



WAYPOINT



BOC CONTINUING EDUCATION MODULE

The Value of Energy Efficiency in Buildings for Safety and Wellness

MARCH
2022



AGENDA

- COVID-19 IMPACTS

- OBSTACLES FOR OPERATORS

- USING EE AS A TOOL

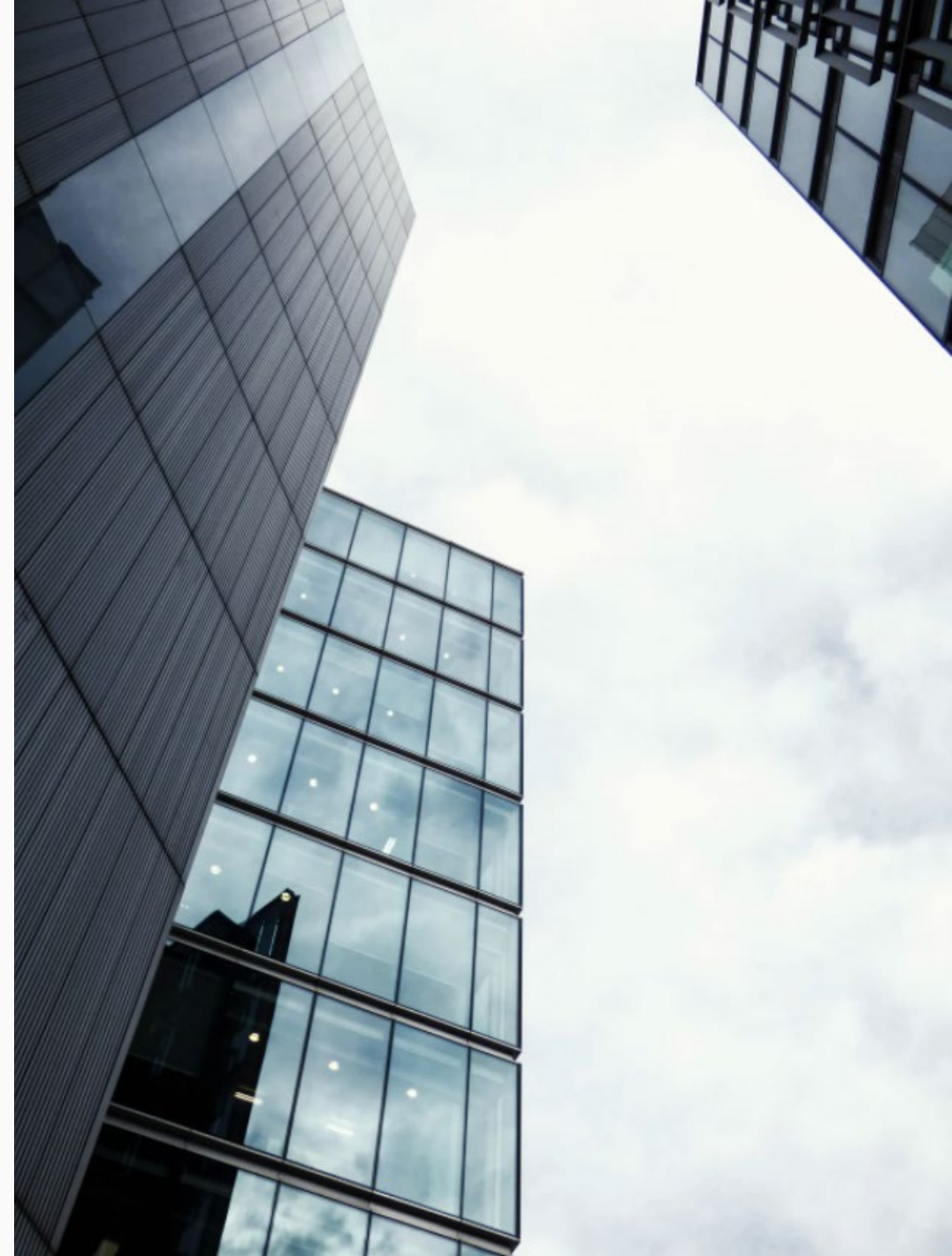
- OPERATIONAL OPPORTUNITIES

- BUILDING YOUR CASE



COVID-19 IMPACTS

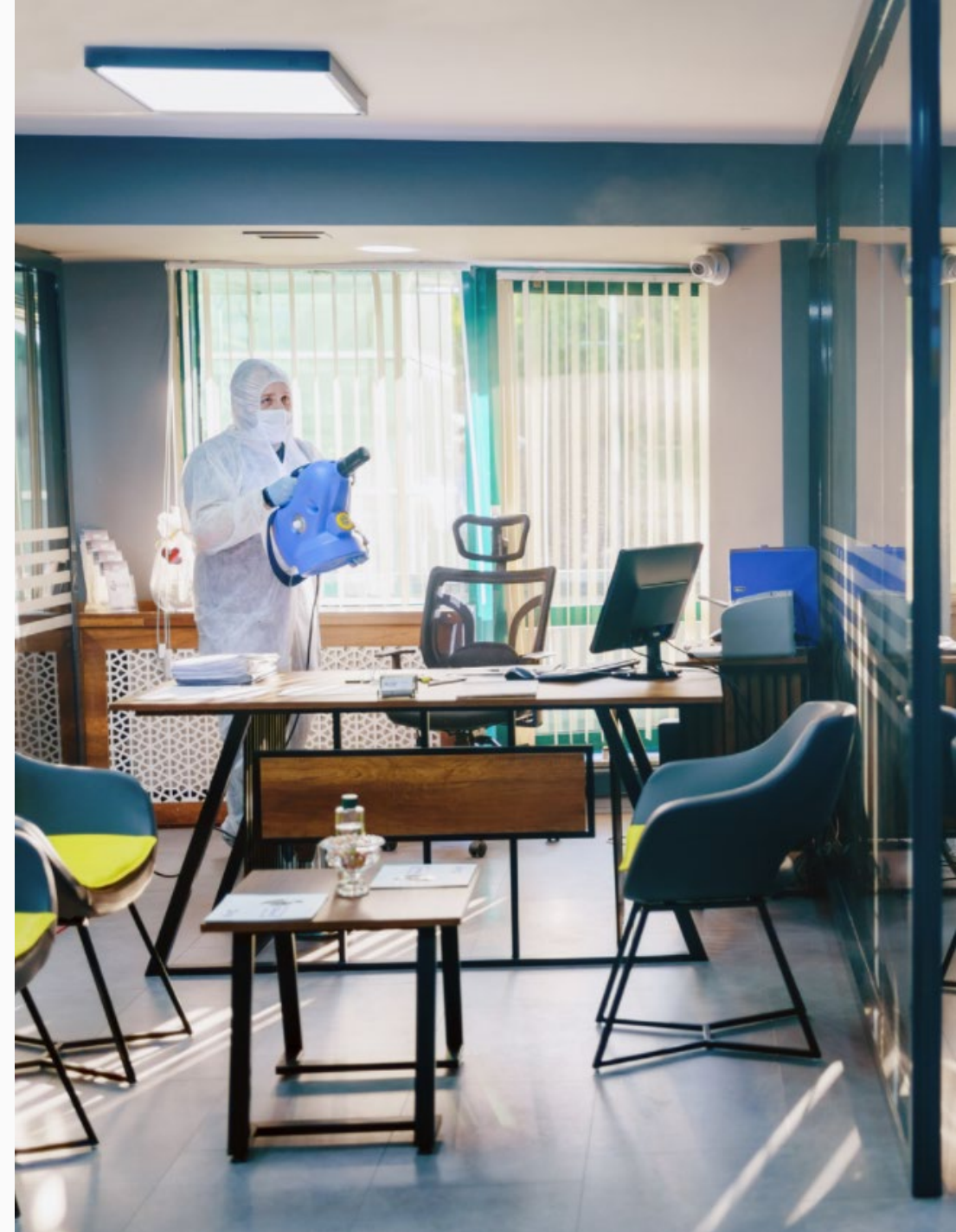
- 2020 presented a brief but severe decline in economic activity
- 2021 included many “fits and starts” with COVID variants and employer back to work plans
- 2022 is back on the mend, but offices are still impacted





COVID-19 IMPACTS

- Supply chain issues have been impacting project timelines
- WFH plans have been shifting in response to pandemic news
- Increase in health and safety concerns
- Pause in energy efficiency strategies for many facilities

