**GIES**

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# Overview of Renewable Energy Programme in Europe

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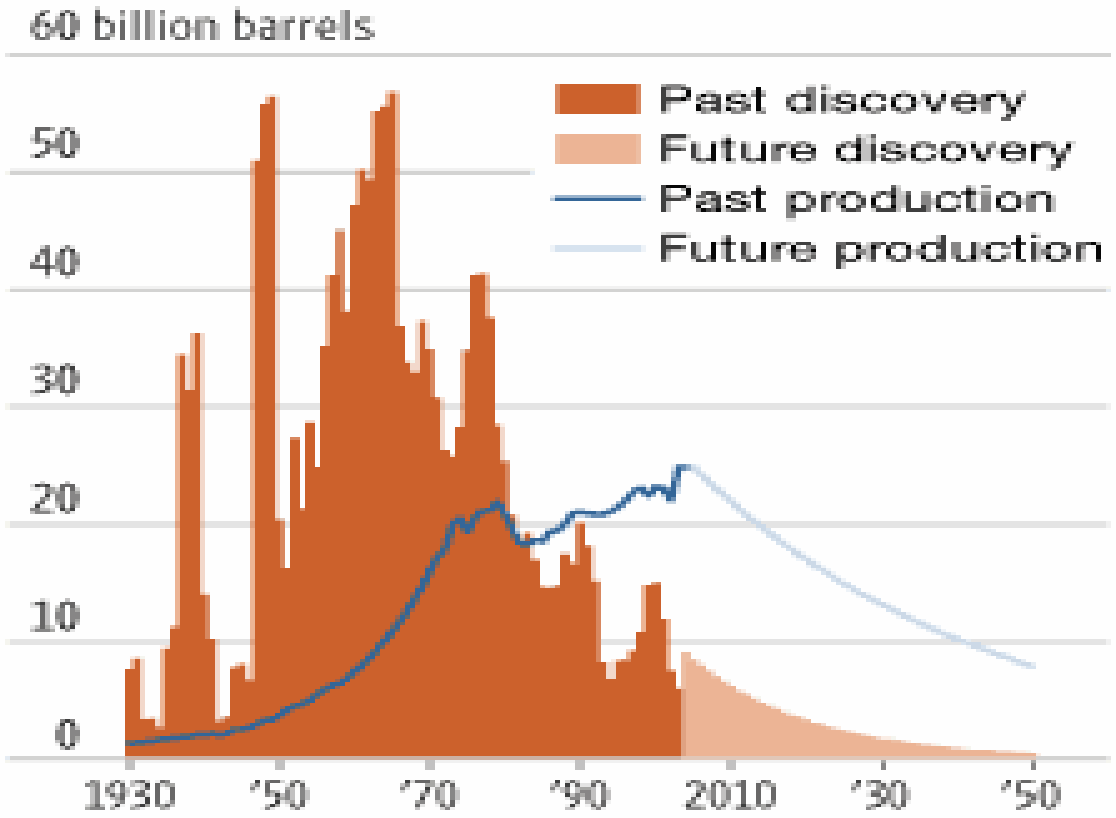
# European Union and Energy

The major concerns:

