



World Energy Council
CONSEIL MONDIAL DE L'ENERGIE

SOUTH EAST EUROPE ENERGY DIALOGUE

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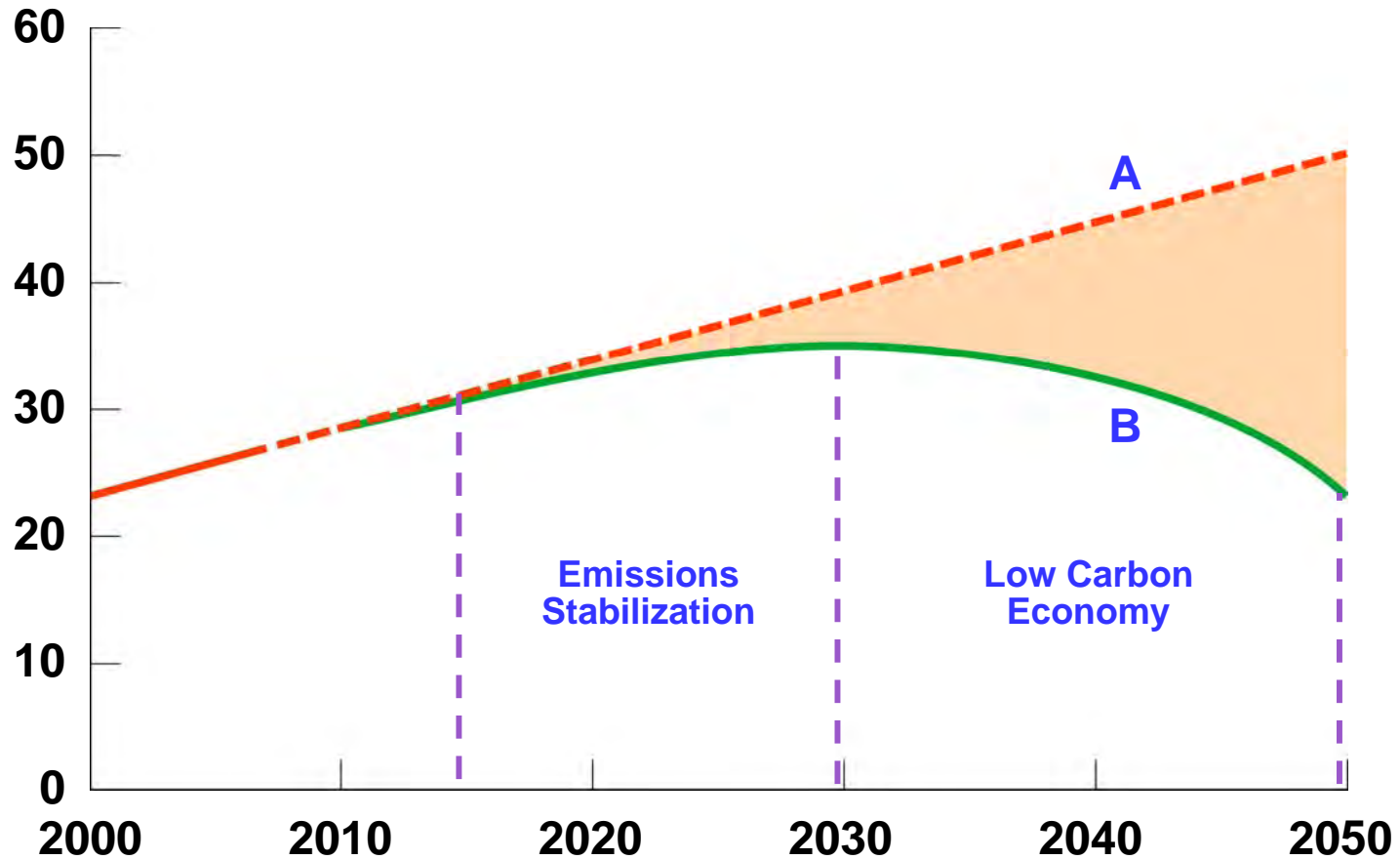
Carbon Capture and Storage Issue

Slav Slavov

World Energy Council

WEC Global CO₂ Emission Scenarios

Emissions GtCO₂/yr



A – Business as usual; B – Roadmap to low carbon future.

