

# An Analysis on Energy and Its Minimization of Consumption by Different Processes

*Sumeet Suman<sup>\*</sup>, Anand Mohan Singh<sup>\*</sup>, Kinsu Kumar<sup>\*</sup>, Meenakshi Sharma<sup>\*\*</sup>*

## Abstract

Energy prices are expected to rise dramatically over the next decade. By 2020, retail gas prices are forecast to be 31% higher in the domestic sector and 35% higher in the non-domestic sector. Domestic electricity prices are forecast to increase by 34% and non-domestic prices by 30%. Energy efficiency activity by individuals and businesses is vital to ensure that the total increase in average energy bills is significantly lower than the expected increase in the unit price of electricity and gas. By working to keep bills down, energy efficiency can help to protect those already in fuel poverty and prevent their numbers from swelling, protecting low-income families who are particularly vulnerable to rising costs.

This article includes discussion on what really energy is and how energy efficient technologies will overcome the entire future energy crisis.

**Keywords:** Scientific Idea, Energy Consumption, Nonconventional Energy Sources, Housing, Schools.

## Introduction

There is a fact, or if you wish a law, governing all natural phenomena that are known to date. There is no exception to this law-it is exact so far as is known. The law is called the conservation of energy. It says that there is a certain quantity, that we call energy, which

does not change in the manifold changes which nature undergoes. That is a most abstract idea, because it is a mathematical principle; it says that there is a numerical quantity, which does not change when something happens.

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<sup>\*</sup>B. Tech. 1<sup>st</sup> Year, Laxmi Devi Institute of Engineering and Technology (L.I.E.T.), Alwar (Raj.).

<sup>\*\*</sup>H.O.D., Applied Sciences, Laxmi Devi Institute of Engineering and Technology (L.I.E.T.), Alwar (Raj.).

**Correspondence to:** Mr. Sumeet Suman, Laxmi Devi Institute of Engineering and Technology (L.I.E.T.), Alwar (Raj.).

**E-mail Id:** [sumeetsuman656@gmail.com](mailto:sumeetsuman656@gmail.com)

### Energy Scenario and Energy Sources

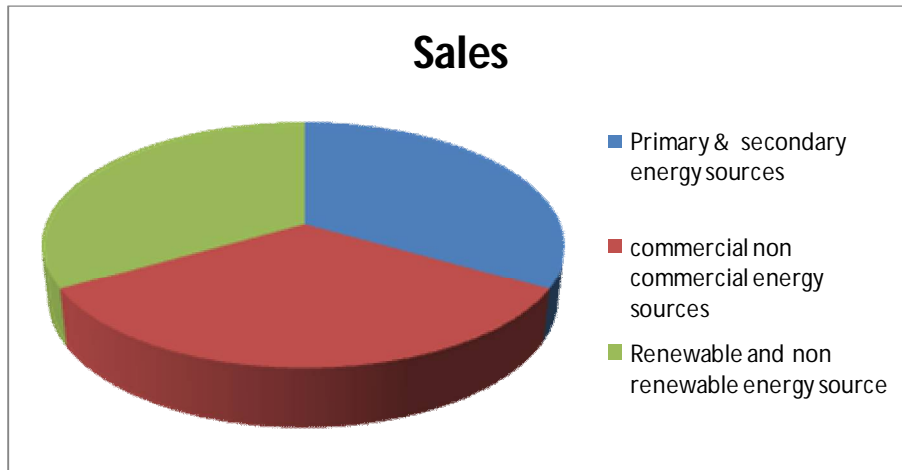


Figure 1. Different Energy Sources

### The Scientific Idea of Energy

There are several important points to note here. First, the most important idea about energy is that it is conserved-in every event and process; there is the same total amount at the end as there was at the beginning. It is this that makes energy a useful quantity. It is not

too strong to say that if energy was not conserved, it would not exist as a scientific concept.

### Energy Consumption

Energy consumption in different parts of the world is shown in the figure given below:

