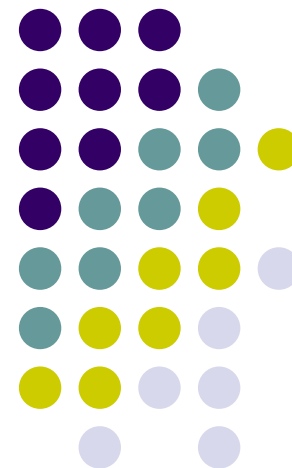


Financing for IGCC and CCS

Clean Energy Forum

Manila, 4 June 2008

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The Asia's energy challenge

- Energy growth expected to be 89% by 2030; accounting for 30% of the World's energy consumption
- \$6.3 trillion investment need in energy infrastructure by 2030
- Provide energy access to 930 million people
- In 2007, about 65% of the World's coal produced and consumed in Asia – Pacific; about half of it for electricity generation
- Urgent need to lower carbon intensity of energy use, especially electricity generation which would require advanced technology and innovative financing

PRC and India in global energy scene

(World Energy Outlook 2007 data)



- Since 2000, India and PRC have contributed to more than 50% increase in global energy demand
- On current trends, PRC and India are expected to contribute more than 40% of the global energy demand growth (15% gas; 80% coal, and 40% oil) by 2030
- On current trends, PRC and India would require about \$5 trillion investment in energy infrastructure by 2030



Why IGCC ?

- **Local environment benefits** – significantly lower SO₂, NOX, particulate matters and solid waste generation
- **Higher efficiency** – higher thermal efficiency thus lower CO₂ emissions and, about 30% less cooling water requirements
- **Expected marginal cost-differential** – potential for reducing the cost gap to about 10% compared to supercritical plants (SC); the cost gaps are 50 – 80% or higher for demonstration projects



Readiness for IGCC in PRC and India

- In PRC – super critical (SC) and ultra super critical (USC) are already in commercial operation; India has recently launched construction of ultra-mega SC plants
- Multiple IGCC plants (2x250 MW; and 2x400 MW) are in active consideration in PRC; in India also multiple IGCC demonstrations in the range of 125 – 250 MW are likely in the short term



What ADB and MDBs can offer?

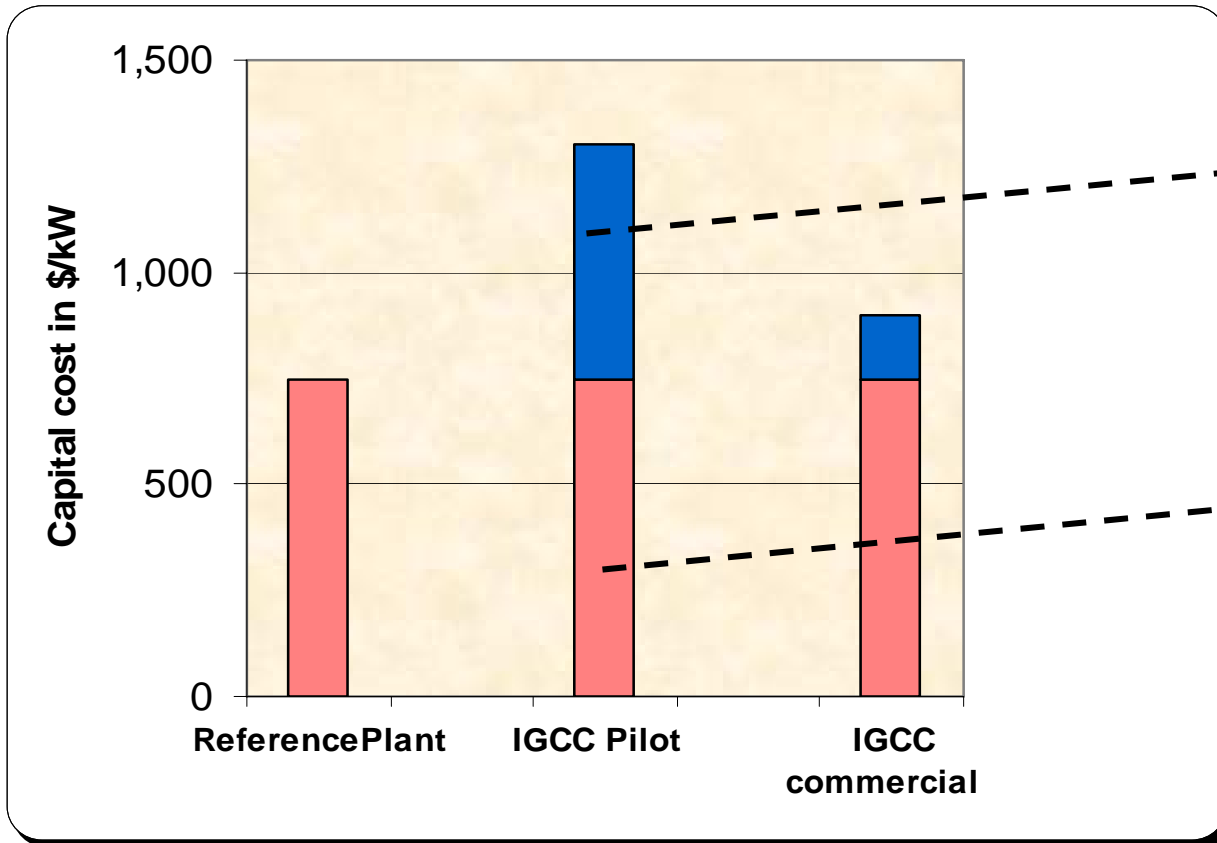
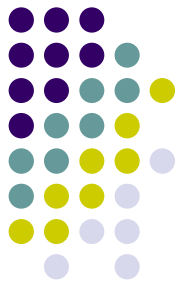
- **Grant financed technical assistance** (TA) to prepare detailed feasibility and institutional capacity building (\$2 million TA committed to India)
- **Tailored low-cost financing from ADB** –
 - Buy-down higher cost: ADB provides up to 10% of the loan amount as grant (maximum \$5 million)
 - sub-LIBOR interest rates, long tenor, flexible repayment option
 - Up-front carbon finance, a Future Carbon Fund is also being set

