

# Funding for Clean Coal Technologies

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Coaltrans – Clean Coal: Serving the Future

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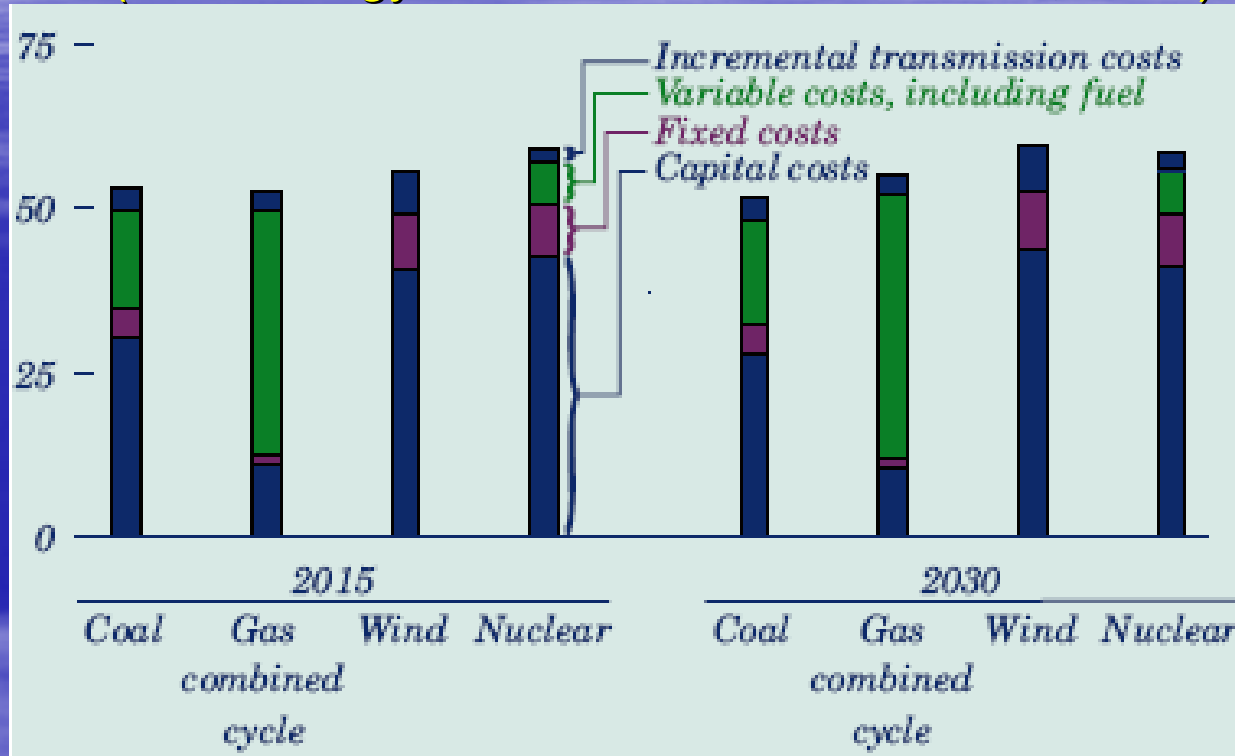
# Costs of Producing Electricity from New Plants, 2015 and 2030

(U.S. Energy Information Administration, 2006)

<i>Costs</i>	<i>2015</i>		<i>2030</i>	
	<i>Advanced coal</i>	<i>Advanced combined cycle</i>	<i>Advanced coal</i>	<i>Advanced combined cycle</i>
	<i>2004 mills per kilowatthour</i>			
<i>Capital</i>	30.34	11.33	27.78	10.76
<i>Fixed</i>	4.73	1.40	4.73	1.40
<i>Variable</i>	14.58	36.97	15.82	40.18
<i>Incremental transmission</i>	3.47	2.88	3.40	2.94
<i>Total</i>	53.12	52.58	51.73	55.28

# Least Expensive Technology Options Are Likely Choices for New Capacity

(U.S. Energy Information Administration, 2006)



- Technology choices for new generating capacity are made to minimize cost while meeting emissions standards – the least expensive option is almost always selected

