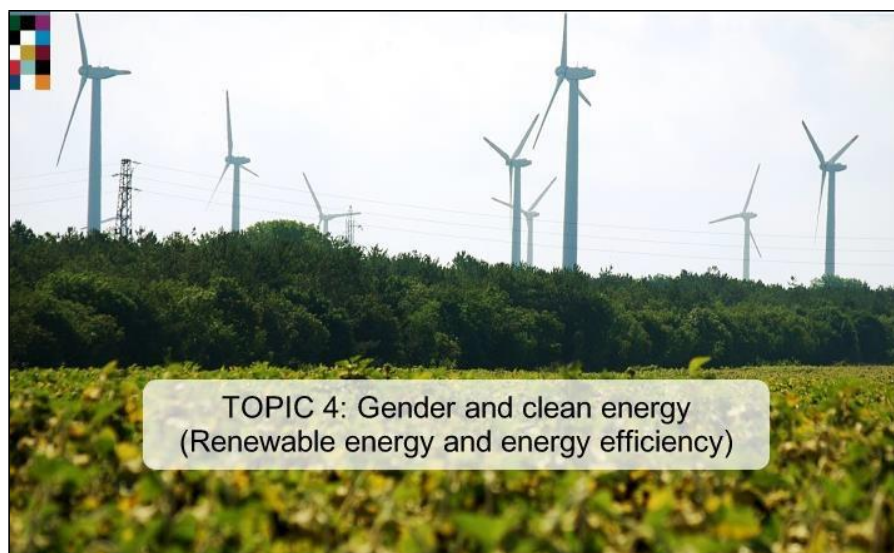


## Overview

Welcome to Topic 4 of the e-module on Gender and Energy, which will cover key issues related to gender and clean energy.



### Clean energy: two pillars

Clean energy has two pillars: renewable energy and energy efficiency.

The first pillar is renewable energy:

Renewable energy includes all forms of energy produced by renewable sources in a sustainable manner, including bioenergy, hydropower, geothermal, marine, solar and wind energy. The development of renewable energy has multiple drivers, including energy security, depletion of natural resources, local pollution and climate change.

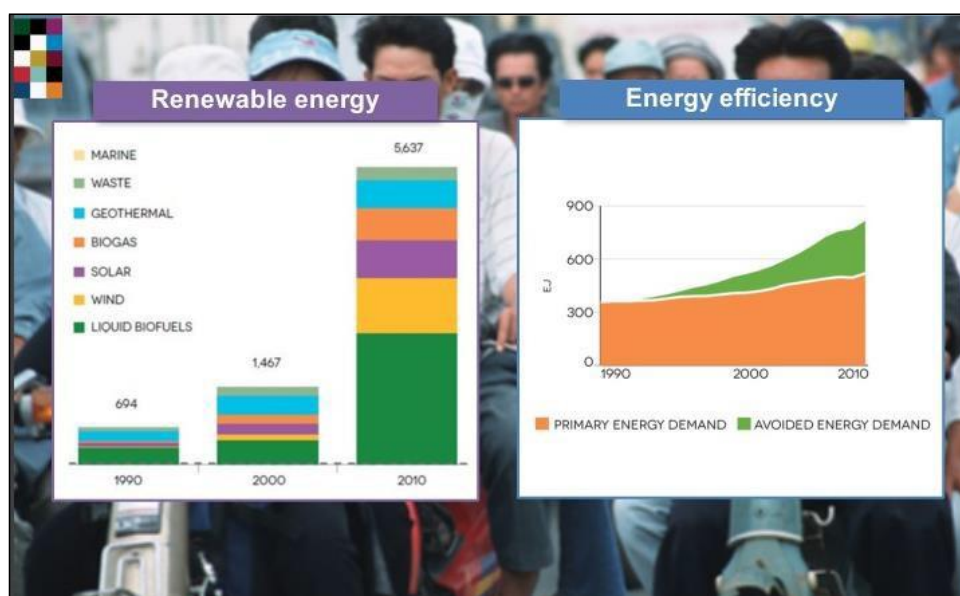
Although 82% of the world's energy supply comes from non-renewable sources, such as fossil fuels and nuclear energy, the use of renewable energy has grown exponentially since 1990, as shown in the left-side graph. Wind, biogas and solar energy exhibited the most dramatic increases. The impressive scale-up in the use of these sources is largely attributed to the provision of sustained policy incentives and dramatic reductions in technology costs.

