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Importance of Energy Conservation

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Abstract- Energy conservation refers to reducing energy consumption through using less of an energy service. Even though energy conservation reduces energy services, it can result in increased environmental quality, national security, personal financial security and higher savings. On a larger scale, energy conservation is an important element of energy policy. Energy conservation is often the most economical solution to energy shortages. Energy conservation is unquestionably of great importance to all of us, since we rely on energy for everything we do every single day. Energy supplies are limited and, to maintain a good quality of life, we must find ways to use energy wisely.
Keywords - Energy auditing, Energy conservation, Energy efficiency, Energy consumption, Effects of energy conservation.

I. INTRODUCTION

We depend on energy for almost everything in our lives. We wish to make our lives comfortable, productive and enjoyable. Hence even if the outside temperature rises a little, we immediately switch on the air conditioner to keep our house cool. This is again using up of energy. Unfortunately, what we do not realize is that we have started taking things for granted and we have started wasting energy unnecessarily. Most of us forget that energy is available in abundance but it is limited and hence to maintain the quality of life, it is important that we use our energy resources wisely.

"The earth provides enough to satisfy every man's needs but not every man's greed"- Gandhiji.
Hard facts on why energy conservation is a must are outlined below:

- *We use energy faster than it can be produced – coal, oil and natural gas – the most utilised sources take thousands of years for formation.*
- *Energy resources are limited – India has approximately 1% of world's energy resources but it has 16% of world population.*
- *Most of the energy sources we use cannot be reused and renewed – Non renewable energy sources constitute 80% of the fuel use. It is said that our energy resources may last only for another 40 years or so.*
- *Energy saved is energy generated – when we save one unit of energy, it is equivalent to 2 units of energy produced.*
- *Save energy to reduce pollution – energy production and use account to large proportion of air pollution and more than 83% of greenhouse gas emissions.*

"Energy conservation" and "Energy efficiency" are often used interchangeably, but there are some differences. At the most basic level, energy conservation means using less energy and is usually a behavioural change, like turning our lights off or setting our thermostat lower. Energy efficiency, however, means using energy more efficiently, and is often a technological change. Energy efficiency measures the difference between how much energy is used to provide the same level of comfort, performance or convenience by the same type of product, building or vehicle. A combination of both energy conservation and energy efficiency measures yields an ideal solution.

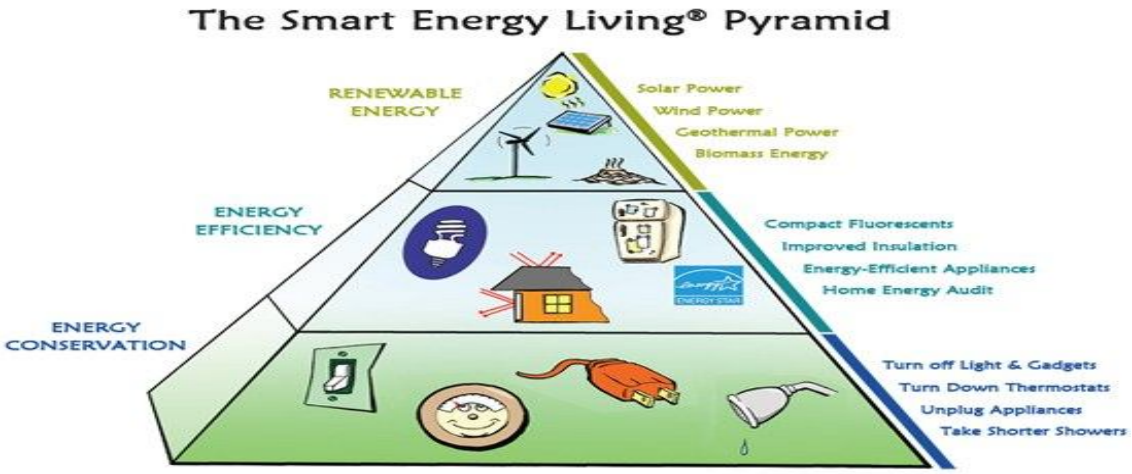

Fig. 1: Relationship between energy conservation & energy efficiency

II. METHODOLOGY

One of the primary ways to improve energy conservation in buildings is to use an energy audit. An energy audit is an inspection and analysis of energy use and flows for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the output(s).

Fig. 2: Energy audit

Consumers are often poorly informed of the savings of energy efficient products. A prominent example of this is the energy savings that can be made by replacing incandescent light bulbs with more modern alternatives. When purchasing light bulbs, many consumers opt for cheap incandescent bulbs, failing to take into account their higher energy costs and lower lifespans when compared to modern compact fluorescent and LED bulbs. Although these energy efficient alternatives have a higher upfront cost, their long lifespan and low energy use can save consumers a considerable amount of money.

