

# AURIGA CORPORATION SMART GRID SERVICES



Since 1990, Auriga Corporation has developed an industry-wide reputation for high quality and value-added consulting services. Auriga is recognized as a premier provider of professional consulting services in Smart Grid Systems in the USA and internationally. Auriga has a solid foundation as an ISO 9001 compliant company.

The Smart Grid is a rapidly evolving platform with a combination of new electronic intelligent devices, communications networks, information technology systems and regulations. Smart Grid Systems will allow utilities and consumers to manage energy generation, transmission, distribution and usage in real-time, and to promote collaboration between utilities and consumers to drive energy efficiency and conservation. Auriga's Smart Grid system design and implementation approach is based on current best-practice methodologies that have been successfully developed and applied in many past projects.

## EXPERIENCED TEAM

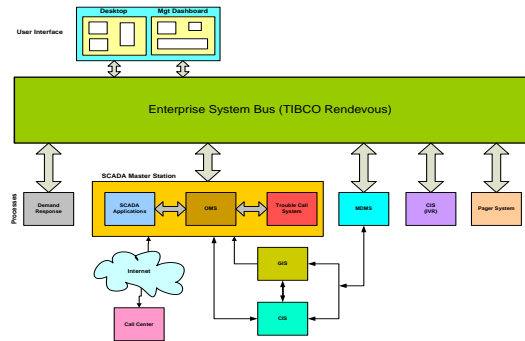
Auriga maintains a team of highly qualified and experienced subject matter specialists in Smart Grid, Distribution Automation, Communications and Advanced Metering Infrastructure (AMI) systems. They have conducted feasibility studies and implemented numerous projects in the USA and internationally. Additionally, they have experience working with international funding agencies such as USTDA, USAID and the World Bank.

Auriga's highly qualified and experienced Electrical Engineering consultants are recognized in their respective professional subject matter specialties. In addition, our firm has Licensed Professional Electrical Engineers (PE). Principal consultants at Auriga have an average of twenty-five years of prior experience working for public and private sector organizations such as engineering firms, system suppliers, and electric power utilities.

## SCOPE OF SERVICES

Auriga Corporation provides a complete range of Smart Grid consulting services including:

- Feasibility Studies
- Requirements Definition
- Technical Specifications
- Procurement Documents
- Bid Evaluation
- Contract Negotiations
- Design Review
- Testing, Training, and Commissioning
- Project Management and Project Oversight



## City of Anaheim Smart Grid Project

The City of Anaheim has undertaken a three year project to expand its Smart Grid development by upgrading and enhancing its Advanced Metering Infrastructure (AMI) and Demand Response (DR) Systems, beginning in January 2010. The project included the installation and enhancement of smart meters, advanced switches for fault isolation, capacitor banks, capacitor controllers, Supervisory Control and Data Acquisition (SCADA) System, Meter Data Management System (MDMS), and software required for systems control and integration.

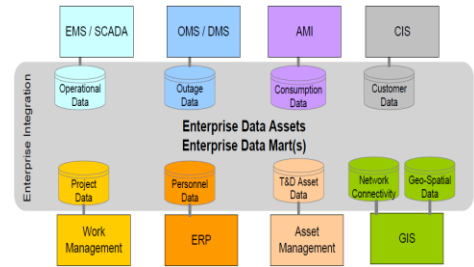
The project allowed the City of Anaheim to gain visibility of their power usage based on supply and demand conditions through remote monitoring and control of electric devices. The Smart Grid technologies employed include smart residential meters, advanced sensors and controllers in a distributed environment, expanded fiber optic and wireless communication, new application software, and smart end-user devices.

Auriga developed conceptual design of the Smart Grid Enterprise Architecture. In addition, Auriga developed functional and performance requirements, cost estimates, and phased implementation plan. Finally, Auriga prepared a Grant Application for the Smart Grid Project for the Department of Energy (DOE). The City of Anaheim received a \$5.8 Million Grant from the DOE for this Project. ***The Project has been adopted as a model for deployment of Smart Grid and Metering systems for small and medium sized utilities in the USA.***

## SCOPE OF SERVICES: Smart Grid

In addition, Auriga services include design and implementation of:

- Enterprise Application Integration
- Integration of SCADA/ DMS/ OMS/ GIS/ CIS
- Advanced Metering Infrastructure (AMI)
- Meter Data Management System (MDMS)



## SMART GRID & ENERGY PROJECT REFERENCES

Auriga has or is currently providing Smart Grid System consulting services for the following Projects:

### Smart Grid Systems

- Smart Grid Project – City of Anaheim, California
- Feasibility Study: Integrated Smart Grid System – Karachi Electric Supply Company, Pakistan

Additionally, Auriga has extensive experience in providing Design and Engineering Services for the Energy Sector:

### Energy Projects

- Professional Engineering Services – Sacramento Municipal Utility District (SMUD), California
- SCADA System Upgrade – US Navy Pearl Harbor, Hawaii
- Focused Management and Operations Audit – Shelby Energy, Kentucky
- Preliminary Design and Engineering: 60 kV/ 12 kV Substation – City of Lodi, California
- Preliminary Design and Engineering: 60 kV/ 12kV Substation – Roseville, California
- Feasibility Study: 500 kV Datka-Kemin Transmission Line – National Electric Grid, Kazakhstan

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### Karachi Electric Supply Company

#### USTDA-Funded Smart Grid Project

Auriga conducted a feasibility study for Karachi Electric Supply Company's (KESC) Integrated Smart Grid System. Auriga developed a strategy to reduce or eliminate KESC's power losses through technical and non-technical sources. As part of this project, Auriga conducted a feasibility study to develop and implement a Pilot Project (25,000 meters) in the Defense Housing Society. Auriga developed a strategy, selected AMI technology and defined the policies and procedures to implement the technological solution to reduce the losses.

Together with KESC, Auriga's team examined many case studies of similar implementations of Smart Grid Systems, both in the United States and internationally to develop a practical, robust, and cost effective solution for the KESC's Integrated Smart Grid Project.

The highlights of our technical approach included a presentation of the following four different technologies:

- Smart Grid Technologies (SCADA/ DMS/ OMS/ GIS/CIS)
- Advanced Metering Infrastructure
- Wireless Communications
- Fault Detection and Isolation Technology