Electricity Distribution Companies in India: Preparing for an uncertain future

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Prayas (Energy Group)

Webinar presentation by Ashwin Gambhir
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Outline

• Emerging trends in the electricity sector

• Implications for DISCOMs

• Suggested ideas for way forward
Chronic Problems faced by DISCOMs

- Lack of financial viability of DISCOMs
- Poor planning, high cost of supply
- Inadequate access, poor supply quality
- Non-competitive tariffs for large consumers

**Causes**

- Issues with power procurement
  - 80% costs due to power purchase
  - High cost of generation
  - Flawed planning

- Operational inefficiency
  - Persistent AT&C losses
  - High operations and maintenance expenses
  - Inefficiencies in capital expenditure

- Skewed tariffs
  - Subsidy to agriculture, other consumers
  - Excessive cross subsidy

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Recent trends

• Wind/solar PV and coal generation prices
  – Rs 2.5-3/kWh for wind/solar & fixed for 25 years, vs Rs 4-5/kWh for new coal.

• Sustained surplus in base power

• Competitiveness of alternative supply options, increasing sales migration
  – Open Access, Captive, net-metering – accelerating, loss of CSS, planning difficult.

• Rising average cost of supply (ACOS) and Tariffs

• Relentless fall in Li-ion battery prices
Sustained surplus in base power

- India tripled its coal capacity from 71 GW to 192 GW from 2007-17.
- ~ 40 GW, (i.e. 15% of conventional capacity) of utilities, classified as stressed assets; due to factors such as lack of demand, very high cost of power, inadequate or poor-quality fuel, unwillingness of generators to supply at contracted rates. Not a short-term transient phenomenon.
- Considering the obligation for fixed cost payments, any excess capacity will contribute to the financial distress of DISCOMs or will most likely turn into a NPA.

<table>
<thead>
<tr>
<th>State DISCOM</th>
<th>Backing down reported (MW)</th>
<th>Backing down as % of contracted capacity</th>
<th>Fixed-cost payments due to backing down (Rs. crore)</th>
<th>Fixed-cost payments for backing down as a % of fixed cost payments to generators</th>
<th>Fixed-cost payments for backing down as a percentage of agricultural subsidies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rajasthan</td>
<td>1798</td>
<td>14%</td>
<td>1051</td>
<td>16%</td>
<td>59%</td>
</tr>
<tr>
<td>Punjab</td>
<td>3457</td>
<td>27%</td>
<td>3006</td>
<td>33%</td>
<td>51%</td>
</tr>
<tr>
<td>Maharashtra*</td>
<td>4231</td>
<td>19%</td>
<td>2828</td>
<td>21%</td>
<td>59%</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>2444</td>
<td>17%</td>
<td>2177</td>
<td>28%</td>
<td>40%</td>
</tr>
<tr>
<td>Gujarat</td>
<td>5525</td>
<td>30%</td>
<td>3823</td>
<td>36%</td>
<td>104%</td>
</tr>
</tbody>
</table>

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Proliferation of captive consumption

- Captive consumption already 20% to 30% of total sales in few states
- FY 14 to FY 15 saw 9% ↑ in Odisha, 12% in Chhattisgarh, and 34% in Karnataka
- Captive rules amendments to encourage serious players, not just CSS evaders
  - Treatment of subsidiaries
  - Preference shares and treatment of group captive

Source: PEG compilation from various CEA reports
Open Access based sales migration, 2016-17

> 90% of open access is short term with durations > 1 day; makes power procurement planning challenging for DISCOMs

In Maharashtra, Rajasthan and Gujarat, OA as high as 20% of DISCOM HT sales

Source: PEG compilation from various regulatory orders
Estimates for FY17 for all states except Rajasthan (FY 16) and Madhya Pradesh (Sept 2015 to August 2016)
Increasing costs and rising tariffs

Average cost of supply (ACOS)
- Actual ACOS in FY 16 – Rs.7/unit
- Increasing at 6% per annum (3-5 yr CAGR)
- ➔ Around Rs 8.5/kWh in next few yrs

Tariffs
- Cross subsidy significant for HT,LT industrial, commercial consumers > 130% of ABR
- Average tariffs for cross-subsidizing consumers ~ Rs. 9/ unit

