Sustainable Development & CCS

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Introduction

Background paper

- **Status of CO_2 Capture and Storage (CCS)**
- **Current trends and future potential**
- **On-going initiatives, especially in developed countries**

Purpose

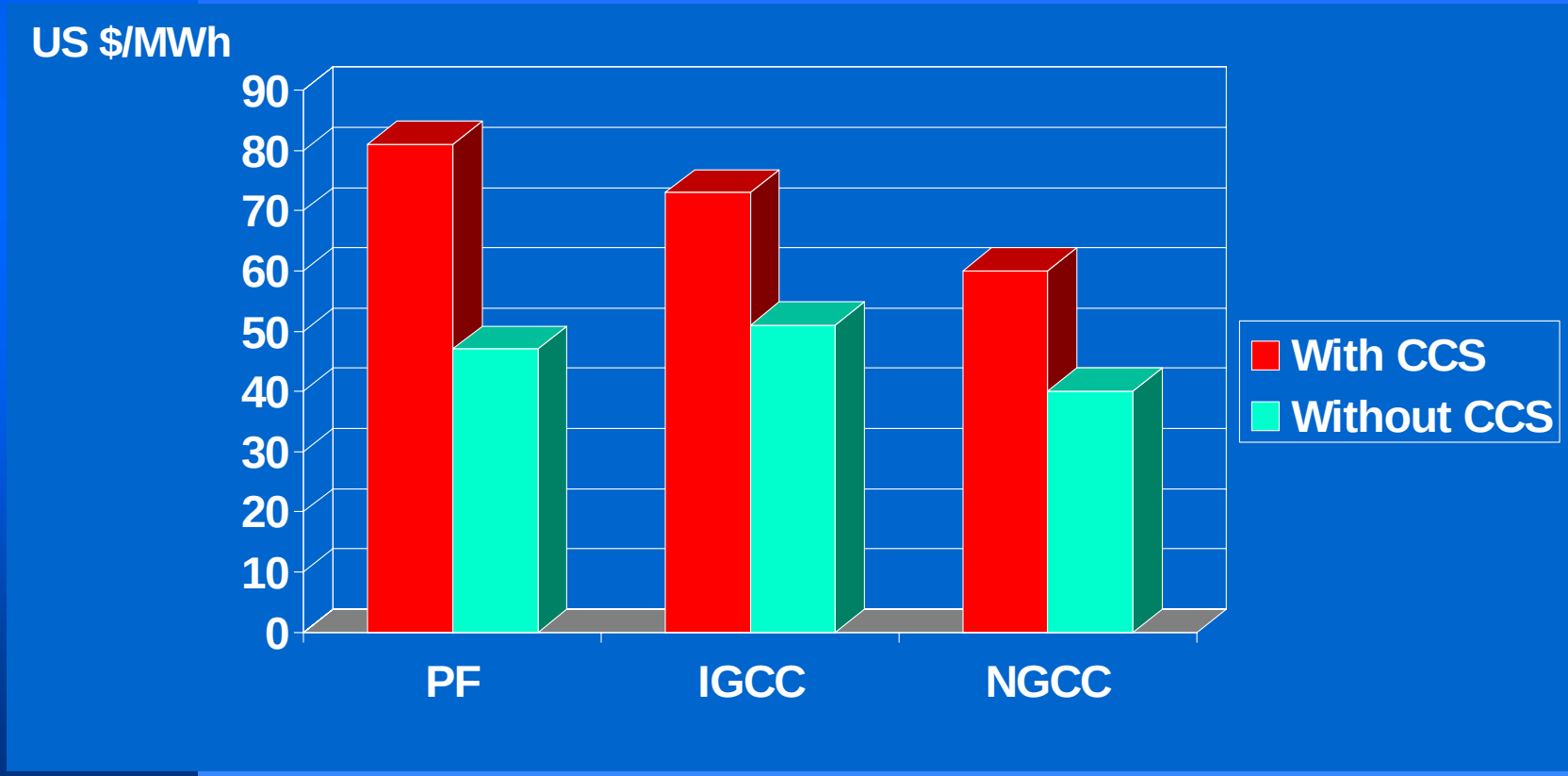
- Potential for advancing deployment
  - Potential for global cooperation
  - Challenges to developer and host
  - Enhancing deployment / transfer
    - Policy options
    - Other measures

