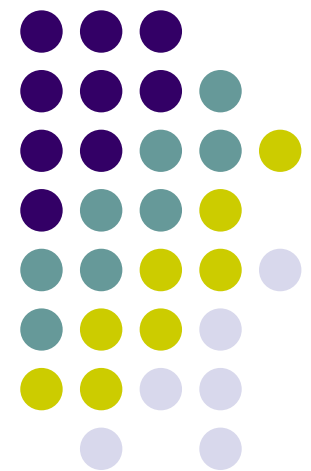
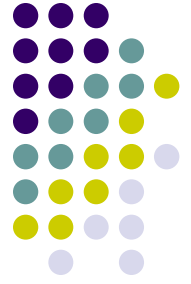


Making CCS Work - Financial Aspects

CSLF Roundtable Dialogue
Cape Town, 15 April 2008



Disclaimer



The views expressed in this presentation are the views of the ADB mission members and DO NOT necessarily reflect the views or policies of the Asian Development Bank, its Board of Director or the Governments they represent.



Introduction

- Asian Development Bank (ADB) is providing assistance to developing member countries (DMCs) of Asia –Pacific region for the past 41 years
- In 2007, ADB provided about \$10 billion assistance to its DMCs, including more than \$200 million in technical assistance grant
- Among its DMCs, People's Republic of China (PRC) and India are CSLF member countries
- ADB is registered as a stakeholder in the CSLF

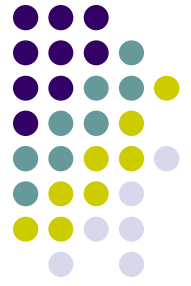
PRC and India in global energy scene

(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 will account for 60% of the global incremental CO2 emissions (2005 – 2030)