Power from Alternate Sources
- Cost of RE power < Rs. 4/unit
- > 70% of non-agri. sales with energy charges > Rs. 5/unit
- Short/medium term power < Rs. 4 unit

Share of non-agriculture sales with energy charge greater than Rs.5/kWh
Increasing Viability of kW scale solar PV systems

- Generation cost for such system @ or < Rs. 5/kWh.
- Even without net metering, a consumer with significant proportion of day-time load will save ~ Rs. 2/unit with rooftop solar.
- In the face of policy/regulatory hurdles to net-metering/OA, consumers will also find solar + storage options viable in the near future.
Electric Storage, esp. Li-ion batteries

- $1000 - 209/kWh (2010-17), 80% reduction, @ 25% annual avg. reduction

- Expected at $100/kWh by 2025 or even earlier. Even a lower 10% CAGR from 2017-2 would result in $90/kWh.

- Extremely modular, low gestation period and multiple applications

Can fundamentally change the sector planning, operation and business model of utilities.
Solar + Storage (recent bids from US)

- Excel Utility, Colorado latest bids (2018)
  - Solar-560 MW, Storage 275 MW, 4 hours, i.e. 1100 MWh (operational in 2023)
  - Solar: 2.3-2.7¢/kWh (i.e. Rs. 1.5-1.76/kWh)
  - Solar + storage: 3-3.2¢/kWh (i.e. Rs. 1.95-2.08/kWh)
  - 100% of its existing coal generation is now more expensive than these bids.

- NV Energy, Nevada, PPAs signed in May, 2018
  - 3 solar + storage project filed for regulatory approval
  - Solar – 401 MW, at 2.65-2.99 ¢/kWh
  - Storage – 100 MW, 4 hours, i.e. 400 MWh
    - 2 contracts are for 15 years, for a capacity payment charge of $ 6110-6200/MW-month escalating at 2%/yr. Implies a LCOS of 5.7 ¢/kWh. This configuration of storage adds ~ 0.7 ¢/kWh (Rs 0.5/kWh) to solar PPA.
    - Incremental PPA price adder for storage has fallen to ~$5/MWh.
Shaking fundamental pillars of electricity sector

• Direct generation cost of new Renewables is less than avg. tariff of existing generation.

• Generation projects no longer require long gestation periods and are modular.

• Electricity can be stored with increasing ease and affordability

• Grid services are likely to be as critical as supply.
Challenges before the DISCOM in near future

- Either increase consumer tariffs or higher need for direct revenue subsidy by states.
- If not managed appropriately, can lead to severe financial stress. May reflect in tariff shocks, poor supply quality for small consumers, huge stranded assets, and greater need for repeated and larger bailouts, with associated implications for banking sector.
- Naturally, such a fallout would also have serious political implications.
## Limited scope of current strategies in tackling these challenges

<table>
<thead>
<tr>
<th>Improving efficiency → reduce ACoS, tariff</th>
<th>Increasing fixed charges, for same ABR</th>
<th>Reduction in tariff to retain migrating consumers</th>
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<tr>
<td>• Heroic efforts to increase efficiency will ↓ the rate of growth of ACoS</td>
<td>• For e.g. - fixed charges doubled to reduce energy charges to retain consumers</td>
<td>• Measures such as tariff rebates and ToD rebates provided in many states such as Punjab, AP and Maharashtra</td>
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<td>• Indicative calculations show that growth rate can reduce to 2 to 3% p.a from the current 5 to 6% p.a.</td>
<td>• Energy charges may reduce by 10-20% but will remain &gt; Rs. 5/unit</td>
<td>• Despite such measures open access and captive consumption continue to rise</td>
</tr>
<tr>
<td>• Increase could be due the need for additional capex, loan repayments and wage increase</td>
<td>• High incidence of fixed charges will make shift to solar PV captive more lucrative.</td>
<td>• Maharashtra examples</td>
</tr>
<tr>
<td>• Thus ACoS and tariffs will continue rising.</td>
<td>• Counter-intuitively, this strategy can encourage sales migration.</td>
<td>• Despite 16% reduction in tariffs via subsidy to industries, open access increased by 29% in FY16</td>
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<td></td>
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<td>• Even with ToD rebate of Rs. 1.50/kWh, open access is the same in peak and off-peak hours</td>
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(Inevitable) Changing role of the DISCOM

Trends interdependent; raise fundamental questions about viability and feasibility of current business model and role of DISCOMs, based largely on

- ‘Cost-plus’ method for tariffs, revenue recovery; little incentive for improving efficiency.
- Cross-subsidy based tariff design.
- Consistently increasing demand met mainly by buying baseload power, largely through long-term contracts, and often on cost-plus basis.

