Smart Grid framework: The roadmap ahead

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CII Meet
02-Nov'2012

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OUR STAKEHOLDERS

Stakeholder Expectation Alignment

Stakeholder	Expectation	Technology
Consumer	Reliability, Low Tariff, Empowerment, Customer service	AMI, DR, OMS, GIS, CRM, CIS
Community	Safety, Environment	SCADA
Regulator	Revenue, AT&C Loss	DMS, DA
Investor	Risk Management, Growth, Return on Equity	ERP BILLING/ ASSET MGMT/
Employee		

Smart Grid Drivers in India

Six factors will drive the adoption of Smart Grid in India are:

- ***Supply shortfalls :*** Demand continues to outpace India's power supply. The increasing affordability of household appliances is adding to the burden of grid. Official estimates of India's demand shortfall are 12% for total energy and 16% for peak demand. Managing growth and ensuring supply is a major driver for all programs of the Indian power sector.

- ***Loss reduction :*** India's aggregate technical and commercial losses are thought to be about 25 – 30%, but could be higher given that the substantial population that is not metered and the lack of transparency. While smart grid is not the only solution of reducing losses , as it could make a substantial contribution.

- ***Managing the 'human element' in system operations:*** Labor savings are not a prime driver for smart grid in India, as contracts for outsourcing are expensive. However, Automated Meter Reading (AMR) would lower recording and other errors.

Smart Grid Drivers in India – Contd..

- ***Peak Load Management :*** India's supply shortfalls are expected to persist for many years. A Smart grid allow more 'intelligent' load control, either through direct control or economic pricing incentives that are communicated to customers in a dynamic manner. Such measures would help mitigate supply-demand gap.

- ***Renewable Energy :*** India has supported the implementation of renewable energy. Historically, much support was from wind power, but the newly announced National Solar Mission (NSM) and its goal to add 20000 MW of solar energy by 2020 should be an accelerant. Spurred by environmental concerns and the desire to tap into all available sources of power, this move can also be a smart grid driver.

- ***Technological leapfrogging :*** perhaps, the most intriguing driver for India is the potential to "leapfrog" into a new future for electricity, as it did with telecommunications. Also, the "smart" in smart grid is ICT – an area of unique capability of India.

