



Beyond Widgets: Racking Up Savings from Systems Approaches to Building Performance

Tuesday, May 16, 2017
9:30-10:45 am

Panelists

- Matt Jungclaus, Rocky Mountain Institute
- Rick Tonielli, ComEd
- Scott Williams, Williams Building Systems Engineering, PC
- Laura Van Wie McGrory, Alliance to Save Energy (moderator)

Matt Jungclaus

Rocky Mountain Institute

Beyond Widgets: Racking Up Savings From Systems Approaches to Building Performance

Better Buildings Summit | May 16, 2017 | Washington, DC



Matt Jungclaus | mjungclaus@rmi.org



**RMI TRANSFORMS
GLOBAL ENERGY USE
TO CREATE A CLEAN,
PROSPEROUS, AND
SECURE LOW-
CARBON FUTURE.**



RMI HAS HISTORY SYSTEMS THINKING

REDUCING PIPE FRICTION TO
DRIVE EFFICIENT INDUSTRIAL
PROCESS

FOCUSING ON LOAD
REDUCTION TRIMS SYSTEM
SIZES AND COSTS

MOVING BEYOND BUILDINGS
DRIVES VALUE IN THE
ELECTRIC GRID

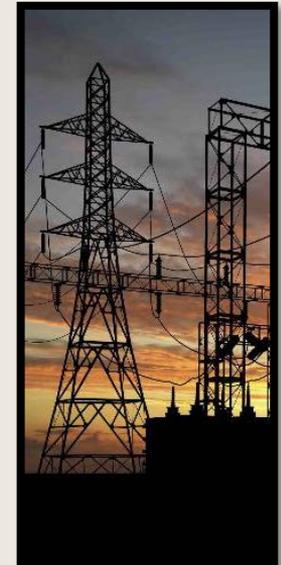
INDUSTRIAL DESIGN



BUILDING RETROFITS



GRID EFFICIENCY



Capital Savings Made Possible By a Systems Approach

Windows

\$4 M

Radiative Barrier

\$2.7 M

DDC Controls

\$5.6 M

VAV AHUs

\$2.4 M

Lighting & Plugs

\$8.7 M

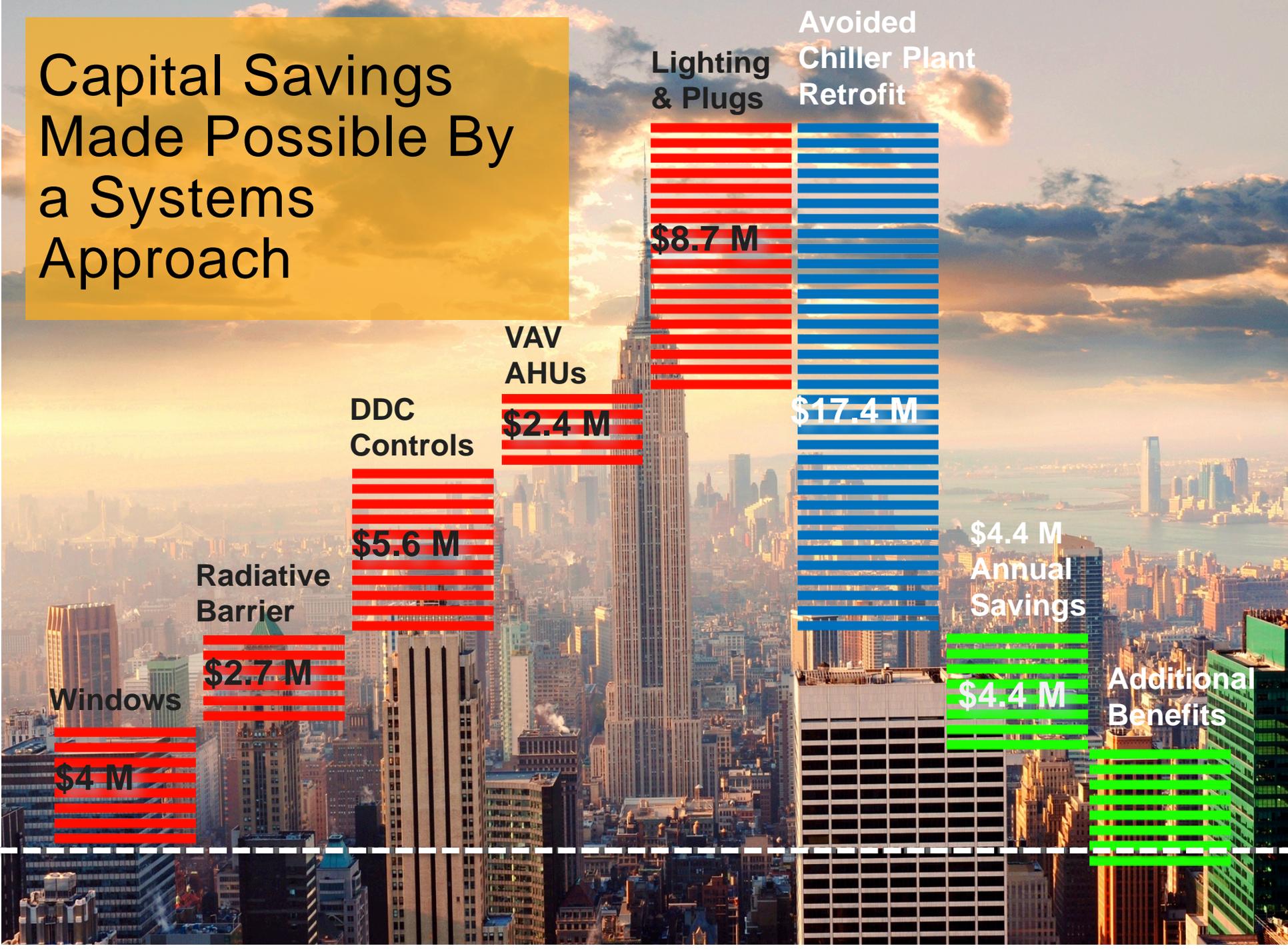
Avoided Chiller Plant Retrofit

\$17.4 M

\$4.4 M Annual Savings

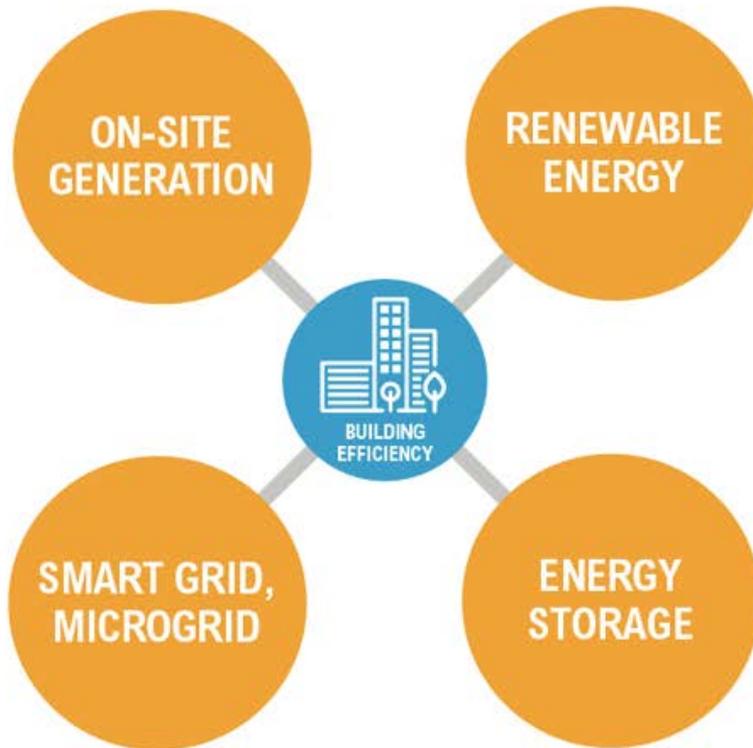
\$4.4 M

Additional Benefits



