Business Plan of Utilities – Investment under MYT Regime

Puneet Munjal
Vice President, Tata Power Delhi Distribution Limited
12th Feb 2019
**TATA Power – DDL… The Architect of Transformation in Utility Business**

**51:49 Joint Venture**

**One of the Most Successful Private Power Distribution Utility**

License Area: North and North West Delhi (510 sq. km)
License Period: 25 years

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>July ‘02</th>
<th>March ‘18</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATIONAL PERFORMANCE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AT&amp;C Losses</td>
<td>%</td>
<td>53.1</td>
<td>8.40</td>
<td>84%</td>
</tr>
<tr>
<td>System Reliability – ASAI - Availability Index</td>
<td>%</td>
<td>70</td>
<td>99.67</td>
<td>42%</td>
</tr>
<tr>
<td>Transformer Failure Rate</td>
<td>%</td>
<td>11</td>
<td>0.71</td>
<td>94%</td>
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<tr>
<td>Peak Load</td>
<td>MW</td>
<td>930</td>
<td>1852</td>
<td>99%</td>
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<tr>
<td>Length of Network</td>
<td>Ckt. Km</td>
<td>6750</td>
<td>15378</td>
<td>128%</td>
</tr>
<tr>
<td>Street Light Functionality</td>
<td>%</td>
<td>40</td>
<td>99.41</td>
<td>149%</td>
</tr>
<tr>
<td><strong>CONSUMER RELATED PERFORMANCE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Connection Energization Time</td>
<td>Days</td>
<td>51.8</td>
<td>2</td>
<td>96%</td>
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<tr>
<td>Meter Replacement Time</td>
<td>Days</td>
<td>25</td>
<td>2.09</td>
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<td>Bill Complaint Resolution</td>
<td>Days</td>
<td>45</td>
<td>4</td>
<td>91%</td>
</tr>
<tr>
<td>Mean Time to Repair Faults</td>
<td>Hours</td>
<td>11</td>
<td>2</td>
<td>96%</td>
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<tr>
<td>Call Center Performance - Service Level</td>
<td>%</td>
<td>-</td>
<td>95</td>
<td></td>
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<tr>
<td>Payment Collection Avenues</td>
<td>Nos.</td>
<td>20</td>
<td>6725</td>
<td></td>
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<tr>
<td>Consumer Satisfaction Index</td>
<td>%</td>
<td>-</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td><strong>OTHERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capex (Cumm)</td>
<td>Mn USD</td>
<td>187</td>
<td>1060</td>
<td>467%</td>
</tr>
<tr>
<td>Consumers</td>
<td>Count Mn</td>
<td>0.7</td>
<td>1.64</td>
<td>140%</td>
</tr>
<tr>
<td>Employees</td>
<td>Count</td>
<td>5600</td>
<td>3283</td>
<td>41%</td>
</tr>
</tbody>
</table>
MYT Framework

Planning Stage
(Budget Projections submitted for a time horizon of 4-5 years)

Approval/Implementation Phase
Sent for DERC Approval
Execution of Work

Capitalization of the Work & Preparation of True Up Entry

Financial Reconciliation/Concluding Stage

Significance of Capital Investment Plan

Customers
Tariff Impact
Service Delivery

Reliability
Regulator Performance Assurance Tariff Impact

Utility Return on Equity Low AT&C

Network Expansion Plans
Budget Requirements of different functions
CAPEX Investment Plans based on Load Flow Study
Conditions of Capital Investment complied by Discoms

• The License issued to Power Utilities specifies following conditions for Capital Investment & Project Implementation & Discoms need to ensure that

  ❖ There is a need for the major investment in the Distribution System which the Licensees proposes to undertake;

  ❖ The Licensee has examined the economic, technical & environmental aspects of all viable alternatives to the proposal for investing in or acquiring new Distribution System assets to meet such need; and

  ❖ The Licensee has explored all possible avenues and is sourcing funds in the most efficient & economical manner.
Capital Investment Plan

• The DERC (Terms and Conditions for Determination of Tariff) Regulations, 2017 stipulates that Capital Investment Plan submitted by Discoms shall be scheme wise and include
  – Purpose of investment
  – Capital Structure
  – Capitalization Schedule
  – Financing Plan
  – Cost-Benefit Analysis
  – Performance Improvement envisaged in the Control Period
  – Any other factor influencing investment
Capital Investment Plan Submission