Status of CCS

- **Technological**
  - **Established capture technology:**
    - **Post-combustion capture**
    - **Pre-combustion capture**
  - **Pilot plants now being constructed for:**
    - **Oxyfuel combustion**
  - **Pipelines:**
    - **Current pipelines ~ 50Mt/y capacity**
  - **Geological storage:**
    - **Similar injection technology to CO_2-EOR**

Status of CCS

- **Substantial added cost**



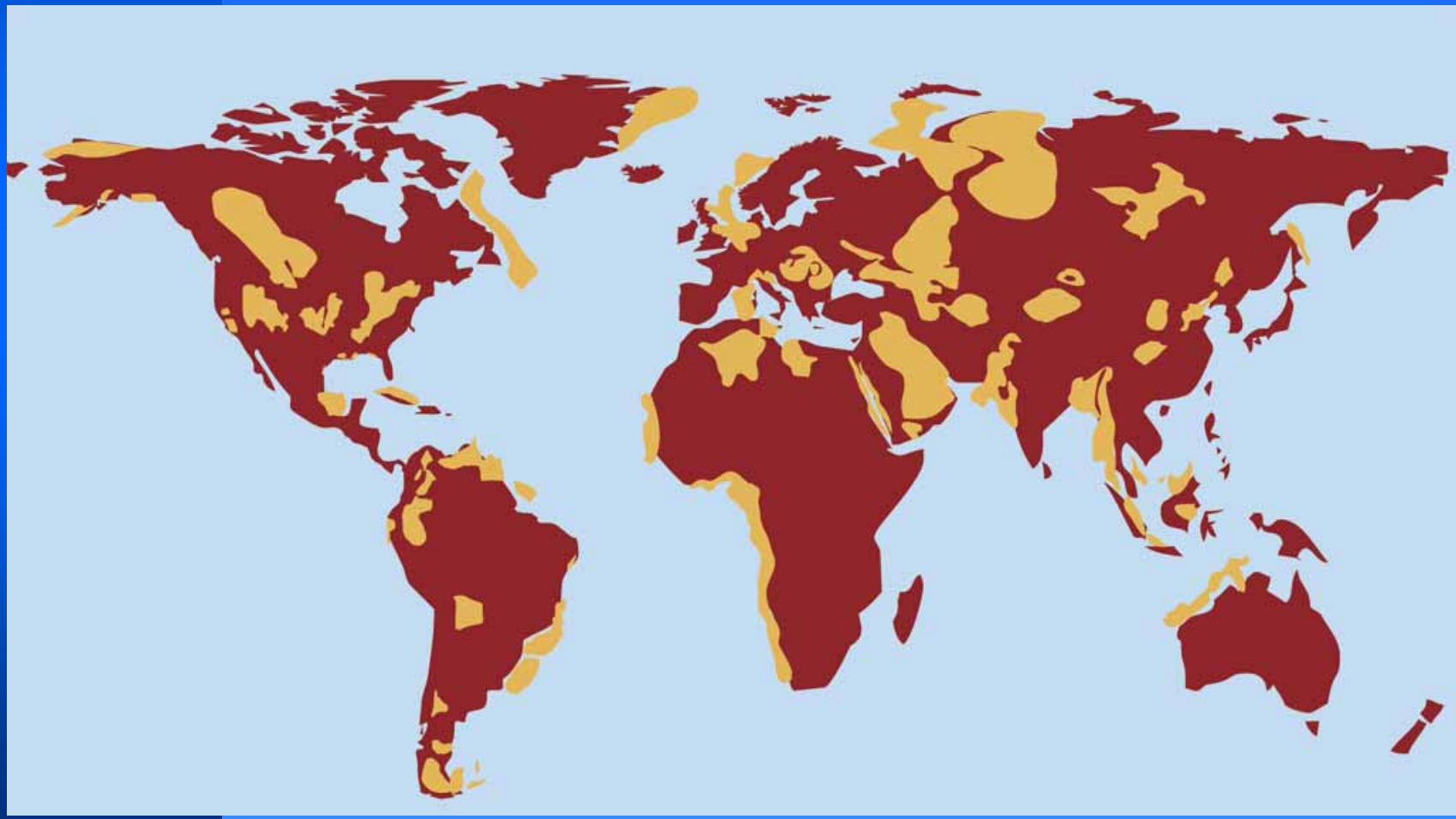
Average values based on IPCC 2005

Status of CCS

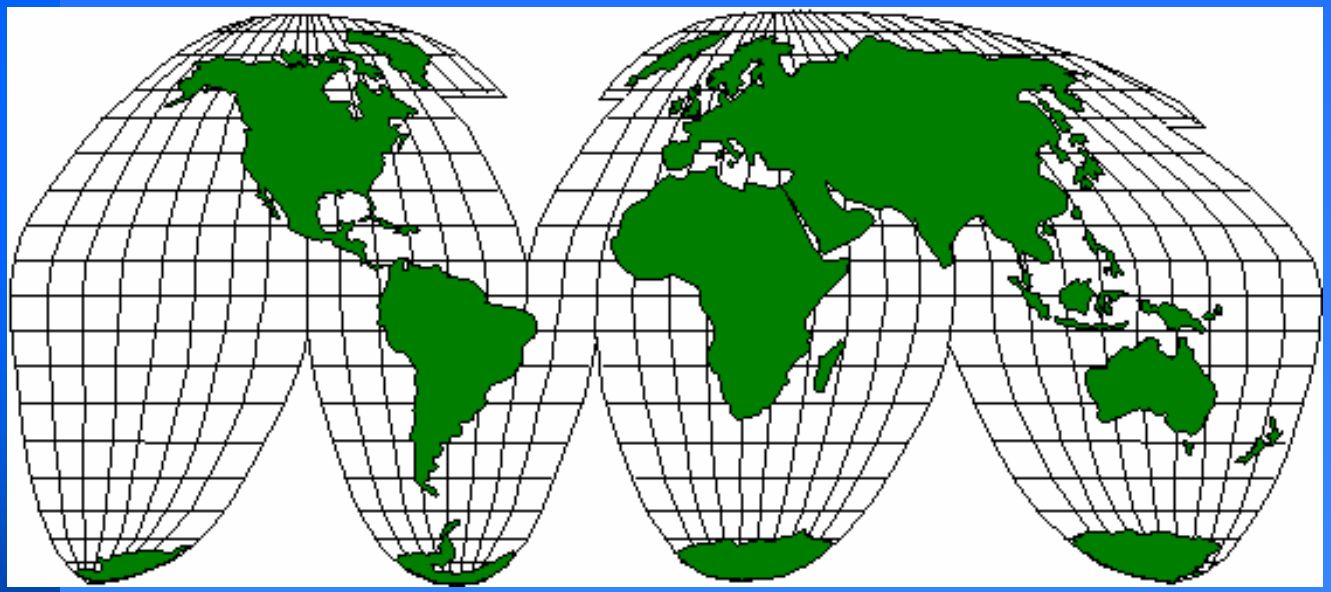
- **Storage capacity ($GtCO_2$) – contribution to stabilization at:**

Storage in:	550 ppmv	450 ppmv
OECD (as at 1990)	242	551
Former Soviet Union	87	319
Asia	296	638
Rest of the World	273	652
Global total	898	2162
Global capacity estimates	1675 - 11000	

Future: where will CO_2 be stored?



