Presentation on

AT&C LOSS

By

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Gujarat Urja Vikas Nigam Ltd
Gujarat Power Scenario in 2002

1. State’s installed capacity: 8756 MW
2. Peak deficit: 20%
3. Power cut / Load shedding of 4-5 hrs
4. Low voltages due to inadequate transmission network and substations
5. Erratic power supply due to mixed load of agriculture and villages

Cont..
Gujarat Power Scenario in 2002

6. T&D losses as high as 34.20% - rampant power theft

7. Severe voltage fluctuations and transformer failure

8. Retail tariff - not cost reflective

9. Poor billing and collection efficiency

10. Loss of Rs. 2543 Cr. in 2000-01

11. Accumulated losses Rs. 8286 Cr. before unbundling
**Steps for Turnaround for Unbundling of the Sector**

- GEB unbundled on 01.4.2005 into 7 Companies in segments for better administration, efficiency & consumer services
Load management prior to JGY

Pre-JGY Load Rostering System

- 8-14 Hours of 3-Phase Power Supply
- 10-12 Hours of Single Phase Power Supply
- 3-4 Hours of No Power Supply
Load management after JGY with SDT

Load Rostering System after JGY

- 24 Hours 3 Phase supply to JGY Feeders
- Min. 8 Hours 3 Phase Continuous Supply to Agriculture Feeders
- 1 Phase Power Supply in balance period on Agri Feeders
Installed capacity

- Present installed capacity - 26524 MW
  Conventional - 19888 MW
  Renewable - 6636 MW

- Present Peak demand - 15142 MW
  (State has successfully met the peak power demand of 15142 MW without any load shedding.)

- From 2009 Gujarat became a power surplus state
## Highlights

<table>
<thead>
<tr>
<th>Particulars</th>
<th>2002</th>
<th>2017</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation Capacity (MW)</td>
<td>8756</td>
<td>26524</td>
<td>202%</td>
</tr>
<tr>
<td>Transmission Substation (Nos)</td>
<td>730</td>
<td>1670</td>
<td>129%</td>
</tr>
<tr>
<td>Transmission Lines (KM)</td>
<td>31012</td>
<td>55467</td>
<td>79%</td>
</tr>
<tr>
<td>Distribution Lines (CKM) (HT+LT)</td>
<td>351917</td>
<td>664353</td>
<td>89%</td>
</tr>
<tr>
<td>Distribution Transformers (Nos)</td>
<td>212973</td>
<td>1012859</td>
<td>376%</td>
</tr>
<tr>
<td>Distribution Feeders (Nos)</td>
<td>4954</td>
<td>14503</td>
<td>193%</td>
</tr>
<tr>
<td>Consumers (Nos)</td>
<td>0.73 Crs</td>
<td>1.46 Crs</td>
<td>100%</td>
</tr>
<tr>
<td>Agriculture Consumers (Nos)</td>
<td>6 Lakhs</td>
<td>13.8 Lakhs</td>
<td>123%</td>
</tr>
<tr>
<td>Consumption /sale (Mus)</td>
<td>23129</td>
<td>75516*</td>
<td>226%</td>
</tr>
<tr>
<td>Revenue from sale of power (Crs.)</td>
<td>7274</td>
<td>36188</td>
<td>397%</td>
</tr>
<tr>
<td>Sector Profitability (Crs.) (Profit/ (loss))</td>
<td>2543 (loss)#</td>
<td>807(profit)*</td>
<td>-</td>
</tr>
</tbody>
</table>

*Provisional & #Details for FY 2000-01
AT&C Loss
Dist. Loss reduced from 25.83% in 2004-05 to 12.42% in 2016-17
# Ujjwal Discom Assurance Yojna

<table>
<thead>
<tr>
<th>Year</th>
<th>Target</th>
<th>Achievement [As On Mar-17]</th>
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<tbody>
<tr>
<td>2015-16</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>2016-17</td>
<td>14</td>
<td>12.42</td>
</tr>
<tr>
<td>2017-18</td>
<td>13.5</td>
<td></td>
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<tr>
<td>2018-19</td>
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</table>
DISCOM wise % AT & C Loss

