


A Global & Technology Perspective to European Energy Policy

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More Coherent European Energy Policy
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Three viewpoints

I. The importance of a global perspective in a European energy policy

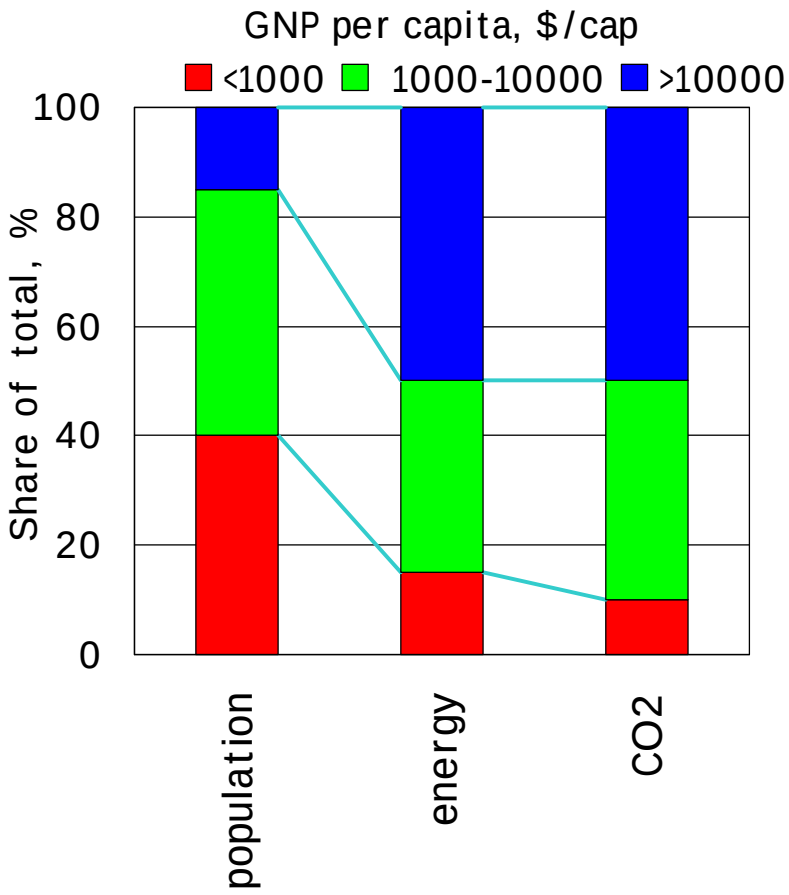
II. The role of new energy technologies in meeting our future energy challenges

III. The resources and mechanisms to enhance market take-up of new technologies

I. The importance of a global perspective in a European energy policy

How important is Europe in the energy landscape ?

The key to global energy issues are now in emerging economies



Source: IEA

- Energy has a direct link to
  - Global poverty alleviation
  - Global climate change and warming
- Most of the CO_2 and energy increase comes from the emerging economies
  - Now ~ 50% of all emissions
  - But growth is >3%/p.a.
- Most of the global energy technology market is outside the EU
  - In Europe's interests to supply low-emission technologies
  - Large (to 2030: €16 trillion; much more for accelerated penetration of low-emissions' technology path)

II. The role of new energy technologies in meeting our future energy challenges

How much and how fast

can the new technologies provide energy for us ?