Current: Power plants with CCS



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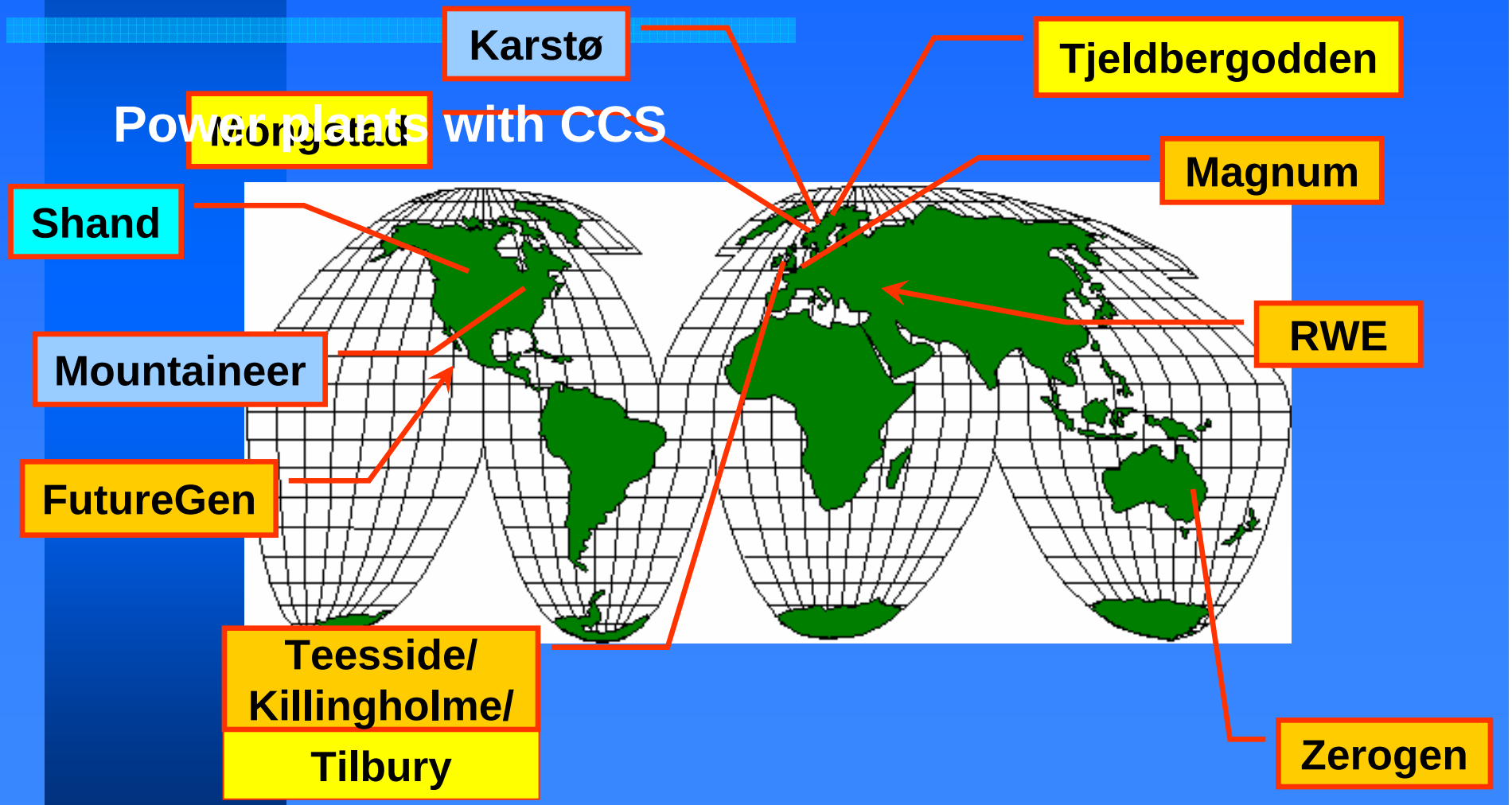

