STRANG

ARCHITECTURE ENGINEERING INTERIOR DESIGN //PERFORMANCE SPACE©

DESIGN & TECHNOLOGY

WHICH MECHANICAL SYSTEM IS BEST FOR YOUR FACILITY?

When evaluating a building mechanical system, consider:

- How and when you intend to use the space.
- System complexity.
- The personnel to maintain it.
- Redundancy and safety features.
- Costs associated with construction, operation and maintenance.

The mechanical system is one of the least visible parts of a building. When not designed and installed properly, this system can be problematic for building owners and occupants. A common problem is that the mechanical system does not support the owner's intended use. When planning a new facility, you can avoid this problem by working with an engineer to design the system that meets your specific performance, flexibility and cost criteria.

A mechanical system for a pharmaceutical pilot plant (right) has demanding requirements for performance.

Performance

The first step in determining your building's mechanical system is to identify the desired level of performance, paying particular attention to flexibility. Once you determine the required performance levels, you can evaluate a variety of systems that meet these requirements and your budget. Different facility types have distinct performance requirements. For example, a laboratory has much more demanding performance requirements than a church.

Maintenance

All mechanical systems require regular maintenance during their lifetime. Many systems can be designed to alert maintenance staff of scheduled and unscheduled maintenance requirements, thereby saving money, minimizing downtime and increasing productivity.

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SYSTEM	FLEXIBILITY	COST/ S.F.	BOTTOM LINE
VAV	Excellent	$10-14	Accommodates small, separate temperature control areas, such as a conference room or single office. Separate thermostats for each zone allows individual temperature control so one area may be heating while the other is cooling. Easily relocated for a renovation. Easily maintained and operated.
Heat Pump	Good	$9-12	Suitable for individual zones that are occupied after hours; it isn't necessary to turn on a large air handling system in the event one area of the building becomes occupied. Allows one area to be in cooling while another is in heating. Much more difficult to relocate because they have electrical and plumbing systems that also must be relocated. Decentralized equipment and complexity makes maintenance and operation more challenging.
Packaged Rooftop	Poor	$7-10	Simple system with single thermostat that controls large area that requires heating or cooling at the same time. Serves large areas, such as open offices or training centers. Beneficial if a specific area of the building is used for extended periods of time (training center), while the rest of the building is shut down while unoccupied (office). Not flexible for changes in space, use or energy requirements. Easily accessible for repairs, but cumbersome to access during harsh winter conditions.

Flexibility and Controls

Most facilities are dynamic and must respond to change, including department moves, after-hours operations or a change in use. Increased system flexibility helps a building respond to change, enhances comfort and reduces operating costs. Flexible systems often require more complex and costly equipment and controls. A manufacturing facility or laboratory with critical environment requirements or hazardous exhaust systems should include a redundant backup system to maintain operations when the original system is not operating correctly.

State-of-the-art control systems respond to changing indoor and outdoor environmental conditions and automatically adjust the system to match the building requirements. This maximizes comfort and efficiency, and minimizes energy consumption

Costs

Many owners consider only the construction cost. However, in order to get a clear understanding of the total costs, it's also important to consider maintenance and operating expenses. Owners can recoup the capital expenditure of a more expensive system if it is more dependable and efficient, and decreases operating costs over its lifetime.

When evaluating the cost of a mechanical system, owners also should consider the cost of comfort. Thermal discomfort may result in a loss of productivity and/or business.

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/ System complexity
/ The personnel to maintain it
/ Redundancy and safety features
/ Costs associated with construction, operation and maintenance

Ultimately, your goal should be to select the best system that suits your performance and budget requirements.

FOR MORE INFORMATION REGARDING MECHANICAL SYSTEMS, CONTACT STRANG AT (608) 276-9200 OR BY E-MAIL AT INFORMATION@STRANG-INC.COM.