Empire State Building sustainability program

Tony Malkin and the Clinton Climate Initiative established a partnership with Jones Lang LaSalle, Johnson Controls Inc., and Rocky Mountain Institute. The team worked together seamlessly to develop a replicable model for optimizing the performance of an existing building, while reducing greenhouse gas emissions and delivering measurable economic returns.

"The goal with the Empire State Building has been to define intelligent choices which will either save money, spend the same money more efficiently, or spend additional sums for which there is reasonable payback through savings. Addressing these investments correctly will create a competitive advantage for ownership through lower costs and a better work environment for tenants."

- Anthony E. Malkin, Empire State Building

Partner companies
5

Energy-efficiency ideas vetted
60+

Final projects recommended
8

Iterative design process
8 mos.

Annual energy savings
$4.4M

Energy reduction
38%

What?

- Economically viable integrated sustainability program for the Empire State Building including:
- Infrastructure projects
- Design standards
- Tenant energy management
- Property management
- Leasing and marketing initiatives

Why?

- To create a replicable model that will lead to significant reductions in greenhouse gas emissions, and promote sustainable design and operations in existing buildings.

How?

- Rigorous eight-month iterative design process
- Narrowed 60+ ideas to a package of eight recommended projects
- Identified optimal balance of financial and environmental return on investment
- Addresses increased infrastructure needs, utility costs, future planning, and tenant use of energy
- Includes building windows, radiators, automated controls, cooling plant, air quality, tenant space design, and tenant energy use
- Requires the active engagement of an ESCO (JCI), the building owner, and building tenants

How much?

- Incremental cost of $13.2 million
- Saves a maximum of $4.4 million in annual energy costs
- Equivalent to a 38 percent energy reduction

What are the top three things we are hoping to change?

- Dramatically reduce energy use of the Empire State Building, and be able to demonstrate the savings in a transparent and verifiable way
- Improve tenant comfort and reduce tenant energy use via improved design and energy awareness
- Improve the building's marketability
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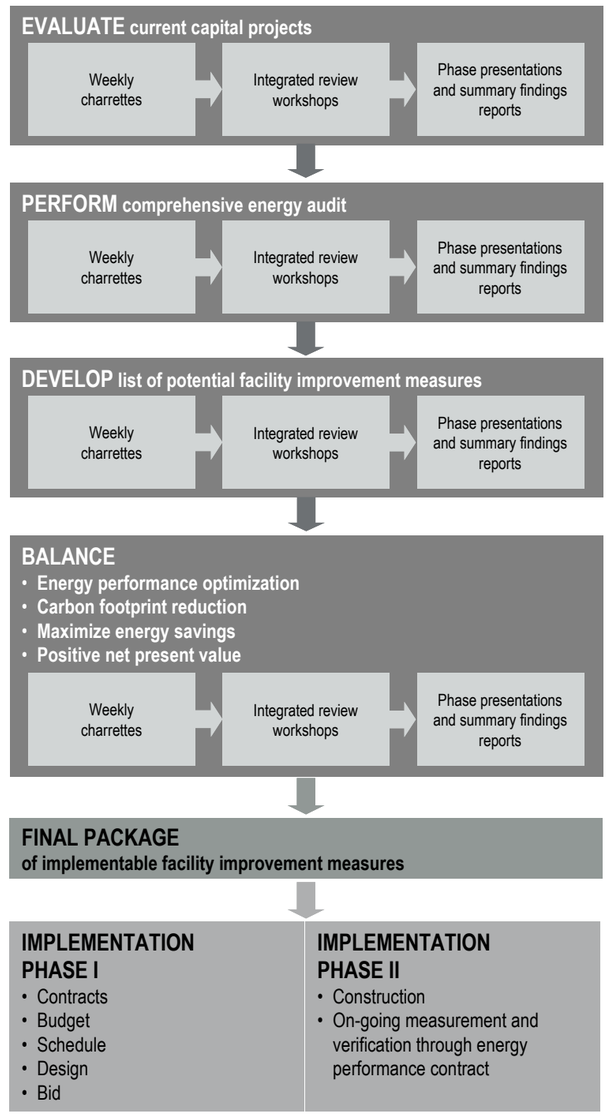
What are the top five unique things we are doing?

- "Right steps in the right order" retrofit for whole-systems optimization
- Utilized both industry sustainability ratings, plus created new tools
- Demonstrating that a building retrofit can cost-effectively achieve upwards of 35 percent energy savings
- Innovative commercial model and measurement and verification model
- Designing a model pre-built office suite as a physical example of an integrated sustainability program that bridges base-building and tenant space improvements

What are the top three results we are expecting to see?

- Achieve an energy use reduction of 19 percent in the initial phase, and gradually increase the savings to 38 percent as the longer-term projects are completed
- Create a competitive advantage in the marketplace.
- Cause an increase in the number of multi-tenant building retrofits that seek more dramatic energy use reductions by tackling tenant as well as base-building systems



Developing tools to build on

eQUEST
Baseline model of current energy performance; predicts performance under new measures

Comprehensive carbon footprint tool

Tenant sustainability master planning tool
Engage tenants, provide LEED Platinum pre-built space model and guidelines for energy management

Process of elimination

1 Identify opportunities

- 60+ energy efficiency ideas were narrowed to 17 implementable projects
- Team estimated theoretical minimum energy use
- Developed eQUEST energy model

2 Evaluate measures

- Net present value
- Greenhouse gas savings
- Dollar to metric ton of carbon reduced
- Calculated for each measure

3 Create packages

- Maximize net present value
- Balance net present value and CO_2 savings
- Maximize CO_2 savings for a zero net present value
- Maximize CO_2 savings

4 Model iteratively

- Iterative energy and financial modeling process to identify final eighht recommendations