SYSTEMS THINKING ALSO APPLIES AT THE GRID LEVEL

HIGH ENERGY, ADVANCED TECH =
HIGH ADDITIONAL COST



HIGH EFFICIENCY, ESTABLISHED
TECH = LOW OR NO ADDITIONAL
COST



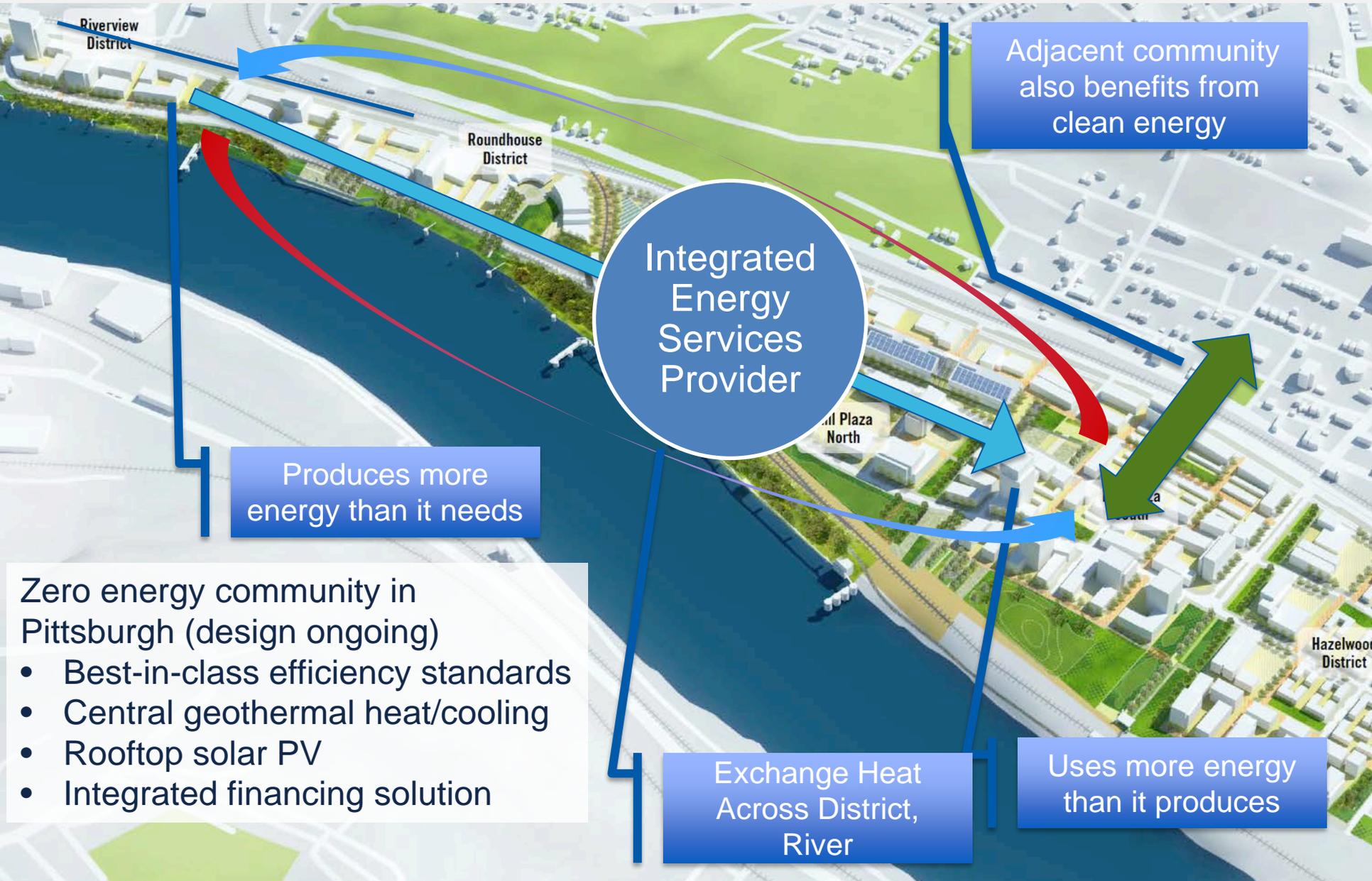
THANK YOU

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DISTRICT SCALE ENABLES DEEPER ENERGY SAVINGS, DRIVES GREATER VALUE



Adjacent community also benefits from clean energy

Integrated Energy Services Provider

Produces more energy than it needs

- Zero energy community in Pittsburgh (design ongoing)
- Best-in-class efficiency standards
 - Central geothermal heat/cooling
 - Rooftop solar PV
 - Integrated financing solution

