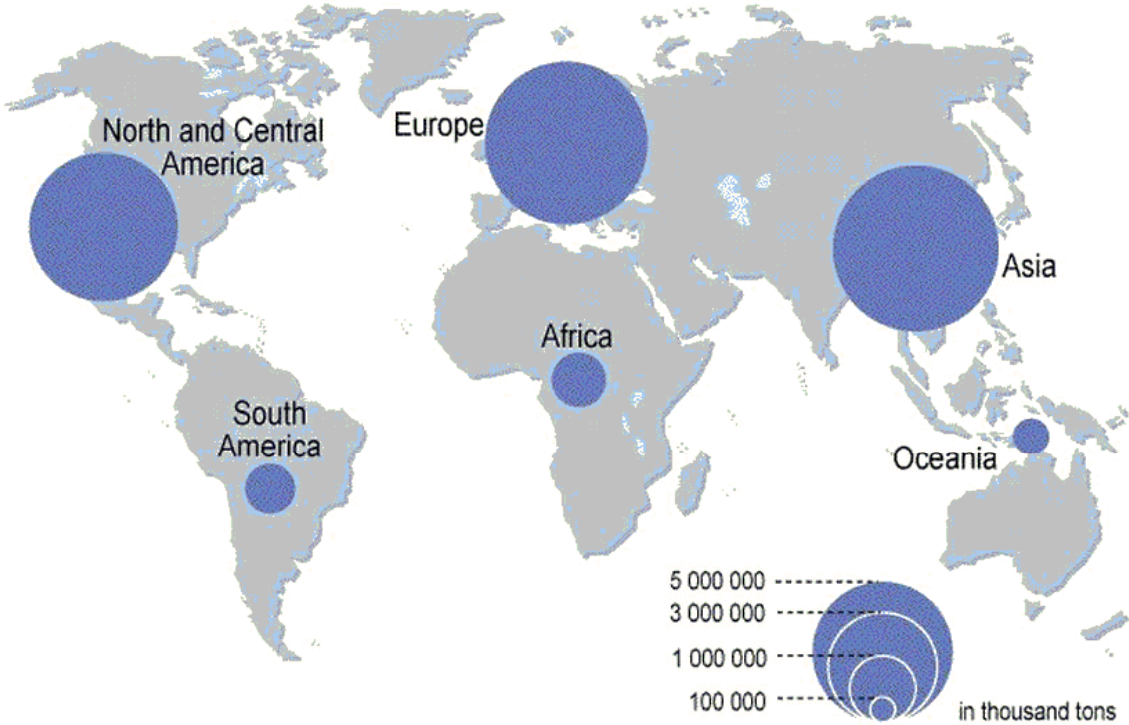
Annex I 80-95% reduction

EU vision 80% red.internal

Source: 2010 Netherlands' Environmental Assessment Agency



# CO2 emissions from industrial processes

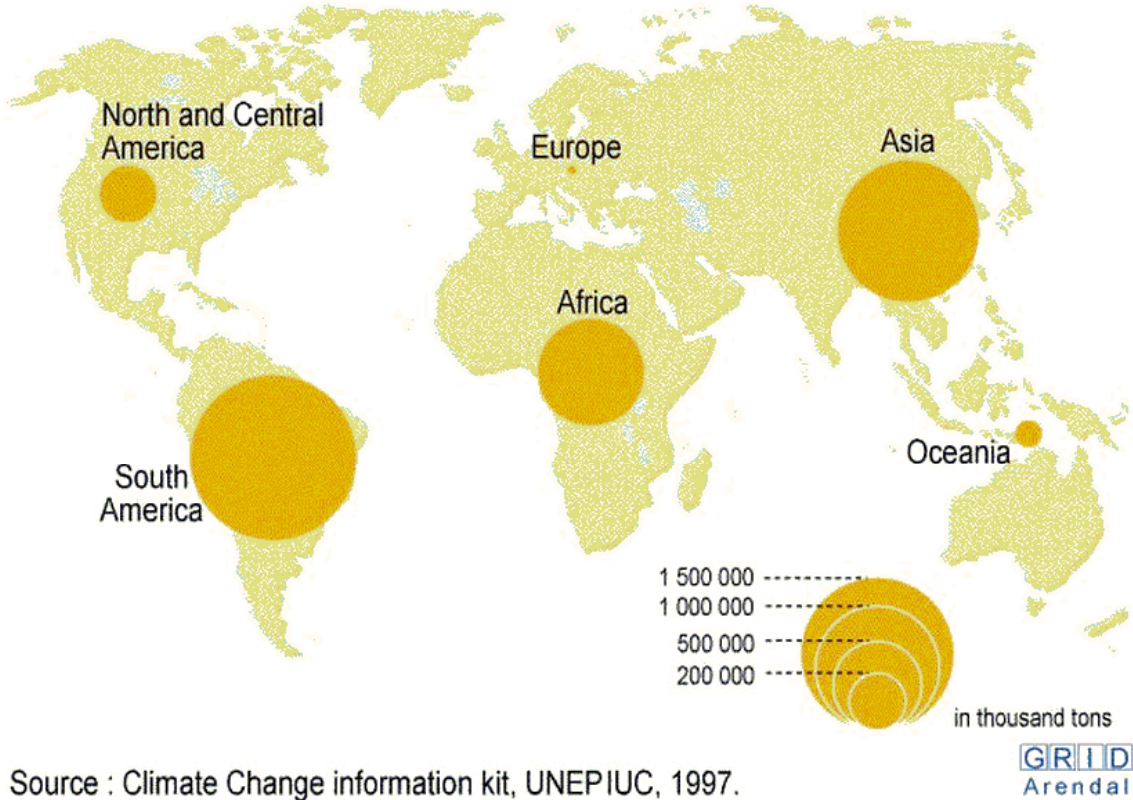


Source : Climate Change information kit, UNEPIUC, 1997.





