

# Towards Ecomodernity: The Anatomy of Green Transition

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Stockholm 12 September 2013

by

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# The Story of Limitlessness

## THE WALL STREET JOURNAL

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### GREED IS GOOD

"Invest to increase my wealth" - W. Buffett



#### Berkshire Hathaway, Inc.

Stock Symbol: BRK-A \$108,100/share

Opportunities Available At Fine Brokerage Houses Everywhere

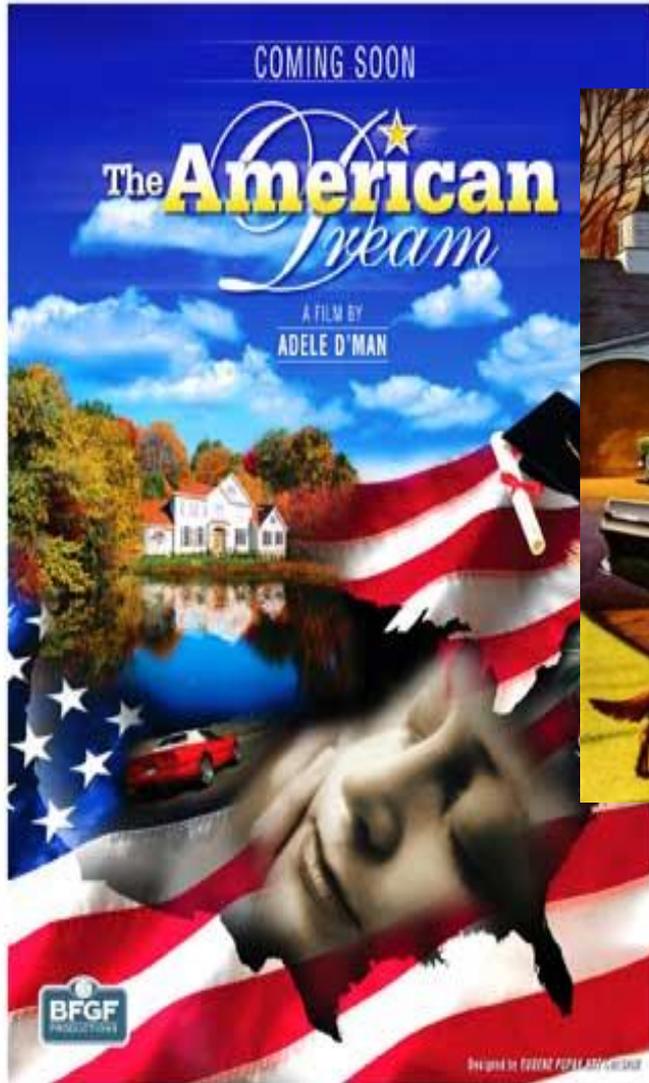


Resolution 3000 x 2200 px - Free JPG file download - [www.psdgraphics.com](http://www.psdgraphics.com)

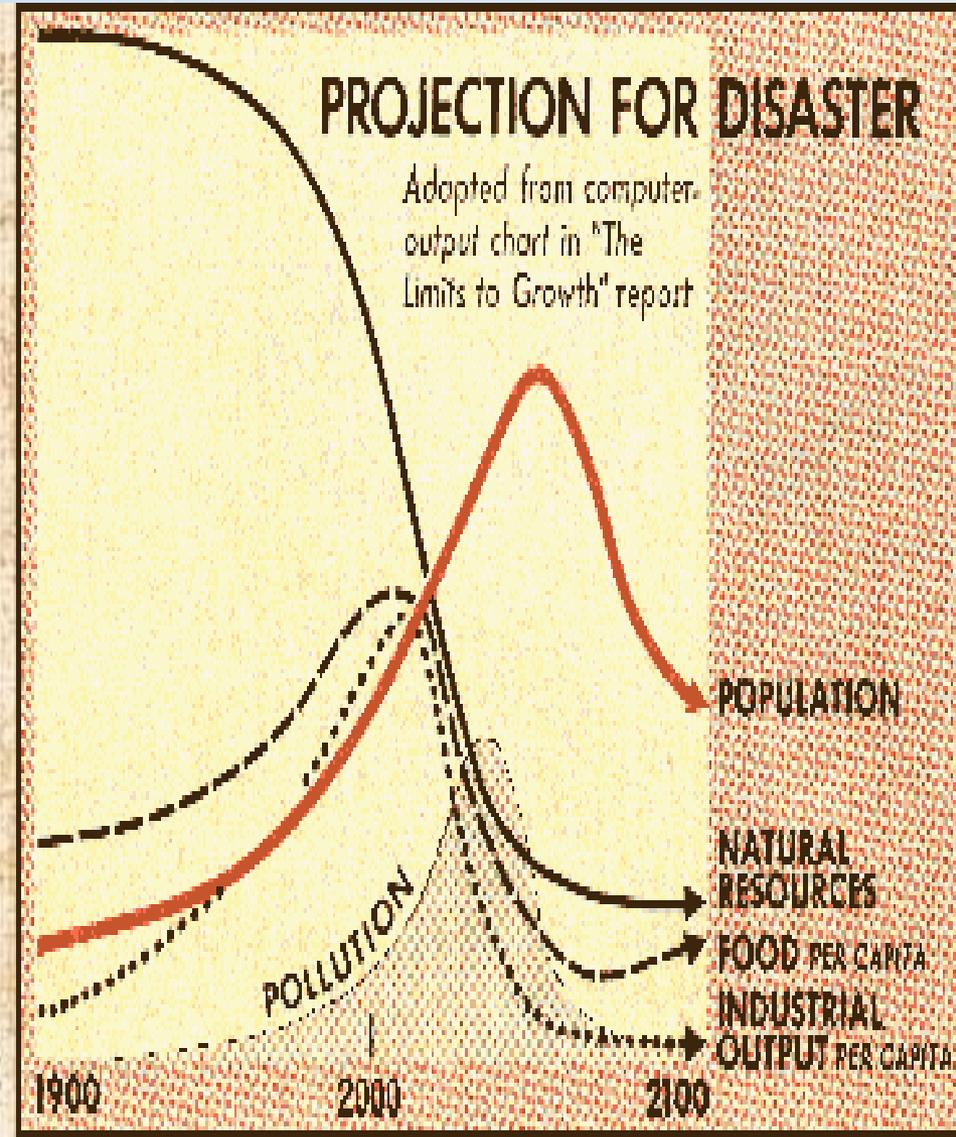


FMD  
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# The American Story of Limitlessness



# The Story of Limits to Growth



# Two Versions of Limits to Growth



# Towards Ecomodernity: A Story of Transcendence

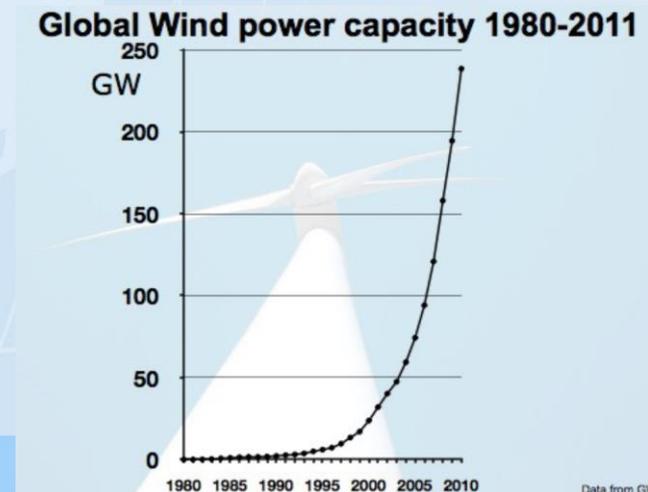
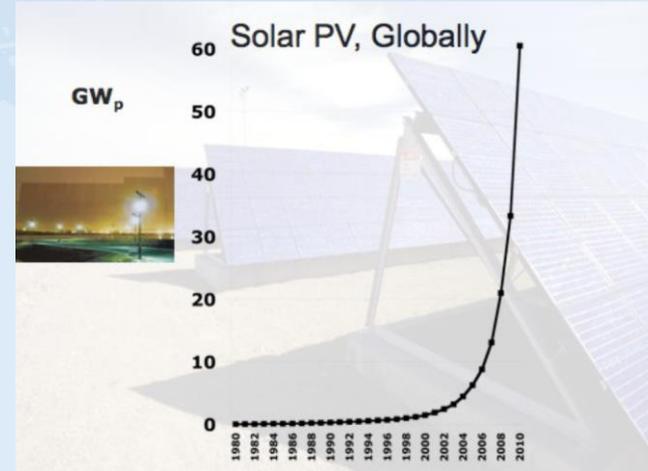


**NO LIMITS**

Once we accept our limits, we go beyond them.