Exchange Heat Across District, River

Uses more energy than it produces

Rick Tonielli

ComEd

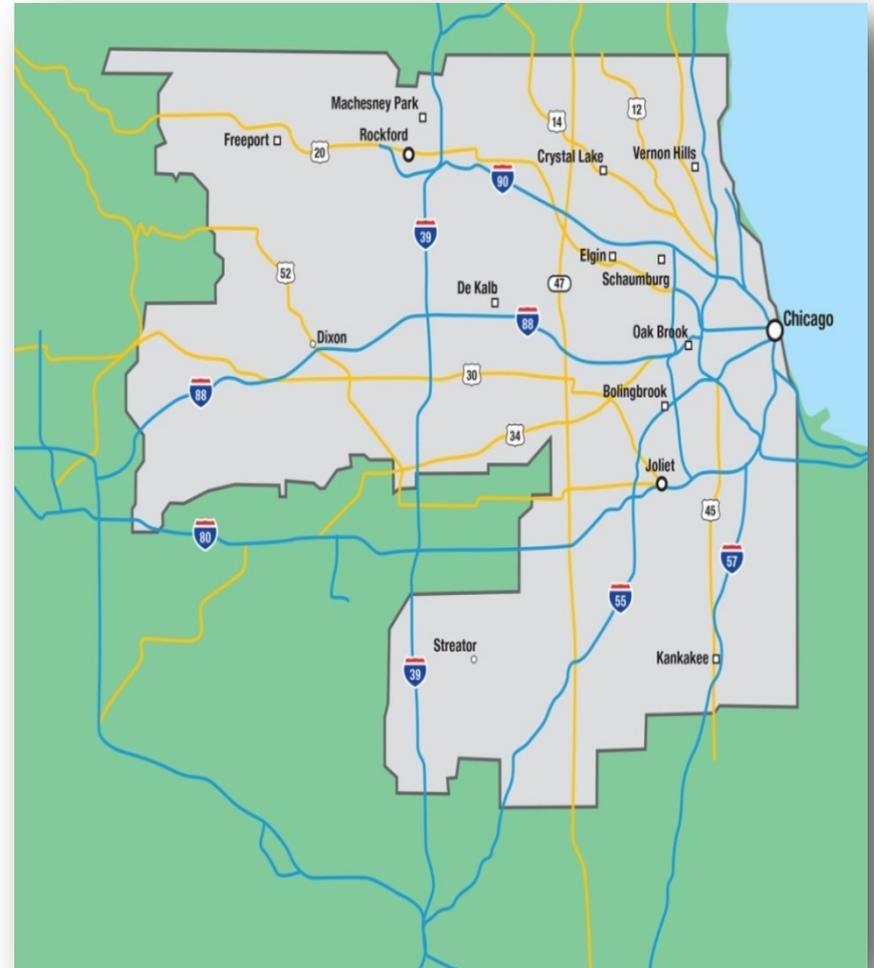
Beyond Widgets: Racking Up Savings from Systems Approaches to Building Performance

Rick Tonielli

Sr. Program Manager

Territory Profile

- ✓ ComEd is an electric delivery company providing service to 3.8 million customers in northern Illinois
- ✓ Energy efficiency programs are in ninth program year
- ✓ Rollout of smart meters to all customers will be complete in 2018



Economic Impacts of Energy Efficiency Programs

Since 2008, ComEd has paid out:

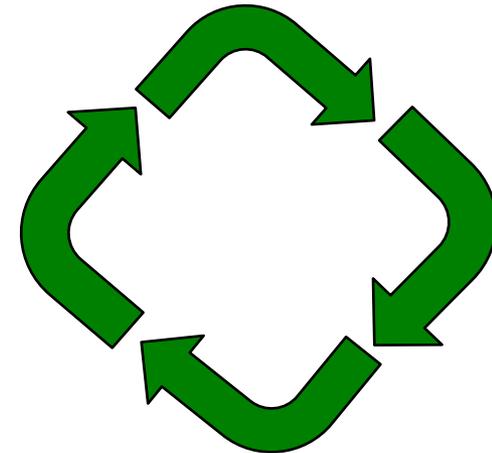
- ✓ over \$350M in energy efficiency incentives to commercial and industrial customers, generating over \$850M* in savings on their electric bills
- ✓ Over \$165M in incentives to residential customers, generating over \$1.25B* in savings

* Based on preliminary results and subject to revision and evaluation adjustments