# CO2 emissions from land-use change



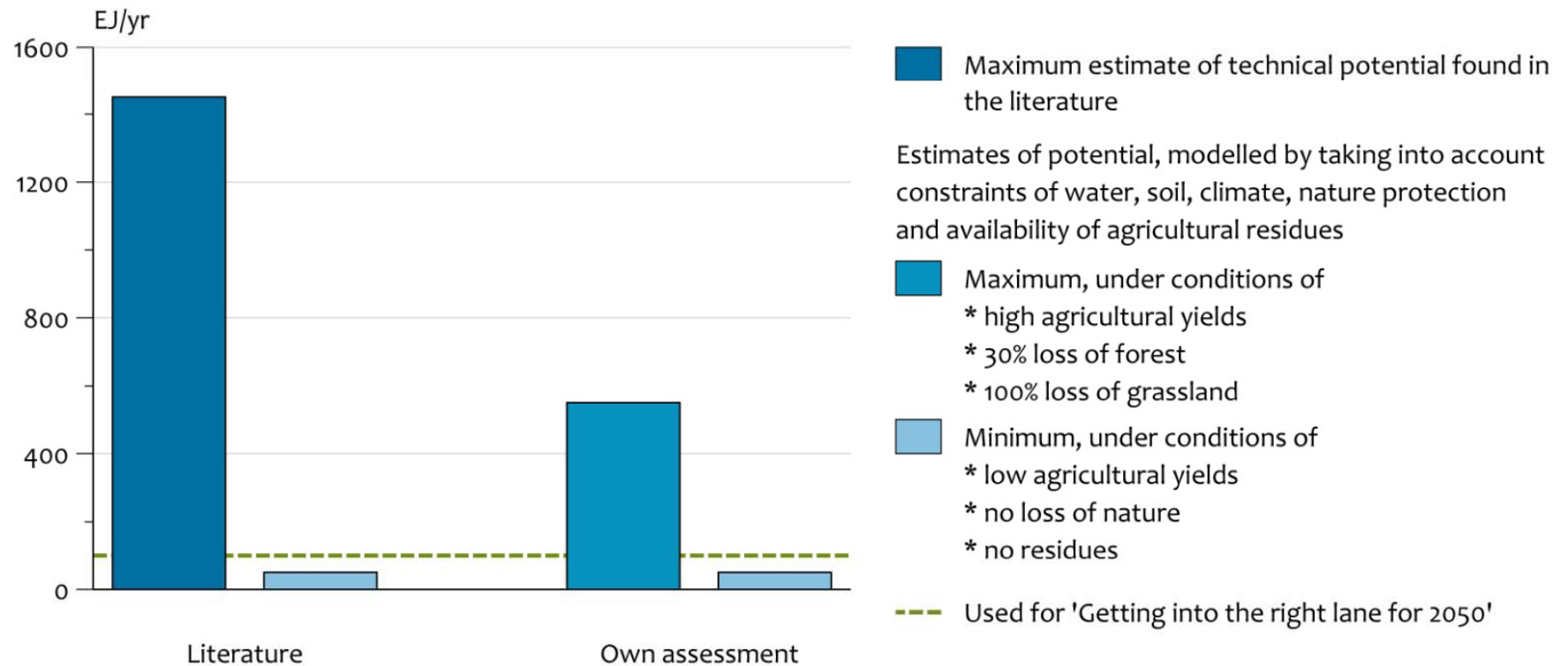


# Scarcity - Phosphates





## Estimates of global bio-energy potential, 2050



Source: 2010 Netherlands' Environmental Assessment Agency



# Need for System Change

Scarcity is bad for economy ....





## Need for System Change



...and for ecosystems



## Innovative approaches in the chain .....

- Netherlands' policy experiences
  - Business-cases:
    - Closing the gypsum chain
    - Jeans for Jeans (J4J)
    - Construction, Food, Paper

Chain action works .....





