Commercial Aspects of CCS Technology Deployment

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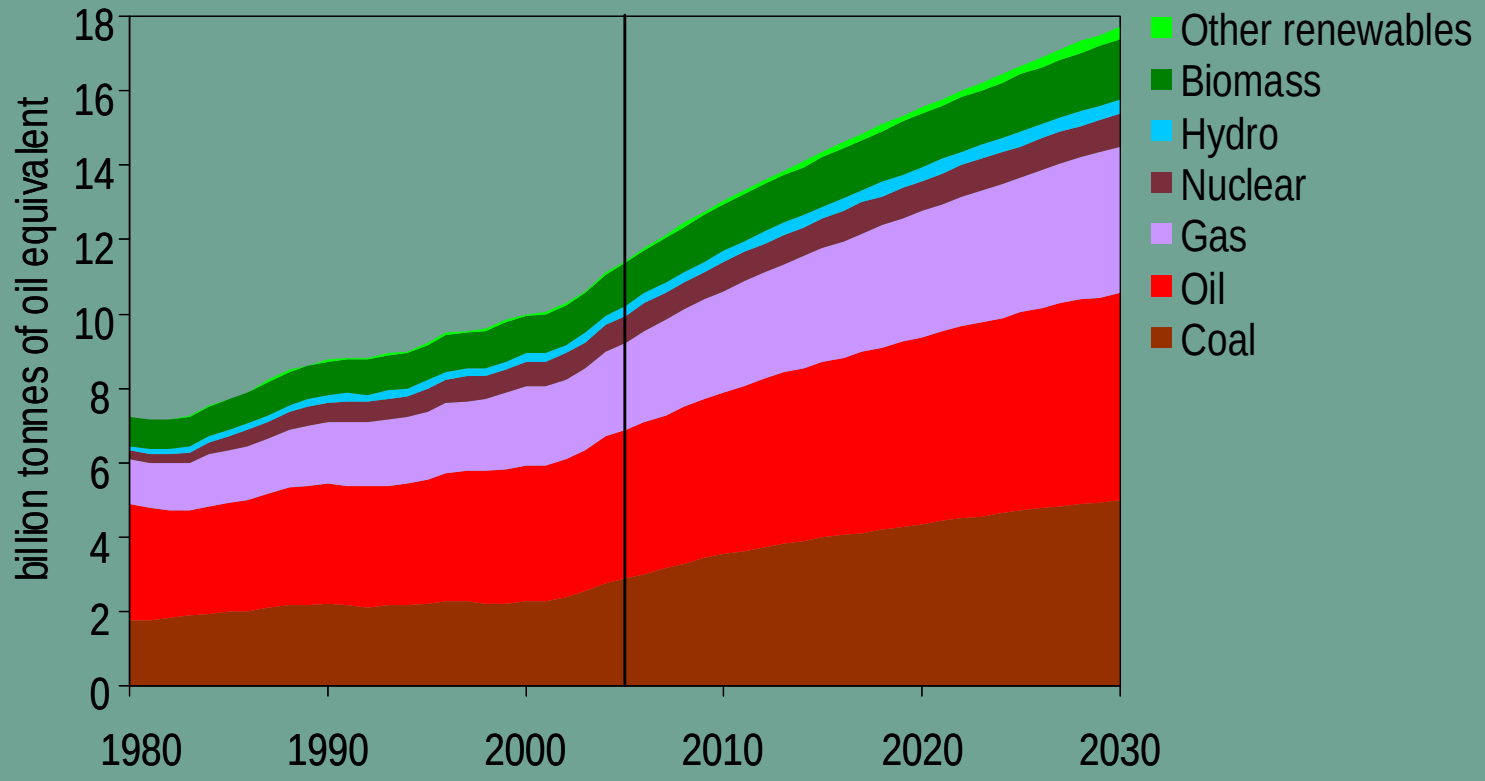
Introduction

- Asian Development Bank (ADB) is providing assistance to developing member countries (DMCs) of Asia –Pacific region for last 41 years
- In 2007, ADB provided approx. $11 billion assistance to its DMCs
- Among its DMCs, People's Republic of China (PRC) and India are CSLF member countries
- ADB is registered as a stakeholder in CSLF

World Primary Energy Demand



Global demand grows by more than half over the next quarter of a century, with coal use rising most in absolute terms

(Source : IEA- World Energy Outlook 2007)