The second pillar is energy efficiency:

Energy efficiency is defined as the relationship between how much energy is needed to power equipment such as a light bulb, a boiler or a motor, and the end-use service that such equipment produces, such as lighting, heating and motor power. Energy efficiency contributes in relaxing cost and availability constraints, and in reducing environmental impacts of energy use and production. For countries that are struggling to meet the energy needs of consumers, improvement in energy efficiency are critical to providing more reliable

service, and may also improve affordability. As we can see in the right-side graph, improvements in energy efficiency have led to increasing gains due to the avoided energy demand.

Global energy intensity – a proxy indicator for energy efficiency - decreased by 1.0% per year (in purchasing power parity terms) since 2000. The energy intensity improvement that took place over the last 20 years allowed savings equivalent to almost 25% of the cumulative global primary energy demand.



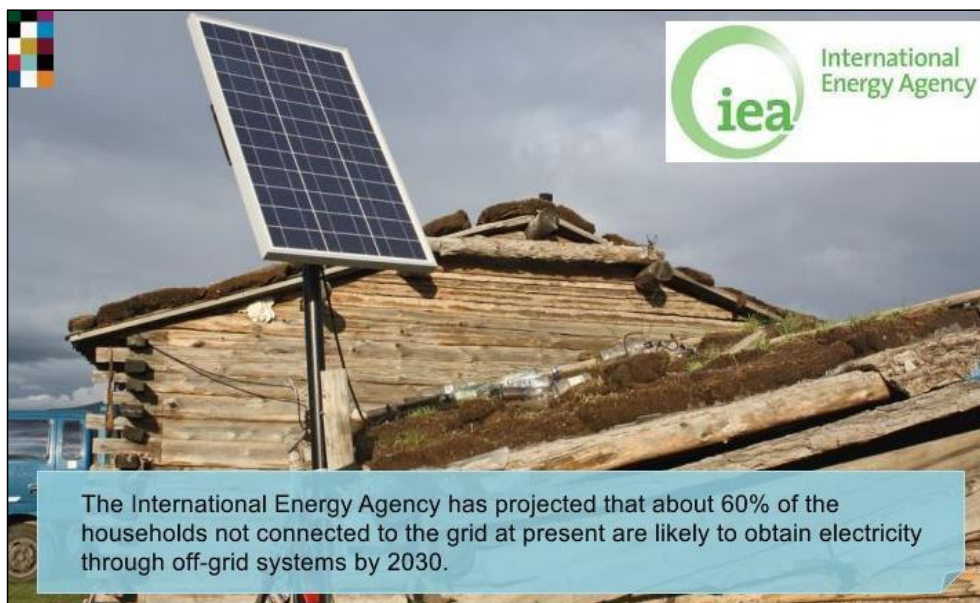
### Renewable energy: grid and off-grid electricity

With global investment in clean energy experiencing rapid growth over the last 10 years, developing countries are also promoting renewable energy sources to support growth and poverty reduction. Renewable energy systems include both grid-connected large-scale applications and small-scale off-grid solutions.

The cost of many renewable energy technologies has been a major barrier to faster expansion and adoption. However, strong growth in renewable deployment has led to significant reductions in the costs of some technologies, such as solar photovoltaic and wind energy, which have now become cost-competitive in some countries.

Where grid extension is not feasible, off-grid systems may be a reliable and affordable solution, particularly in rural areas. At the lower end, solar lanterns provide electric lighting for a few hours per day and often allow phone charging. Solar home systems are able to power lights, phone charging and a television or a fan, and larger systems may also power electric food processors or washers. Finally, renewable energy mini-grids serve village or district level communities using locally available renewable energy sources such as solar and wind power.

