

Deep Energy Retrofit Challenge

U.S. Department of Energy's Sustainability Performance Office



Challenge Overview

The Deep Energy Retrofit (DER) Challenge is a new effort from DOE's Sustainability Performance Office (SPO) to improve the sustainability of DOE facilities through retrofit projects that leverage private investment. The goal is to award a minimum of \$125 million in performance-based contracts by the end of FY2018 targeting energy use reductions of 40% or greater in treated facilities. The DER Challenge supports the Executive Order (EO) 13693 requirement to reduce the energy use intensity (EUI) of goal subject buildings by 25% by 2025 from a 2015 baseline.

DER Objectives

Since DOE has already reduced the EUI of its goal subject buildings by 30% from 2003 through 2015, achieving an additional 25% savings from the new 2015 baseline will require more innovative approaches. DER projects will play a major role. The energy conservation measures installed in these projects will help the Department meet other sustainability goals embodied in EO 13693, including reducing greenhouse gas emissions, increasing the use of renewable and alternative energy, meeting the Federal Guiding Principles for High Performance Sustainable Buildings (HPSB), and converting existing buildings to net zero energy status.

New DOE facilities — such as The National Renewable Energy Laboratory's Research Support Facility — are built to the highest standards. However, since new construction adds less than 1% per year to DOE's total building stock, meeting the goals of EO 13693 requires a focus on existing buildings, many of which date to the 1950s and 60s. Given the limited availability of appropriated funding, performance contracting is the ideal vehicle for upgrading energy performance and resolving the backlog of deferred maintenance issues in our facilities.



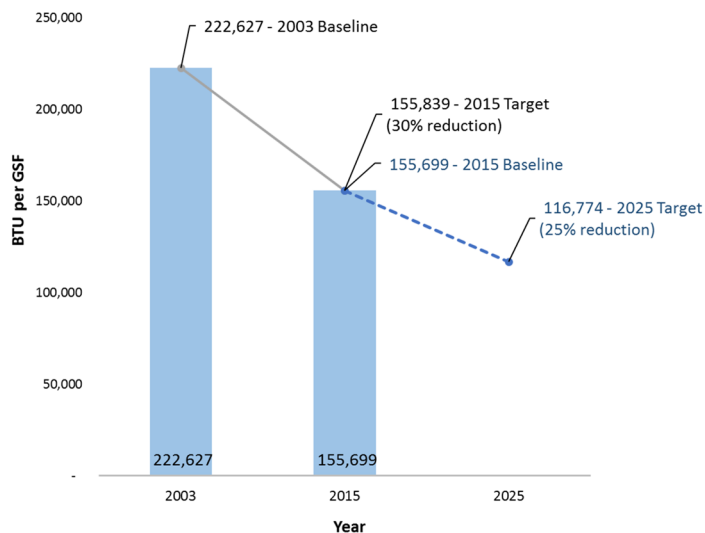
NREL team conducting energy audits of existing campus buildings. The goal is to identify areas for energy and water conservation (Photo by Dennis Schroeder / NREL).

DOE Achievements as of FY 2015

- ⇒ EUI Reduction : **30%**
- ⇒ Scope 1 & 2 GHG Reduction : **33%**
- ⇒ Scope 3 GHG Reduction : **17%**
- ⇒ Percentage of buildings compliant with the *Guiding Principles for Sustainable Federal Buildings*: **7.6%**

Figures in **Green** exceed Federal targets

DOE Energy Use Intensity Reduction Progress and Targets



What Is a Deep Energy Retrofit?

The Rocky Mountain Institute defines a deep energy retrofit as a whole-building analysis and construction/renovation process that achieves much larger energy and energy cost savings—sometimes more than a 50% reduction—than those of conventional energy retrofits. Deep retrofits also tend to improve the satisfaction and health of building occupants.

While advanced technologies are sometimes employed, deep retrofit projects most often involve off-the-shelf technologies such as high efficiency HVAC and heat recovery equipment, LED lighting, occupancy sensors and other building controls, as well as cool and highly insulated roofs.

When implemented using third-party financing such as ESPC, ESPC ENABLE, and UESC, deep energy retrofits can be achieved with no upfront capital. Identifying and implementing deeper retrofit savings is a key strategy for DOE to achieve its sustainability goals.

Strategies for Deep Retrofits

Conventional retrofits most often focus on individual energy conservation measures. Deep retrofits are achieved through a holistic approach that considers the building, its occupants, and the energy consuming equipment as an integrated system. Deeper savings are obtained by focusing first on minimizing space conditioning loads through reduction of outdoor air infiltration and reduction of heat transfer through the building shell. Internal gains are reduced through the use of LED lighting, occupancy sensors, and efficient appliances.

Reducing space conditioning loads reduces the required size of the HVAC equipment, driving down costs and further improving project economics. With energy use at a minimum, renewable energy sources become more affordable as well, making the building a candidate for net zero energy use. A deep retrofit project is thus an important first step in making a building “net zero ready”.

Tentative Schedule

SPO will officially kick off the Deep Energy Retrofit Challenge with the first design charrette to be held on December 14, 2016. The charrette will bring together an array of DOE stakeholders to discuss barriers to achieving deep energy retrofits and opportunities to overcome them.

Information gathered in the first charrette will be used to develop further guidance on deep retrofit projects and to inform Notices of Opportunity. A second charrette will be held subsequently to introduce the ESCOs and other stakeholders to the deep retrofit concept and gather their feedback.

DOE Deep Energy Retrofit Tentative Schedule

December 14, 2016	First Charrette
February 2017	Second Charrette
Spring 2017	Release first Notice of Opportunity (NOO)
Summer 2017	Additional NOOs released
Fall 2017 and beyond	Projects Awarded
CY 2018	Follow Ups & Lessons Learned

Following the charrettes, Notices of Opportunity will be drafted, with release expected by the Spring of 2017. Projects are expected to be awarded beginning in the Fall of 2017. SPO is making a team of NREL experts available at no cost to develop broad project scope and assist in development of the NOO.

Progress of the awarded projects will be monitored on a regular basis to provide any support needed. As the projects progress, lessons learned and best practices will be identified. Reporting on the successes and challenges throughout the projects will enable DOE to share these lessons across the Department as well as other federal agencies to encouraging others to implement similar deep energy retrofit initiatives.

Questions or Comments?

Sustainability Performance Office

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