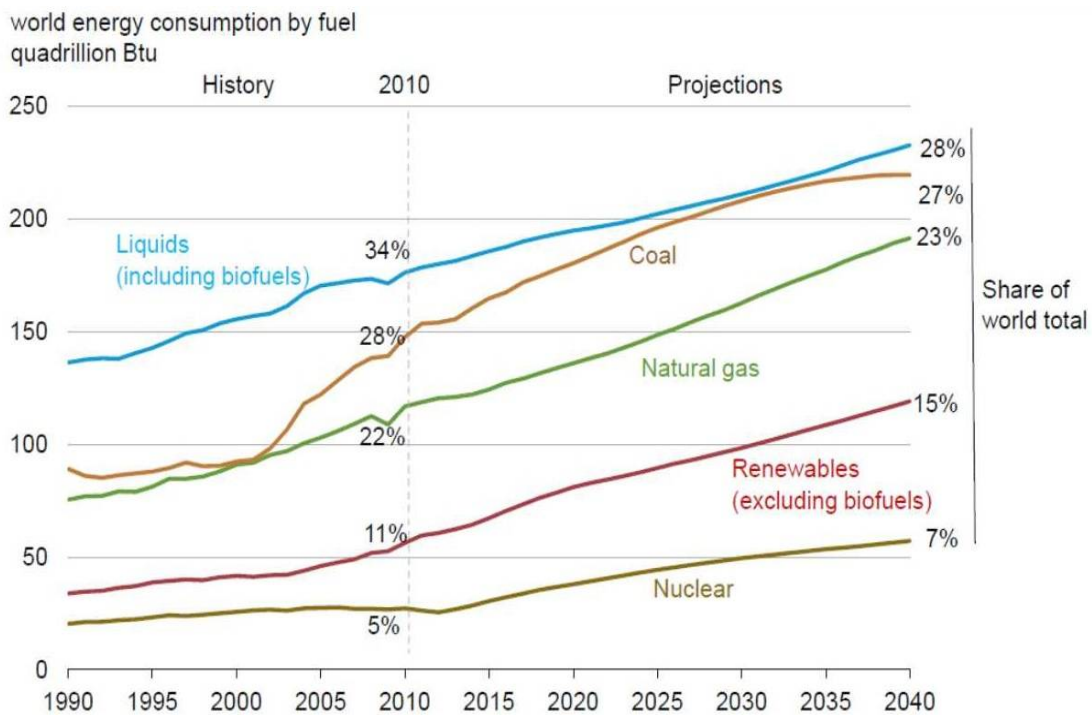


Figure 2. Energy consumption in different parts of the world

Impact of energy efficiency on energy consumption in 11 countries, 1974-2010

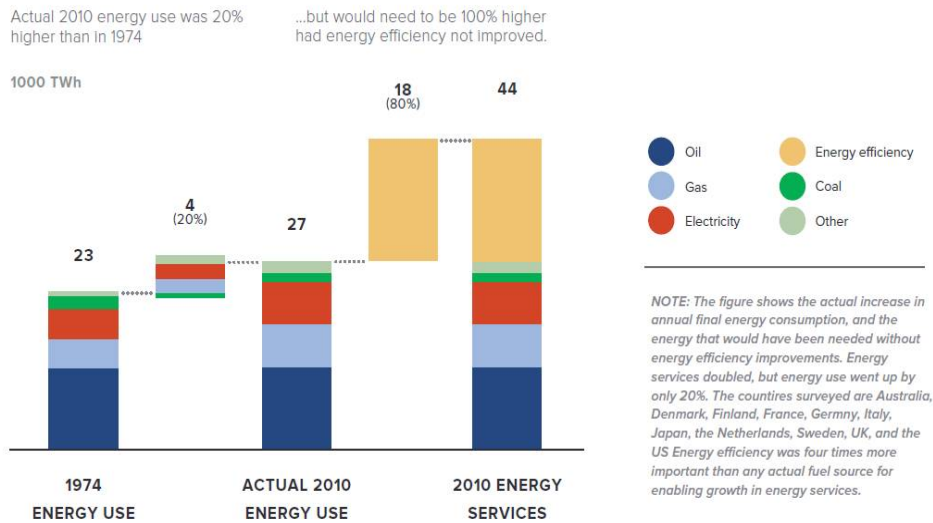


Figure 3. Impact of Energy Efficiency on Energy Consumption in 11 countries (1974-2010)

**Non-Conventional Energy Sources can be used to Minimize the Consumption of Non Renewable Energy Sources**

The nonconventional energy sources can be used instead of the conventional sources to reduce the power consumption from the non renewable energy sources such as:

**Wind Energy**

Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth surface and rotation of the earth. The wind flow, or motion energy, when “harvested” by modern wind turbines, can be used to generate electricity. The terms “Wind energy” or “Wind power” describes the process by which the wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy of the wind into mechanical power. Wind turbines are available in a variety of sizes and power ratings. The largest machines have blades that span more than the length of a football field, stand twenty building stories high, and produce enough electricity to power 1400 homes. A small home

sized wind machine has rotors between 8 and 25 feet in diameter and stands upward of 30 feet and can supply the power needs of an-all electric home or small businesses. Utility scale turbines range in size from 50 to 750 kW. Single small turbines, below 50kW, are used for homes, telecommunications dishes, or water pumping.

**Solar Energy**

Solar energy is a clean and renewable energy source. Once a solar panel is installed solar energy can be produced free of charge. Very little maintenance is needed to keep solar cells running. In the long term, there can be a high return or investment due to the amount of free energy a solar panel can produce, it is estimated that the average household will see 50% of their energy coming in from solar panels.