The International Energy Agency has projected that about 60% of the households not connected to the grid at present are likely to obtain electricity through off-grid systems by 2030, as a cost-effective option to bridge the energy gap until widespread grid electrification catches up.



## Energy efficiency

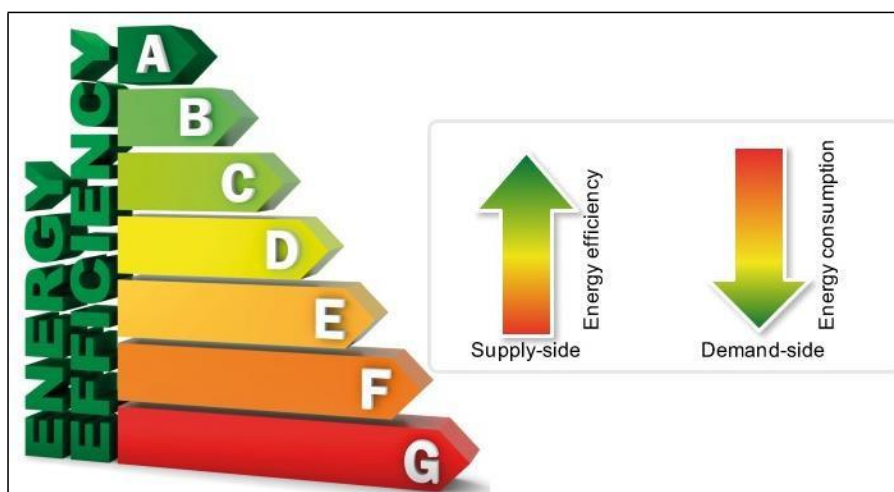
Energy efficiency can allow the provision of a given level of energy service with a reduced amount of energy. Or it can deliver more services (for instance to more people) for the same energy input. Energy efficiency offers multiple benefits, including increased energy availability and affordability, improved competitiveness, and reduction of greenhouse gas emissions.

There is considerable scope for increasing energy efficiency on the energy supply-side and reducing energy consumption through efficiency on the demand-side without decreasing economic output, lowering living standards or diminishing the quantity and quality of services provided.

Demand-side efficiency gains can be attained in three ways:

- By using efficient lighting, such as compact fluorescent lamps or LED bulbs.
- By using efficient appliances for refrigeration, air conditioning, space and water heating, as well as cooking. The graph above shows the energy efficiency rating system label that applies to all new appliances, with A showing the most efficient rating and G the lowest efficiency level. Many countries have adopted this system, and are encouraging users to acquire appliances rated A or B, the higher efficiency ratings.

- By building thermal insulation, which is one of the most cost-effective options for reducing energy consumption for space heating and cooling, while often improving comfort levels.



### Gender and renewable energy

Women are the primary energy users in the household, as they perform most household chores that require energy, like cooking, washing, and cleaning, and are therefore in a good position to monitor and manage energy use. Women also tend to be more receptive to energy efficiency measures. For example, in Europe, recent studies have shown that single men use up to 25 percent more energy than single women, and women have been found to be more receptive than men to energy efficiency efforts and more likely to change their behavior to save energy.

However, women are not always involved in making decisions about use of energy sources or appliances, particularly in traditional contexts, and they often lack access to finance for investing in energy efficient appliances, either in their homes or in their businesses.

In addition, women often lack access to information on energy efficient technologies. A recent study in the Europe and Central Asia region showed that men are better informed and proactive about applying energy efficiency measures because insulation repairs are commonly perceived as a ‘man’s job’, while women are mostly interested in the costs and potential savings from energy efficiency.

Energy efficiency information campaigns and financing need to be targeted distinctly to men and women, and subsidies or microfinance may also be targeted to female heads of households.

For example, in Mexico, an energy efficiency campaign for refrigerator replacement was specifically targeted to women because women tend to be the decision-makers in the purchase of household appliances.



### Gender and renewable energy

Over 3 million solar home systems have been installed in Bangladesh under the rural electrification and renewable energy program, reaching about 50,000 households per month. This is an excellent example of a renewable energy program that has had considerable gender impacts.

