

Renewable energy

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Introduction

Of the most important environmental impacts associated with energy uses what is known as global warming. Associated with "global warming due to increased concentration of certain gases in the atmosphere, mainly carbon dioxide. Recent studies have contributed to increasing awareness and knowledge of the problem and stressed the need to take decisive and immediate action. So the Kyoto Protocol to the United Nations Convention on Climate Change, and the whole world to reduce greenhouse gas emissions. And the use of renewable energy effect is known in the preservation of the environment and on Traditional sources as a result achieved by reducing the emission of these gases is expected to report emissions from Expected to reach emissions from conventional fuel about 190 million Tons of carbon dioxide in 2017 in addition to other gases. , The energy sources in World are many and varied, including non-renewable sources and other renewable or permanent Thus, sources of energy can be divided into two types of sources : Depletable sources of energy and sustainable energy sources or renewable They also have an important role in enhancing security of energy supply, And encourage technological development and providing employment opportunities And regional development, especially in rural areas. Will talk about new and renewable energy.

Renewable energy:

the energy derived from natural resources, which is renewed or can not be implemented (sustainable energy). And renewable sources of energy, are fundamentally different from fossil fuels of oil and coal and natural gas or unclear fuel which is used in nuclear reactors . Thus, sources of energy can be divided into two types of sources: depleted sources of energy and sources of permanent or renewable energy will be talking about new and renewable energy.

1- depleting or conventional energy:

They include coal, oil and minerals, natural gas and chemicals, which is depleted because it can not be made again or replaced again in a short time.

2- Renewable energy or clean or alternative:

The wind and air, solar, water, wave and geothermal power in the ground and biomass, which energies are depleted.

In the following few lines you will learn about the most important forms of renewable energy and how to use them:

A - Energy Water :

Comes from hydro power water flow or fall in the case of waterfalls (waterfalls), or the splash of the sea, where waves arise as a result of wind movement and do the seas and oceans and lakes, and the movement of these waves arise energy can be exploited and converted into electrical energy , producing Waves in the ordinary energy of between 10 to 100 kilowatts per meter of beach in the middle distance from the equator. Can also benefit from the energy generated by tidal movements in the water and, finally, can also take advantage of the difference in temperature between the upper and lower layers of water that can be up to a difference of 10 degrees Celsius.

B - biomass (Biomass fuels) :

Is the energy derived from organic materials such as burning plants, bones and animal waste, waste and agricultural residues. And plants used in the production of biomass energy can be a fast-growing trees, or grain, or vegetable oil, or agricultural residues, and there are different methods to address the types of biofuels, including:

- direct combustion: It is used for cooking, heating, steam production, however, this process yields a little heat.
- burning indirect: the production of coal (without oxygen).
- fermentation methods: the production of methane gas which is used in Kaldvip household chores, cooking and lighting.
- thermal solution.
- Meet

And gives all of the methods of the previous derivatives, such as methane and alcohol, steam and chemical fertilizers, ethanol is one of the best fuels derived from biomass is derived mainly from corn and sugar cane.

C - geothermal power :

A geothermal energy, which capitalize on the high temperature in the underground mining of this energy and converted into other forms, in some areas of ground cracks and fissures underground water seeping through the cracks and crevices to great depths to touch the areas of extreme heat Vtschen and ascend to the top sparkling heated, and some These

springs arises and deactivated several times in the Time and some flowing constantly and streamlined, carrying dissolved minerals from the rock layers deep, and it appears that the so-called hot springs, and the people meant this kind of springs to the hospital, in addition to the projects are based on the exploitation of water heat emanating from the earth to generate electricity.

D - wind energy :

The energy generated to move the large panels installed high places by air, and is producing electricity from wind by the engine (or turbine) with three arms of the rotary bearing column is transforming the kinetic energy of wind into energy Alternator, when with the wind on the wings push air to create a dynamic cause spin, and this rotation is turbine produces electricity. The amount of energy produced from wind turbines on the speed Wind and Qatar arm; so put the turbines, which used to run factories or for lighting towers above; because the wind speed increases with height above the ground, and the turbines are placed in large numbers to large tracts of land to produce the largest amount of electricity. It is worth noting that wind energy is also used in the conduct of boats and sailing ships.

E - Solar Energy :

The sun is one of the largest sources of light and heat on the face of the earth, and spread this energy - generated from nuclear fusion reactions inside the sun - on the parts of the earth according to its proximity to the equator, and this line is the region which has the largest share of that energy, and thermal energy generated by the rays utilized by the sun is converted to (electric power) by (solar cells) . There are two ways to collect solar energy,

the first: that is to focus sunlight on a compound by a convex mirror shape, and usually complex consists of a number of tubes with water or air, the sun heats the air or turning water into steam.

The second method, wherein the compound is absorbed by the board-level heat of the sun, and uses heat to produce hot air or steam.