Strategic Approach to Energy Efficiency

- ✓ Education and outreach
- ✓ Web-based tools for analyzing energy use
- ✓ Assistance in long-range energy planning
 - Benchmarking (example: EPA Portfolio Manager)
 - Assessment of Building Performance
 - Development of an Energy Management Plan
 - Whole-Building Upgrades
 - Performance Monitoring and Verification



Facility Assessments

- ✓ Offered to all business customers
- ✓ Free site analysis performed by ComEd engineer
- ✓ Identification of energy efficiency opportunities
- ✓ Calculated simple paybacks including value of available incentives

Energy Assessment

Prepared for
Sample Corp

By: Steven Lallage • Associate Engineer • (630) 437-2358 • Steven.Lallage@ComEd.com
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EXECUTIVE SUMMARY

Financial Benefit	
We estimate your Facility has the potential for:	
Annual Savings	\$13,100
Smart Ideas® Incentive	\$12,500

Annual Energy Benefit		
Before	1,000,000 kWh/yr	Up to 15% Energy Savings
After	852,500 kWh/yr	Up to 147,500 kWh Reduced

Annual Environmental Benefit	
Can Reduce Your Carbon Footprint by up to...	
101 Metric Tons of CO ₂ Equivalent	
or 16 Homes Powered Annually	

Want to get Started?... Let us help >>>>

Or visit: ComEd.com/financeincentives to learn more

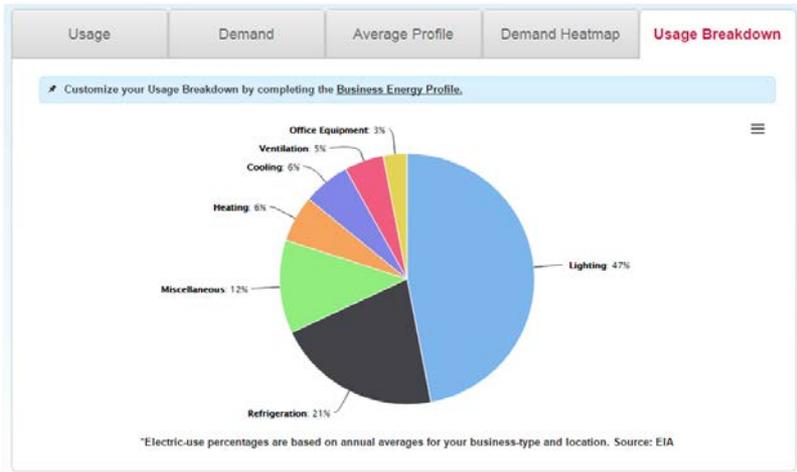
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ComEd powering lives
an Exelon Company

Business Energy Analyzer (BEA)

- ✓ Free online energy analytics tool leveraging interval usage data
 - Energy tracking dashboard
 - Easy-to-use, exportable energy data
 - Benchmarks against similar businesses or multiple locations
 - Provides customized analysis with suggested energy solutions



Comprehensive Energy Savings Offers

- ✓ Comprehensive energy savings – standard
 - The more projects completed, the greater the incentive
 - Two year project reservation

TIER ONE

Select 3 options

Complete all three projects

Receive standard incentives

Plus an extra 20% incentive based on the total standard incentives

TIER TWO

Select 4 options

Complete all four projects

Receive standard incentives

Plus an extra 25% incentive based on the total standard incentives

TIER THREE

Select 5 options

Complete all five projects

Receive standard incentives

Plus an extra 30% incentive based on the total standard incentives

Thank You!

Rick Tonielli, Sr. Program Manager

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ComEd Energy Efficiency Program

URL: ComEd.com/BizSavings

Phone: 855-433-2700

Email: BusinessEE@ComEd.com

Scott Williams

**Williams Building Systems
Engineering, PC**

BEYOND WIDGETS: RACKING UP SAVINGS FROM **SYSTEMS** APPROACHES TO BUILDING PERFORMANCE

Scott Williams PE, MBA

Williams Building Systems
Engineering, PC

Golden Valley, MN

- ▶ Consulting Engineering
 - ▶ Healthcare
 - ▶ Higher Education
 - ▶ Commercial
- ▶ Portfolio Owner Engineering Leader
 - ▶ Retail
- ▶ Consultant - Owner's Representative
 - ▶ Healthcare
 - ▶ Retail

