THANKS TO OUR EVENT SPONSORS
THE BUILDING EDUCATION SERIES 2019:
THE OSWALD BUILDING, 1100 SUPERIOR
7:30 AM COFFEE AND REGISTRATION
8:00 – 10:00 AM PRESENTATION

JANUARY 17: INNOVATIONS IN CLEVELAND

FEBRUARY 21: FACILITY MANAGERS ROUNDTABLE

MARCH 21: SOLAR AND WIND TECHNOLOGY

MAY 16: WATER: THE HEALTH OF LAKE ERIE AND THE BURNING RIVER ANNIVERSARY

JULY 25: CLIMATE CHANGE: A CANDID DISCUSSION

SEPTEMBER 19: DEMYSTIFYING BUILDING CERTIFICATIONS

NOVEMBER 21: ENVIRONMENTAL HEALTH AND IMPACTS ON HUMAN HEALTH
FACILITY MANAGERS ROUNDTABLE

TODAY’S SPEAKERS:

Corinne Wallner, Facility Manager, Trinity Cathedral

Charles Schreier, Professional Engineer, Go Sustainable Energy
Corinne Wallner joined Trinity Cathedral in 2015. Trinity Cathedral is a landmark campus, center for music & art, forum for social change, and a diverse community of faith. Corinne manages 5 buildings, 100,000 sq. ft. complex including (3) retail storefronts and a 124 space multi-use parking facility. She has worked over 15 years in property management. Previously, worked for nearly 20 years in the security and hotel management.
Trinity Cathedral Life Safety Improvements

2230 Euclid Avenue, Cleveland, Ohio
• Removal of Cathedral fixed seating in the 90s impacted A-3 occupancy use (community halls & places of worship)

• Trinity approached City of Cleveland Building Department (2016) to identify a life safety project to comply with occupancy as an A-1 (symphony & concert hall) and A-2 (banquet halls)

• Formal City adjudication process outlined required safety upgrades. Board of Building Standards & Building Appeals granted variances.
• Life safety improvements requested:
  1. Sprinklers in basement.
  2. Prevent smoke infiltration from basement to Cathedral
  3. Place portable fire extinguishers
  4. Update fire alarm system
  5. Provide emergency lighting and exit signage
  6. Panic hardware at egress doors
  7. Handrails at egress stairs

• New Cathedral maximum occupancy that will be allowable after improvements: 900 persons.
• (small venue maximum occupancy: 749)
1. Sprinklers

- Installing approximately 14,000 square feet of new sprinkler coverage in the basement
- Dual main from back (Prospect side of building)
- Specialty hangers due to clay tile construction.
2. Smoke Dampers

- Return air - replace 6 control dampers with smoke dampers and provide fire alarm interface to close dampers in event of fire.
- Modification of supply air duct at 16 locations to install new smoke damper and provide fire alarm interface to close dampers in event of fire.
- Fire alarm interface to shut down the air handling units.
• Improvements to life safety systems are required for the building department to issue a new Certificate of Occupancy.
4. Update Fire Alarm System

- Current system includes Simplex and Radionics devices with two independent panels.

- Scope proposes to consolidate all devices to a Simplex panel.

- Add new Simplex based audible/visible notification throughout the Cathedral and Parish House (a few additional locations on 3rd floor, chapter room, cathedral hall, etc.)

- Replace Radionics based beam detectors.

- New duct detectors and control modules in conjunction with the mechanical upgrades to shut down the air handling units and close smoke dampers.
5. Emergency Lighting and Exit Signage

• Tie existing Cathedral chandeliers to emergency power for use as the Cathedral emergency lighting system (avoids battery wall packs in Cathedral).
• Using the inverter to power 13 exit signs and 3 wall unit emergency lights.
• New door holder for the 3rd floor.
6. Panic Hardware at Exit Doors

- Total 27 doors to be adjusted to receive new panic hardware
7. Handrails at Egress Doors

- 8 new railings, bronze and aluminum materials.
- Approximately 52 linear feet total of new railings.
7. Handrails at Egress Doors

ALUM. POST DETAIL

BRONZE POST DETAIL

SECTION

Trinity Cathedral Life Safety Improvements

November 21st, 2017
GEOTHERMAL HEAT PUMP SYSTEMS

ARE YOU IN THE LOOP?

Geothermal extracts latent heat from the ground or from a nearby source of water. Because temperatures underground and in deep water remain a consistent level year-round, this heat can be concentrated by a heat pump then dispersed through a building for warmth in winter. In summer, the process reverses as interior heat is removed and dispersed back to the earth or water well.
FOUR TYPES OF GEOTHERMAL GROUND LOOP SYSTEMS PREDOMINATE IN COMMERCIAL APPLICATIONS

CLOSED LOOP SYSTEM

In a ground-sourced closed loop system, horizontal or vertical loops of plastic tubing buried underground on the property continuously circulate heat-exchanging fluid. This fluid absorbs latent heat from the ground and conveys it to an indoor heat pump and compressor. The heat is concentrated, then dispersed by an indoor coil into the building. Cooled fluid then circulates back to the loop field to absorb more heat. For cooling in summer, the earth acts as an effective heat sink to absorb heat extracted from the building.