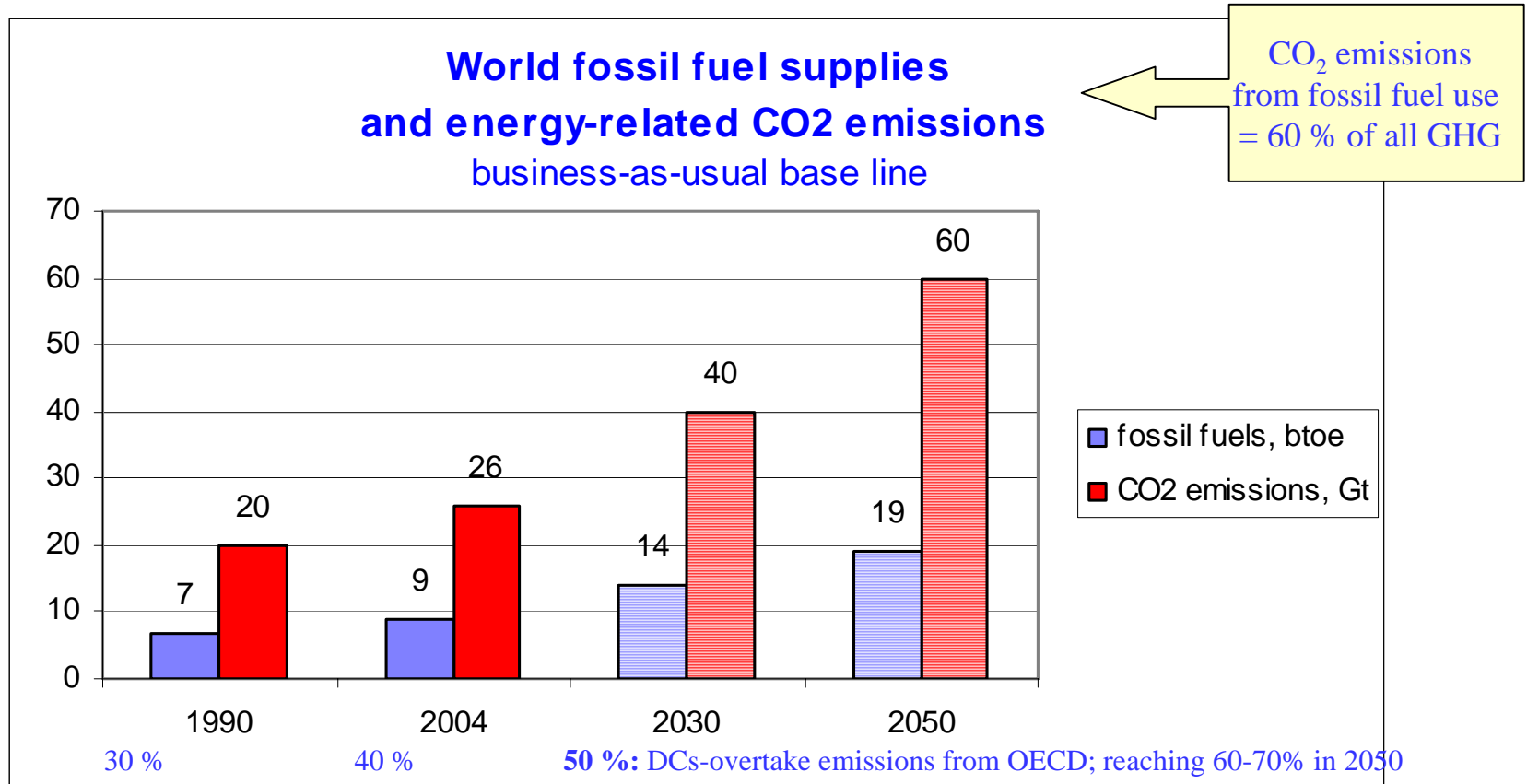
What role of fossil fuels (FF) ??

WEC Global Scenarios and IAE predicted that:

- FF to cover 82% of world demand in 2030; and 64% in 2050; or increase of FF demand of 80% under present policies; **but** 60% under alternative policies;
- Therefore, annual CO₂ (FF) emissions from 20Gt in 1990; to 40 Gt in 2030 and 60 Gt in 2050 (under present policies)



The present global energy dynamics are unsustainable.



Source Figure: 1990-2003: IEA, World Energy Outlook 2006; IEA, Prospects for CO₂ Capture and Storage, Paris 2004; WEC Global Energy Perspectives to 2050 and Beyond.



Immediate alternative policies??

CCS has potential to reduce substantively if deployed:

- at a significant scale;
- in a timely manner, after reaching commercial stage;
- at costs, attractive to investors;
- at affordable prices to consumers;

Important however in view:

- CCS will not be panacea, it should be a part of a portfolio mitigation policies.





Carbon Capture and Storage More than Option- A Necessity!

- What is the issue?
- How important as a mitigation option?
- Its cost and competitiveness?
- Its investment needs?
- Legislation, policy instruments
- Outlook to 2030 and beyond?





Carbon Capture and Storage More than Option- A Necessity!

What is the issue?

- CCS technology captures CO₂, compresses and transport to geological formation sites;
- CCS is one chain-bound technology;

Main challenges:

- high capture cost & efficiency losses; others?