<table>
<thead>
<tr>
<th>DISCOM</th>
<th>YR 05-06</th>
<th>YR 16-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGVCL</td>
<td>18.44</td>
<td>8.23</td>
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<tr>
<td>MGVCL</td>
<td>18.79</td>
<td>10.08</td>
</tr>
<tr>
<td>UGVCL</td>
<td>19.59</td>
<td>8.18</td>
</tr>
<tr>
<td>PGVCL</td>
<td>38.48</td>
<td>19.06</td>
</tr>
<tr>
<td>GUVNL</td>
<td>25.83</td>
<td>12.42</td>
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</tbody>
</table>
Category wise AT&C Loss

<table>
<thead>
<tr>
<th>Category</th>
<th>YR 05-06</th>
<th>YR 16-17</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT Exp</td>
<td>2.83</td>
<td>1.18</td>
</tr>
<tr>
<td>Industrial</td>
<td>6.36</td>
<td>2.77</td>
</tr>
<tr>
<td>GIDC</td>
<td>3.5</td>
<td>1.92</td>
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<tr>
<td>Urban</td>
<td>25.09</td>
<td>10.95</td>
</tr>
<tr>
<td>JGY</td>
<td>51.59</td>
<td>30.95</td>
</tr>
<tr>
<td>Ag.</td>
<td>37.01</td>
<td>19.36</td>
</tr>
<tr>
<td>Overall</td>
<td>25.83</td>
<td>12.42</td>
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MADHYA GUJARAT
VIJ COMPANY LIMITED

BEST PRACTICES ADOPTED
BY M.G.V.C.L. for AT&C Loss Reduction
Best practices for AT&C Loss Reduction

- Segregation of Rural Feeders in JGY & AG Feeder.
- Use of 11 KV XLPE UG Cable.
- Use of LT overhead XLPE coated conductor:
- Use of 2.5 Sq MM, 2 Core, XLPE LT Cable for Single
- Use of 3 Phase Ariel Bunch Cable (ABC):
- Bifurcation of Feeders:
- Load Balancing:
- Optimum size of Transformers:
- High Voltage Distribution System (HVDS):
- Energy Accounting:
- Seven Action Plan.
- Automatic Remote Meter Reading:
- Electronic Meters:
- Quality Installation Checking:
Segregation of Rural Feeders in JGY & AG Feeder.

- JGY Scheme launched in Sep 2003 - Execution in just 30 months (completed by March 2006)
- Segregation of Agricultural Load from Rural Feeders by laying new Jyotigram feeders to cater load of villages
- Specially Designed Transformers (SDT) installed on Agricultural Feeders for supply of 24x7 single-phase power to farmers living in Farms
- Implemented throughout the State covering 18000 villages & 10000 Hamlets/ Petaparas with investment of Rs. 1290 Crs (State Govt. grant of Rs. 1110 Crs.)
- Through JGY – saving huge capital investment for laying additional transmission
- JGY avoided the need of additional generation capacity augmentation required to cater the same level of supply
- 100% inhabited villages and House hold have been electrified
Use of 11 KV XLPE UG Cable.

- Reduction in I2R loss due to low resistance
- In view of following discrete advantages we have provided Under Ground HT XLPE cable in urban area.
- Reduction in interruptions and thereby increasing system reliability.
- Reduction in accidents
- Increase in Customer Satisfaction
- Enhancing the aesthetic look
Use of LT overhead XLPE coated conductor.

- To avoid hooking,
- Reducing transformer failure,
- Reduction in interruption
Use of 2.5 Sq MM, 2 Core, XLPE LT Cable for Single Phase Service Connection.

In the theft prone area, the unscrupulous consumers used to tap the service line directly before the meter and thereby stealing the electricity. It is easier and convenient for the consumers to fiddle with the PVC insulated cable; however after use of two core XLPE cable, such type of stealing of energy is reduced.
Use of HT & LT Ariel Bunch Cable (ABC):

- HT AB cable is used in rural areas wherever there is a crossing of Agriculture and Jyotigram power supply network to minimize direct jumpering from Jyotigram.
- LT AB Cable is used for avoiding direct hooking by the consumers of slums and hamlets areas as well as for agriculture area.
Bifurcation of Feeders:

- To reduce the technical losses as well as to maintain the tail-end voltage regulation, the lengthy feeder and overloaded 11 kV feeder having more than 150 Amp. Loading is further bifurcated. This has reduced the technical losses and improved the voltage profile.
Load Balancing:

- All the distribution transformers in urban areas as well as on industrial feeders are provided with electronic meter, the load profile of each transformer is studied and accordingly load balancing of each phase is done.