Infrastructure Development
- Admin Works
- Civil Works
- IT related
- Consumer care centres & cash collection centres
- Testing labs

Reliability Improvement
- Automation & GIS Implementation
- AMR Installation
- Replacing old HT Panels with RMU
- Replacement of Sick Cables
- Other system improvement works

AT&C C Loss Reduction
- Metering Systems
- High Voltage Distribution System
- Replacement of LT bare Conductor with LT ABC
- Installation of Capacitor bank

Load Growth
- New Grids (33/11KV & 66/11KV)
- Augmentation of existing grids
- Feeder lines
- Power Transformer
- Distribution Transformer
Capital Investment – Load Growth

- Load Growth is primarily on account of two major reasons:
  - Load Growth caused by Green Field Electrification of existing un-electrified areas/ new residential apartments.
  - Natural Load Growth in existing areas caused by Vertical Load, increased spending capacity due to improvement in standard of living.

- Sub Categories are as follows:
  - EHV System Augmentation- Grids, Lines, Cables & Transformers, EHV Related 11kV Schemes.
  - 11kV System Augmentation- Distribution Substation, Circuits, DTs
  - New Commercial/Industrial Establishments and investments made to provide power supply to the un-electrified areas.
  - New Smart/Static Meter Requirement in these un-electrified areas.
Capital Investment - Load Growth

- **Input Data**: Asset Loadings, Network Spatial Distribution & Connectivity, Load Forecasts, Area Development Plans
- **Network Modeling/Updating using Geographical Information System Data**
- **Network Assessment based on Power System Load Flow Studies using CYMDIST Software (Eaton)**
- **Mitigation Option to avoid violation of Network Parameters such as**: 1. Overload, 2. Voltage Regulation, 3. Redundancy, 4. Technical Loss etc. in future
- **Benefits on account of recurring Technical Loss Reduction/Optimum Asset Utilization are quantified using CYMDIST (Cost Benefit Analysis is carried out)**
- **Budget Estimation is carried out using SAP Project System Module**
- **Site Surveying is carried out to ascertain whether the plan is meeting the System Design/RoW Requirements**
- **For every violation, multiple mitigation options are simulated and prioritized in the Load Flow Software**
- **Proposals along with the estimates are sent to the Hon'ble Regulator for their approval**
- **After approval of the Schemes, the schemes are budgeted, material is procured and execution is carried out**
- **Once execution has been completed, financial reconciliation is done**
- **Capitalization of the Asset & Preparation of True-up**
Capital Investment – AT&C Loss Reduction

Technical Loss
1. Based on Load flow of the network over a period of time, the technical losses are estimated at various level of network i.e. 66/33 KV Lines, 66/11 or 33/11 KV PTRs, 11 KV Lines, 11/0.415 KV DT and LT lines.
2. Based on the results obtained; schemes are prepared for technical loss reduction in respective area. Say for example, in some areas the line losses are to be addressed and in other it could be no load loss or load loss of DT.
3. Some of the actions taken are
   ▪ Installation of capacitor banks to take care of reactive compensation
   ▪ Addition of new feeder
   ▪ Installation of new DTs
   ▪ Laying new LT feeders

Commercial Loss
1. Based on following inputs the strategy for commercial loss reduction is prepared
   ▪ Analysis of Energy Audit (Energy Balance) report prepared upto the DT level.
   ▪ Input from field teams (O&M as well as Enforcement)
   ▪ Analysis of AMR data
2. Some of the actions taken are
   ▪ Conversion of LV bare to LV ABC or HVDS system
   ▪ Replacement of meters with Smart meters/static meters
Capital Investment – Reliability Improvement

Following inputs are used to prepare the strategy

1. Area wise SAIDI, CAIDI and SAIFI. This helps in understanding the performance of various areas geographically.
2. Analysis of fault occurrences for each feeder, area and network layer.
3. Analysis of data from SCADA, PQ meters and ABT meters.
4. Analysis of network using load flow and reliability tools

