

City of Tallahassee, Florida

Full-Scale Implementation of Automated Demand Response

Scope of Work

The City of Tallahassee’s Automated Demand Response (ADR) project involved deployment of customer systems, load control programs, and distribution automation equipment. The City deployed an automation distribution system to the majority of its critical circuits. Enhanced distribution automation implementation also included upgrades to the outage management system (OMS), supervisory control and data acquisition (SCADA) system, and geographic information system (GIS). The project also improved overall system cyber security.

Objectives

The project included multiple objectives. These included: deployment of ADR with commercial and institutional customers to achieve an average system reduction of 10 MW, evaluation of readiness of smart thermostat technologies in anticipation of offering a demand response program to residential customers, and implementation of distribution automation technologies to automate system response to disturbances and interruptions.

Deployed Smart Grid Technologies

- **Distribution automation systems:** The City automated feeder breakers, installed automated reclosers and automated switches together with the accompanying distributed intelligence software platform to automate many distribution system grid management functions. These functions included monitoring the distribution grid, automatically identifying and isolating faults and restoring service to unfaulted segments, stabilizing power disturbances, and providing for the remote operation of the switches and reclosers from the system control center.
- **Communications and control infrastructure:** A new radio frequency (RF) communications system was deployed which provides communications between the devices and provides grid operators with monitoring and control capability for distribution automation equipment. Additionally, the utility’s OMS, GIS, and SCADA systems were integrated.
- **Customer programs:** The City established a peak demand program that allows participating customers to enroll in a time-based rate, earning monthly credits on their utility bills based on reduction of electricity demand during critical peak times. Customers receive notice of a pending event a day ahead, and the frequency and duration of events is limited to minimize disruptions. In conjunction with other existing rates, including residential time of use, this option provides customers with greater control over their electricity costs and bills and reduces peak demand.

At-A-Glance

Recipient: City of Tallahassee

State: Florida

NERC Region: Florida Reliability Coordinating Council

Total Project Cost: \$15,025,907

Total Federal Share: \$7,512,953

Project Type: Electric Distribution Systems
Customer Systems

Equipment

- Demand Response Automated Server
 - 7 Load Controllers
 - 54 Smart Thermostats
- Outage Management System
- SCADA System Upgrade
- Distribution Automation Equipment for 29 out of 138 Circuits
 - Radio Frequency Distribution Automation Communications Network
 - 93 Automated Feeder Switches and Reclosers

Time-Based Rate Programs

- Demand Response Credit

Key Benefits

- Improved Electric Service Reliability
- Deferred Need for New Generation Capacity

City of Tallahassee, Florida *(continued)*

- **Demand response control devices:** The project deployed over 60 automated control devices, including smart thermostats at commercial and institutional sites. The City deployed an OpenADR certified demand response automation server (DRAS) capable of two-way communication with participating customer systems. During peak demand events, the DRAS automates the process of reducing electric consumption at these facilities, particularly for air conditioning.

Benefits Realized

- **Improved electric service reliability:** The automated distribution system significantly reduced the number of customer minutes of outage time on the electric distribution system for those circuits that were upgraded. Additionally, grid operators can utilize the SCADA system to attain greater visibility and control of the distribution system. These improvements enhance distribution system reliability, reduce restoration time, and reduce the number of customers affected by sustained outages.
- **Deferred need for new generation capacity:** ADR is part of the City's larger demand-side management program. By strategically lowering the demand for electricity during peak periods, the City can delay the need for new power plants or purchases of electric power from other sources.

Lessons Learned

- **Distribution automation:** A strong contractual requirement for robust engineering design of signal propagation and throughput capability of the radio communications system is essential to the successful implementation of an automated distribution platform.
- **Demand response technologies and flexibility:** Residential smart thermostats and industry communications protocols were not as mature as anticipated. This resulted in fewer ADR participants.
- **Environmental Regulations:** New environmental regulations limited the use of commercial back-up generators initially planned to be used in demand response programs
- **Institutional customers:** Meeting the accelerated ADR deployment schedule was challenging due to the long lead times needed by institutional customers to accept new utility programs.

Future Plans

- **ADR for Residential Customers:** As the smart thermostat and home automation industry continues to evolve, the City anticipates building on its ADR platform to provide opportunities for additional commercial customers and residential customers to participate.
- **Distribution automation:** The City will consider proceeding in 2017 with distribution automation deployment to another 15 circuits, followed by a similar deployment in 2019. These future deployments are currently in the extended planning budget, although subject to annual authorization and appropriation.
- **System Integration:** The City is working towards linking its meter data management system with its OMS to further improve its outage restoration capabilities.

Contact Information

David Byrne, Director, Electric System Integrated Planning

City of Tallahassee

David.Byrne@talgov.com

Recipient team website: www.talgov.com