

Ensuring sustainable energy consumption - developing awareness in college students regarding energy conservation & energy consumption

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Abstract: According to Sustainable development Goals -SDG 7, an attempt was made to ensure sustainable energy consumption & safe environment. An action project was undertaken with undergraduate college students of central suburbs of Mumbai city to develop awareness regarding energy conservation and to help them to change their energy consumption behavior and habits. First year students of one of the colleges of Mumbai city were selected. Weekly three sessions were conducted for six weeks period. The broad objective of the project was to encourage youth to be energy efficient, to use alternate renewable energy sources besides bringing awareness to adopt new practices for energy conservation. The project commenced with the pretesting to check the students' level of knowledge & awareness, to know about their energy consumption habits and behaviors. The result of the pretesting was quite exasperating as majority of the students have poor energy consumption behavior like for instance keeping mobile charger plug in whole night, not switching off water heaters, or keeping laptops on when not in use etc. Various educative techniques were used to educate target group. The project was concluded after six weeks period and the post testing results had reflected positive behavioral changes in students. During the project students have developed understanding about the concept of energy conservation, about making smart choices and inculcated readiness to use renewable energy sources. In the final round students took a pledge to be energy efficient individuals.

Key Words: energy conservation, energy consumption, sustainability, behavioral change.

1. INTRODUCTION:

Energy conservation is the need of modern world which is changing every second, the natural resources are depleting and this depletion also comes at the cost of creating an enormous destructive waste product that then impacts the rest of life. The goal with energy conservation techniques is to reduce demand, protect and replenish supplies, develop and use alternative energy sources and to clean up the damage from the prior energy processes. Energy efficiency is the wave of the future. The world is quickly moving towards energy sustainability. At the same time, the mankind is trying to re-establish the connection it once had with nature. An energy efficient consumer is a personal step toward the direction of renewable energy, environmental protection, and sustainable living. Energy conservation is the decision and practice of using less energy. Turning off the light when you leave the room, unplugging appliances when they are not in use and walking instead of driving are all examples of energy conservation. Without energy conservation, the world will deplete its natural resources. The depletion also comes at the cost of creating an enormous destructive waste product that then impacts the environment. Energy conservation involves using less energy by adjusting your behaviors and habits. Energy efficiency, on the other hand, involves using technology that requires less energy to perform the same function. Energy-saving light bulbs, large household appliances, smart thermostats, and smart home hubs like Constellation Connect are all examples of technology that can be energy efficient. When you're taking steps toward energy conservation and efficiency, changing your daily energy habits is key to managing your energy usage. Education is probably the most powerful of the energy conservation techniques that can be used. Teaching people the importance of conservation, to gain more control over their energy bills and reduce the demand on the earth's natural resources. It makes a difference if people are guided about alternate choices that can be used in daily living and the habits can be developed in young generation.

2. ACTION RESEARCH PROJECT :

A community-based action project was taken to bring awareness in young students belonging to middle class homes regarding energy conservation. The broad aim of the project was to educate students to be energy efficient and

specific objective was to bring change in their daily living habits and to be smart user of energy. The project was carried out in 3 phases with 155 students from central suburban area college of Mumbai City. The project was run for three months from October 2019 till December 2019. The project taken was a collaborative effort with Indian Institute of technology (IIT) Mumbai & TATA POWER. The experts from IIT Mumbai were contacted to train selected students for making solar lamps. The experts from TATA POWER were invited to deliver talk and conduct sessions with students to orient them regarding energy conservation and how to save electricity by changing our habits.

3. EXECUTION OF PROJECT:

Pretesting data collection was done through Questionnaire based on energy consumption habits and behavior of students. The objective was to know their energy consumption behavior at home and outside and further to understand their knowledge regarding energy conservation. The pretesting data revealed that more than 85% of the students use most of electrical facilities and modern appliances. Majority of the students were not much aware to use renewable sources of energy. Most of the students belonged to middle class families and staying in modest localities of Mumbai city. The survey data reflected that majority of the students' families are paying electricity bill of around 1500 to 2000 and many find that economically difficult.

Phase 1: Orientation for the topic energy conservation.

Talk by resource person

Experts from Tata Powers – India's leading Integrated power company were invited as resource persons to inform students about the significance of Energy conservation, energy generation process, world energy use and India's position in carbon footprint.

Phase 2: Workshop on making solar energy lamps.

1. Workshop on making solar lamps

Solar lamp project was initiated in collaboration with Indian institute of technology (IIT) Mumbai to provide training to make solar lamps to trap recycled solar energy. The solar lamp kit was given by IIT Mumbai at nominal rates to students. The engineers had trained students to assemble the whole kit. The expert explained students how to recharge lamp everyday with solar energy. The lamp is a renewable energy product used to study at night time which may help families to save electricity and control energy bills.

2. Visits to factories and outlets for solar energy products

Includes visit to CLF factory near Mumbai to provide direct experience for the available products on energy conservation. The students visited few units to get orientation about how CLF works and how that helps in saving electricity.

3. Booklets and informative material distribution on energy conservation ideas

To disseminate information reading resources are provided in English and Hindi language where the tips were given to save energy and why is it important to conserve energy. Indian people are not much pro energy efficient and it is important to make them understand that conservation is something you can put into practice immediately, either at very little or no cost to you. Simple daily changes in life can make a huge difference.