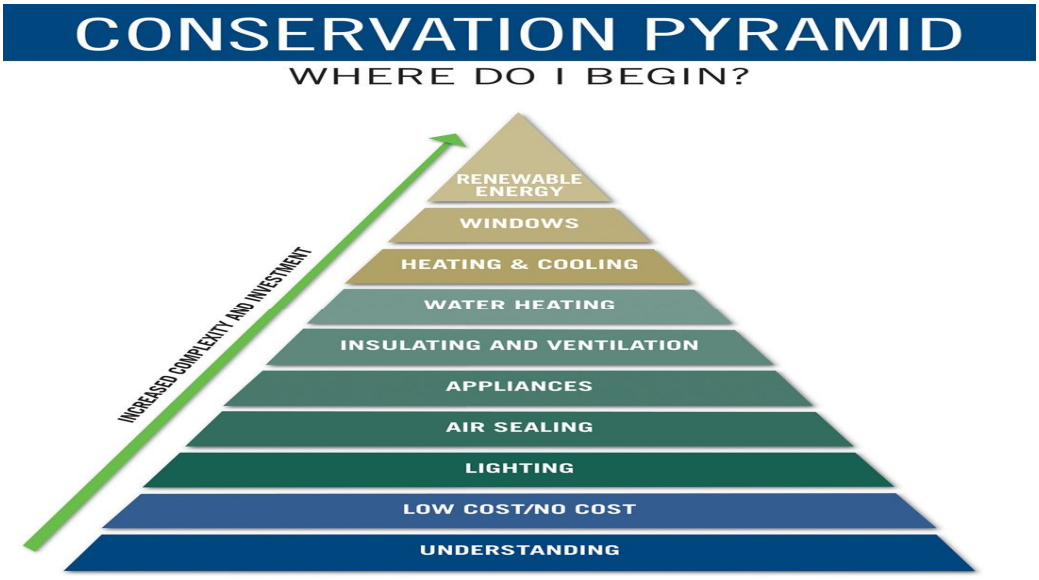

Fig. 3: Conservation pyramid

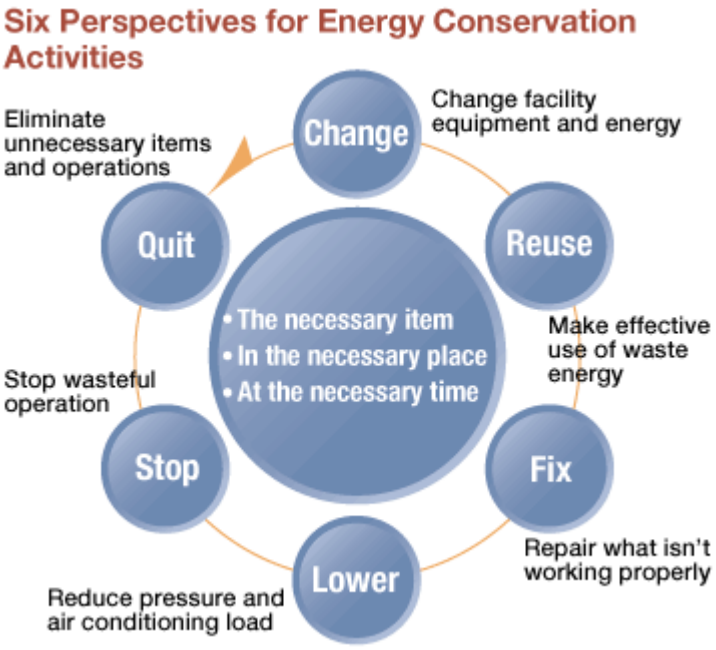

Fig. 4: Procedure of energy conservation

- The average house uses 38% of its total annual energy use on heating.
- When a house is occupied, the thermostat should be set at 68F for maximum energy efficiency.
- Install a central air conditioning system only when whole house air conditioning is needed.
- A sun tempered superinsulated home uses passive solar design concepts with super-insulation techniques.
- Replace aging appliances with newer energy efficient ENERGY STAR models.
- Unplug! Upto 75% of the electricity used to power home electronics is consumed while the products are turned off. Appliances like computers, tv's, cable boxes, cell phone chargers, coffee makers, etc. all continue to consume energy just by being plugged in into an outlet.
- Clean the lint filter in the dryer after every load to improve air circulation, and periodically check the dryer vent to ensure it is not blocked.
- Make sure the dish-washer and clothes-washer have full loads before running them. Use the "air dry" setting on the dishwasher. Wash clothes in cold water when possible and rinse them in cold water.
- Inspect windows and ductwork for any air leakage. If we feel air leaking at duct joints, we can use duct tape to seal them. Winterize windows with weather stripping (for all movable parts) and caulk (for non-moving parts). Eliminating these leaks can reduce heating costs up to 10%.
- Use kitchen, bath and other ventilating fans sparingly. Leaving them on too long will suck away a tremendous amount of household heat. Turn them off when their job is complete.
- Turn down thermostat at night or when away for more than four hours during the day.
- Boil water in a kettle or covered pan; the water will boil faster and use less energy.
- Keep range-top burners and reflectors clean. They will reflect heat better and will save energy.
- Match the size of the pan to the heating element. More heat will get to the pan, and less will be dissipated.
- Avoid opening the oven door repeatedly to check food while it cooks. This allows heat to escape and requires more energy to complete the job. Use a timer to let you know when food is ready.
- Use small electric cooking appliances (such as portable grills and skillets) for small meals rather than the stove or oven.
- Don't preheat the oven unless absolutely necessary.
- Use a microwave to cook meals whenever possible; it uses about half the energy of a conventional oven.
- Use crock pots and slow cookers; they can be as much at 75% more energy efficient than stoves and oven.
- Turn down hot water heater to its lowest setting when you go on vacation or are away from the house for an extended time period.
- Use energy star compact fluorescent light bulbs. Energy star compact fluorescent light bulbs last longer and use up to 75% less energy than standard light bulbs.
- Use halogen light bulbs for outdoor lighting (spot lights, flood lights, security lights). They use about 25% less energy than traditional incandescent bulbs.