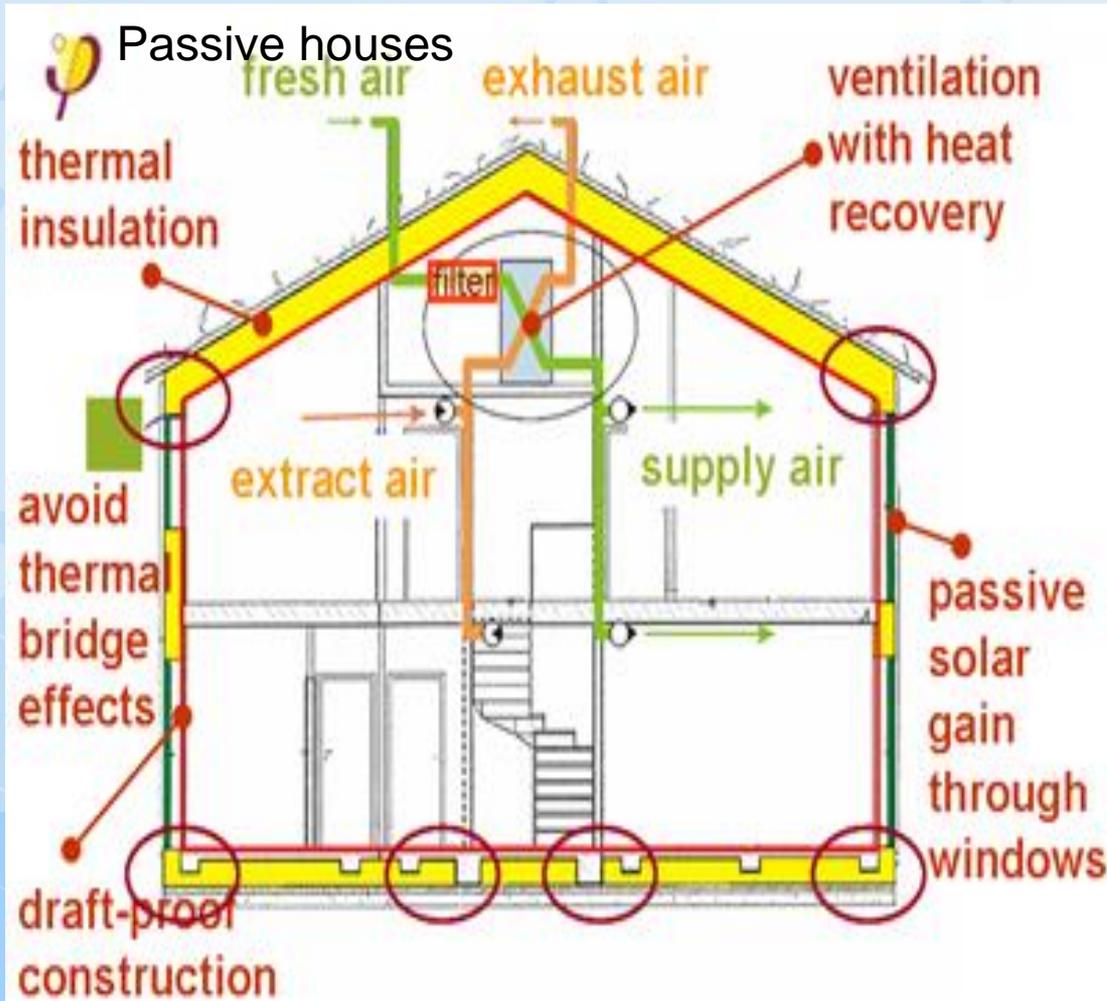
~ *Albert Einstein*

# Green Growth in Renewables



From Kåberger 2012

# Eco-Efficiency



**e**

# WUB

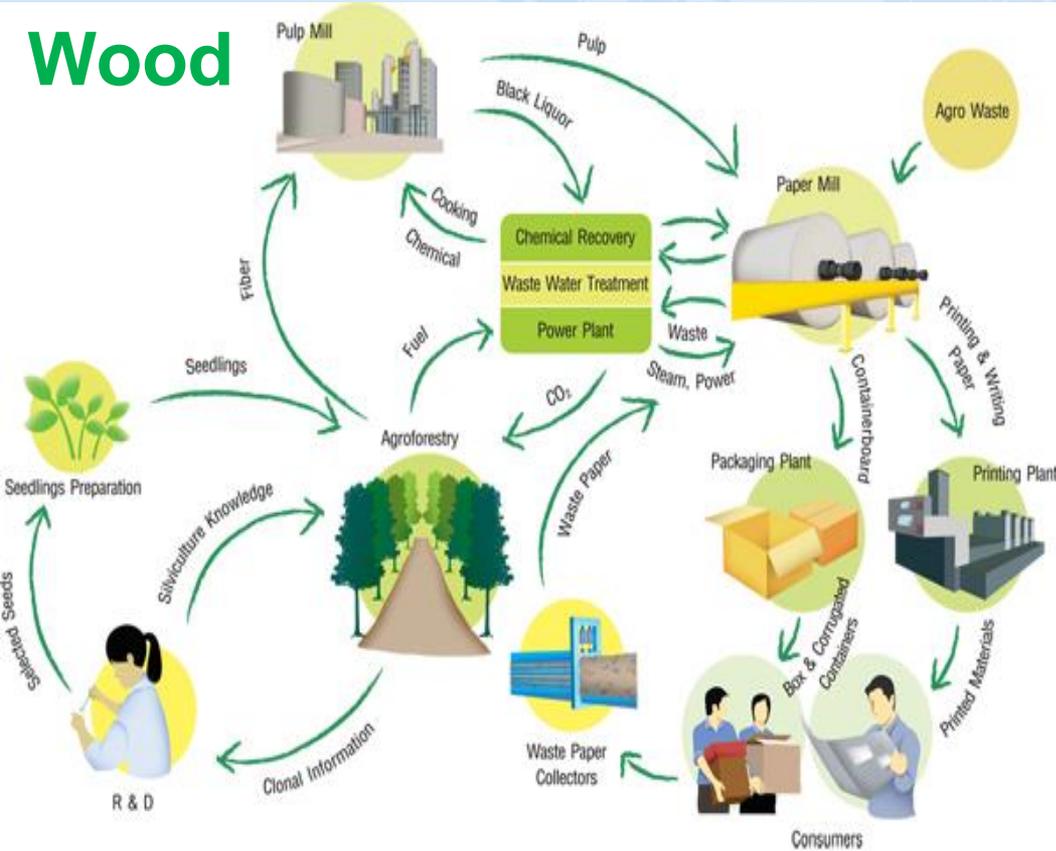
## FACTOR FIVE

Transforming the Global Economy through 80% Improvements in Resource Productivity

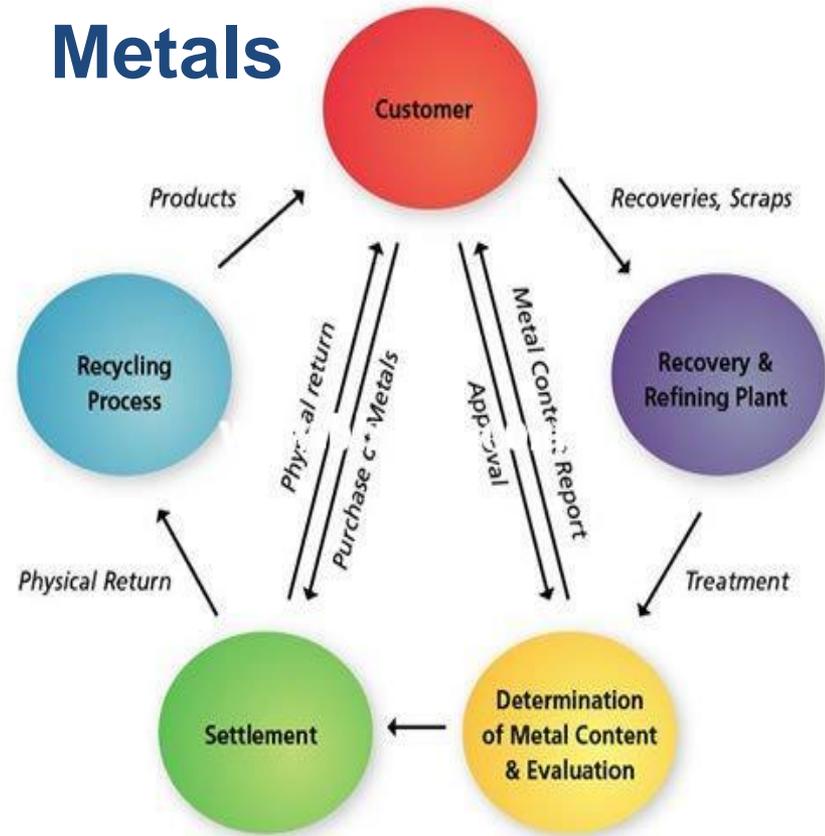
ERNST VON WEIZSÄCKER  
KARLSON 'CHARLIE' HARGROVES • MICHAEL H. SMITH  
CHERYL DESHA • PETER STASINOPOULOS

