

One building can change the world – Empire State Building’s groundbreaking leadership

The Empire State Building energy retrofit is on track to meet or exceed its goal of reducing energy usage by 38 percent, saving some 115,000 tons of greenhouse gas emissions over the next 15 years. As project manager of the Empire State Building energy retrofit and program manager of the analytical process that led the project, Jones Lang LaSalle offers unique insight into the impact this high-profile project has had on the worldwide movement to make commercial buildings more energy efficient. In undertaking the \$106 million energy retrofit, owner Anthony E. Malkin had three overarching goals: to make the business case for economically feasible integrated retrofits, to establish a model that can be replicated throughout the U.S. and the world, and to commit himself and his project team to actually moving the needle on sustainable public policy in order to motivate others to follow suit.

Just as it did when it opened in 1931, the Empire State Building has raised the bar for the future of office space, this time in a sustainable fashion. This paper looks at how the goals established by the Empire State Building team have been met, how the model has reverberated in private markets, and what the team leaders are doing to ensure these lessons are converted into effective and groundbreaking public policy.

On time, within budget, results ahead of forecast

The first chapter of this story has made headlines throughout the world: Discussions with executives at the Clinton Climate Initiative convinced Malkin that the Empire State Building would make a great test bench to determine the business case of the costs and benefits of a major energy efficient retrofit. “If we can make it work here, we can make it work anywhere.” The most famous office building in the world will receive international attention, which will result in more adoption and inspiration. Malkin worked closely with a team of energy and environmental experts at Jones Lang LaSalle, Johnson Controls and Rocky Mountain Institute that developed and investigated more than 60 potential energy strategies to determine the combination of projects that would produce the optimal balance of greatest benefit (in terms of reducing greenhouse gases and energy costs) per dollar of upfront cost. Eight projects were ultimately selected for implementation. The question now is: has it worked?

Why greening existing buildings matters – the impact we can make

An estimated 75-85 percent of buildings standing today in the United States will still exist in 20 years. In New York City, about 43 percent of current office space was built before 1945.

In New York City 80% of total energy is consumed by the city’s 900,000 buildings. The largest 20 percent of those properties devour 80 percent of this energy. This means that 64 percent of the energy used in New York City is used by 20 percent of commercial buildings. If these buildings reduced their energy use by 40 percent, as the Empire State Building is, energy use in New York City would be reduced 25 percent!

The Empire State Building consumes as much energy in one day as 40,000 single family homes. Its sustainable retrofits will reduce greenhouse gas emissions by 105,000 metric tons over the next 15 years—an amount roughly equivalent to removing 25,000 cars from the road during that period.

Achieving energy savings through sustainable retrofits is 3-5 times less expensive per watt than generation through alternative sources such as wind, solar or geothermal.

Nearly 18 months after the announcement of the retrofit, the initiative is on schedule for 2013 completion. The work covered by the energy performance contract is to be completed in 2010 and the project is within budget for work to date. The Empire State Building is on track to meet or exceed its projected 38.4% annual energy reduction, for an extraordinary yearly savings of \$4.4 million in energy and operational costs. Malkin’s contract with ESCO Johnson Controls, developed by JLL, JCI, and CCI to create a new BOMA standard agreement that transparently reflects costs and includes rigorous measurement and verification protocols, guarantees this level of BTU and wattage reduction, including a total projected savings of 90 percent.

The combination of the eight initiatives has resulted in an overall energy reduction including some additional unexpected benefits. For example, a planned project to install an additional chiller and riser to expand the capacity of the building's cooling system as part of the broader overall repositioning of the building has been rendered unnecessary because improvements in managing the cooling load freed up over 33% of the chillers' capacity. Corridors will be permanently cooled with the same number of chillers, which were also retrofitted to optimize efficiency, with supplemental chilled water remaining to serve tenants.

Perhaps the most significant evidence that the Empire State Building energy retrofit is achieving its demand-reduction targets is the improvement in its ENERGY STAR rating. The team's analysis showed that an ENERGY STAR rating of 90—among the top 10 percent of buildings in terms of efficiency—would be attainable once the major retrofit work was completed in 2011. In fact, the building achieved a 90 ENERGY STAR rating well ahead of schedule, in May 2010. This achievement is remarkable for a 79-year-old building, given that ENERGY STAR's benchmarking criteria do not take a building's age into account.