- Energy Security
- Climate Change
- Competitiveness
- Innovation

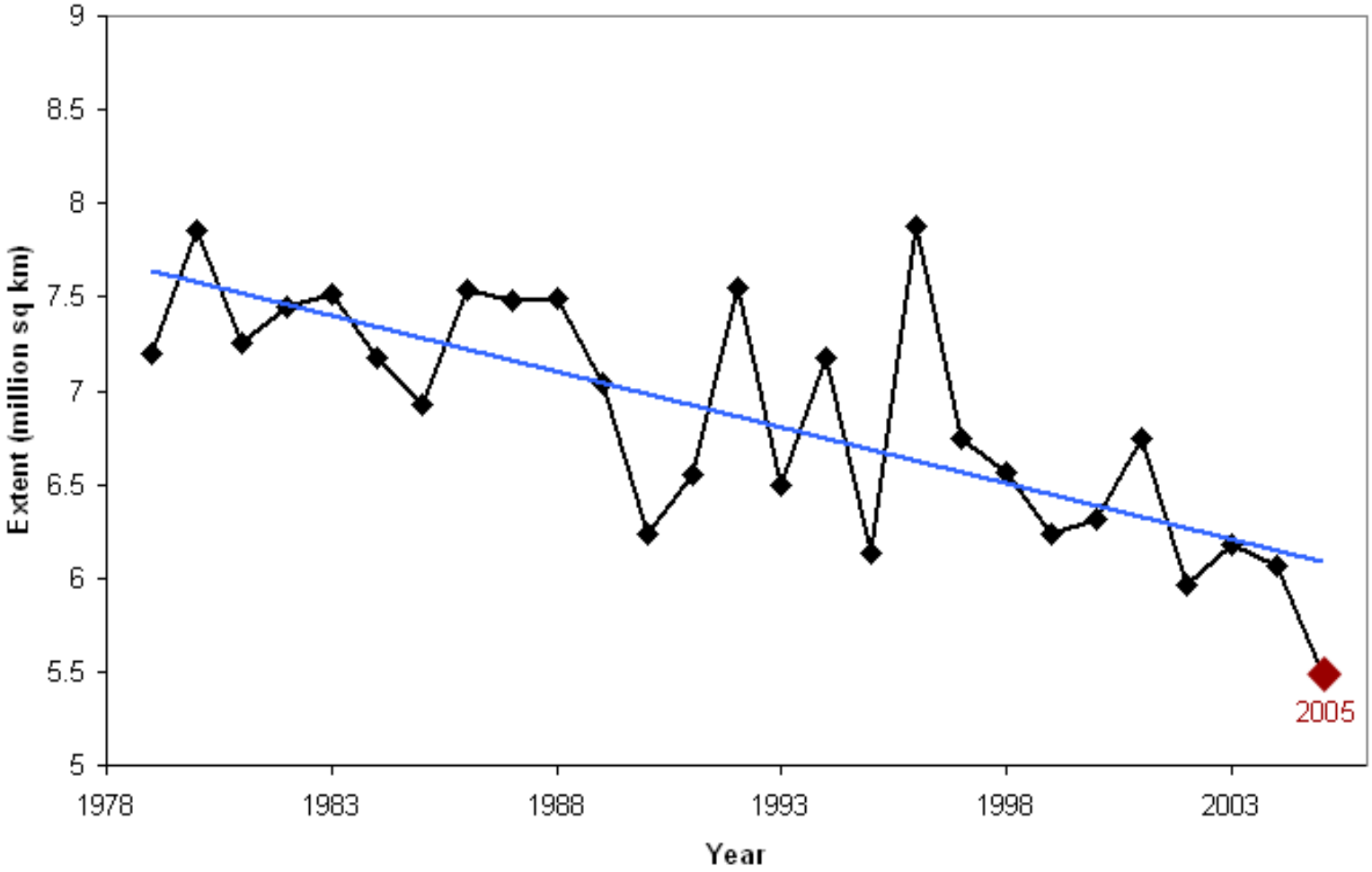
# PESSIMISTIC VIEW

Colin Campbell predicts global oil production will peak next year, but the oil industry calls him a crackpot.

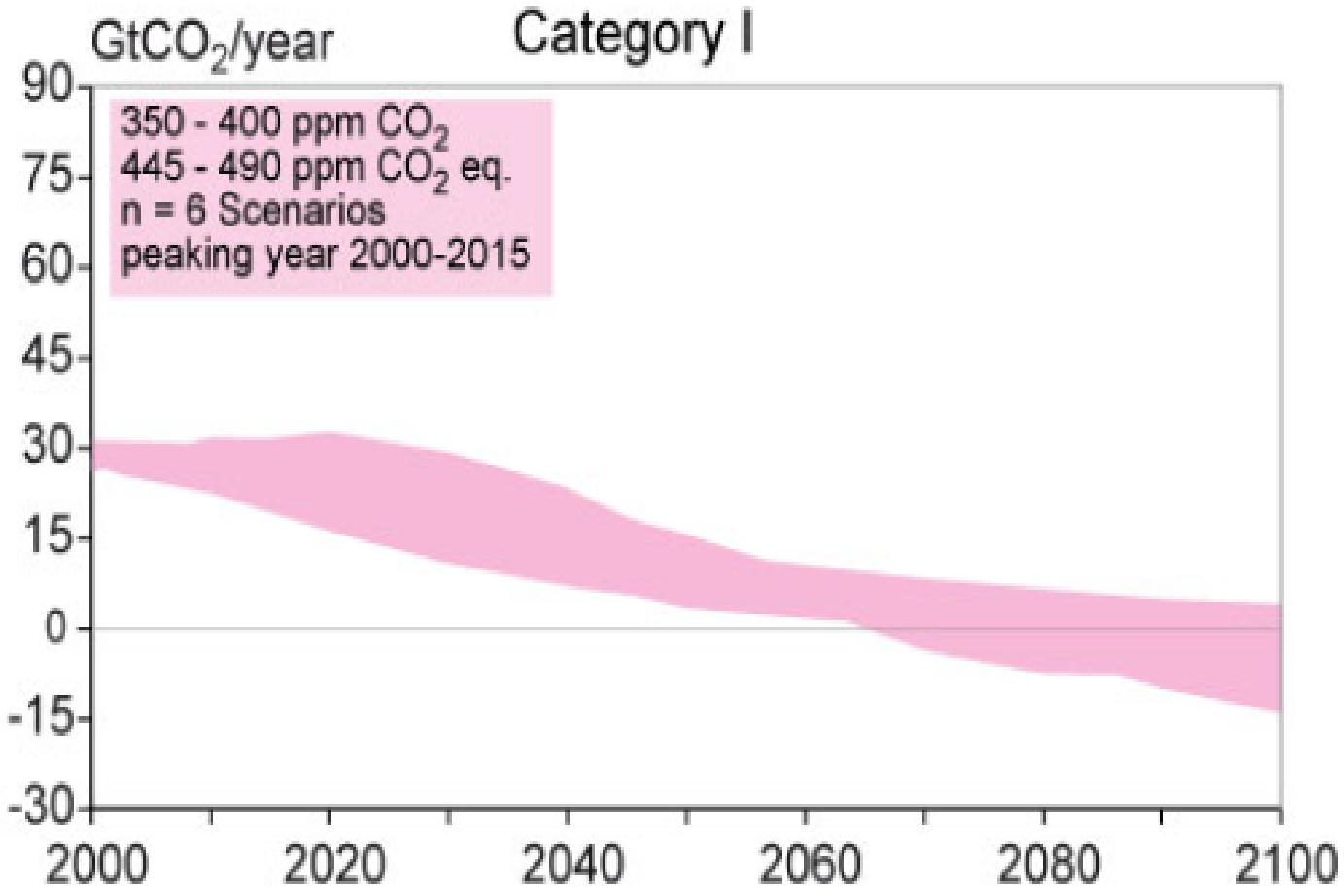



Note: Past discovery refers to three-year moving average of annual oil finds.
*Source: Colin Campbell*