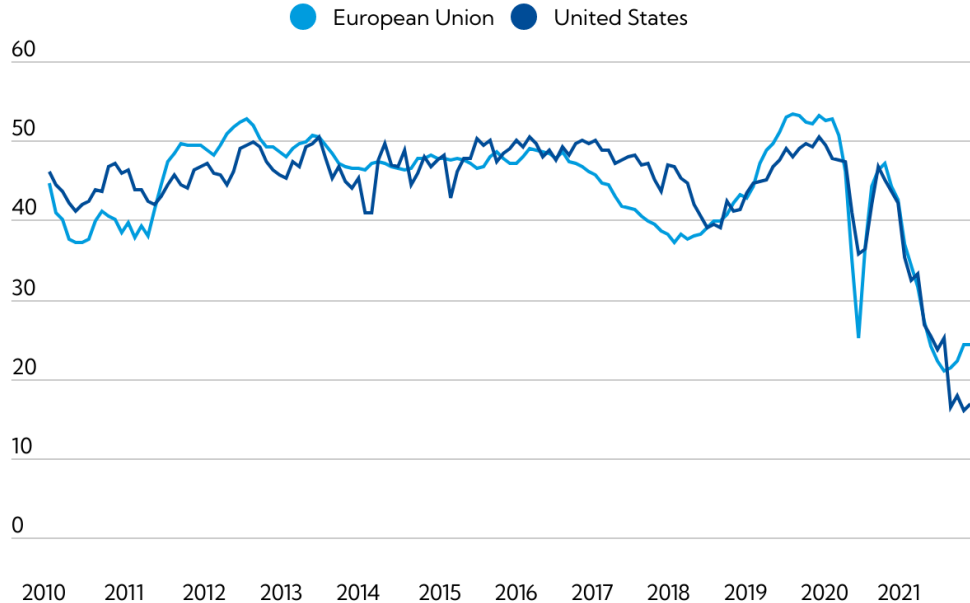




SUPPLY CHAIN ISSUES

Backlogs and bottlenecks: supply chain turmoil

Suppliers' delivery times in the US and EU have slowed considerably — a lower index reflects longer delivery times.
(Manufacturing PMI, suppliers' delivery times)



Sources: IHS Markit.

Note: PMI=Purchasing Managers' Index. Readings above 50 indicate faster delivery times, readings at 50 signal no change, and readings below 50 indicate slower.

IMF

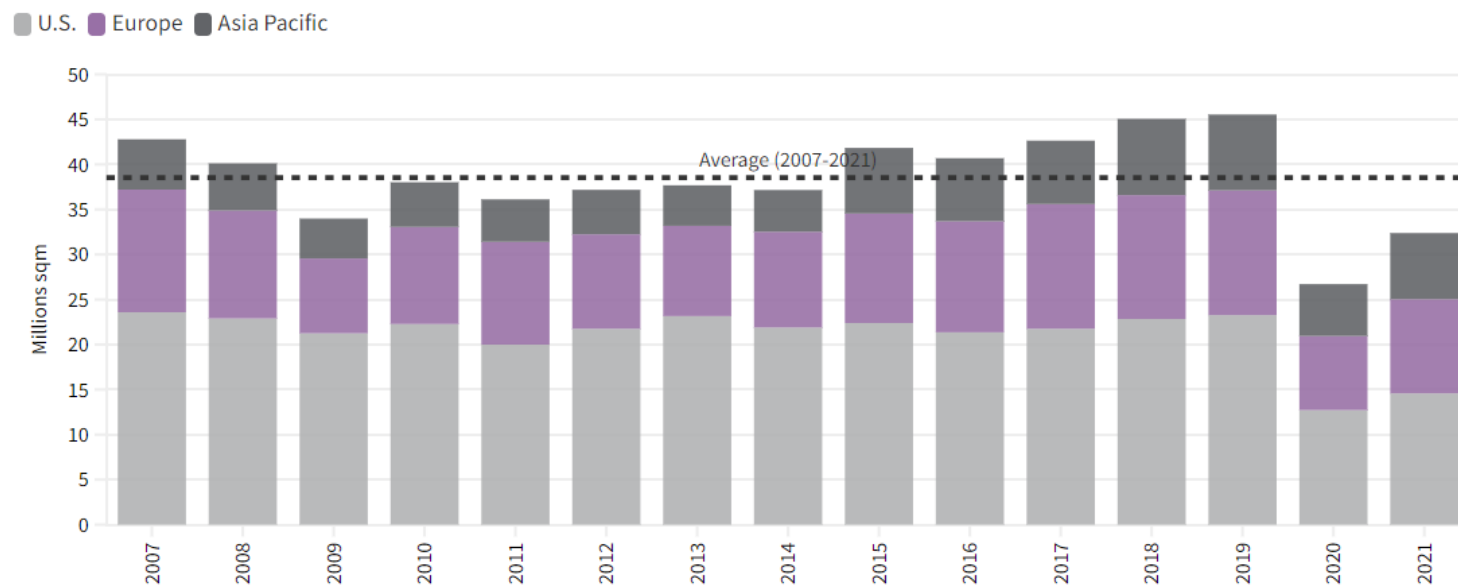
- Labor shortages, global traffic restrictions, and semiconductor shortages have created a perfect storm of supply chain chaos
- Lead times for projects are taking way longer as a result



