



Modern energy plant controls are designed to operate equipment. They are not designed to anticipate load demand, monitor and react defensively against complex utility rate structures, measure equipment performance against specifications, identify maintenance priorities or monitor and forecast operating costs.

**EnergyShepherd** provides that capability - forging the intelligent link between equipment capability and user demand.

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## OVERVIEW

EnergyShepherd is an equipment optimization and management software tool specifically developed for monitoring and improving the efficiency of medium to large central and distributed energy plants. It is ideally suited for facilities such as university campuses, medical complexes, multi-building office configurations, government installations and similar size operations whose energy plants control complex arrays of boilers and chillers that provide heating and cooling for large public areas.

Energy costs have reached budget-busting proportions for many industrial and commercial users. In today's complex energy environment, simply operating the wrong equipment configuration at the wrong time can establish a peak use demand for the month, if not for the entire year, resulting in heavy utility rate penalties and increased operating costs. Even the most sophisticated plants face the ever-present risk of budget overruns, system failures or both trying to balance user demand against unforeseen weather fluctuations, complex utility rate structures, equipment performance failures and inconsistent operating practices.

Medium to large centralized plants running configurations of heaters and chillers and responding to demand either automatically or by manual operator control, represent a complex, dynamic scenario where real-time data is key. EnergyShepherd provides that key-- forging the intelligent link between equipment capability and user demand.

EnergyShepherd is designed to both monitor and optimize plant performance, anticipating and balancing user demand against energy cost. EnergyShepherd monitors and forecasts energy consumption in real time dollars, minute to minute and out to a year in advance. Operators and administrators can see exactly how efficiently their plant is performing day to day and the impact of that performance on annual operating costs.

**EnergyShepherd is data agnostic. Built on a Microsoft Excel' platform, which EVERY facility can manage, the software was designed and refined over several years of actual field deployment in the design, development, commissioning and operation of large complex plants. It will monitor and manage operations regardless of the control systems and technology in place for any utility rate in any utility market. The software program can integrate with and optimize any manufacturers or group of manufacturers' control systems that have an accessible data link.**

## **PLANT PERFORMANCE BENEFITS**

Energy plants are dynamic systems with multiple factors impacting efficiency and cost of operation. Central energy plants, even with the highest efficiencies available, waste utility dollars when not well monitored or managed. EnergyShepherd is at the heart a management tool. It will supervise both the administrative and technical functions that make for effective quality control, and preventive maintenance programs.

EnergyShepherd constantly compares equipment configuration and capacity against specifications and plant performance. It can advise operators of performance degradation that can lead to system stress. Based on this information, operators can schedule needed maintenance and administrators can budget for equipment upgrades or replacement. Early warnings of equipment fouling or malfunction can also avoid system overload or even possible plant failure.

The data acquired from EnergyShepherd helps to forecast and pinpoint potential problems permitting supervisors to:

- Reduce repetitive maintenance, excessive parts replacement, purchasing errors, costly overtime and emergency repairs by using the system's "smart analysis" for plant performance that compares equipment specifications to actual performance and load demand requirements
- Provide for a continuity of operator skills by monitoring and advising personnel of plant performance while forecasting demand and prioritizing tasks to be accomplished — thus continually optimizing operations and minimizing costs
- Free high-priced, skilled labor to focus on high-priority tasks while allowing less skilled labor to perform routine, but essential, maintenance
- Instruct new personnel and refresh existing staff with relational graphics that depict actual system operations and provide for self-training in forecasting equipment demands and consumption practices in "what if" and real-time cost scenarios
- Simplify and improve administrative chores and record keeping including often hard- to-quantify ESCO audits

## **UTILITY RATE EXPLOITATION**

As a result of tight energy supplies relative to demand, utility companies in virtually every state and every market are creating complex rate structures designed to reward conservation and penalize "excess consumption". Especially penalized are energy demands during peak-load periods. Some of these penalties are so severe that a fewminutes of excess consumption at the wrong time can attract 5-figure penalties and ratchet up the rate structure for the next 11 months.

In some markets, the wrong 15 to 30-minute operation of a 1,000-ton chiller can cost \$12,000 to \$18,000 for just the demand penalty. If the utility has a ratchet clause where the facility pays for 90% of its summer peak (measured in 30-minute intervals) throughout the year, a simple demand driven mistake can set the rate for an entire year. EnergyShepherd, however, can help plant operators measure the annual cost of a moment's decision and better advise management on the options and costs of responding to moment to moment choices governing the comfort and operation of the facility.

Some utility markets have shoulder rates where energy charges step up or down at different times of day. It is common to see energy costs at the highest rates twice that of the lowest time rate. Combinations of inattention, degraded equipment, emergency response to user-demand and failure to pre-plan for temperature/load swings can trigger costly results.

On the other hand, plants designed, maintained and optimized for efficiency can exploit complex rate structures to achieve the lowest possible annual operating costs. EnergyShepherd optimizes the plant's ability to meet system demand without unduly stressing equipment or attracting utility consumption penalties. It avoids load spikes and emergency operating scenarios.

### **Energy Saving Contracts**

Energy Cost Savings Contracts (ESCO's) are a common occurrence in many well-run installations. However, as a practical matter, quantifying the hard dollar savings associated with these programs for discount/reimbursement purposes can prove difficult.

Furthermore, the incentive to optimize plant operation is diminished if the value of an operator's choices are blended with the savings paid to the ESCO. EnergyShepherd can accurately track these savings and report them on an as-needed basis. No longer is it necessary to spend time and effort calculating (estimating) ESCO's when the information is readily available as a by-product of the EnergyShepherd monitoring function.

### **IN SUMMARY**

EnergyShepherd is a management tool for optimizing plant efficiency and reducing energy consumption--thus controlling operating costs.

- EnergyShepherd is a passive system (monitoring, advising, and forecasting) it does not interface with plant controls directly.
- EnergyShepherd is built on a dynamic Microsoft Excel' operating platform that EVERY customer can utilize.
- EnergyShepherd is data agnostic--it will interface with any manufacturer's equipment with a modern data link.

- EnergyShepherd monitors and forecasts operating performance in hard dollars minute to minute and out to a year, so administrators can evaluate operating costs.
- EnergyShepherd permits operators to query the system with "what if" scenarios to see the effect of changes prior to altering plant operations
- EnergyShepherd measures equipment performance against specifications and advises operating personnel of maintenance priorities and pending equipment degrading/fouling and possible system failure
- EnergyShepherd can monitor energy costs for any utility rate structure in any energy market
- EnergyShepherd can advise and forecast energy consumption toward managing fuel contracts, if desired
- EnergyShepherd can be used effectively in the commission of new systems/plants by helping to optimize equipment configurations, establish a performance benchmark and monitor future operations against known criterion
- EnergyShepherd can upgrade the value of operating personnel by giving them the "smart tools" that make energy controls meaningful in terms of balancing energy consumption against anticipated load demand and utility rate structures
- EnergyShepherd can help optimize plant performance 24/7 by advising, prioritizing and forecasting operations so that less skilled personnel are more effective plant operators

EnergyShepherd is not the answer to every energy plant configuration. However, for large, centralized or distributed systems serving multi-building or campus configurations and operating complex arrays of boilers and chillers, EnergyShepherd can introduce substantial immediate saving--savings in outright reduction of energy usage and cost and savings in long-term optimized plant performance, reduced personnel overtime and smart utility utilization.