# Resource Recycling

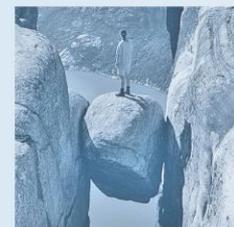
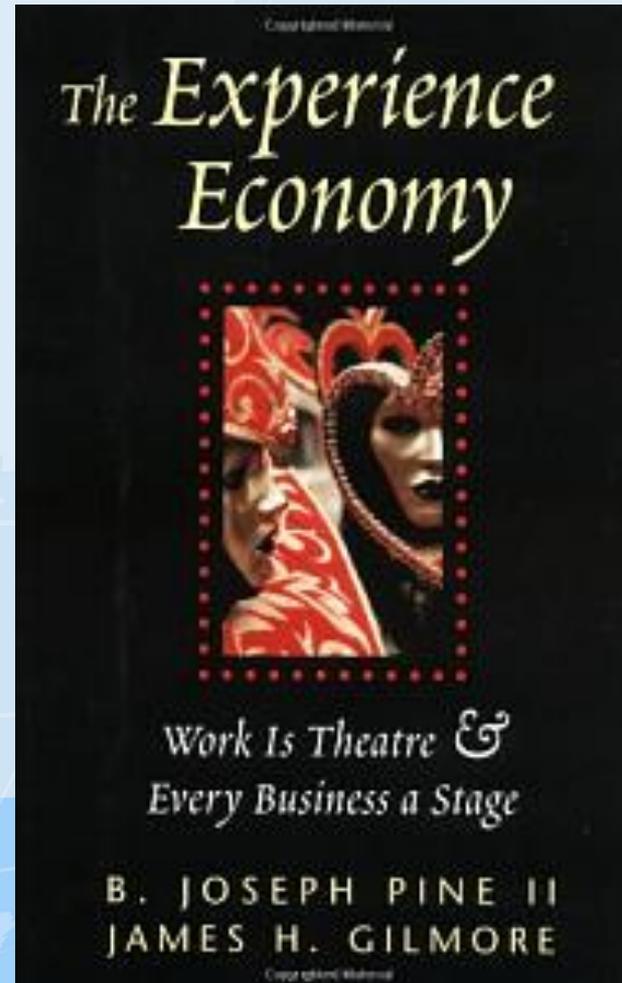
## Wood



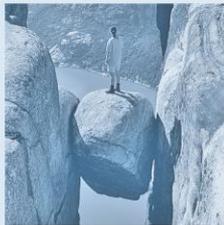
## Metals



# Culture and Experience Economy

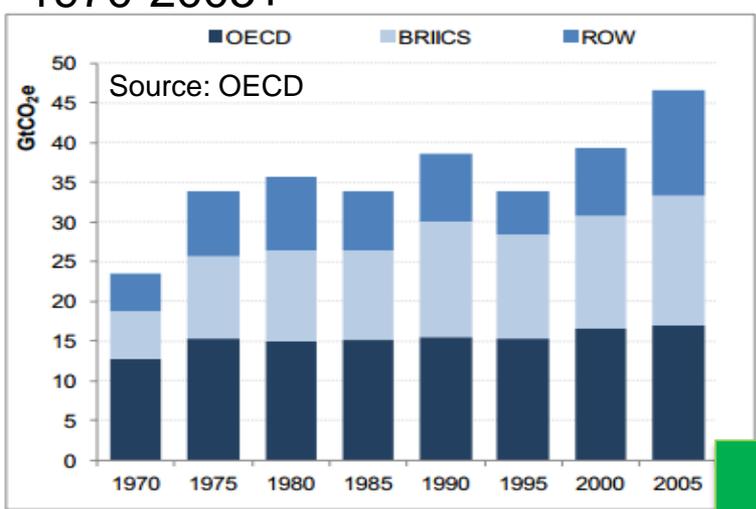


# GREEN TRANSITION: AN INNOVATION PERSPECTIVE

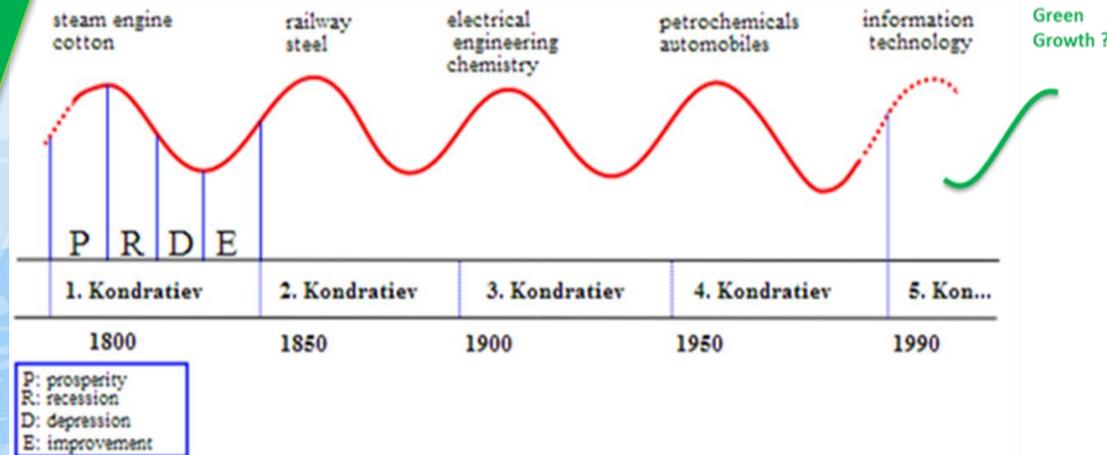
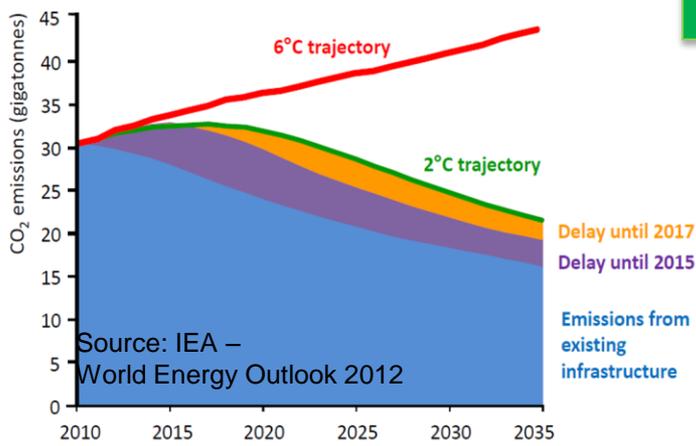