OFFICES & COVID-19

- Leases are still impacted by COVID-19, though recovering
- Average office vacancy rate climbed to 15.7% across top 50 U.S. markets in 2021

Global Office Gross Leasing Volumes, 2007 - 2021



Source: JLL, February 2022
24 markets in Europe; 50 markets in the US; 22 markets in Asia Pacific.



EMPLOYERS WFH PLANS

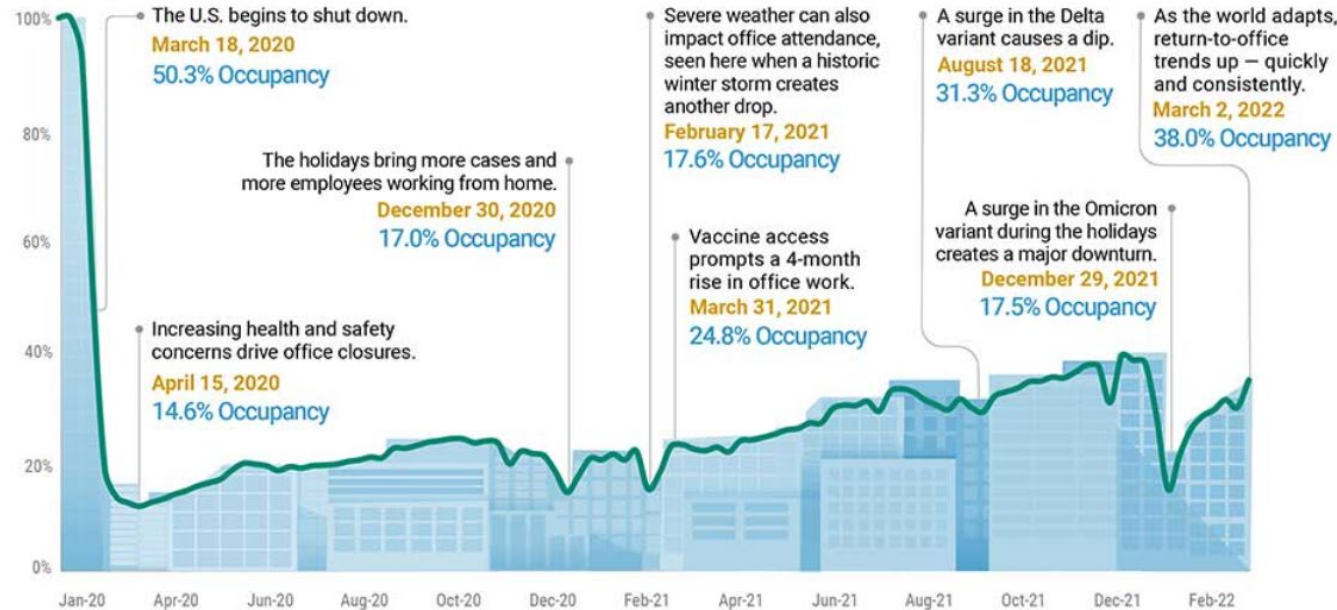


- Employers are shifting toward a long-term transformation and are putting aside continuous adjustments to their return-to-office plans
- Hybrid is here to stay and there will be no return to the old 'normal' - most corporate occupiers are contemplating a hybrid model with a split of three days in the office and two at home
- Before the Covid-19 pandemic, 8.4% of people in the US worked from home full or part-time, and in the post-crisis future, that figure is expected to be 15.8%