## Innovative approaches in the chain .....

..... but no transition

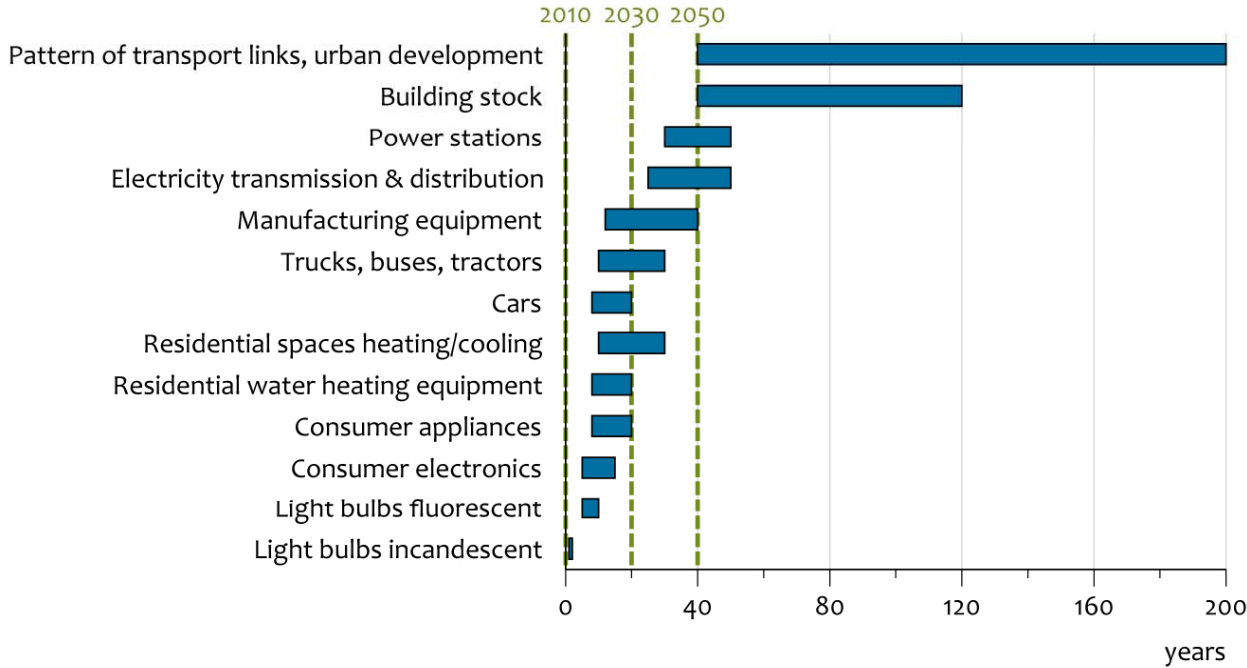
towards sustainable economy

- Market failure
- Institutional failure
- Transition failure
- System failure



# System inertia is one of the links between long-term vision and near-term investments

## Energy capital lifetimes



Source: Philibert and Pershing, 2002

Image: Netherlands' Environmental Assessment Agency



## R&D for System Change

From cheap and disposable to costly and scarce

1. Vision:
  1. Low-carbon – Resource efficient
  2. Maintain eco-systemfunctions
  
2. Three axes for R&D:
  - Life Cycle approaches
  - Integrated environmental assessment
  - Account of all aspects - tech, soc, geo-polit, behaviour
  
3. Limit use of resources to 1 planet → Change life-style
  
4. Avoid lock-in



## R&D for System Change

### Align European R&D to system change

1. Environment: interlinkages, cost of in-action, policies and instruments
2. Processes and Materials: internalize eco-innovation  
CO2-based
3. Energy: renewable, efficiency
  - **Low-carbon EU economy as strategic goal**
4. Agriculture&Food: increase yield, artificial proteins
  - **Maintain ecosystem-functions**
5. Transport: mode shift, behaviour change



