Power Sector Reform
India – The Long Road Ahead

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Outline

- Overview of the Indian power sector
  - Structure
  - Performance
    - Drivers for reform
- Reform steps
  - Mechanisms and modes
- Analysis
- Conclusions
India: A Divide Within

**Bihar includes Jharkhand for some data**
*Uttar Pradesh includes Uttaranchal for some data*

*Calculated and compiled from various official sources*
Pre-Reform (1991) Structure

- SEBs (State Electricity Boards) were responsible for power supply
  - Govt. Departments
  - Vertically integrated monopolies
    - Most of the Distribution
    - Much of the Transmission
    - Significant fraction of the Generation
  - Supposed to earn 3% RoR on Asset Base

Source: Dubash (2002)
Indian Power Scenario - Overview

Installed Capacity ≈ 105,000 MW
- 1,500 MW in 1950
- 4th largest in the world (estimate – varies because of captive power)
- Coal is the predominant fuel
- Gross generation of 515 billion kWh in 2001-02

- Per capita consumption ≈ 360 kWh
  - World Average ≈ 2,200 kWh

- 90% villages electrified
  *BUT*, < 40% of rural houses connected

- 10,000 - 15,000 MW annual growth needed
Not Enough Paying Consumers: Mismatch in Consumption & Tariffs (2001-02)

Consumption
≈ 315 Billion kWh

Prices
239.9 ps/kWh (Average)
≈ 5.00 ¢/kWh

Source: Planning Commission
The Bottom Line

- “Cost of supply” is Rs. 3.50/kWh, realization only Rs. 2.40/kWh
  - Much of the electricity is sold below cost (and some well above cost)
  - Much of it is unaccounted for
    - High T&D losses (~30%)
      - Technical – 12-15% (?)
      - “Commercial” =Theft – 15-18%
  - US losses are 8-9% only

- Utilities are bleeding money
  - Returns calculated as –30 to –40%
  - Losses (excluding $1.5 B subsidy) are approximately $4 billion
Utilities Pay for Politics of Agricultural Tariff

- **Agriculture**: 30% consumption; < 5% revenues
  - Industry bears the brunt – cross subsidy
    - They move to captive power, hurting the current system more

- **Subsidies are growing**
  - Not completely covered by tariff increases, government subsidy & cross subsidy

- **Irrigation pumps not metered**
  - Wasteful consumption
  - Inefficient pumps
  - Illegal connections

- **Intermittent & poor quality supply**: 6 – 9* hours/day
  - Farmers may be willing to pay for regular & good quality power
The Reforms

Opening up Generation (1991)
- Paralleled overall reforms and liberalization in the economy
  - Triggered by a Balance of Payment Crisis
  - Change of Central Government
- Generation was opened to private participation
  - 8 “Fast Track Projects” were chosen, including Enron’s Dabhol
  - IPPs encouraged through attractive norms
  - PPA-based tariffs (often, no bidding)
  - Main regulation was through CEA (techno-economic clearance)
- Why the focus on generation?
  - Easy to implement (states already had “outside” suppliers)
  - Worldwide trend
    - Players and structure (rise of IPPs)
    - Rise of natural gas combined cycle power plants
- Limited capacity added
  - Private power was much more expensive than SEBs own power
The Reforms (cont.)

- **Structural Changes (mid 1990s)**
  - Establishment of independent Electricity Regulatory Commissions
  - Came, like most changes, under legislative cover
  - Intent to unbundle the SEBs
  - Some states began in the mid nineties; Center reformed in 1998
    - Began even before realization of shortcomings of generation reforms
    - Significant push from Multi-Lateral Agencies

- **Distribution Reforms (APDRP) (2001) ** *Current Thrust*
  - Consensus realization that without fixing distribution, all other reforms will “throw good money after bad”
  - Significant funding available
    - About $1.5 Billions dollars per year - Mix of grant and loan, and some domestic development body funding
  - Combination of carrots and sticks (from Center to States)
PSUs, Government, and ERCs

Source: CERC
Electricity Regulatory Commissions (ERCs)

- Are key to the reforms
  - Set tariffs (bulk supply as well as retail)
    - Separates price-setting from operations
    - Any tariff-driven shortfall must be met through explicit government payments

- Central and State ERCs
  - States’ purview is for all purely in-state transactions
  - Diminishing the role of the CEA to technical approvals

- ERCs are reasonably independent
  - Minimum 55 years age requirement – Commission members often have a govt. background
    - (?) a negative as it perpetuates business-as-usual mentalities
ERCs (cont.)