OPEN LOOP SYSTEM

The open loop system is utilized in water-sourced geothermal installations. Water from a well or deep pond is pumped directly to the water-source heat pump where latent heat is extracted from the water then transferred to refrigerant, concentrated by the heat pump and dispersed into the home. The cooled water is then returned to its source through a separate discharge well or pumped directly back to the pond. Open loop systems require a very dependable, unvarying source of deep water.
HORIZONTAL SYSTEM

This type of installation is generally most cost-effective for residential installations, particularly for new construction where sufficient land is available. It requires trenches at least four feet deep. The most common layouts either use two pipes, one buried at six feet, and the other at four feet, or two pipes placed side-by-side at five feet in the ground in a two-foot wide trench. The method of looping pipe allows more pipe in a shorter trench, which cuts down on installation costs and makes horizontal installation possible in areas it would not be with conventional horizontal applications.

VERTICAL SYSTEM

Large commercial buildings and schools often use vertical systems because the land area required for horizontal loops would be prohibitive. Vertical loops are also used where the soil is too shallow for trenching, and they minimize the disturbance to existing landscaping. For a vertical system, holes (approximately four inches in diameter) are drilled about 20 feet apart and 100 to 400 feet deep. Into these holes go two pipes that are connected at the bottom with a U-bend to form a loop. The vertical loops are connected with horizontal pipe (i.e., manifold), placed in trenches, and connected to the heat pump in the building.
Most companies that rely on equipment prefer to employ two types of maintenance strategies. Reactive maintenance implies that a machine shouldn’t be maintained unless it’s broken or fails. While this can save companies money in the short term, it typically ends up costing more down the road and can even result in increased liabilities. Preventative maintenance ensures that equipment continues to function effectively by having it routinely monitored. Here are a few reasons why preventative maintenance is the best option for your company.
4 REASONS WHY PREVENTATIVE MAINTENANCE IS NECESSARY

- Increase Safety
  When equipment isn’t working at peak performance, it creates unsafe working conditions for employees and any person that may inhabit the building. With a preventative maintenance program, equipment is carefully monitored to ensure that it’s operating safely.

- Equipment Efficiency
  A preventative maintenance program can help plan routine maintenance such as inspections, part replacements, and fluid changes. When a piece of equipment is not maintained, it begins to naturally degrade over time. This forces the equipment to work harder than necessary, decreasing efficiency and increasing costs. With preventative maintenance, equipment will run at peak performance, increasing its lifespan and decreasing costs.

- Reliability
  Unreliable equipment can result in delays and errors, which doesn’t look good for your business. When you take advantage of a preventative maintenance program, you’re ensuring that every product and service is completed on time for your customers.

- Decrease Equipment Downtime
  With a preventative maintenance program, companies can plan maintenance tasks at optimal times so any downtime doesn’t affect business flow. When you wait for a problem to occur, the unscheduled amount of time it takes to fix the machine can severely impede business.
3 REASONS TO UPGRADE YOUR CONTROL SYSTEMS

Operating an efficient commercial building helps to evolve with the ever-changing technological trends. Upgrading an operating control system might seem like an unnecessary task, but research has proven that it’s a crucial aspect of maintaining a building. Understand why you should upgrade your control system before it becomes obsolete.

- **Repairing Old Systems is More Expensive**
  
  As technology continues to advance, control systems are slowly phased out of production. This means that older systems become more expensive to replace, as specific parts become less and less available. As systems continue to evolve, you have two choices: purchase spare parts while you can or wear your system down until it inevitably malfunctions. Not only does it cost more to replace old equipment, but you will have a harder time finding personnel trained in repairing outdated control systems.

- **Upgrading Increases Efficiency**
  
  The longer your control system operates without an upgrade, the more inefficient it will become. A degrading system is a dangerous system because it puts the entire building at risk of failure. Upgrading the control system ensures that it works effectively and that all areas of your commercial building are running smoothly.

- **Create a Smarter Building**
  
  Upgrading your control system, you’re creating a more efficient commercial building. Advances in technology, data is collected at a faster speed, and made available. Upgrading your control system will keep your building and your business ahead of the game.
42% of the world's energy is used in buildings.

50% of energy used in buildings is wasted because of inefficient building management systems.

In developed economies, at least half of the buildings expected to be in use in 2050 have already been built.

Only 25% of building costs are associated with capital expenses, while 75% of costs are used to operate a building over its life cycle.

Only 20% of facility managers use 80% of the available capabilities in their building management systems.