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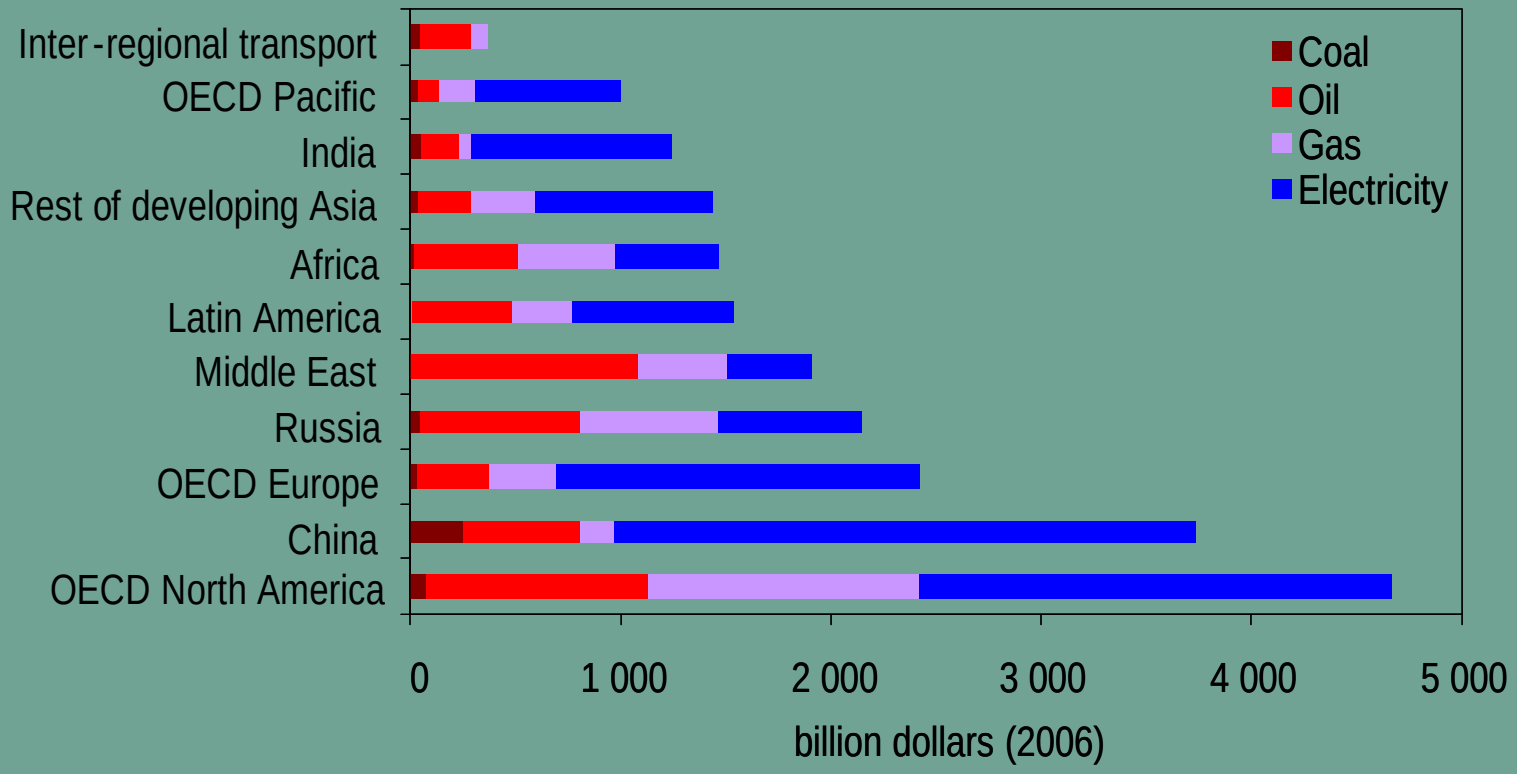
Business-as-usual Energy Use and Environmental Challenge

1. World's energy consumption is expected to increase by 50% in next 25 years with continued dependency on fossil fuel
2. At the end 2007, coal provided 25% of the primary energy needs and 40% of the World's electricity
3. Coal reserves estimate and current consumption rate suggests that it will outlive other fossil sources – oil and gas
4. GHG mitigation technologies are still to be commercially employed

Cumulative Investment in Energy-Supply Infrastructure, 2006-2030



Just over half of all investment needs to 2030 of $22 trillion are in developing countries, 17% in China & another 6% in India alone

(Source : IEA – World Energy Outlook 2007)

