

Power Sector Reform India – The Long Road Ahead



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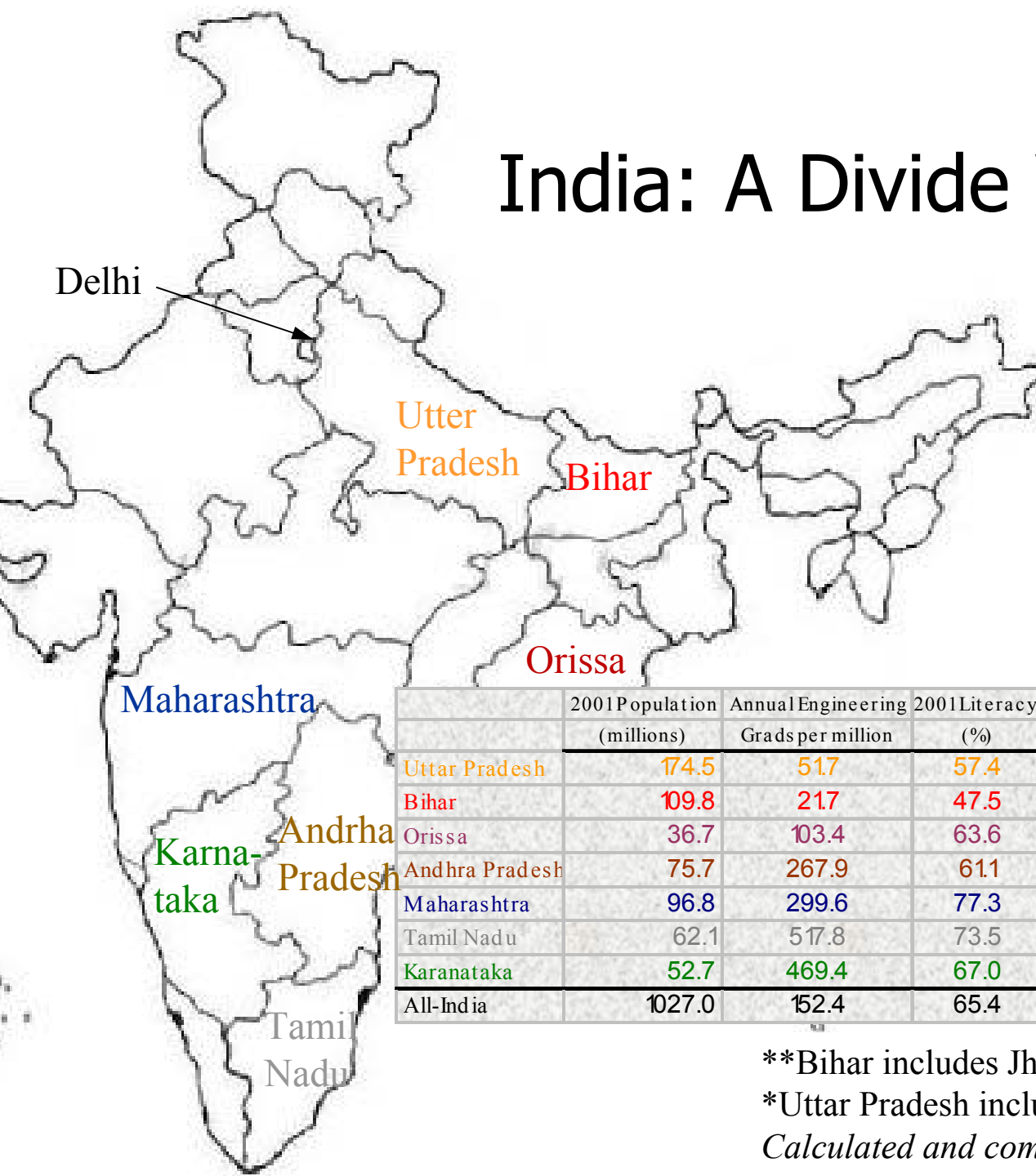
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Outline

- Overview of the Indian power sector
 - Structure
 - Performance
 - Drivers for reform
- Reform steps
 - Mechanisms and modes
- Analysis
- Conclusions