The solutions to mitigate climate change are industrially available but need to be scaled up

- Global CO_2 emissions
  - 7 GtC/p.a. in 2005
  - 14 GtC/p.a. in 2050
- Here 15 technology solutions, each 1 GtC/p.a.
  (in total≈ 2 x present CO_2 emissions)

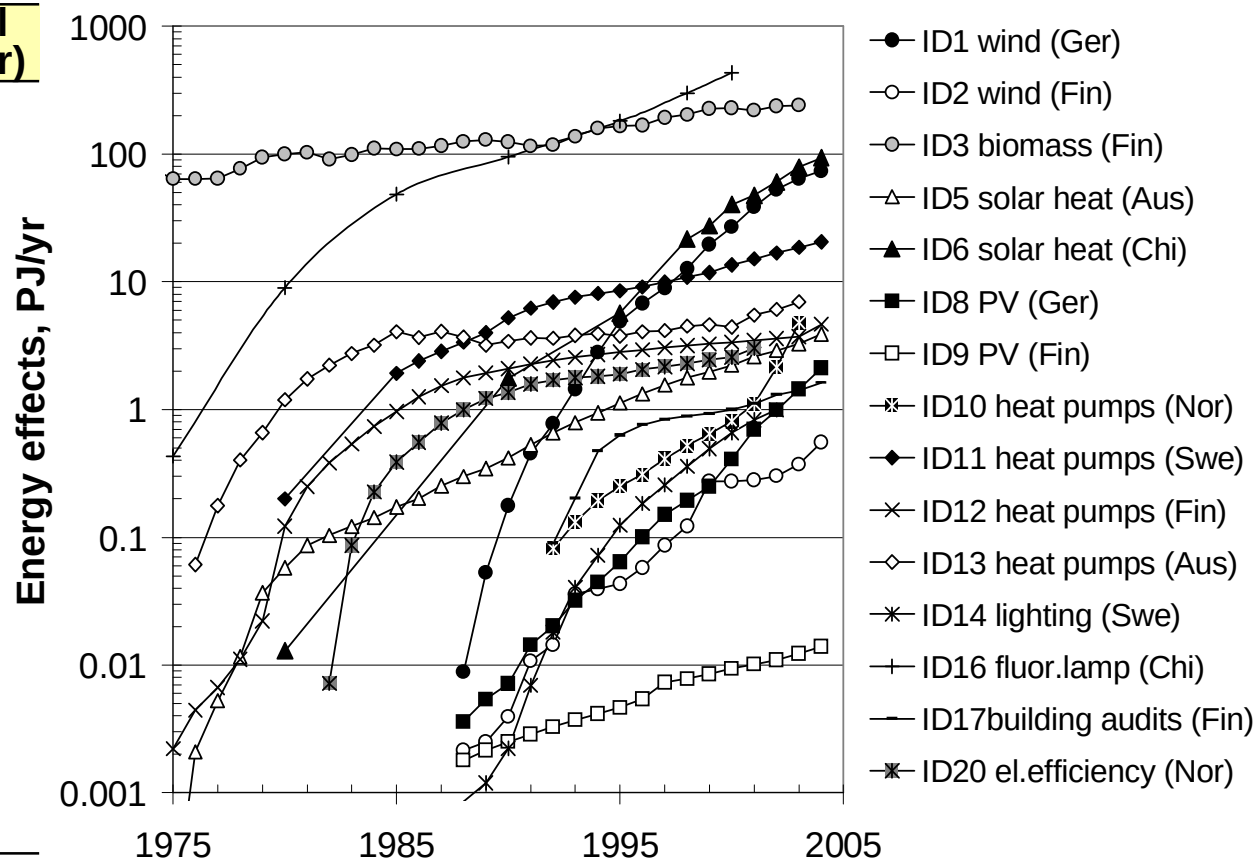
Global solutions year 2050

Option	Impact	Solution
Energy efficiency and conservation	4 (GtC/a)	Traffic Buildings Power plants
Low carbon fuels	4	Natural gas CO_2 storage
Nuclear	1	Fission reactors
Renewable energy and fuels	4	Wind Solar Biofuels
Carbon sinks	2	Forestation Plantations

Source: Pacala S, Socolow R. Stabilization wedges: solving the climate problem for the next 50 years with current technologies. Science 2004; 305:986-972

