

India Geospatial Forum

**Energy Session: Modernizing India's Electricity
Infrastructure**



***Leveraging Geospatial Technologies
for an Efficient Future.***

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Elec Generation – The Present

Electricity Generation – Installed Capacity

Sector	Hydro	Thermal Coal	Thermal Gas	Thermal Liquid	Nuclear	Renew-ables	Total
State	27.4	50.1	5.2	0.6	0	3.5	86.9
Central	9.3	41.2	6.7	0	4.8	0	62.1
Private	2.6	28.7	7.0	0.6	0	21.5	60.3
Total	39.3	120.1	18.9	1.2	4.8	25.0	199.9

Elec Distribution – The Present

Electricity Distribution Infrastructure – Recent Additions

Plan Period	66 kV	33/22 kV	15/11 kV	LV	Total Line	Power Trans Cap	Dist Trans Cap
	(In '000 Ckt Km)					(GVA)	
10 th Plan	-	26	359	470	855	-	
11 th Plan	23	114	1,036	2,080	3,253	86	128
12 th Plan	30	149	1,357	2,723	4,259	108	162
Total	53	289	2,752	5,273	8,367	194	290

Elec Distribution – The Future

Electricity Distribution Infrastructure – TPDDL vs Pan India

Plan Period	Peak Dem Served	66 kV	33/22 kV	15/11 kV	LV	Total Line	Power Trans Cap	Dist Trans Cap
	(GW)	(In '000 Ckt Km)					(GVA)	
TPDDL	1.6	0.32	0.21	3.80	6.05	10.38	3.32	4.74
Pan India in 2012	152	23	140	1,395	2,550	3,253	86	128
Pan India in 2017	218	53	289	2752	5,273	8,367	194	290