- This has reduced the transformer failure as well as improved the voltage profile on each circuit, which has led to reduction in technical losses.
Optimum size of Transformers:

- Each transformer load profile is studied and if the connected load on the transformer is found less or more than the KVA capacity of the transformer, the transformer is immediately either de-augmented or augmented. This has saved the technical losses of the transformer and also improves voltage profile.
High Voltage Distribution System (HVDS):

- HVDS is being implemented in DISCOM to reduce hooking in rural areas as well as to reduce the LT line losses. We are installing 5 KVA single phase transformer for Zupadpatti, Kutir Jyoti, suburbs and small clusters areas.

- There are 10 KVA, 16 KVA, 25 KVA Transformers for giving power supply to individual agricultural connections under the Special Scheme, “KHUSHY” (Kisan Heet Urja Shakti Yojana), i.e. HVDS.

- The implementation of KHUSHY (HVDS) will not only reduce the Technical Loss but also the Commercial Loss by way of reducing theft of power in LT lines.
Energy Accounting:

- Meters are provided on Transformer Centre to find out weak pockets on feeders. Along with regular meter reading programs, meter reading of transformers are taken and TC wise losses are calculated.

- This helps us to have clear vision of weak pockets and help in qualitative installation checking.
Actions at consumer installation

- All the 3 phase electro-mechanical meters are replaced with 3 Phase Static meter.
- Single phase electro-mechanical meters are replaced with Single Phase static meters in phased manner.
- It is a practice to replace all stopped meter, defective meter, slow meter etc. at every month end.
- All the meters are kept in MM Box/SMC boxes duly sealed with Polycarbonate seals.
- Wherever the meters are inside the houses they are taken out.
- The service lines having joints are replaced with new cable.
- The meter readers are instructed to note on the back-side of the bill regarding the condition of the meter, viz. glass broken, seal tampered, meter without box, old clock type meter, meter burnt etc. to take immediate action by the SDO.
Automatic Remote Meter Reading:

- DISCOM installed on all the Extra High Tension and HT consumers Automatic Remote Metering (AMR) for quick and accurate meter reading without visiting the site of consumer. This has contributed significant process improvements for load survey, tamper data and billing related on-line monitoring and access to data. This has also reduced the time & labour for taking readings in physical mode.

- All the HT consumers are provided with AMR.
Quality Installation Checking:

- Dedicated staff for vigilance activities is provided in each circle with Electronic Reference Standard Meter, (3 phase and 1 single phase) with class of accuracy 0.2.
- Vigilance wing headed by IG (Security), an IPS Officer. Under him 200 teams are deployed with Ex-army men and Police Officers. The main function of the vigilance wing is to strike and to deal with strong-headed consumers and also installation checking as per the feed back given by the DISCOM.

Cont....
Quality Installation Checking:

- Each DISCOM has special vigilance department headed by Add Chief Engineer / Superintending Engineer and other staff to curb the power theft.
- All DISCOM have deployed Ex-Army personnel as well as Gunman to assist vigilance team.
- Each vigilance team is provided with video camera and the engineers are provided with mobile phones with camera.
Quality Installation Checking:

- Dedicated police station headed by DYSP / PI and other staff for dealing with the power theft complaints as per Electricity Act, 2003.
- At present total 11 Nos of Police stations in different regions of Gujarat have been established and nearly 300 post of police staff are created.
- All the cases of power theft are dealt by Fast Track Court as per directive of Govt of Gujarat.
- Strict penalty for power theft including imprisonment.
Issues & Challenges