Empirical observations on the market penetration rates of energy technologies

Technology (country)	Exponential growth(%/yr)
HF ballasts (S)	44.6
Photovoltaics (D)	40.6
Building audits(FI)	38.9
Cold appl.labels(EU)	38.9
Wind energy (D)	30.6
Wind energy (W)	26.0
Wind energy (EU)	25.8
CFL lamps (W)	24.2
Wind energy (FI)	23.8
Photovoltaics (W)	21.9
Solar heating (A)	15.4
Nuclear power (F)	15.2
Biomass (FI)	15.1
Photovoltaics (FI)	13.8
Heat pumps (S)	10.6
Heat pumps (A)	8.2
Oil (W1)	8.1
Nuclear power (W)	7.8
Heat pumps (FI)	5.7
Oil (W2)	4.2



Source: P.D. Lund: Market penetration rates of new energy technologies. *Energy Policy*, 34, 3317–3326 (2006)

New energy technologies may offer faster change than the old ones

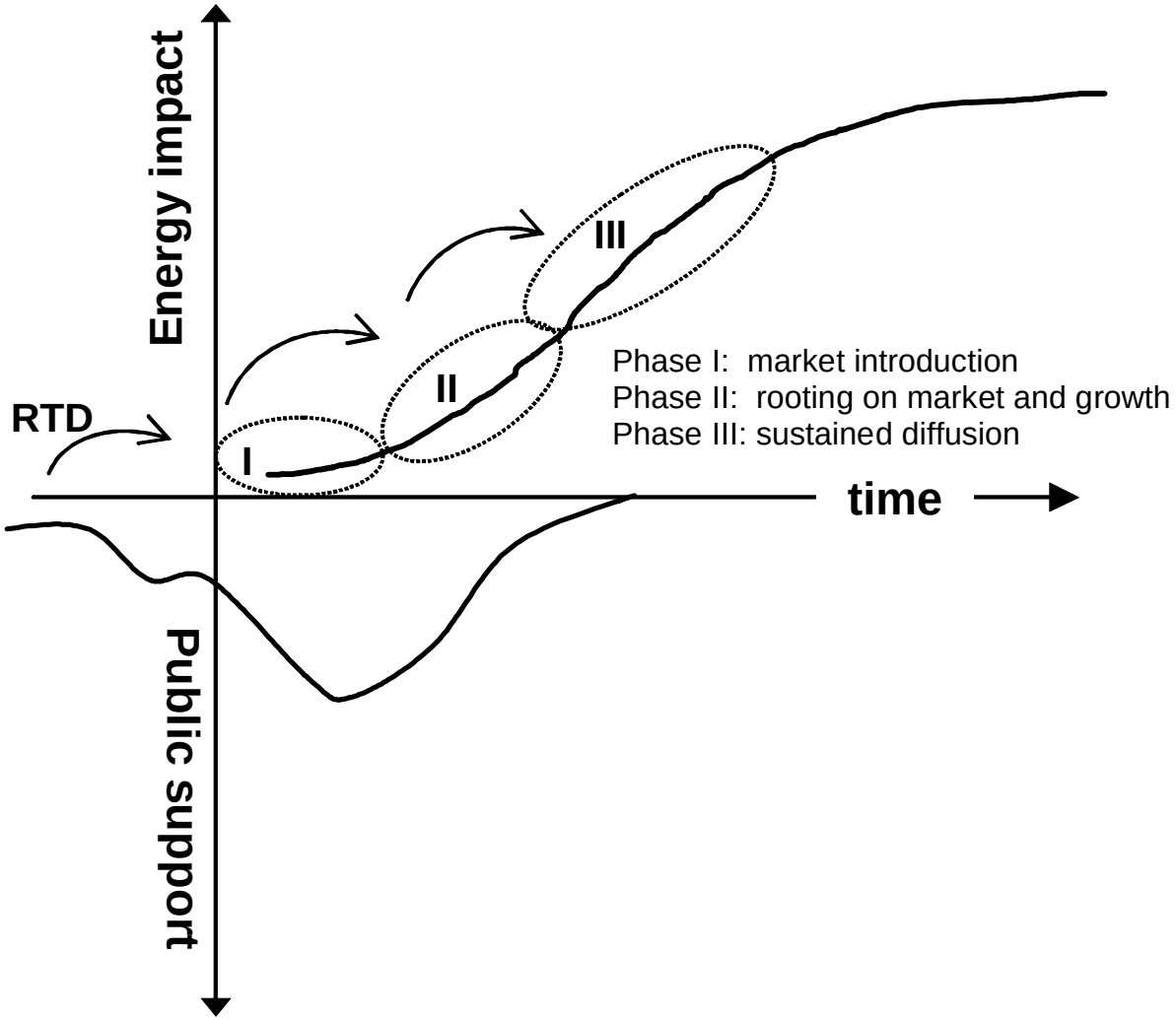
- Switching time to new technology is
  - low when infrastructures or big power plants are involved
  - fast when close to end-use side or consumer markets
- Reaching economic and technology maturity accelerates market penetration
  - energy efficient lamps may provide savings equal to 1/3 of all nuclear energy by 2010
  - wind power may provide 10% of global electricity by 2025