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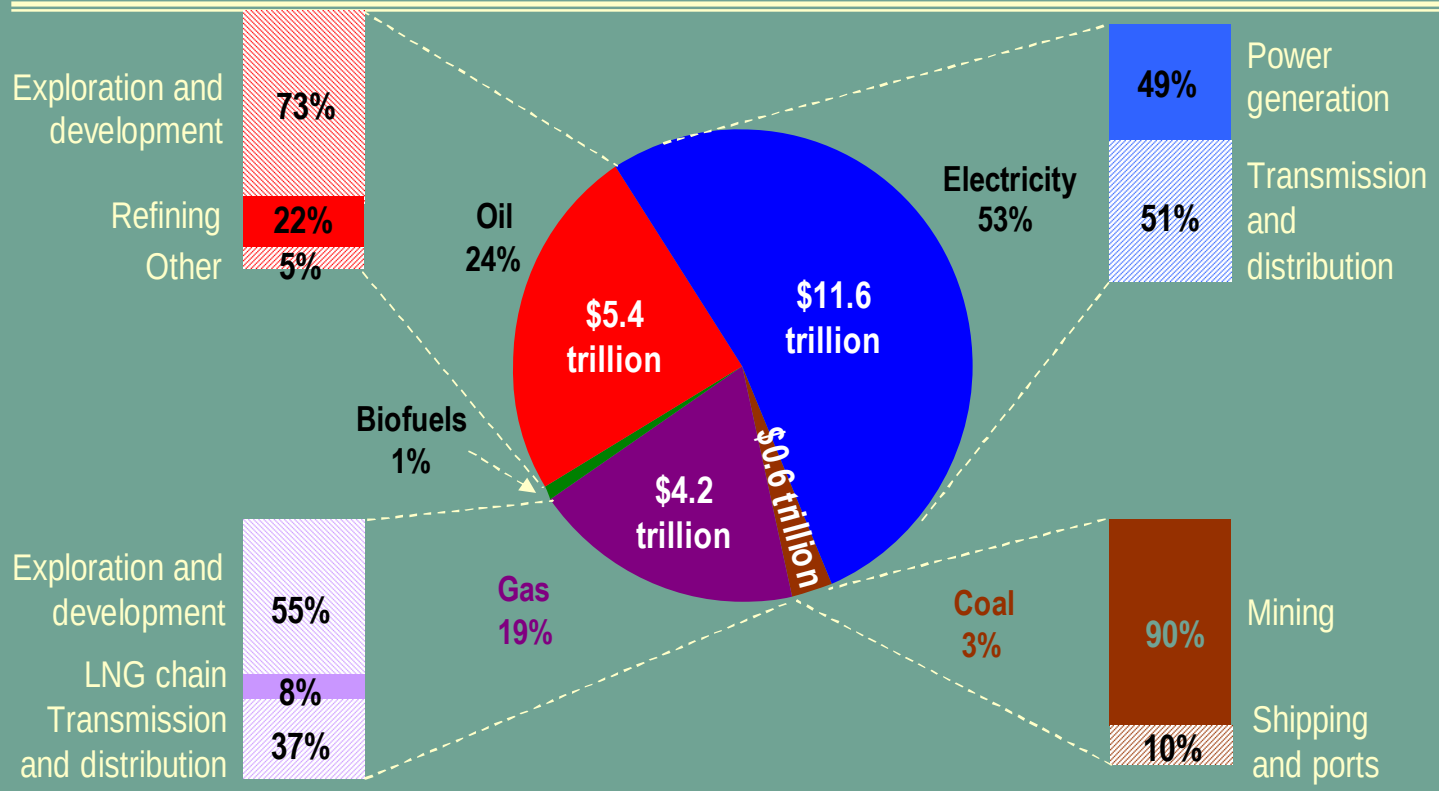
Energy Supply Infrastructure Investment (2006 – 2030)



Total investment = $21.9 trillion (in $2006)

Just over half of all investment needs to 2030 of $22 trillion are in electricity sector alone

(Source : IEA - World Energy Outlook 2007)

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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
- Need to lower carbon intensity of energy use, especially electricity generation