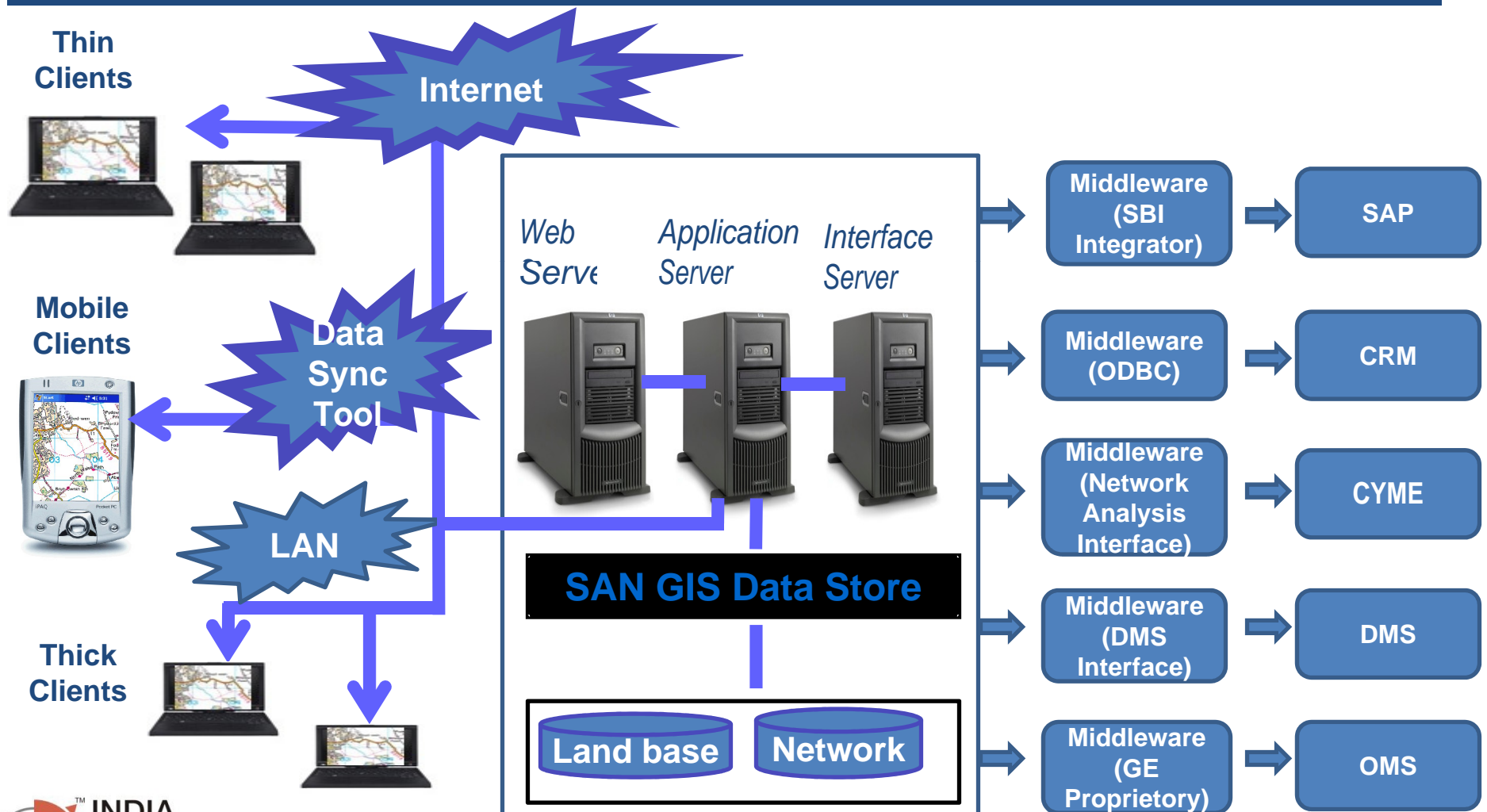
TPDDL

- **Spent Rs 12 Cr in GIS implementation over 2 years;**
- **Spending Rs 1.5 Cr per year for changes & updations;**
- **Rate of Return Rs 4 Cr per year.**

GIS...Implementation challenges: Clear Roadmap

- 1. GIS implemented as standalone Application:**
Business processes incompletely identified >
Underdeveloped architecture > Limited utility to
business > Lack of user interest. .
- 2. Integrating GIS with other Applications:**
Inadequate design of data & transaction exchanges
> Difficulty in selecting & implementing middleware.
- 3. Design & maturity of GIS Database:** > Difficulty in
subsequently expanding use of GIS > Limits
integration of IT and OT deployment.

GIS...Implementation challenges: Architecture & Applications.



GIS...Implementation challenges: Building the Database.

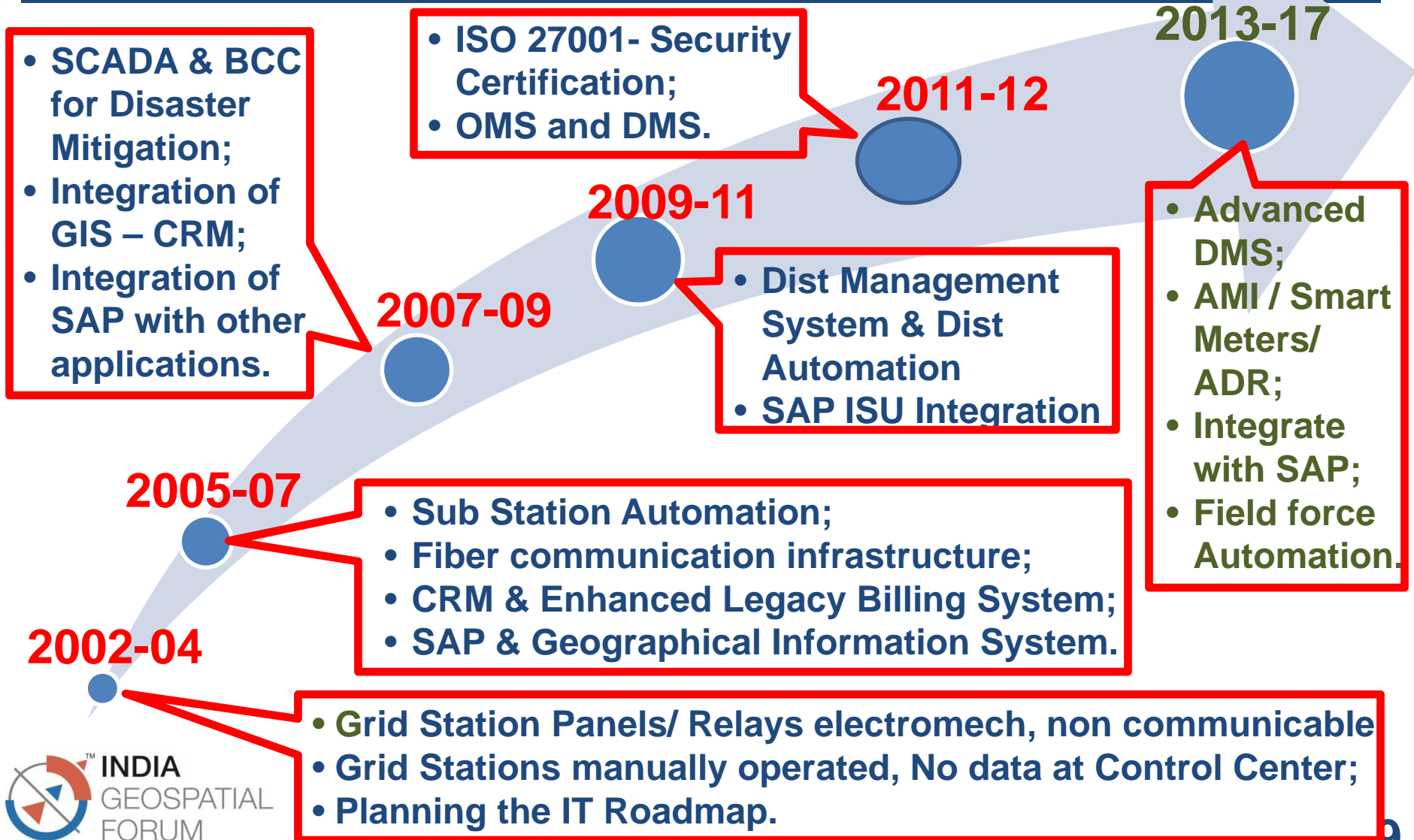
- 1. Developing the Land Base** – Satellite images > Field survey > Built ups > Geographical features.
- 2. Developing the Electrical Network** – Single line diagrams > EHV + HV + LV > Field survey > Co-relate with FAR > Associate asset data.
- 3. Modifying & Importing Consumer Data** – Field survey > Co-relate consumer with transformer/ feeder/ distributor/ phase/ building > Meter position.
- 4. Speed of Survey and Upload** – Dynamic network > Data becomes quickly out dated.

