



# Building Commissioning and Retro-Commissioning AHFC Energy Now Conference

# Mechanical Engineer

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  - Energy assessments, energy modeling, MEP design and building commissioning



# Presentation Goals

- Educate group about different types of Commissioning (Cx), when Cx should be used and the value obtained through Cx.
- Encourage adoption of the commissioning process for:
  - New building construction and renovation projects
  - Retro-Commissioning of existing building



*NORTECH found potential energy efficiency measures that could save 14% of the annual operating costs for the Carol Brice Center in Fairbanks. The Center upgraded their lighting and HVAC systems for improved energy efficiency.*

# New Building Cx

## Commissioning Process Defined:

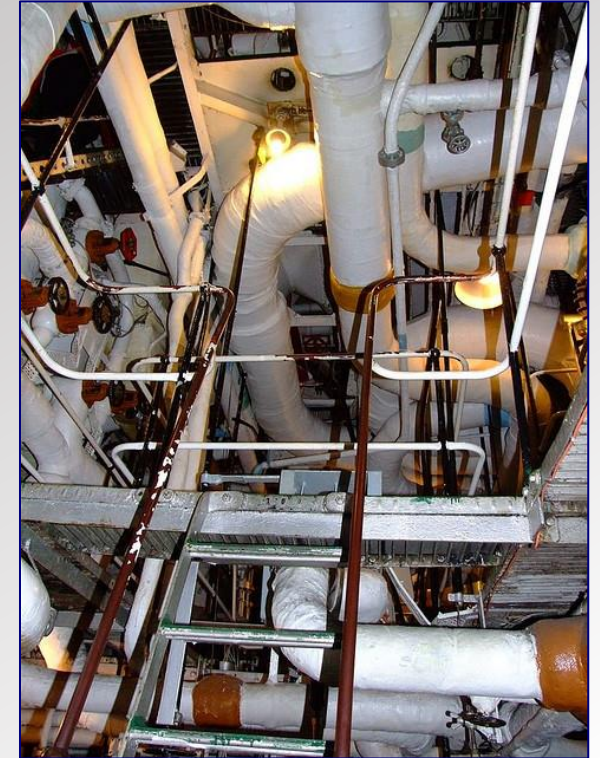
“A quality-focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested operated and maintained to meet the Owner’s Project Requirements.”

ASHRAE Standard 202-2013, Commissioning Process for Buildings and Systems



# Why Commission (Owner)?

- Lower life cycle cost of constructing and operating a complex facility:
  - Increased energy efficiency and system reliability
  - Increased O&M staff involvement during design and construction improves training
  - Improved Indoor Environment Quality (IEQ)
  - Recommended by ASHE, required for LEED, ASHRAE Standard 189.1, Standard for the Design and Construction of High-Performance Green Buildings





# Commissioning Types

Different types of commissioning:

- New building commissioning (Cx)
  - Building Enclosure Commissioning (BECx)
  - MEP Commissioning
  - Specialty System Commissioning
- Re-Commissioning
- Retro-Commissioning (RCx)
- Continuous Commissioning (CCx) or Ongoing Commissioning (OCx)



# Retro-Commissioning (RCx)

## ➤ Definition:

“Commissioning process applied to an existing facility that was not previously commissioned”

ASHRAE Standard 202-2013, Commissioning Process for Buildings and Systems

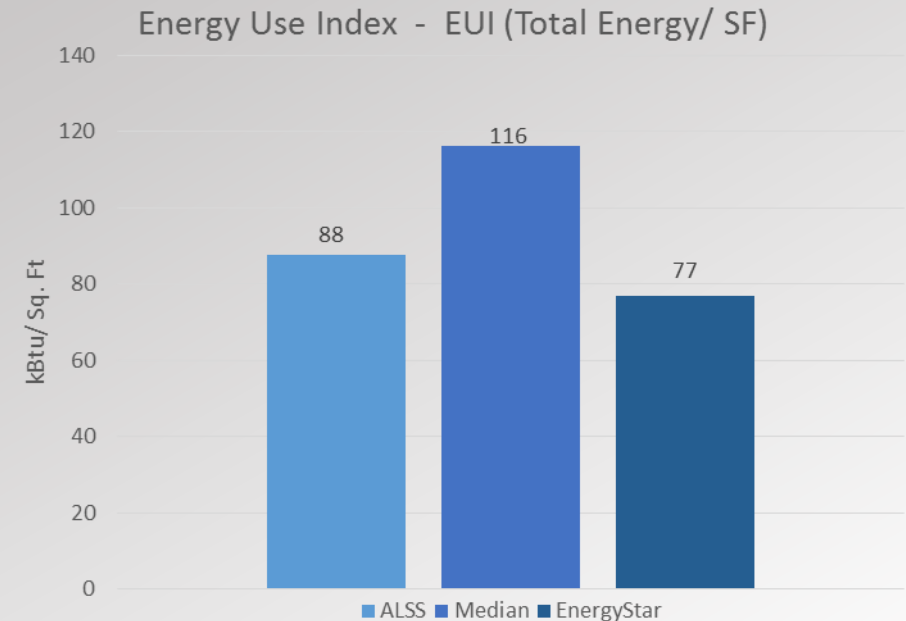


*Energy audits showed a potential 30% reduction of energy costs at the Auntie Mary Nicoli Elementary School in the Kuspuik School district with recommended energy efficiency measures.*

# RCx

## ➤ Benefits:

- Reduce energy costs
- Return equipment to proper operational state
- Reduce occupant IEQ complaints
- Increase system reliability – fewer premature failures
- Improve O&M procedures



