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Distribution Transformers - Energy Efficiency & Reliability

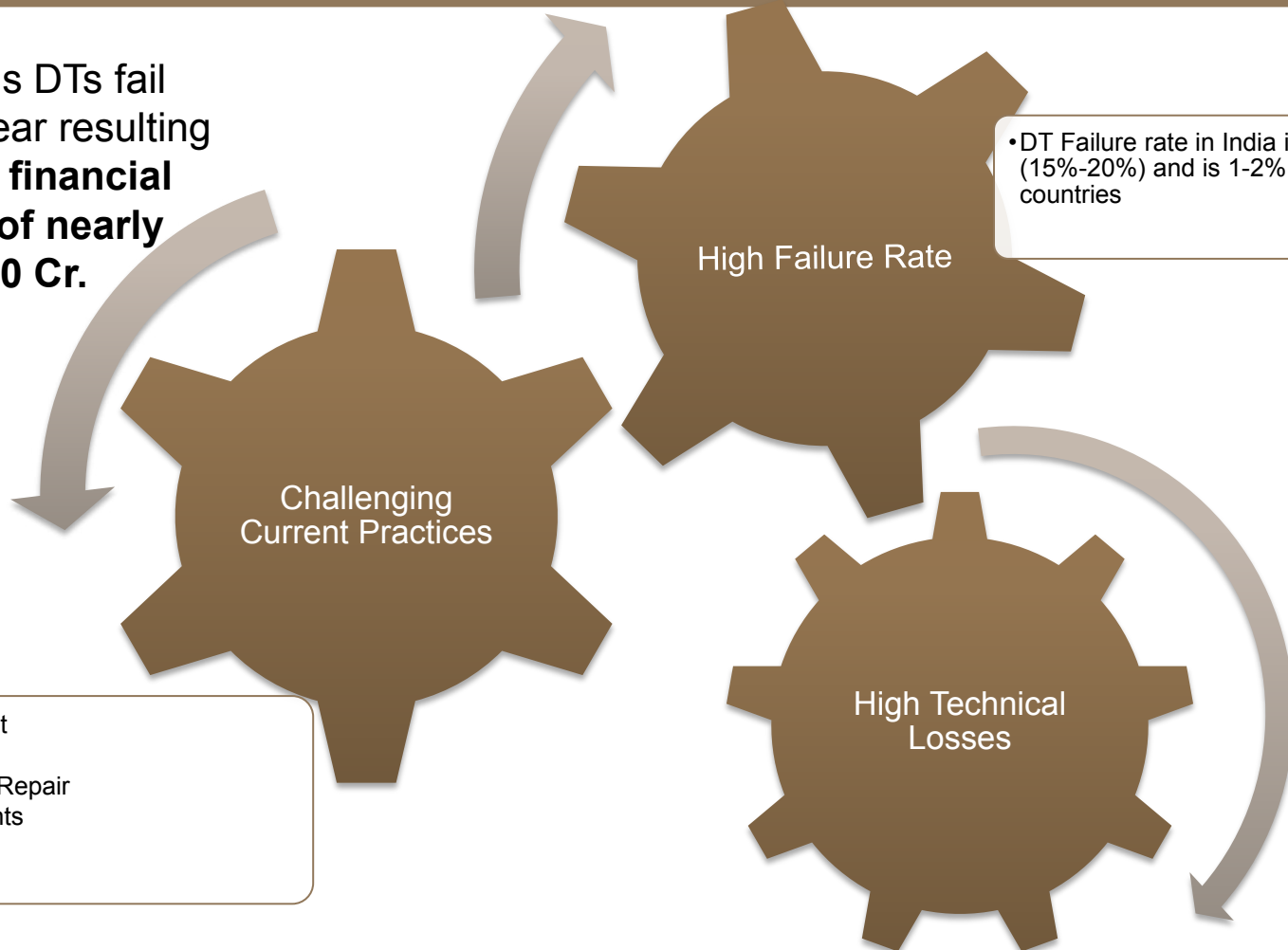
Manas Kundu
Bhopal, 10th March 2017



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- **Third world's largest transformer market (2015-16)**
 - **Distribution – 180,000 MVA**
 - **Power – 90,000 MVA**
 - **Compounded production growth rate - 9.8% (2006 – 2016)**
 - **Distribution transformer production CAGR over 10 years – 7.7%**
 - **Distribution transformer installed stocks growth rate – 6.4% (2005 – 2011)**
 - **Exceeding 7 million distribution transformers, 400 million kVA s powering India**
 - **Total distribution transformer assets valuation > INR 50,000 Crores**