# Marginalistic vs Transformative/innovation Perspectives

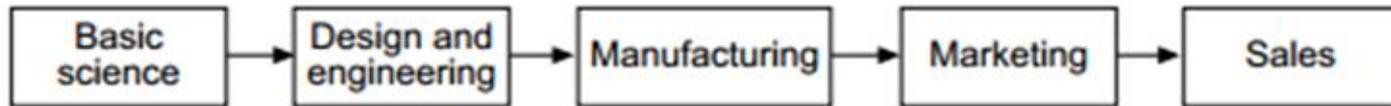
GHG emissions by regions:  
1970-2005+



## IEA Scenarios



# Technology Push: Green Transition Driven by Big Science

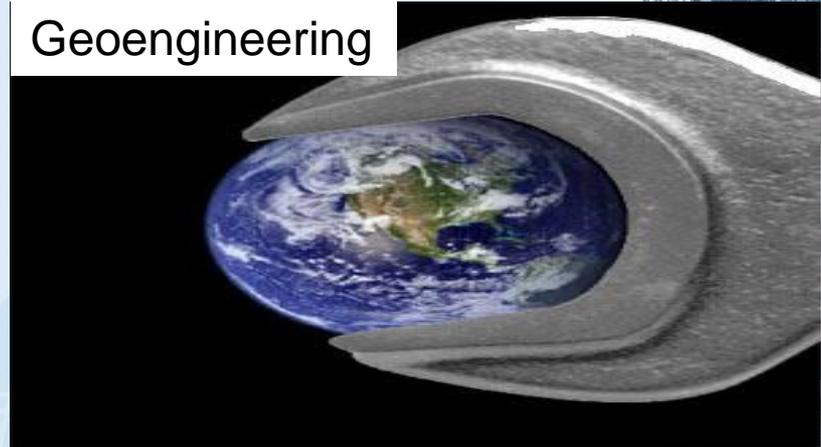


From Rothwell 1994

Nuclear



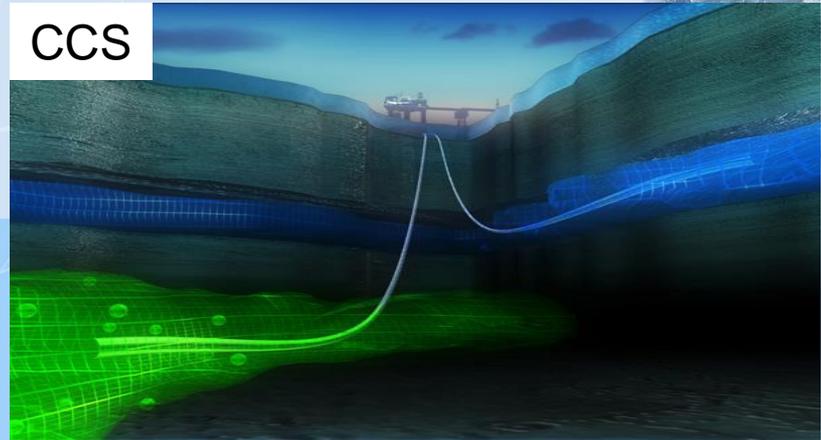
Geoengineering



NASA - Solar



CCS



# Demand Pull: Green Transition Driven by Consumption

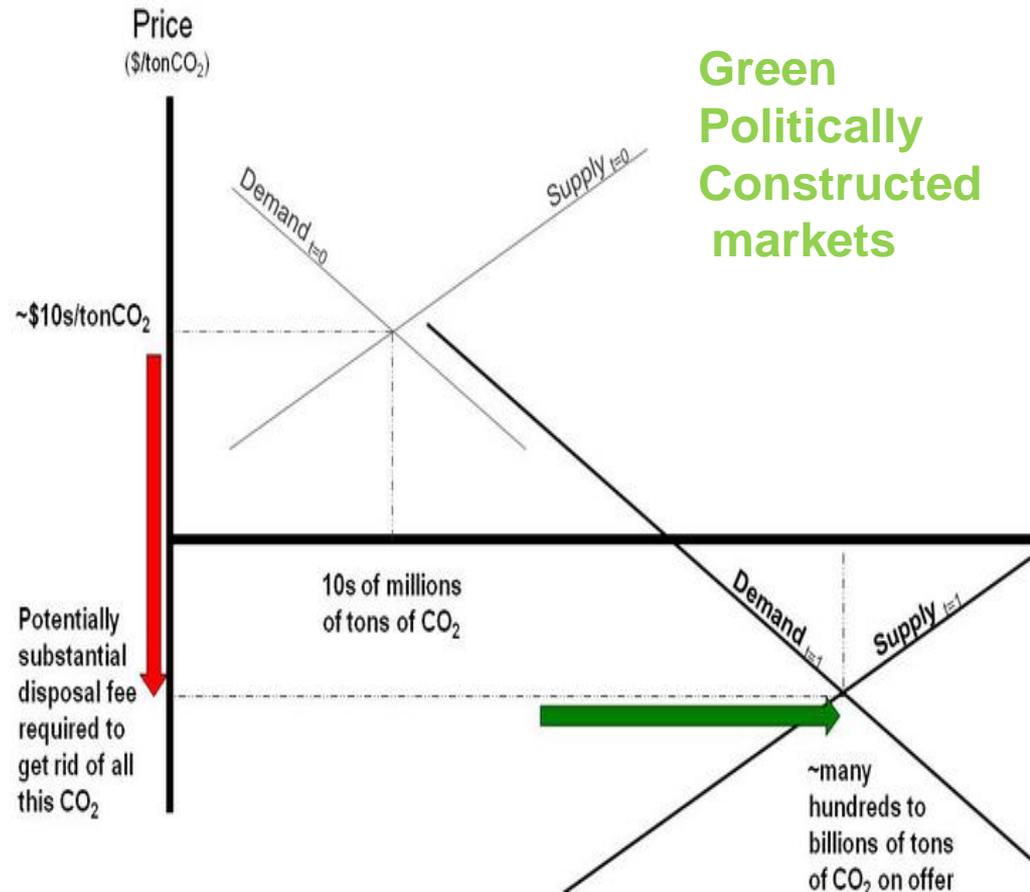


From Rothwell 1994

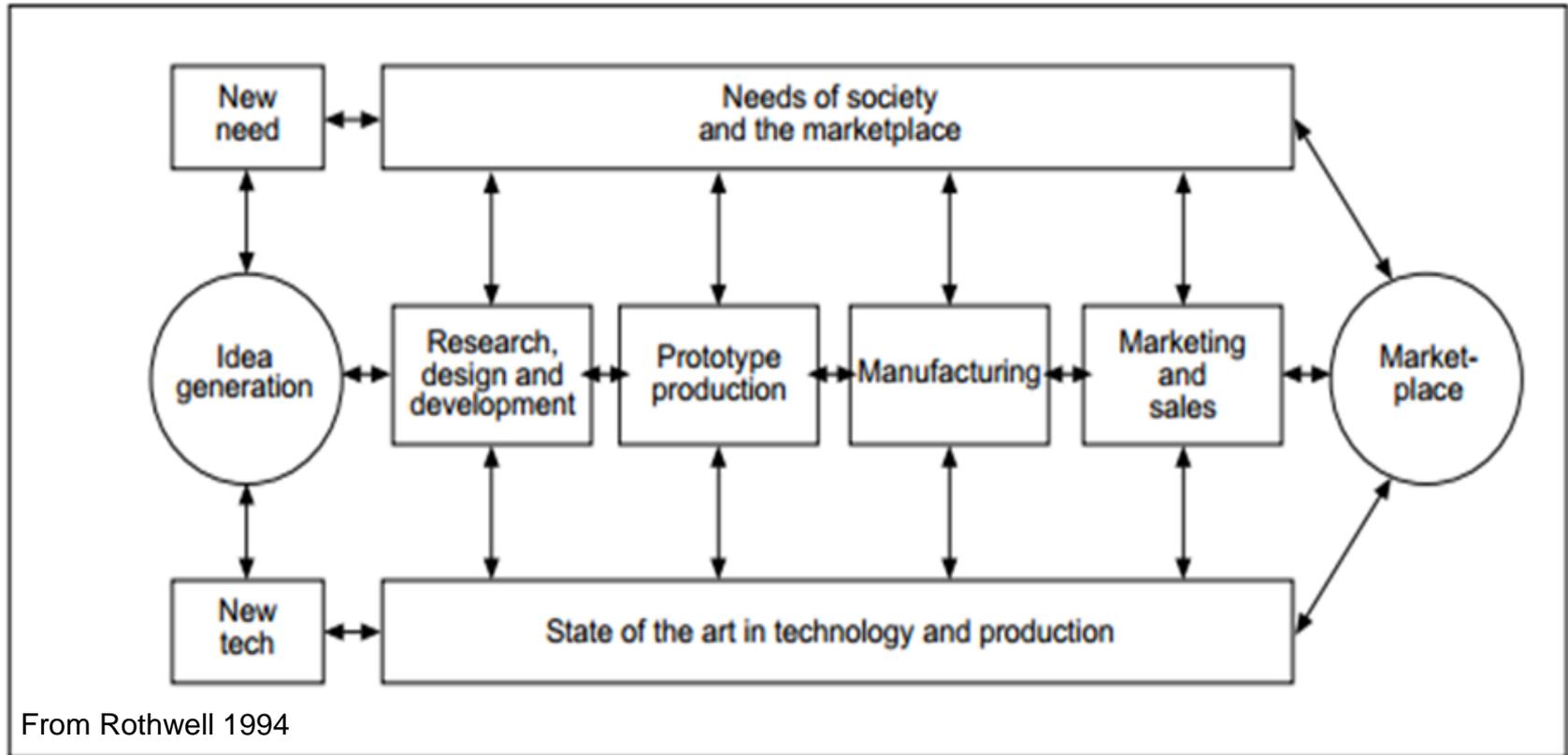
Green Consumption



Green Niche markets



