

SAVING ENERGY RESOURCES BY IMPROVING THE ENERGY SUPPLY SYSTEM**M.B. Xolmurodov**

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Abstract. Energy conservation can be as simple as turning off lights or appliances when you do not need them. You can also use energy-intensive appliances less by performing household tasks manually, such as hang-drying your clothes instead of putting them in the dryer or washing dishes by hand. Energy efficiency is good for the air you breathe, the water you drink, and the community in which you live. Saving energy reduces air and water pollution and conserves natural resources, which in turn creates a healthier living environment for people everywhere. There are many advances in solar photovoltaic technology and tax incentives to attract more homeowners. Using wind turbines to generate electricity will greatly depend on where you live.

Key words: renewable energy sources, electricity consumption, energy efficiency, electricity consumption.

Introduction. Installing small wind turbines in your home is a great eco-friendly option for those living in places with good wind speeds. Living in energy-efficient houses puts individuals into a more favorable position by having lower heating and electricity bills, staying more comfortable and safer during unexpected blackouts, increasing house's resale value and ultimately bringing benefits to one's health. Not only are these types of homes beneficial for their owners but also for the environment. From the viewpoint of the energy system, energy-efficient houses can actively help the power system by demanding less electricity from the grid in times of its shortage as well as supplying this valuable commodity into the system and thus helping it once it is needed. Every modern home buyer these days is looking for smart homes which ease their lives and reduce their carbon footprint [2]. Smart devices detect the usage of power and turn them when not in use. Extension of grid, commonly known as rural electrification was the earliest solution proposed to electrify rural areas.

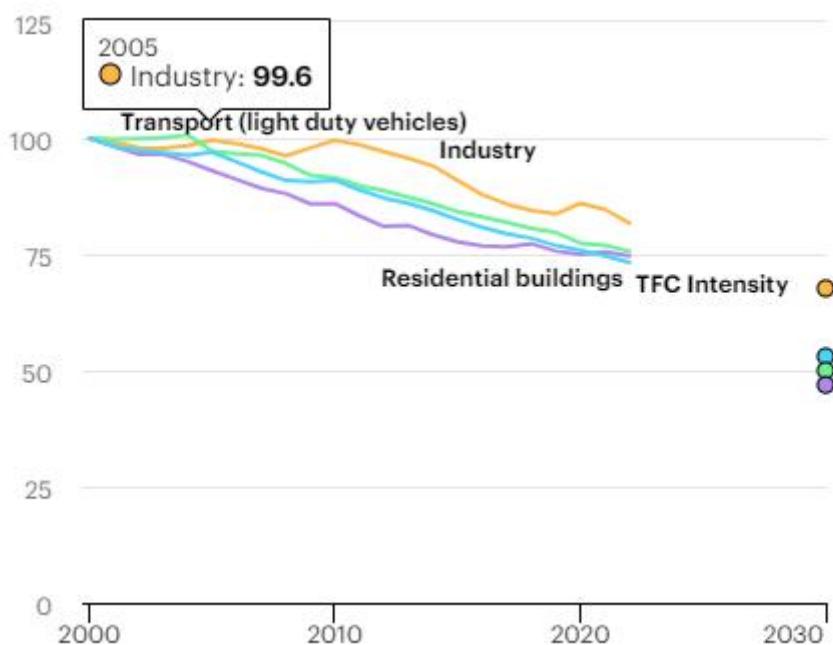


Figure 1. Global energy intensity improvement by sector

Energy efficiency is called the “first fuel” in clean energy transitions, as it provides some of the quickest and most cost-effective CO₂ mitigation options while lowering energy bills and strengthening energy security. Energy efficiency is the single largest measure to avoid energy demand in the Net Zero Emissions by 2050 Scenario, along with the closely related measures of electrification, behavioral change, digitalization and material efficiency [1]. All together these measures shape global energy intensity – the amount of energy required to produce a unit of GDP. For an energy system to be sustainable: the resources applied to producing the energy must be capable of lasting indefinitely; energy conversion should produce no harmful by-products, including net emissions, nor wastes which cannot be fully recycled; and it must be capable of meeting reasonable energy demands.