# R&D for system change ..... by industry

Re-think and Re-design for Dematerialization





# R&D for system change ..... for consumers

Awareness and Information

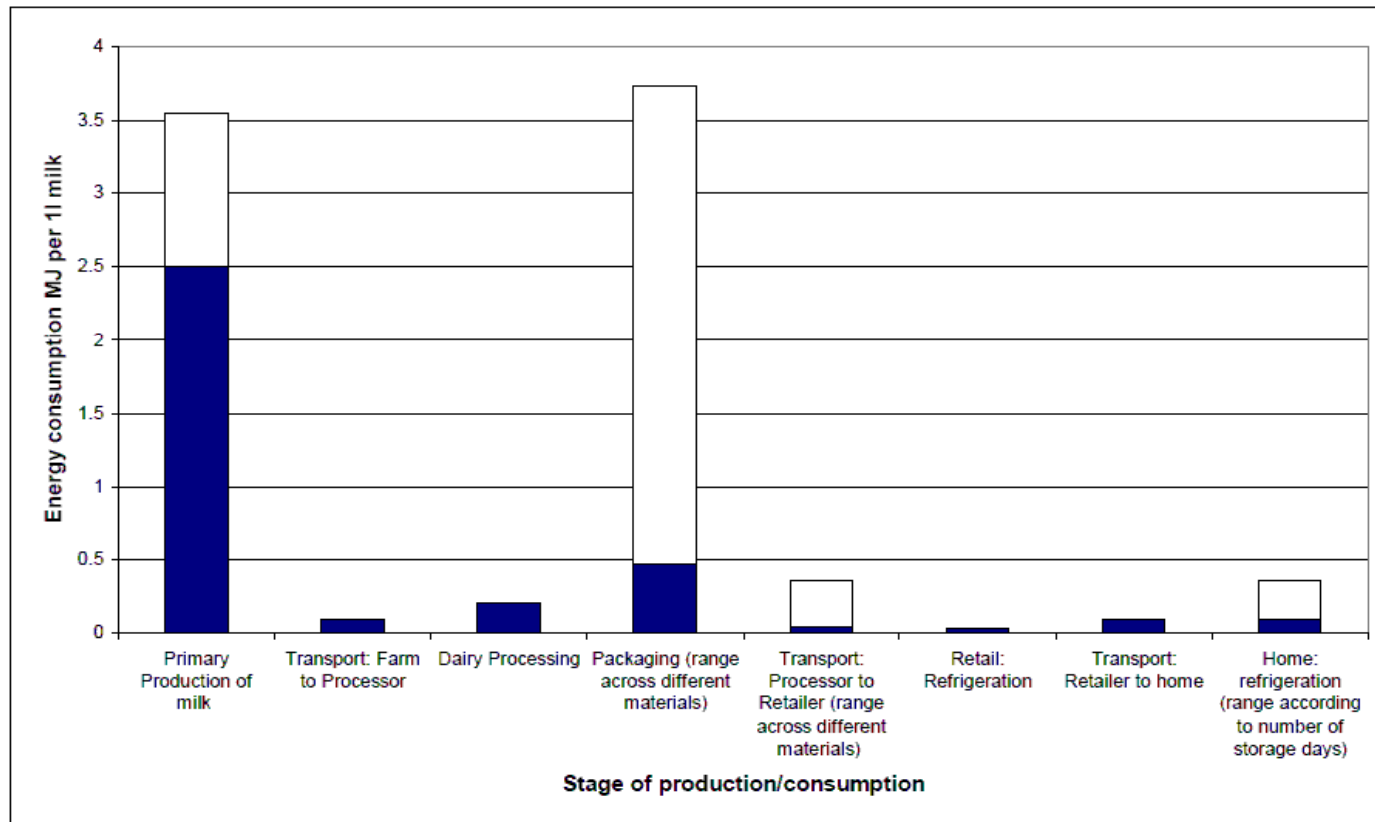
Create attractive alternatives

Promote change.....





# Change of Life-style



Energy consumption across the conventional milk production and consumption system

Defra, 2006



## R&D for System Change.....

..... but no transition

towards sustainable economy

- R&D within vested interests
- R&D within the borders of imagination