30% of energy used in buildings is waste.
Charles Schreier is a PE with Go Sustainable Energy, LLC (Go). Raised in Buffalo, NY he obtained his bachelor’s degree in Mechanical Engineering from the University of Dayton (UD) in 2002. Following graduation he spent two years as a volunteer in the Oregon and Alaska before returning to UD for his master’s degree in Mechanical Engineering which he completed in 2007. While there he helped administer the ETHOS Program, which sends undergraduate engineering students to work with non-government organizations in developing countries. Following a short internship at the North House Folk School he joined the Go team and has been there ever since. His free time is filled with far too many hobbies including woodworking, guitar, snow sculpting, birch bark basketry, and most recently CERT training.
Finding Opportunities Through Investigation

-Charles Schreier, PE
Identifying Opportunity

“Without data, you’re just another person with an opinion.” – W Edwards Deming

What data do you have?

- Utility bills
- Construction documents
- Equipment readouts
- Equipment Spec Sheets
- Building Automation System (BAS)
- System Feedback – people, observation, investigation
Utility Bills – Portfolio Manager

Bill issued by: The Illuminating Company, PO Box 3687, Akron OH 44309-3687

To avoid a 1.50% Late Payment Charge being added to your bill, please pay the Amount Due by the Due Date.

Your current PRICE TO COMPARE for generation and transmission from The Illuminating Company is listed below. In order for you to save money off of your utility’s supply charges, a supplier must offer you a price lower than The Illuminating Company’s price of 5.07 cents per KWH for the same usage that appears on available competitive supplier offers, Commission of Ohio’s “Energy Choice Ohio” website at www.energychoice.ohio.gov.

Residential Service - 0000000000 - 5.07 cents per KWH

Energy Efficiency 632 KWH x 0.002161 $0.00
Peak Demand Reduction 632 KWH x 0.000540 $0.00
Renewable Energy 632 KWH x 0.000470 $0.00

Your next meter reading is scheduled to occur on or about Jun 27, 2017.

We are required to include your name, address and usage information on a list of eligible customers that is made available to other competitive retail electric service providers. If you do not wish to be included on this list, please call us at 1-800-225-0444, go to the Customer Choice section of our website - www.firstenergycorp.com or write to us at 76 S. Main St., Akron, OH 44308 Attn: FECC. Please note that an election to not be included on this list will not prevent Ohio Edison, The Illuminating Company or Toledo Edison from providing your information to governmental aggregators. If you previously made a similar election, your name will continue to be excluded from the list without any additional action on your part. If you previously decided not to be included on the list and would like to reverse that decision, please write us at the same address, number and address.

Read Dates

May 26, 2017 KWH Reading (Actual)
Apr 29, 2017 KWH Reading (Actual)
KWH used

Energy Use (kWh)
Measured Load (kW)

Cost ($)

Charges From The Illuminating Company

Customer Number: 0000000000
Rate: Residential Service CE-RSD
Cost Recovery Charges

Charges From Electric Generation Supplier Ohio

Electric Generation Supplier

123 ANYSTREET, CITY ST 123
Customer Service: 1-000-000
Account Number: 000000
Rate: GEN-000
Billing Period: Apr 29, 2017 to May 26, 2017
Basic Charge 632 KWH x 0.00000000
Total NOPEC - Electric Generation Supplier Ohio Charges 00.00

Detail Payment and Adjustment Information

05/12/17 Payment

-00.00
Case 1: Chiller Performance

- Opportunity
  - Chiller is not performing at capacity forcing both to run.
- How it was identified
  - Unexpected cycling observed
  - Output calculation based upon BAS data
- At full load was providing 166 tons (rated 200)
- Costs
  - 11,574 kWh/year
  - ~$2,000 per year
  - 22,719 lbs-CO₂ / year
Case 1: Chiller Performance

Chiller 1 Performance 6/12/2018 - 6/19/2018

Chiller Load (tons)

Chiller Efficiency (kW/ton)

- Measured Efficiency
- Modeled Efficiency
- %Difference — Linear (%Difference)

$y = 0.0031x - 0.1638$

$R^2 = 0.7581$
Case 2: Scheduling

- **Opportunity**
  - Fan setbacks during unoccupied hours
- **How it was identified**
  - Equipment Logging

- **Savings Estimates**
  - 11,373 kWh/year
  - ~$1,123 / year
  - 25,401 lbs-CO$_2$/year
Case 3: Optimize Schedule

- **Opportunity**
  - Optimize schedule

- **How**
  - Review interval data to verify unoccupied hours are setting back.
Case 4: Boiler Tuning

- **Opportunity**
  - Excess air tuning and controls
- **How it was identified**
  - Observation and logging

- **Savings Estimates**
  - 707 mmBtu/year
  - ~$3,237 / year
  - 82,000 lbs-CO$_2$ / year
Case 5: Supply Air Reset

- **Opportunity**
  - Reduce space conditioning energy

- **How it was identified**
  - Identification of capabilities in equipment manual
  - Review of equipment settings

- **Savings Estimates**
  - 32,301 kWh/year
  - ~$2,507 / year
  - 58,465 lbs-CO$_2$ / year
Other Options

- Notched/Cogged V-Belts
- Boiler Tuning
- Consider Occupancy sensors
- Are variable equipment being leveraged (pumps with VFDs)?)

Questions?

Email
  - cschreier@gosustainableenergy.com