

Prof. Ibrahim Hassan

Former Vice President for Studies and Conferences Affairs at Saif Bin Helal Center for Studies and Research in Energy Sciences (SBHC)
Environmental Studies and Air Pollution Prof. at the Faculty of Science, Alexandria University
Chairman of the National Committee of Environmental Issues at the Academy of Scientific Research and Technology



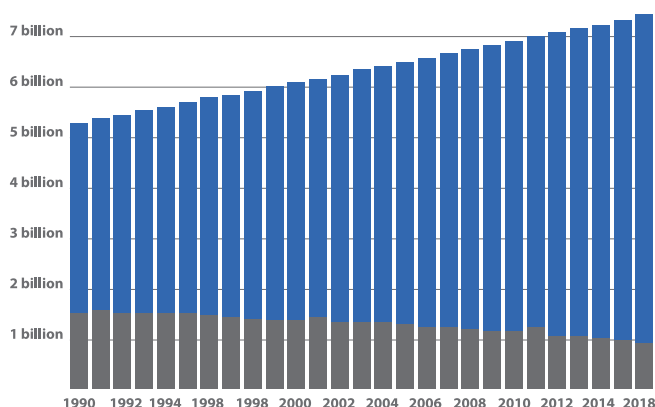
Energy Security and Development Challenges for Promoting Sustainable Energy in the Future

Energy and its uses represent one of the landmarks of the beginning of human civilization, which began with the discovery of fire and the burning of biomass to generate heat for the purpose of heating or cooking. After that, the industrial revolution at the end of the 18th century led to a shift in the pattern of energy use from burning biomass to using coal, oil, and natural gas as primary energy sources. With the increase in population over the years, the need for these non-renewable sources has doubled, pushing the environment to the brink of destruction and the climate changes that we all suffer from.



Seventh Sustainable development Goal

Number of people with and without electricity access



Number of people with and without electricity access

With the continuous increase in population, the gap between those who can afford energy expenses and those who cannot has widened. Despite the availability of electricity to more people globally, nearly one billion people still live without electricity, and three billion people lack access to clean cooking facilities and are exposed to dangerous levels of indoor air pollution. At the same time, the fossil fuel-dependent economy is causing climate change. Therefore, energy is essential in overcoming all the challenges that the world faces today, including adapting to climate change, food security, health, education, sustainable cities, job opportunities, and transportation. Therefore, we must resort to environmentally friendly energy sources that can be made available to any region of the world. The seventh Sustainable Development Goal is expected to stimulate efforts to meet the Paris Climate Agreement.

Sustainable Development Goal 7 (SDG7) is one of the seventeen Sustainable Development Goals adopted by the United Nations General Assembly in 2015 (Clean and Affordable Energy). It aims to provide modern and sustainable energy sources that can be relied upon at a reasonable cost for everyone. Energy availability is one of the most important pillars on which economic development, poverty reduction efforts, and people's well-being depend. In addition to its five goals, which are at the heart of the seventeen Sustainable Development Goals. If we do not achieve the energy goal, it will be extremely difficult to provide opportunities for good health care or education, achieve gender equality, create job opportunities, achieve growth, ensure sustainable consumption, or effectively resist climate change, which threatens to undermine the achievements of all goals. The aforementioned seventh goal is also a fundamental factor for almost every aspect of development. For this reason, success must be a primary goal, and we need to achieve its goals much earlier than 2030 to create conditions for progress towards all goals.

Goal 7 of the United Nations Sustainable Development Goals is closely linked to the rest of the 17 goals, especially Goals 2 (End hunger in all its forms), 3 (Ensure healthy lives and well-being for all), 6 (Clean water and sanitation), and 9 (Industry and innovation 13 (Climate Action), 14 (Life Below Water), 15 (Life on Land), and 17 (Partnerships to Achieve Goals).



A figure showing the overlap of the seventh goal with the rest of the sustainable development goals

People have been relying on coal and oil for energy and electricity production for a long time now, and due to the environmental damage caused by those sources, countries around the world are seeking other alternatives (renewable energy sources) for energy production such as solar, hydro, wind, green hydrogen, and others:

- Solar radiation provides the universe with solar energy. It is an extremely clean energy source that can be extensively used due to its abundance. Solar energy technologies such as photovoltaic panels, concentrated solar power, solar heating, and cooling are racing to produce and supply energy to all areas, including remote areas where there are no traditional fuel sources.
- Harnessing the kinetic energy in the wind can provide us with clean but intermittent energy. Wind energy can be exploited by establishing wind farms consisting of several wind turbines in areas characterized by strong and frequent winds.
- The heat emanating from the Earth's interior can be utilized to produce energy through geothermal power plants and heat pumps that capture the heat emitted from hot springs. This energy usually does not produce any harmful emissions and does not affect the ecological balance due to the enormous thermal capacity of the Earth.

Hydropower: It is the energy produced by converting the potential kinetic energy in flowing water into electrical energy, through the construction of dams in rivers to produce clean energy without emissions. Hydropower accounts for most of the annual energy production among renewable sources.

- Hydrogen contains nearly three times the energy of fossil fuels, making it more efficient. With some water and a little electricity, more electricity or heat can be generated. It is also widely available.

Despite the world has begun to shift to renewable energy sources, they still constitute only 18% of total global energy consumption, while modern renewable energy sources constitute only 10% of the total.

Energy security is of critical importance to humanity and the planet. It is a balance between the three dimensions of sustainable development: economic, social, and environmental. The bottom line is that sustainable energy is a call to conserve and repair the environment, allowing each individual to have access to reliable energy while being able to afford it, in order to live a productive, healthy, and safe life while respecting the planetary constraints we all face as a result of climate change.