Issues around DTs

6-8 lakhs DTs fail every year resulting in **huge financial losses of nearly Rs. 5000 Cr.**



•DT Failure rate in India is very high (15%-20%) and is 1-2% in developed countries

- Procurement
- O&M
- Breakdown Repair
- Replacements

- No Load Losses
- Full Load Losses

-
- **Distribution Transformer failure rate ~ 13%**
 - **Ranging from 0.5% to 22%**
 - **Approx. 70% repaired , balance replaced**
 - **Approx. additional cost to distribution sector - INR 5,000 Crores**
 - **Repair - INR 3,000 Crores**
 - **Replacement – INR 2,000 Crores**
 - **Approx. additional burden to consumer – 6.5 Paisa per unit !!**

Energy Efficiency – An Opportunity

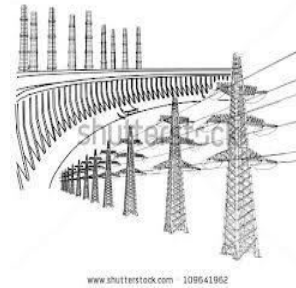
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95 TWh Annual Electricity Savings through 2030

19 % reduction in Distribution Losses

**Cumulative financial Savings
INR 56,000 Crores**

13.3 million tons annual reduction of carbon dioxide emissions



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Equivalent to the Output of a 4400 MW Wind Farm



Equivalent to 75 million Ton of coal



INR 21,000 Crores Investment in energy efficient DT

INR 45,000 Crores Savings in operating costs

Equivalent to 3.3 million cars off the road



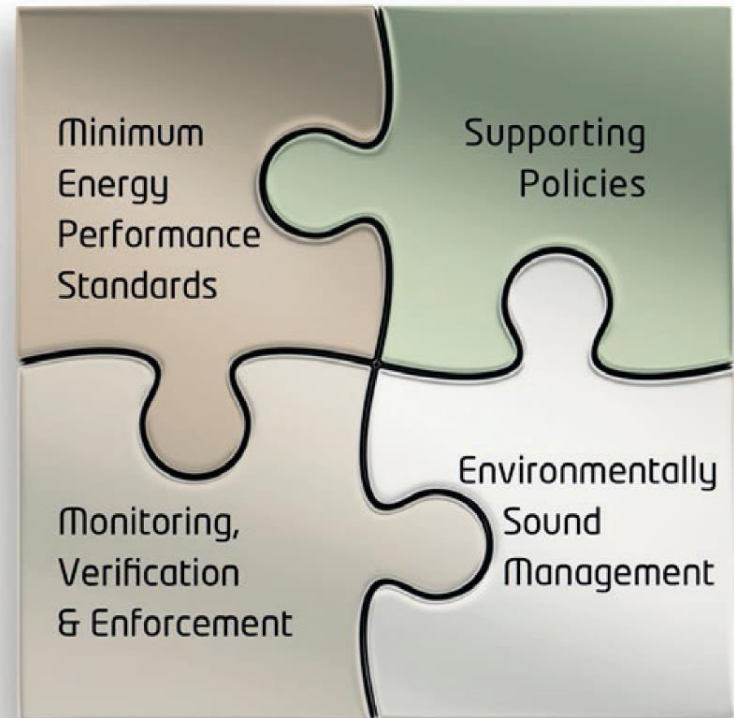
Partnership Approach For Enhanced Reliability

