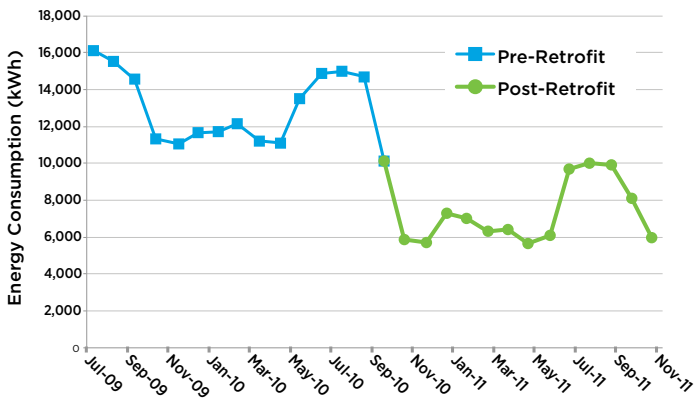
Prologis Rolls Out Warehouse Energy Retrofits

Prologis partnered with the U.S. Department of Energy (DOE) to develop and implement solutions to retrofit existing buildings to reduce annual energy consumption by at least 30% versus pre-retrofit energy use as part of DOE's Commercial Building Partnership (CBP) program.[1] The National Renewable Energy Laboratory (NREL) provided technical expertise.

Prologis, a DOE Better Buildings Challenge[2] member, upgraded the interior lighting at an 800,000-ft² unconditioned distribution center in Olive Branch, Mississippi, as part of a tenant improvement project for a major national retail customer. This case study summarizes the retrofit project's business case and demonstrates a solution for overcoming a common barrier to improving energy efficiency. Actual energy savings were determined based on utility bills obtained from the customer. The electricity savings versus pre-retrofit use were 41%, exceeding the goal of 30%. A graph of measured electricity use is shown below. Prologis is currently replicating this retrofit across their portfolio of buildings which included ownership of or investment in properties and development projects expected to total 565 million ft² as of September 2012.

Warehouses and storage facilities in the United States represented 14% of total commercial floorspace (equivalent to 10 billion ft²) and consumed 7% of commercial primary energy consumption as of 2003.[3] The lighting retrofit described here represents a large energy and cost reduction opportunity for warehouse and distribution center space across the United States.

Average Daily Energy Consumption



The Prologis facility in Olive Branch, Mississippi.

Photo courtesy of Prologis

Project Type	Warehouse, Retrofit
Climate Zone	ASHRAE Zone 3A, warm and humid
Ownership	Owned by Prologis, leased by a major national retail customer
Barrier Addressed	Split owner/tenant incentive for investing in energy efficiency improvements
Square Footage	800,000 ft²
Energy Savings (Versus Pre-Retrofit)	41%
Energy Savings (Versus Pre-Retrofit)	1.9 million kilowatt-hours (kWh)/yr
Expected Cost Reductions (Versus Pre-Retrofit)[4]	$226,000/yr
Simple Payback Period	11 months
Expected Carbon Dioxide Emissions Avoided[5]	1,400 metric tons/yr
Retrofit Completion Date	October 2010

[1] CBP is a public/private, cost-shared initiative that demonstrates cost-effective, replicable ways to achieve dramatic energy savings in commercial buildings. Companies and organizations, selected through a competitive process, team with DOE and national laboratory staff who provide technical expertise to explore energy-saving ideas and strategies that are applied to specific building projects and that can be replicated across the market.

[2] DOE Better Buildings Challenge: http://www4.eere.energy.gov/challenge/

[3] DOE Buildings Energy Data Book table 3.2.2 (http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=3.2.2)

[4] Using an electricity cost of $0.12/kWh provided by Prologis

[5] EPA Greenhouse Gas Equivalencies Calculator: http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Decision Criteria

At the Olive Branch facility, the customer received and paid the utility bills. This arrangement, commonly referred to as a triple-net lease, is widely used in industrial and commercial leases. It can present a barrier to improving energy efficiency because the building owner neither controls how energy is used nor pays for its purchase. Prologis' decision to collaborate with the lessee to save energy by upgrading the building's existing equipment was driven by the opportunity to offer desirable energy-efficient space to the customer and support the company's commitment to sustainable business practices. Making investments that improve energy efficiency aligns the interests of the building owner and occupant. The investment to improve efficiency benefitted both the owner and lessee by supporting the owner's retention of tenants and by reducing the operating costs for the tenant.

Economic

Prologis' investments in improving energy efficiency helped lower the overall cost of operations for the customer. Prologis funded the lighting project through a tenant improvement (TI) allowance as part of the lease renewal with the customer. The lease renewal period provided an opportune time to invest in efficiency while other TI work was taking place. Investment of even a small part of the TI budget in efficiency can yield significant savings for the building occupant.

The capital outlay for this type of project can pose a barrier for capital-constrained companies. For this project, Prologis competitively bid the installation work, bought fixtures in bulk, and captured available utility rebates. According to Prologis, utility rebates can reduce project costs by up to 50% in certain markets. The simple payback period for this lighting retrofit was 11 months, giving the customer an excellent return on investment. The energy savings and payback at this facility were especially good because the facility was occupied 24 hours per day, 7 days per week.