- All the activities related for reduction in AT & C loss is fight with the poor mentality of public.
- Even with police protection, numbers of time the I/C drives arranged from GUVNL and MGVCL could not succeed to carry out installation checking. And many a times during checking mob attacked to our I/C Squad gangs and met unfair situations which lead to lodging of Police FIRs.
- In Rural areas having Ag-JGY feeder crossing, the people are habituated to connect direct link between Ag-JGY feeder for getting 24 Hrs. power supply on Ag feeder, sometimes it leads to electrical accidents.
Expenditure & Revenue Activates
Steps taken – Distribution

- Expenditure (CAPEX) in last 10 years – **Rs. 18,100 Crs**
- Feeder Segregation – Jyoti Gram Yojana – **Rs. 1300 Crs**
- Revenue rise from **Rs 11,500 Crs** to **Rs 36,000 Crs**
- Average tariff rise from **Rs 2.87** to **Rs. 5.42**
- No increase in Tariff in last year
Steps taken - To increase Revenue

- Timely completion of billing of consumers.
- HT consumer billing through AMR.
- Timely disconnection of defaulter consumers.
- Collection of bills through different modes like window collection at sub division level, ATP machines, Gram Panchayat, Post offices, Private agencies, Banks and online payment gateways.
- E-urja system for study of all the parameters related to billing process.
Revenue Rs. 36188 Cr

- Residential: 14.43%
- Commercial: 0.39%
- Industrial: 63.50%
- Agriculture: 13.05%
- Water Works: 2.21%
- Railway: 1.10%
- Other: 4.92%

Revenue by Sector:
- Residential: 14.43%
- Commercial: 0.39%
- Industrial: 63.50%
- Agriculture: 13.05%
- Water Works: 2.21%
- Railway: 1.10%
- Other: 4.92%

Total Revenue: Rs. 36188 Cr
Improvement in Cash Collection

![Graph showing improvement in cash collection from 2005 to 2016.](image-url)
Gap between Cost & Realization

Average Realization (Rs. Per Unit)  Average Cost to Serve (Rs. Per Unit)

Year | Realization | Cost | Realization | Cost |
--- | --- | --- | --- | --- |
2006 | 3.74 | 3.44 | 3.74 | 3.44 |
2007 | 3.49 | 3.49 | 3.49 | 3.49 |
2008 | 3.72 | 3.72 | 3.72 | 3.72 |
2009 | 3.96 | 3.96 | 3.96 | 3.96 |
2010 | 4.64 | 4.64 | 4.64 | 4.64 |
2011 | 4.50 | 4.50 | 4.50 | 4.50 |
2012 | 4.52 | 4.52 | 4.52 | 4.52 |
2013 | 4.91 | 4.91 | 4.91 | 4.91 |
2014 | 5.27 | 5.27 | 5.27 | 5.27 |
2015 | 5.36 | 5.36 | 5.36 | 5.36 |
2016 | 5.54 | 5.54 | 5.54 | 5.54 |
2017 | 6.00 | 6.00 | 6.00 | 6.00 |
Renewable Energy Initiatives

- Wind capacity - 4086 MW
- First comprehensive Solar Power Policy - 2009 and revised in 2015
- Solar capacity - 1127 MW in Gujarat (India - 8062 MW)
- State of art 750 MW Solar Park - 350 MW in operation
- Country’s first canal top project of 1 MW & another 10 MW on SSNNL canal commissioned.
- 5 MW Solar rooftop Gandhinagar projects commissioned
- 4 MW Solar rooftop commissioned in Vadodara
Solar pump sets & Home lights

- Solar pump sets from 3 HP to 7.5 HP are installed in different parts of Gujarat with 100% grant of GOG.
- Up till now 7742 Nos. of pump sets of different capacity are installed.
- Up till now 25910 Nos. of Solar home light of 400 W are installed.
As per new Solar policy of GOG benefits to the existing consumers are given to provide Solar roof top.

The capital cost for 1 KW roof top is Rs. 69000/-. The subsidy of 30% by MNRE & Rs. 10000/- by GOG are granted so the end cost per KW is only Rs. 38300/-. The above subsidy is given for max. 2 KW

Annual units generated/ KW is 1500 units.

The area required for 1 KW is 100 sqft.