Current trends & future potential

- 30+ further projects announced
  - Many designed for fitting capture later
- Emissions avoided
  - ~3 Mt/y CO_2 by the end of 2007 (excl. EOR)
  - Rising towards 50 Mt/y CO_2 by 2015
- Depend on suitable regulatory/legal and financial frameworks

Current Initiatives

- **Regulatory/legal framework**
  - **International**
    - **London Convention – Protocol amended**
    - **OSPAR – amended but yet to be ratified**
    - **Monitoring and reporting guidelines**
    - **But no requirement for deep reductions in emissions**
  - **National laws and regulations**
    - **Mostly not consider CCS**
    - **Netherlands**
    - **Germany, UK examining national laws**
    - **European directive**
    - **USA, Canada**

Current Initiatives

- Financing
  - Government support for first-of-a-kind plant
  - Emissions trading
  - Clean Development Mechanism
  - Joint Implementation
  - Carbon tax

Clean Development Mechanism

- Host decides whether project is sustainable
- CDM Executive Board concerned about
  - CCS crowding out other projects
  - Physical leakage
  - Responsibility for leakage
  - Project boundary
  - Site management

Challenges

- Acceptance of climate obligations
  - Caps need to be lowered
- Confidence
  - In CCS technology
  - Real projects will help
- Storage
  - Identification of sufficient capacity
  - Depleted oil / gas fields
  - Need to survey deep saline aquifers

Challenges

- **Liability**
  - **Responsibility for stored CO_2**
  - **Regulation of storage**
- **Finance**
  - **CDM & follow-on projects**
  - **GEF and other sources of funding**
- **Public attitudes**

Potential for global cooperation

- **Multilateral**
  - **ZEPP Technology Platform**
  - **IEA Greenhouse Gas R&D**
  - **APEC**
  - **Carbon Sequestration Leadership Forum**
  - **G8: Gleneagles Plan of Action**

Potential for global cooperation

- **Bilateral agreements include:**
  - **US-China, US-Australia, US-Canada, US-Norway**
  - **Australia-China**
  - **EU-China**
  - **UK-China, UK-India, UK-Norway, UK-USA**
  - **Japan - various**

Example of bilateral cooperation

- **Australia - China**
  - **Huaneng Power will build capture pilot**
  - **Using capture process from CSIRO, Australia**
  - **Side-stream at existing PF-power plant**

Enhancing deployment & transfer

- Technology
- Finance
- Health, Safety and Environment
- Public attitudes
- Policy

Enhancing deployment & transfer

- **Technology**
  - **Novel ideas which reduce cost of CO_2 capture**
  - **Geological information, especially about deep saline aquifers in all countries**
  - **Locations: future sources and potential storage sites**
  - **International standards for design and management of CCS facilities**

Enhancing deployment & transfer

- **Finance**
  - **CDM EB should support use of CCS in developing countries**
  - **Other funding bodies, e.g. GEF, should support CCS**
  - **Europe should extend ETS in perpetuity and lower the cap**
  - **Other countries should implement trading schemes**
  - **Commercial sources of finance should become involved in CCS projects**

Enhancing deployment & transfer

- **Health, Safety and Environment**
  - **Substantiate claims of low leakage by further, monitored large-scale injection projects**
  - **Build confidence e.g. promulgate risk assessments results**
  - **Develop regulatory frameworks for CCS**

Enhancing deployment & transfer

- **Public attitudes**
  - **Improve public understanding of CCS**
  - **Time campaigns to coordinate with need**
  - **Regular surveys of public attitudes**

Enhancing deployment & transfer

- Policy
  - Reduce greenhouse gas emissions substantially
    - Stabilise atmospheric concentrations before 2100
  - Support CCS projects through CDM
    - Develop briefings for SBSTA to improve understanding of CCS