BACKGROUND

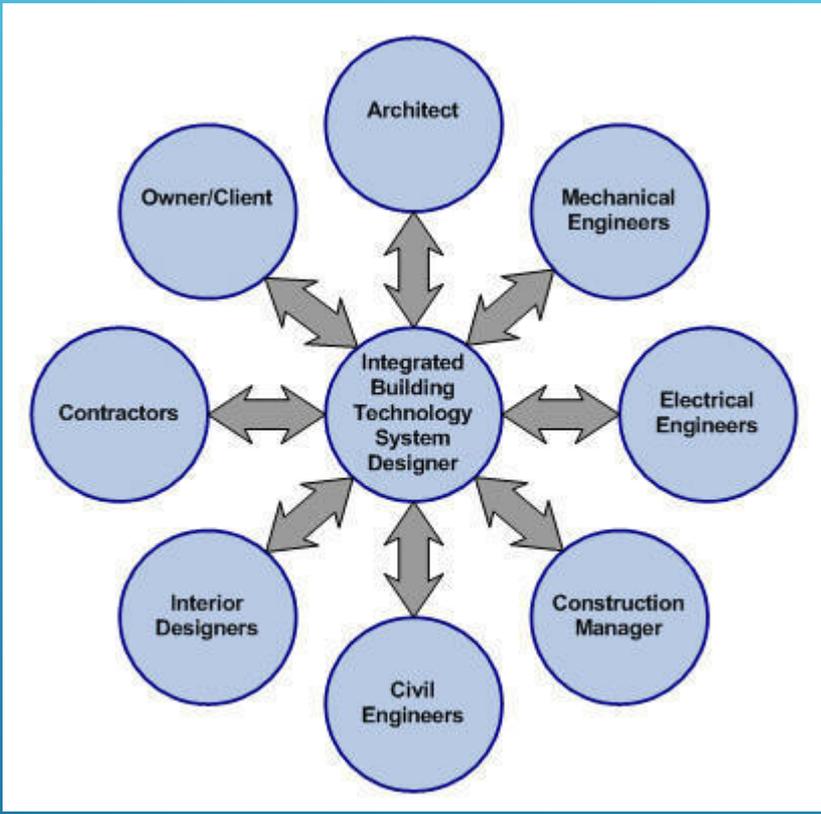
- ▶ Building Systems Interact
- ▶ Capture Interactions to Optimize Design
- ▶ Energy Savings
- ▶ Economics!

WHY SYSTEMS VIEW?

