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**Environmental Chemistry**

# **Energy Management**

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# Definition

Energy management is a process that involves **optimization of energy use** for the **best possible outcomes** and **taking steps for its conservation**. It also includes planning related to the **production of energy** and its **storage for future usage**.

- So, the ultimate aim of this process is not only to save the cost but also to achieve complete environmental sustainability.
- Whenever energy is consumed or is produced by fossil fuels, some amount of greenhouse gases, mainly carbon dioxide is released into the atmosphere. This contributes to global warming which is an undesirable phenomenon. So, efficient energy management is also a key component of Carbon Management or Net-Zero.
- Contrary to the prevalent belief, energy management applies not only to large buildings and industrial facilities but even to small living units, like our kitchens or dining room.
- So, you can start applying the process right away from your home by switching off the electrical appliances when not in use to save your electricity bills.





# Why is Energy Management important?

## 1. ENERGY MANAGEMENT SAVES COSTS

Now we already know this, using an EMS in a building may bring up to 29% savings on total energy consumption costs. But even a small measure if taken, such as replacing old CFL bulbs with more energy-efficient LED lights, can reduce the lighting energy consumption by more than 50%, given that it's used for a long period of time.

## 2. REDUCES THE RISK OF ENERGY SCARCITY

Though energy is just converted from one form to another, it's still susceptible to its scarcity.

As per a study conducted by the US Energy Information Administration(EIA), the world's energy consumption is expected to grow by 48% by 2040. If not taken adequate steps, a sudden surge in energy demand may cause energy scarcity in the future.

## 3. TO REDUCE GREENHOUSE GAS EMISSIONS

38% of the world's total electricity is produced via coal power plants. The burning of coal and other fossil fuels release Greenhouse gases like CO<sub>2</sub>, CH<sub>4</sub>, CO, CFC, etc that poses the threat of global warming and its induced climate change.

## 4. TO MAINTAIN ENERGY PRICE

A balance between demand vs supply is essential to manage the cost of any commodity. And this goes with energy too. The fluctuations in energy prices will also affect the prices of electrical appliances.

So, proper energy management will ensure the affordability of energy and its appliances in present times and for the future.

## 5. MANAGING ENERGY ALSO SAVES WATER

We just discussed the overhead costs of renewable energy sources. Going down further, the hydroelectric power plants, though they are free from fossil fuel consumption, may degrade the quality of water resources in a variety of ways. Oxygen stratification, eutrophication, thermal pollution, and mercury pollution are the major challenges posed by hydroelectric facilities where they are constructed

# How Energy Management Works

## STEP 1: DATA COLLECTION

- There is no secret here. The more data you can get, and the more detailed it is, the better.
- Energy data can come from your monthly utility bills, from manual meter checks (old school approach once a week, or once a month), or from automatic uploads from smart meters. Monthly bills might be an easy starting point, but you'll see the limits of that approach very quickly.
- The lack of detail in terms of time, area, and type of energy use make it difficult to find useful insights. Manual meter checks can give you a day-by-day curve, but this process is time-consuming and error-prone.
- Smart meters that record, store, and transmit data, where it can be viewed and processed using a dedicated software platform, are ideal. However, you choose to get your data, it is a necessary first step.

## STEP 2: FINDING AND QUANTIFYING OPPORTUNITIES TO SAVE ENERGY

- When you begin to investigate and analyse your data, you'll begin to find interesting bits of information. It may be an increase in your monthly bill after adding new air conditioning units, or an increase of lighting use during overtime hours.
- Whatever the situation, you need proper visualizations (graphs) and analytics to find out what is happening behind the raw data. This can be difficult to achieve by spreadsheet, but simple year-on-year comparisons can be a good starting point.
- Looking at detailed interval energy data is the ideal way to find routine energy waste. You can check whether staff and timers are switching things off without having to patrol the building day and night, and, with a little detective work, you can usually figure out who or what is causing the energy wastage that you will inevitably find.

### **STEP 3: ACTION TO SAVE ENERGY**

- Achieving savings requires action. When you identify opportunities for saving, the natural next step is to act on them. Some solutions may be one-off fixes, while others may need more internal cooperation and persuasion.
- Building support for action can be more challenging than the action itself. It helps to provide clear evidence of the savings opportunity. When everyone agrees and understands that there is a problem, you can build momentum to take action and solve it.
- You can create graphs and presentations yourself or share the findings through cloud software.
- As for those energy-saving opportunities that require you to upgrade equipment or insulation: assuming you've identified them, there's little more to be said. Just keep your fingers crossed that you make your anticipated savings.

### **STEP 4: TRACK PROGRESS & ONGOING IMPROVEMENT**

- Energy savings that come from behavioural changes (e.g. getting people to switch off their computers before going home) need ongoing attention to ensure that they remain effective and achieve their maximum potential.
- If you've invested money into new equipment, you'll probably want to prove that you've achieved the energy savings you predicted.
- If you've been given energy-saving targets from above, you'll need to provide evidence that you're meeting them, or at least making progress towards that goal...
- Make sure your energy management system can provide you with regular performance reports and timely alerts. This lets you address problems immediately. But even without an advanced tool, you should still input your monthly bills into a spreadsheet and make sure everything stays on track.

# Conclusion

- Energy management is essential for dealing with rising costs and regulatory requirements. The earlier you start the better. To do it right and smart, you should have an energy management system to automate and optimize each of the four steps above.
- At the minimum, you should keep an eye regularly on your energy data, just to ensure things are not getting worse. But ideally you are considering energy management as an ongoing effort to find new savings opportunities, engage your employees and track your progress.
- Only then will you achieve lasting results without investing frustrating hours into manual work.

## Thank You...