- Light-zone your home to some electricity. Concentrate lighting to areas where needed for reading, work and safety. Reduce lighting in little used areas.
- Install lighting dimmer switches; they save energy by reducing the lighting intensity in a room.

III. RESULT

- Saves money: One of the most immediate benefits of energy conservation is the amount of money we will save each month on our utility bills.

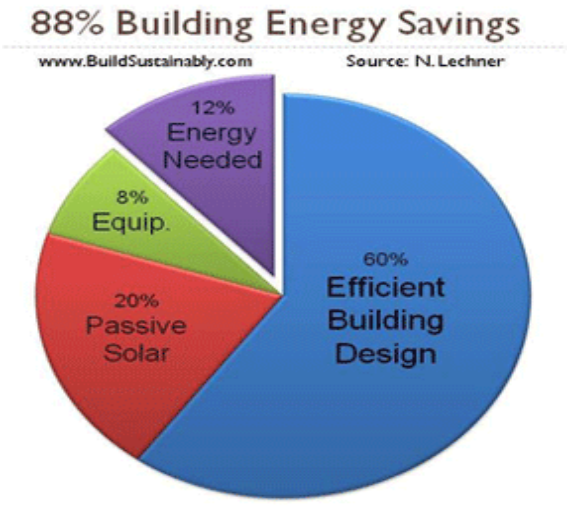

Fig. 5: How energy conservation saves money

- Environmental & social effect: Mitigates the numerous adverse environmental and social impacts associated with energy production and consumption. These include air pollution, acid rain and global warming, oil spills and water pollution, loss of wilderness areas, construction of new power plants.
- Energy conservation extends the lifetime of equipment and reduces the maintenance cost by operating less hours and at less than maximum capacity.
- Energy conservation reduces increasing global warming.

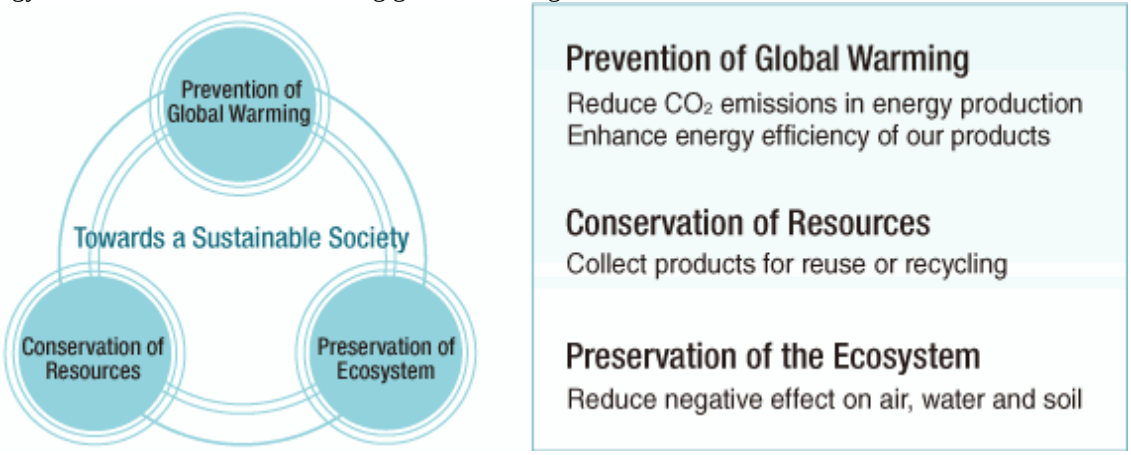

Fig. 6: Effect of energy conservation on global warming

IV. CONCLUSION

December 14th is celebrated as World Energy Conservation day. Energy conservation is a method to reduce energy demand. Conserving energy is an important way to reduce strain on the environment and bring down electricity expenses. Energy conservation supports the eco friendly lifestyle by providing energy, which saves money and at the same time saves the earth.

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