CCS –power generation and its relevance to PRC and India

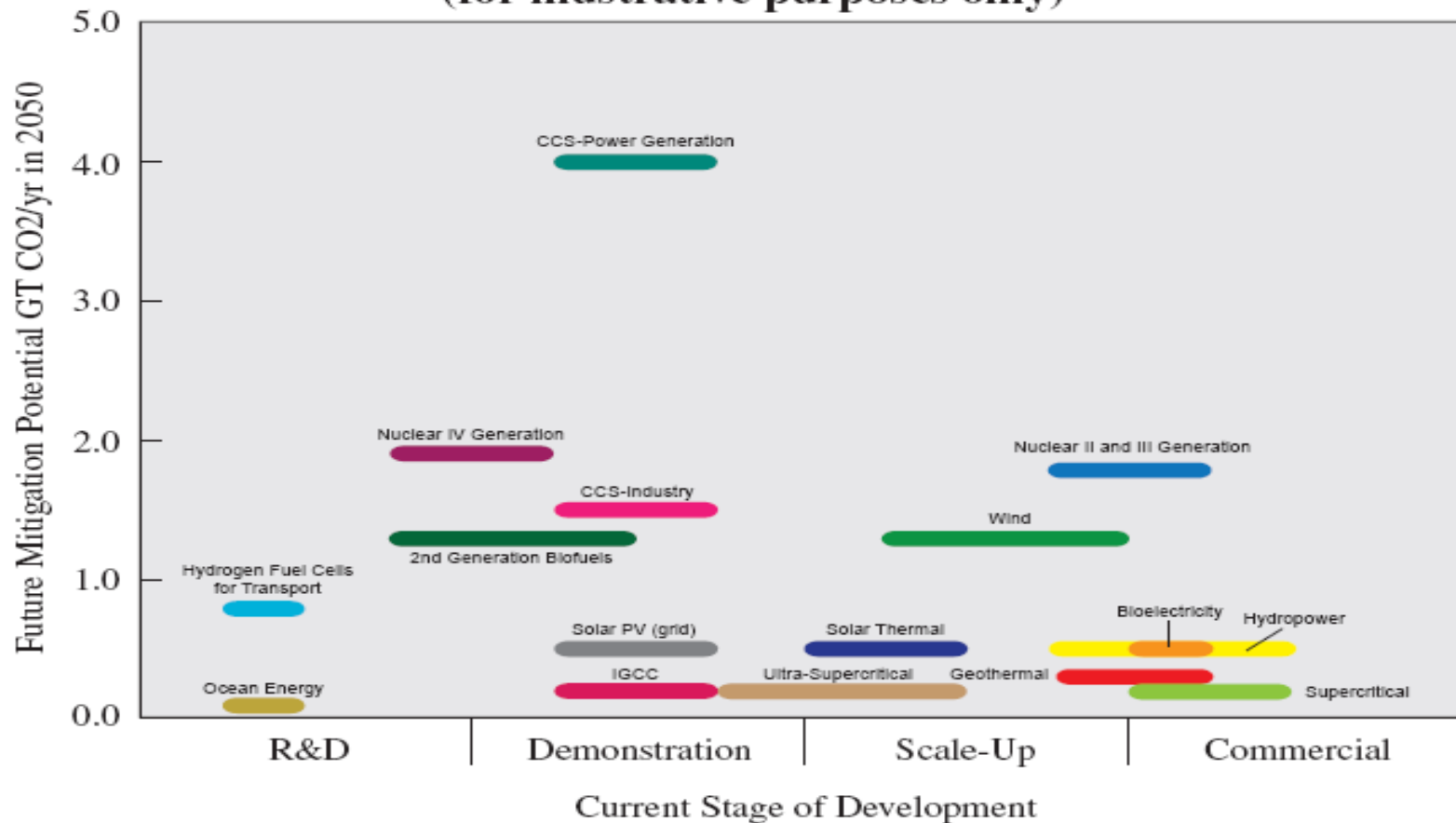


- PRC and India are expected to add cumulative about 2,000 GW of new capacity by 2030; about 70% of which will be coal-based
- Electricity generation accounts for 50% of the CO₂ emissions
- Coal-based power plants are the main point source for CO₂ emission. A 1,000 MW coal-based power plant would typically produce 6 million t of CO₂/ year.



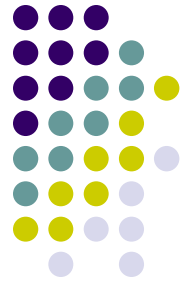
Why CCS –power generation is important?

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



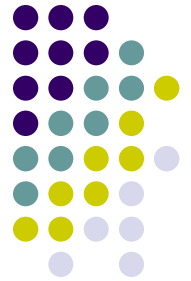
Source: IEA “Energy Technology Perspective” and World Bank estimates

But the CCS-power generation is still in early stages.....



- CCS is proven in production enhancement in oil and gas exploration fields, but at the moment, there is no commercial size coal-based power plant with CCS
- The recent international efforts are aggressively targeting CCS-power generation
- With suitable preparatory work, the time lag for CCS deployment in PRC and India can be minimized

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

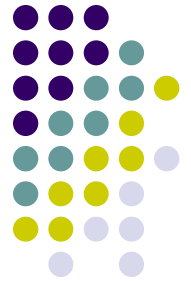
By 2015, multiple CCS-power generation will be proven in the complete CCS chain

Need for capture-ready power plants in PRC and India



- New generation stock progressively need to be made “capture ready” to ensure that later CCS retrofit is not prohibitive
- Currently an uncertain timeline for economic drivers or regulatory requirements for CCS application but... some essential measures are required
 - **technology selection** – IGCC, advanced SC and USC
 - **siting and sizing of new plants** – additional space and proximity to CO₂ sink

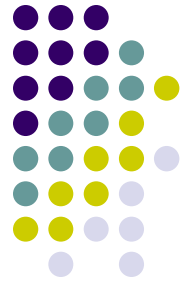
Readiness for capture-ready plants in PRC and India



- In PRC – super critical (SC) and ultra super critical (USC) are already in commercial operation; India has recently launched construction of SC plants
- IGCC is in the planning horizon in India; PRC is about to start construction of multiple IGCC plants (2x250 MW; and 2x400 MW)

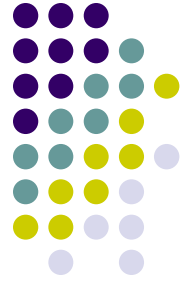
Capture-ready plants can be implemented with small incremental cost in PRC and India

Need to fast-track IGCC deployment in PRC and India



- **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 SC plants; the cost gaps are 50 – 80% for demonstration projects

IGCC demonstration in PRC and India - What ADB and MDBs can offer?