Based on above the schemes are prepared for various actions to be taken

1. Adding new switching devices
2. Automating switching points
3. Adding new DTs, Feeders, interconnectors etc.
4. Implementing new technologies for advances level of restoration schemes.
5. Adding advanced relays and self healing schemes.
Capital Investment Benchmarking is a Two Pronged Approach

Cost Data Book
- DERG published CDB
- CDB benchmarks the prices based on other DISCOMs trends & market research.
- CDB is revised from time to time to benchmark the allowed expenditure for any Capex

Competitive Bidding
- Tata Power-DDL conducts competitive bidding to award contracts.
- Selected L1 bidder is further negotiated to obtain lower rates.
- Further, reverse auction method is adopted to obtain most competitive rate

The Licensees invites & finalises tenders for procurement of equipment, material and/or services relating to such major investment, in accordance with a transparent, competitive, fair & reasonable procedure as may be specified by the Commission from time to time.
## Approval process for Capital Investment

### Document Submission (By Discom)
- Detailed Project Report for all EHV works, 11 KV & LT works
- Bill of Materials.
- Approval of Expert Technical Committee for Deposit Schemes.
- Site Photographs
- Site Inspection/visit Form

### In Principle Approval (By DERC)
- Necessity
- Overall suitability
- Pay back period
- Whether the scheme fits into CEA’s overall system planning study for Delhi
- Whether in-feed to the new sub station proposed will be available from the system of Delhi Transco Ltd (DTL)

### Final Approval (By DERC)
- Adherence to Competitive Bidding Guidelines
- Achievement of scope and objectives in line with the in principle approval
- All legal clearances including Electrical Inspectors certificate obtained

1. Capex Schemes of value less than Rs. 20 Lakhs and cumulative upto Rs. 50 Crs are not subjected to DERC approval
2. Deposit schemes of value upto Rs. 2 Crores are not subjected to DERC approval.
Physical verification of Assets by DERC

- DERC conducts physical audit of all the assets capitalized on Quarterly basis.
- The list of all the schemes capitalized is submitted to DERC on Quarterly basis (Annexure 1)
- The detailed BoQ of each scheme (Annexure-2) along with the respective GIS map is also provided to the Auditors.
- DERC conducts site visit of all the assets with concerned project officials of Tata Power-DDL.
- DERC approves the capitalization of the assets based on physical audit of the assets.

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**Details of Schemes Capitalized During the Quarter From 01.01.2011 to 31.03.2011**

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<thead>
<tr>
<th>S.No</th>
<th>Scheme No.</th>
<th>Scheme Description</th>
<th>Zone</th>
<th>District</th>
<th>Date of Capitalization</th>
<th>Date and Ref. of approval</th>
<th>Approved Date</th>
<th>Approved Cost (Rs.)</th>
<th>Capitalized Cost (Rs.)</th>
<th>Revised Approval, if any in capitalization not more than approved cost</th>
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<tbody>
<tr>
<td>1</td>
<td>000001</td>
<td>Scheme 1</td>
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<td>DOL</td>
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<td>Scheme 2</td>
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<td>DOL</td>
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<td>17/02/2011</td>
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<td>5000000.00</td>
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**Bill of Quantity**

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<th>Item Description</th>
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<th>Rate (per unit)</th>
<th>Total (Rs.)</th>
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<td>100</td>
<td>10000</td>
</tr>
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<td>90000</td>
</tr>
<tr>
<td>Item 4</td>
<td>400</td>
<td>400</td>
<td>160000</td>
</tr>
<tr>
<td>Total</td>
<td>1000</td>
<td>1000</td>
<td>1000000</td>
</tr>
</tbody>
</table>

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**Notes**

- DERC conducts the physical verification of all the assets capitalized on a Quarterly basis.
- The list of all the schemes capitalized is submitted to DERC on a Quarterly basis (Annexure 1).
- The detailed BoQ of each scheme (Annexure-2) along with the respective GIS map is also provided to the Auditors.
- DERC conducts site visits of all the assets with concerned project officials of Tata Power-DDL.
- DERC approves the capitalization of the assets based on physical audit of the assets.
Verification by DERC for final approval of Capitalization

- DERC verifies whether various equipment & materials for execution of schemes have been procured through fair, transparent & competitive means.

- DERC verifies various requisite statutory certificates including Electrical Inspector certificate.