EMPLOYERS WFH PLANS

THE SLOW RETURN TO THE OFFICE 2 Years of Kastle Back to Work Barometer



Vox

Why the future of the office has been put on hold

... security services company Kastle, airport biometric ID company Clear, and health care concierge Eden Health [are] all pivoting to include coronavirus screenings in their offerings.

THE REAL DEAL

Covid-19 vaccine won't be immediate cure for office market

An average of about 23 percent of workers in 10 cities had returned to the office the week of Dec. 16, according to Kastle Systems.

The New York Times

Remote Work is Here to Stay. Manhattan May Never Be the Same.

Only 15 percent of workers have returned to offices in New York City and the surrounding suburbs, up slightly from 10 percent last summer, according to Kastle Systems.

THE WALL STREET JOURNAL

Delta Variant Threatens Small Businesses as It Slows Return-to-Office Plans

By last month, signs were emerging that more employees were heading back... 35% of the workforce had returned to traditional office space, as of July 21, in the 10 major cities monitored by Kastle Systems.

Forbes

Will Omicron Move More Work from Offices to Homes?

You can see the impacts in office occupancy data. Kastle Systems' "Back to Work Barometer" tracks keycard entries and occupancy in ten major metropolitan office markets.

Kastle Back to Work Barometer: Kastle customers are in more than 2,600 buildings in 138 cities. The Barometer reflects swipes of Kastle access controls from the top 10 cities, averaged weekly. It summarizes recent weekday building access activity among our business partners, not a national statistical sample.



EVEN EMPTY BUILDINGS USE ENERGY



- Lease agreements sometimes require tenant spaces to be operational regardless of occupancy
- Some tenants have equipment that's required to run (servers, etc.) regardless of occupancy
- Facilities must maintain ideal humidity and temp for equipment
- Health and Safety plans have become a bigger priority for many offices, and sometimes equipment use just isn't adjusted for occupancy



OBSTACLES FOR OPERATORS

POLL

- Tenant turnover as employers adjust to long-term hybrid workforce plans
- Even current tenants might use space differently, require more space or less space
- Some occupants are implementing more flexible work shifts over longer hours
- Additional building requirements for health and safety protocols
- New ventilation protocols increasing energy load in some cases
- Even in pre-pandemic times, it's hard to sell EE to owners if it's not already a priority





VENTILATION FOR COVID-19

- For COVID-19 mitigation, CDC & ASHRAE recommends:
 - Increasing Outdoor Air (OA)
 - Use fans to increase circulation
 - Turn off any demand-controlled ventilation (DCV) controls that reduce air supply based on occupancy or temperature during occupied hours
 - Using HEPA filters for air filtration
 - Filters should be MERV 13+
 - Overall increase airflow
- The problem is, most of these strategies result in energy INCREASE.





VENTILATION FOR COVID-19



- Indoor Air Quality (IAQ) Sensors
 - Mass flow calc – how much Outside Air (OA) you're bringing in
 - While we can't directly monitor COVID-19 particles in the air yet, we can monitor for CO₂ which helps us dial in OA intake to balance energy efficiency and health and safety
 - This allows you to monitor ventilation around a setpoint (e.g. 1000 ppm)
 - Recommended: non-dispersive infrared (NDIR) sensors



HOW TO LEVERAGE ENERGY EFFICIENCY

POLL

- Reducing energy use will (in most cases) reduce operation costs which can be reinvested in health and safety protocols
- Many of the EE strategies allow for greater control of building systems, which increase occupant comfort
- The best strategy to focus on if there's no CapEx for projects is evaluating and maintaining your current system in the most efficient way, including low-cost and no-cost projects
- But first, let's talk about CapEx projects