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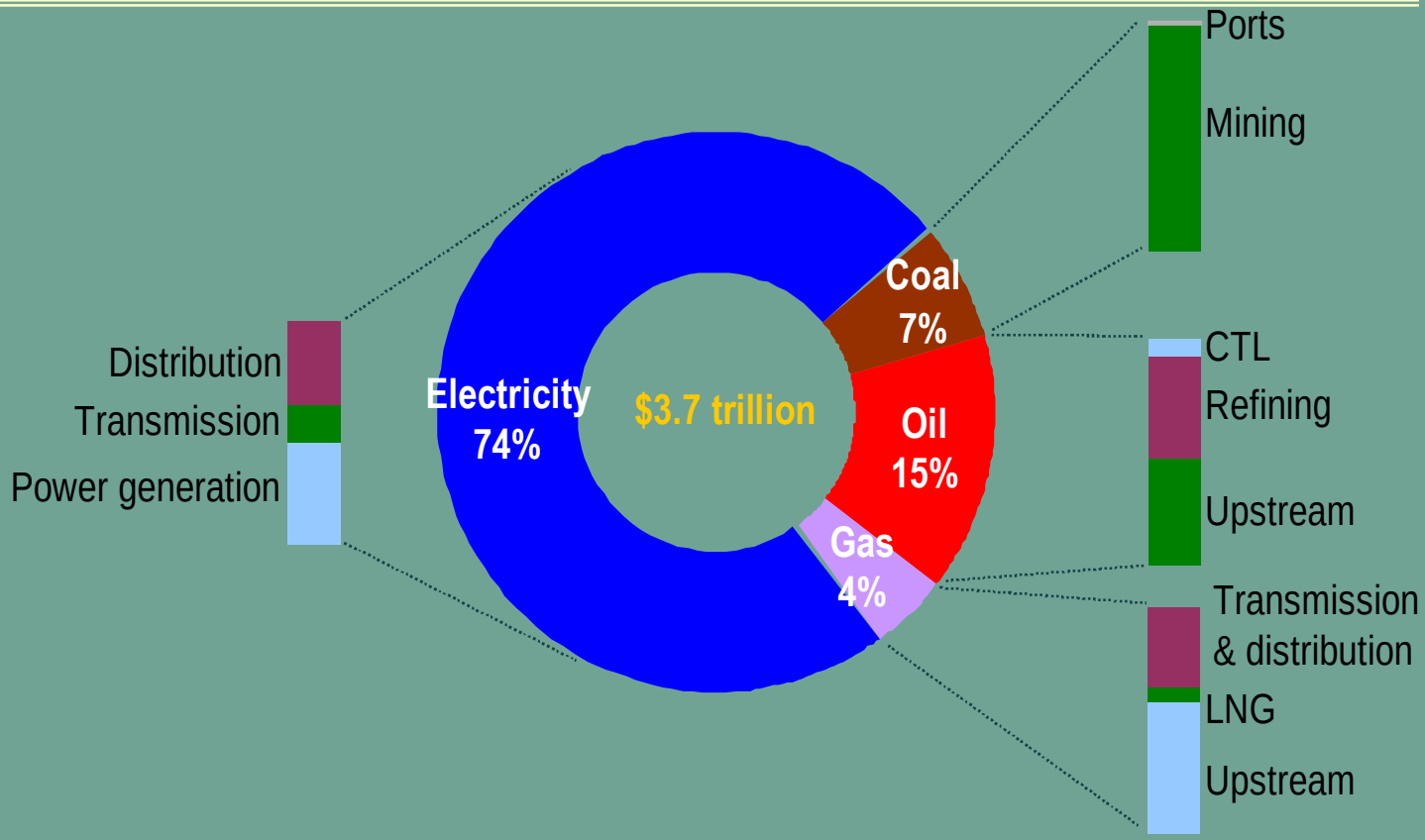
Cumulative Energy-Supply Investment in China, 2006-2030



China needs to invest $3.7 trillion in energy supply infrastructure – three-quarters of which for the electricity sector

(Source : IEA - World Energy Outlook 2007)