**Current scenario**
- Wires and supply
- Universal supply obligation (USO) for all consumers
- Dominant grid user
- State demand = DISCOM demand
- Cross-subsidy-based model

**Future scenario**
- Mainly, wires licensee
- Provider of last resort
- Grid balancing
- USO only for small consumers
- New revenue models
### Suggested ideas for way forward...1

<table>
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<tr>
<th>Encourage Long-term sales migration of large consumers</th>
<th>Avoid long-term, base load power purchase contracts</th>
<th>Agricultural demand met through solar feeders</th>
</tr>
</thead>
</table>
| • Minimum duration of OA to be extended to 1 year     | • Revaluate need for 25 year base load PPAs, given RE capacity addition, demand uncertainty.  
  • Given current trends, many states may not need new capacity for a decade or so.  
  • New PPAs after rigorous analysis of demand, supply alternatives  
  • Use analytical tools - load forecasting models, power sector models for exercise  
  • Capacity addition planning through a public process | • Deploy 2-10 MW scale solar PV plants at the substation, where agriculture feeders have been separated.  
  • Capacity procurement through competitive bidding and PPAs at fixed tariff for 25 years.  
  • Significant reduction in subsidy requirement with fixed solar tariff of ~ Rs 3/kWh and rising cost of grid supply (APPC). |

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Solar Agriculture feeders - Maharashtra status

- ‘Chief Ministers solar feeder policy’.
- 1.5-2 GW tendering underway, ~ 7.5 lakh ag pumps will be solarised in ~1 yr.
- Discovered price – Rs 3.1/kWh, much lower than present APPC of Rs 4/kWh.
- Plans to further scale it across state.
### Suggested ideas for way forward...2

<table>
<thead>
<tr>
<th>Rationalising tariff design</th>
<th>Developing robust markets</th>
<th>Accountability for service quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Move away from cost-plus regulation; explore price cap/benchmarking</td>
<td>• Innovation in power procurement and contract design</td>
<td>• Monitoring actual supply hours.</td>
</tr>
<tr>
<td>• Have uniform tariff slabs for all industrial, commercial and domestic consumers with consumption &lt;300 units</td>
<td>• More flexible instruments in the market</td>
<td>• Improve metering and billing systems- third party audits by SERCs</td>
</tr>
<tr>
<td>• High intra-category cross subsidy to ensure revenue neutrality of approach</td>
<td>• <em>Provide transparent procurement options for &gt; 1 week</em></td>
<td>• Public hearings on supply and service quality issues</td>
</tr>
<tr>
<td>• Link tariff increase of small consumers (&lt;300 units) to inflation</td>
<td>• <em>Allow industrial consumers on DEEP</em></td>
<td>• Harnessing technology to improve efficiency-use of more real time, automatic, publicly available data for accountability.</td>
</tr>
</tbody>
</table>

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Schematic representation of suggested approach

- Strong institutions
- Analysis driven approach
- Accountability for service quality
- Developing robust markets
- Public Participation
- Transparency
- Accountability

- Shrink the pie - DISCOMs focus on wires, cater to small consumers
- Long-term sales migration of large consumers
- Avoid long-term, base load power purchase contracts
- Agricultural demand met through solar feeders
In summary

Unless guided by conscious policy decisions, these changes will unfold chaotically, leaving the distribution companies stranded with excess capacity and huge losses—and the sufferers of such a fallout will be mostly small and rural consumers with serious implications for state level politics.

To avoid such consequences, it is extremely important to intervene at the earliest.

The impending changes can be turned into opportunities only if distribution companies, regulators, and policymakers begin acting at the earliest.
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