# EU R&D for System Change

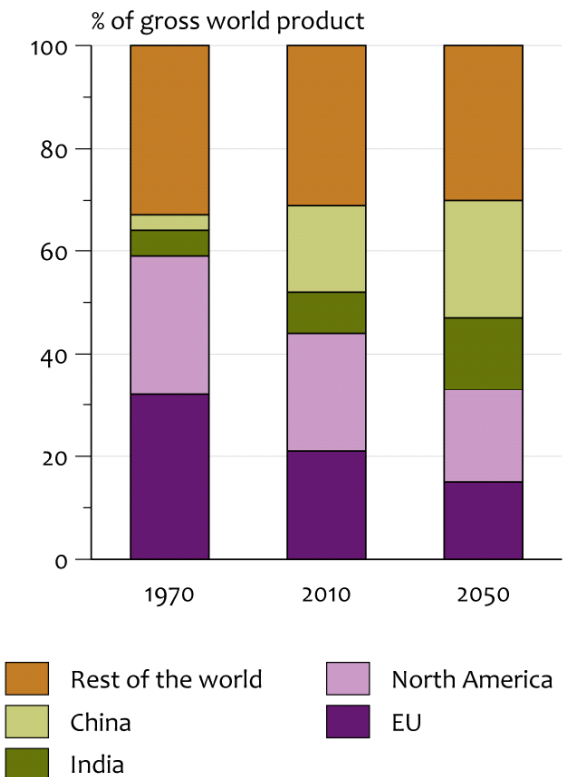
Global role EU shrinks....

...but can still set the standard...

...if EU commits to R&D  
for system change.

## GDP of major world regions

Baseline projection



Source: 2010 Netherlands' Environmental Assessment Agency



“Don’t ask what system change can do for you.  
Ask what you can do for system change.”

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Netherlands’ Ministry of Infrastructure and Environment

Sustainable Production