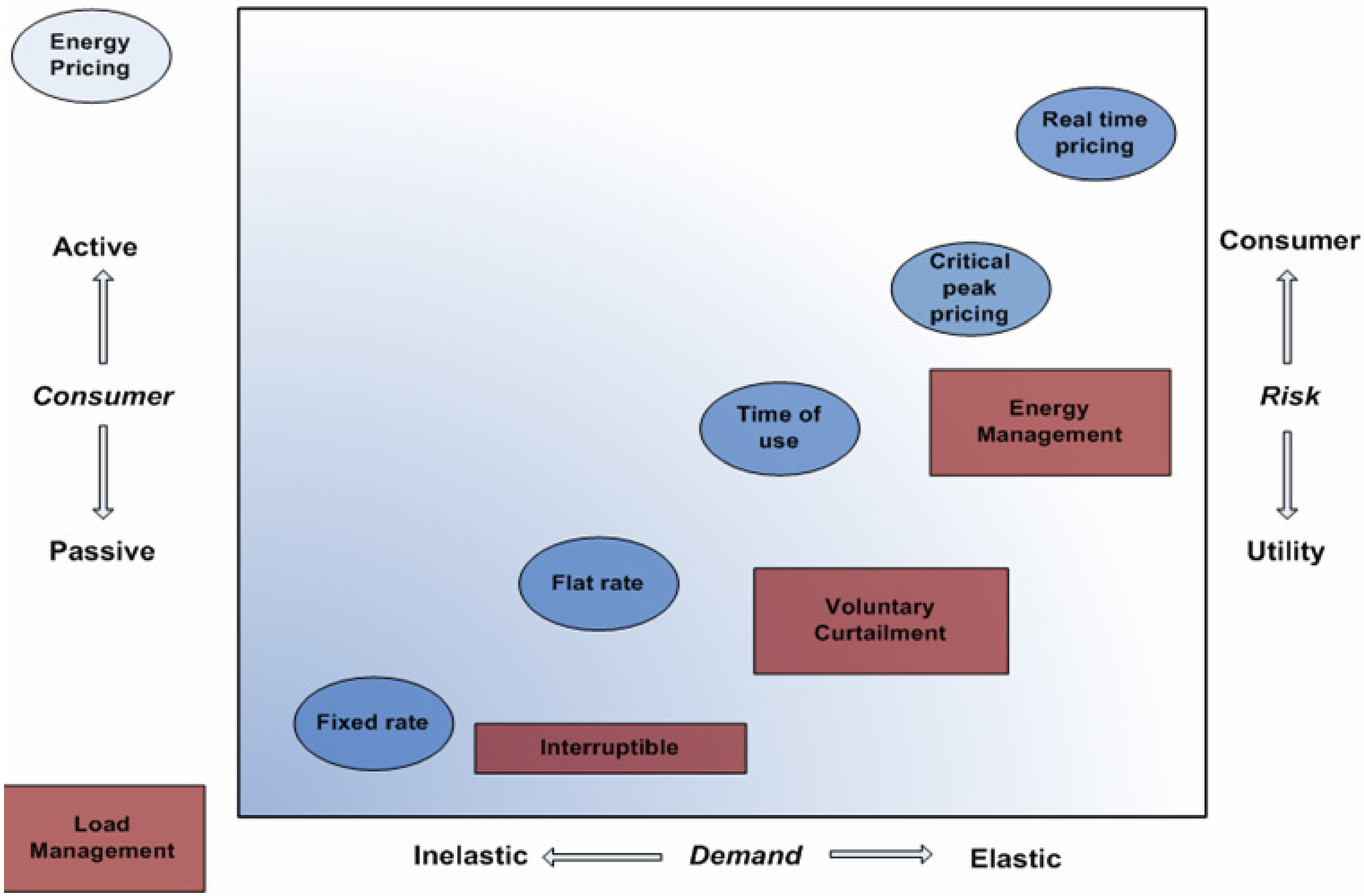
Smart Grid Gap

Characteristic	Today	Tomorrow
Enables Consumer Participation	Little price visibility, time-of-use pricing rare, few choices	Full price info, choose from many plans, prices and options, buy and sell
Accommodates Generation/Storage	Dominated by central generation. Little DG, DR, storage or renewable	Many "plug and play" distributed energy resources complement central generation
Enables New Markets	Limited wholesale markets, not well integrated	Mature, well-integrated wholesale markets, growth of new electricity markets
Meets PQ Needs	Focus on outages not power quality	PQ a priority with a variety of quality/price options according to needs

Smart Grid Gap

Characteristic	Today	Tomorrow
Optimizes Assets & Operates Efficiently	Little integration with asset management	Deep integration of grid intelligence with asset management software
Self Heals	Protects assets following disruption (e.g. trip relay)	Prevents disruptions, minimizes impact, restores rapidly
Resists Attack	Vulnerable to terrorists and natural disasters	Deters, detects, mitigates, and restores rapidly and efficiently

