



SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)
COIMBATORE-35

**Strategies For Energy
Management**

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Actively manage real-time energy use



- Proactive, real-time data management can expose a wide range of unknown challenges associated with occupancy, building use, and peaks in utility usage. For example, my firm, Southland Energy, installed a comprehensive metering system for a data center customer, monitoring everything from air and water flows, to very specific details of the data center. The real-time data allowed the building operators to identify potential issues instantaneously, implement corrective actions to prevent critical shutdowns, and manage loads before they affected the entire system.



Actively manage what is measurable



- Use advanced metering and energy management systems (EMS) to capture real-time data, ensure its accuracy and, in turn, address specific issues. For example, a K-12 school installed an energy dashboard that managed the overall facility while actively engaging faculty and students. The customer could view how the systems were operating and how much they were saving based on their actions and system improvements.



Actively manage what is measurable



- In instances where building owners have utility monitoring equipment but no collection or processing software, the meters or monitoring equipment become stranded assets. This is because millions of data points have to be gathered and processed manually, multiple times during the year. A sophisticated metering system equipped with the proper EMS software will automatically collect, process, and format these data points in real time, if not hourly. The ability to process these useful data points into an easy-to-use format improves the overall system effectiveness and functionality.



Actively manage energy consumption



- Use collected data to build a strategy that manages costs and consumption on a daily, weekly, monthly, and annual basis. Southland Energy worked with an industrial customer to evaluate multiple peak demand reduction strategies. Load shifting and demand limiting systems were implemented to limit customer loads during peak hours and reduce costs.
- Limiting peak demand consumption offers additional benefits that are not always easy to identify or claim. For example, during peak hours, utilities run “Peaker plants” to meet demands from the grid. However, these plants are often older and less efficient electricity generation plants, with the sole purpose to run periodically to meet demand. Reducing peak demand during summer months saves electricity costs and overall greenhouse gas emissions per kW.
- Managing consumption allows for early detection of improper set points, schedule misalignments, and equipment/system failures. Analyzing trends of metered points over days, weeks, months, and years helps to pinpoint irregularities, leaks, and excessive run times. The proper system can flag leaks, changes in occupancy, occupant set point changes, and energy and water waste.



Have a holistic plan



- Without clear direction and an action plan, it is difficult to make a meaningful impact beyond the “low hanging fruit.” A holistic plan is critical to leverage overall savings and provide a mix of improvements for substantial results. Facility leaders often benefit from a holistic plan that bundles low hanging fruit such as lighting and building automation measures with longer paybacks such as renewable energy. This evaluates all possible savings including water, waste, energy, and system/facility reliability to package the appropriate measures for the facility’s goals and financial requirements.



Secure leadership buy-in and support



- Real, holistic changes will not be attainable without direct involvement and support from leadership. It is critical to engage leadership and key decision makers that impact the financials of facility operations.



Negotiate



- Negotiate supply contracts with third-party marketers to reduce energy costs. Southland Energy has worked with several customers on energy specific solutions and identified opportunities to help them negotiate utility rates efficiently. The firm worked with a condominium high-rise customer and was able to negotiate a 5% reduction of utility rates, while also evaluating improvement measures. These results can be achieved when we know historical consumption and have accurate projections for consumption; take advantage of available curtailment, arbitrage, and/or demand response programs; and issue pricing RFPs to multiple suppliers to ensure best market value.



Take risks



- Major changes that drastically reduce consumption can require difficult steps and decisions, but reward outweighs risk if changes are properly managed. The ability of a trusted advisor to leverage in-house capabilities coupled with a strong commitment to change helps alleviate the burden.



Take action but don't "over study"



- While energy studies and audits are useful and provide direction, in most cases data is already available and can be used to take action sooner rather than delaying it. Develop a plan for action with available information.
- Many facility executives complete several energy audits but do not act on a path forward. Southland Energy has performed such studies and audits, while also leveraging customers' existing studies and audits to implement their suggestions. From simple lighting retrofits to complicated central utility plants and renewable energy systems, customers have turned improvement ideas into a reality.



Partner with those who can supplement in-house knowledge

- Relationship building and partnering are keys to building an effective energy management strategy. This can involve partnering with other facility management and energy management leaders; energy services companies (ESCOs); industry subject matter experts, such as the [U.S. Department of Energy](#) or consultants; utilities; and other knowledge centers, such as the Association of Energy Engineers (AEE).



Establish an occupant behavioral awareness program

- Technology implementation and building retrofits are only part of the equation. Occupants have a big impact on a building's efficiency and investments made. Education is key to the behavioral process, and empowering occupants with knowledge and resources will help increase energy savings as they can realize the impact through efficiency or financial gain.
- Facility executives that adopt these 10 tips for energy management improvements are closer to ensuring their organizations are able to increase efficiency, while overcoming budget constraints, volatile energy costs, and the hidden expenses of aging equipment.



TYPES OF ENERGY



- ▶ **Mechanical energy**

Mechanical energy is energy that results from movement or the location of an object. Mechanical energy is the sum of Kinetic and Potential Energy.