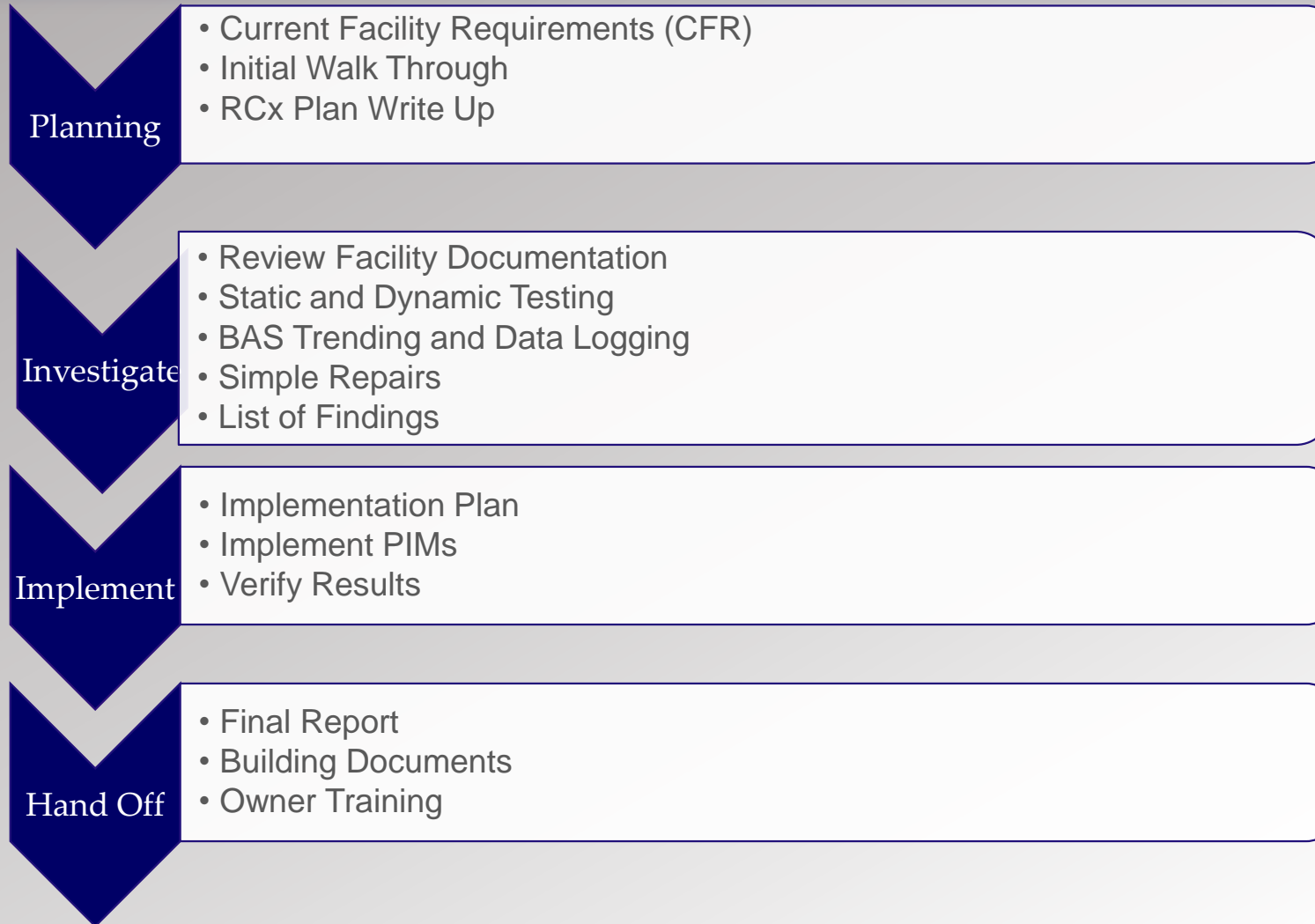


# Building Systems for Retro-Commissioning

## ➤ Building Systems for RCx:

- Environmental controls
- Lighting
- Electrical power
- Energy management

# RCx Phases



## ➤ Planning:

### ▪ Facilitate development of the Current Facility Requirements (CFR)

- Facility objective, size, location and user requirements
- Maintainability, access and operational performance requirements
- Temperature, humidity, ventilation, acoustics, pressure relationships
- Sustainability and efficiency goals
- Occupancy/operations schedules
- Training requirements
- Project Schedule
- Project Budget
- Special requirements

# RCx

## ➤ Typical PIM

- Minimize runtime
- Adjust setpoints
- Optimize equipment staging
- Sensor calibration
- Valve and damper performance
- Identify and eliminate simultaneous heating and cooling
- Restore controls overrides

# RCx

- Good candidates:
  - High energy use
  - Problem systems
  - High occupancy rates
- Bad candidates:
  - Out-dated, end of life equipment
  - Major equipment failures
  - Out-dated controls



*NORTECH performed a pilot project to retro-commission Wonder Park Elementary for the Anchorage School District. With simple adjustments, the district was able to reduce maintenance call outs.*



# RCx Cost

- Simple payback typically < 2 years
- Cost influences
  - Building size
  - Complexity of systems
  - Expertise and involvement of O&M staff
  - Availability of facility documentation

# Summary

- Commissioning:
  - Decreases cost
  - Improves outcomes
- Cx or RCx should be used in new construction, additions and renovations and existing buildings



*NORTECH has provided commissioning and retro-commissioning services to a number of buildings for the Yukon Kuskokwim Health Corporation.*

# Questions?

Thank you!