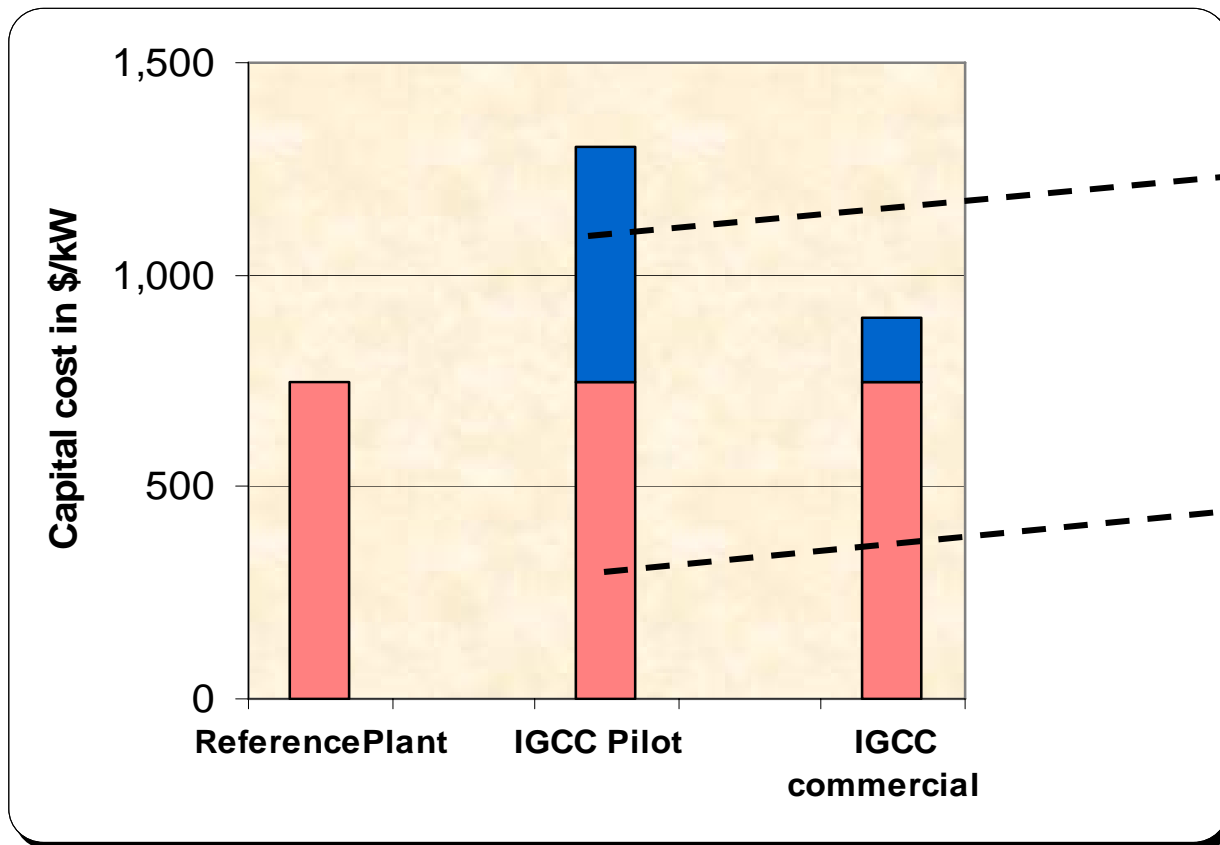


- **Grant financed technical assistance** (TA) to prepare detailed feasibility and institutional capacity building (\$2 million TA committed to India)
- **Tailored low-cost financing from ADB –**
 - Buy-down higher cost: ADB provides up to 10% of the loan amount as grant
 - sub-LIBOR interest rates,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

ADB's proposed financing for an IGCC plant in PRC will bring down the cost of electricity by 25% compared to domestic financing

Financing approach to IGCC in India and PRC

(for illustrative purposes only)



Concessional financing through *Climate Investment Facility*

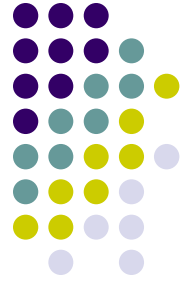
Sub-LIBOR loan + 10% of loan amount as grant

Looking ahead – CCS –power generation demonstration in PRC and India : key issues



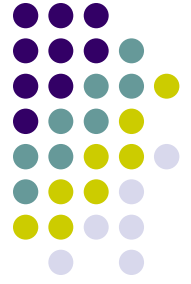
- CCS technology is proven on smaller scale, challenge is commercial size, efficiency and technology availability
- No economic drivers / regulatory need. Carbon revenues may not be adequate and uncertainty beyond 2012
- CCS application in electricity generation is a key strategic long-term need for coal-based economies of India and PRC.
- 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.

Key challenges in financing CCS - role for MDBs and policy makers



- In the current pre-demonstration phase, risks are too high for private investors, it will need support from Governments, and multilateral development banks (MDBs)
- MDBs like ADB can play an important role by providing finances, and risk mitigation products and can also leverage private capital flows by absorbing political and policy risks to give greater certainty to investors
- Butpolicy makers need to send a clear signal about their commitment and vision for low carbon technologies

Looking ahead for CCS readiness – what ADB and MDBs can offer ?



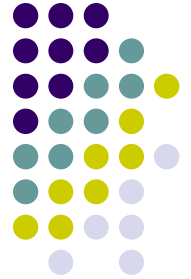
- Grant-financed TAs to :
 - develop a road map
 - provide support in capacity building to implement the road map
 - Mapping of CO2 reservoirs
 - feasibility studies preparation for an industrial-size demonstration project
- Low-cost financing for demonstration projects that will reduce the gap between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



Conclusions

- Fast-track globalization of CCS technologies is essential; developing countries need to be “ready”
- Critical need to support upstream preparatory activities - analytical work, knowledge sharing, capacity building, legal and regulatory regime
- Innovative low-cost financing exist from MDBs for demonstration projects but private sector participation will be crucial in the long term

For further details



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