# The Coupling Model: Green Transition Driven by Complex Interplay



# Bridging Radical and Incremental Innovation

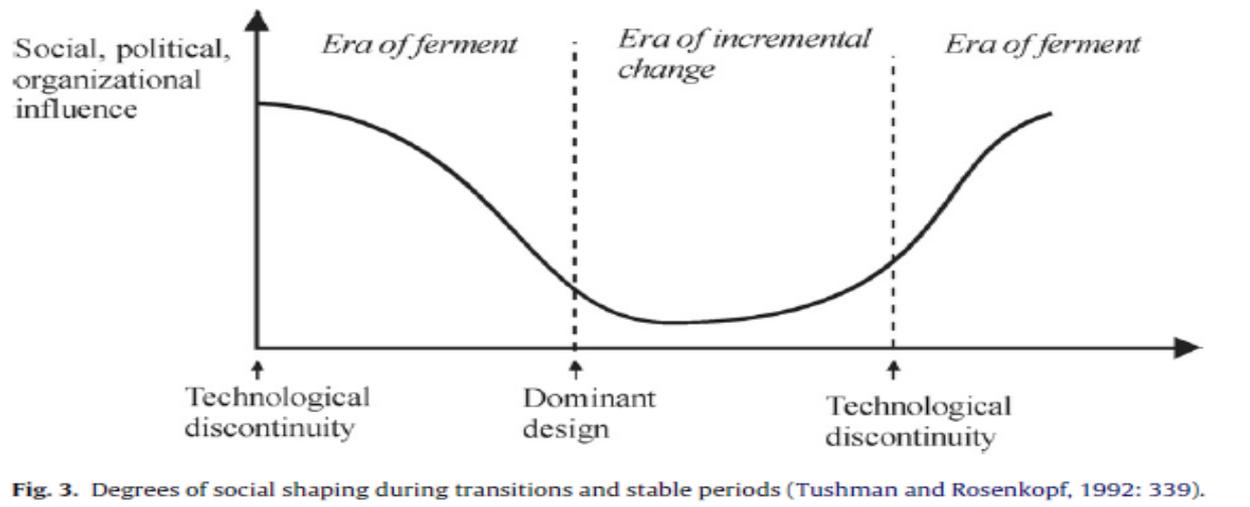


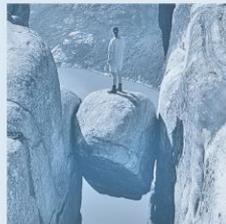
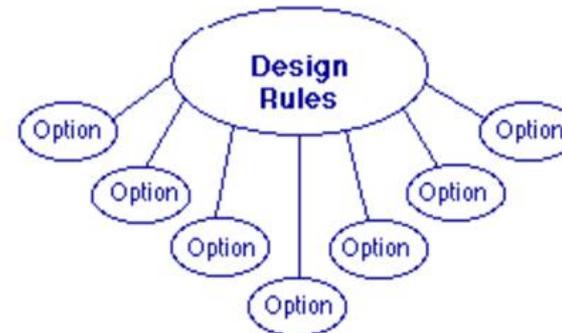
Fig. 3. Degrees of social shaping during transitions and stable periods (Tushman and Rosenkopf, 1992: 339).

## Modularity Creates Design Options

System Before Modularization



System after Modularization



# Electric Car Radical or Incremental Innovation?

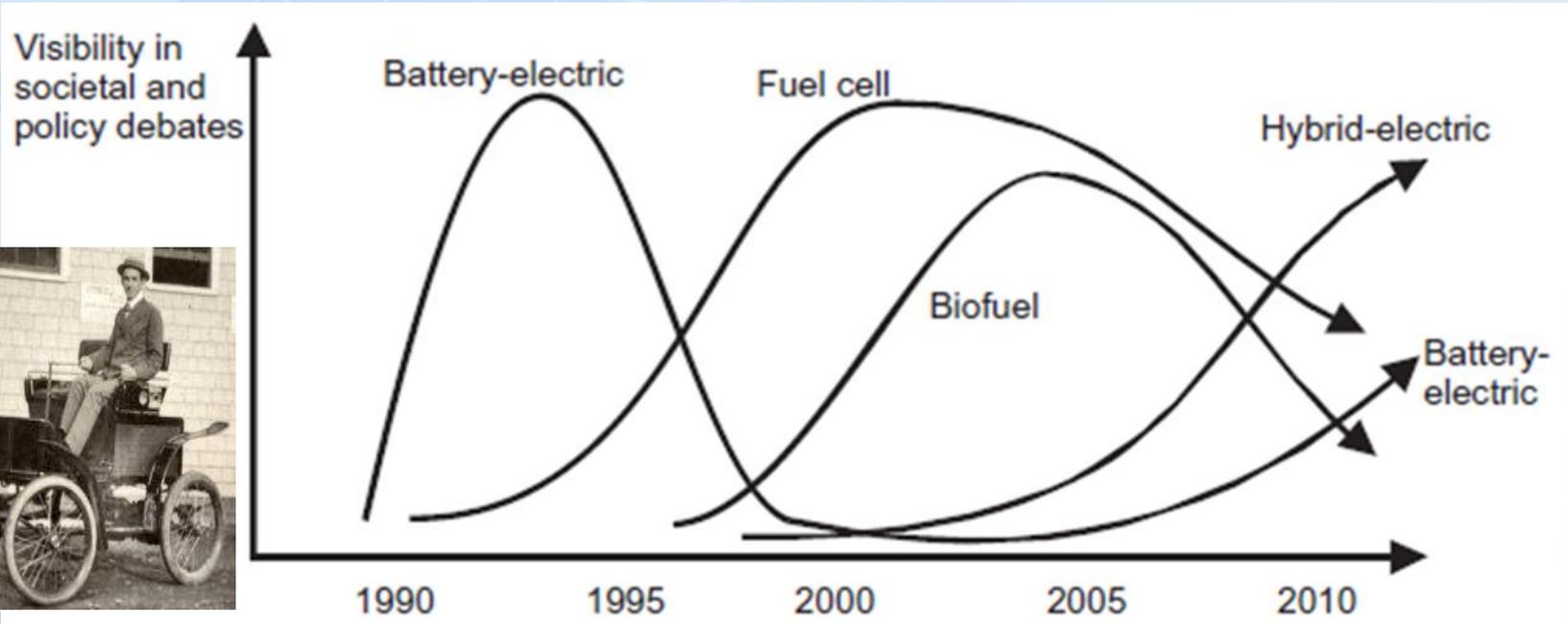
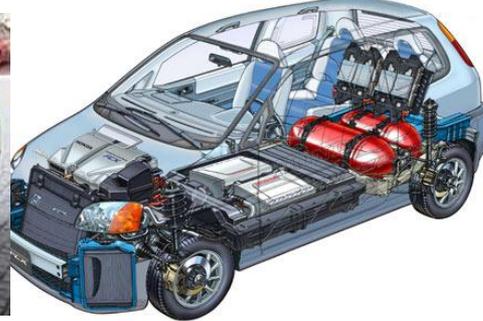


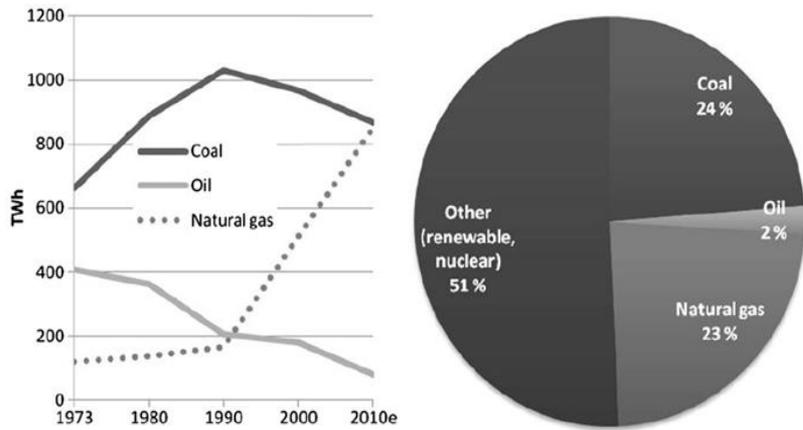
Fig. 3. Hype-disappointment cycles for green car propulsion technologies.

From Geels 20??