India: A Divide Within



	2001 Population (millions)	Annual Engineering Grads per million	2001 Literacy (%)	State NDP/capita (in 1998-99 Rs.)	Elect. Cons./capita kWh/annum (2001)	Teledensity (2000) (per 100 popn.)
Uttar Pradesh	174.5	51.7	57.4	9,765	195.6	1.3
Bihar	109.8	21.7	47.5	6,328	152.3	0.6
Orissa	36.7	103.4	63.6	9,162	312.5	1.2
Andhra Pradesh	75.7	267.9	61.1	14,715	375.3	3.1
Maharashtra	96.8	299.6	77.3	23,398	593.8	5.4
Tamil Nadu	62.1	517.8	73.5	19,141	497.6	4.7
Karnataka	52.7	469.4	67.0	16,343	349.2	3.8
All-India	1027.0	152.4	65.4	15,735	359.6	2.9

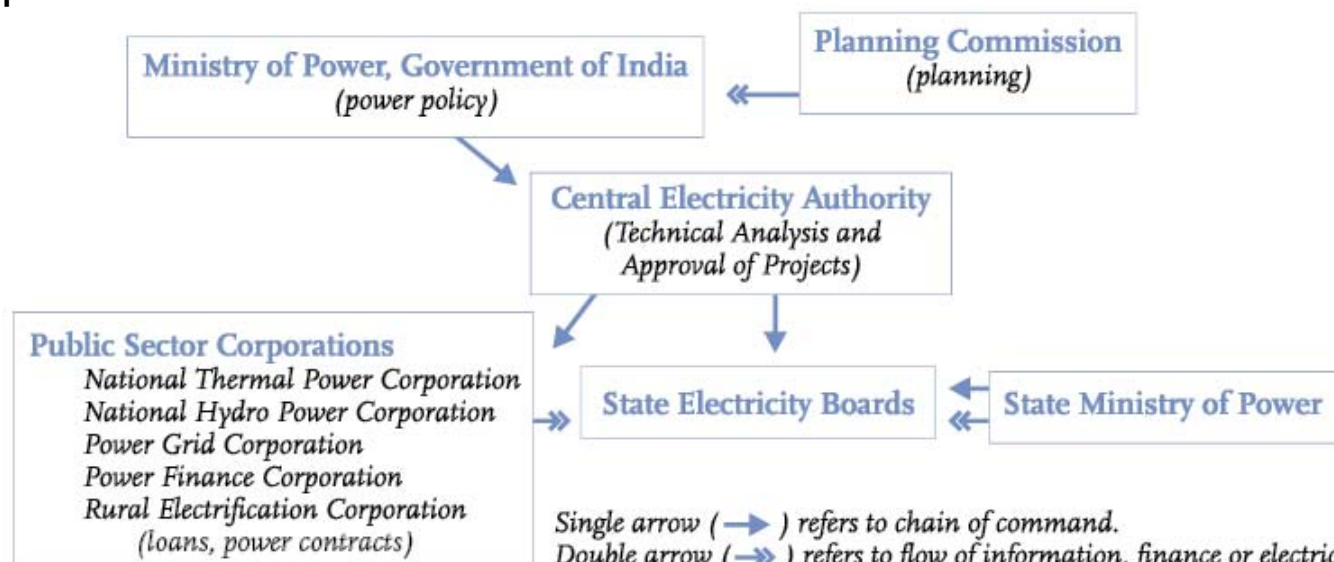
**Bihar includes Jharkhand for some data