- DERC verifies the copies of Purchase Order for procurement of equipment & contracts awarded for services.

- DERC also checks the veracity of payments made against the set Purchase Order through the Journal Vouchers.
**Sample Format for Capital Investment proposal submitted to DERC – Load Growth**

**Scheme Justification**

| a | Scheme Name | CAPEX 18-19: INTERCONNECTOR SHIV DHARAM KANTA KIOSK and POLE NO. HT 507-17/52/2, ZONE-507, DISTT.-BDL |
| b | Scheme No. | PR/507/07/00114 |
| c | Estimated Cost (in Rs. Lacs) | TPDDL: 27.48 (Excl. of taxes) | CDB: 27.48 (Excl. of taxes) | RR Charges: 3.88 Lacs |
| d | Scheme category | Load Growth / 11 KV System Augmentation |
| e | Objective | To shift load of GOONGAWALA WITH T-OFF GALI NO-9 JJ CLY PL/M Feederto Shiv Dharam Kanta Feeder from Siraupur Grid and to ensure N-1 of trunk feeder. |
| f | Scope of work in brief (Major Items) | 1) HT XLPE-400 CABLE - 885 Metres |
| g | Completion Period | 300 Days |
| h | Single Line Diagram of the existing network & proposed network | Attached |
| i | Justification/ Necessity | Existing Scenario: GOONGAWALA WITH T-OFF GALI NO-9 JJ CLY PL/M Feeder from SOTH-2 Grid feeds the load of a large area including HVDS area. The loading of GOONGAWALA WITH T-OFF GALI NO-9 JJ CLY PL/M feeder is 256 Amps. However network connectivity is such that only one backup source can be used at a time, therefore during N-1, it was difficult to backfeed the load on backup source. Moreover this feeder was contributing to tech. losses due to high loading. |
| | | Proposed Scenario: It is proposed to lay a new interconnector between GOONGAWALA WITH T-OFF GALI NO-9 JJ CLY PL/M and POLE NO. HT 507-17/52/2. This will shift approximately 100 A load from... |
## Scheme Justification

### Scheme Name:
CAPEX 18-19: OVERHEAD TO UNDERGROUND CONVERSION OF RAJA VIHAR VIHAR KHADDA BASTI FEEDER FROM POLE NO. HT516-45/22-23 TO FSS, Zone-807, District-SDL

### Scheme Category
Reliability Improvement Scheme/ Safety Related CAPEX Work

### Objective
To improve the reliability of RAJA VIHAR KHADDA BASTI FEEDER from BADLI Grid.

### Scope of Work in brief (Major Items)
1. HT XLPE 400 CABLE - 880 Metres

### Completion Period
300 Days

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### Single Line Diagram of the existing network & proposed network
Attached

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### Existing Scenario:
Raja Vihar khadda basti feeder and DMRC depot feeder from Badli grid are running on some poles in parallel. They both have OH Bare Dog sections. Therefore in case of any fault on any one feeder, the other one also needs to be shut down for safety purposes. This affects the SAIDI index as well pose a serious safety hazard.

### Proposed Scenario:
In order to ensure to reliability of RAJA VIHAR KHADDA BASTI feeder, 0/H section of this feeder approx. 600 m will be replaced by U/G cable for enhancing safety as well as improve reliability parameters - SAIDI, as nos. of customers will be less affected during any outage/fault condition which will help in compliance of PA timeline in case fault rectification.