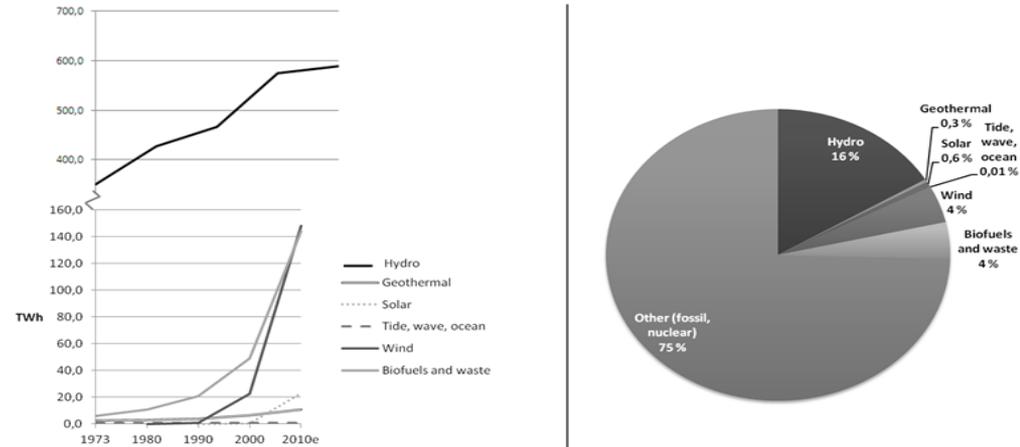


# The Battle of Modernities

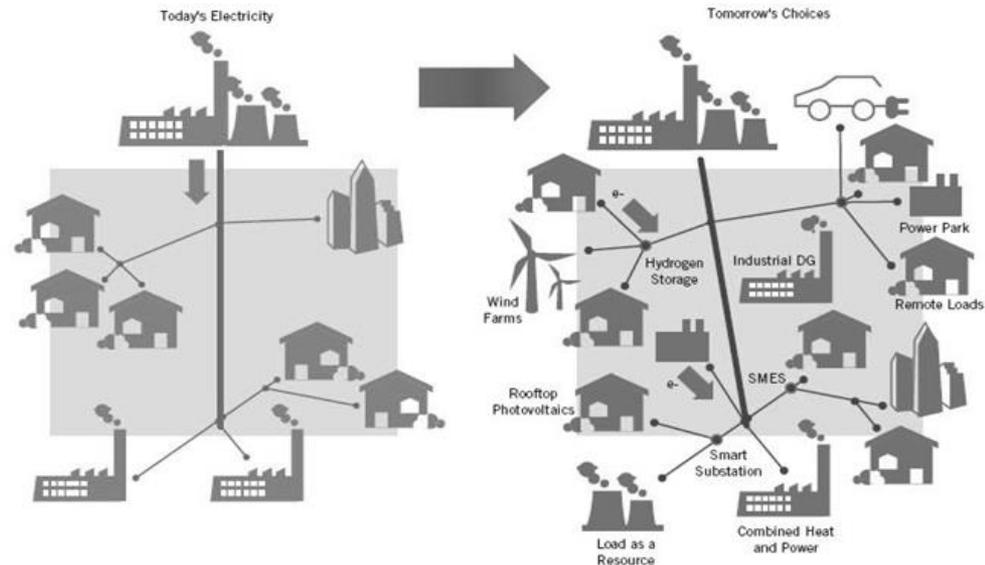
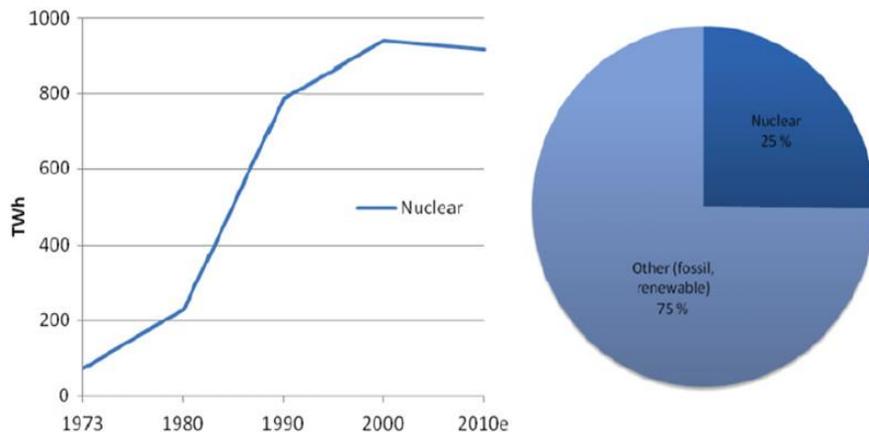
**Fig. 3.** Carbon modernity: generation by source 1973–2010. *Source: IEA (2011a).*



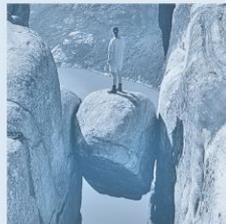
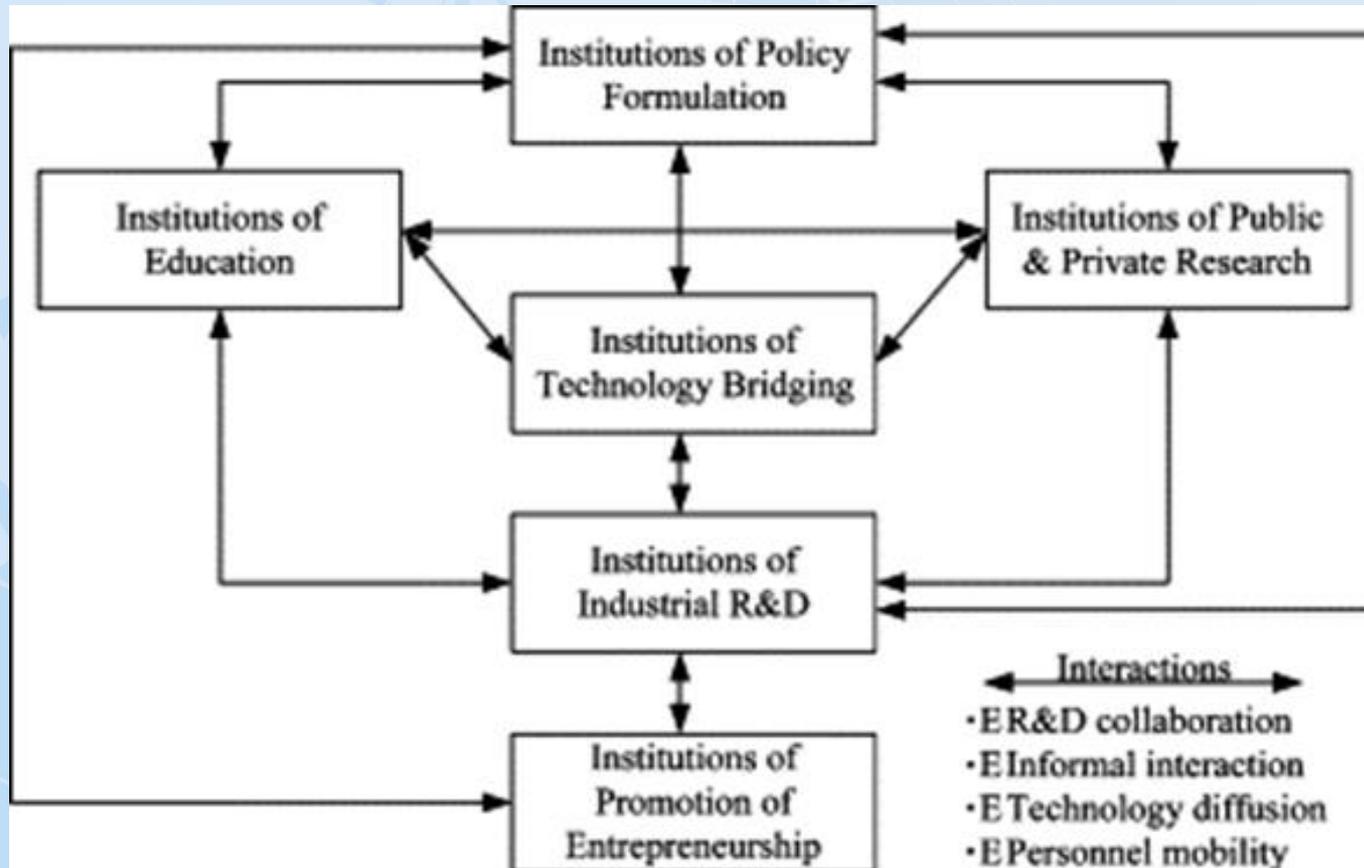
**Fig. 6.** EU power capacity mix in 2000 and 2011. *Source: IEA (2011a).*



**Fig. 4.** Nuclear modernity: generation by source, 1973–2010. *Source: IEA (2011a).*



# The system of Innovation Model Bringing in Public Policy



# Green Transition and the Kantian Rule

Act only according to that maxim whereby you can, at the same time, will that it should become a universal law

(Foundations of the Metaphysics of Morals 1785)