*Uttar Pradesh includes Uttaranchal for some data

Calculated and compiled from various official sources

Pre-Reform (1991) Structure

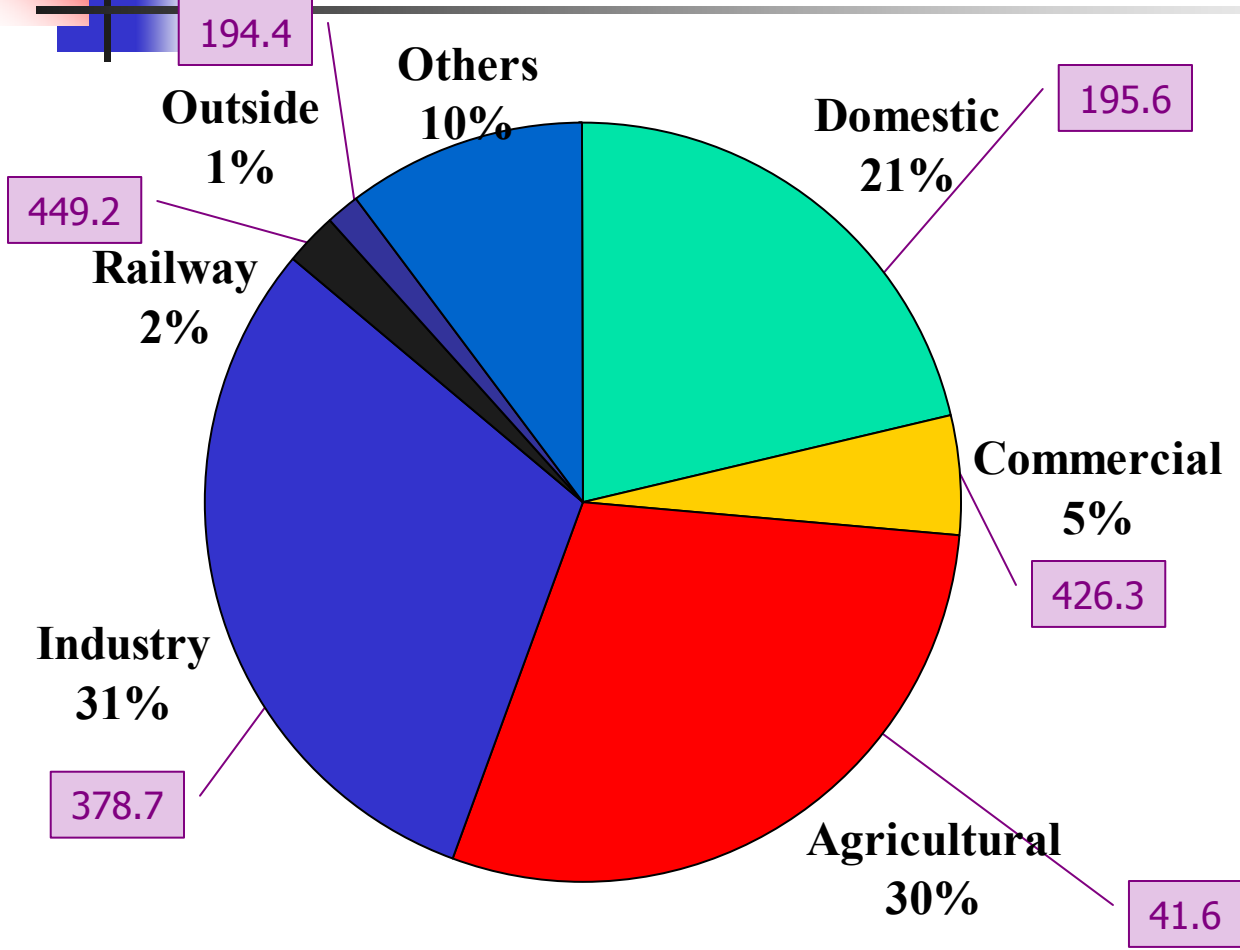
- SEBs (State Electricity Boards) were responsible for power supply
 - Govt. Departments
 - Vertically integrated monopolies
 - Most of the Distribution
 - Much of the Transmission
 - Significant fraction of the Generation
 - Supposed to earn 3% RoR on Asset Base



Indian Power Scenario - Overview

- Installed Capacity \approx 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 \approx 360 kWh
 - World Average \approx 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%) *US losses are 8-9% only*
 - Technical – 12-15% (?)
 - “Commercial” =Theft – 15-18%
- 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