# Arctic Ice: September Extension 1978 - 2005

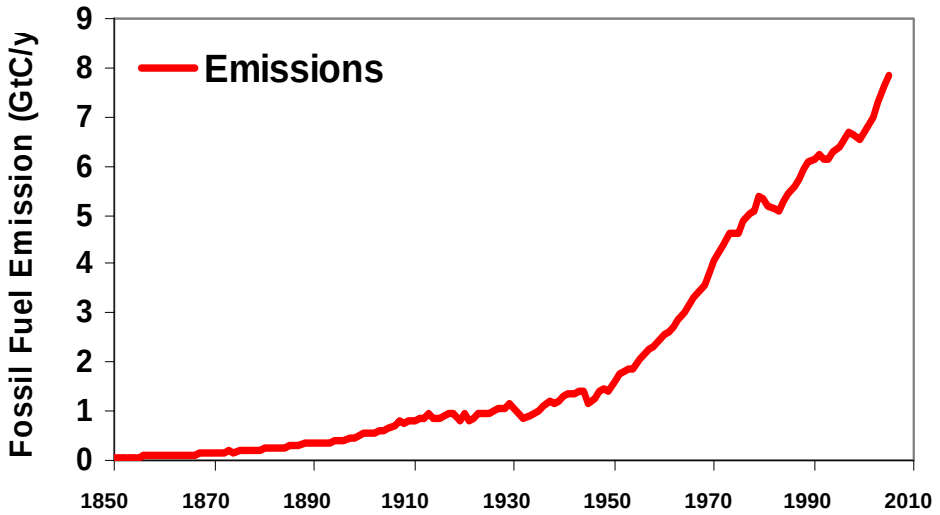



National Snow and Ice


GtCO2/year
Category I
350 - 400 ppm CO2
445 - 490 ppm CO2 eq.
n = 6 Scenarios
peaking year 2000-2015
90
75
60
45
30
15
0
-15
-30
2000
2020
2040
2060
2080
2100

# Anthropogenic C Emissions: Fossil Fuel

2006 Fossil Fuel: 8.4 Pg C

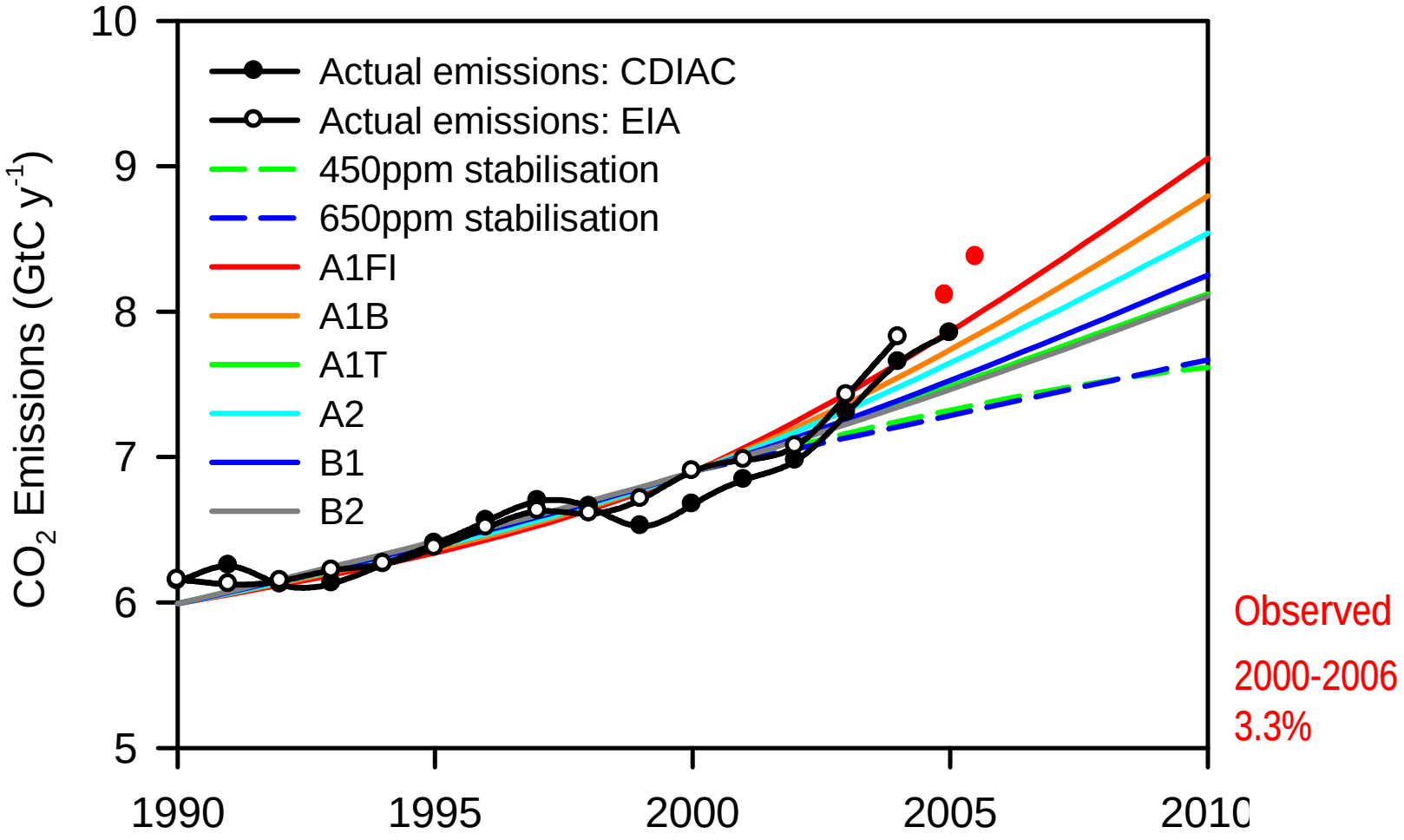



1990 - 1999: 1.3% $y^{-1}$

2000 - 2006: 3.3% $y^{-1}$

Raupach et al. 2007, PNAS; Canadell et al 2007, PNAS

# Trajectory of Global Fossil Fuel Emissions



# European Union and Energy

Agreement in March 2007:

- GHG reduction at least 20%
- Renewable energy 20 %
- Energy efficiency 20% below projection

- **<u>In short 3 x 20% by 2020</u>**

- **3 * 20 % => <2 ° C?**

# The new legislative package on climate, efficiency and renewables

- Issued 23 January 2008, includes:

- (1) Proposal amending the EU **Emissions Trading** Directive (EU ETS);
- (2) Proposal relating to the **sharing of efforts** to meet the Community's independent greenhouse gas reduction commitment in sectors not covered by the EU emissions trading system (such as transport, buildings, services, smaller industrial installations, agriculture and waste);

# The new legislative package on climate, efficiency and renewables

- (3) Proposal for a Directive promoting **renewable energy**, to help achieve both of the above emissions targets.
- (4) Other proposals that are also part of the package and include:
  - a proposal for a legal framework on **carbon capture and storage**,
  - a Communication on the demonstration of carbon capture and storage and
  - new Guidelines for environmental state aid.

## Europe's Renewable Energy Programme for 2020:

1. New Renewable Energy (RE)-Share 2020: 20% of energy for final energy consumption
2. All Member States must exploit their potentials, all technologies are required
3. New Directive has to be compatible with successful MS policies and instruments
4. No disruption of markets

# Renewables in Energy Use

- Commission calls for changing structure of energy consumption. Today, the share of renewable energy in the EU's final energy consumption is at 8.5% which means that an average increase of 11.5% is needed to meet the target of 20% in 2020.
- In order to achieve this, Commission is proposing individual, legally enforceable targets for each of the Member States.