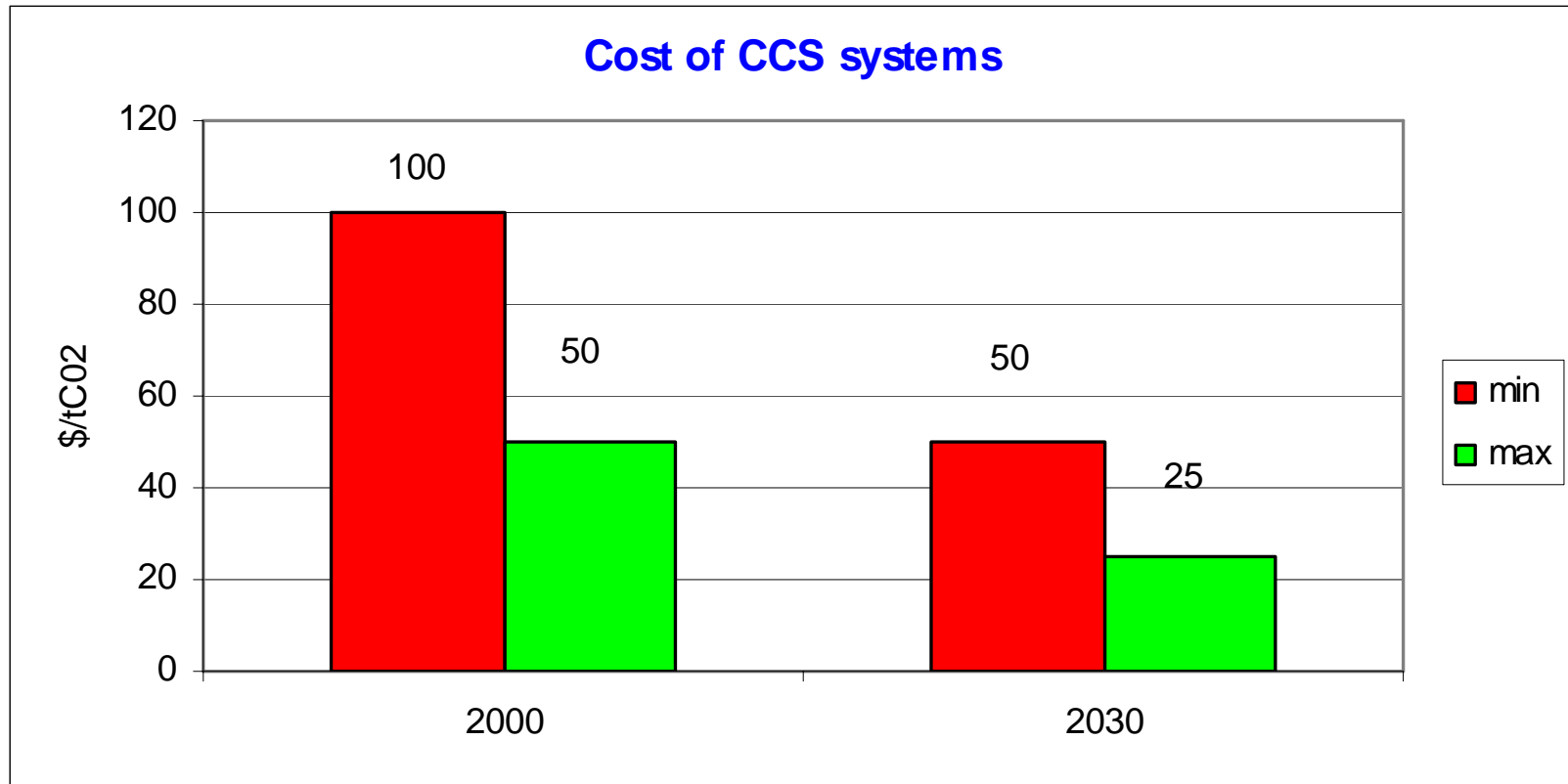
Current status:

- 70 projects worldwide; 3000 km pipelines; 33Mt CO₂;



