

Department of Energy's Pantex Plant Saves More Than \$10 Million in Energy Costs

Pantex Plant uses DOE's Central Region Super ESPC to replace inefficient equipment and add a new control system



ESPC Case Study

Overview

The U.S. Department of Energy's (DOE's) Pantex Plant in Amarillo, Texas, will save approximately \$10.4 million in energy-related costs over the next 18 years, thanks to a DOE Central Region Super Energy Savings Performance Contract (Super ESPC) delivery order. The Pantex Plant Super ESPC delivery order is the largest to date for a DOE facility.

Reduce Utility Bills with Energy Savings Performance Contracts

The Department of Energy's Federal Energy Management Program (FEMP) helps government agencies use Energy Savings Performance Contracts (ESPCs) to finance many kinds of energy efficiency projects.

Benefits of ESPCs:

- New equipment
- No up-front costs
- Energy and water savings
- Lower utility bills
- Improved reliability and load management
- Better air quality

FEMP has developed streamlined "Super ESPCs" so Federal agencies can contract with preselected energy service companies to implement projects. FEMP's six Regional Super ESPCs allow agencies in a particular U.S. region to place delivery orders with the preselected companies. Technology-Specific Super ESPCs can help any facility in the country obtain access to financing for certain advanced energy technologies.

Advantages of Super ESPCs:

- Prequalified, competitively selected energy service companies
- Expedited contracting process
- Ability to combine multiple projects or facilities in one contract
- DOE's technical and contracting expertise

For more information, please call 1-800-363-3732 and see FEMP's Web site (www.eren.doe.gov/femp/financing/esp.html).

Plant staff and energy service company personnel have teamed up with experts in DOE's Federal Energy Management Program (FEMP) to save energy and water, use solar technologies, enhance the plant's ability to manage production, and save taxpayer dollars. Although electricity and natural gas prices in west Texas have been relatively low, the first delivery order at Pantex will still save about \$480,000 annually in energy bills and operation and maintenance (O&M) costs. New energy conservation measures and technologies installed under the delivery order should reduce energy bills at the plant by about 15%.

The shining star of these new technologies is the new energy management control system (EMCS). Although the EMCS doesn't have the shortest payback period, it will make the greatest contribution to the facility's overall energy efficiency. It will allow DOE and NORESCO LLC, an energy service company for the Central Region Super ESPC, to constantly monitor energy usage on a real-time basis. This capability allowed both parties to agree to an aggressive measurement and verification (M&V) protocol based on accumulated run-time data and actual weather conditions.

NORESCO is also upgrading the lighting; consolidating and centralizing a distributed chilled water and steam distribution system; replacing rooftop heating, ventilating, and air-conditioning (HVAC) units; and installing a solar domestic water heating system, water heater resets, controls for preheat coils, and an ozone laundry system.

Through Super ESPC projects like this, DOE can implement innovative but proven technologies and conservation measures to solve problems caused by old, inefficient plant equipment. Super ESPCs also foster strong partnerships with the private sector that benefit both parties.



A Pantex laundry supervisor discusses the benefits of ozone water treatment systems with NORESCO field staff.

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U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy



Background

In recent years, the DOE Pantex Plant nuclear weapons assembly and disassembly facility had been struggling to maintain an energy management system installed in the early 1980s. Replacement or expansion parts were not available, and the plant's process control capability was lost. Many energy-consuming systems were in manual-control mode, operating 24 hours a day. Chiller plants using R-11 refrigerant were at the end of their useful life. Several smaller chillers had been installed for specific loads or small stand-alone buildings rather than connected to a nearby, capacity-constrained loop chiller system.

Several thousand feet of the main steam distribution line had to be energized in the summer to provide hot water to rest rooms and shower facilities. Rooftop HVAC systems required an excessive amount of maintenance and repairs. With these conditions as a starting point, NORESKO proposed measures that would improve operations and reduce energy use.

Project Summary

The Pantex Plant's energy management team worked closely with NORESKO to evaluate every feasible measure that could save energy and water. After undertaking a thorough cost/benefit analysis, DOE and NORESKO selected nine energy conservation measures for the first delivery order. Two of the nine required about 73% of the total investment cost but will contribute about 80% of the total savings: the EMCS and the chiller water/steam piping system.

The EMCS controls 54 large air-handling units in 26 buildings and optimizes the use of the economizer cycle, turns off the blower fan during non-working periods, and uses variable-volume controls when the facility is occupied. The system also monitors the performance of other conservation measures. NORESKO engineered the EMCS to allow for future expansion and process control.

NORESKO is providing complete O&M support to the EMCS for the first 36 months to maintain equipment and sensors and train in-house staff. To ensure real-time data monitoring and reporting, NORESKO will use the communications feature of the EMCS to remotely monitor equipment performance and savings. The EMCS logs will also be the basis for M&V and reports of annual savings.

The improved chiller water/steam piping disconnects small loads from eight stand-alone chillers

and connects them to the existing chiller loop. A variable-frequency-drive pumping arrangement operates the central chiller loop. Gas-fired water heaters provide the summer load, allowing a major portion of the steam distribution system to be shut down.

The Pantex Plant provided funding for security escorts and in-house project management. FEMP provided project facilitation support and an on-site delivery order overview to acquaint the project management team with the unique requirements of a Super ESPC.

Benefits

DOE's Pantex Plant is successfully using the Super ESPC process to replace old, inefficient equipment without increasing annual energy and O&M costs. Because NORESKO had access to demand-side management incentives from Southwestern Public Service Company, an extra \$290,000 in funding can be applied to the project. The new EMCS allows the plant to have automated controls for its industrial process. The new energy-efficient equipment and enhanced operating procedures improve productivity while allowing Pantex to reallocate O&M staff to other essential projects.

Looking Ahead

Pantex Plant staff and NORESKO have developed an excellent working relationship, and a second Super ESPC delivery order was planned for other areas of the facility. NORESKO and DOE have identified approximately \$15-\$20 million in efficiency improvements that could generate more than \$1 million per year in additional energy and related savings.

For More Information

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