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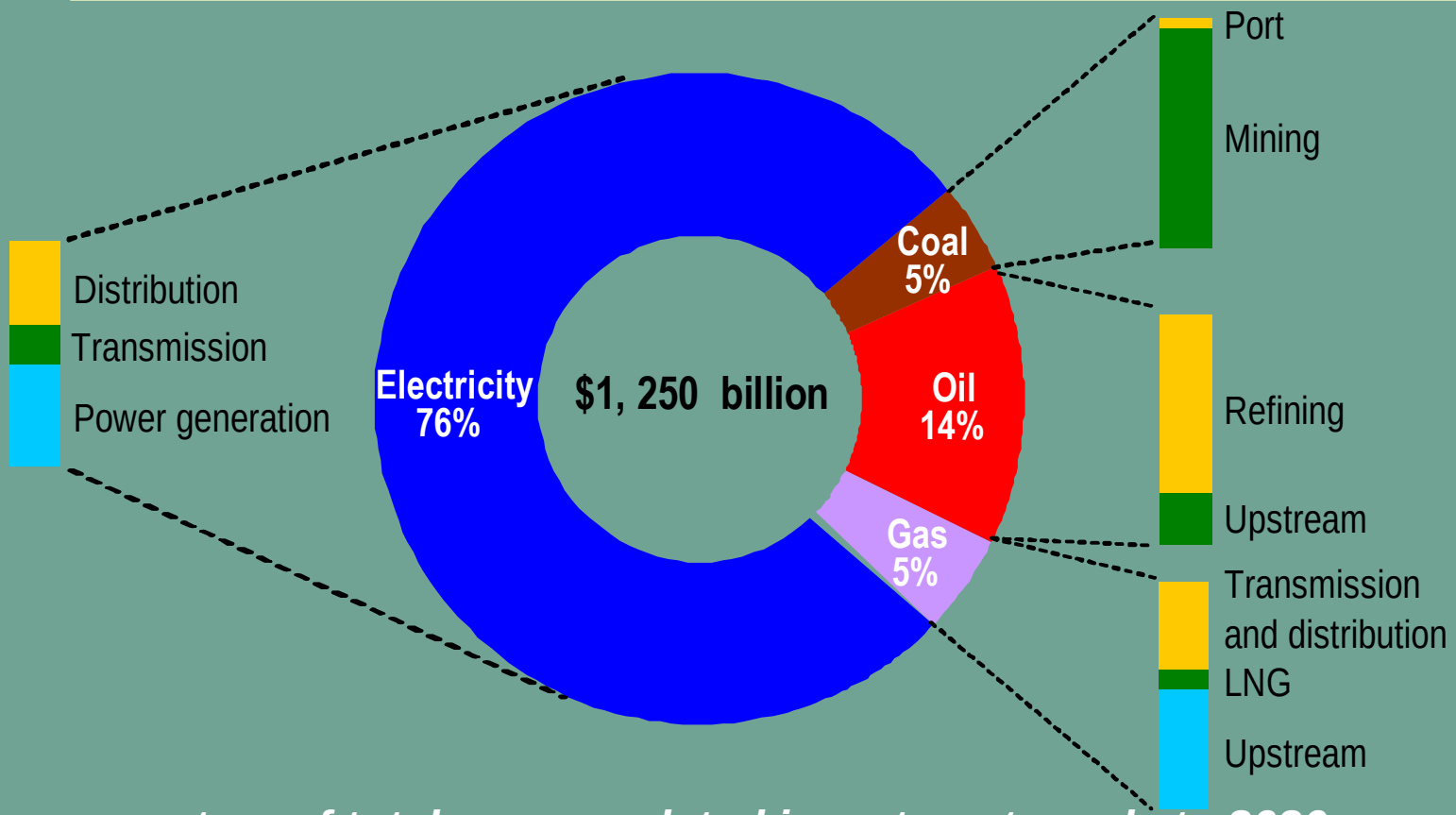
India's Investment in Energy Infrastructure, 2006-2030



Three-quarters of total energy-related investment needs to 2030 are for power infrastructure

(Source : IEA - World Energy Outlook 2007)

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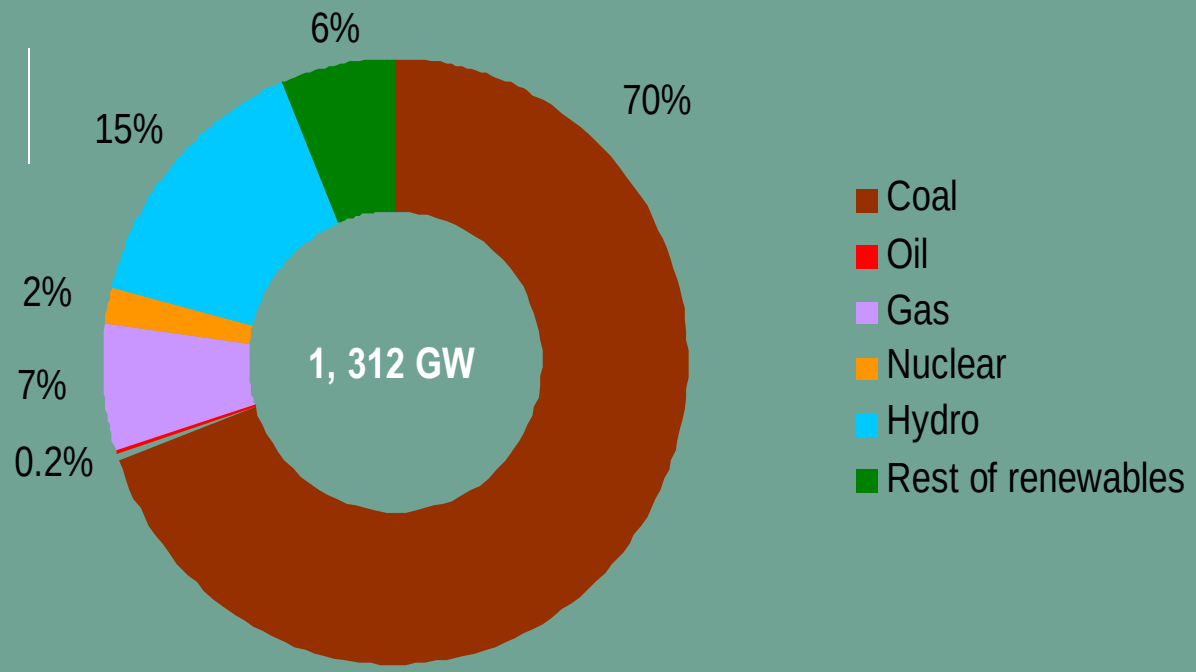
Power Generation Capacity Additions in China, 2006-2030