# **How Much Money is Needed:**

*Worldwide - \$4 trillion for new power generation*

*\$439 billion for refurbishment*

*2001 – 2030*

*Will it be coal, natural gas or nuclear?*



*“Coal fired capacity additions over the period 2001-2030 will exceed 1400 GW. Nearly half of these new plants will be developed in China and India”*

**Source: IEA World Energy Investment Outlook**



## Technology

## Capital Cost (\$/KW)

Conventional Coal

800 – 1300

Advanced Coal

1100 – 1300

IGCC

1300 - 1600

Assume mid-ranges – IGCC is \$400 KW more than conventional coal

Source: Extracted from International Energy Agency World Energy Investment Outlook

*About \$560 billion dollars in incremental investment to build IGCC instead of conventional coal in India and China*



# How Much Money is \$560 Billion?

**\$18.6 billion per year for 30 years**

<b>Iran External Debt</b>	<b>\$16.8 billion</b>
<b>Disney Company Revenue for 2 Quarters</b>	<b>\$17.3 billion</b>
<b>Difference in global oil costs of \$10 barrel for 30 days</b>	<b>\$25.8 billion</b>
<b>General Motors 2005 loss</b>	<b>\$10.6 billion</b>
<b>Annual Revenue for Coke</b>	<b>\$20 billion</b>

# Where Will The Finance Come From?

- Not likely private sector investors
- Not likely from internally generated funds
- Not likely from current development assistance accounts

*New financial paradigms are needed.*

# Cost of Incremental Financing for Deployment of CCS Technologies

*Literature reviews indicate that while the availability of financing is noted as a barrier, rarely is incremental capital cost of advanced technology singled out as an issue*

In IPCC Report, section labeled “Barriers to Technology Transfer Between Countries”

*“...The capital costs of EST’s (environmentally sound technology’s) are generally higher than conventional technology.”*

*[Only reference to capital cost in entire section.]*

# Most Explanations “Miss the Boat” By Not Focusing on Higher Capital Costs for Advanced Technology

## Developing Countries Needs...

- Capacity building
- Investment-friendly environments, socially and environmentally responsible
- Technological leap-frogging
- Education and training
- Focus on local conditions

# Macro-Economic Parameters

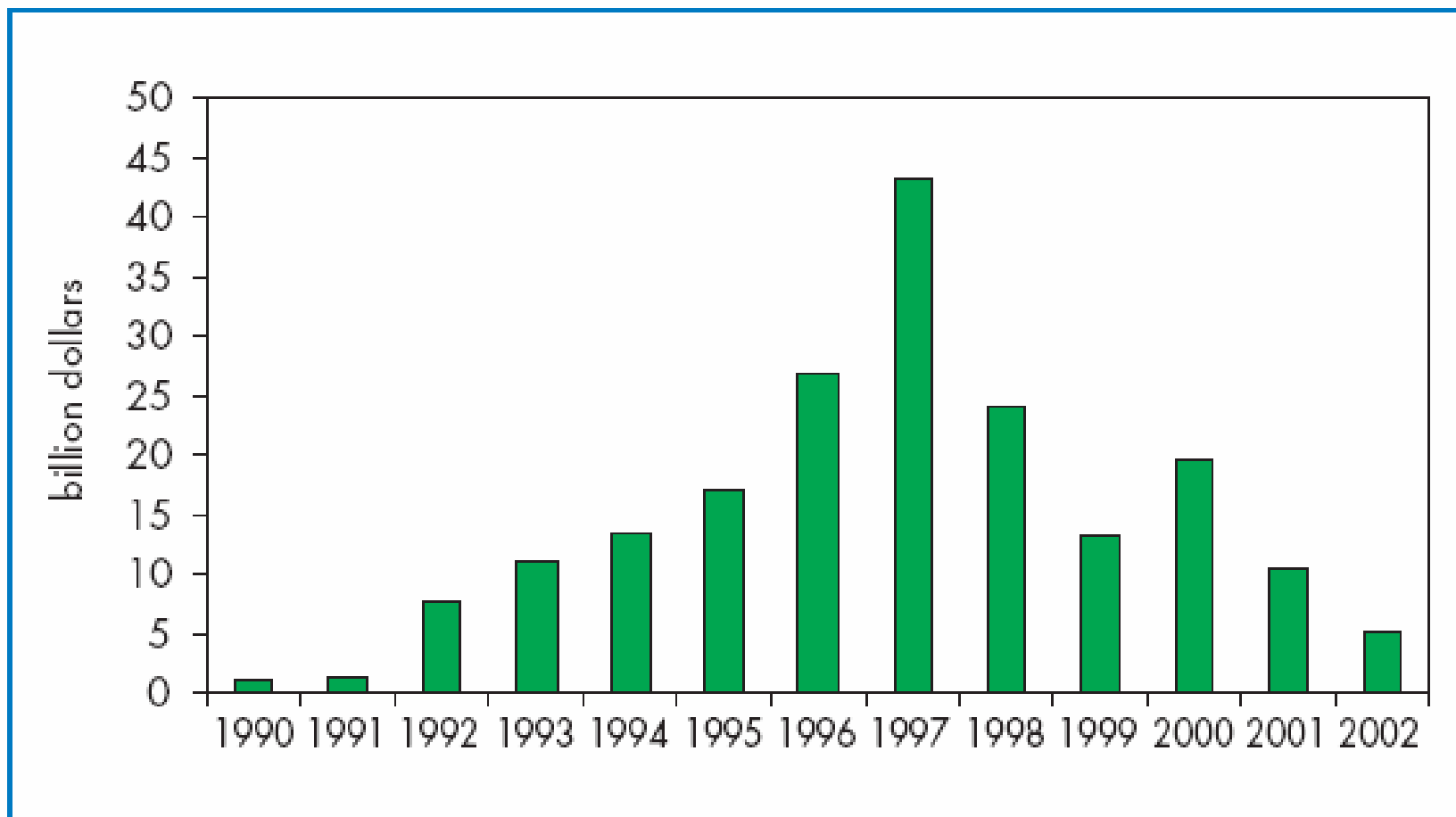
- Market Reform/Regulation
- Commercialization → Possible Privatization
- Encouraging Foreign/Private Investment
- Rule of Law/Property Rights/Contract Sanctity
- Institutional Structures
- Capacity Development

