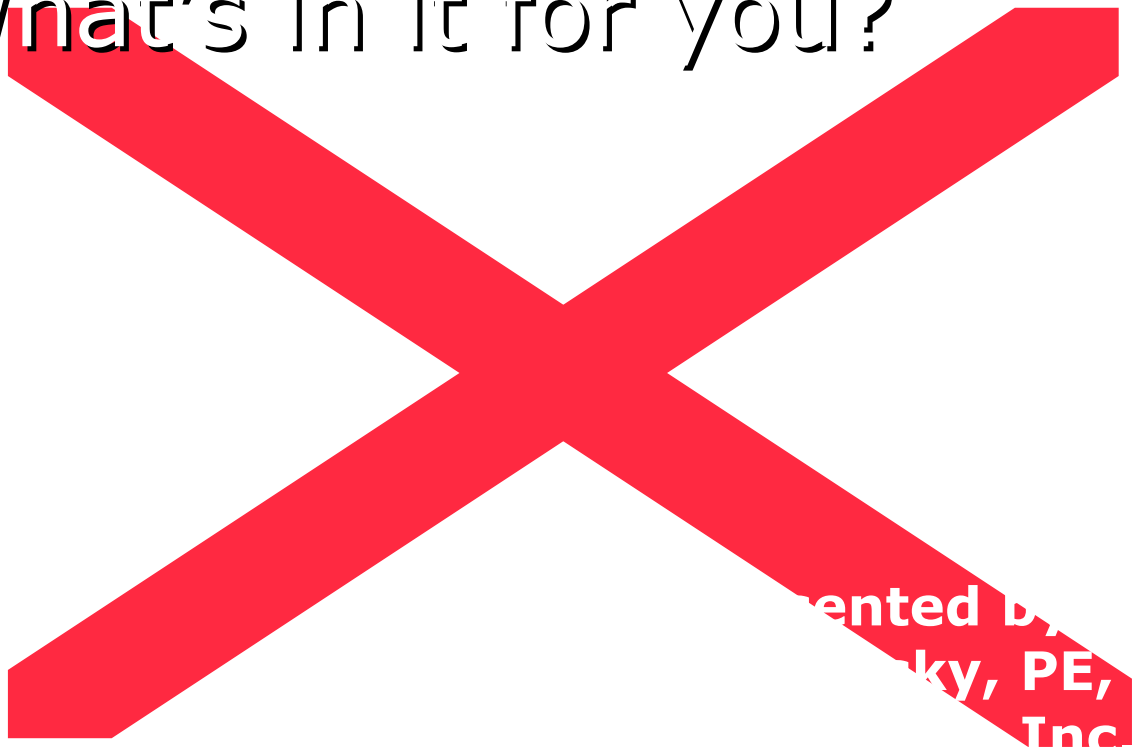
# Retro-Commissioning

## What's in it for you?



# Retro-Commissioning

- Focus on:
- Defining Commissioning, Retro-Commissioning
- Identifying the need for retro-commissioning services
- Conditions evaluated during a site assessment
- Retro-commissioning benefits

# What is commissioning?

In ASHRAE Guideline 1-1996 - The HVAC Commissioning Process, HVAC commissioning is defined as: *The process of ensuring that systems are designed, installed functionally tested and capable of being operated and maintained to perform in conformity with the design intent.*

# What is commissioning?

*ASHRAE Guideline 0 - 2005 further defines a commissioning process as: A quality-focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated and maintained to meet the Owner's Project Requirements*

# What is Retro-commissioning?

*Retro-commissioning is similar to commissioning and involves, not only tuning up existing systems, but often adapting the systems to serve the current building use.*

# What is Retro-commissioning?

- *Review building design documents*
- *Monitor and testing systems to determine the building performance status*
- *Identify improvement projects*
- *Evaluate savings*
- *Prioritize projects*
- *Implement selected projects*
- *Monitor systems after the project to verify savings*

# What is Retro-commissioning?

***A Practical Guide For Commissioning Existing Buildings*** *prepared in 1999 by Portland Energy Conservation, Inc. and Oak Ridge National Lab for the US Department of Energy*

***The Commissioning Process,*** *ASHRAE Guideline 0-2005*

***Energy Star Buildings Manual – Recommissioning***

# How do you identify the need for retro-commissioning services.

- Building never commissioned
- Building use has changed since originally designed and/or commissioned
- Occupants comfort reduced
- Occupant complaints increasing
- Maintenance costs are high or increasing
- Energy costs are high or increasing

# What conditions are evaluated during a site assessment?

*Real-world HVAC and lighting design, as well as energy analysis, provide the best experience to perform a site assessment for a retro-commissioning effort.*

# What conditions are evaluated during a site assessment?

*When people have comfort complaints, the site assessment team should look for:*

*Inoperative equipment*

- *Compressors*
- *VAV reheat coils*
- *Thermostats*
- *VAV damper operators*
- *Fan powered VAV fans*

# What conditions are evaluated during a site assessment?

*……comfort complaints, …..look for:*

*Improperly_sized HVAC equipment*

*Improperly located thermostats or zoning*

*HVAC System Type*

- *Two-pipe fan coils*
- *Baseboard heaters serving same zone as another HVAC system*
- *Coils not arranged for humidity control*

# What conditions are evaluated during a site assessment?

*……comfort complaints, …..look for:*

*Air/water flow too high or too low*

- *Design calculations incorrect*
- *Air/water side not balanced*
- *High velocity*
- *Noise*
- *Air "dumping"*

# What conditions are evaluated during a site assessment?

*……comfort complaints, …..look for:*

*Zone supply air too hot or cold*

- *Excessive outside air at central air handling unit*
- *"Wild" coil on central air handling unit*
- *Central heating or cooling source manually disabled*
- *Inappropriate supply air set point*

# What conditions are evaluated during a site assessment?

*……comfort complaints, …..look for:*

*Building negatively pressured*

- *Too low volume of outside air to provide makeup air for exhaust fans*
- *Poor economizer relief damper operation*

*Causing: Unconditioned air infiltrating into zones*

# What conditions are evaluated during a site assessment?

*……comfort complaints, …..look for:*

*Out of calibration controls*

- *Thermostats*
- *Supply air set point*
- *Mixed air set point*

# What conditions are evaluated during a site assessment?

***Control functions are overridden or disconnected, thus defeating intended control action***

- *Time clocks*
- *DDC scheduled start/stop*
- *Economizer operation*

***Buildings occupied 8-10 hours per day but are fully conditioned 24/7***

# What conditions are evaluated during a site assessment?

***DDC control systems are under utilized***

- ***No occupancy set back schedules***
- ***No supply air temperature reset***
- ***No economizer control***

# Retro-commissioning Benefits

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***Improved comfort is important for:***

- ***Employee productivity***
- ***Employee retention***
- ***Tenant retention***

# Retro-commissioning Benefits

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***Significant energy cost savings***

- ***5% to 15% savings in energy costs (DOE Energy Star)***
- ***Energy is typically 1/3 of variable expenses (BOMA)***

# Retro-commissioning Benefits

***Significant energy cost savings***

***Even when building occupants are comfortable, the building may still have high energy use that can be reduced.***

- ***VAV boxes with reheat-high min or max air flow***
- ***No occupancy setbacks***

# Retro-commissioning Benefits

***Improved equipment efficiency***

- ***New equipment may not pay back now but improvement options may be identified for future replacement needs***

- ***Improved maintenance performance***

# Summary

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***Retro Commissioning-What's in it for you?***

- ***Save money***
- ***Save energy***
- ***Retain tenants***
- ***Retain employees***