- **Improved procurement process**
 - Vendor qualification
 - Vendor / product certification
- **Improved operation / maintenance system**
 - Deployment of “SMART” monitoring & protection systems
 - Outsourcing of maintenance services
- **Outsourcing of Distribution System Network Services**

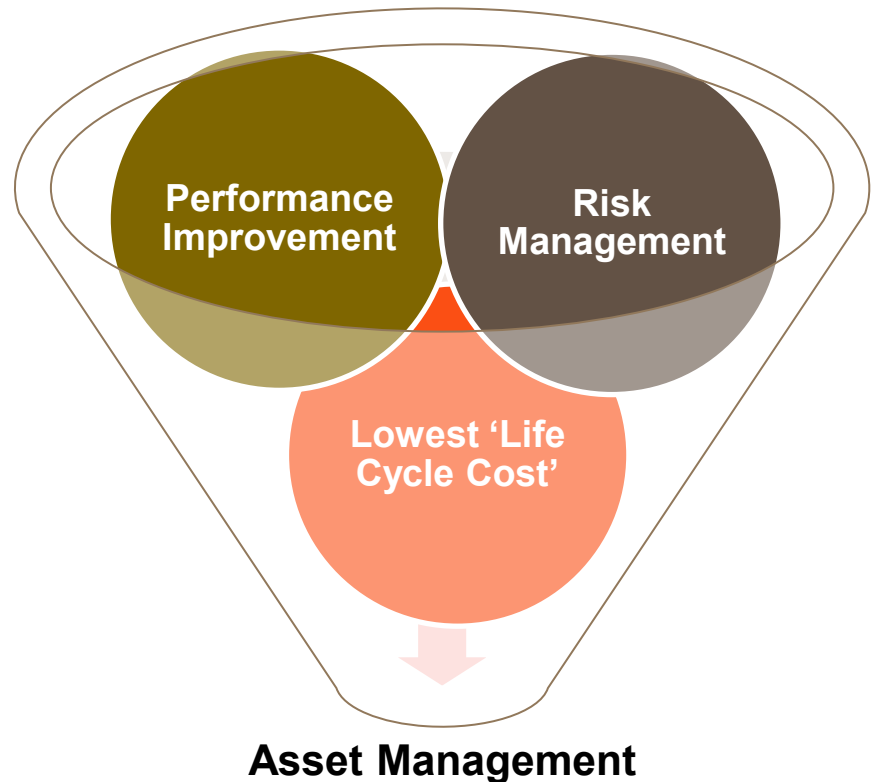
Integrated Approach For Rapid Energy Efficiency Transition

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- Improved MEPS
- Incentives from Network regulators'
- Utilities' & manufacturers' partnership for 'MV& E'
- Effective 'Life Cycle Management'
– Cradle to Grave



- Risk Management
 - Regulatory risk
 - Customer risk
 - Vendor risk
- Performance Improvement
 - SAIFI
 - SAIDI
 - T & D losses
- Lowest 'Life Cycle Cost'
 - Procurement & Installation cost
 - Operation & maintenance cost
 - Recycling of assets



New Model – Managed Service Provider (MSP)

Major Activities for MSP Operations

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Regulator

Allotment

Tariff (ARR)

Supply code; SOPs - PQR, Customer satisfaction

Load Dispatch Center (LDC)

Performance Fee

Technical loss saving through improved DT performance

Generation

- Central
- State
- Open Market

Transmission

- Inter state
- Intra state



Generation & Transmission

Distribution Licensee

DT MSP

HT & LT Consumers

- As of March 2015, the DISCOM cumulative losses stood at INR 3,60,700 crores.
- Estimated national average AT&C losses 24%
- At least 3-4% can be attributed to Technical losses within DTs



Metering & Billing



Revenue Collection



DT Health Diagnostics



Planning

Network Analysis & Planning



One-time Special Repairs



Operation and Maintenance

Regular Maintenance



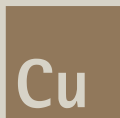
Fault Restoration

Fault Restoration

Thank you

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