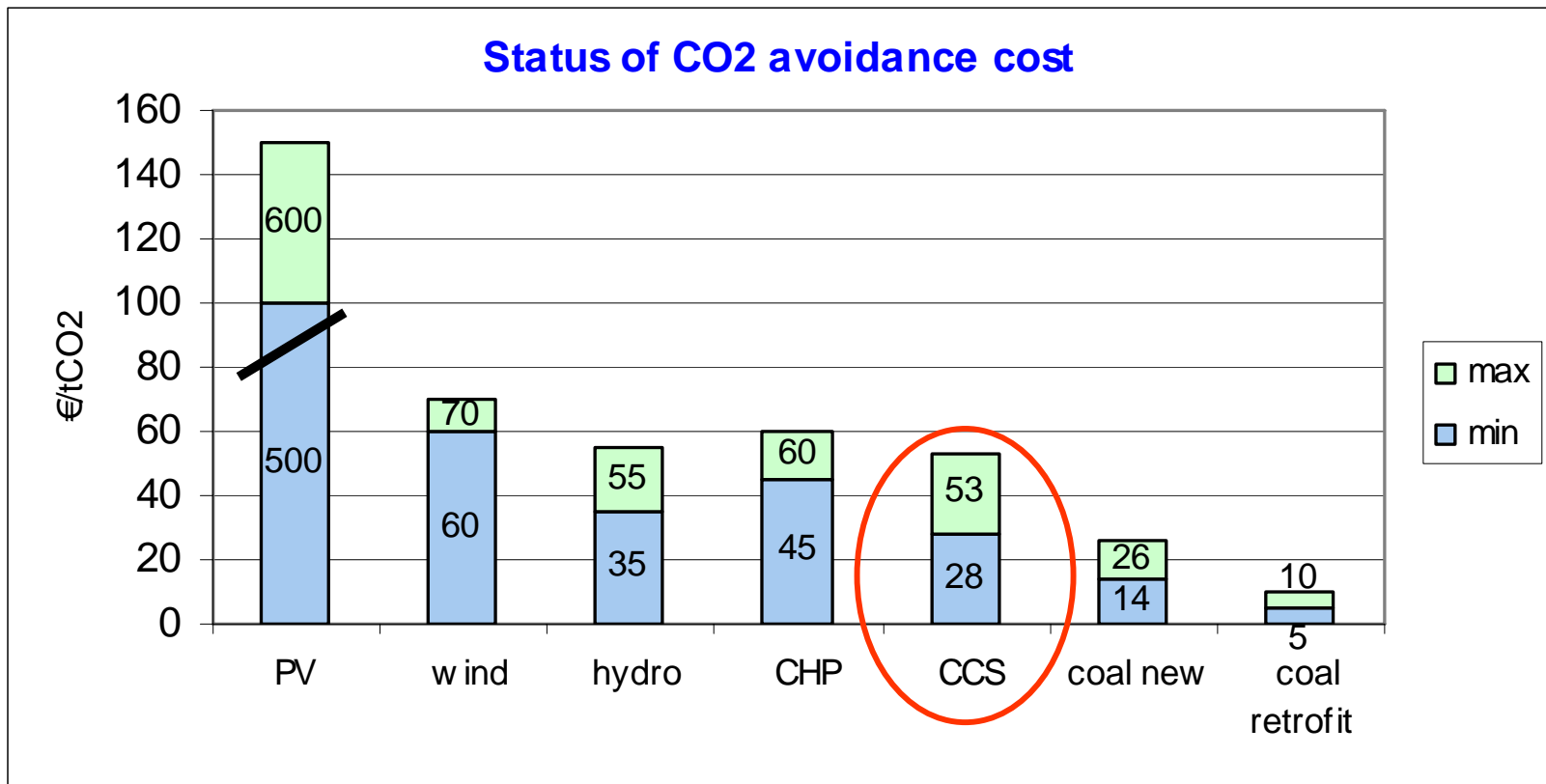
Its cost?

Present CCS costs are too high, but are expected to be cut by half by 2030; price of kwh may rise by 2-3 US cents; and by 10-20% to final consumers.



