TRANSFORMATION OF

ETHIOPIAN ELECTRIC UTILITY

Mr. Vinod Kumar Khare, CEO, EEU
10th June 2015
AGENDA

1. History of Ethiopian power sector
2. Present power scenario
3. Government growth and transformation plan
4. Management takeover by Indian consortium
5. Strategy plan
6. Progress so far
7. Growth plan
8. Way ahead
9. Conclusion
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ETHIOPIA

- Country in the horn of Africa
- Total area - 1.13 million square km
- 90 million inhabitants
- Population growth - 2.3% per year
- Average annual GDP growth rate ~10.7% for the last 10 years
Emperor Menilik II introduced electricity to Ethiopia

Ethiopian Electric Light and Power Authority established

Electricity Operator Regulation proclaimed

1898 1956 1997 1999 2013

Ethiopian Electricity Agency (EEA) & Ethiopian Electric Power Corporation (EEPCo) established

Ethiopian Electric Power (EEP) and Ethiopian Electric Utility (EEU) established
PRESENT POWER SCENARIO

Generation (~2268 MW)
- Hydro: 87%
- Wind: 8%
- Diesel: 5%
- Geothermal: 0%

Transmission (~12653 km)
- 400KV: 35%
- 230KV: 42%
- 132KV: 19%
- 66KV: 4%
ENERGY RESOURCES ARE HIGHLY UNDER-UTILIZED

<table>
<thead>
<tr>
<th>Resource</th>
<th>Unit</th>
<th>Exploitable reserve</th>
<th>Exploited</th>
<th>Percent exploited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydropower</td>
<td>MW</td>
<td>45000</td>
<td>2167</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>Solar/day</td>
<td>KWh/m²</td>
<td>5-7</td>
<td></td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Wind power</td>
<td>MW</td>
<td>13500</td>
<td>171</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Geothermal</td>
<td>MW</td>
<td>7000</td>
<td>7.3</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>Billion m³</td>
<td>113</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Wood</td>
<td>Million tons</td>
<td>1120</td>
<td>560</td>
<td>50%</td>
</tr>
<tr>
<td>Agriculture wastes</td>
<td>Million tons</td>
<td>15-20</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>Coal</td>
<td>Million tons</td>
<td>300</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Oil shales</td>
<td>Million tons</td>
<td>253</td>
<td></td>
<td>0%</td>
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Electricity consumption of Ethiopia is 5 watt/person compared to a world average of 306 watt/person
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TRANSFORMATION PLAN

Ethiopian Electric Power Sector Transformation Program as part of ambitious growth and transformation program of Government of Ethiopia

• Increase generating capacity from 2000MW to 10,000MW
• Expand the power transmission network by 50%
• Expanding the distribution network by 100%
• Distribution network rehabilitation
• Increase customers from 2 million to 4 million
• Increasing electric access coverage from 41% to 75%
• Reducing energy loss
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MANAGEMENT TAKEOVER BY INDIAN CONSORTIUM (1/2)

- India has come a long way in Power Sector reforms
- Ethiopia currently in a similar position as India was decades ago
- Indian consortium led by Power Grid Corporation of India engaged by Government of Ethiopia to-
  - Takeover the management and transform electrical system of Ethiopia
  - Implement ‘To Be Processes’ based on American Productivity and Quality Center’s Electric Utility Process Classification framework (APQC’s EUPCF)
  - Establish new organization by performing institutional transformation to reach at world class electric service provision
  - Inducting best operational practices
MANAGEMENT TAKEOVER BY INDIAN CONSORTIUM (2/2)

- Capability building of EU staff
- Infrastructure enhancement measures
- IT enablement
- Leverage the concept of balance scorecard as an aggregated dashboard of Key Performance Indicators (KPIs)
- Key aspects covered in Balance Scorecard-
  - Financial Stability
  - Operational Efficiency
  - Employee Productivity
  - Customer Orientation
- Meet the power requirements and associated challenges of an ever growing economy
INTernational Business of PowerGrid