Tenant enthusiasm

Aggressive as Malkin and his team were toward energy reduction opportunities under their control, the success of the program also relies on actions taken by the building's tenants, whose participation in the building's program will deliver 17 percent of the total energy reduction per the original analysis. Malkin approved Jones Lang LaSalle's development of a set of protocols to engage new and existing tenants in the energy reduction process. This was a bold decision, since many owners are reluctant to require energy efficiency measures in lease negotiations, for fear of driving off prospective tenants. Could such a measure succeed?

The experience at the Empire State Building suggests a strong "yes." Most new tenants have been enthusiastic about occupying green space and reducing their overall occupancy cost, working with our team to understand the incremental first costs, if any, and the return on this investment delivered by an energy efficient space. The retrofit also enhances the building's appeal to occupants in terms of thermal comfort, indoor environmental quality, and ventilation to suit individual needs. These factors, plus the enhanced reputation of being in a green building, have attracted several large tenants that might not have considered the building previously.

Some tenants have even gone far beyond the performance specifications developed by the team in creating leading-edge sustainable workplaces. Multinational construction company Skanska relocated its U.S. headquarters to the Empire State Building and received LEED Platinum certification for its space in 2009. In adopting and surpassing the building's efficiency standards, Skanska reduced total energy consumption by 57 percent compared to its previous space in another building. Skanska has stated that it anticipates \$500,000 in energy savings over the life of the lease, and a payback of its initial 4.7% incremental investment within five years.

A replicable model

The energy retrofit has gained widespread attention from the business world, government decision-makers and the general public. At a time when there is tremendous interest in commercial building energy retrofits but a lack of capital to fund them, the Empire State Building is the highest profile demonstration of the financial payback that can be achieved. Perhaps the largest audience is the 4 million annual visitors to the building's observation deck, who can now also visit a new interactive, multi-media exhibit highlighting the greening of the building and why it is important to the environment.

More than 100 owners, lenders and corporate real estate executives have toured the building during the retrofit process, and the vast majority agrees that some of the strategies being implemented can be translated to other buildings. In some cases, these visits have triggered calls to action. Jones Lang LaSalle is leading similar initiatives at 32 other properties totaling over 13 million square feet. Malkin himself is replicating the process in at least 11 other buildings under his control. Several other owners are in discussions with Jones Lang LaSalle to replicate the model at properties across the U.S., the U.K. and Australia.

Though the Empire State Building model is in the early stages of replication, and has only been publicly known for just over a year, the Jones Lang LaSalle team has projected dramatic results for their related projects in the works. Though capital commitments for sustainable improvements vary, six of the projects farthest along are projected to achieve from 20-50 percent energy reduction, with annual savings from \$240,000 to a remarkable \$2.5 million. Capital investment ranges from about \$700,000 to \$4 million, with a payback of just 1.6 to 5.5 years.

Here is a look at the relationship between cost, energy reduction, dollar savings and payback in the six buildings:

	Capital Cost	Energy Reduction	Annual savings	Payback period
Bldg. A	\$4,000,024	50%	\$2,501,756	1.6 years
Bldg. B	\$1,763,280	23%	\$321,805	5.5 years
Bldg. C	\$1,625,469	20%	\$463,055	3.5 years
Bldg. D	\$1,509,064	42%	\$398,169	3.9 years
Bldg. E	\$1,269,885	29%	\$314,460	4.0 years
Bldg. F	\$700,225	26%	\$242,426	2.9 years

Help wanted: public sector incentives

The U.S. government has expressed strong interest in the work at the Empire State Building as a model for energy reduction and a justification for programs to enable financing. In July 2010, Malkin told a Congressional Joint Economic Committee that actual energy savings are anticipated to exceed 40 percent, and that he expects a three-year payback on his investment. The same month, Jones Lang LaSalle Public Institutions Practice CEO Herman Bulls participated in a White House panel on ways the U.S. can help enhance energy efficiency in large commercial buildings. One prominent enthusiastically is former President Bill Clinton, who has urged many individual legislators to tour the Empire State Building for a firsthand look at what can be achieved.

At the local level, the project team has met with interested policymakers and financiers including interested officials from cities such as New York, San Francisco, London, Philadelphia and Toronto. In addition, they have presented to a “who’s who” of real estate industry, energy performance and preservation groups including BOMA, CoreNet, Real Estate Roundtable, Urban Land Institute, U.S. Green Building Council, National Resources Defense Council, AIA, ASHRAE and National Trust for Historic Preservation.

