Agenda

- About PG&E & TCS
- Project Background
- Business Challenge
- Project Objective
- Solution Overview
- Demo
- Benefits
- Lesson Learnt
- Q/A
Incorporated in California in 1905, Based in San Francisco

One of the largest combined natural gas and electric energy companies in the United States

20,000 employees who carry out Pacific Gas and Electric Company's primary business—the transmission and delivery of energy

**Fast Facts**

Operates in Northern and Central California, Service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east

141,215 circuit miles of electric distribution lines and 18,616 circuit miles of interconnected transmission lines

42,141 miles of natural gas distribution pipelines and 6,438 miles of transportation pipelines. 5.4 million electric customer accounts

Electricity to 5.3 million customers, 4.3 million natural gas customers.
About TCS | TCS Corporate Overview

47  years in business

$16.5  billion US$ in FY16 revenues

350,000+  employees representing:

122  nationalities

1,700  active clients

46  countries

98%  business from existing customers

According to Brand Finance Forum 2013 (IT Services)
About TCS | TCS GIS Capabilities

Experience

Thought Leadership
- Enterprise GIS transformation
- Business process optimization
- Geodata management strategy
- Enterprise integration blueprint
- Enterprise architecture map
- Change & risk management

Consulting

Experience

Results
- Project management framework
- Structured development cycle
- Enterprise collaboration portals
- Mobility & field force automation
- Mapping standards & templates
- Integrated business processes

Implementation

Experience

Flexible Partnership
- Follow the sun Offshore model
- GIS Managed Service Delivery
- Deep GIS bench & skills
- Operations and Maintenance
- 24x7 Support
- Multi vendor collaboration

Support

Experience

Technology

- SAP Global Partner
- IBM Premier Business Partner
- Microsoft Gold Certified Partner
- Sun Partner
- Oracle Platinum Partner
- esri Partner Network Silver
- GE Energy Authorized Partner
- OGC Member
- Autodesk Authorized Developer
- INTERGRAPH Enterprise Solution Partner
- Google Enterprise Partner
Project Background

Business Problem

- The management and maintenance of Electric Transmission’s assets has been challenging due to:
  - Poor spatial accuracy of some assets
  - Lack of business system integration
  - No clear single source of data
  - Poor accessibility to information
  - Paper based information / data
  - Convoluted workflows & processes
  - Sub optimal data integrity and governance

Business Objective

- Make spatially accurate data readily available to support the key activities that affect reliability; maintenance and inspection, system infrastructure assessment, system planning, and vegetation management.
- Provide PG&E with the tools to enhance public and employee safety, ensure compliance, and increase productivity and efficiency throughout the business

Business Solution

- The future state enabled by the ET GIS/AM project will:
  - Spatially align ET assets to available LiDAR data
  - Integrate ET GIS /AM with SAP and other key business systems
  - Determine single source of data and eliminate data duplication
  - Provide improved web and analytical tools
  - Convert key paper based data to the GIS
  - Improve processes and governance to ensure key data integrity and completeness
Business Challenges

Prior to this Project:

• Users needed to access multiple systems to get requisite information – GIS, Work and Asset Management system, EDMS system.

• No single source of information. Majority of time is spent in gathering data from multiple systems.

• ET Assets management was done separately in SAP and GIS with no integration, difficult to decide source of truth for relevant information to improved decision making.

• Manual work assignment and tracking through excels, SAP clerks used to send Job package to Lead mappers with relevant data to map the ET assets.

• Assessing status and health of ET Assets was difficult as information was scattered across multiple systems as well as in spreadsheets and emails.
## Project Objective – Desired Outcome

### Before

- Poor spatial accuracy of some assets
- Lack of business system integration
- No clear single source of data
- Poor accessibility to information
- Paper based information / data
- Convoluted workflows & processes
- Sub optimal data integrity and governance
- Legacy (Map Guide ) GIS system is in use for housing ET Assets

### After

- Spatially align ET assets to available LiDAR data
- Integrate ET GIS /AM with SAP and other key business systems
- Determine single source of data and eliminate data duplication
- Provide improved web and analytical tools
- Convert key paper based data to the GIS
- Improve processes and governance to ensure key data integrity and completeness
- QA/QC and Validations to ensure data integrity
- Implement ESRI based GIS system
Transforming Transmission Operations

What is ETGIS?
- Provide users with the tools to enhance public and employee safety, ensure compliance, and increase productivity and efficiency throughout the business.

What is its Purpose?
- Make spatially accurate data readily available to support key activities that affect reliability; maintenance and inspection, system assessment, system planning, and vegetation management.