---

### Scheme Proposal

<table>
<thead>
<tr>
<th>Name of Scheme</th>
<th>CAPEX 18-19: OH to UG Conversion Raja Vihar Khadda Basti Feeder</th>
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</thead>
<tbody>
<tr>
<td>Name of Applicant</td>
<td>TPDCL-Pt</td>
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<tr>
<td>Total Cost of Scheme (Rs.): Executive of Tax</td>
<td>(1,665,741.14)</td>
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<tr>
<td>TPDCL Share (Rs., Exclusive of Tax)</td>
<td>(1,665,741.14)</td>
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<tr>
<td>Customer Share (Rs., Exclusive of Tax)</td>
<td>0.00</td>
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<tr>
<td>Annual Revenue Return%</td>
<td>26.60</td>
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<tr>
<td>Payment Period (Years)</td>
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<tr>
<td>As Per Cost Data Book - CDB FY 2017-18</td>
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<tr>
<td>Total Cost of Scheme (Rs., Exclusive of Tax)</td>
<td>(1,665,741.14)</td>
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<tr>
<td>TPDCL Share (Rs., Exclusive of Tax)</td>
<td>(1,665,741.14)</td>
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<tr>
<td>Customer Share (Rs., Exclusive of Tax)</td>
<td>0.00</td>
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<tr>
<td>Annual Revenue Return%</td>
<td>26.60</td>
</tr>
<tr>
<td>Payment Period (Years)</td>
<td>5.76</td>
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<tr>
<td>Credit for dismantle</td>
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<tr>
<td>New Charges For Railways (Rs.)</td>
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<tr>
<td>Total Road Restoration Charges</td>
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<tr>
<td>Total Civil Cost</td>
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</tr>
<tr>
<td>Total El Cost</td>
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<tr>
<td>Load Demand (kW)</td>
<td>6.61</td>
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<tr>
<td>Units Saved from Technical Loss per Year</td>
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<tr>
<td>Estimated Duration for Project Completion (Days)</td>
<td>300</td>
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<tr>
<td>Funding Arrangement</td>
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<tr>
<td>Approval of Steering Committee</td>
<td>NO</td>
</tr>
<tr>
<td>Approval of EUC for depot work</td>
<td>NO</td>
</tr>
<tr>
<td>Railways Permission Required</td>
<td>NO</td>
</tr>
<tr>
<td>Availability Land &amp; ROW</td>
<td>PWD</td>
</tr>
</tbody>
</table>

Name of Feeder: RAJA VIHAR KHADDA BASTI
Sample Format for Capital Investment proposal submitted to DERC – Infrastructure

Scheme Justification

**A. Schema Name:** CAPEX-18-19: Scheme prepared for training center in CENPEID (Tata Power – DDL)

**B. Schema No.:** CV/C/0000/0239

**C. Estimated Cost (in Rs.)**
- Estimated Cost without taxes: Rs. 20,211,500

**D. Schema category:** Infrastructure Development Schemes/ Civil Infrastructure Projects

**E. Objective:** Construction of new training rooms at CENPEID.

**F. Scope of work in brief (Major Items):**
- New training rooms at CENPEID.

**G. Layout Drawing:** Attached

**Background:**
Various training programs and workshops are organized at Tata Power DDL Learning Centre, CENPEID for company employees and BAs working with the company. The company is also inducting fresh and young talent both in the AoT and ETM/T category from reputed institutions. At times, to optimize the cost, external faculties are invited at CENPEID to benefit more participants rather than sending employees outside. CENPEID has also joined hands with TMTC for conducting premium programs for our senior executives.

CITC Cenpeid has become a highly appreciated Partner Training Institute with Power Finance Corporation for organizing programs under the themes approved by MoP for external utility participants. By organizing such programs, Tata Power DDL has been earning revenue under the MoP themes and also through customized programs being developed for other national and international utilities.

The above has resulted into the need to enhance and improve the quality of training infr to cater to external utility participants from India and other international Utilities.
Sample Format for Capital Investment proposal submitted to DERC – AT&C Loss Reduction

Capital Investment proposal for AT&C Losses (Sample Format)

Scheme Justification

**Scheme Name:** Conversion of overhead single-phase conductor to LT ABC at NNR Colony in areas 536 (B) KPM Metro Circle in CAPEX 12-13.

**Scheme No.:** PRU/06321/00002

**Notification No.:** 486/0003/14/48

**Executive Summary:** In Caper's plan of capex 12-13 list of schemes were implemented zone wise. This scheme is opacified in proposed CAPEX 12-13 under LT ABC list as 3. No. 09. The list of proposal in priority list is attached.

Site Survey for this area has been done by Mr. Surya with a team. The site survey report is verified by zone and submitted in CEGS for scheme preparation. ELD & BG for this scheme has also been provided after survey and is attached with the scheme. As per zone manager's review feeder of LT ABC is required as per the load growth in the area of NNR colony in 2013. As per zone, there are 3 nos. of AOB existing and having DT losses of 11%. A site survey was done and the existing conductor is very old and in need to be replaced. Also, there is concern of safety. So LT ABC is used for conversion.