Source: IEA, Prospects, op. cit., p. 17

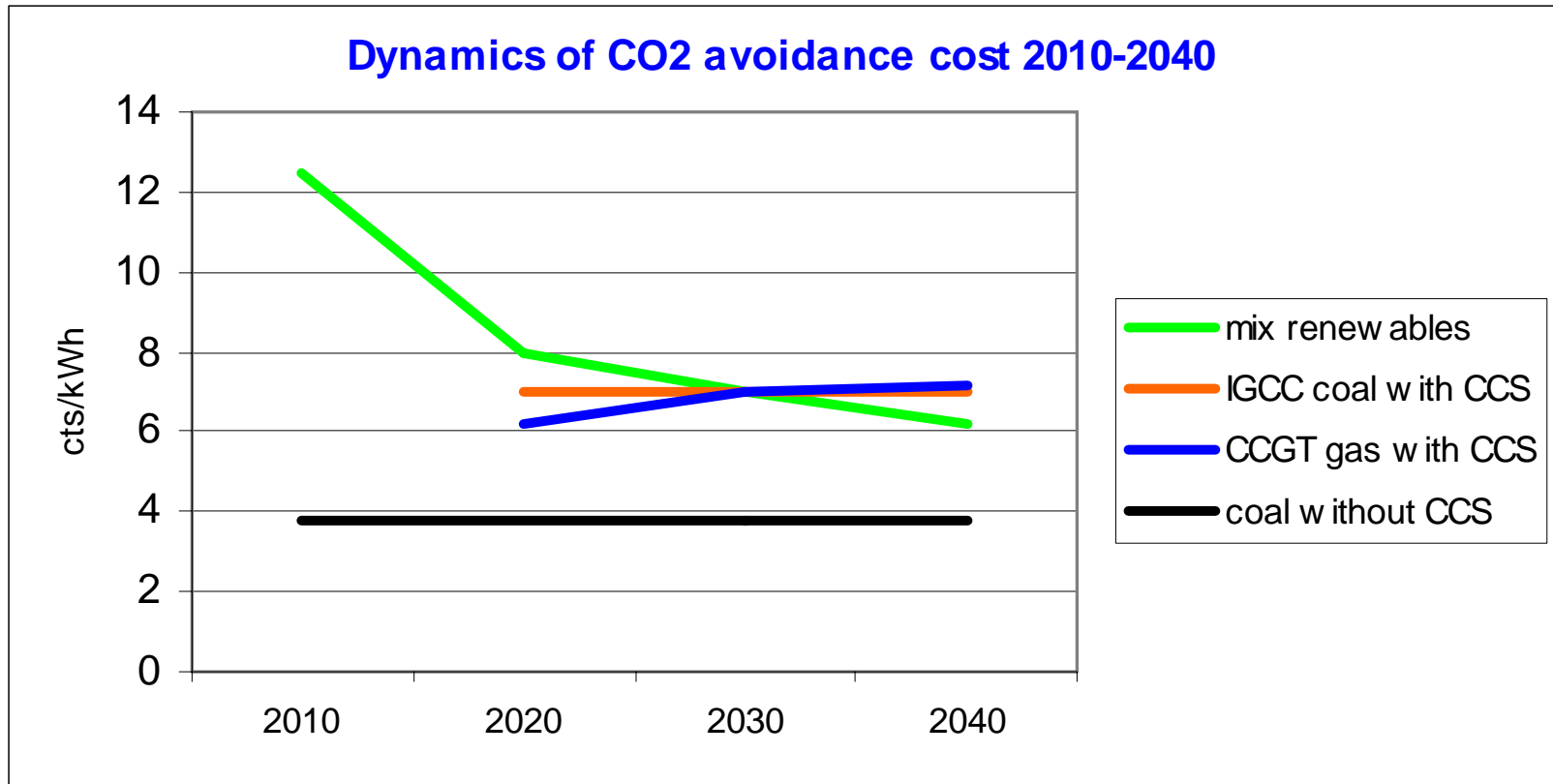
Its present competitiveness?- CCS is competitive with other mitigation options though it does not benefit from policy incentives.



Source: RWE, in Euracoal, Coal Industry Accross Europe 2005, p. 7

Its future competitiveness?

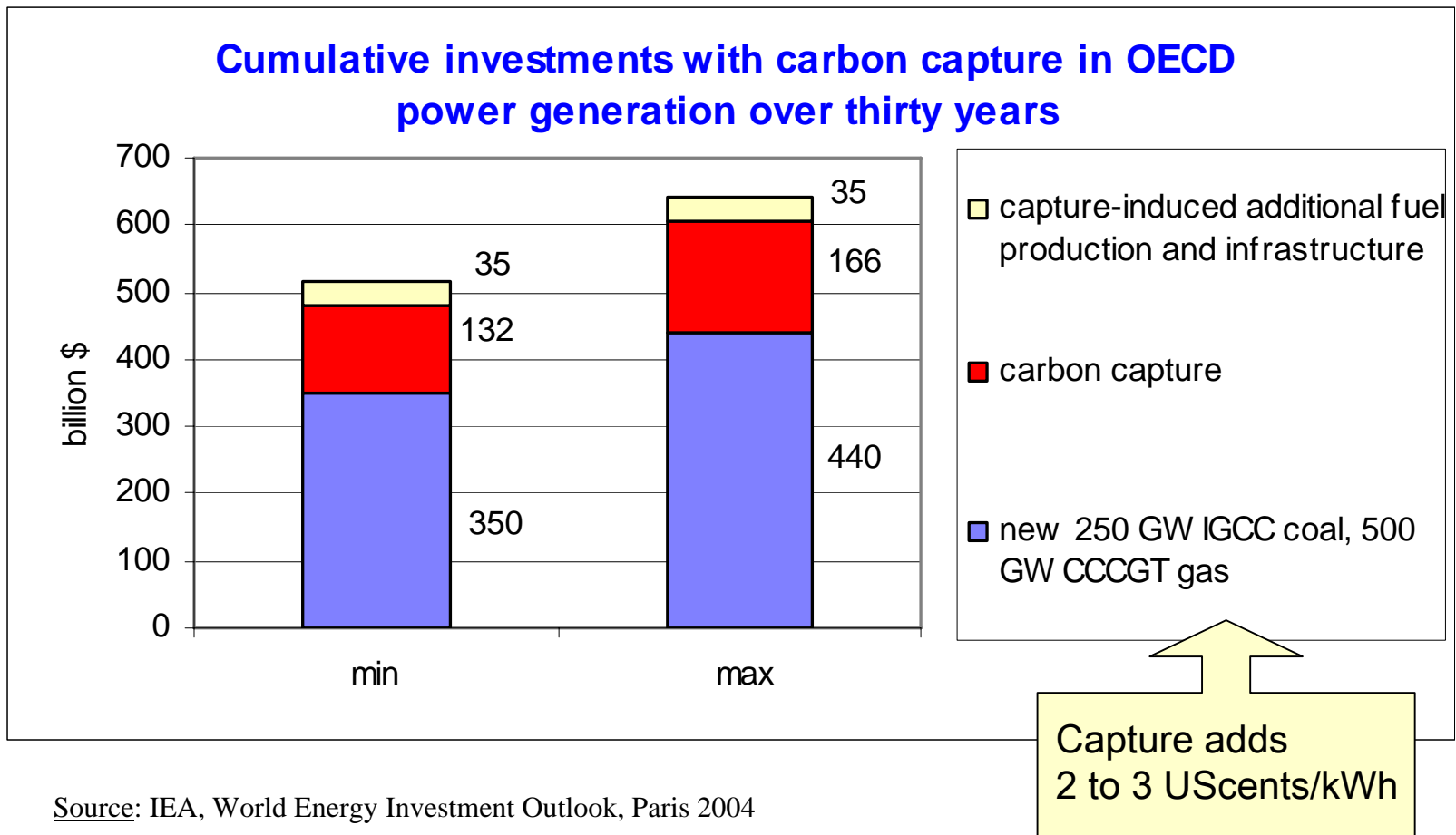
CCS will be exposed to rising competition in expanding power markets.