The program targets remote rural areas not serviced by the grid where the poverty rates tend to be high. Local NGOs and microfinance organizations provide loans to households and businesses to purchase solar home systems. The program also makes electricity affordable for the poorest households by providing a subsidy for smaller solar home systems.

An independent impact evaluation confirmed a variety of benefits from solar home systems, including increased food and non-food expenditures of the households, longer evening study hours, and positive health impacts, especially for women. It has also been found that owning a solar home system increased mobility (by providing street lighting) and entrepreneurial ambitions among women, positively impacting their decision-making ability.

The program has also resulted in job creation for men and women, as local companies started to manufacture components and appliances to serve the dynamic solar home systems market. As a result, Bangladesh has the seventh largest renewable energy workforce in the world.

In general, as with energy efficiency, renewable energy information campaigns and financing need to be targeted distinctly to men and women, and subsidies or microfinance may also be targeted to female heads of households.

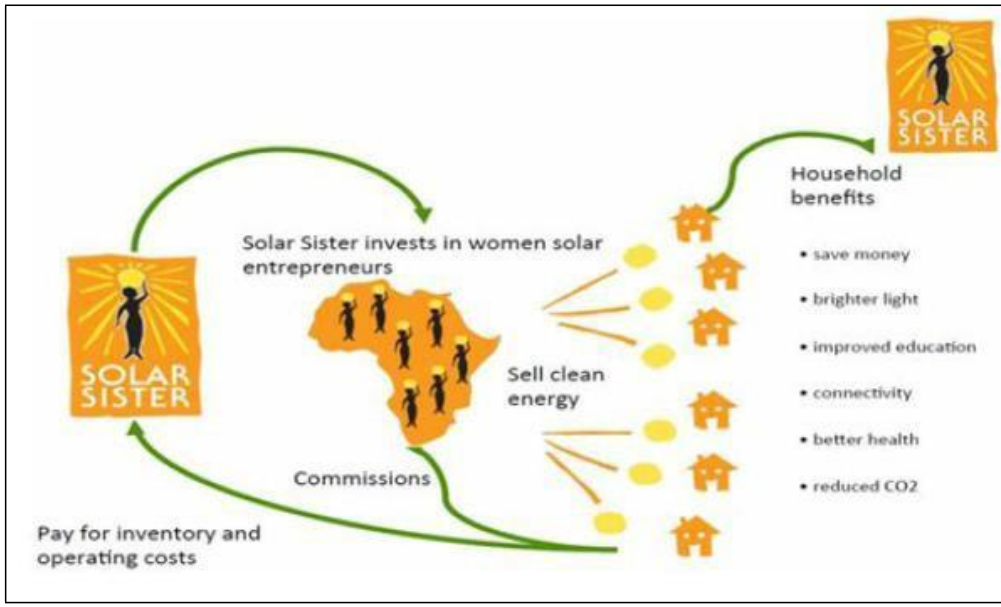


### **Female income-earning opportunities in off-grid renewable energy systems: Solar Sister**

Even though portable solar lanterns are an affordable solution for electricity provision that can cost as little as USD 10, the lack of distribution channels has prevented scale-up in rural areas.

Solar Sister is a social enterprise founded in 2010 that provides women with training and support to create solar micro-businesses. The objective is to build a direct-sales network to bring solar technology right to women's doorsteps, while providing income generation opportunities for women by earning of a commission on each sale. The women form a distribution network from their circles of family, friends and community.

Solar Sister operates in 3 African countries (Uganda, Nigeria and Tanzania) with 1,000 Solar Sister entrepreneurs that have reached 180,000 people so far. Solar Sister provides women a 'business in a bag', which includes a start-up inventory of portable solar lamps and mobile phone chargers, training and marketing support, and support for community launch events to showcase the products at high visibility locations.



**Check Your Understanding**

1. Advertisements for energy efficient appliances should be targeted to men, because they are usually the breadwinners in the family and are entitled to make decisions on how their money is used.
  - A. True
  - B. False