70% of the new generation capacity will be coal-based in China

(Source : IEA - World Energy Outlook 2007)

Opportunities for CCS in Power Generation in Asia

- 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.
- CCS is the most promising technology to reconcile coal usage with expected carbon constrained future
- Largest capacity addition is expected in next 20 years; PRC is expected to double its 2005 capacity by 2020

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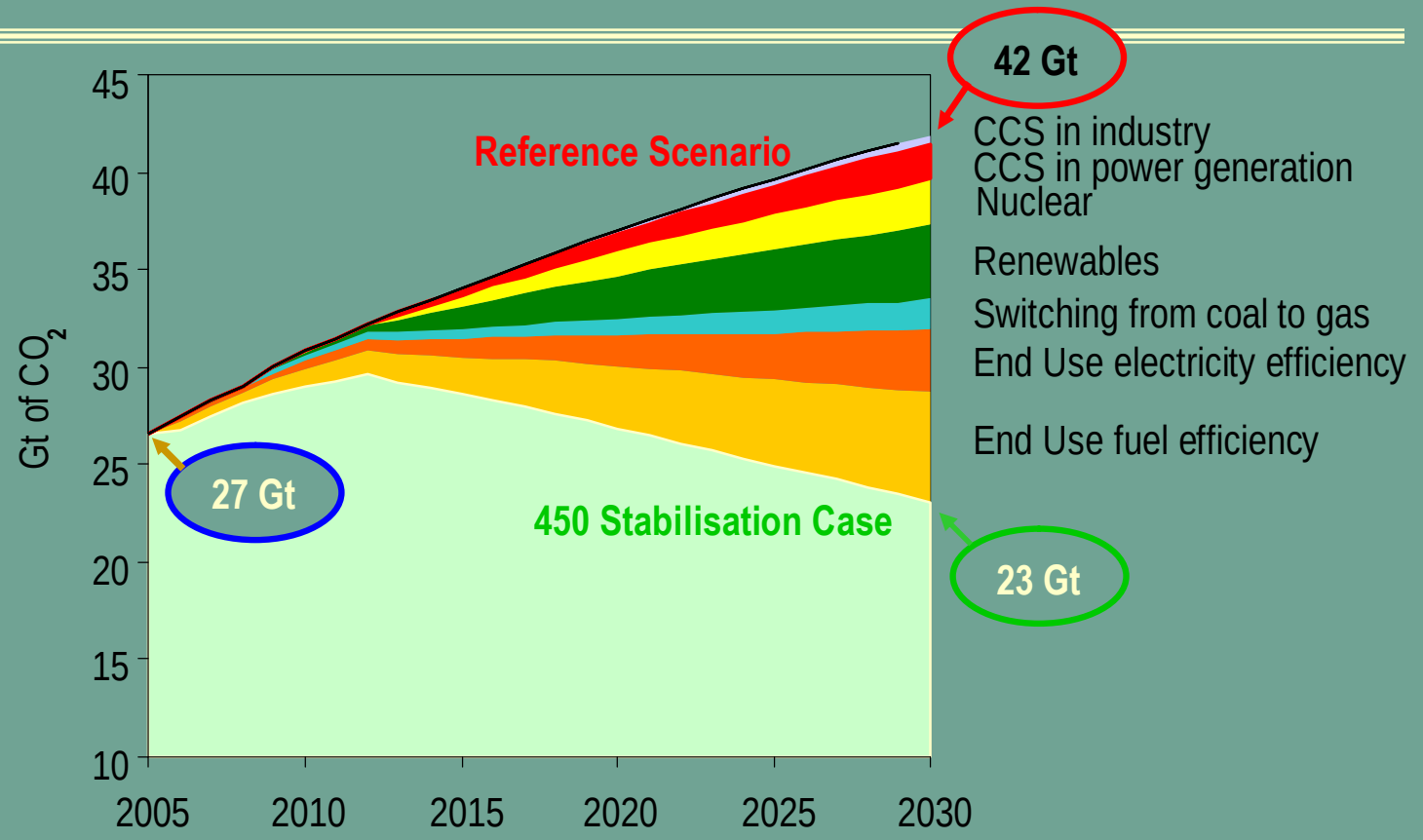
Energy related CO_2 Emissions



