

COMPREHENSIVE BUILDING IMPROVEMENTS: NEW CARROLLTON FEDERAL BUILDING

The New Carrollton Federal Building
Image courtesy of: Rife International

CONTACTS:
CARA CARMICHAEL (CCARMICHAEL@RMI.ORG)
MICHAEL GARTMAN (MGARTMAN@RMI.ORG)

1820 FOLSOM STREET | BOULDER, CO 80302 | RMI.ORG
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Energy service company Ameresco’s deep energy retrofit at the GSA’s New Carrollton Federal Building resulted in a projected 60% energy reduction and 56% water reduction, particularly impressive given the relatively efficient operation of the original building. The project hinged upon a 40% downsizing of the existing chiller system—made possible through integrative, whole-system design—and was bolstered by excellent local utility incentives.

KEY ENERGY CONSERVATION MEASURES (ECMs):

- Central chilled-water plant
- Integrative building controls and sensors
- 11,000+ LED replacements
- 808 kW solar PV
- Geothermal heat rejection
- Exhaust-to-Outdoor-Air heat-recovery loop

PROJECT SNAPSHOT:	
Location	New Carrollton, MD
Building Size	1.2 million ft ²
Original Construction	1994
Development & Construction Duration	38 months (2012–2015)
Investment Value	\$40.0 million
Appropriated Funds	\$586,000 (1%)
Contract Term	22 years
Cost Savings	\$2.5 Million/year
Energy Savings	94,588 MmBtu/year (60%)
Energy Service Company	Ameresco, Inc.

“ANY TIME YOU HAVE A CHAMPION DRIVING THE PROJECT, THAT’S A KEY DIFFERENCE.” - Nicole Bulgarino, Ameresco senior vice president

INTEGRATIVE DESIGN AND FOCUS ON END USE

An integrative approach was essential in maximizing efficiency gains at the New Carrollton Federal Building. A bulk of the project savings was achieved by a new chiller system, which was made possible by the building’s seemingly unrelated lighting retrofit. The installation of LED fixtures, among other measures, reduced the chiller’s required cooling capacity by over 40%. This massive downsizing of the replacement chiller system generated significant capital savings over business as usual, and supported investments in deeper-cutting ECMs.

The project team also intentionally focused on providing end-uses (e.g., warmth and comfort), rather than specific systems. This shifted the team away from pursuing basic component replacements and toward an in-depth exploration of more unique measures. This approach eventually yielded the geothermal heat-rejection loop and exhaust-heat recovery system that serve as essential components of the building’s new HVAC system and were critical to achieving aggressive energy targets.

The team’s integrative-design approach also shows in the building controls, which integrate the operation of the HVAC system (including a central chiller plant, cooling towers, geothermal loop, heat recovery system, and kitchen exhaust) with lighting and other building systems. The building-systems controls ECM was calculated to have the highest impact on energy and cost savings.

A three-year measurement and verification process using International Performance Measurement and Verification Protocol Option C (whole building-level) is currently under way on the majority of ECMs, with the solar PV array and water conservation measures being metered separately.



OVERARCHING SUPPORT

Ameresco credited the GSA’s National Deep Energy Retrofit (NDER) Program with making smooth delivery of the project possible. National-level support and a clearly stated objective of achieving best-in-class energy savings set the project tone early on. Programmatic support from the national office under the NDER program also allowed the GSA’s regional team to focus on measure development.

The use of a third-party project facilitator was also integral to pushing this project toward deep savings. This facilitator, a resource provided by the U.S. Department of Energy (DOE) Federal Energy Management Program, provided independent analysis to the regional GSA team regarding which project strategies best fit their goals and budget. The facilitator, as well as the DOE’s step-by-step guidance on the energy savings performance contract process, helped the regional team make informed decisions to optimize the efficient use of taxpayer dollars.

BUILDING PROJECT BUY-IN

Ameresco and the GSA worked to build project buy-in by incorporating non-energy upgrades in the project, including a building roof replacement and rain gardens—the latter effectively met the GSA’s stormwater management requirements. Rain gardens were installed concurrently with the neighboring parking lot canopy PV system in order to offset that system’s aesthetic impacts, which had been a concern early in the project. The project team also found tenant engagement and education vital to maintaining a smooth construction process in a continuously occupied space.



*Heat recovery coil installation
Image courtesy of: Ameresco, Inc.*



*South parking lot PV canopy
Image courtesy of: Ameresco, Inc.*