Source: Wuppertal Institut für Klima, Umwelt, Energie, et alii, Strukturell-ökonomisch-ökologischer Vergleich regenerativer Energietechnologien mit CCS, Wuppertal 2007, Zusammenfassung, S. 18

Investment needs?

Count between \$500 and 1000 million for first demoplants, 50 % of which for CCS. Later, CCS adds less: 20 to 25 % (IEA).



Financing CCS technology transfer to developing countries?

How much would that cost?

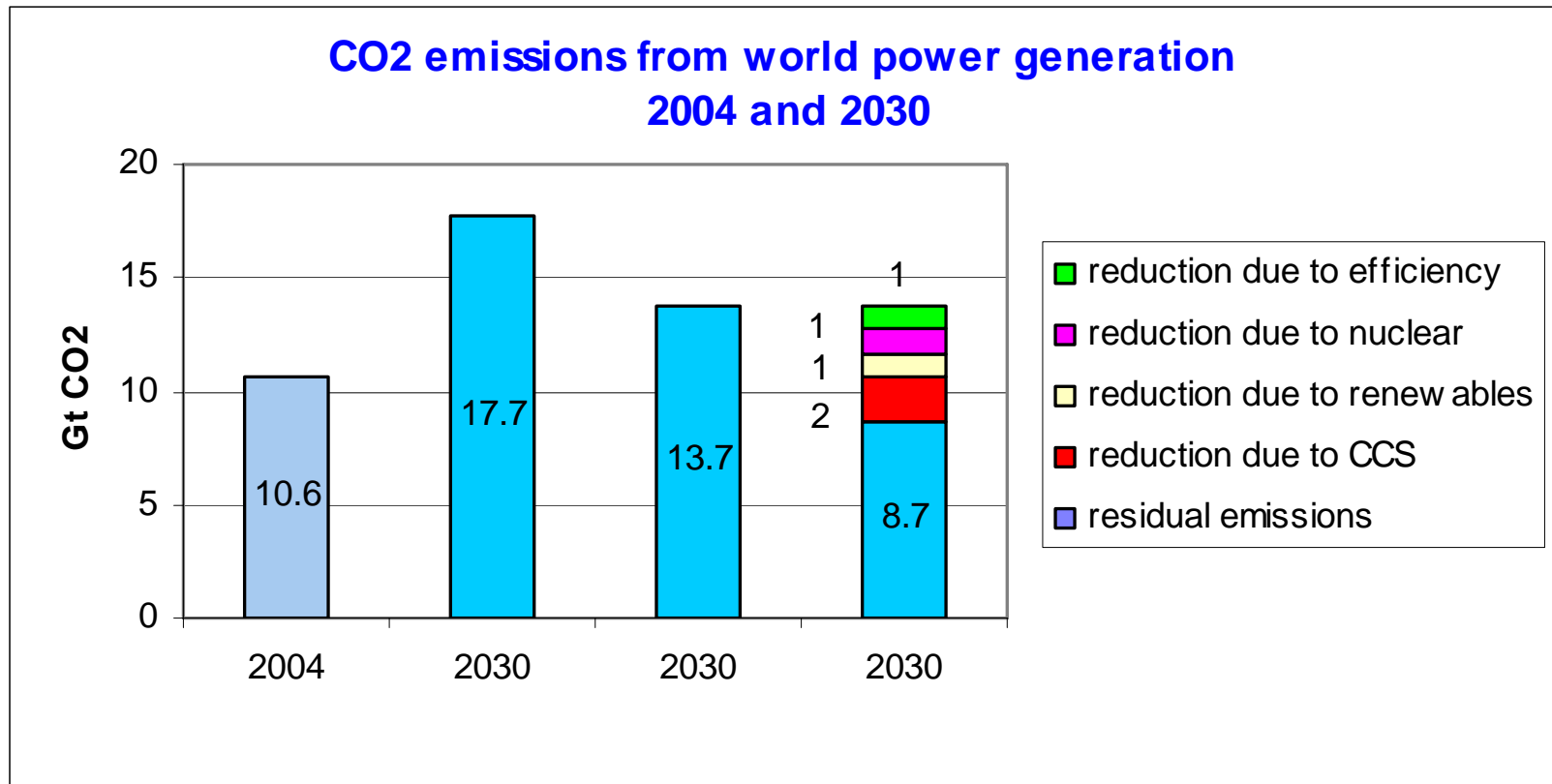
DC's fossil power generation capacities during 2015-2030:
+ 592 GW = + 1.4 Gt CO₂ to reach 7.9 Gt²).