From Congress and the White House to cities and public-interest groups, audiences are hearing a common theme: the easiest and most cost-effective way for government and business interests to reduce greenhouse gases on a major scale is to focus on energy efficiency in large commercial buildings. However, even with the shining example of the Empire State Building and a patchwork of government incentives and mandates at the federal, state and municipal level, the groundswell of retrofits today falls far short of the industry’s potential.

Many building owners support sustainable concepts, but cannot afford the upfront capital expense of green improvements while waiting for them to return their investment. Others might be more willing to embrace sustainable retrofits with the help of government incentives to reduce the ROI timeframe.

Property Assessed Clean Energy (PACE) programs in 23 states finance energy projects, with repayment in the form of higher property tax on the affected properties over a decade or more. The incremental tax is more than offset by reduced energy cost. This structure aligns the cost of retrofits with the benefit of energy savings, since both taxes and utilities are typically paid by tenants. Several large-scale commercial property owners have expressed strong interest in PACE financing as it becomes available in more states. However, a recent challenge by the Federal Housing Finance Authority has stalled the progress of PACE in residences, where most of the funding to date has been concentrated, leaving the future of the program in the commercial sector in doubt.

On the incentives side, while tax credits and other benefits increase for the use of clean forms of energy such as solar, wind and geothermal, comparatively little government incentive exists for actually reducing energy use. According to Malkin, the savings generated by the Empire State Building’s sustainable capital improvements is 3-5 times per watt less expensive than comparable savings produced by alternative energy technologies would be.

As the Congressional and White House panels heard from Malkin and Jones Lang LaSalle, sensible and effective government policy would:

- *Make energy reduction as great a priority as production from renewable sources.* Improving efficiency is the quickest route to cost-effective sustainability. It should be treated as a carbon negative power generation.
- *Focus on the biggest energy consumers first.* Commercial buildings represent the bulk of property energy consumption—the Empire State Building alone consumes the equivalent of 40,000 single-family homes.
- *Consider existing buildings at least as much as new ones in sustainability incentives.* An estimated 75-85 percent of commercial buildings standing today will still exist 20 years from now, yet the focus on energy-related incentives is on new construction. Rebates are far more predictable and simple for owners to pursue than tax incentives and the up-front award of rebates for efficient retrofits would greatly encourage investment in such programs.

- *Remove barriers to PACE and other federal loan guarantees.* Current requirements such as subordinating existing mortgage loans to federal energy-related lending discourages private financial institutions from participating in arrangements such as PACE.
- *Put tax incentives for sustainable retrofits on equal footing with those for new construction.* Current tax deductions are focused mainly on incentivizing energy efficiency in new construction, but the vast majority of commercial property is comprised of existing buildings.
- *Establish accepted nationwide sustainable performance and appraisal standards, and require measurement and reporting for all buildings.* While certification systems such as LEED and ENERGY STAR are of great value and have worked to transform the industry, they were not developed to reflect important criteria such as the impact of energy efficiency measures on an asset's present and future value. In addition, such evaluations are currently voluntary in most areas, making it difficult for stakeholders from tenants to lenders to make quality sustainable decisions. Consistent and useful information shared across the country will lead to an invaluable data set, which will enable the development of baseline standards and corresponding efficiency improvement targets.

Sustainable retrofits pay

In summary, there is no quicker route to reducing our nation's overall carbon footprint than retrofitting existing buildings—especially large ones—to be sustainable. While not necessarily inexpensive, such green improvements dramatically reduce energy consumption so that the projects are paid for through those savings. They offer reasonable payback periods and generate large financial savings for years afterward.

Despite enthusiasm for the model created for the Empire State Building, cost may be a barrier to some property owners who must borrow from lenders often reluctant to loan specifically for sustainable retrofits. Just as the public sector has stepped in to place clean energy production and residential efficiency on a fast track, government entities should facilitate financial incentives from loan guarantees to tax credits and other incentives for sustainable retrofits.

In 1931, in the midst of the Great Depression, the Empire State Building became the tallest building in the world. Now it is one of the most energy efficient. The Empire State Building continues to inspire us to push the limits of technical progress and improved performance – finding a way to save and make money in a challenging economic environment while improving the spaces in which we work. Through a quantitative and transparent process, and with the support of public policy and financial incentives, this replicable process can be successfully implemented to make a tremendous and measurable impact on the reduction of energy use in the United States and globally while delivering real economic returns.

For more information contact Dana Robbins Schneider at +1 917 882 5646 or dana.schneider@am.jll.com.

*Join the sustainability conversation:
www.joneslanglasalle.com/greenblog*