By 2030, emissions are reduced to some 23 Gt, a reduction of 19 Gt compared with the Reference Scenario

(Source : IEA - World Energy Outlook 2007)

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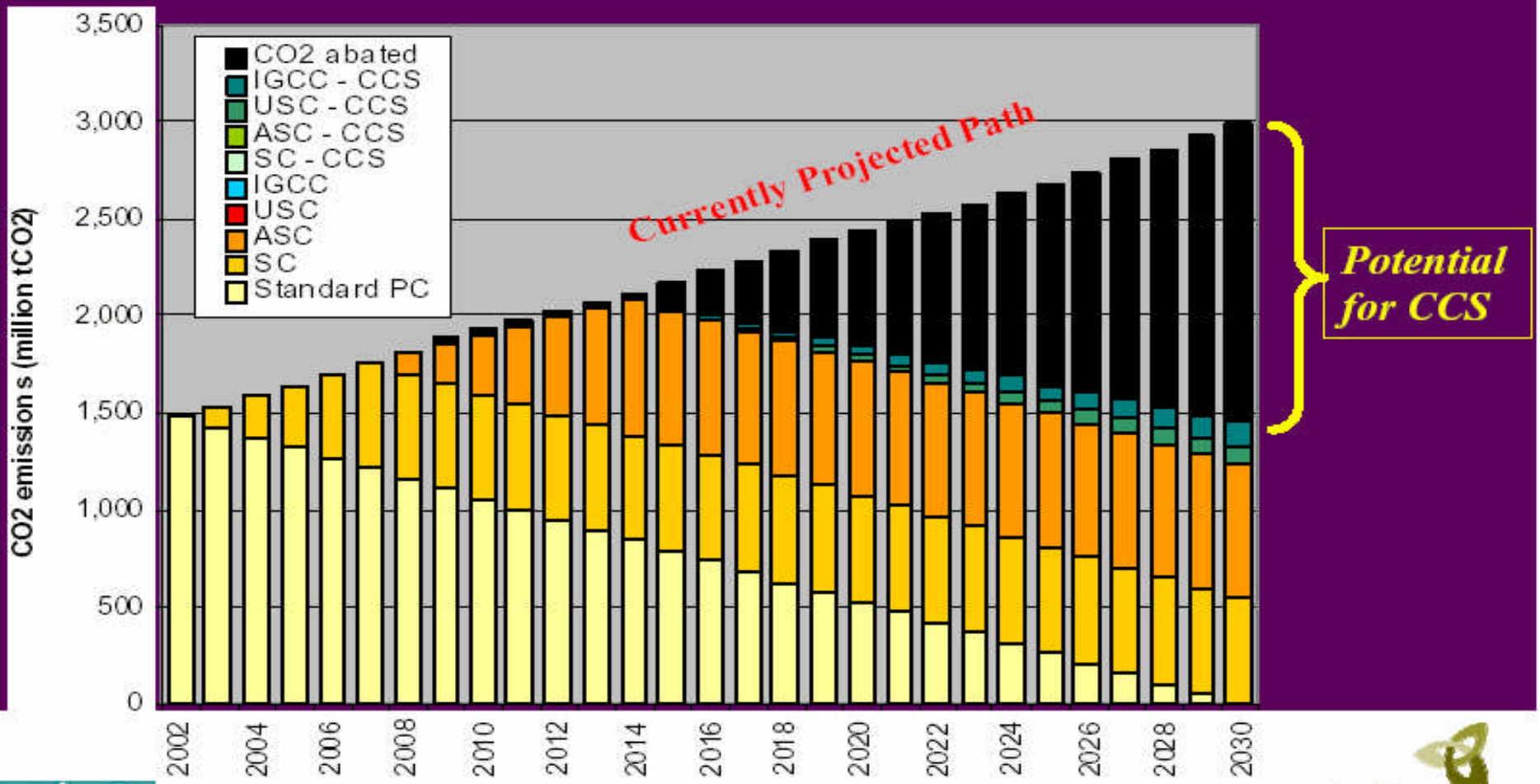
China Emissions from Coal fired Power showing potential of CO2 Capture and Storage (CCS)