**Justification:** Conversion of overhead to LT ABC is required because per load and the existing overhead conductor is very old and is needed to be replaced. Also, there is concern for safety. So LT ABC is used for conversion.

**Scope of Work:**
1. PLCI-Poles (16)
2. 3X120 sqmm LT ABC (300mtr)
3. TYCO Boxes (20 No.)

**Budget and Cost Details:**

<table>
<thead>
<tr>
<th>Scheme No.</th>
<th>Capex Head</th>
<th>Total Budget @ Unit Cost</th>
<th>CoC of the scheme</th>
<th>%RR</th>
<th>PAYBACK PERIOD</th>
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</thead>
<tbody>
<tr>
<td>PRU/06321/00002</td>
<td>LT ABC</td>
<td>20 Cr</td>
<td>3.50 Cr</td>
<td>32.40</td>
<td>1.00</td>
</tr>
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</table>

**Resolution No.:**

<table>
<thead>
<tr>
<th>Scheme Notification No.</th>
<th>Name of Scheme</th>
<th>Purpose of Scheme</th>
<th>Name of Applicant</th>
<th>Total Cost of Scheme (Rs.)</th>
<th>NDRPL Share (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>180003/21/20/38302</td>
<td>Transmission Lines with LT ABC Cable at NHRI Colony</td>
<td>LOAD GROWTH: AT&amp;C</td>
<td>324,996.56</td>
<td>324,996.56</td>
<td></td>
</tr>
</tbody>
</table>

**Customer Share (Rs.):** 0.00

**Annual Revenue Return (%):** 32.40

**Payback Period (Years):** 3.00

**Load Demand (Kw):** 9.00

**Units Saved from Technical Losses per Year:** 0.90

**Estimated Duration for Project Completion (Days):** 90

**Execution Agency:** KESC (I&I)-Metro

**Percentage Voltage Regulation:** 0.01

**Creation Date:** 25.05.2012

**Approval Date:**

**Funding Arrangement:** INTERNAL

**Approval of Steering Committee:** NO

**Approval of ETC for Depot Works:** NO

**Availability of Land / Source:** MCD/PWD

**ANNEXURES:**

1. History
2. Justification
3. Scope of Work [Attached]
4. Technical Observation
5. Single Line Diagram
6. Geographical Layout
7. VR & R/R Sheet

**Name of Feeder:** NHRI COLONY
During 1st MYT percentage of capital expenditure for AT&C loss reduction was significant.

Almost 66% of capital expenditure was incurred in non-growth heads i.e. AT&C losses, Reliability Improvement & Infrastructure development.

In 3rd MYT period, 77.2% of capital expenditure was incurred towards Load Growth demonstrating productive allocation of capex.

Reduced AT&C losses freed surplus to meet the load growth in 2nd MYT.

Capital Investment as approved by DERC under different heads.
AT&C losses in 2002 was as high as 53.1% before Tata Power-DDL took over.

In 1st MYT Period, 33.8% of total capital expenditure was incurred to reduce AT&C losses as power theft & technical losses were astronomical.

In successive MYTs, the distribution network got strengthened so percentage Capex on AT&C significantly reduced.

Reduced Capex towards AT&C allows higher Capex allocation towards growth & network expansion.
Percentage Capex incurred towards improving Reliability was 19.94% (289 Crs).

The Capital Investment incurred towards Reliability improvement led to satisfactory improvement in Reliability indicators - SAIFI & SAIDI.

The improved Reliability of network provides fiscal space to allocate Capital expenditure towards network expansion & load growth.

Capital expenditure incurred towards strengthening distribution network in 1st MYT yielded dividends which gave us the fiscal space to allocate majority of Capex 56% towards load growth in 3rd MYT.
Capex Required for the Utility of the Future

- **2018-2025**
- **Distribution Network Automation & Mechanization**
- **Digitization**
- **Distributed Energy Storage**
- **Electric Vehicles**
- **Advanced DMS**
- **Distributed Generation**
- **Data Analytics**
- **ADM S**
- **Power Quality**
- **Dynamic Power Management & Weather Forecasting**
- **Smart Meter Communication Technologies**
- **Intelligent Substations**
- **Energy Efficiency and Demand Response**
Towards a New Incentive Model