**Housing**

Entertainment systems, with common controls and output devices, and convergence between audio, video and computer communications in laser disc systems. Security systems, with fire

and smoke alarms, emergency callers and intruder detectors linked to central alarm facilities, Energy management systems, based

on remote metering by the public utilities. All things being equal, they will reduce CO<sub>2</sub> emissions from new buildings by around 70%.



Figure 4.Housing

For example:

- An average office building constructed to 1990 standards would emit 105 tonnes of carbon dioxide per year. Constructed to 2010 standards it would emit 31 tonnes per year, a reduction of 70%.

Carbon dioxide emitted from a building can be used as a direct measure of the power consumed by the building. The carbon emission can be reduced by applying the following methods.

- Carbon dioxide emissions;
- Building insulation envelope;
- Heating system;
- Insulation of pipes, ducts and vessels;
- Artificial and display lighting;
- Mechanical ventilation and air conditioning;
- Commissioning building services;
- Written Information;
- Energy performance certificates; and
- Metering.

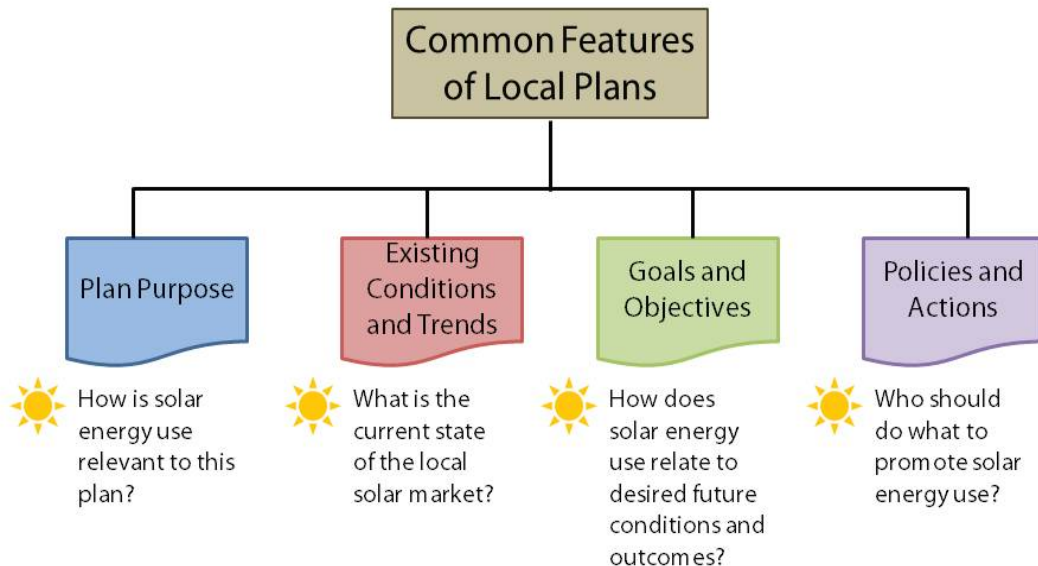


Figure 5.Common Features of Local Plans

### Schools

The walls of the schools can be constructed using pre-engineered timber frame panels which contain insulation produced from recycled newspaper. These panels offer insulation levels in excess of the building regulations in force at the time and they fit neatly together which reduces cold air infiltration. The windows can be made double glazed that have low emissivity glazing which allows sunlight to enter the room whilst

inhibiting heat loss. Through a careful design process and tightly monitored construction phase, Angus Council has been able to develop a low carbon school which provides a modern learning environment for its primary school and infant pupils. The school uses energy efficiently and generates its heat from renewable resources. Lights, heating and ventilation are automatically controlled to ensure that the internal environment is always comfortable without wasting energy.