4. LIGHTING SYSTEM:

- One of the best energy-saving practice is the light switch. Turn off lights when not required.
- Dirty tube lights and bulbs reflect less light and can absorb 50 percent of the light; dust your tube lights and lamps regularly.
- Fluorescent tube lights and CFLs convert electricity to visible light up to 5 times more efficiently than ordinary bulbs and thus save about 70% of electricity for the same lighting levels.
- Ninety percent of the energy consumed by an ordinary bulb (incandescent lamp) is given off as heat rather than visible light.
- Replace your electricity-guzzling ordinary bulbs (incandescent lamps) with more efficient types. Compact fluorescent lamps (CFLs) use up to 75 percent less electricity than incandescent lamps.
- Paint and decorate your house in light colours instead of dark colours, they reflect light and hence need less artificial lighting.
- Many dark lamp shades absorb light or reflect in the wrong direction; get advice from a good light store to avoid these.

5. ROOM AIR CONDITIONERS:

- Use ceiling or table fan as first line of defence against summer heat. Ceiling fans, for instance, cost about 30 paise an hour to operate - much less than air conditioners (Rs.10.00 per hour).
- You can reduce air-conditioning energy use by as much as 40 percent by shading your home's windows and walls. Plant trees and shrubs to keep the day's hottest sun off your house.
- One will use 3 to 5 percent less energy for each degree air conditioner is set above 22°C (71.5°F), so set the thermostat of room air conditioner at 25°C (77°F) to provide the most comfort at the least cost.
- A good air conditioner will cool and dehumidify a room in about 30 minutes, so use a timer and leave the unit off for some time.
- Keep doors to air-conditioned rooms closed as often as possible.
- Clean the Air conditioner filter every month. A dirty air filter reduces airflow and may damage the unit. Clean filters enable the unit to cool down quickly and use less energy.

6. REFRIGERATORS

- Make sure that refrigerator is kept away from all sources of heat, including direct sunlight, radiators and appliances such as the oven, and cooking range.
- Refrigerator motors and compressors generate heat, so allow enough space for continuous airflow around refrigerator. If the heat can't escape, the refrigerator's cooling system will work harder and use more energy.
- Don't overfill the refrigerator and be sure to allow adequate air circulation inside.
- Think about what you need before opening refrigerator door. You'll reduce the amount of time the door remains open.
- Allow hot and warm foods to cool and cover them well before putting them in refrigerator. Refrigerator will use less energy and condensation will be reduced.

7. WATER HEATER:

- To help reduce heat loss, always insulate hot water pipes, especially where they run through unheated areas. Never insulate plastic pipes.
- By reducing the temperature setting of water heater from 60 degrees to 50 degrees C, one could save over 18 percent of the energy used at the higher setting.

8. MICROWAVE OVENS & ELECTRIC KETTLES:

- Microwaves save energy by reducing cooking times. In fact, one can save up to 50 percent on cooking energy costs by using a microwave oven instead of a regular oven, especially for small quantities of food.
- Remember, microwaves cook food from the outside edge toward the centre of the dish, so if you're cooking more than one item, place larger and thicker items on the outside.
- Use an electric kettle to heat water. It's more energy efficient than using an electric cook top element.
- It takes more energy to heat a dirty kettle. Regularly clean your electric kettle by combining boiling water and vinegar to remove mineral deposits.
- Don't overfill the kettle for just one drink. Heat only the amount of water you need.

9. COMPUTERS:

- Turn off your home office equipment when not in use. A computer that runs 24 hours a day, for instance, uses - more power than an energy-efficient refrigerator.
- If your computer must be left on, turn off the monitor; this device alone uses more than half the system's energy.
- Setting computers, monitors, and copiers to use sleep-mode when not in use helps cut energy costs by approximately 40%.
- Battery chargers, such as those for laptops, cell phones and digital cameras, draw power whenever they are plugged in and are very inefficient. Pull the plug and save.
- Buy energy efficient appliances with energy star rating consume less energy and save money.

10. CONCLUSION:

Sustainable development goals 2030 -SDG 7 proclaims three targets; access to modern energy; increase global percentage of renewable energy and to; double the improvement in energy efficiency. Most of the countries all over

the world are looking into other alternatives for energy production renewable energy sources like solar energy which is a clean form of energy and can be used extensively due to its abundance.

Keeping this in view an action project was taken to bring awareness in young students belonging to middle class homes regarding energy conservation & energy consumption behaviors. Along with awareness lectures one significant activity conducted was making of solar lamps. Solar lamp project was initiated in collaboration with Indian institute of technology (IIT) Mumbai to train students to make lamps to trap recycled solar energy. The lamp is charged with solar energy and can be used to study at night time. The response received from students is quite encouraging. Majority of students reported using the solar lamps during night time. The project was conducted in the year 2019 and due to current pandemic, we were forced to cease the efforts in this direction, at least practical work could not be continued. Nevertheless, we continued awareness sessions through online mode but still lot can be done and as soon as covid pandemic weakens we may begin the project again.

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