- Above 20% AT&C Loss: Incentive only for major reduction in excess of 5%
- Between 20%-15% AT&C Loss: Incentive only for reduction as per set targets by regulator
- Between 10%-15% AT&C Loss: Incentive based on combination of loss reduction & increase in reliability
- Below 10% AT&C Loss: As losses reduce more incentive to be based on reliability
- Incentive on Sale of Surplus Power
5-star Energy Efficient Appliances

Installation Of LED Based Street Lights

Distribution Of LED Bulbs At Subsidized LED Bulbs Procured From EESL In Line

Objectives Of UJALA Scheme

Solar Rooftop

Installation Of Smart Meter

Net Metering

Government Schemes Implemented through DISCOMs

<table>
<thead>
<tr>
<th>DSM Schemes</th>
<th>Count (Nos)</th>
<th>Energy Saved (MU)</th>
<th>Peak Load Reduction (MW)</th>
<th>CO2 Reduction (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebate based AC Replacement Program</td>
<td>19795</td>
<td>17.65</td>
<td>17.81</td>
<td>5876.98</td>
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<tr>
<td>DSM based energy efficient lighting program</td>
<td>1400000</td>
<td>44.1</td>
<td>10.5</td>
<td>14685.3</td>
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<tr>
<td>Discount Based scheme for energy efficient LED lighting Products &amp; Ceiling fans</td>
<td>155000</td>
<td>7.89</td>
<td>1.44</td>
<td>2627.35</td>
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<tr>
<td>Unnat Jyoti by Affordable LEDs for All (UJALA scheme)</td>
<td>1017271</td>
<td>30.66</td>
<td>7.22</td>
<td>10212.47</td>
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<tr>
<td>Super Energy Efficient Ceiling Fan (BLDC technology based)</td>
<td>1849</td>
<td>0.31</td>
<td>0.09</td>
<td>104.18</td>
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<tr>
<td>Total</td>
<td>100.61</td>
<td>37.06</td>
<td>33506.28</td>
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</tr>
</tbody>
</table>
Thank You
Benchmarking of Opex

O&M expenses (Employee expenses, R&M Expenses & A&G Expenses) is determined by DERC on the basis of capacity of assets installed at site i.e., per circuit km of line & per MVA

<table>
<thead>
<tr>
<th>Particulars</th>
<th>% of O&amp;M Expenses</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT Voltage level</td>
<td>70%</td>
<td>N.A.</td>
</tr>
<tr>
<td>HT Voltage level</td>
<td>20%</td>
<td>8% in line and 12% in grid</td>
</tr>
<tr>
<td>EHT Voltage level</td>
<td>10%</td>
<td>4% in line and 6% in grid</td>
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</tbody>
</table>

Approved O&M expenses for Tata Power-DDL

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Unit</th>
<th>2017-18</th>
<th>2018-19</th>
<th>2019-20</th>
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</thead>
<tbody>
<tr>
<td>66 kV Line</td>
<td>Rs. Lakh/ckt. km</td>
<td>3.297</td>
<td>3.482</td>
<td>3.678</td>
</tr>
<tr>
<td>33 kV Line</td>
<td>Rs. Lakh/ckt. km</td>
<td>3.297</td>
<td>3.482</td>
<td>3.678</td>
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<tr>
<td>11kV Line</td>
<td>Rs. Lakh/ckt. km</td>
<td>0.862</td>
<td>0.910</td>
<td>0.961</td>
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<tr>
<td>LT Line system</td>
<td>Rs. Lakh/ckt. km</td>
<td>6.372</td>
<td>6.730</td>
<td>7.107</td>
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<tr>
<td>66/11 kV Grid S/s</td>
<td>Rs. Lakh/MVA</td>
<td>0.927</td>
<td>0.979</td>
<td>1.034</td>
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<tr>
<td>33/11 kV Grid S/s</td>
<td>Rs. Lakh/MVA</td>
<td>0.927</td>
<td>0.979</td>
<td>1.034</td>
</tr>
<tr>
<td>11/0.415 kV DT</td>
<td>Rs. Lakh/MVA</td>
<td>1.326</td>
<td>1.400</td>
<td>1.479</td>
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