Source: IEA

III. The resources and mechanisms to enhance market take-up of new technologies

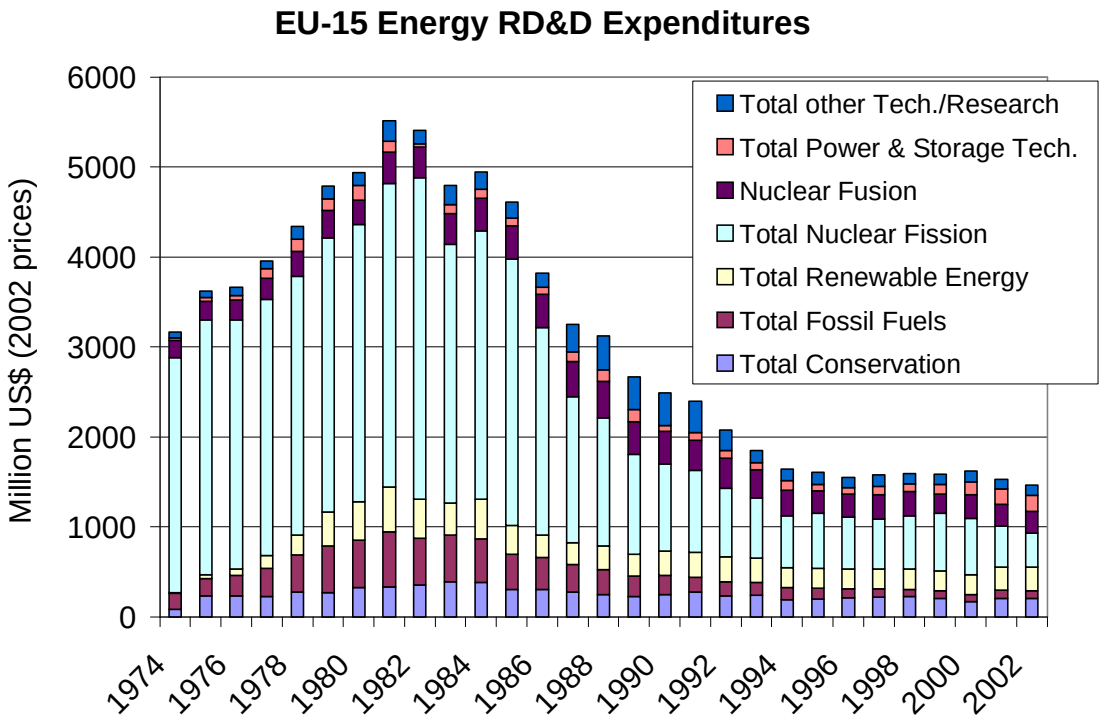
Is the present support sufficient and efficient to realize the potential offered by new energy technologies ?