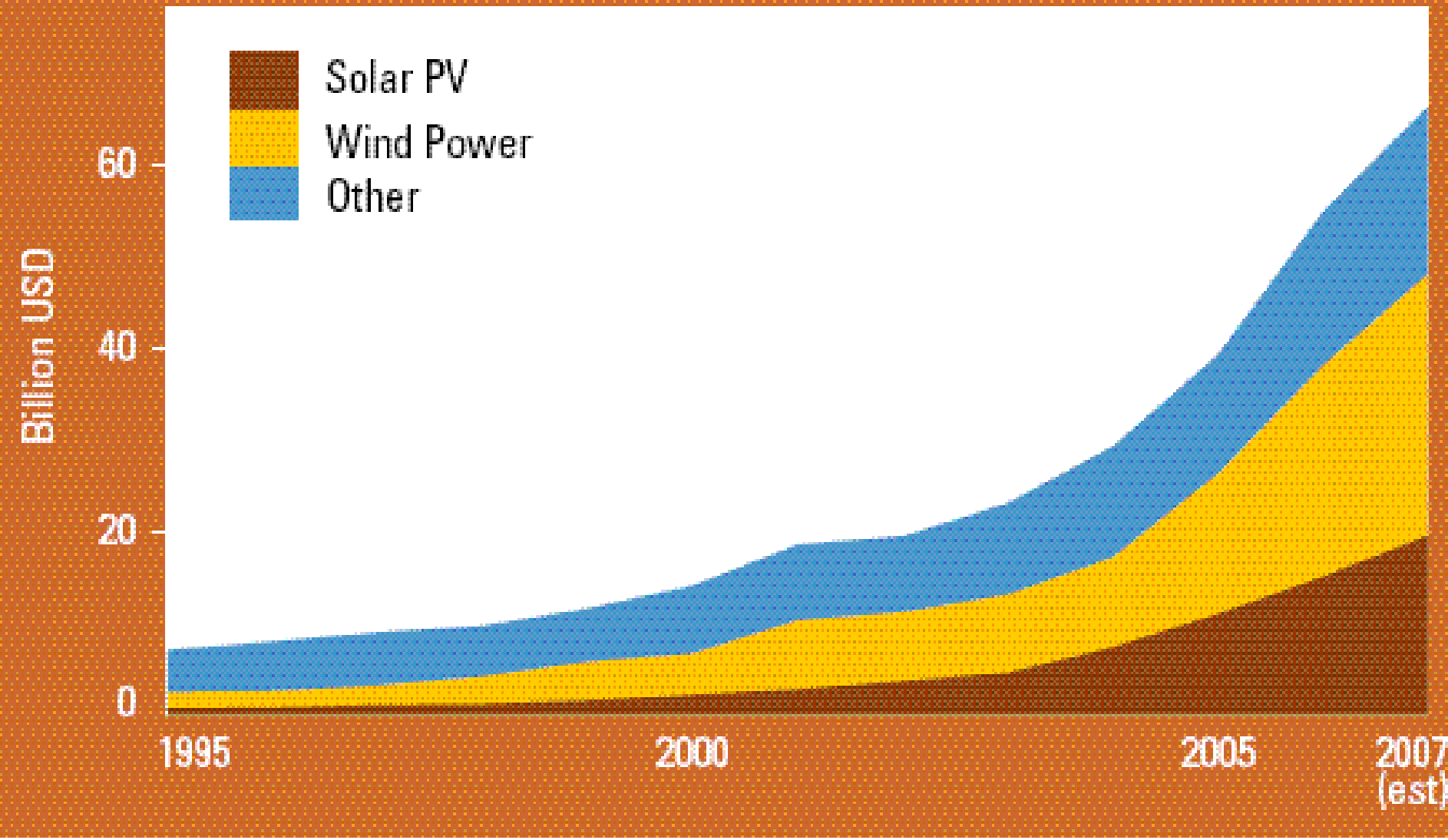
**A. National overall targets**

| | Share of energy from renewable sources in final consumption of energy, 2005 ($S_{2005}$) | Target for share of energy from renewable sources in final consumption of energy, 2020 ($S_{2020}$) |
|---|---|---|
| Belgium | 2.2% | 13% |
| Bulgaria | 9.4% | 16% |
| The Czech Republic | 6.1% | 13% |
| Denmark | 17.0% | 30% |
| Germany | 5.8% | 18% |
| Estonia | 18.0% | 25% |
| Ireland | 3.1% | 16% |
| Greece | 6.9% | 18% |
| Spain | 8.7% | 20% |
| France | 10.3% | 23% |
| Italy | 5.2% | 17% |
| Cyprus | 2.9% | 13% |
| Latvia | 34.9% | 42% |
| Lithuania | 15.0% | 23% |
| Luxembourg | 0.9% | 11% |
| Hungary | 4.3% | 13% |
| Malta | 0.0% | 10% |
| The Netherlands | 2.4% | 14% |
| Austria | 23.3% | 34% |
| Poland | 7.2% | 15% |
| Portugal | 20.5% | 31% |
| Romania | 17.8% | 24% |
| Slovenia | 16.0% | 25% |
| The Slovak Republic | 6.7% | 14% |
| Finland | 28.5% | 38% |
| Sweden | 39.8% | 49% |
| United Kingdom | 1.3% | 15% |

# Renewable heat and cooling

- First time that a EU Directive includes the promotion of renewable heat and cooling and makes this sector subject to obligatory growth

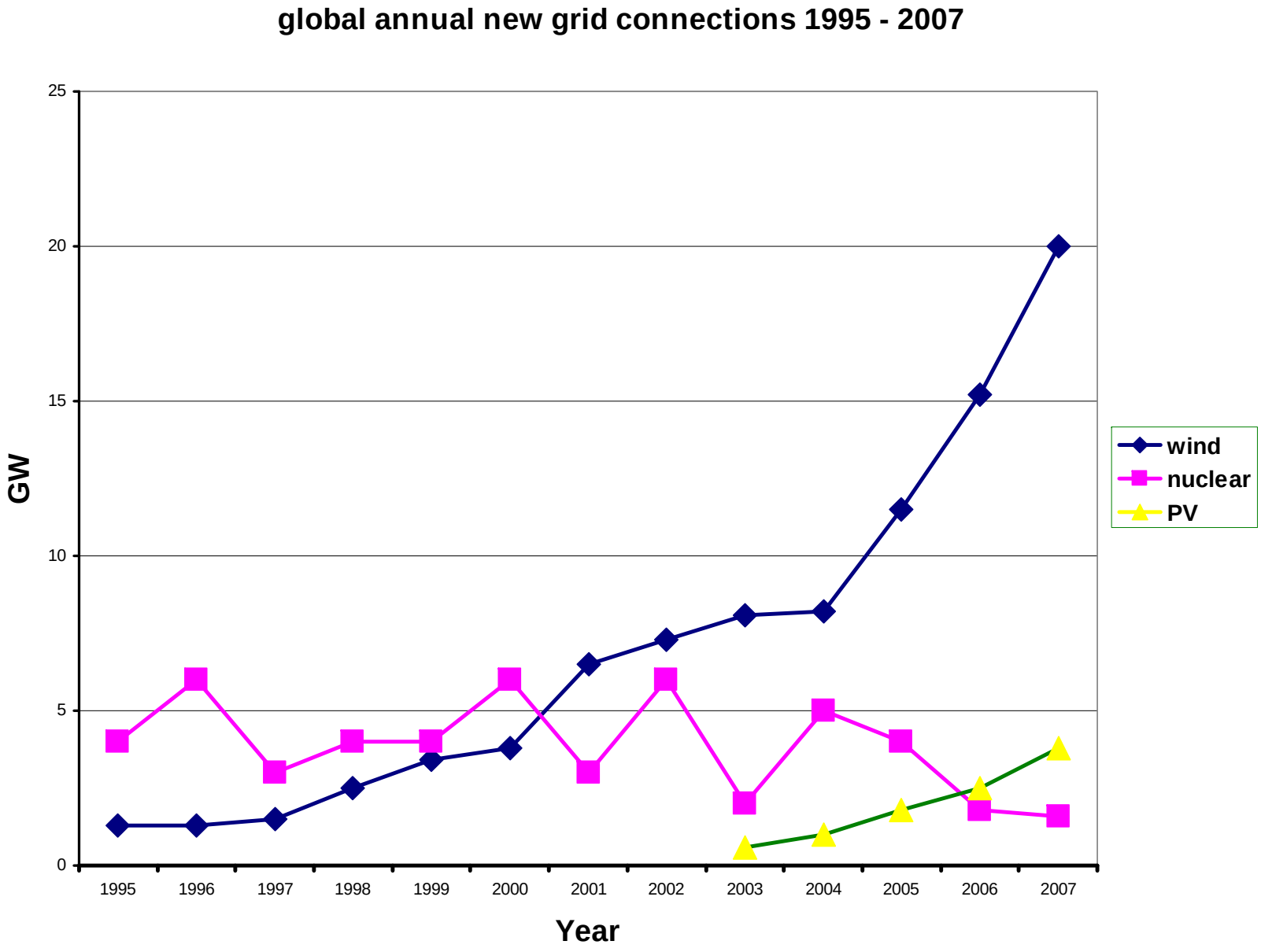
# Annual Investment in Renewable Energy Capacity (excluding large hydro), 1995–2007




Source: REN21 – Renewables 2007, Global Status Report (pre-publ. for Bali)

| Growth Rates 2006 | |
|---|---|
| Wind | 25-30% |
| Solar PV (grid) | 50-60% |
| Solar hot water | 15-20% |
| Biofuels | 15-20% |

Source: REN21 – Renewables 2007, Global Status Report (pre-publication for Bali)


global annual new grid connections 1995 - 2007
25
20
15
10
5
0
GW
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Year
wind
nuclear
PV

