Power Sector Reform, Private Investment and Regional Co-operation in South Asia

David Newbery
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http://www.electricitypolicy.org.uk
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David Newbery, University of Cambridge

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http://www.electricitypolicy.org.uk
Messages

• Power shortages constrain development
• Problem lies with insolvent Discos
• IPPs without deep reform of SEBs fails
• Private investment needs solvent Discos
• Energy trade makes economic sense
• needs paying customers
  – and Energy Charter?
Shortfall of power in India

Source: Singh and Wallack 2004
India’s ESI performance (ICRA 2004)

• “the proportion of billing on metered basis at less than 50% of energy input into the system.”
• “… in the North East, the coverage … is very low and typically less than 35%”.
• for Delhi “the generation plants are aged and have a low PLF (48.5%) and low availability (62.2%).
• “AT&C losses of 52.8%”
• “The power sector as a whole has negative net worth … with a low cost coverage ratio of 43%”
Demand and load shedding in Maharashtra 1 March 2006

- Load shed
- Hydro
- From TCPL
- Central purchases
- Gas
- Thermal

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Why are there shortages?

• Is there inadequate capacity?
• or is the problem under-pricing?
  – Including failure to collect bills?

_The evidence suggests that India and Pakistan have above expected generation while other countries suffer low penetration._
Electricity Intensity SE Asia and comparators 1971-99

Source: World Bank Development Indicators

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Electricity Consumption v $GDP per head averages

Source: World Bank Development Indicators

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Electricity Consumption v RGDP per head averages

Source: World Bank Development Indicators and Penn World Tables

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Electricity consumption per $'000 (1996) PPP

- China
- Pakistan
- India
- S Asia predicted
- Sri Lanka
- Bangladesh
- Nepal
Electricity consumption and price 1993

- Market economies
- CEE
- Fitted to MEs

The graph shows the relationship between average industrial and domestic price per kWh and consumption kWh/$'000 GDP. The data points are scattered across the graph, with a trend line indicating a decrease in price with increased consumption.
Real Indian tariffs (US cents (2000) per kWh)

Source: IEA Energy Prices and Taxes
Cost of supply, tariffs and losses in India in constant US$

Source: Ranganathan, V. (2005)
Losses as percent of generation

- Pakistan
- Nepal
- India
- Sri Lanka
- Bangladesh
- Malaysia
- China
The problems

India:
- billing often less than 50% of generation
- SEBs making massive losses $4-5 billion p.a.
- early reformers (Orissa) failing
- problems with IPPs - Dabhol

• Bangaldesh
  - 1998: BPDB uninterrupted supply only 49 days,
  - 25% peak power unserved, PLF 55%, availability 77%

• Pakistan
  - KESC losses doubled 1990-2000 to 40%
  - problems with IPPs - Hubco
Obstacles to private investment

• Sunk investment supplying essential service
  – need assurance on returns, but SEBs bankrupt
  – sovereign/credit risk => high WACC, short loans
  => high capital charge (=> CCGT but LNG price volatile) =>
     PPA cost > SEB tariff => stress on SEBs

• Pakistan: standardised agreements helpful, but
  Hubco: oil-fired (exchange rate risk)
  – 1998 tariff dispute resolved 2001

• Bangladesh: success with CCGTs and cheap gas
  – AES sells out to Globaleq
Requirements for IPPs

• Confidence that investment is least-cost choice
• Necessary contracts (PPA, fuel, sovereign guarantees) will be upheld
  – stable macro/exchange rate regime
• Legal disputes settled fairly and quickly
  – international arbitration not blocked by injunctions
• Solvent commercial distribution companies
• Open access to large customers can help
  – Indian *Electricity Act 2003* useful here
Special problems of IPPs in India

- **choice:** CCGT on LNG
  - low capital cost, quick build
  - India is marginal LNG importer, _BUT_
- gas prices held down from pre-import days
- back-up fuel heavily taxed
- LNG prices volatile => variable merit order
  - average cost of electricity goes up more than fuel
  - CCGT needs to be designed for mid-merit running
The Enron Dabhol CCGT