Global Presence

Afghanistan  Bhutan  Bangladesh  Nepal  UAE  Nigeria  Sri Lanka  Kenya
Myanmar  Ethiopia  Tajikistan  Kyrgyz Republic  Pakistan  Congo  Senegal
Tanzania  Uzbekistan  Kazakhstan

16 Assignments for Projects worth more than USD 250 Million under execution with estimated Consultancy Fee of USD 95 Million

As on date

<table>
<thead>
<tr>
<th>Total Assignments</th>
<th>Completed</th>
<th>Ongoing</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>55</td>
<td>14</td>
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POWERgrid - One Nation, One Grid
POWERGRID- AREA OF CONSULANCY

DESIGN & ENGINEERING
CONTRACT/ PROCUREMENT SERVICES
PROJECT MANAGEMENT & CONSTRUCTION SUPERVISION
CAPACITY BUILDING
OPERATION & MAINTENANCE
ASSET MANAGEMENT
POWERGRID- AREA OF CONSULTANCY CONT'D.

PREPARATION OF GRID CODE
PREPARATION OF TARRIFF MECHANISMS
SMART GRID SOLUTIONS
ENERGY EFFICIENCY SOLUTIONS
ADVISORY IN MARKET ANALYSIS
IMPLEMENTATION OF RENEWABLE ENERGY CERTIFICATE MECHANISM
STRATEGIC PLAN OF EEU

- Electricity for all
- Financial self sustainability
- Capacity development
- Customer centricity
- Process excellence and IT self enablement
- Sustainable growth
TRANSFORMATIONAL DEVELOPMENT ACHIEVEMENTS

- New organization structure implemented
- Introduced new Policy/Procedure
- New Compensation & Benefits policy roll out
- Training and Development
  - Gap assessment Conducted
  - Training Programs identified & developed
  - Training for Engineers, Managers, Technicians in progress
- Quality Concepts & Standardization of Engineering Practices
- Revised & Standardized Power Purchase Agreements (PPAs)
- Rehabilitation of Generating units
- Rehabilitation and augmentation of transmission and distribution system
As part of Ethiopia’s long term goal to become a middle income country by 2025, increased urbanization and industrial developments are drastically uplifting the demand for energy. Energy demand is also stimulated by aggressive electrification rollout plan.
### Projects under construction

<table>
<thead>
<tr>
<th>Project</th>
<th>Power utilization (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Ethiopian Resaissance Dam</td>
<td>6000</td>
</tr>
<tr>
<td>Gibe III</td>
<td>1870</td>
</tr>
<tr>
<td>Genale Dawa III</td>
<td>254</td>
</tr>
<tr>
<td>Adama II</td>
<td>153</td>
</tr>
<tr>
<td>Solar</td>
<td>300</td>
</tr>
<tr>
<td>Geothermal</td>
<td>70</td>
</tr>
<tr>
<td>Waste to energy</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>~8700</strong></td>
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### Future power demand

- **Average annual growth rate**: ~12.7%
- **Demand**
  - **2012**: 0
  - **2037**: 120000

HUGE POWER DEMAND IN FUTURE
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WAY AHEAD

To be a hub for renewable energy source in East Africa

Ethiopia is a regional powerhouse in the horn and east Africa

LEGEND
- 220 kV
- 230 kV
- 230 kV Submarine Cable
- 400 kV
- 500 kV
- HVDC Link

Substation at 230 kV and above
Substation with Generation Facility (Switchyard at 230 kV and above)
Town
AC/DC Station (Converter/Inverter)
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ETHIOPIA INVESTMENT OPPORTUNITIES

• Ethiopia- one of **World’s Fastest Growing Economies**, recent record of Double digit GDP growth

• **Increasing Foreign Investment Inflow**- Development of many very large industry corridors

• Ethiopia is endowed with **abundant Renewable energy resources**

• Government intends to **accelerate regional integration and strengthen regional energy trade** while bringing in substantial export revenues and achieving economic growth

• Political stability

• Stable policies

• Secure operational environment

• Incentive to drive industrial preferences

• Push to sustainable growth

• Encourage private participation

• Investor friendly environment
THANK YOU