# Good binding targets but difficult approach to Mechanism

- The currently applied Directive 2001/77/EC on the Promotion of Renewable Energies in the Internal Energy Market ensures

1. Priority on national support mechanisms , recognising
2. Barriers to enter the overall energy market as main reason for the need of support mechanism

- This analysis for the need of policy instruments to promote RE is no longer part of the new directive proposal

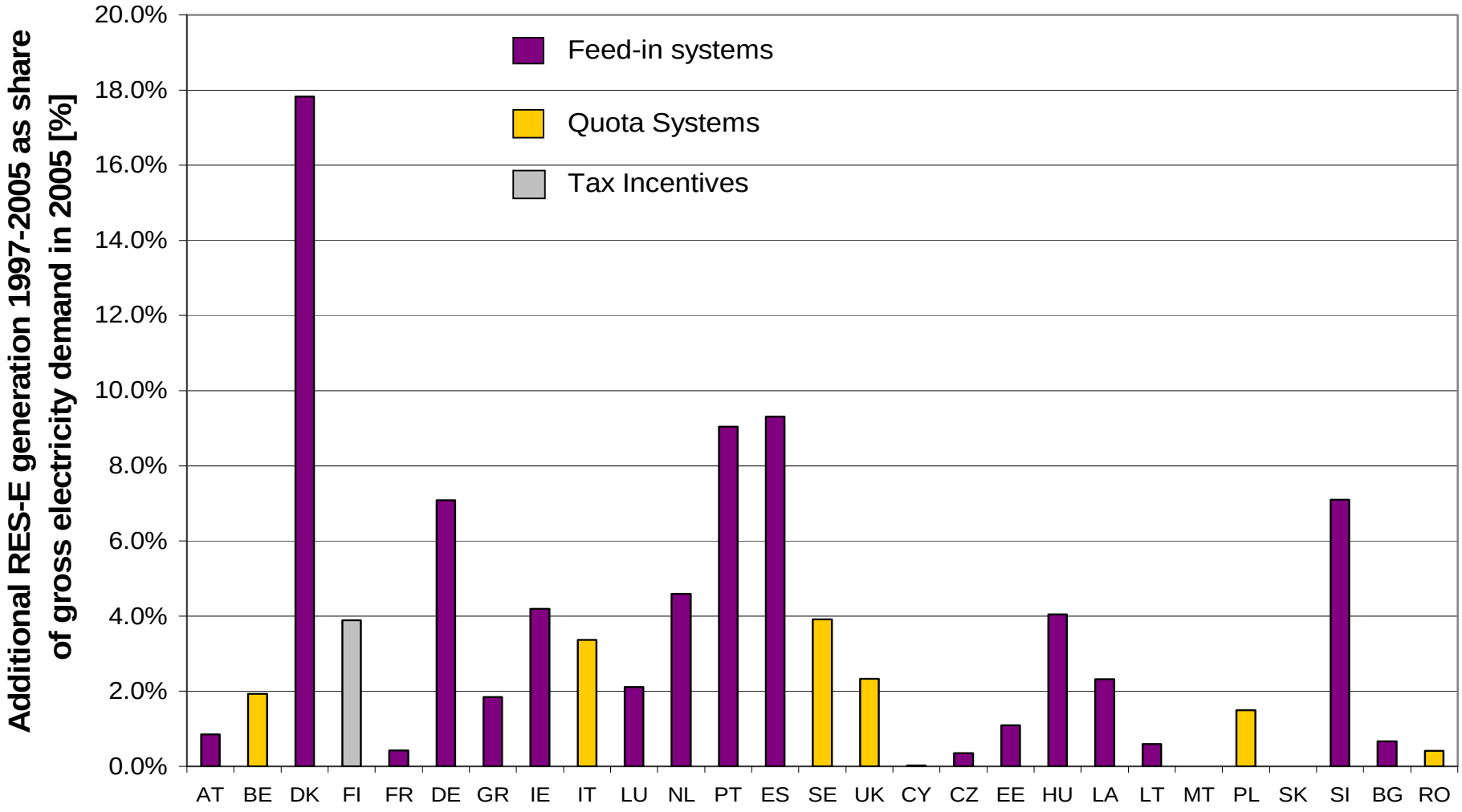
# Virtual certificate trade becomes main tool now

- National policies on support mechanisms will face out if the EU 27 wide certificate trade will stay in this Directive as its very essence
- This will increase costs for renewable energies drastically
- Estimate

# RES Directive Proposal ends national policies for support

- The Directive introduces a **new virtual trade system, based on Art. 95 ECT**
- It introduces a specific **harmonised** new trade mechanisms and policy **only for the virtual trade** in renewable certificates.
- This move renders any further **national energy policy** in support mechanisms for renewable energy **impossible.**
- The former Certificate of Origins in the current Directive 2001/77/EC will become now **tradable papers.**