- Utilities attempt to ignore their orders
  - Often are challenged in court
    - Especially by govt. bodies or SEBs
    - Have won virtually all their cases

- Their *Tariff Philosophy* remains important
  - Have disallowed large hikes for some classes of consumers
  - Make (sometimes untenable) assumptions
    - E.g. on simultaneity of loads

- Aggressively pushing for loss reduction
Modes of Structural Reform

- Most restructuring is through unbundling and corporatization of the SEBs
  - GenCo
  - TransCo
    - Single Buyer
  - DistCos
    - Based on geography
- End-game is privatization (sequential reform is perhaps politically easier)
- Many models of reform available
  - Reforms do not necessarily mean markets
  - Where would competition come in?
    - Generation (wholesale competition) – limited success
    - No retail competition
    - Auctions for privatizing distribution companies (or other assets)
State Reforms – Three Examples

- **Orissa – The Front Runner (1996 Reform Act)**
  - Unbundled and then privatized distribution
    - Strong World Bank influence (design and finance)
  - Considered a failure - Consumers and utilities have both suffered
    - Losses (kWh and economic) both increased
  - Many causes of failure
    - Unrealistic assumptions and goals
      - Losses
      - Paying Customers
    - Lack of government support
  - Dampened enthusiasm for reforms, especially privatization
State Reforms (cont.)

- **Andhra Pradesh** – Seen as one of the most successful reformers (1999 Reform Act)
  - Corporatization only (privatization is some time away)
  - Strong Govt. support
    - Shortfalls are paid by AP Govt. (budget) – paid out to DistCos
  - Some issues with the process
    - ERC allows Transco to charge varying Bulk Supply Tariffs to the 4 DistCos, based on their economic situation
      - Not grounded in economic efficiency
      - Burdens privatization efforts
- **Delhi** – Innovative - Learning from past mistakes (2000 Act)
  - Distribution was privatized (in 2002) based on *loss reduction bids*
    - Improvements above targets split between pvt. companies and consumers
    - Indicates importance of **benchmarking** for privatization
  - Transco will receive the subsidy to cover difference
Unbundling – Increases Accounting Transparency

Present (est.)

Future (hypothetical)

Unbundling “forces” profitability – raising costs
What Reforms Don’t Address Directly

An institutional framework for economic success, regardless of ownership/mode, must send correct price signals

- Virtually no time-of-day prices today (generator or consumer)
  - Without a load duration curve, all generators want to operate as much as they can
    - Plant load factor is a dangerous measure of performance
- In-state (SEB) plant is today priced differently
  - Internally see marginal costs vs. Average costs from outside
  - Different regulations (center vs. State ERCs)
- RLDCs vs. Transco – how should dispatch be handled?
  - PPAs as currently being undertaken reduce economic efficiency
    - Long life
    - High offtake requirements
    - No accounting for variable costs
What Reforms Don’t Address Directly/Completely (cont.)

- Use of average numbers masks information about marginal costs – *important for efficiency*
- Access – not just a supply issue but demand (affordability)
- Agriculture – how can the prices be rationalized?
Issues for Reforms

- Utilities still don’t function like business entities
  - SEBs used for political patronage, social engineering
  - Part of the privatization process included “deals with the devil” over labor security
    - High employee costs, perhaps greater institutional cost
    - Andhra Pradesh has over 65,000 employees for about 6,200 MW
      - Connecticut has just a several thousand employees for similar capacity!

- In a loss-making system, who has first rights to cash flow?
  - Earlier policies favored generators over other segments
  - What of cherry picking for privatization (viable, urban areas)?

- Are there enough players, and does size matter?
Future Reforms

- A Big Bang Approach?
  - Pending Electricity Bill 2001 might alter things drastically
    - Open access philosophy
    - Helps private players and some consumers, might hurt the SEBs/current utilities

- Successful reforms will depend on political will to tackle the hard issues facing the sector
Thank You