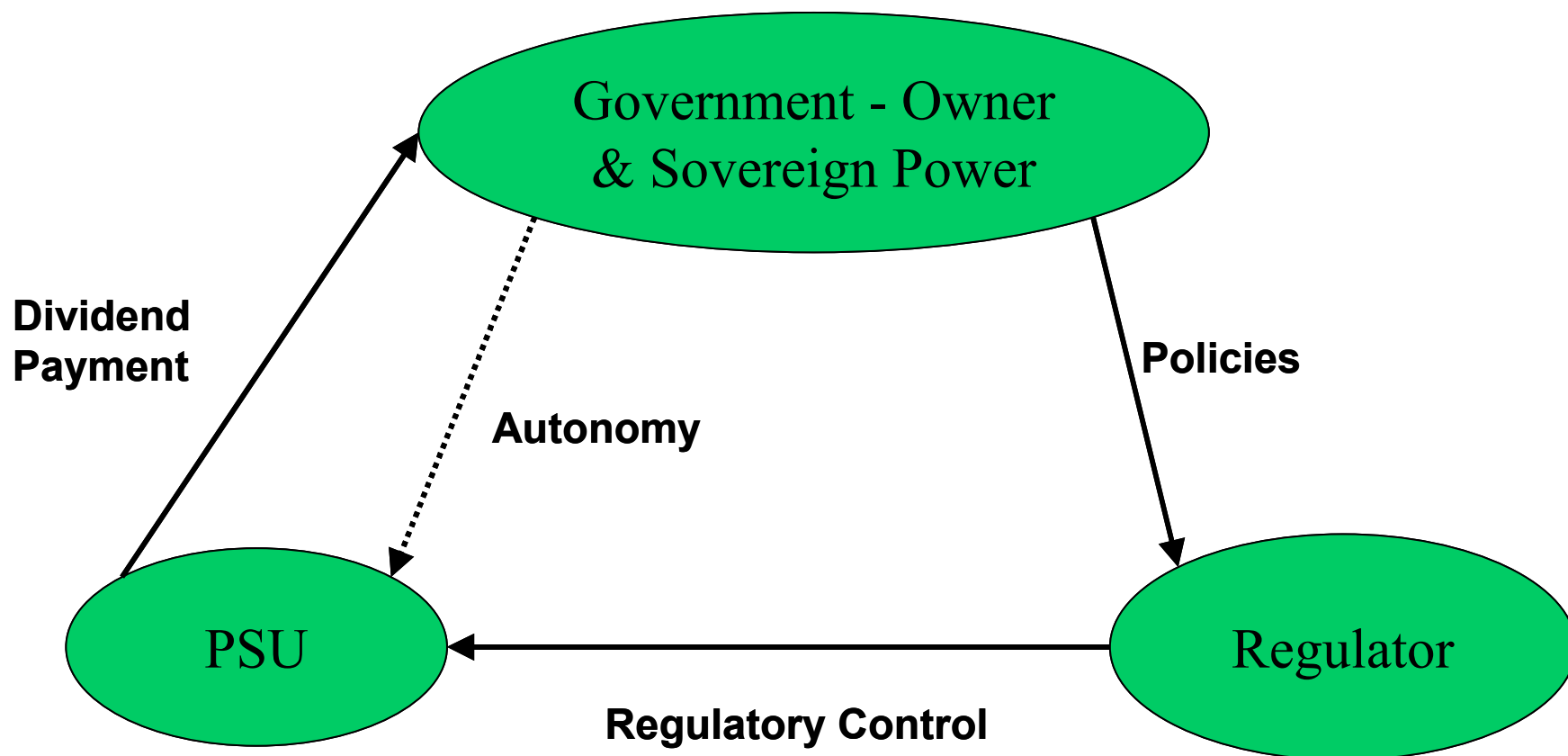
- Opening up Generation (1991)
 - Paralleled overall reforms and liberalization in the economy
 - Triggered by a Balance of Payment Crisis
 - Change of Central Government
 - Generation was opened to private participation
 - 8 “Fast Track Projects” were chosen, including Enron’s Dabhol
 - IPPs encouraged 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