Consumer & Utility – Response to Power System Risk and Pricing



Challenges for Smart grid implementation in India

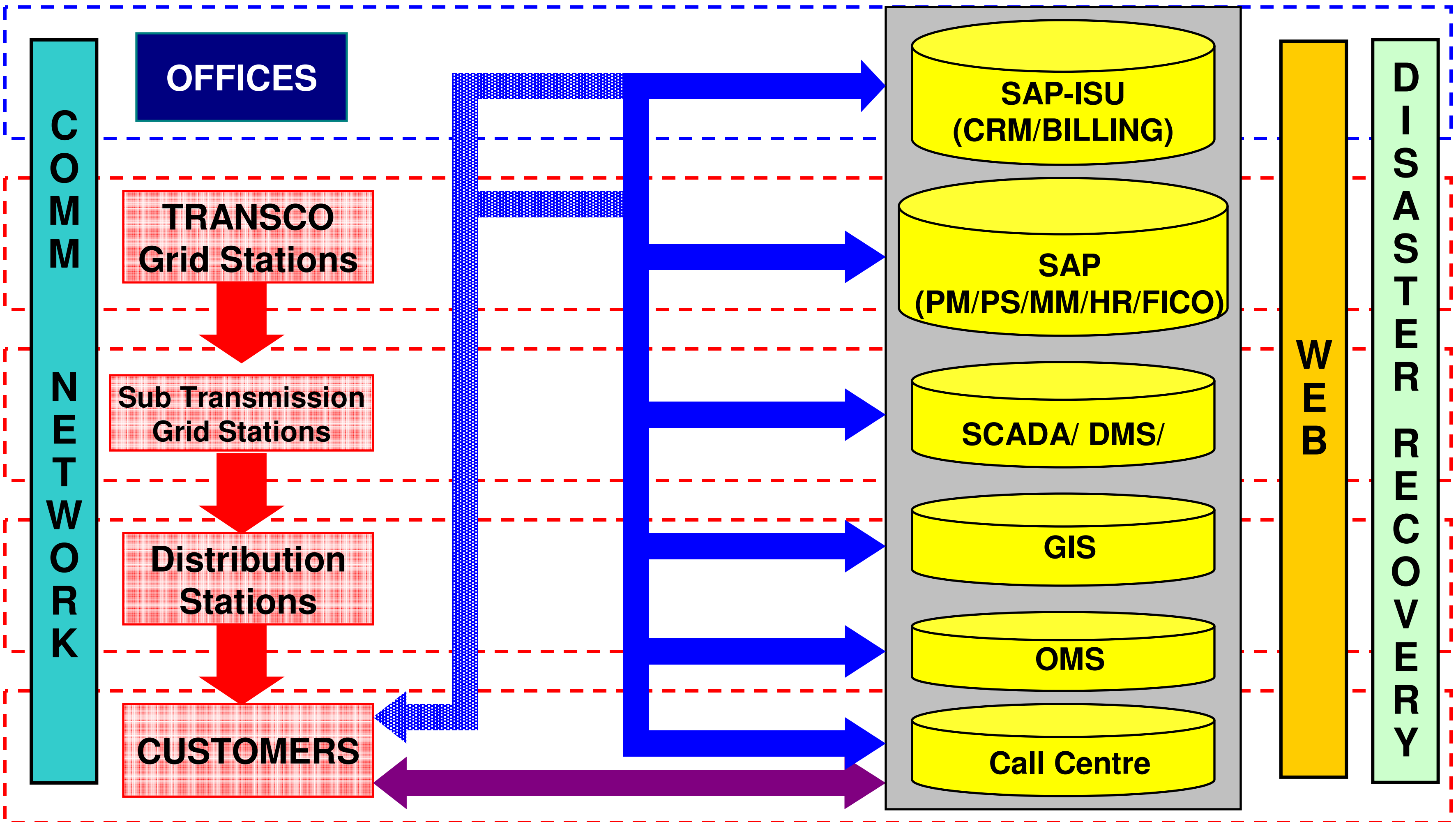
- *Financial resources*
- *Government support*
- *Compatible equipment*
- *Speed of technology development*
- *Lack of policy and regulation*
- *Capacity to absorb advanced technology*
- *Consumer education*
- *Cooperation*
- *Cost assessment*
- *Rate design*
- *Consumer protection*
- *Lack of empirical evidence*

