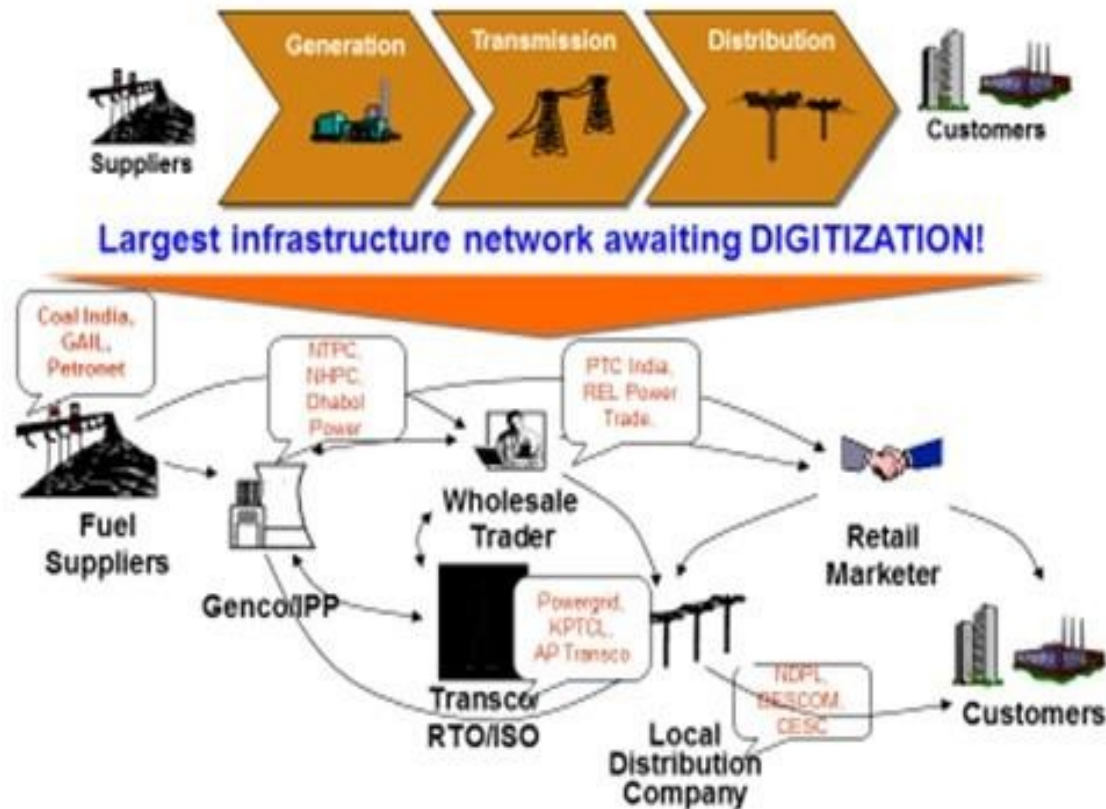


Leveraging Smart Grid Assets for Smarter Cities

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ELECTRICITY GRID: A PARADIGM SHIFT

Traditional Grid



Emerging Integrated Grid



Source: EPRI

An electricity grid with Communication, Automation and IT Systems that enable Real Time Monitoring and Control of Power Flows from points of generation to points of consumption at the appliances level

TYPICAL COMPONENTS OF SMART GRIDS

1. Electrical Network Strengthening at 33kV/11kV/0.415kV levels
2. SCADA/ DMS and Distribution Automation Systems
3. Moving Overhead Lines to underground cables at select locations
4. Distributed/Renewable Generation and its integration with electrical grid; Smart Microgrid that can island from main grids in times of emergencies
5. Conversion of Air Insulated Substations to Gas Insulated Substations
6. Communication systems connecting all substations and DTs on fibre optic network
7. Smart Metering or Advanced Metering Infrastructure (AMI)
8. Billing, CRM and Consumer Portal
9. Mapping electrical assets and consumers (all buildings) on digital maps (GIS)
10. IT Network (LAN, WAN), Data Centre, Asset Management and other Enterprise IT Systems
11. Enterprise Resource Planning (ERP)
12. Outage Management Systems and Mobile Crew Management Systems
13. Enterprise Applications Integration and Analytics

