Upgradation and Expansion of Electricity Distribution Grids in Maharashtra (India)
Indian Power Sector Scenario

Overview:

• Peak Power Demand in India 243 GW growing at 5.7% CAGR.
• Renewable Energy contribution 82 GW growing at 19.5% CAGR.

Initiatives by the Government of India in Power Sector:

1. Revamped Distribution Sector Scheme (RDSS)- US$ 8.4 Billion:
   • Loss Reduction
   • System Strengthening
   • Smart Metering

2. Ease of Living:
   • Reliable and quality power supply (24X7)
   • Improvement in consumer services

3. Emphasis on Renewable Energy (50% by 2030 and net zero carbon emission by 2070):
   • KUSUM (Kisan Urja Suraksha Uthan Maha Abhiyan)- US$ 950 million
   • PM Surya Ghar Muft Bijli Yojana (Roof Top Solar Scheme)- US$ 9000 million
Maharashtra Power Scenario

About Maharashtra:
- Maharashtra is third largest state in India (0.3 million sq kms) and second largest state by population (112 million)
- It ranks first in terms of economy with estimated GDP of around $500 billion
- Maharashtra's Energy demand in FY 24 was 207 billion units

About MSEDCL (Maharashtra State Ele. Dist. Co. Ltd)
- MSEDCL is largest power distribution utility in India and second largest in Asia
- It serves around 30 million consumers.
- In FY 24, it sold 131 billion units and catered to maximum demand of 25 GW and generated revenue of US$ 12,236 million

- **MSEDCL has contracted 35% of power from renewable sources excluding hydro (14.5 GW)**
- **11 GW solar power from rural distribution and rooftop solar segment are under process for contracting.**
- **MSEDCL is now focusing on RTC green power and storage solutions to ensure integration of R.E sources**
Consumer mix and Infrastructure in MSEDCL

Consumer Mix

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nos. of Consumers</td>
<td>30 millions</td>
</tr>
<tr>
<td>Annual Sales</td>
<td>1,31,812 MUs</td>
</tr>
<tr>
<td>Maximum Demand Catered</td>
<td>25.2 GW</td>
</tr>
<tr>
<td>Employees strength</td>
<td>80,000</td>
</tr>
</tbody>
</table>

Infrastructure

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Unit</th>
<th>FY 23-24</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Stations</td>
<td>Nos.</td>
<td>4,200</td>
<td>5%</td>
</tr>
<tr>
<td>DTCs</td>
<td>Nos.</td>
<td>875,896</td>
<td>8%</td>
</tr>
<tr>
<td>LT Lines</td>
<td>Ckt-kM</td>
<td>676,836</td>
<td>2%</td>
</tr>
<tr>
<td>HT Lines</td>
<td>Ckt-kM</td>
<td>384,243</td>
<td>3%</td>
</tr>
</tbody>
</table>

Demand is expected to grow @ 6.5% and will reach 45GW by 2035
Need for upgradation of Distribution grids

1. Rising Demand:
   • Expected to become $10 Trillion economy by FY 2030.
   • Rise in per capita consumption
   • Penetration of Electric Vehicles

2. Integration of growing renewable energy in grid:
   • 17 GW Ag load being shifted on solar.
   • 3 million solar roof top consumers by 2027.

3. Transmission Constraints:
   • Disparity in demand and generator location
   • Congestion in North-South corridor resulting constraints in RE evacuation

4. Distribution Constraints:
   • Ageing infrastructure
   • High technical loss due to overloading
   • Difficulty in accommodating decentralized solar generation

5. Technical advancement of Power System:
   • Use of IoT regime for fault detection and restoration
   • Supervisory Control And Data Acquisition (SCADA)
Overcoming constraints

1. Load flow analysis and network Planning

2. System Strengthening under RDSS scheme (4.6 Billion $USD)

- Agriculture feeder separation (5,000 Nos)
- Overloaded feeder Bifurcation (1,000 Nos)
- New sub-stations/Upgradation of existing sub-stations (527/705 Nos)
- Underground cabling and AB cable (100 Kms)
- HVDS in high loss areas (Losses > 25%)
- Smart metering- System metering (Feeders & DTCs) and Consumer metering (25 million)
- New/Augmentation of Distribution transformers (26,000/16,000)
- SCADA
Mukhyamantri Saur Krishi Vahini Yojana 2.0 (MSKVY 2.0)

- The GoM reframed the scheme as a Mukhyamantri Saur Krushi Vahini Yojana 2.0 (MSKVY 2.0) in May 2023 and set objective of 30% feeder solarization by 2025 as a ‘Mission 2025’.
- With this running scheme, ~ 15 hundred thousand farmers will be benefited.

<table>
<thead>
<tr>
<th>Decentralized solar generation</th>
<th>Grid connectivity @ 11 kV voltage level at sub-station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Requirement</td>
<td>Acquire appx. 28,000 acres of barren land for solar plants</td>
</tr>
<tr>
<td>Feasible Land</td>
<td>Within 0 – 5 kms of radial distance from substation and in case of private land parcel preference to be given to the nearest land parcel</td>
</tr>
</tbody>
</table>

- 9 GW power to come by Dec 2025
- System strengthening required to accommodate decentralized power provision:
  - Sub-station- 2732 (no's)
  - Upgradation of sub-station- 504 (no's)
  - HT line- 13,234 Km
  - Expected expenditure- US$ 1 Billion
  - PPR submitted to ADB for approval

MSEDCL has issued LoAs for ~9,155 MW solar plant under the scheme
THANK YOU