▶ Don't Use Traditional Design

▶ Architectural → Structural → Mechanical → Electrical → Operator

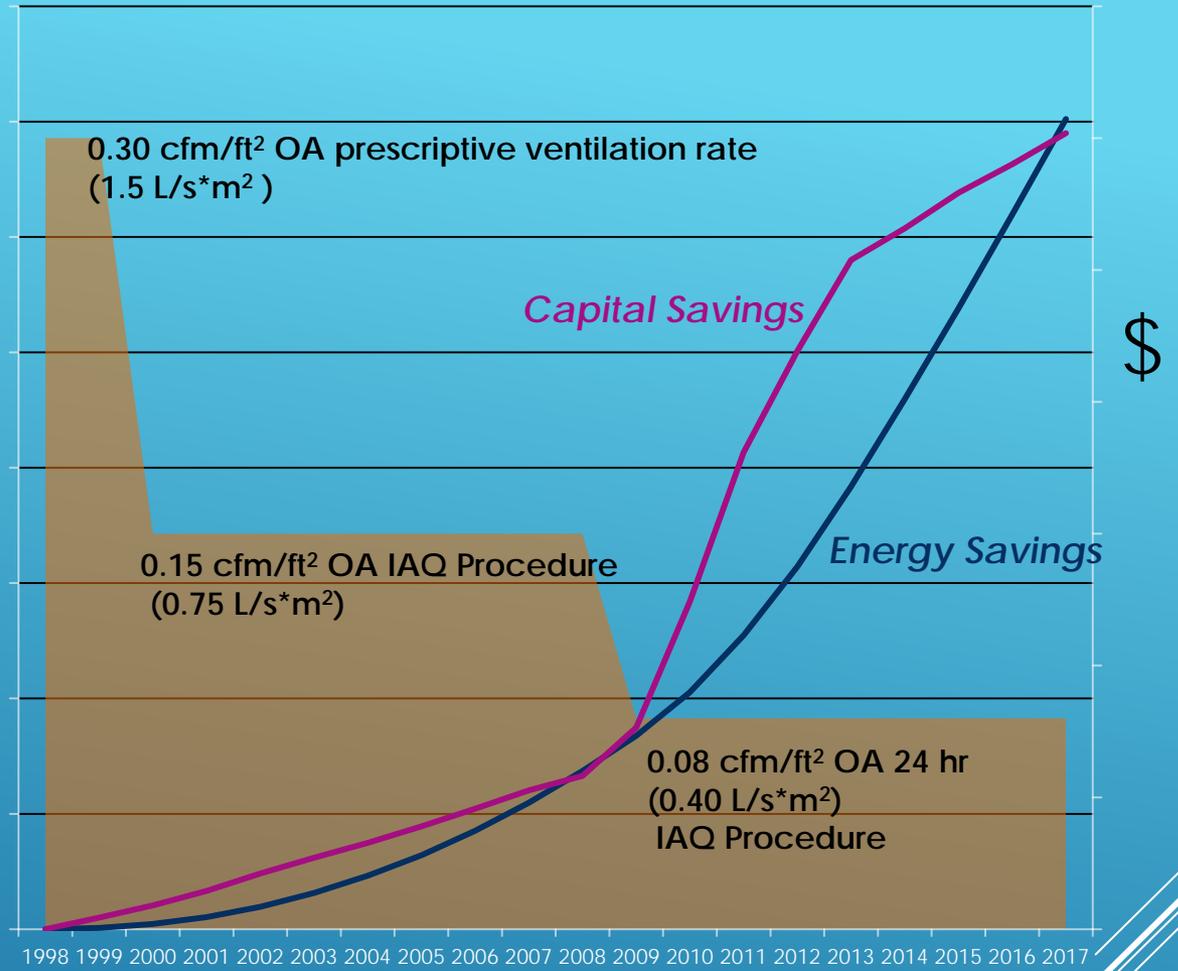
▶ Understand and Iterate Systems Interactions