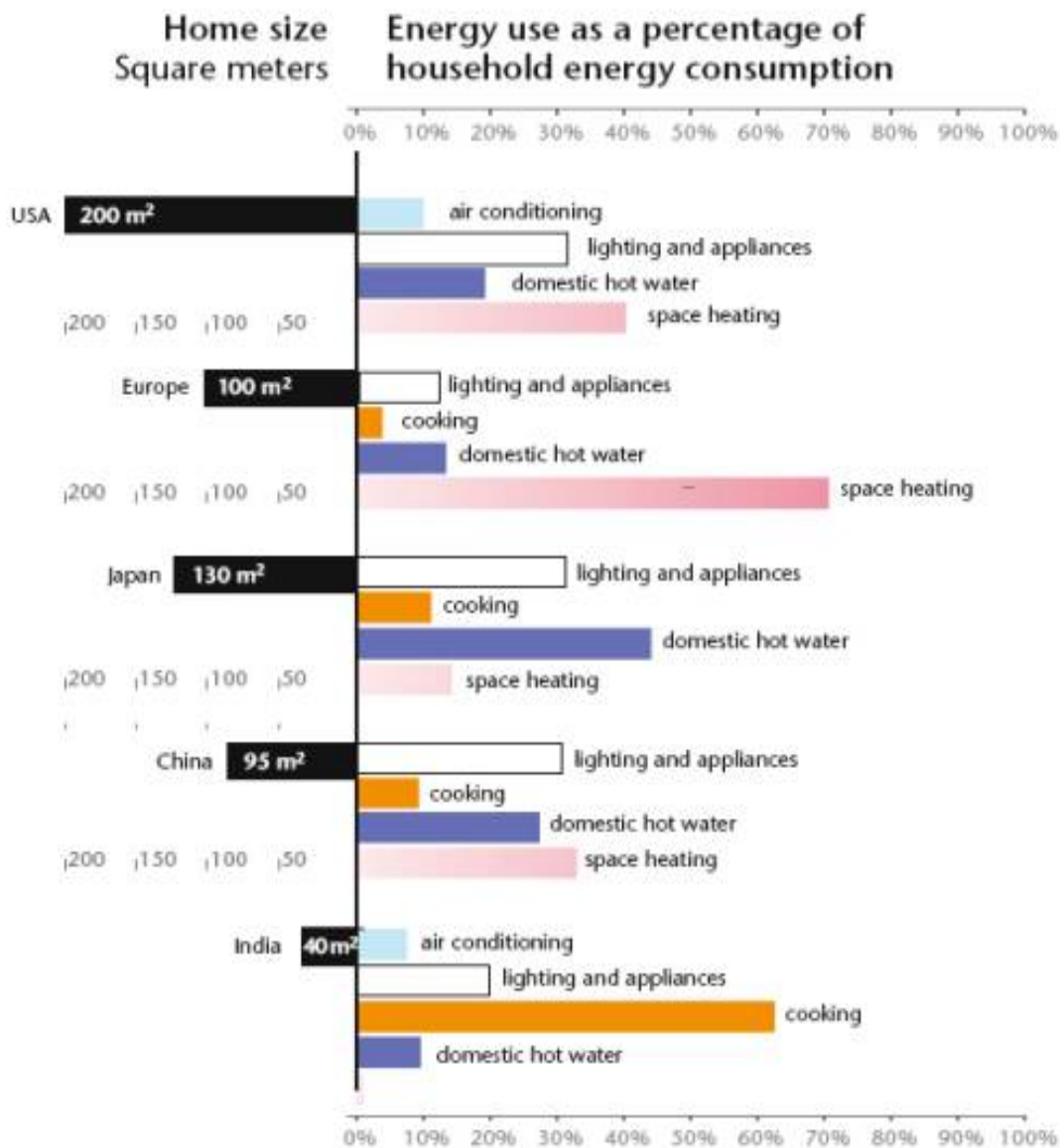


Figure 6. Energy Use as a Percentage of Household Energy Consumption

Water is too an energy source and its consumption needs to be reduced like heat and electricity Recommended Practices for Reducing Water Consumption indoors include:

1. Install flow restrictors between the supply line and the kitchen and bathroom faucets to limit water waste.
2. Install shower heads and faucets that use less water than current federal standards.
3. Install high-efficiency toilet (HET) or dual-flush toilets that use less than 1.3 gallons on average per flush, as compared to 1.6 gallons per flush for current models [1].
4. Use locally provided reclaimed water for landscaping. Consider providing separate supply lines to toilets for reclaimed water use in toilet flushing.

## **Discussion**

As the results of a recent survey show, industry stakeholders want to ensure that government is a partner in realizing those advantages through the power of the consumer. The future is pointing toward an energy system where renewable energy will reinvent the way the world meets its energy needs. The International Energy Agency predicts that \$5.7 trillion will be invested in renewable energy by 2030 and while energy efficiency may come from either a decrease in demand or an increase in productivity, spurring the renewable energy market definitely hinges on creating market incentives that drive the adoption of renewable energy technologies. Energy industry experts overwhelmingly view public policy as the way to effect this change.

Additionally, energy industry stakeholders eagerly anticipate the oncoming smart grid transformation. Smart grid technology is one of the most favored energy initiatives among those surveyed. The grid of the tomorrow will most likely include the application of intelligent metering, automated and intelligent network control devices or strategies, and ways to manage interconnection with variable output generation. The development of home automation, predominantly in the US and Japan and India is traced and this reveals the lack of integrated energy management systems that are available abroad on the current domestic market. Research in current home automation and energy management systems in the UK shows that such 'smart' devices are being developed, but on a very ad hoc approach. This has resulted in there being little or no interaction or cooperation between the different energy suppliers and appliance makers.

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