DESIRED FEATURES OF SMART CITIES

1. **Ensure 24x7 stable electricity to all citizens**
2. **Building GIS data of all infrastructure and services in an integrated fashion**
3. **High levels of Renewable Energy mix that is integrated with the power grid**
4. **EV Charging Infrastructure; Grid-connected EVs as virtual power plants (VPPs)**
5. **Efficient Water Distribution Network with leakage detection systems and safe Gas Distribution Networks**
6. **Integrated Billing Systems for a variety of services; Common Consumer Care Centers and user friendly Payment Platforms**
7. **Intelligent Transportation Systems – Traffic lights; Congestion Alerts; Common Toll Payments etc.**
8. **Digital Security Systems Integrated with emergency services (police, fire, ambulance, municipality etc.)**
9. **Intelligent buildings with rooftop PV and EV Charging facilities integrated with automation systems of the electric utility participating in the demand response**
10. **Sharing of data between various domains and building smart analytical tools**

Business Case for Smart Cities:

- ❖ **Two categories Cities in India:** Existing cities and New Cities
- ❖ **No Single Ownership** for all their services in a City - Herculean task to bring all services on a Common Platform
- ❖ Projects Complex and justifying ROI even more difficult

Business Case for Smart Grids:

- ❖ Electricity Distribution Companies (Discoms) in several states report very high AT&C losses (>30% in many large states); Smart Grid projects can bring losses down to below 10% and the payback period is 3-4 years
- ❖ Possible to **extend the Digital Platform** of one domain - say Electricity - to offer services in other domains - say Water, Gas, Internet, Security, Traffic etc

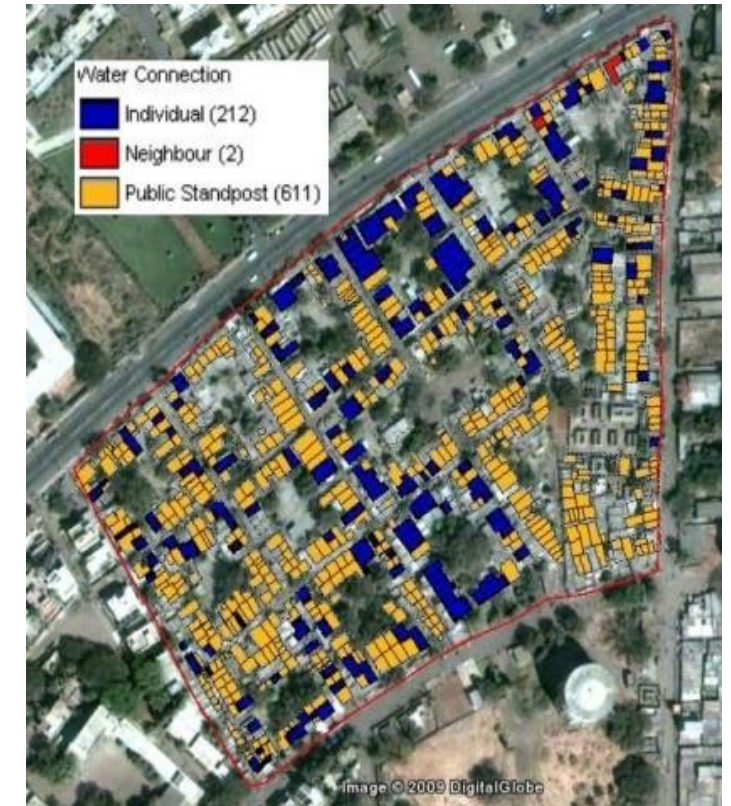
BUSINESS CASES FOR DIGITALIZATION OF POWER SECTOR - GIS MAPS

A. GIS Maps

- All electrical assets (medium voltage and low voltage lines, substations) and consumers are mapped on a digital map and the Utilities update this system on regular basis to capture changes/addition to the electrical network as well as new consumers/buildings
- This digital map can be effectively used by other infrastructure services providers for planning as well as operation and maintenance of their systems
- Very useful for planning the laying of water supply and sewerage lines, telecom cables, gas pipe lines etc; also useful for planning of road network

Market Opportunities

- ✓ Share the maps with other stakeholders in a city for a modest fee



BUSINESS CASES FOR DIGITALIZATION OF POWER SECTOR - AUTOMATION SYSTEMS

B. Automation Systems - SCADA/DMS, DA and SA, DR, DERMS

- Field infrastructure and dedicated communication bandwidth of automation systems can be shared with other infrastructure domains
- Latest trend is utilities building their own communication networks

Market Opportunities

- ✓ Common SCADA with Water and Gas Distribution Utilities
- ✓ Sharing the Communication Infrastructure for Security and Traffic cameras and other Smart City Applications
- ✓ Communication Network can be leased to Telecom Operators