Concessional loan – through the proposed multi-billion dollar clean technology fund

ADB's proposed financing for an IGCC plant in PRC will bring down the cost of electricity by 20% compared to the domestic financing

Financing approach to IGCC in India and PRC

(for illustrative purposes only)

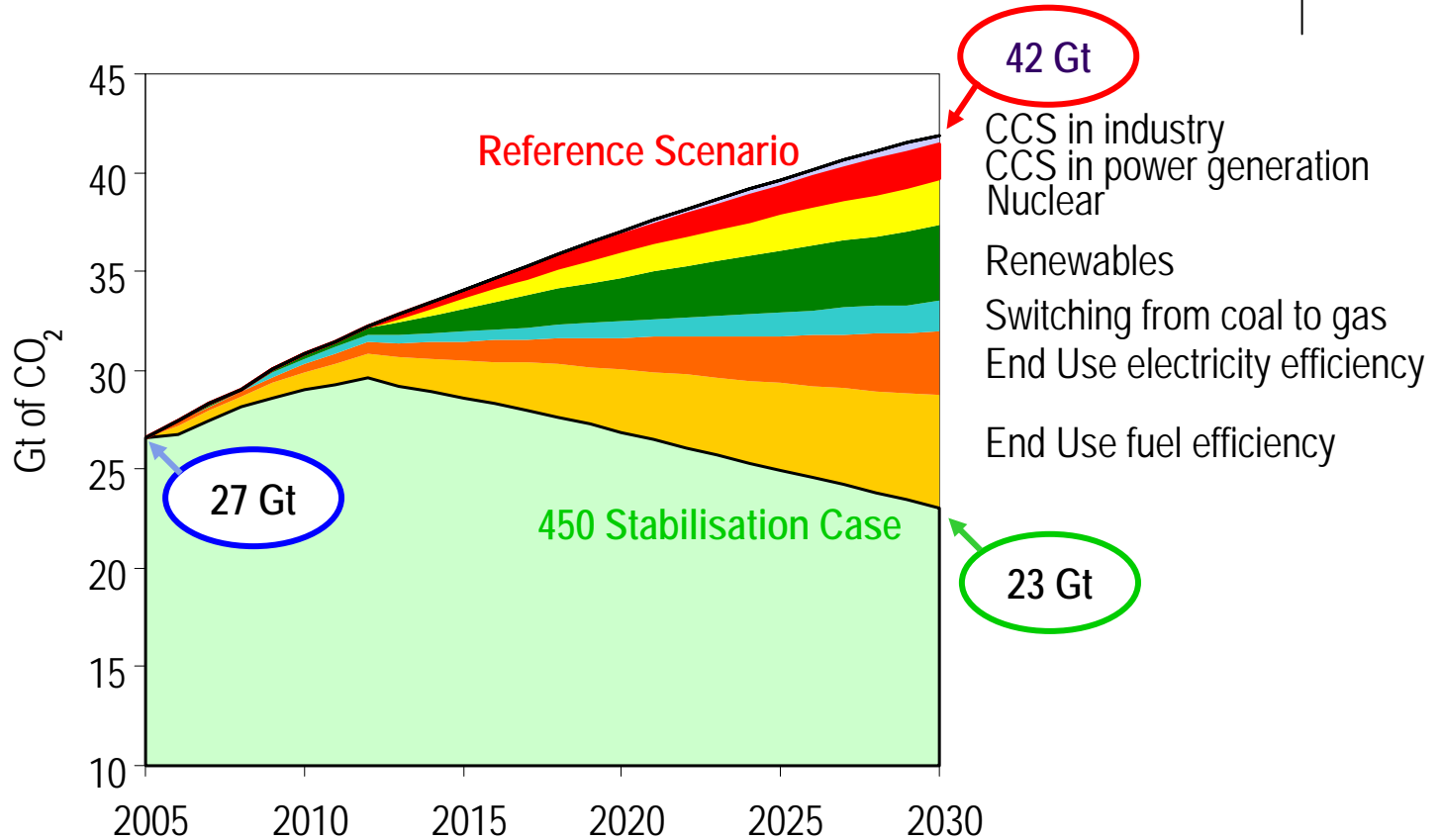


Concessional financing through Clean Technology Fund

Sub-LIBOR loan + 10% of loan amount as grant

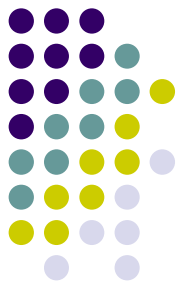


Energy related CO₂ emissions and CCS

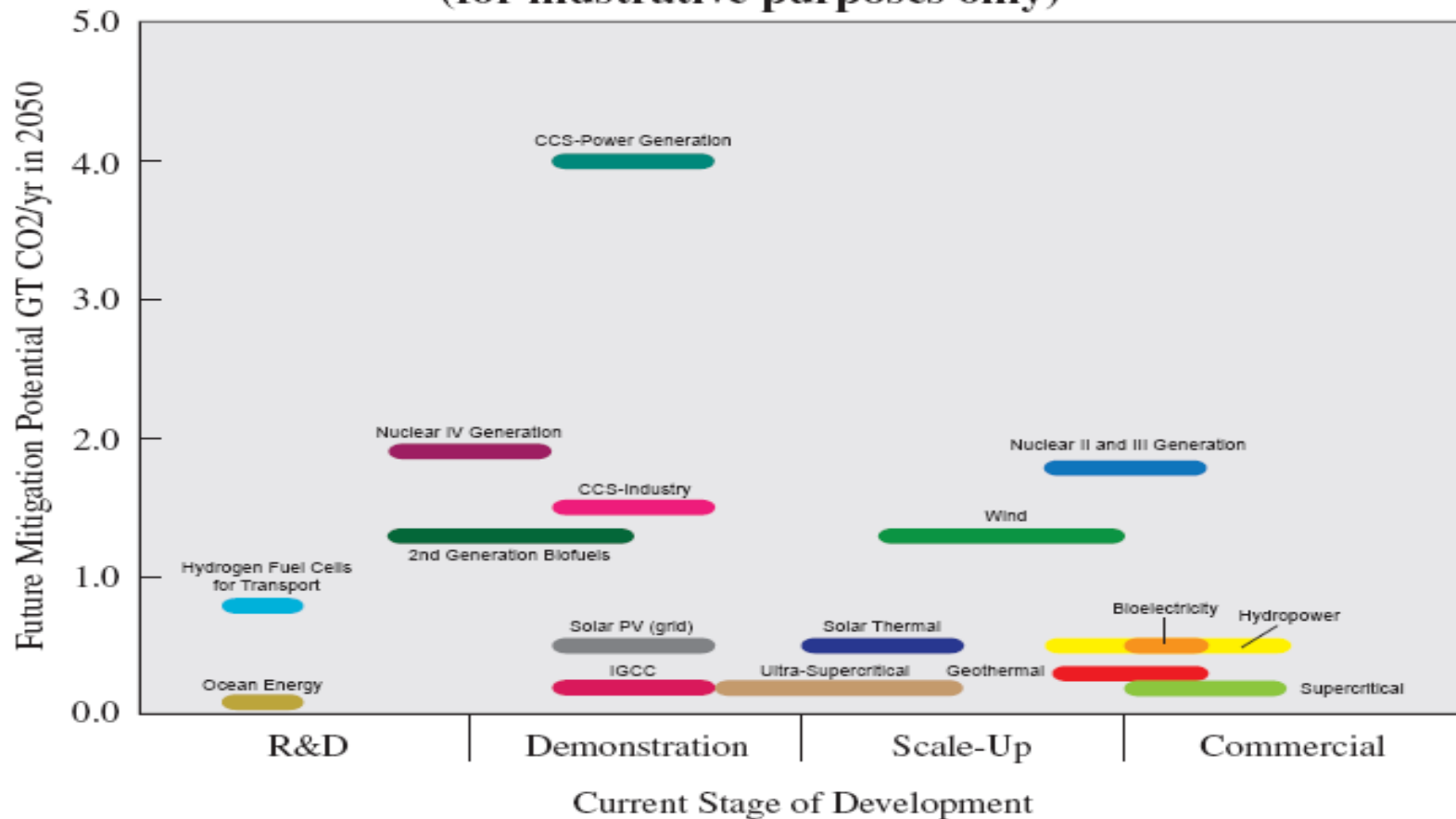


(Source : IEA - World Energy Outlook 2007)

Why CCS –power generation is important?



Future Emissions Reduction Potential and Current Stages of Technical Development for Selected Clean Energy Technologies (for illustrative purposes only)



Source: IEA “Energy Technology Perspective” and World Bank estimates

Relevance of CCS–power generation to PRC and India



- PRC and India are expected to add cumulative about 2,000 GW of new capacity by 2030; about 70% of which will be coal-based