Barriers in Smart Grid Implementation in India

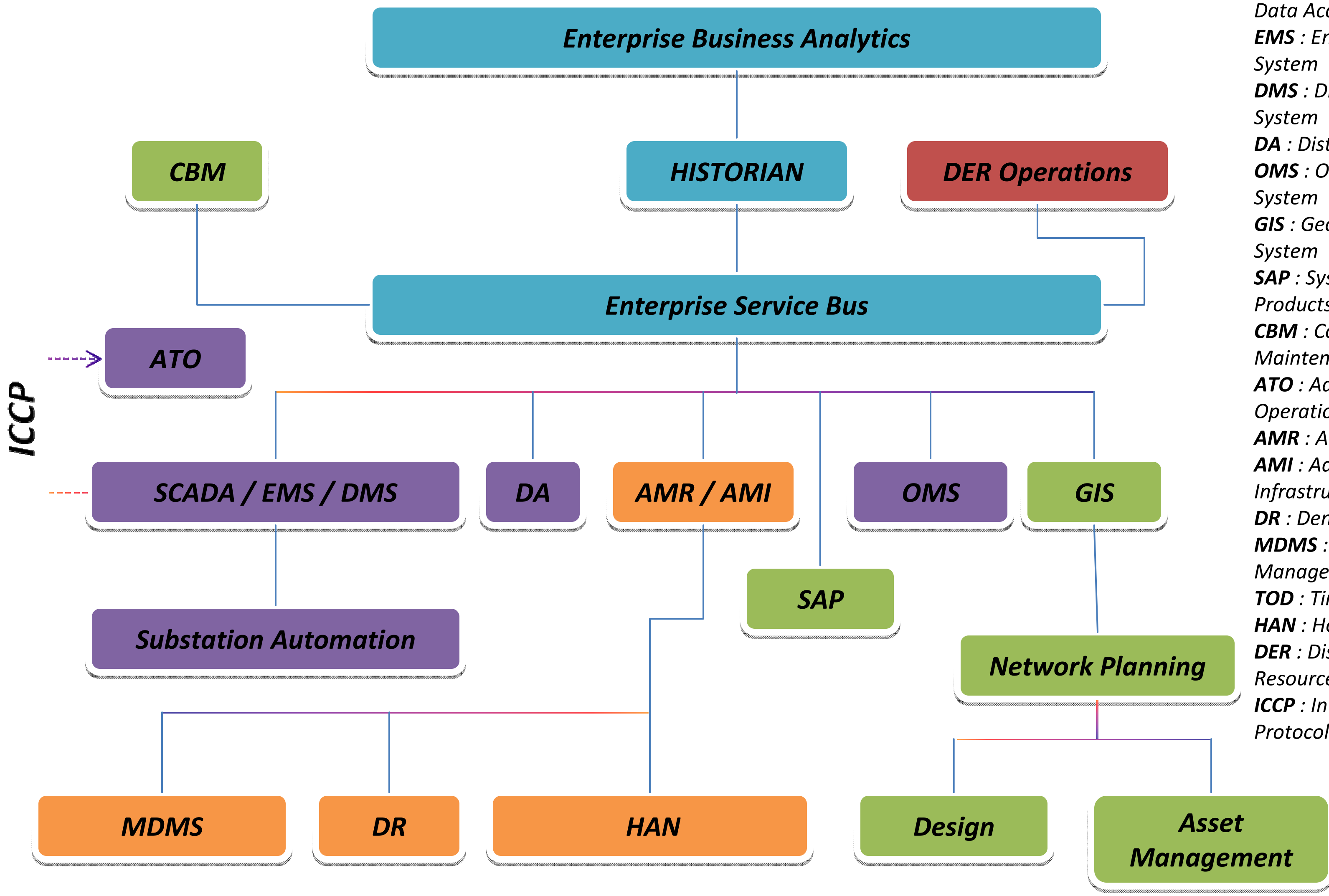
Major hurdles are:

- No proven commercial viability for large-scale smart grid roll out
- Poor financial health of most state-owned T&D companies
- Low awareness of technological developments in the utility sector
- No coordinated national road map for smart grid deployment
- A fragmented industry

Smart Grid – Initial Phase
Adoption of Technology



The Big Picture



SCADA *: Supervisory Control & Data Acquisition*
EMS *: Energy Management System*
DMS *: Distribution Management System*
DA *: Distribution Automation*
OMS *: Outage Management System*
GIS *: Geographical Information System*
SAP *: System Application & Products*
CBM *: Condition Based Maintenance*
ATO *: Advanced Transmission Operations*
AMR *: Automated Meter Reading*
AMI *: Advanced Metering Infrastructure*
DR *: Demand Response*
MDMS *: Meter Data Management System*
TOD *: Time of Day*
HAN *: Home Area Network*
DER *: Distributed Energy Resources*
ICCP *: Inter Control Centre Protocol*

Thank You