BUSINESS CASES FOR DIGITALIZATION OF POWER SECTOR – BILLING AND CRM

C. Billing and Customer Relationship Management (CRM)

- Billing and CRM systems have been implemented in most towns and the consumers have multiple options to make their payments
- There are also Consumer Care Centers at strategic locations and interactive Consumer Portals
- DISCOMs have regular interactions with their customers on – Meter Reading, Bill Distribution, Payment Collection, Attending to Complaints, Information on Planned Outages etc

Market Opportunities

- ✓ These Systems can be used for collection of Water and Gas Bills, House Taxes and other Municipal Dues
- ✓ Can even be extended to private utilities such as Cable TV, internet, telephone, etc
- ✓ This not only reduces the overall collection cost, but also facilitates higher compliance in timely payment. If the consumer wishes, he/she could even opt for a consolidated bill across all such services

BUSINESS CASES FOR DIGITALIZATION OF POWER SECTOR – CALL CENTERS

D. Call Centers and Call Data Archives

- Customer Care Centers, Call Centers, Chatbots and Voice Bots of electric utilities are very valuable assets in a city/country
- The incoming calls (on single number) can be diverted to the respective teams responsible for each domain and their crew
- The IT and communication infrastructure and cost can be optimized to a great extent

Market Opportunities

- Revenue from sharing the Customer Care Centers, Call Centers, Chatbots and Voice Bots with other stakeholders
- **Analytics of data** from the customer calls and interactions with Chatbots and Voice Bots can be useful tools for different stakeholders to optimize their business operations
- Call Centers of electric utilities can be made **City Command and Control Centers** at marginal cost

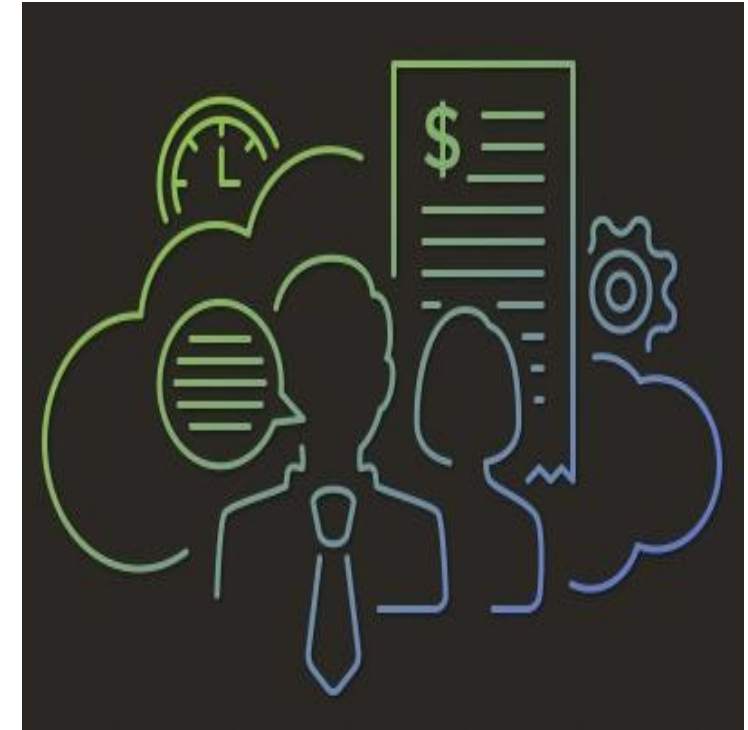
BUSINESS CASES FOR DIGITALIZATION OF POWER SECTOR – MANAGEMENT SYSTEMS

E. Outage Management System (OMS) and Mobile Workforce Management System (MWFM)

- OMS and MWFM platforms can be shared with other infrastructure and services providers

Market Opportunities

- ✓ Revenue from sharing the OMS and MWFM with Water and Gas Distribution agencies, White Goods Services agencies, other city service providers



Summary

- **Smart Grid** can be an anchor infrastructure of Smart Cities to accelerate the development of liveable, workable and sustainable ecosystem in SAARC Cities
- **Renewable Energy** is the key to build sustainable future which will promote carbon neutral Smart Cities
- **Standard Framework for Smart Cities** would help in understanding the interdependencies of various domains and better planning
- **Smart City Maturity Model** would map and benchmark various domains in the City and offer a framework to develop the roadmap for transformation from AS-IS state to TO-BE state in a phased manner



Thank you

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