GIS...Sustenance Challenges

- 1. Keeping the Land Base Updated** – Field surveys to capture new build ups & features.
- 2. Capturing Expansion and Modifications of the Electrical Network** – New lines > Shift of normal isolations > Augmentations > Robust internal process.
- 3. Updating Consumer Data** – New consumers > Changes of existing consumers.
- 4. Dynamic Revision of Consumer Indexation** – Co-relate consumer with Distribution Sub-station.



GIS....The TPDDL experience.



GIS....Benefits for TPDDL #1

Asset Management:

- **GIS - DMS and GIS – SAP integrated for Asset Management;**
- **Assets equalized in GIS – SAP – FAR;**
- **Asset planning, creation, movement and retirement an integrated GIS – CYME – SAP – FAR process;**
- **Optimising capital expenditure and investment plans.**

GIS....Benefits for TPDDL #2

Operation Management:

- **GIS - DMS integrated for 11KV network management;**
- **GIS - OMS integrated for consumer outage management;**
- **Network diagram extracted from GIS used for operations and PTW;**
- **Asset attributes extracted from GIS for maintenance planning and scheduling;**
- **Technical loss studies and mitigation plans.**

GIS....Benefits for TPDDL #3

Commercial Management:

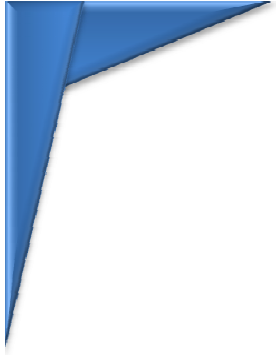
- **GIS used for exactly locating consumer;**
- **GIS based pole numbering and pole mapping;**
- **Street light wattage & type attached to Pole Number and mapped in GIS;**
- **Consumer indexing for Energy Audit;**
- **Instant new connection and dues recovery;**
- **Technical feasibility for high demand Consumers.**

GIS....Policy and enablers #1.

- 1. Availability of satellite images** – Must be made available to private sector.
- 2. Regulators should encourage investment in GIS** – Investment linked with clearly defined benefits and transparently calculated IRR.
- 3. Regulators should encourage Asset Management aided by GIS** – Planning, creating, maintaining, moving and retiring electricity network assets should be thru GIS.

GIS....Policy and enablers.

- 4. Preferential funding for GIS aided Capex schemes** – Banks and other funding agencies may recognise GIS aided scheme designs as superior with better assured returns.
- 5. Training & skill development** – Centrally monitored GIS training & skill development.



Thank you.



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