Smart building technology investments typically pay for themselves within one or two years by delivering energy savings and other operational efficiencies.

JLL was well on the way to making 77 West Wacker an energy efficient Class A building. Then in 2014, they partnered with Environmental Defense Fund and found even more energy and cost reduction opportunities. JLL’s success story is a model for energy management in Class A buildings.

Summary

77 West Wacker is an iconic building in downtown Chicago. The building rises 50 floors to support more than 16 businesses with over 950,000 square feet of rentable space. When the building was constructed in 1992, the cost of electricity was cheap, the timeless architectural style incorporated a lot of glass, and the news of the day was about sick building syndrome. The building was mechanically designed with a pneumatic HVAC system versus direct-digital control used today, creating large opportunities for energy efficiency.

So how did building management company JLL take this all-electric building from struggling for Energy Star rating to a Class A standout in 10 short years?

About JLL (NYSE: JLL) JLL is a professional services and investment management firm offering specialized real estate services to clients seeking increased value by owning, occupying and investing in real estate. With annual gross revenue of $4.5 billion, JLL has more than 200 corporate offices, operates in 75 countries and has a global workforce of approximately 53,000. On behalf of its clients, the firm provides management and real estate outsourcing services for a property portfolio of 3.0 billion square feet.

About Environmental Defense Fund (EDF), a leading international nonprofit organization, creates transformational solutions to the most serious environmental problems. EDF links science, economics, law and innovative private-sector partnerships.

About EDF Climate Corps Climate Corps is EDF’s innovative summer fellowship program that places specially trained graduate students within organizations as dedicated energy problem solvers.
Current ASHRAE and OSHA standards call for 1,000 parts per million of CO2. Install sensors to get transparency into your CO2 data and stop paying to bring in more outside air than you need to.

The 77 West Wacker team also took on a full retrocommissioning in 2010, whereby they implemented all recommendations in the first 90 days, seeing up to 900,000 kWh of immediate energy reductions.

Tip: Get a full-service contract with your automation system software provider so you can utilize unused maintenance hours for energy efficiency customizations.

The Story

It all began with the simple gesture of sharing the building's energy contract and electric bills.

Myrna Coronado-Brookover, a senior vice president and general manager at JLL, oversees the management of 77 West Wacker. Her job is to constantly maximize value, control operating expenses, and keep the building attractive to current and potential tenants. With energy costs amounting to the second largest expense line item in the building's budget, she knew she had to create a team effort to tackle energy efficiency.

Tony Marzano is JLL's chief engineer for 77 West Wacker. His goal is to run an efficient operation while creating value for JLL. In 2004, Tony was at the meeting when Myrna handed over the energy contract and the electric bills to the engineering team and challenged them to collaborate with her on finding ways to reduce energy use.

A unique partnership was being formulated between business and operations at 77 West Wacker. The two departments now shared a common goal: to be more sustainable while increasing the building's competitiveness in the Class A commercial real estate market.

Together, Myrna and Tony put together an aggressive strategy for 77 West Wacker to achieve ENERGY STAR®, LEED EBOM Gold and become one of the most energy efficient Class A buildings in the U.S., joining Retrofit Chicago and later also achieving BOMA 360 designation. The duo was able to bring a new mindset to managing 77 West Wacker by focusing on education, automation, and data.

Implementation

One of the biggest obstacles for 77 West Wacker in attaining energy efficiency was complacency. Like many established buildings, there was a history of doing things the way they'd always been done. At least, that is, until Myrna pointed to the energy bills and made it clear that the way it was always done was inefficient, from an energy and expense standpoint. However, there were already some great ideas for efficiency improvements coming from the engineers of 77 West Wacker. The engineers just needed the impetus and support from management to act.
Having control over all the fan powered boxes is a game changer in that it allows the operator to set a global room temperature set point. In the summer this can be utilized to pre-cool the building and all its contents below normal, during the late night and early morning hours when the energy is at its least expensive; thereby deferring the building’s peak demand period. The adverse is true for winter operation. For example: when the polar vortex hit on January 7, 2014, the energy prices went through the roof, peaking at $1.73 per kWh; 77 West Wacker was able to reduce over 1,000 kWh per hour during this 12-hour period. This resulted in not only a banner day for the engineering team, but also for participation in demand response.

The team at 77 West Wacker also established a list of non-critical versus critical systems to help reduce energy use on a daily basis, and when the grid called for reductions. Every building is unique. For 77 West Wacker, there were some necessary adjustments that had to be made to the automation system in order to take advantage of easily achievable energy savings. For example, Tony’s engineering team adjusted the programming so that the building was not actively heating and cooling simultaneously, (unfortunately a common occurrence in many buildings). They also implemented a BAS global heat disable function, which turns off resistive heat coils on fan-power-boxes with a single command. And as mentioned, they automated a pre-cooling and night purge control sequence, which eliminated daytime electric demand spikes.

Through these and other energy management innovations, the 77 West Wacker team was able to decrease electrical expenses by 47%, from $1.3 million in 2009 to $686,000 in 2012. Today, 77 West Wacker’s energy costs are approximately $.83/psf, (versus the original cost of $1.25/psf), an enormous accomplishment for an all-electric building.
**Education**

A building owner can inspire their staff to seek knowledge, information, and collaboration around best energy management practices. For Myrna, this included a scrutiny of the expenses, a renegotiation of energy contracts, and a rethinking of how 77 West Wacker teams worked together. For Tony, the education path was clearer: get himself and his team credentialed for Building Operator Certification (BOC) Levels 1 and 2; take energy and environment classes through I.U.O.E Local 399; and complete the Systems Maintenance Administration (SMA) designation.

Education is also the key defense against the barrier of complacency. When considering retrocommissioning 77 West Wacker, the team could have replaced equipment that had lasted 20 years with the same piece of equipment - after all 20 years is a decent ROI. Instead, they invested in efficiency and the long-term gains of decreased energy use.

While management and staff education is ongoing, there is another key stakeholder that must be involved in any building’s energy management strategy: the tenants. A key barrier in tenant engagement around energy efficiency is shifting the mindset that energy use at work is different from energy use at home. In 2014, 77 West Wacker began educating tenants in energy efficiency. They started by obtaining baseline data, performed analysis for efficiency opportunities, and provided tenants with the information and impetus to act. This tenant engagement project is another way that 77 West Wacker has developed a scalable solution that can serve the JLL building portfolio.

**Results**

77 West Wacker’s impressive results were a collaborative success story, with management seeing the panoramic view of building efficiency, and the engineers managing and optimizing the daily details.

- In 2009 energy expenses were $1.3 million
- By the end of 2009, 77 West Wacker achieved an ENERGY STAR rating of 78
- In 2010, they completed retrocommissioning; expenses were driven down by 27%, and they achieved an ENERGY STAR rating of 89
- Between 2010 and 2011, they reduced energy expenses by another $300,000
- By 2012 energy expenses dropped to $686,000

**Moving Forward**

At the end of 2012, 77 West Wacker had a record high ENERGY STAR rating of 91 and was holding steady on energy expenses. But they didn't stop there. With the help of EDF Climate Corps, they continued to find opportunities to become more efficient, take advantage of demand response programs, and dive deeper into real-time data and automation. 77 West Wacker had already reduced overall energy use by 32%. But they decided to go even further by joining the City’s Retrofit Chicago program. They have now committed to an additional energy reduction of 26.5% by 2018, directing their strategy toward tenant engagement.