



Investing in the Development of Low Carbon Technologies SET-Plan – Information System (SETIS)

Technology Innovation in the Cement Industry & the SET-Plan

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European Commission, DG JRC

EU Energy and Climate Change policy

- greenhouse gas emissions
- security of energy supply
- competitiveness

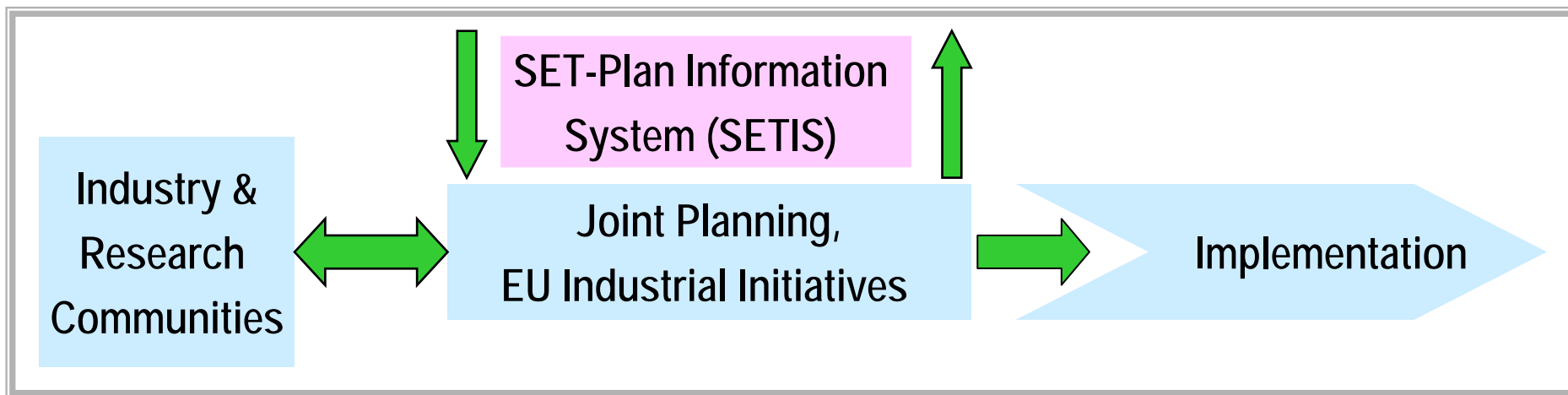


The SET-Plan is the TECHNOLOGY PILLAR

From 80% dependency on fossil fuels to 80% reduction
in GHG emissions in 40 years!

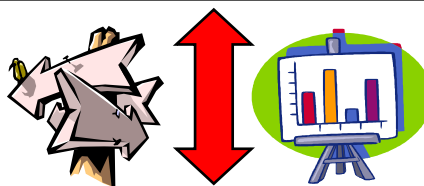
A reinvention of our energy system
...towards the 2050 system

European Community Steering Group on Strategic Energy technologies



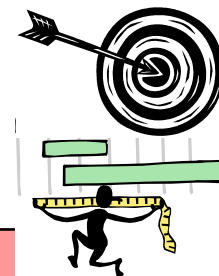
<http://setis.ec.europa.eu/>

European Community SET-Plan Steering Group



- ✓ Technology & Capacity Maps
 - ✓ Technology Portfolio (17)
 - ✓ Common Assessment Framework for Energy Technologies
 - ✓ Information exchange – Validation
- ✓ Priorities, Roadmaps, KPIs
- ✓ Assess/build the case for new priority
- ✓ SETIS – web portal

SETIS



Member States, EERA
Industry & Research Communities
(ETPs)
International Cooperation

European
Industrial Initiatives,
Joint Actions



SET-Plan: towards implementation



European Industrial Initiatives – industry led, mainly focused on the decarbonising the power sector (1st phase)

Roadmaps: R&D, D efforts needed estimated at 53 b€ over the next 10 yrs

- *Wind: up to 20% of EU electricity by 2020*
- *Solar (PV&CSP): up to 15% of the EU electricity*
- *CCS: reaching cost competitiveness within a carbon pricing environment*
- *Electricity grids: 50% of networks in Europe operate along "smart principle" by 2020*
- *Nuclear: Generation IV demonstrated*
- *Bioenergy: 14% of energy mix-sustainably by 2020*
- *Smart Cities: 40% GHG reduction in 2020*

•“Further Industrial Initiatives may be necessary, and therefore the Council encourages the Commission to continue to examine areas with great potential such as marine energy, energy storage and **energy efficiency** for this purpose...”
Council Conclusions, February 2008

•“Calls on the Commission to add **energy efficiency technologies**, including co- and polygeneration, to the areas covered by the EII...”. EP Conclusions, June 2008