*None of these overcome higher capital costs of advance technology.*

*Most discussions refer to private capital, not official development assistance as solution to energy poverty.*

*Don't look to traditional U.S. electric power investors, i.e., IOU's/IPP's.*

*Figure 7.20: Power Sector Private Investment in Developing Countries, 1990-2002*



Source: World Bank (2003e).

# Existing Financial Instruments

- Loan guarantees or direct loans
- Tax exemptions/credits
- Direct subsidies, i.e., construction and/or production
- Emission credits
- Export credit insurance
- Ameliorate risk – political/credit
- Sovereign guarantees
- Capital cost buy-down

# Access Non-Traditional Financing for Power Projects

- Non-utility corporations, i.e., Berkshire Hathaway
- Insurance Companies
- Pension Funds
- Innovative Long-term bonds with delayed principal payout
- Break project financing into construction/operation
- Increased government/private sector coordination

# **Acceleration Strategies**

- **Demonstration Plants –  
Future Gen**
- **Tax Incentives**

# FutureGen Project

- Initiative to build the world's first integrated sequestration and hydrogen production research power plant
- \$1 billion project with goal of zero emissions
- When operational, will be cleanest fossil fuel burning plant in world
- Will utilize coal gasification technology integrated with combined cycle electricity generation and sequestration of carbon dioxide emissions



# Surge in U.S. Applications for Clean Coal Tax Credits

- Tax credit programs created by Energy Policy Act of 2005 lead to 49 tax credit applications submitted to USDOE for construction of clean coal and gasification projects
- 22 filed under the coal-based program in 19 states for integrated gasification combined cycle

# Concerns Over Financing Advanced Clean Coal Deployment

- Environmental Regulatory Uncertainty
- In regulated power markets disallowance of incremental costs – forcing lowest cost options
- Investor uncertainty
- Lack of access to capital
- Uncertain prices of future carbon credits
- Post Kyoto?
- U.S. policy shifts?

# Conclusion

- New models of trade assistance; development assistance needed to coordinate with private sector.
  - Clean energy technology export initiative
  - WSSD Outcomes
  - Global Development Alliance
  - Global Development Bonds

**Thank you.**

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