- 1992 India opens up ESI to FDI
- officials visit USA to encourage investors
- Enron proposes LNG terminal + 3 x 770 MW CCGT at Dabhol, 180 km S of Mumbai.
- 1993 PPA signed, 1995 renegotiated
- “Payment problems with MSEB, however, prompted Enron-backed Dabhol Power Corporation (DPC) to serve notice of breach of contract on MSEB in May 2001. Construction on Phase II was halted in June 2001.”
- July 2005 settlement of arbitration, transfer to MSEB
- May 2006 planned restart of Ratnagiri block 1 (delayed?)
Power costs from Ratnagiri

- initial cost “likely to be around Rs 4.25 ($55/MWh) ... and not be more than Rs 5.70 ($125/MWh)” (March 2006)
- Power from NTPC = Rs 7.25 ($160/MWh)
- May 9 2006 price of naphtha = $20/mmBThu
- Global price of LNG = $8-12/mmBthu
- Heat rate = 7000/kWh
- $140/MWh on naphtha, $64-84 on LNG
- Still 4 times early 1990s when deal struck
Fuel prices US$ per million BTU

India chases IPPs - LNG looks attractive
LNG Import prices

IEA Energy Prices and Taxes, BP 2005
Gas and Oil prices at NBP and German Border

Source: Platts, IEA
Weekday moving 24 hr av coal and gas generation Britain 1 Oct-9 Dec 05

Source: NGC, Platts
Financing Investment

- **FDI:** advantage: best practice, bears capital cost risk
  - disadvantage: high cost finance
- **Self-financing of generation investment**
  - possible *if* prices cost reflective and earning 10% real return can finance investment growth of 10%
  - *if* installed base valued at optimal deprival value
  - *and* supported by local loan finance and forex

*Then less need for FDI in generation*
‘Enterprising’ distribution companies

• Problems:
  – discos bankrupt, inefficient, lack proper management control
  – Cost-reflective regulation difficult with high losses

• Privatisation might solve this
  – but without cutting losses and improving regulation sales value may be very low

=> *Discos must become proper enterprises*
  – decisions guided by costs and benefits, not rules
Privatising Discos

• Can Discos be transformed into enterprises before privatisation?
  – Or is the only solution privatisation to drive reform?

• Chile examples promising
  – losses reduced, bills collected
  – but Orissa was disappointing

*Credit-worthy discos essential for IPPs*

*Privatisation needed to sustain reforms*
A South Asia Energy Charter?

• Advantage of treaty obligations
  – security for cross-border infrastructure investment
  – but still need credit-worthy counter-parties

• European Energy Charter
  – signed by 51 countries 17 Dec 1991
  – legal safeguards for investment, transit and trade

• EU Accession stimulated FDI in central Europe
  – because they had to accept the Energy Directives
Role of energy trade

• SAFTA Agreement signed 6 Jan 2004
  – but progress slow

• Potential for beneficial energy trade large
  – Bangladesh has cheap surplus gas, India is importing expensive LNG
  – cheaper to move gas than electricity to Delhi
  – Burma-BD-India pipeline might reassure BD?
  – Iran-Pak-India gas pipeline cheaper than LNG?

• Grid connections to allow cheap hydro from Bhutan and Nepal to flow to India
  – would support investment in hydro there
Energy trade

- Nepal hydro potential = 43,000 MW (244 MW developed)
- 750-MW West Seti scheduled 2005 - exports could contribute $96 m to GDP rising to $1.51 billion by 2027
- Bhutan's hydropower potential = 16,000 MW, CHPC (hydro) earning > 40% of Govt revenue
- Exports in 1995-6 1,564 GWh, projected to rise to 6,400 GWh in 2006 when the 1020 MW run-of-river Tala Hydroelectric Project Authority (THPA) is commissioned
- regional grid could avoid investment need of $80 million
- Pakistan’s royalties from transiting gas from Iran to India could be $600 m
Conclusions

• 1990s- disillusionment with SEBs
  – shortages, inability to finance investment
=> bring in IPPs without reforming SEBs
  => tensions, financial distress, losses continue
• Reform discos to make them commercial
  – then privatise to sustain reforms
  – Open access to large customers helps generators
• Energy Charter overcoming political resistance
to energy trade would also help FDI
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