Branding

To make its spaces energy efficient and attractive, Prologis regularly modernizes its buildings to improve energy efficiency. As this case study illustrates, Prologis has extensive experience working with customers to upgrade lighting from traditional high-intensity discharge (HID) and T12 fluorescents to energy-efficient T5 fluorescents and light-emitting diodes (LEDs). These types of energy efficiency upgrades are becoming common in many markets with high energy prices and strong utility rebate programs.

Policy

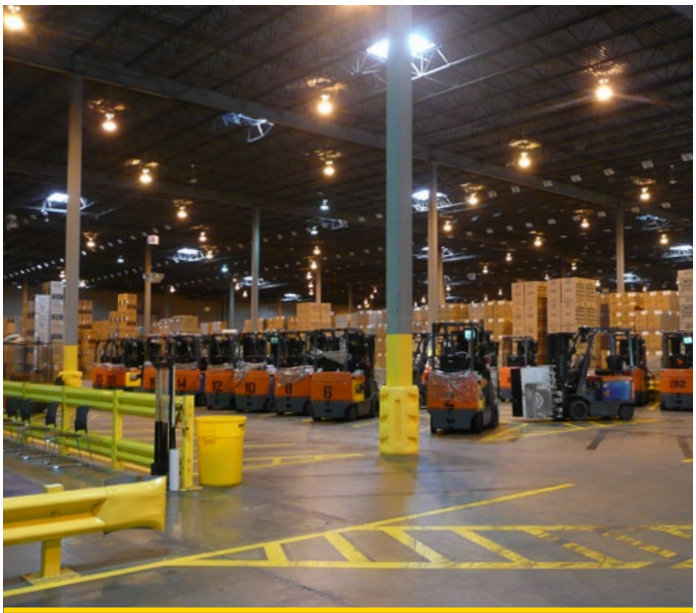
Prologis maintains corporate sustainability goals that strengthen the company's efforts to improve the energy efficiency in its facilities. The company joined DOE's Better Buildings Challenge in 2011, committing to reducing energy consumption across 100 million ft^2 by 20% by 2020. More than 40% of Prologis' global property portfolio has received energy efficient lighting upgrades.

Energy Efficiency Measures

Prologis replaced 966 metal halide 400-W high-intensity discharge (HID) fixtures with 6-lamp, 54-W T5HO high bay fluorescent fixtures and added occupancy sensors to each. The building had skylights before the retrofit, though daylight availability was not sufficient to justify dimming the fluorescent fixtures. NREL calculated the illuminance levels that would result from the project to make sure it met Prologis' requirements and calculated energy savings for the project's business case. The Olive Branch distribution center was unconditioned except for exhaust fans, which were not addressed as part of the retrofit. Energy used at the facility was predominantly electricity; the only natural gas use was a minor contribution by indirect gas-fired heaters to provide freeze protection in the winter. The contractor for this project coordinated activities to minimize the disruption to the building's 24/7 operations, for example working when the warehouse was less busy than usual.

Energy Use Intensity

The retrofit took place in October 2010. A comparison of utility bills from before and after the retrofit showed a reduction of annual electrical energy use intensity (EUI) from 19.4 to 11.4 kBtu/ft^2, a 41.2% savings. Savings amounted to roughly 2.5 kWh/ft^2/yr. Similar savings across all U.S. warehouses and distribution centers could potentially yield savings totaling 25 billion kWh/yr, equivalent to approximately $2.5 billion/yr in reduced energy costs.



A pre-retrofit picture of the Olive Branch Prologis facility showing 400-W metal halide fixtures. Skylights were part of the building before the retrofit.

Photo courtesy of Prologis

The Olive Branch facility after the retrofit showing the new T5HO fixtures.

Photo courtesy of Prologis

Lessons Learned

Take advantage of an untapped reservoir of energy savings

Given the focus that is often placed on sustainable new construction, it is easy to miss large opportunities for relatively easy energy savings in existing commercial buildings. Replacing traditional HID and T12 lighting technology is a widespread opportunity for cost-effectively cutting energy use. Warehouse and distribution center facilities that have large footprints and long operating hours can pay back investments in lighting improvements very quickly, especially when utility rebates are captured to reduce project costs.

Leverage tenant improvements

Improving energy efficiency in leased commercial space takes coordination between the owner and lessee to overcome barriers on both sides of the relationship. Owners do not pay for building energy use in a triple-net lease arrangement and lessees do not own the capital equipment such as the light fixtures. In many cases, the cost of upgrading to more efficient equipment can be shared. In addition, landlords may provide an allowance during lease-up or renewal to customize the leased space to meet particular customer requirements. Lessees can reap significant operational savings and improved work environments by allocating a part of this allowance to measures that improve energy efficiency. Lessees benefit from lower operating costs and landlords benefit from an improved facility that can better attract and retain customers.

Benchmarking: Challenge and Opportunity

Because of the triple net-lease arrangement, it can be challenging for industrial and commercial building owners to understand how much energy their facilities consume. Property owners have an opportunity to reach out to lessees to understand energy consumption in their buildings and work together to develop solutions that benefit both lessees and landlords. This goal can be accomplished by engaging building occupants to share energy use data with property owners on an ongoing basis. Sharing this data allows both parties to work together to target retrofits and upgrades that are mutually beneficial, lowering operating costs while modernizing building systems.

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

For more information, visit:
eere.energy.gov
eere.energy.gov/buildings/commercial/

DOE/GO-102013-3864 • March 2013
Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 10% post consumer waste.