Strategic Planning to Implementation



Looking back into the past

In Europe from 1990 to 2007:

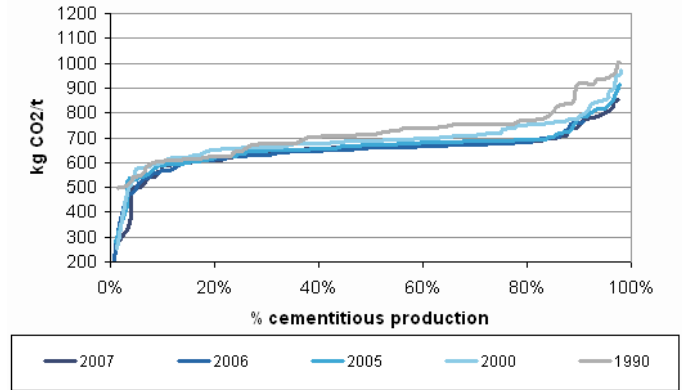
- ↓ 8.2% Thermal energy efficiency
 - ↓ 8.8% Gross CO2 per tonne cementitious product
 - ↓ 3.5 % Electric energy efficiency
- (from GNR)

Looking into the future

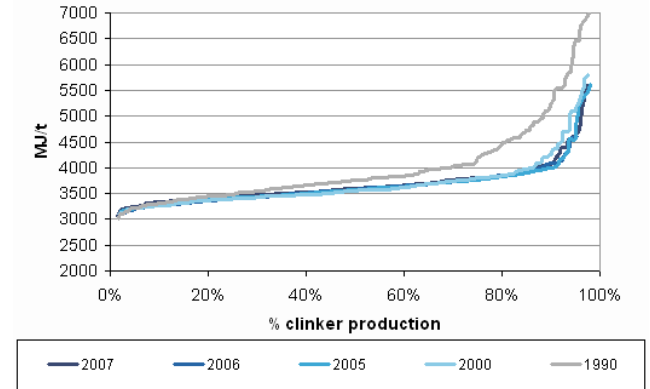
□ How much improvements can be expected, by when? 10 to 15 %? 20%?

□ Role of technology innovation (BAT, breakthrough technology, CCS) ?

Gross CO2 emission per tonne cementitious (Company level)



Thermal energy per tonne clinker





Expert Consultation

- Workshop on the role of technology innovation in Energy Efficiency and CO₂ emissions reduction in :
 - ✓ the iron and steel industry, January 2010.
 - ✓ The Cement_industry – March 2010

Technology Assessment

- Study on deployment scenarios on technology innovation in the cement up to 2030.
- Chapter in the Technology Map on Cement.
- Study on deployment scenarios on technology innovation in the iron and Steel industry up to 2030 in Europe.
- Chapter in the Technology Map on Iron and Steel.



Context - Highlights



- *Europe production 10.5% of world production*
- *Four out of the five bigger producers are sited in Europe: Lafarge (France), HeidelbergCement (Germany), Italcementi (Italy), Holcim (Switzerland)*
- *Prospective Efficiency Improvements without major breakthroughs*
 - *Average thermal consumption*
 - 3.67GJ/t clinker in 2006 -> 3.3 to 3.4GJ/t clinker in 2030?
 - *Electrical consumption*
 - From current 110 kWh/t -> 105 kWh/t in 2030 (in case of no CCS)?



➔ *Major CO₂ decreases up to 2050 in a global context coming from:*

- Local Efficiency improvements (10%)
- Higher use of clinker substitutes (24%)
- Higher use of alternative fuels (waste and biomass) (24%)
- CCS?: (56%)

CCS technologies currently being considered (oxy-combustion and post-combustion), Impact on price of cement (double?)

(Source: WBCSD/IEA Cement Technology Roadmap 2009)



Barriers



Energy prices although in some regions of the world do take place (e.g. China, waste heat recovery) .

The market penetration of cements with a decreasing clinker to cement ratio will depend on several factors,

- Availability
- Properties
- Price
- National Standards
- Market acceptance

The achievement of higher rates of fuel substitution have stronger political and legal barriers that technical ones

- Waste legislation
- Waste collection
- Alternative fuel Costs
- Social acceptance



Needs



- i) promotion of current state-of-the-art technologies*
- ii) encourage and facilitate an increased use of alternative fuels,*
- iii) facilitate and encourage clinker substitution*
- iv) facilitate the development of CCS,*
- v) ensure predictable, objective and stable CO2 constrains and an energy framework on an international level,*
- vi) enhance research and development of capabilities, skills, expertise and innovation,*
- vii) encourage international collaboration and public-private partnerships.*

