ENERGY to care

Greater efficiency supports patient care.

Installing Demand Control Kitchen Ventilation

All ECM content was independently developed and reviewed to be vendor-, product-, and service provider-neutral.

DESCRIPTION

Demand control kitchen ventilation (DCKV) are types of kitchen ventilation systems, usually kitchen hoods, that modulate the amount of exhaust based on cooking demand. Modulating kitchen exhaust and corresponding make-up air when exhaust is not needed can save a significant amount of energy.

PROJECT TALKING POINTS

- Typical kitchen hood operation wastes energy because they are generally turned on when staff arrive, and shut off when staff leave, regardless of how often hoods are used during the day.
- Demand control kitchen ventilation hoods are a class of kitchen exhaust systems that modulate exhaust air depending on the intensity of cooking underneath them.
- DCKV systems operate by sensing opacity from smoke or steam, heat and other factors to control the amount of exhaust. Linking make-up air and other associated HVAC systems with DCKV control will dramatically increase savings.
- According to ENERGY STAR, food services can be 34% more energy intensive than general hospital square footage. Demand control kitchen ventilation targets one of the most energy intensive portions of a facility.
- Due to the slightly higher payback (3-8 yrs.), target advanced kitchen controls after quicker payback ECMs, leveraging past savings to help fund this ECM. Also consider adding the smaller marginal cost of DCKV during end of life replacement of kitchen equipment.
- Reducing high kitchen ventilation and exhaust requirements, when the space is unoccupied will reduce kitchen and tertiary (HVAC make-up air) equipment run time, extending equipment life.

TRIPLE BOTTOM LINE BENEFITS

Cost Benefits: Modulating intensive kitchen exhaust and make-up air will save significant amounts of energy and reduce equipment run-time. Payback is normally 3-8 years.

Environmental & Health Benefits: Energy savings, especially those served by fossil fuel intensive electric grids, will have significant environmental benefits. Health benefits due to a reduction in power plant emissions can be summarized using the Healthcare Energy Impact Calculator.

Societal Benefits: Reducing energy costs associated with kitchen hoods means more capital can be directed toward enhanced patient care.

PURCHASING CONSIDERATIONS

- Consider during end of life replacement of kitchen hoods or controls upgrades of tertiary make-up air units.
- Ensure that building controls technicians are included in project scope.
- Consider purchasing a DCKV system that uses multiple sensors to detect cooking activity (smoke, heat, etc.).

HOW-TO

1. Engage all stakeholders including facilities staff, kitchen staff, purchasing, the Building Automation System (BAS) contractor/expert, and the building commissioning agent
2. Discuss kitchen occupancy with food service staff and determine an occupied/unoccupied schedule.
3. Involve building controls technicians and identify all tertiary HVAC equipment like make-up air fans or units.
    a. Develop a controls strategy to control tertiary unit demand with DCKV system.
4. Commission and functionally test controls and new demand control hoods. Educate kitchen staff on how to operate new equipment.
5. Map and trend new equipment and controls points on building automation system. Periodically check on equipment operation and override frequency.
6. If kitchen staff overrides are too frequent, discuss with staff and make necessary changes to controls.

REGULATIONS, CODES AND STANDARDS, POLICIES

- ASHRAE 170 – Ventilation for Healthcare Facilities
- ASHRAE 62.1- Ventilation for Acceptable Indoor Air Quality
- ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings
- ASHRAE 189.3- Design, Construction and Operation or Sustainable High-Performance Health Care Facilities

CROSS REFERENCES

LEED v4. For BD + C: Healthcare

- Energy and Atmosphere
    - Prerequisite- Fundamental Commissioning and Verification
    - Prerequisite-Minimum Energy Performance
    - Credit- Enhanced Commissioning
    - Credit- Optimize Energy Performance
- Indoor Environmental Quality
    - Credit- Enhanced Indoor Air Quality Strategies

LEED v4. For Operation & Maintenance: Existing Buildings

- Energy and Atmosphere
    - Prerequisite- Energy Efficiency Best Management Practices
    - Prerequisite- Minimum Energy Performance
    - Credit- Existing Building Commissioning- Analysis
    - Credit- Existing Building Commissioning- Implementation
    - Credit- Ongoing Commissioning
    - Credit- Optimize Energy Performance
- Indoor Environmental Quality
    - Prerequisite- Minimum Indoor Air Quality Performance
    - Credit- Enhanced Indoor Air Quality Strategies
    - Credit- Thermal Comfort

RESOURCES

- Better Buildings Center (energy.gov) – Guidance on Demand-Controlled Kitchen Ventilation
- ENERGY STAR Emerging Technology Award Fact Sheet – Demand Control Kitchen Ventilation