EE STRATEGIES FOR COVID-19



- Having a Building Automation System (BAS) will allow you to dial in systems and track shifting trends more closely
- RCx or MBx to optimize your existing systems
- Strategic Energy Management (SEM) Programs
- Replace old lighting systems
- Installing VFDs on fans or pumps will allow you to tweak how your building systems work, giving you greater flexibility for new tenant schedules
- Installing programmable thermostats will help increase control and inform operat



OPERATIONAL EE EXAMPLES

- Consider plugging air leaks around windows and doors with weather stripping or caulk
- Communicate with tenants to unplug equipment that's not in use while they are out of the office for extended periods of time
- Install occupancy and daylight sensors wherever possible
- Keep furniture from blocking registers and vents
- Keep exterior windows and doors closed when HVAC is in use
- Close curtains, shades and blinds at night to retain heat
- Repair damaged or old valves and steam traps
- Reduce water heater temp to 120° F (if codes allow)





OPERATIONAL EE EXAMPLES

POLL

- **Lower condenser water temperature set point during winter months:** dropping the condenser supply water temp 80°F to 75°F during cooler outdoor weather increases the chillers' efficiency (80,000 – 100,000 kWh annually, or ~\$6,000)
- **Lower Space Thermostat Setpoint:** reduce heating set point in the winter by 2°F – the larger the building, the more the savings (200,000-250,000 kWh or ~\$25,000-30,000 annually)
- **Electric baseboard heaters:** reduce operating hours for electric baseboard heaters for perimeter heating after business hours (50,000-60,000 kWh or ~\$4,500 annually, calculated based on reduction from 24/7 use to 14 hours per day)
- **Compressed Air Pressure Setpoint:** reduce pressure from 130 to 90psi for air compressor that serves onsite pneumatic tools (24,000 kWh or \$2,000 annually)





HOW TO SELL ENERGY EFFICIENCY

1. Understand the priorities of the facility owner
2. Establish baseline and calculate energy savings
3. Create projection of annual energy use before and after project is implemented
4. To calculate the simple payback, you divide the total investment cost by the annual cost savings
5. Don't forget to check local utility incentive offerings for financial assistance!

$$\frac{\text{Total Project Cost}}{(\text{Annual kWh Saved} \times \text{electricity rate})} = \text{Simple Payback in Years}$$

Ex:

$$\frac{\$500,000}{(2,200,000 \text{ kWh} \times \$0.075)} = 3 \text{ Years}$$



CASE STUDY: FORT WAYNE FACILITY

HVAC Controls

added to Chiller Plant Controls

Project Summary

Looking for an improvement in efficiencies, a Fort Wayne manufacturer looked at their chiller plant to find energy saving opportunities. They utilized the incentive program from Indiana Michigan Power to help offset the cost of upgrades. Pneumatic Controls were replaced with more efficient direct digital controls (DDC). The installation of controls to existing equipment operating 24/7 proved to be successful and will save the customer over 300,000 kWhs annually.

The project consisted of adding a new DDC Front End Controls platform with new user interface and graphics for easier facility end-use in controlling the chiller, two chilled water pumps, two condenser pumps and the cooling tower fan. Sensors were added for building chilled water/condenser water/supply and return temperature, chilled storage tank supply temperature, and condenser water tank temperature. The facility was able to optimize new start/stop set-points to achieve maximum energy savings. The project saved 359,885 kWh annually with an incentive of \$21,593 from Indiana Michigan Power.

Project Stats

Facility Type: Office

Type of Project:
HVAC Controls

Total Facility Square Feet:
~282,550

Annual Energy Cost Savings:
\$28,791

Incentive Total:
\$21,593

Total kWh Savings:
359,885 kWh

Total Cost:
\$134,168

Simple Payback After Incentive:
3.91 Years or 26% ROI



CASE STUDY: 311 S WACKER



Dave Burk © Hedrich Blessing 2011

PROJECT SNAPSHOT: 311 South Wacker

Measures implemented	Wireless pneumatic thermostats connected to an energy management system; Lighting
Total project cost	\$879,197
Estimated annual energy savings	4,384,242 kWh
Estimated annual cost savings	\$329,000*
Incentive received	\$402,318
Estimated payback period without incentive	2.7 years
Estimated payback period with incentive	1.4 years

[ComEd Energy Efficiency Resources](#)

*Estimated annual cost savings are based on an electricity rate of 7.5 cents per kWh.