Technology diffusion process



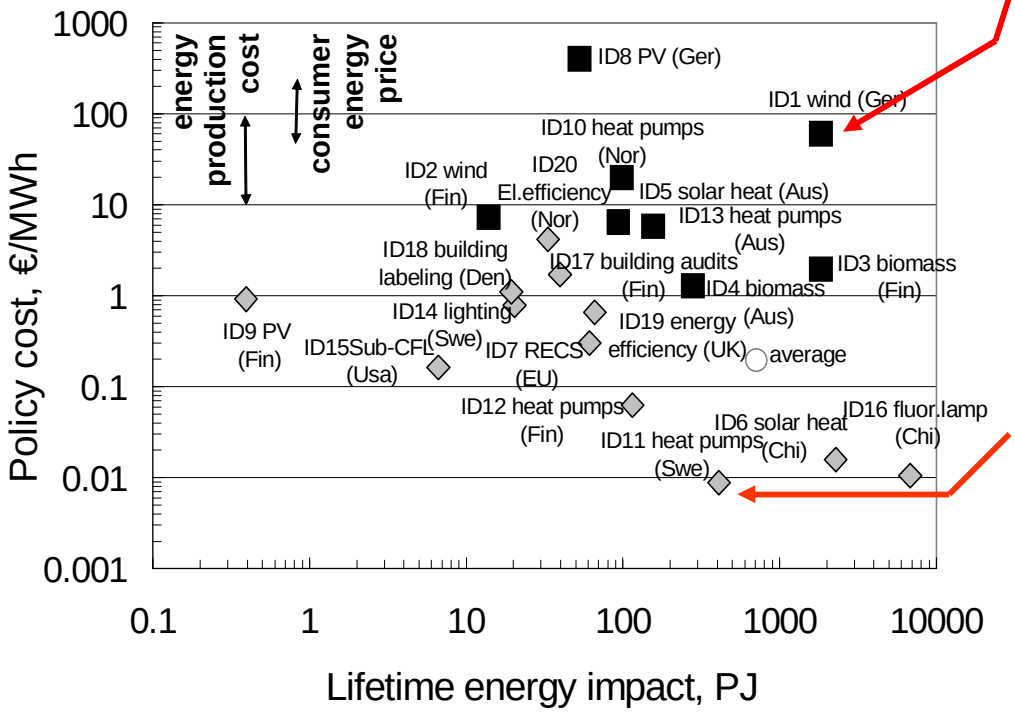
Public and private support to energy technology R&D has dropped dramatically

- Public energy R&D support of Member States is 1/3 of the 1980's level
- Energy companies invest «0.5% of turnover in R&D
- Energy in EU's 7th FP is <5% of the budget ; 20 years ago it was 50%
- 29% of the energy R&D in FP7 is allocated to one fusion experiment (ITER)



Source: European Commission, IEA

The cost to the public from enhancing new technologies depends on the policies chosen



Source: P.D. Lund: Effectiveness of policy measures in transforming the energy system. *Energy Policy* 2006 (in press)

- volume measures provide support to a product
  - mostly a passive subsidy (e.g. investment grants, fixed feed-in-tariffs)
  - public cost is 1-100 €/MWh
- catalyzing measures boost the commercialization process
  - are market driven and rely on market forces (purchasing power, info, global markets..)
  - public cost 0.1-1€/MWh, but some procurement type and business driven ~0.01€/MWh

Is there a case for a more coherent EU energy policy in previous perspectives ?

i. Europe should provide strong leadership for the market take-off of new energy technologies globally

ii. Europe should increase energy R&D efforts considerably

iii. Europe should push innovative and effective commercialization strategies using market mechanisms (combining technology push, market pull, and networking actions)

Thank you
for your
attention !

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