At \$30/tCO₂, CCS would eliminate these incremental emissions for \$43 billion during 15 years, or \$3 billion/year (less in CDM- and JI-financed projects).

Is that too much for the international community?

Outlook to 2030?

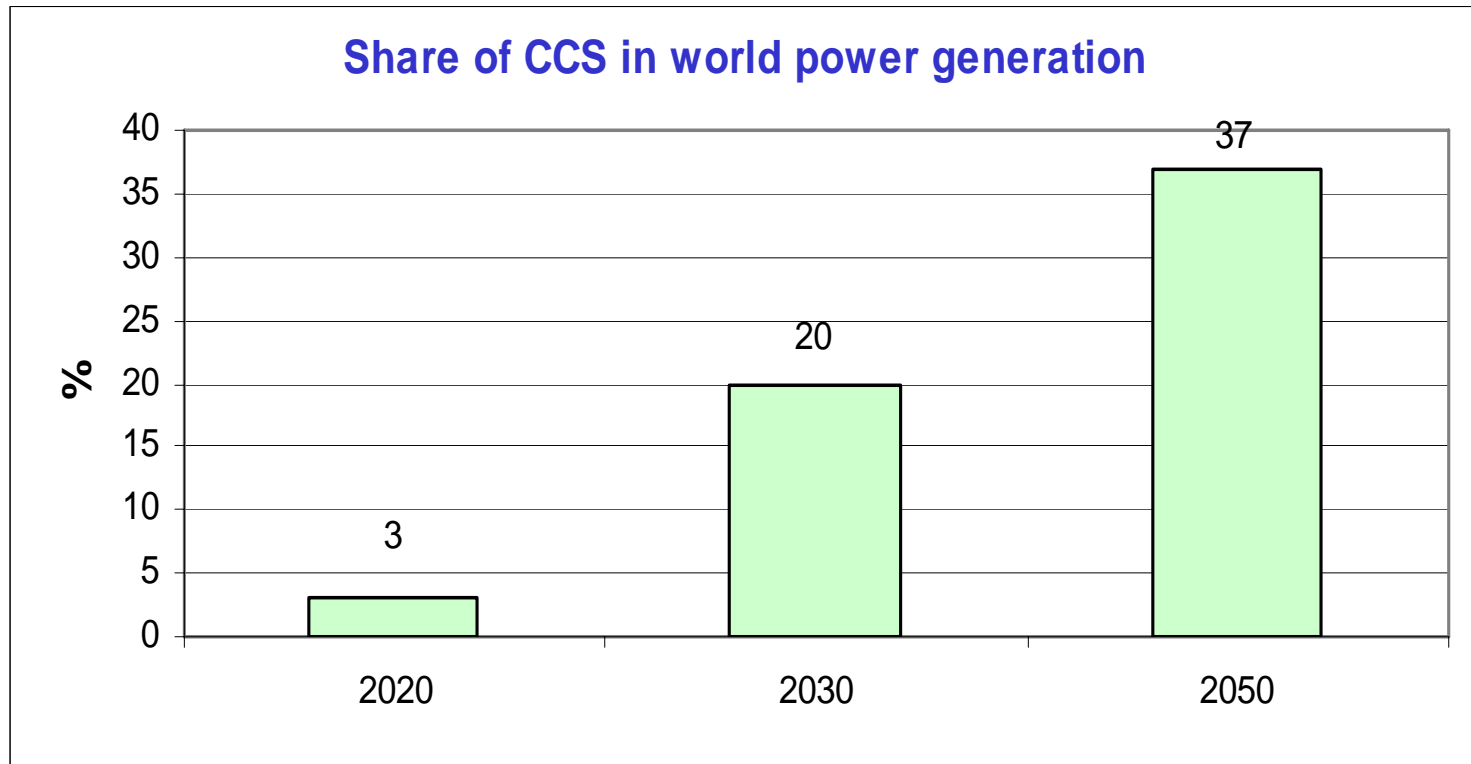
At 20 to 50 \$/tCO₂, CCS could reduce CO₂ emissions from world power generation in 2030 by 2 Gt, i. e. more than renewables and nuclear (IEA).