# Additional RES-E penetration 1997 - 2005



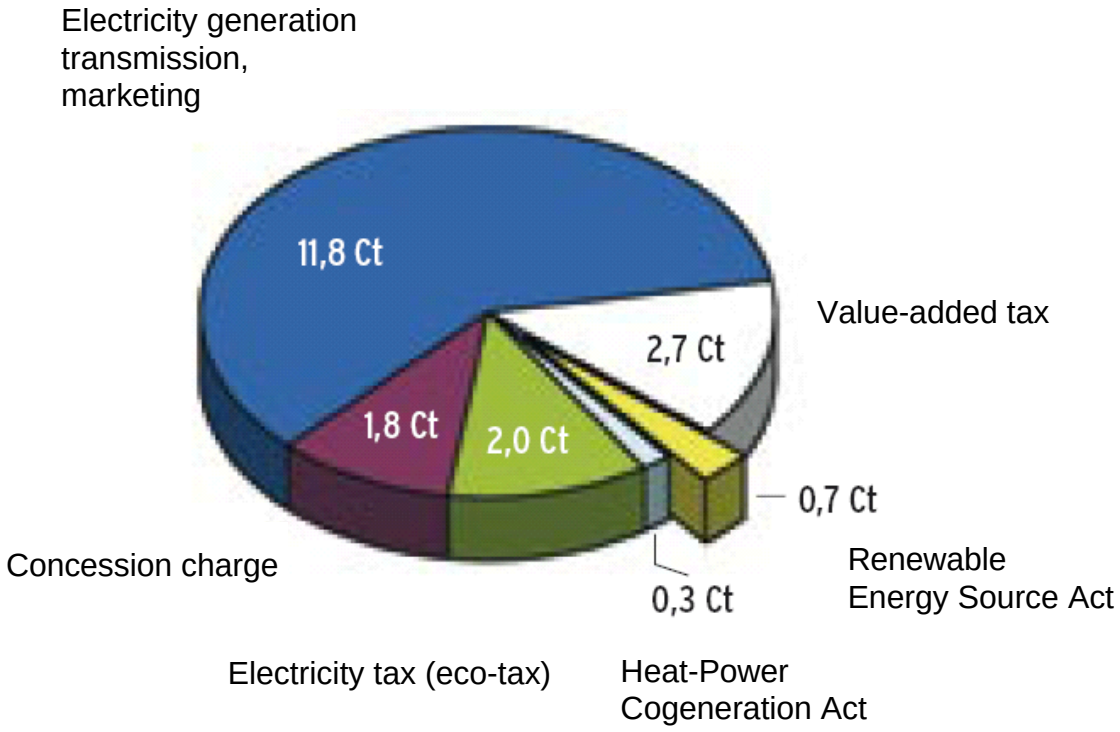

Source: Fraunhofer ISI

# certificate markets?

- Provide payment on the basis of supply and demand
- Payment is therefore uncertain
- Projects hard to justify on basis of such payments
- Ambitious targets/caps hard to agree on

- Feed-in-tariffs lead to impressive activity, if generous

# EEG: Share of costs for one kWh of electricity in private households (19,4 €-Cent), 2006.



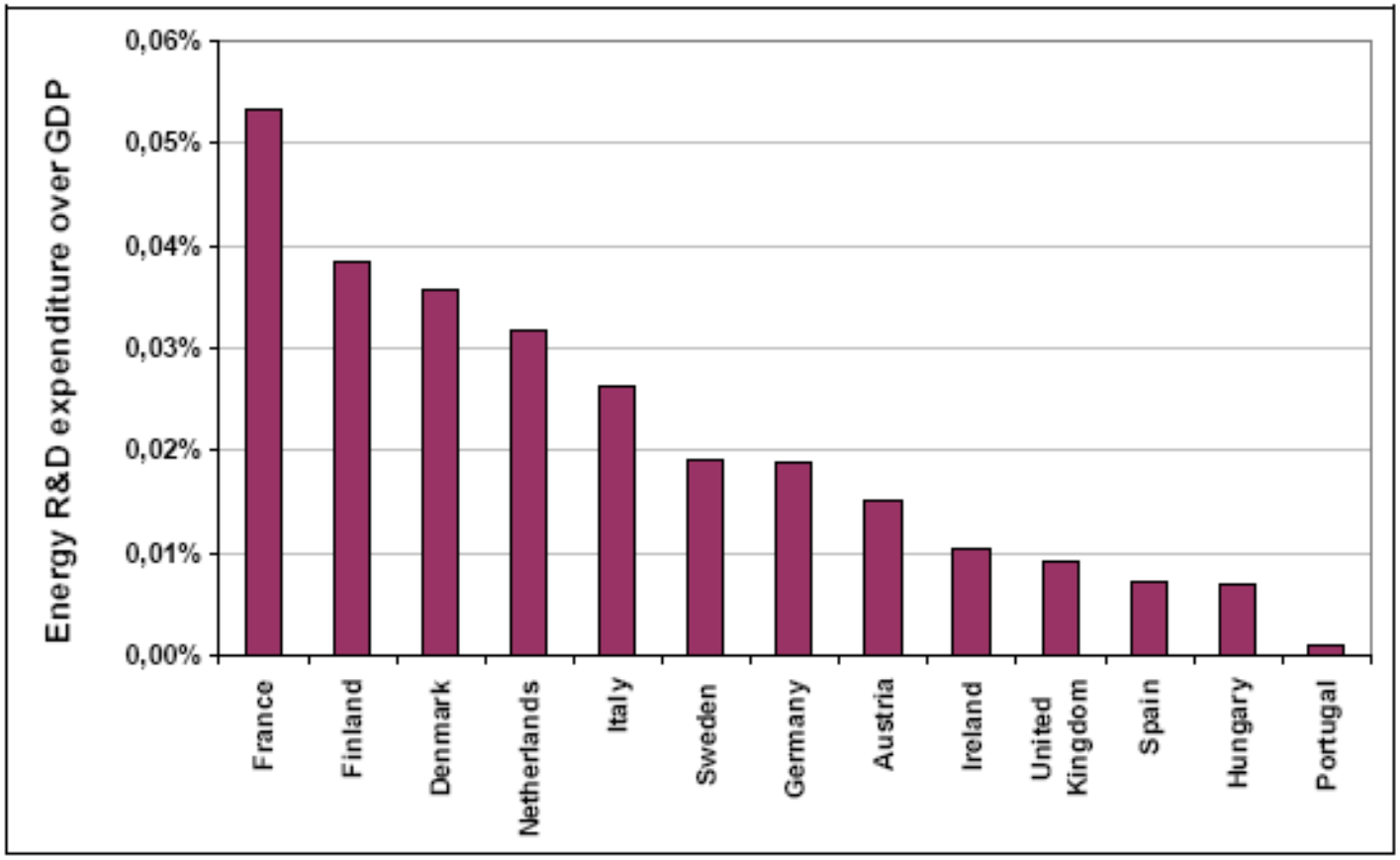

Source: BMU 2006

# Energy Research Improvement

- November 2007: European Commission adopted a proposal for a European Strategic Energy Technology Plan.
- Energy technology will be a key element of Europe's plans to reduce its greenhouse gas emissions and move towards a low-carbon future.
- Analysis of structural weaknesses in the current energy research system
- The new Technology Research aims help the European Union to position itself to develop “the technologies it needs to meet its political objectives and at the same time ensure its companies can benefit from the opportunities of a new approach to energy”