- Electricity generation accounts for 50% of the CO₂ emissions; coal-based power plants are the main point source for CO₂ emission
- CCS-power generation is the most promising technology to reconcile coal usage with expected carbon constrained future

Recent international trends in CCS-power generation development



- **FutureGen, USA** – multiple IGCC-CCS demonstration
- **UK** – post-combustion capture on a commercial-scale power plant testing full CCS chain
- **EU** plans to complete testing 12 different CCS technologies in various capture, transport and storage set up
- NETL completed a desk **study on cost comparison** (US data) of different power plant configuration with and without CCS

By 2015, multiple CCS-power generation will be proven in the complete CCS chain

Looking ahead.....- key issues



- CCS technology is proven on smaller scale, challenge is commercial size, efficiency and technology availability
- No economic drivers / regulatory need. Carbon revenues may not be adequate and uncertainty beyond 2012
- Adoption of new technology is time consuming; urgent need to mainstream CCS as a carbon management option in the electricity generation to be “ready” when enabling conditions emerge.



CCS readiness – what ADB can offer ?

- Grant-financed TAs to :
 - develop a road map
 - provide support in capacity building to implement the road map
 - Mapping of CO2 reservoirs
 - feasibility studies preparation for an industrial-size demonstration project
- Low-cost financing for demonstration projects that will reduce the gap between - with and without CCS



Conclusions

- In the short-term, fast-track demonstration of IGCC is essential in India and PRC; suitable low-cost financing exist through MDBs
- CCS development should be inclusive with active participation and cooperative demonstration of projects in developing countries
- For CCS, critical need is to support upstream preparatory activities - analytical work, knowledge sharing, capacity building, setting up legal and regulatory regime

For further details

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