Source: ERM report for DEFRA/DTI 2005

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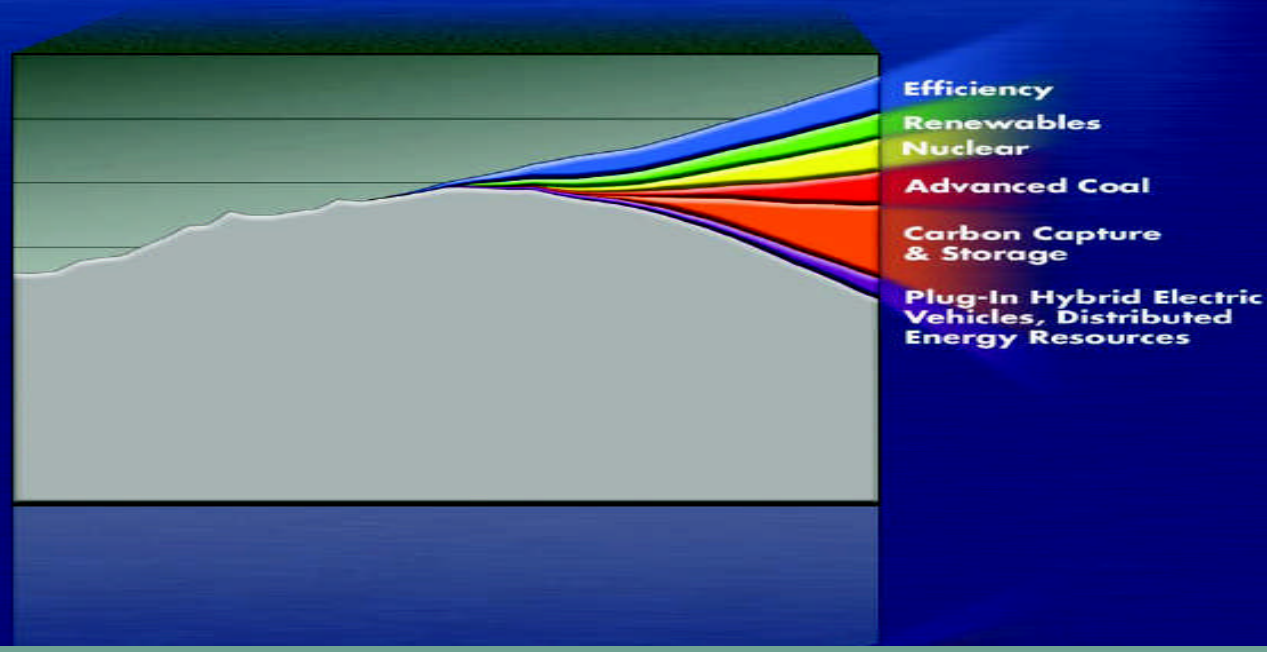
The Power to Reduce CO_2 Emissions

The Full Portfolio



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CCS Deployment in Power Generation in Asia - Issues

- Individual components of CCS technology proven on smaller scale, challenge is commercial size, efficiency and availability
- Obstacles to overcome: cost, technical risk, regulatory and legal issues, and public acceptance
- Lack of business architecture – storage business does not exist
- Mapping and matching of sinks and sources for cost optimization

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CCS deployment – urgent needs

- Development of a road map with clear destinations and performance targets
- New coal-based generation stock should seek higher efficiency and CCS readiness like – IGCC, USC and SC
- Learning by doing – industrial size demonstration plants to check viability of technologies, cost structure, risk assessment and possible mitigations
- Adoption of new technology is time consuming; urgent need to mainstream CCS as a carbon management option

Key challenges in attracting investments in CCS – Role for DFIs and Policy Makers

In the current pre-demonstration phase, CCS needs support from Governments, industry stakeholders and development financial institutions (DFIS)

DFIs like ADB can play an important role by providing finances, risk mitigation products, leadership and knowledge sharing to regional policy makers

DFIs can also leverage their capital resources more efficiently to increase private capital flows by absorbing political and policy risks to give greater certainty to investors

Policy makers need to send a clear signal about their commitment and vision for low carbon technologies

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ADB - CCS related activities

In PRC, ADB is considering participation in the first 250 MW IGCC Plant at Tianjin and future activities leading to an integrated IGCC and CCS plant by 2015.

In India, ADB is participating in the first SC plant, a private sector project and has signed a MOU with Gas Authority of India Ltd (GAIL) on possible CCS opportunities

For further details

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