Acutely important in the age of the Antroposcene



# Greening Policies



## Road Map 2050

- By 2050: cut emissions to 80% below 1990 levels



## Road Map 2050

- achieve a reduction of GHG emissions by 80 %



Remix – 100% renewable electricity is achievable by 2050



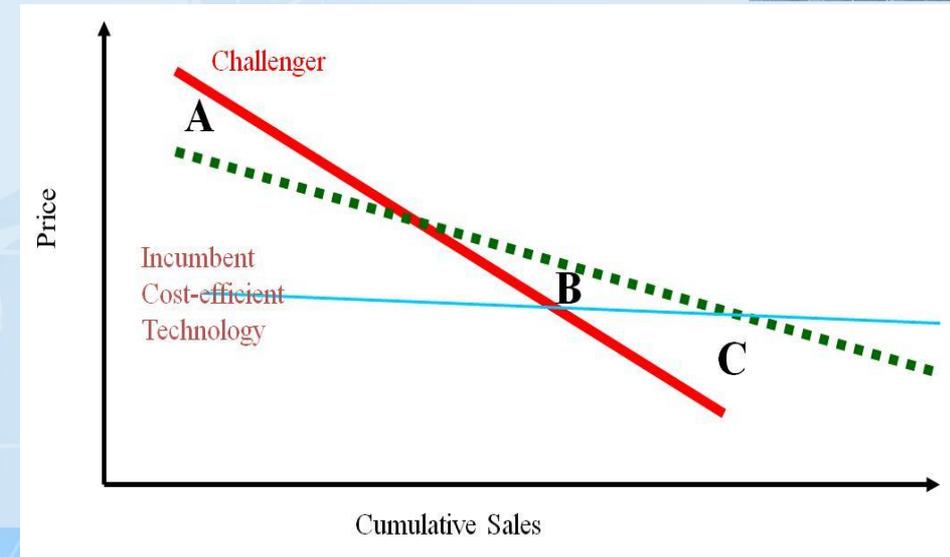
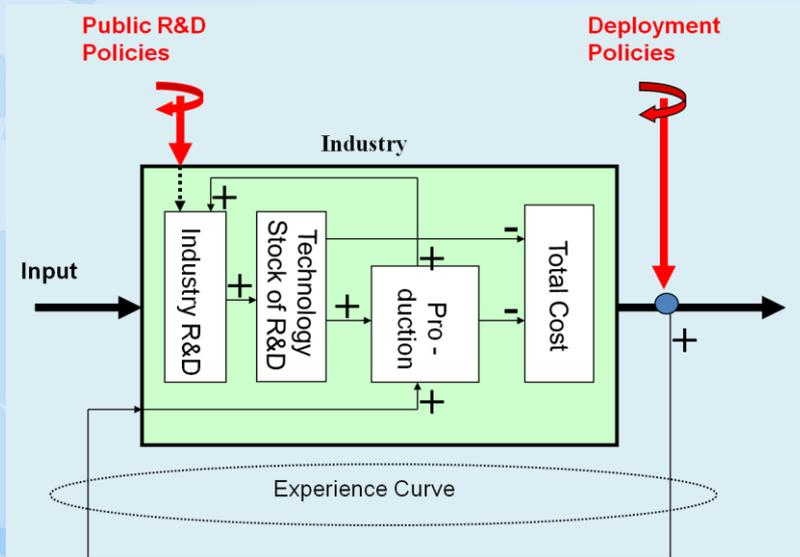
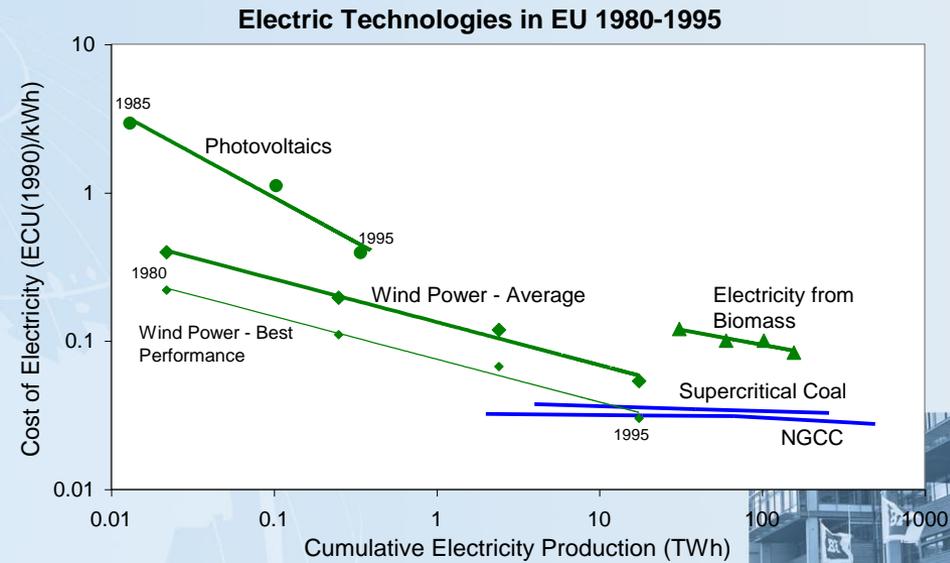
CO2 emission per unit of GDP will be 40-45 percent lower in 2020 than in 2005

Increase the share of renewable energy in its energy mix to 15 percent by 2020.

## Experiments with circular economies

- Germany, Japan and China are trying out **Circular economies**

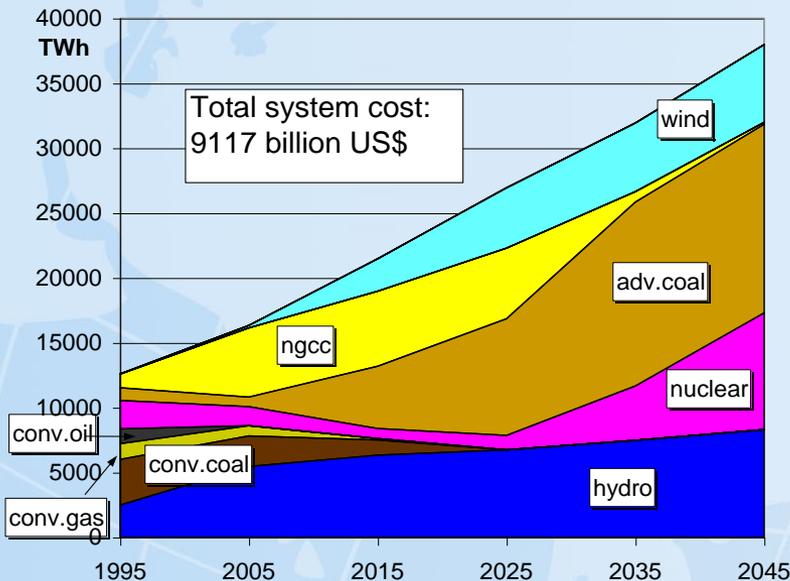
# The Dynamics of Experience/Technology Learning



# Two IEA Scenarios

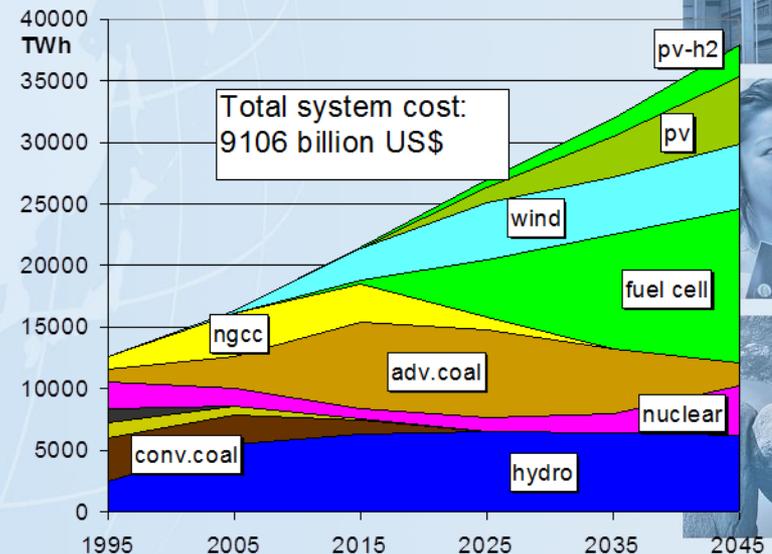
- Energy projections based on least cost solutions going forward
- Scenario made by IEA 1997

Technology Path with Fossil Fuels, Nuclear and Wind



- Energy projections based on least cost solutions going forward
- Scenario made by IEA 1997