- ▶ **Thermal energy**

Thermal energy or heat energy reflects the temperature difference between two systems.

- ▶ **Nuclear energy**

Nuclear energy is energy resulting from changes in the atomic nuclei or from nuclear

- ▶ **Chemical energy**

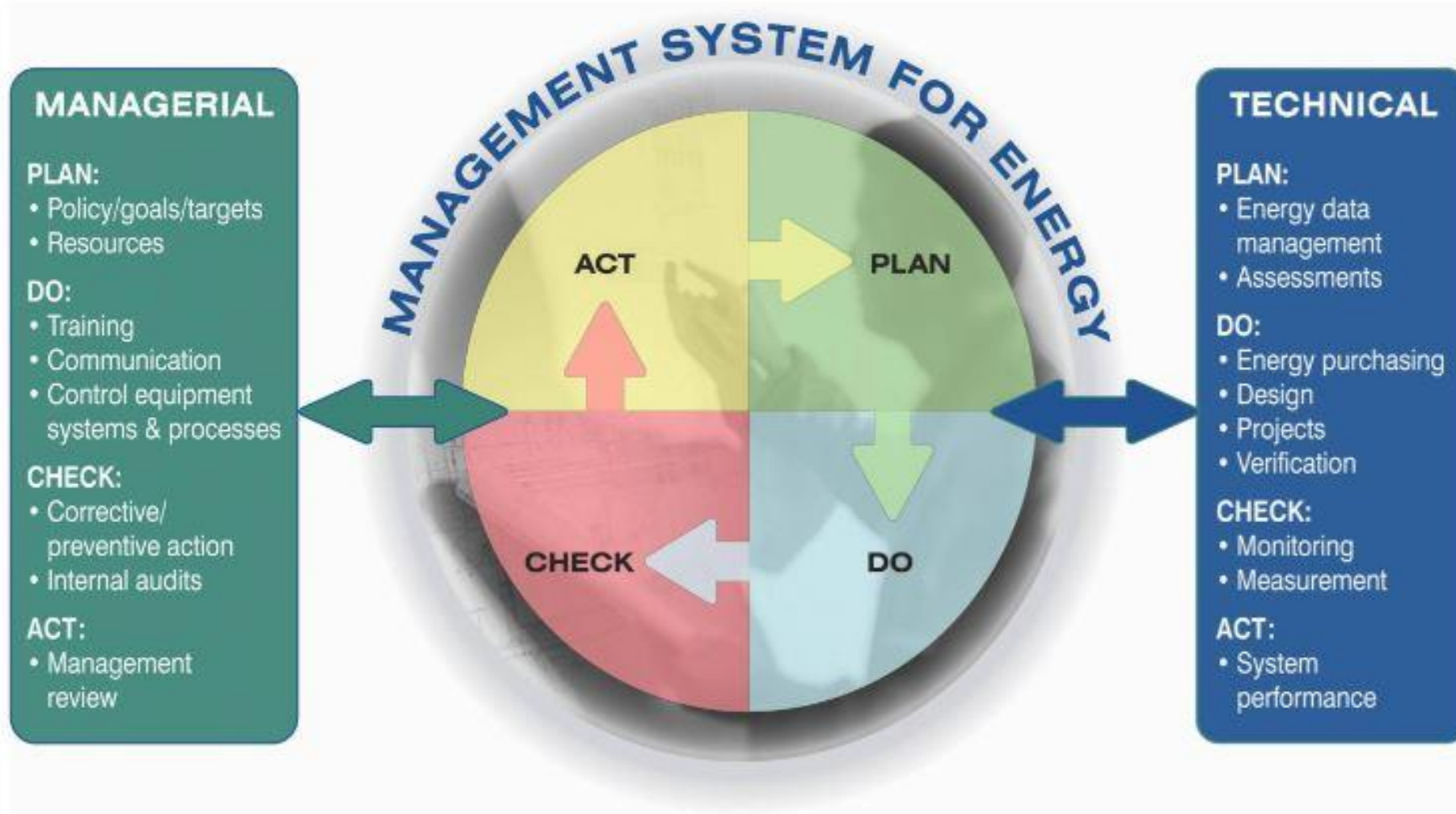
Chemical energy results from chemical reactions between atoms or molecules. There are different types of chemical energy, such as electrochemical energy etc.

- ▶ **Electromagnetic energy**

Electromagnetic energy is energy from light or electromagnetic waves.



The Energy Management System





The Objectives of Energy Management

1. To achieve and maintain optimum energy procurement and utilisation, throughout the organization
2. To minimise energy costs / waste without affecting production & quality
3. To minimise environmental effects.



Energy Management Objectives Clarified



The basic objective of any Energy Management System is to answer five simple questions:

- ▶ How much energy is consumed
 - ▶ How is the energy consumed
 - ▶ Where is the energy consumed
 - ▶ When is the energy consumed
 - ▶ What is the quality of the energy consumed
- ▶ **In order to address these queries Energy Audits are conducted. Lets understand audits -**