Sources: IEA WEO 2006; BAPS = Beyond the Alternative Policy Scenario; see also forthcoming IEA WEO 2007, Chapter 5, Environmental repercussions, Stabilisation Case; also IPCC, Contribution of WG III to the Fourth Assessment Report, Technical Summary, Table TS.10; in the Message model, CCS tops efficiency, renewables and nuclear, at 490-540 ppm.

CCS – how important as mitigation option?

Potentially a major option as of 2020, mainly (80%) in (new) power plants. CCS enables a continued and sustainable use of fossil fuels. CCS is not a panacea, though. It should be a part of mitigation policies portfolio.



Sources: 2020 : IPCC Special Report on Carbon Dioxide Capture and Storage, 2005, p. 358; 2030 and 2050: IEA, Prospects, op. cit., p. 112, 113, assuming a \$50 penalty per ton of CO₂ as of 2015 in developed and as of 2030 in developing countries. The share of CCS in generation (2050: 37 %) is higher than in capacities (2050: 22 %) due to the high load factor of plants with CCS.



Carbon Capture & Storage Legislation

- In a few national laws: legal & regulatory regimes exist for hydrocarbons and mineral industry; and for environmental protection and waste disposal;
- they could just adapt CCS;
- International laws: when CCS cross borders & international water reservoirs;
- Intellectual property protection: rather through enforceable private contracts than through laws regulations.





Carbon Capture & Storage -Policy Instruments-

- CCS does not benefit from policy incentives;
- eligibility in EU-ETS? CDM? Funding from GEF?
- a higher & similar carbon price around the world?
- creating of a global carbon market?
- setting global rules for energy and emission trading?
- emphasis on CCS public acceptance

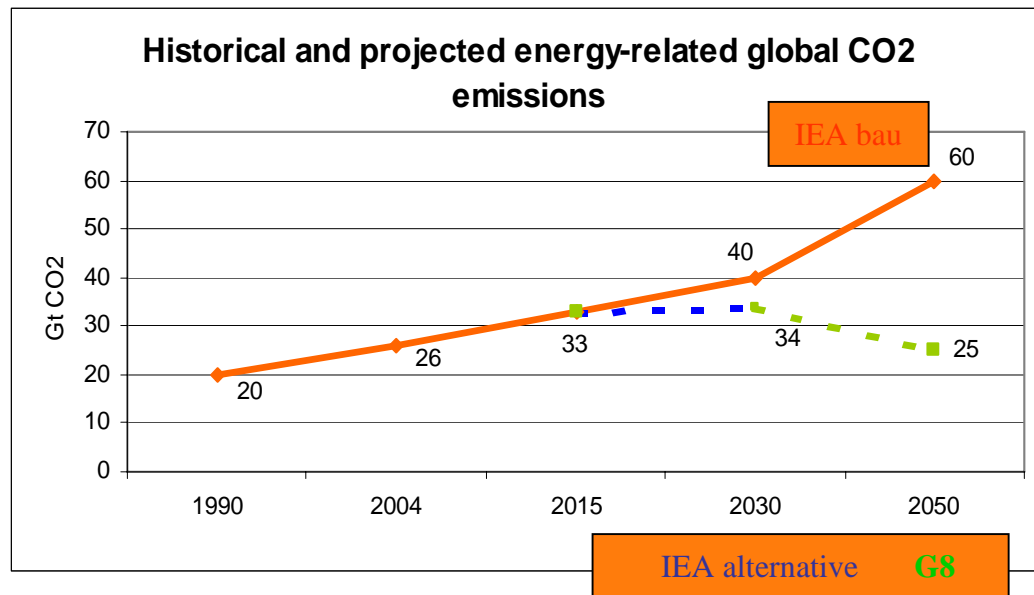


... and beyond?

The G8 Summit in Heiligendamm agreed to study proposals to reduce global CO₂ emissions by 2050 by at least 50 % ¹⁾.

a) If implemented, this would

→ reduce energy-related CO₂ emissions from 60 Gt to 25Gt in 2050



→ stabilise concentrations at 445-490 ppm CO_{2e} (1790: 280 ppm)

→ limit the increase of global mean temperatures to max 2.4 °C.



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The Message:

**CCS is an Essential Bridge
To a
Sustainable & Secure Energy Future**

**THANK YOU
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