Technology Path with Fuel Cells, PV and Wind

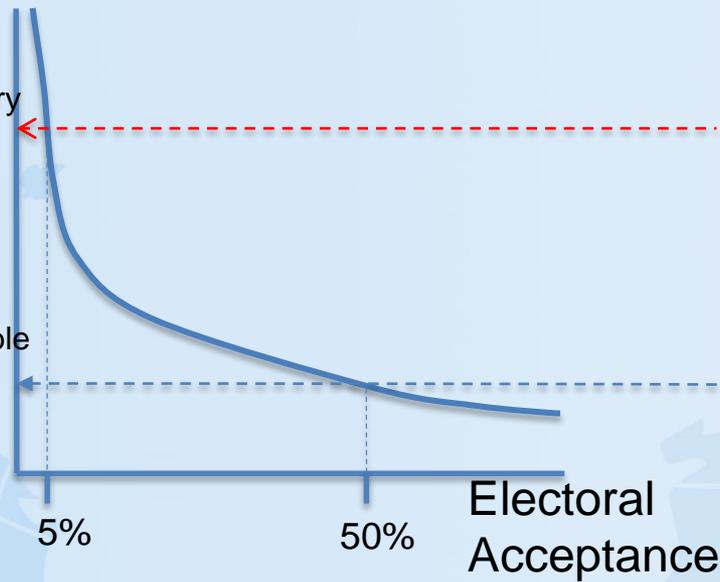


# Economics and Politics

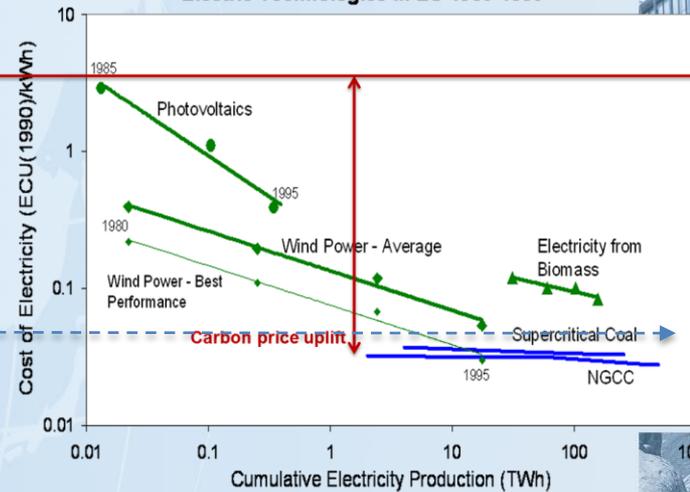
## El-price

Price necessary to drive technology

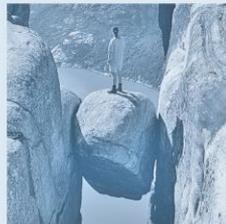
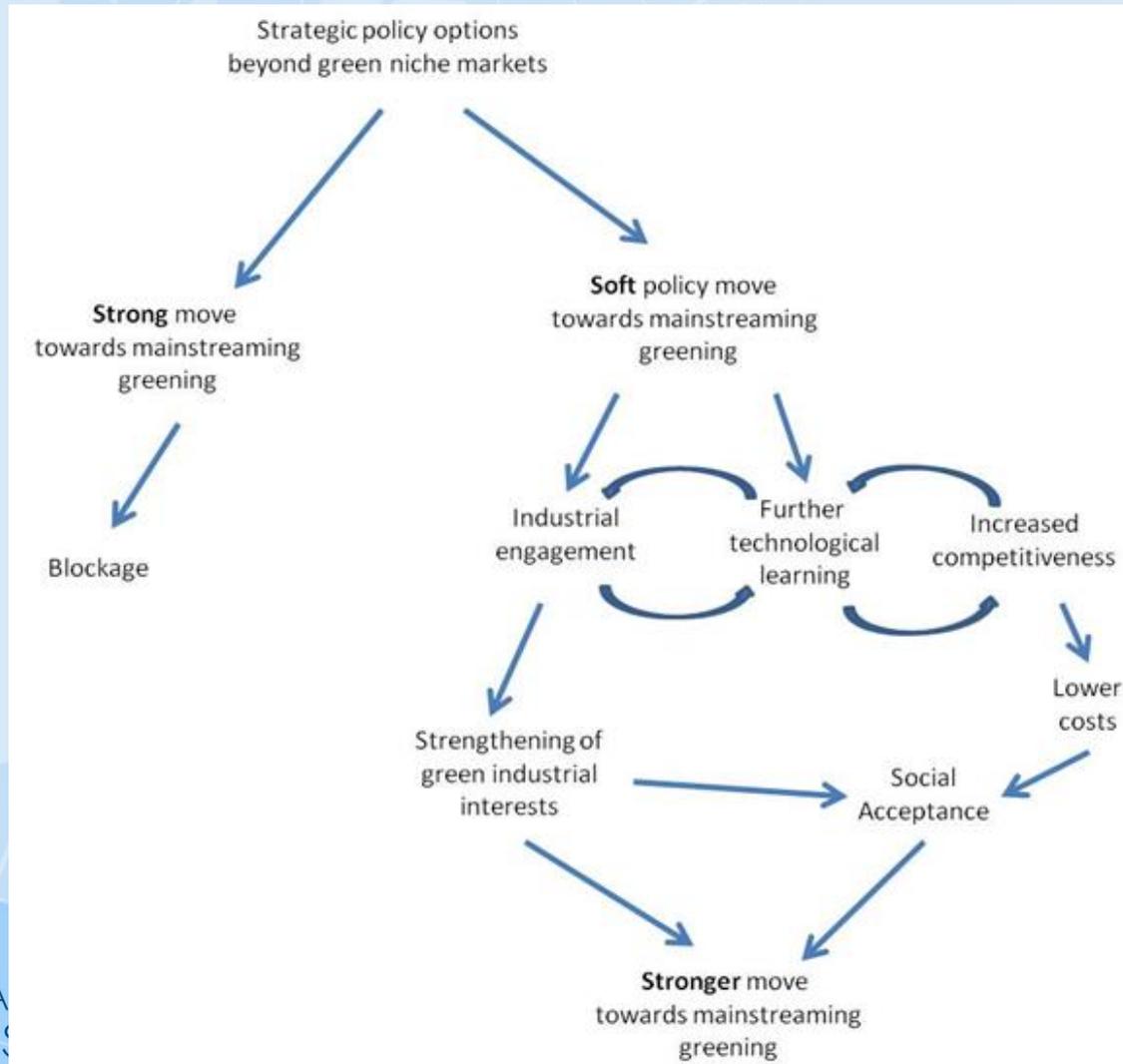
Price acceptable to majority



Electric Technologies in EU 1980-1995



# A Relay Model of Green Transition



# TRANSITION ACROSS CONTIENTAL DIVIDES



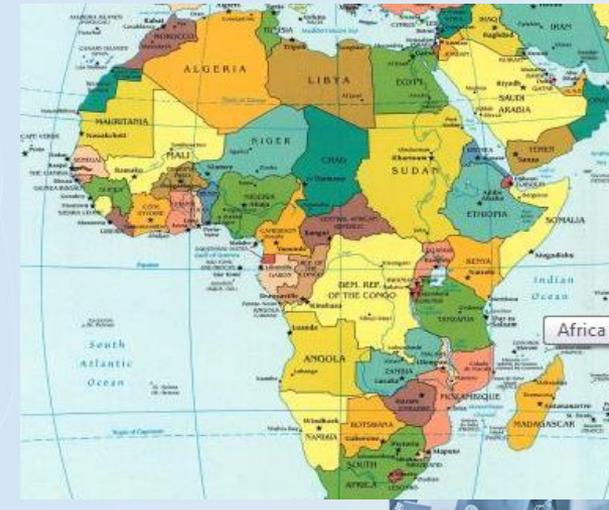
# Green Transition on Three Continents



Advanced technological and Economic capacities  
 Greening through replacement  
 Vested interests and zero sum games  
 Loose out in volumes to Asia

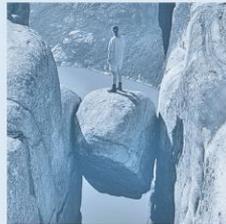


Rapid growth with eco-Efficiency focus  
 Environmental focus  
 Massive rollout of new modern capital stock  
 Taking technological Frontier positions in Many fields



Unapologetic about growth  
 Greening must be coupled to development  
 Options for leapfrogging  
 But poor infrastructure

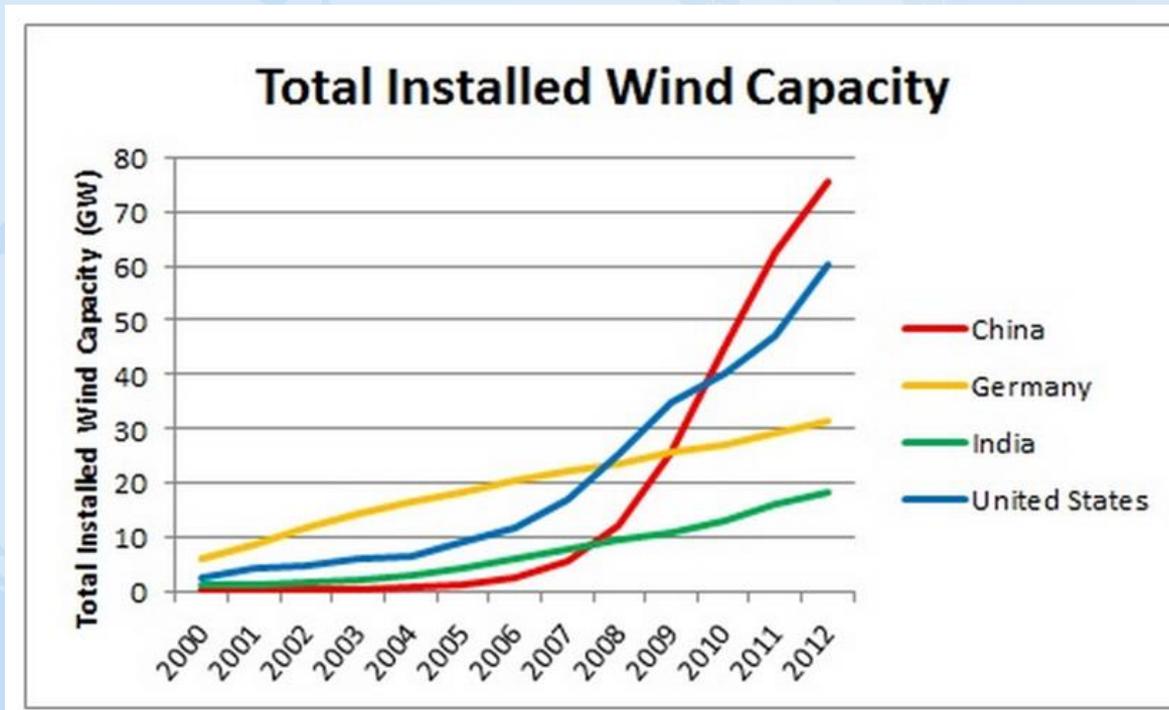
# Technology Migration Across Lead Markets



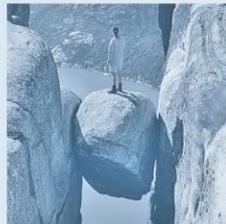
# Sequential Lead Markets for PV



# The Global Wind Race



<http://www.chinafaqs.org/library/chinafaqs-renewable-energy-china-graphical-overview-2012>



The presentation is based on research from the CERES21 project:  
[www.CERES21.org](http://www.CERES21.org)

and on

«Towards Ecomodernity. The Anatomy of Green Transition»  
Forthcoming on Routledge 2014, co-authored with Nina Witoszek