4781 nos. of Solar roof top in different categories have been installed with total 41161 KW capacity.
Thank You
<table>
<thead>
<tr>
<th>SR NO.</th>
<th>YEAR</th>
<th>AWARDS BY</th>
<th>NAME OF THE AWARDS</th>
<th>SUBJECT OF AWARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oct-2007</td>
<td>India-Tech Foundation</td>
<td>Tech Excellence Award 2007</td>
<td>Power Sector Reforms and Initiatives India</td>
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<tr>
<td>2</td>
<td>March-2008</td>
<td>National Award by Ministry of Power, Govt of India</td>
<td>GOLD SHIELD</td>
<td>Power Distribution in recognition of Meritorious Performance</td>
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<td>3</td>
<td>Feb-2009</td>
<td>Indian Electrical and Electronics Manufacturers Association</td>
<td>IEEMA POWER AWARD-2009</td>
<td>Award for Excellence in Power Distribution (URBAN-RURAL)</td>
</tr>
<tr>
<td>4</td>
<td>Nov-2009</td>
<td>FALCON STRATEGIS ADVISORS (INDIA)</td>
<td>ENERTIA AWARD-2009</td>
<td>Excellent performance in the area of Reduction in Distribution Losses, Reduction in Transformer Failure Rate as well as Continuous and Qualitative Power supply</td>
</tr>
<tr>
<td>SR NO.</td>
<td>YEAR</td>
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<tr>
<td>5</td>
<td>Jan-2010</td>
<td>National Award by Ministry of Power, Government of India</td>
<td>BRONZ SHIELD</td>
<td>for Power Distribution in recognition of Meritorious Performance</td>
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<tr>
<td>6</td>
<td>Feb-2011</td>
<td>National Award by Ministry of Power, Government of India</td>
<td>INDIA POWER AWARD-2010</td>
<td>INNNOVATION IN DESIGN AND EXECUTION OF PROJECTS</td>
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<td>7</td>
<td>Feb-2011</td>
<td>National Award by Ministry of Power, Government of India</td>
<td>POWER AWARD-2010</td>
<td>for Overall Utility Performance-(Distribution)-Non Urban Area</td>
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<tr>
<td>8</td>
<td>March-2012</td>
<td>Ministry of power, Govt. of India,</td>
<td>National Award Bronz Shield</td>
<td>for Meritorious Performance of power Utilities for the Year 2009-10.</td>
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<tr>
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<tr>
<td>9</td>
<td>May-2012</td>
<td>Ministry of power, Govt. of India,</td>
<td>POWER LINE AWARD-2012</td>
<td>outstanding performance in Power Distribution</td>
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<td>10</td>
<td>Nov-2012</td>
<td>Council of Power Utilities (CPU), New Delhi</td>
<td>INDIA POWER AWARD-2012</td>
<td>Overall Utility Performance-(Distribution)-MIXED.</td>
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<tr>
<td>11</td>
<td>March-2013</td>
<td>Council of Power Utilities (CPU), New Delhi</td>
<td>A+ Rating</td>
<td>Very High Operational and Financial Capability</td>
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<td>12</td>
<td>June-2013</td>
<td>Ministry of power, Govt. of India,</td>
<td>POWER LINE AWARD-2013</td>
<td>Best Performing State DISCOM’</td>
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<tr>
<td>13</td>
<td>Nov-2013</td>
<td>Indian Chambers of Commerce</td>
<td>Innovation with Impact Award-2013</td>
<td>Demand Side Management</td>
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<tr>
<td>16</td>
<td>Dec-2015</td>
<td>CBIP</td>
<td>Best Performing Power Distribution Utility”</td>
<td>Consistent improvement in performance of various Key Parameters such as AT&amp;C Loss, Financial Performance, Power Supply Reliability, DTR failure rate, CSR Activities, etc. during last three years, i.e. FY 1213 to FY1415.(Dec-15)</td>
</tr>
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<tr>
<td>19</td>
<td>Nov-2016</td>
<td>Indian Chambers of Commerce</td>
<td>conferred Innovation with Impact Award for DISCOM-2016</td>
<td>for Power Distribution companies under ‘Overall Most Innovative DISCOM-2016 ‘ category and Appreciation certificate for Quality service Award</td>
</tr>
</tbody>
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