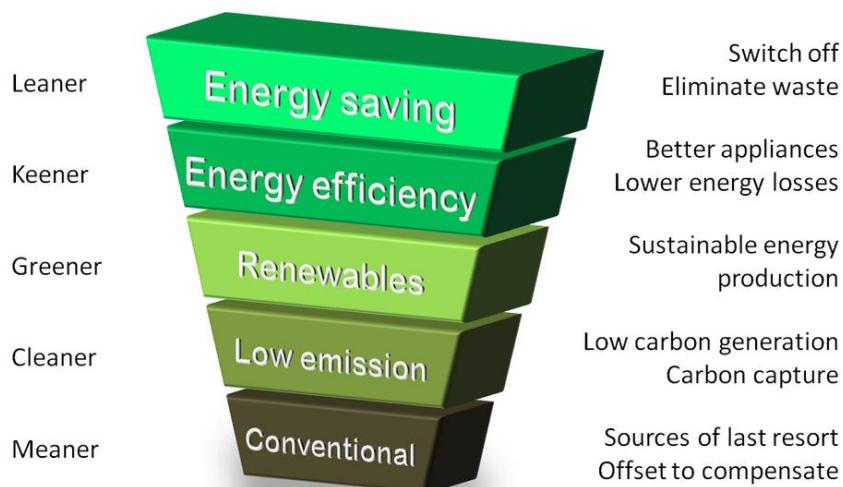


Figure 2. The Energy Hierarchy with the most favored options

Solar panels top the list of the most popular alternative sources of energy that can be used in a home. Considering that you can power your house with a few panels if you're looking for a small jump in energy efficiency, solar is a good way to start moving off the grid and consuming a better source of electricity. Extending national grids is an infeasible and ineffective option in many countries because of the high cost of grid extension and low load factors. A study of the World Bank on rural electrification programs estimated the average cost of grid extension per km between \$8000 and \$10,000 rising to around \$22,000 in difficult terrains [4]. Electricity Home Systems (EHS) are small power systems that are designed to power individual homes or small buildings and provide an easily accessible, relatively inexpensive, and simple to maintain solution. Since houses in rural area are dispersed, it is an ideal setting for this approach. Pico Photovoltaic Systems (PPS), Solar Home Systems (SHS), or Wind Home Systems (WHS) offer solutions for providing electricity in isolated places. Recently, significant research effort has been devoted to microgrids for the development of rural areas. Several microgrids have been installed with ratings ranging from as little as 1 kW to as large as a few hundred kilowatts. Microgrids can either be AC or DC. These microgrids fulfill a range of needs from lighting, communication to commercial purposes. Seven such cases installed in India, Malaysia and Haiti have been studied in depth [5].

In the past decades, several approaches were discussed to exploit locally available renewable energy resources. One of the methods was a step-by-step approach for adoption of renewable technologies at rural level [3]. This approach consists of an electric system and water supply system constituting an energy center. The energy center was further revised and enhanced into a system called Integrated Renewable Energy System (IRES) for the development of rural areas. A smart home will only increase in demand and a good way to increase your home value. In world practice, more attention is now being paid to the use of renewable, alternative energy sources such as sunlight, wind, biomass, geothermal, sea and ocean water waves, along with traditional energy sources. Among them, the sun

occupies an important place. As a result of the use of various technologies, solar energy can cover a large part of the current demand for energy.

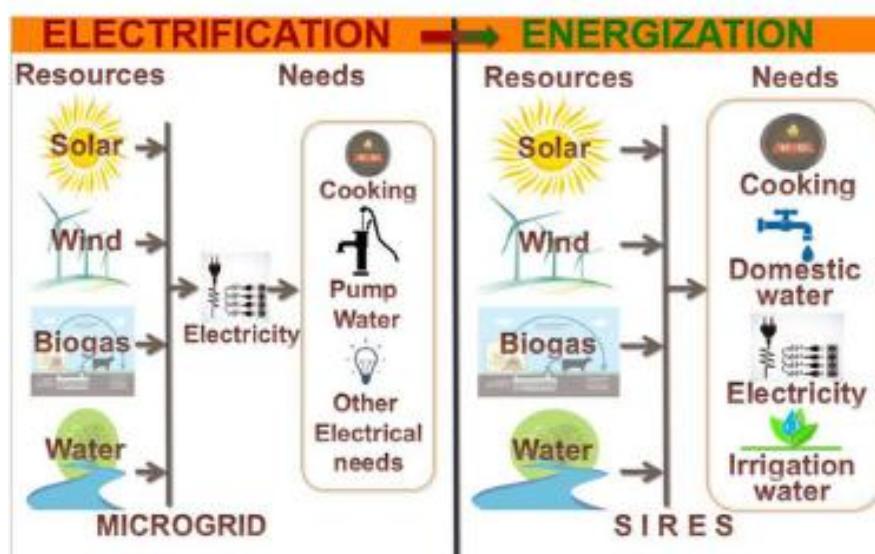


Figure 3. the vital differences between electrification and energization.

The concept of energization refers to the best use of energy in available resources to satisfy various needs. In energization, any one resource can be used to satisfy more than one need. The goal is to use all the resources to meet all the needs in the most efficient manner by matching the resources with the needs as appropriate in an integrated manner. Electrification converts all forms of energy resources to electrical form which is then used to satisfy various needs with no consideration to the overall efficiency of utilization. These terms are often mistaken to be analogous to each other, but in reality, Electrification can be considered as a subset of Energization. Electricity consumption in the region is higher in summer, the main reason for which is the widespread use of pumping equipment for irrigation of agricultural land. Electricity consumption of existing water pumps in the region is more than 50% of the total electricity consumption. With the development of small business and entrepreneurship in our country, the demand for electricity is also increasing.

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