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



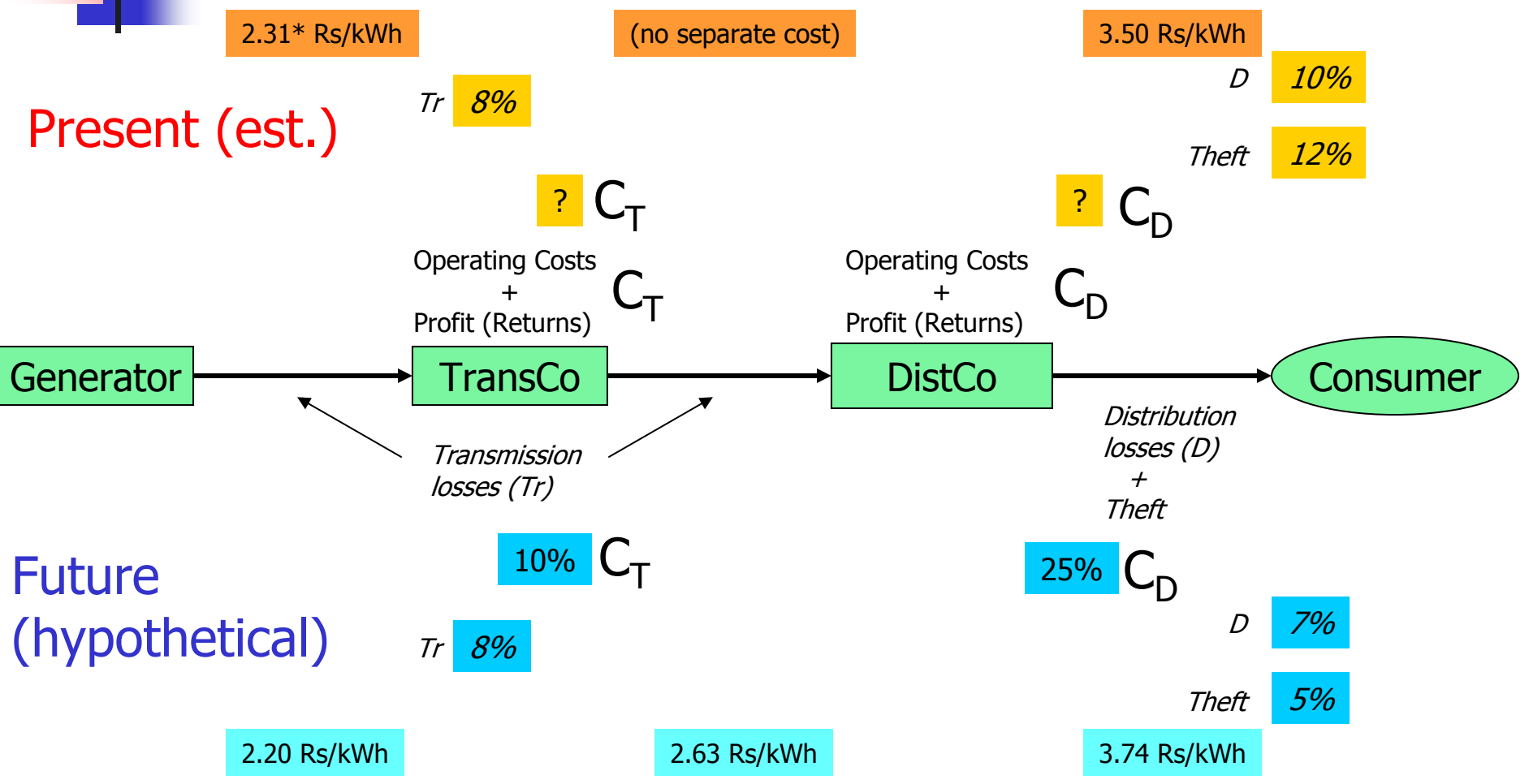
- Orissa – The Front Runner (1996 Reform Act)
 - Unbundled and then privatized distribution
 - Strong World Bank influence (design and finance)
 - Considered a failure - Consumers and utilities have both suffered
 - Losses (kWh and economic) both increased
 - Many causes of failure
 - Unrealistic assumptions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



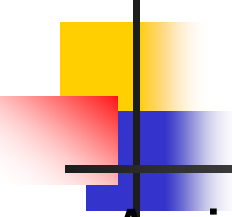
State Reforms (cont.)

- 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



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

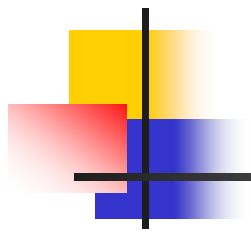
- Utilities still don't function like business entities
 - SEBs used for political patronage, social engineering
 - Part of the privatization process included “deals with the devil” over labor security
 - High employee costs, perhaps greater institutional cost
 - Andhra Pradesh has over 65,000 employees 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