# Energy public spending relative to GDP 2005 of EU Member States

**Source: European Commission MEMO/07/494**



# What is SET ?
# European Strategic Energy Technology Plan

- Creating **European Industrial Initiatives** to strengthen energy research and innovation by bringing together appropriate resources and actors in a particular industrial sector.
  - Wind; solar; bio-energy; CO2 capture, transport and storage; electricity grids; and nuclear fission.

- Creating a **European Energy Research Alliance** for greater co-operation across Europe that have an impact on the development of energy technologies

- Planning the **transition of European energy infrastructure networks and systems**

# Commission’s new tools under SET

- **Regularly up-dated information and EU 27 system monitoring**, open to all, "map" of technologies – providing **information** on the latest situation, **barriers** to technological uptake and the **potential** of existing technologies.
- A new European Community **Steering Group** on Strategic Energy Technologies, which will allow Member States and the Commission to plan joint actions and coordinate policies and programmes.
- A European **Energy Technology Summit** in 2009

- **Several** Targeted Large-Scale European Initiatives, incl.:
  - **energy efficiency in buildings;**
  - **energy efficiency in industry;**
  - **energy efficiency in transport;**
  - **European grid;**
  - **energy storage;**
  - **second generation biofuels;**
  - **carbon capture and storage;**
  - **fuel cells and hydrogen;**
  - **off-shore wind;**
  - **photovoltaic;**
  - **concentrated solar power;**
  - **nuclear fission;**
  - **nuclear waste;**
  - **nuclear fusion;**
  - **and basic research for energy (materials, nanotechnologies, computation, biotechnologies).**

http://ec.europa.eu/energy/res/consultation/setplan_en.htm

# Budget for SET ?

- **No exact figures yet.** The EU's 7th Framework Programme for research (2007-2013) has an average annual budget of about €886 million devoted directly to energy research.


energy
and the challenge of sustainability

# Global Energy Assessment
## Towards a more Sustainable Future

- The *magnitude* of the change required is *huge*
- The challenge is to find a way forward that addresses all the issues *simultaneously*
- A paradigm shift is needed: energy end-use efficiency, new renewables, advanced nuclear and carbon capture and storage.

# Need for an Energy Assessment

- The world is at a critical juncture for energy policy – new challenges have emerged, while old challenges remain

- Previous studies do not identify the strategies and solutions needed to ***comprehensively address*** today's major energy and energy-related challenges in an ***integrated*** way

# GEA Objectives include:

- Scientifically based, comprehensive, integrated, and **policy-relevant analysis** of issues and options, covering
  - Energy and sustainability challenges
  - Resource and technology options, demand and supply
  - System issues, scenarios
  - Policy options
- Local, Regional, and Global dimensions
- Provide basis for policy formulation

# How will GEA be different?

- The only **comprehensive** and **integrated** assessment of energy issues within constraints. Regional and global scenarios!
- The only study to combine a **technical** assessment with **strategic** policy and investment **analysis** for global and place-specific actions
- The only study providing timely analysis for addressing **recent and emerging** global **challenges**; and able to synthesize recent studies on energy

# GEA Knowledge Clusters

- **Cluster I: Major Global Issues and Energy**
  - assessment of the **Challenges**
- **Cluster II: Energy Resources and Technological Options**
  - assessment of the **Components** available to build future energy systems
- **Cluster III: Possible Sustainable Futures**
  - assessment of how to combine the Components to create **Systems** that address the Challenges **– Scenario** development
- **Cluster IV: Policies Advancing Energy for Sustainable Development**
  - assessment of the **Policies** needed to address the Challenges and realize the Systems

# GEA Main Outputs

- Major Report in 4 Clusters (Parts)
- Issues papers
- Information for  intergovernmental processes, governments, corporations, academic sector, education, NGOs, …
- Broad regional and national stakeholder consultations
- Broad outreach efforts, many media channels

# Supporting Organizations

- Austria
- Brazil
- Sweden
- U.S.
- UNDP
- UNEP
- UNIDO
- World Bank
- IIASA
- World Energy Council
- IEA
- ICSU
- World Business Council for Sustainable Development
- UN Foundation
- Hewlett Foundation
- Petrobras
- ...

# Global Energy Assessment

- **unique** and **timely**
- **comprehensive** and **integrated**
- **process** going beyond a **report**
- **policy** relevant and **capacity** enhancing
- **options** and **strategies** for the way forward

# timeline

**2008**

Zero Order Draft by Summer

Stakeholder consultations during the fall

Working on First Order Draft

**2009**

First Order Draft completed early spring

Continued stakeholder consultations

Second Order Draft completed by summer and subject to formal peer review process in the fall

# timeline cont.

**2010**

- Review and revision process completed
- Council approval by August/September
- Web and other media outreach on the outcome
- Presentation to World Energy Congress in September
- Final editing work for printing

# timeline cont.

**2011**

- Main report printed
- Outreach at many meetings, nationally, regionally and internationally
- Other outreach channels, YouTube and more
- Continued web interactions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