Spatial Information - Enabler for Smart Grid

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Smart Grid Initiatives – Tsunami of Data
Evolution of GIS and relevance to Smart Grid
Spatial Information – as a enabler
5 Key requirements for spatial data
Spatial reference - integration with IT/OT systems
Methodology to enable and manage Smart Spatial Data
Conclusions
Smart Grid

- Saves energy, reduces cost, and increases reliability
- Minimizes carbon footprint and reduces emissions
- Increasing focus on renewables
- Peak load management
- Reduces outages, improving efficiency
- Reduction of aggregate technical and commercial (AT&C) losses
- Consumer-focused energy technology
Spatial Information – Smart Grid Enabler

The potential of spatial information is understood but how far is it put into practice?

How do we leverage existing investments and reduce expenditures?

Capital Expenditure:
Smart-grid spending to hit about $200 billion by 2015

Smart Grid Market Growth 2009-2015

Source: Zpryme, GIA

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Smart Grid – Tsunami of Data

- Tsunami of data from and to various systems (smart meters, sensors...)
- Multiple independent systems
- Need to convert data into valuable information
- Establish single source of truth
Impact of the Data Tsunami on Utilities

Rich Data
Poor Information

Continuous Churn of data
Exponential Churn of data

Data Analytics
Integrated Business Processes
CIM and Spatial Reference

Continuous Visibility
Continuous Improvement

Rich Information
Smart Decisions

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Spatial Information – As an enabler for Smart Grid

- Complete, positionally accurate, connected, consistent, up-to-date geospatial information
- Traditional way of looking at spatial information is changing for good
Spatial Intelligence – Where is it?

Adding Spatial intelligence to Smart Grid in a Utility

- Evolution from mapping to strategic tool
- Enterprise-wide collaborative workflows using spatial reference
- Informed decision making through business analytics
Spatial Data – Key requirements

- **Completeness**: Incomplete information – assets, planimetric base, etc.
- **Connectivity**: Topological property referring to the inter-relationships between geographical assets – graphical, logical
- **Consistency**: Correct information across multiple systems – street address
- **Currency**: Reflection of most recent changes
- **Positional Accuracy**: Accurate placement of asset features with respect to their field position
GIS Integration with IT/OT systems
Efficiency in isolation – room for improvement?
Integrate – To ‘Simplify’ or ‘Simply-fail’

Integration without understanding the relationships between systems, benefits and how they evolve can be expensive.
There is more than what meets the eye

Data in utilities is ‘inherently Spatial’
Methodology to enable and manage Smart Spatial Data

**Review & Assess**
- Review ‘as-is’ state and need of spatial data
- Understand related business processes
- Interoperability Needs
- Gap Analysis
- Project Roadmaps

**Build & Transform**
- Source data acquisition & consolidation
- CIM with integrated processes and workflows
- Migration and transformation
- Information mapping across system with spatial reference

**Present & Operate**
- Implement and present
- Enable Business Analytics using Spatial reference
- Roll out collaborative business processes
- Review and refine for improvement
GIS and good data helped a utility to reduce design cycle times and improve meter-to-cash collections

- Helped reduce aggregate technical and commercial losses from 48.1% to 18.5%
- Direct savings derived out of this project: $323,000 in the first year
Case Study: Asset Management

Spatial data consolidation helped improve the asset management function of utilities

- Centralized access to asset data resulting in increased productivity and reduced costs
- Significant ROI
Integration of GIS with OMS, DMS and mobile applications enabled a power utility to:

- Deploy field crews faster
- Reduce restoration after supply complaints
Spatially enabled DR dashboard by integrating MDM, ERP and GIS systems helped in:

- Demand response monitoring
- Load relief signals
Conclusions

• Exponential explosion of data that is inevitable and important to manage

• GIS is a key element in the Smart Grid journey

• Utilities need an interoperable, accurate and intelligent spatial database

• Spatial data has to be integrated across the business
Spatial intelligence is a key element of utility Smart Grid Data.

Questions