Key Objectives
- To establish an integrated GIS and SAP system to provide end-users with GIS tools to improve safety, compliance, reliability, and data integrity by ensuring accuracy & accessibility of critical asset records.
- Design ET GIS Data Model fulfilling the futuristic needs of Power transmission industry.
- Design and development of scalable Enterprise GIS applications (desktop, Web, and LIDAR Imagery viewer) integrating with more than 12 systems such as SAP Plant maintenance, Documentum, Clarity, Vegetation management, Pole Trust & Treat, CAISO Rating, Reliability etc.
- Design and development of SAP Function Location and Equipment’s Dashboards and Reports to improve the productivity of ET analyst group.

Business Outcome
- Customers in over 26 departments who rely on GIS data are now able to make better and timely decisions with the improved spatial data accuracy and additional asset information shown in the GIS system.
- Providers of asset information follow a consistent process of communicating asset information to ensure data accuracy and completeness in SAP and GIS.
- Mappers of the GIS system follow new processes of updating asset information and mapping assets in the new GIS system and be able to provide the business with improved spatial and asset data to support their operations.
- The integrated GIS/AM system will provide end-users with tools to improve public and employee safety, compliance, reliability, data integrity and work efficiency.
ETGIS Solution Highlights

18 Months Program

26 Departments Touched

150+ Business SME’s Involved

15+ Business Process Streamlined

95% Functionality 6m before go live

1500+ Users

1 Awarded best technology project

100% Integrated system, 10+ Integration Points

100% Transition to ArcGIS JS Viewer Technology, WFM for editors

98% Improved Spatially accuracy using LiDAR data
ETGIS Integration Touchpoints

- NRD
- IrthNet
- E-Terravision
- ArcPAD
- Reliability

Online Web Services
- SS Drawings
- ROW Drawings
- SDS
- Switch Itemization Form

EDMS

LiDAR Imagery HD Videos
- PMD WO
- Access Data

PT&T Data
- CAISO Asset Registry
- Ratings
- Asset Info

ETGIS

MapGuide
- Asset Data
- Engg WO
- Maint WO
- SS Assets

External Data
- PG&E Layers
- Weather

Enterprise Land & Environmental
ETGIS Data Migration, Conversion, Enrichment Workflow

- **Data Migration**
  - (Migrate the data from existing into new data model)
  - QC
  - Merging and edge matching of migrated and converted data
  - Spatial accuracy improvement & attribute data population
  - QC

- **Rubber Sheet & Data Conversion**
  - QC
  - Fail
  - PASS

- **Spatial Accuracy Improvement**
  - LiDAR Data
  - Aerial Images
  - Outputs from .bak
  - Manhole Loc
  - Google StreetView

- **Attribute Data Population**
  - LiDAR Data
  - SAP
  - PT&T
  - CAISO xls
  - Asset Register
  - Underground Data

- **ROW Polygons**
  - Fail

- **Plan & Profile polygons**
  - Fail

- **ROW drawing & ROW documents**
  - Fail

- **UG Plan and Profile Maps**
  - Fail

- **Data linking to ET network**
  - QC
  - Fail
  - PASS

- **Imagery Data Publishing**

- **QA & QC**
  - Fail

- **ETGIS Final Data Delivery**
ETGIS Demo

- Integrated with SAP
- View, Open Capital Work Orders & Veg Projects
- Pre-Mapping of Issued for Construction Assets
- View Notifications
- View 17 Key Substation Equipment Attributes
- Improved Spatial Accuracy
- View Light Detection & Ranging (LiDAR) Data
- Links to LiDAR HD Videos & Tower Stills
- Search and Bookmark Capabilities
- Redlining & Sketching
- View CAISO Ratings
- View Outage Data
- View Right Of Way as Polygons
- View Underground Plan &Profile Drawings as Polygons
- Advanced Query & Layer Management
- Integrated with SAP
- View, Open Capital Work Orders & Veg Projects
- Pre-Mapping of Issued for Construction Assets
- View Notifications
- View 17 Key Substation Equipment Attributes
- Improved Spatial Accuracy
- View Light Detection & Ranging (LiDAR) Data
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Project Strategic Value & Benefits

- Electric Transmission GIS is not merely a “mapping” tool or a repository for capturing asset location and connectivity data
  - It shares asset maintenance and operational characteristics with SAP and provides spatial analysis capabilities across the organization

- Electric Transmission GIS is an enabling technology that provides decision support for most key business processes across the entire asset lifecycle
  - Most Electric Transmission business processes require data but more importantly insights pertaining to geospatial information about specific types of assets
  - ET GIS scope and requirements should be defined to address requirements pertaining to each of these business processes (M&I, Asset Strategy and Planning)

- GIS alone does not enable effective asset and or risk management. Integrated GIS and SAP provide the core foundation for capturing, managing, and analyzing Electric Transmission Asset Data
  - Geospatial (location and connectivity) data – “what assets are where?”
  - Maintenance & Inspection data – “what condition are the assets in?”
  - Specification/Features data – “what are the characteristics and settings associated with each asset?”

- Data completeness and accuracy ultimately drive the business value to be realized by Electric Transmission
### Project Objective - Review

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Questions and Answers