

Energy Management System



State Energy Assessment Workshop

By:

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What is an Energy Management System - EMS

- ❑ Centrally located computer screen
- ❑ Displays graphics of building layout, HVAC, measurements.
- ❑ Ties in all DDC leads to specific equipment
- ❑ Controls Air Distribution Systems
- ❑ Controls Lighting Systems
- ❑ Controls HVAC
- ❑ Controls Chilled Water Systems
- ❑ Reduces Utility Costs

Why Have an EMS?

- Energy Management Systems helps companies reduce energy consumption, which means you save money that goes straight back to the bottom line.

EMS Suggested Savings

Building Size (Sq.Ft.)	Average Annual Savings
75,000	\$40,000
200,000	\$100,000
500,000	\$300,000

Where Do Savings Come From?

- EMS' computerized monitoring and control systems automate the operation of equipment and lighting that is presently controlled by individual switches or thermostats.

How Do You Save?

By assuring that equipment is used only when needed you'll see savings from:

- ❑ Reduced heating and cooling costs during operating hours
- ❑ Automatic temperature set-back during non-operating hours
- ❑ Eliminate wasted run-times
- ❑ Reduction of peak power draw (much of your bill is based on the highest peak in a month, even though it may last only a few minutes)
- ❑ Improved operating ranges for boilers and chillers
- ❑ Less downtime due to undetected equipment problems
- ❑ Extended equipment life cycle
- ❑ Lower costs of environmental compliance.

Who Are the Manufacturers?

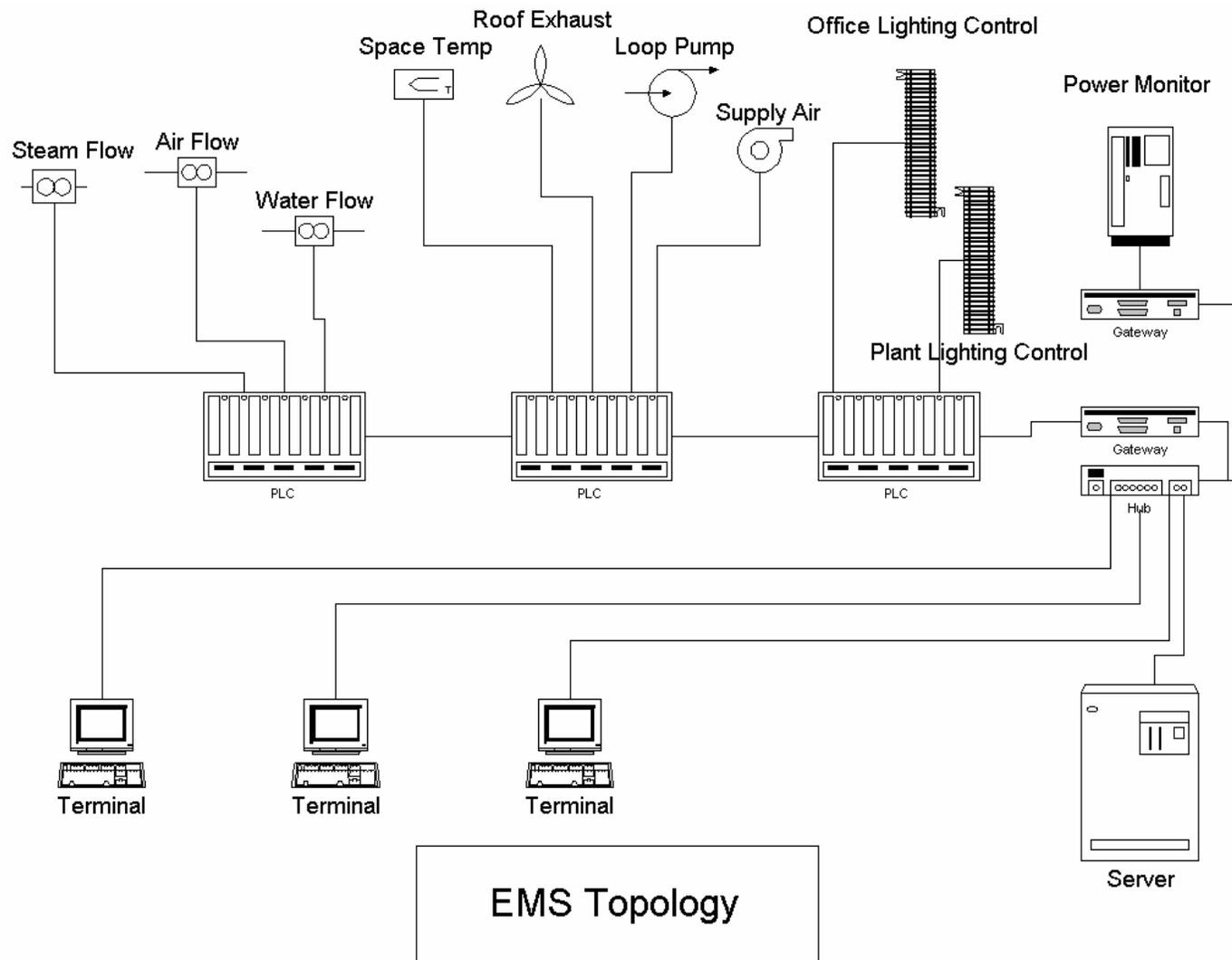
The top three EMS manufacturers are listed below.