CASE STUDY: CHICAGO MARRIOTT HOTEL



PROJECT SNAPSHOT: Chicago Marriott Hotel

Energy-saving improvements	Tower and Chiller upgrades
Estimated first-year energy savings	1,287,000 kWh
Total project cost	\$3,800,000
ComEd Energy Efficiency Program Incentive	\$205,000
Incremental cost for high-efficiency equipment	\$638,000
Estimated annual electric cost savings	\$103,000*
Estimated payback after incentives	6 years*

[ComEd Energy Efficiency Resources](#)

*Estimated annual cost savings are based on an electricity rate of 0.0799 cents per kWh



CASE STUDY:

Sun Prairie Area School District

The Problem

Sun Prairie Area School District found that Cardinal Heights Upper Middle School was suffering from building inefficiencies that had accumulated over time. The 275,699 square foot building was originally constructed as two separate buildings in 1959, and it has now been joined together as one building.

In-house facilities team performed regular maintenance on equipment, with over 1.6 million square feet covering their District, however, internal staff was still limited to what they could perform. The District was interested in leveraging the technical expertise and financial incentives available from Focus on Energy to provide not only new insights, but free up their staff's time for other tasks.

The Approach

In summer 2017, the District contacted Focus on Energy and their Trade Ally contractor, Edison Energy for help. The District had previous experience working with Focus on Energy implementing an energy management plan in 2005. Together with Edison Energy, an audit was conducted to assess the planning and investigation phases. These phases identified low and no-cost, short payback opportunities for the District to reduce their energy consumption while maintaining existing building systems. The District also requested Edison Energy identify certain improvement opportunities broken down into three categories: Energy Conservation Measures, Capital Projects, and Issues List.

The Solution

Due to advice and technical assistance from Focus on Energy and Edison Energy, the District is on track to save \$13,250 annually. The majority of these savings came from:

- Triple Duty Valve Adjustment: Heating Hot Water and Chilled Water Pumps
- Cabinet Unit Heater Temperature Setback

By completing this RCx project, the District was able to identify and correct inefficiencies, but also find more opportunities to continuously improve the state of their building's equipment.

Project Breakdown:

- Equipment Modifications:
 - Triple Duty Valve Adjustment
 - Cabinet Unit Heater Temperature Setback
- Estimated Project Cost: \$6,975
- Annual Energy Cost Savings: \$13,291
- Focus on Energy Incentive: \$7,604
- Payback: 0.52 Years

“Our school district is very active tracking energy usage and seeking projects to reduce our utility consumption and costs. Participating in RCx has shown us the benefits of performing periodic tune-ups to keep our existing equipment running smoothly.”

Kevin Splain,
Sustainability /Energy Manager
Sun Prairie Area School District



focus on energy™

Partnering with Wisconsin utilities



IN SUMMARY

- You can spend money on energy, or you can reinvest that in **safety and wellness protocols**: Reducing energy use will (in most cases) reduce operation costs which can be reinvested in health and safety protocols
- The greater the control of your building systems, the more flexible you can be to changing times, and the **happier your tenants will be**: Many of these EE strategies allow for greater control of building systems, which increase occupant comfort
- You don't necessarily need to spend money to save **money with EE**: The best strategy to focus on if there's no CapEx for projects is evaluating and maintaining your current system in the most efficient way, including low-cost and no-cost projects





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RESOURCES

[U.S. OFFICE MARKETBEAT REPORTS](#)

[2022 Supply Chain Issues: Our Predictions on What to Expect](#)

[3 Major Challenges the Supply Chain Faces in 2022](#)

[2 Years of Kastle Back to Work Barometer](#)

[Global Real Estate Perspective March 2022](#)

[All Work Space Report](#)

[CDC Ventilation Recommendations](#)

[ASHRAE Ventilation Recommendations](#)

[ComEd Energy Efficiency Resources](#)

[BetterBuildings Value Calculator](#)

[COVID-19 Brings Indoor Air Quality Monitoring Upfront](#)

[CO2 concentration monitoring inside educational buildings as a strategic tool to reduce the risk of Sars-CoV-2 airborne transmission](#)

[Indiana Michigan Power Incentives and Case Studies](#)

[Consumers Energy Business Incentive and Rebates](#)

[Focus on Energy RCx Case Study](#)