BUILDING SYSTEMS INTERACTIONS

▶ Performance Based Ventilation

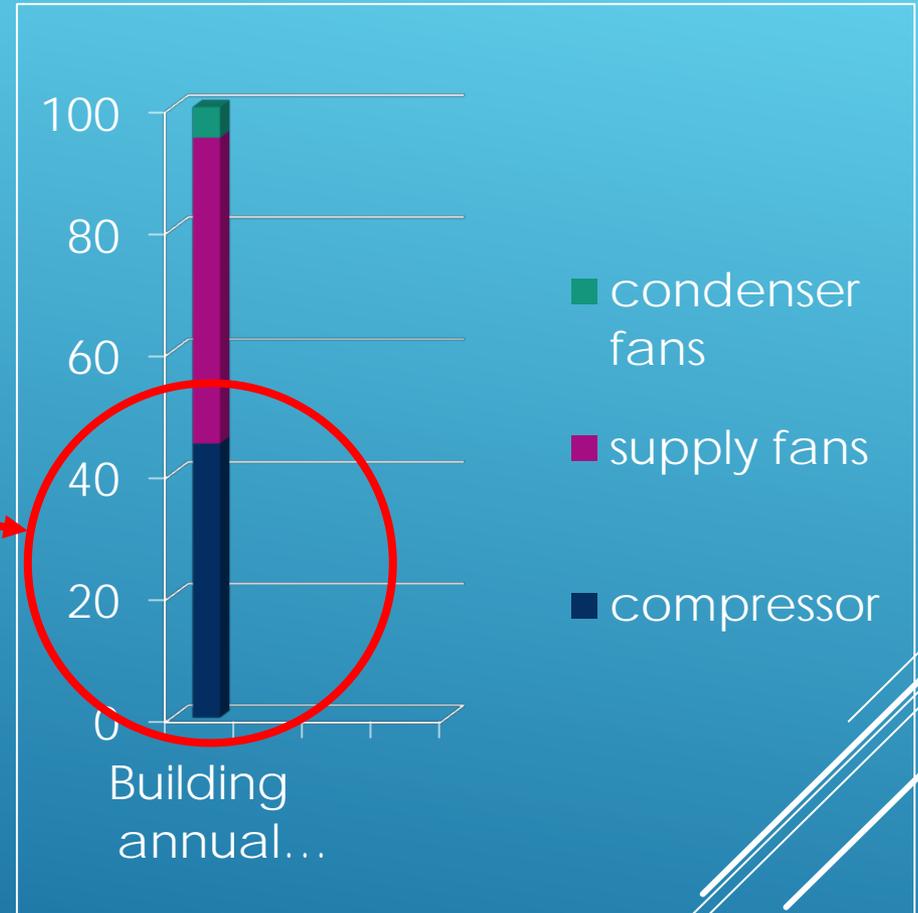
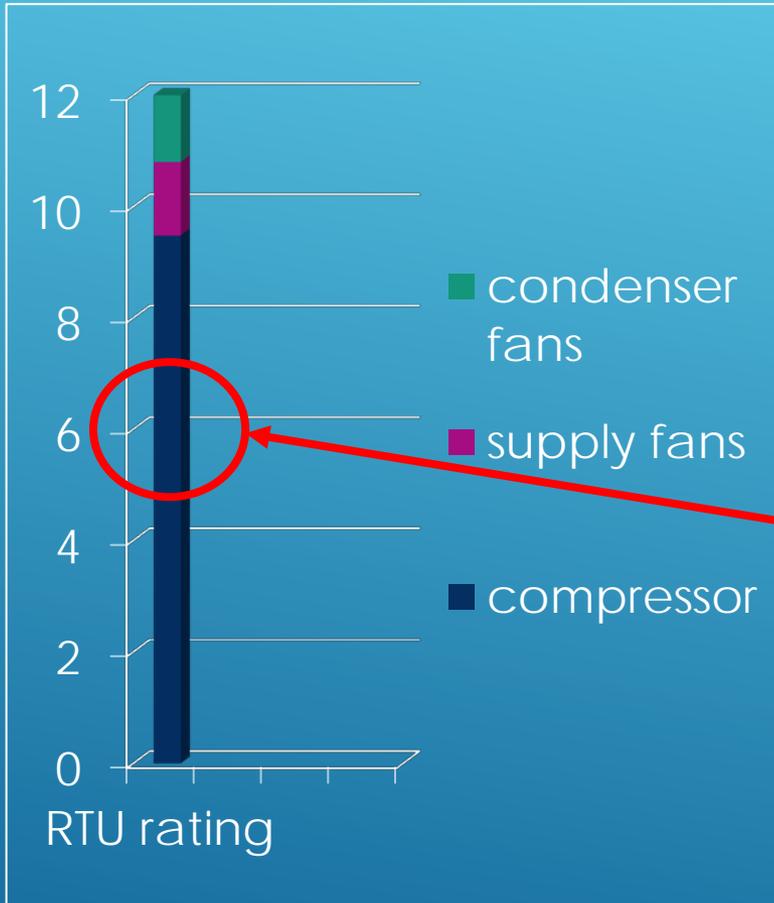
- ▶ ASHRAE Standard 62.1 Prescriptive Approach
- ▶ ASHRAE Standard 62.1 Indoor Air Quality Procedure
- ▶ Control Contaminants and Optimize Ventilation
- ▶ Energy and Capital Savings



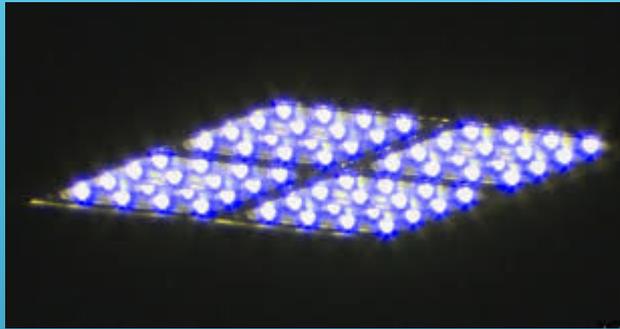
EXAMPLE: OPERATIONS

▶ RTU Energy Efficiency Ratio (EER)

▶ EER = Cooling output in Btu/hr to input power in watts



EXAMPLE: EQUIPMENT



- ▶ Lighting Energy Reduction
- ▶ Increased Building Relative Humidity
- ▶ Less HVAC Operation to Maintain Temperature
- ▶ Reduced Moisture Removal from HVAC

EXAMPLE: SYSTEMS

▶ Scott.Williams@WbsEngr.com

▶ Williams Building Systems Engineering
PC

THANK YOU!

Thank You

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