- Honeywell
- Johnson Controls
- Siemens Building Technologies, Landis Division

Is a Full Blown EMS Necessary?

- ❑ Often 80% of the savings can be achieved with 20% of the investment.
- ❑ Chillers, furnaces, lighting can be controlled independently without a computer interface.
- ❑ Consider installing or upgrading individual controls.

EMS – Basic Layout



EMS Feature Description

1. Scheduled Start/Stop – Starting and stopping equipment based on time of day, and the day of the week.
2. Optimum Start/Stop – Adjust equipment operating schedule based upon space temperature, outside air temp, etc.
3. Duty Cycling – Shutting down equipment for predetermined short periods of time during normal operating hours.

EMS Feature Description – Cont.

4. Demand Limiting – Temporarily shedding electrical loads to prevent exceeding a peak value.
5. Day/Night Setback – Lowering space heating setpoint or raising the space cooling setpoint during unoccupied hours.
6. Outside Air Economizer – Brings in outside air when the OA dry bulb temp is less than required mixed air temperature for the building.
7. Enthalpy Economizer- Brings in outside air when the OA enthalpy is less than that of return air.

EMS Feature Description – Cont.

8. Warm Up/Cool Down Ventilation and Recirculation- Controls operation of the OA dampers when the introduction of OA would impose an additional thermal load during warm-up or cool-down cycles prior to occupancy of a building.
9. Hot Deck/Cold Deck Temperature Reset – Selects the zone/area with the greater heating and cooling requirements and establishes the minimum hot and cold deck temperature differential which will meet the requirements.

EMS Feature Description – Cont.

10. Steam Boiler Optimization – Implemented in heating plants with multiple boilers. Boiler plant optimization is accomplished through the selection of the most efficient boiler to satisfy the space temperature requirements during the building occupied period.
11. Reheat Coil Reset – Selects the zone/area with the greatest need for reheat, and establishes the minimum temperature of the heating hot water so that it is just hot enough to meet the reheat needs for that time period.

EMS Feature Description – Cont.

12. Hot Water Boiler Optimization – Same technique as Steam Boiler Optimization.
13. Hot Water Outside Air Reset – The heating hot water temperature is reduced as the heating need for the facility decreases.
14. Chiller Optimization – For facilities with multiple chillers, the most efficient chiller or chillers are selected to meet the existing load with minimum demand and/or energy.

EMS Feature Description – Cont.

15. Chilled Water Temperature Reset – The chiller discharge water temperature is increased during periods where full load cooling is not needed.
16. Condenser Water Temperature Reset – The condenser cooling water temperature is lowered during times when the outside air can provide additional cooling capability. For example, with a cooling tower, the fans can be run more to get more benefit of evaporative cooling during certain times of the day or season.

EMS – Real Reason

- ❑ I can reduce my energy costs through intelligent energy management.
- ❑ Government regulations mandate an environmentally friendly design.

Independent Lighting Controls



Photocells can control outdoor lighting
Individually or by circuit

Electronic timers can control
multiple circuits, 24/7/365
Can be set for regional daylight
hours and adjust for daylight savings





Powerlink available in column width design

Smart panels can be programmed locally to shut off individual circuits.

Or integrated with lighting control systems to achieve distributed control



Occupancy Monitoring and Control



Occupancy sensors use multiple technologies to control indoor lighting

Portable logging devices can record room occupancy and the time the lights are on and off.





Programmable thermostats can achieve Night setback in heating and cooling mode.

Chiller controls can operate the chillers most efficiently. These controls can operate stand alone or networked into an EMS.

ISNConneXsys



Measurement and Data Acquisition



Portable devices can be used to measure Temperature, humidity, barometric pressure.

They can be placed on an electric motor to Determine run time by sensing the electric Field.

The also can accept current or voltage inputs from field mounted instrumentation.

Thank You