Does not arise from the practice of renewable energy in the remnants of the second carbon dioxide and harmful to increase as global warming occurs when the combustion of fossil fuels or Produces renewable energy from wind , water and sun as can be produced from the waves and tides , but the means of production of electricity using renewable energy sources become familiar in recent times, there are many countries have developed plans to increase the proportion of production of renewable energy to cover its energy needs by 20% of consumption in 2020 , THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the promotion of the use of energy from renewable sources The Community has long recognised the need to further promote renewable energy given that its exploitation contributes to climate change mitigation through the reduction of greenhousegas emissions, sustainable development, security of supply and the development of a knowledge based industry creating jobs, economic growth , competitiveness and regional and rural development. The EU and the world are at a cross-road concerning the future of energy. The challenges of climate change caused by anthropogenic emissions of greenhouse gases, mainly from use of fossil energy, need to be tackled effectively and urgently. Recent studies have contributed to growing awareness and knowledge of the problem and its long-term consequences, and have stressed the need for decisive and immediate action [1] The increased use of energy from renewable sources constitutes an important part of the package of measures needed to reduce greenhouse gas emissions and comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and with further European and international greenhouse gas emission reduction commitments beyond 2012. It also has an important part to play in promoting security of energy supply, promoting technological development and providing opportunities for employment and regional development, especially in rural areas.[1] Three sectors are concerned in renewable energy: electricity, heating and cooling and transport .

National overall targets for the share of energy from renewable sources in final consumption of energy in 2020

	Share of energy from renewable sources in final consumption of energy, 2005 (\$2005)	Target for share of energy from renewable sources in final consumption of energy, 2020 (\$2020)
Belgium	2.2%	13%
Bulgaria	9.4%	16%
The Czech Republic	6.1%	13%
Denmark	17.0%	30%
Germany	5.8%	18%
Estonia	18.0%	25%
Ireland	3.1%	16%

Greece	6.9%	18%
Spain	8.7%	20%
France	10.3%	23%
Italy	5.2%	17%
Cyprus	2.9%	13%
Latvia	34.9%	42%
Lithuania	15.0%	23%
Luxembourg	0.9%	11%
Hungary	4.3%	13%
Malta	0.0%	10%
The Netherlands	2.4%	14%
Austria	23.3%	34%
Poland	7.2%	15%
Portugal	20.5%	31%
Romania	17.8%	24%
Slovenia	16.0%	25%
The Slovak	6.7%	14%
Republic Finland	28.5%	38%
Sweden	39.8%	49
United Kingdom	1.3%	15%

Why Use Renewable Energy

Renewable energy projects in many developing countries have demonstrated that renewable energy can directly contribute to poverty alleviation by providing the energy needed for creating businesses and employment. Renewable energy technologies can also make indirect contributions to alleviating poverty by providing energy for cooking, space heating, and lighting. Renewable energy can also contribute to education, by providing electricity to schools [2]. renewables are on a decreasing cost curve, while non-renewables are on an increasing cost curve [3]. renewable energies are contributing to the three pillars of sustainable development – the economy, the environment and social well-being

- Environmental cleanup systems can operate for years to decades. For longer- term cleanup systems, like groundwater pump-and-treat systems, renewable energy technologies, such as solar panels, can help augment utility-power consumption.
- Choose renewable energy technologies for residential or commercial redevelopment projects to generate electric on-site.
- Using renewable energy technologies reduces pollution and greenhouse gases from the burning of limited fossil fuels.
- Harnessing renewable energy reduces dependence on foreign resources.

Wind farms



Wind power is one of the most environmentally friendly sources of renewable energy A wind farm , when installed on agricultural land, has one of the lowest environmental impacts of all energy sources [4] :

- It occupies less land area per kilowatt-hour (kWh) of electricity generated than any other energy conversion system, apart from rooftop solar energy, and is compatible with grazing and crops.
- It generates the energy used in its construction in just 3 months of operation, yet its operational lifetime is 20–25 years.
- Greenhouse gas emissions and air pollution produced by its construction are low and declining. There are no emissions or pollution produced by its operation.
- In substituting for base-load coal power, wind power produces a net decrease in greenhouse gas emissions and air pollution, and a net increase in biodiversity.

- Modern wind turbines are almost silent and rotate so slowly (in terms of revolutions per minute) that they are rarely a hazard to birds [5] .

The benefits of renewables

Over the past five years renewable energy prices have fallen to a point where most are now cost competitive with fossil technologies when all values (environment, jobs, security, etc.) are considered. There are several other factors, from improved energy security through to the generation of jobs at the local level, which make renewable energy more attractive today. The timing of renewables increased cost competitiveness is advantageous because there is a huge and growing demand for new capacity for utility power, and for millions of systems to serve the 1.6 billion people without electricity in rural areas of developing countries. renewable energies are contributing to the three pillars of sustainable development – the economy, the environment and social well-being . Renewable energy received important backing from the Kyoto UN Climate Change Conference in December 1997. The greenhouse gas emissions reduction targets of the Kyoto Protocol imply that developed countries will pay particular attention to renewable energy because of its great potential for reducing global greenhouse gas emissions [6]. There are important job creation benefits from a strategy for greater promotion of renewable energy technologies. Employment is created at different levels, from research and manufacturing to services, such as installers and distributors. Renewable energy has created more than 14 million jobs worldwide [7]. every renewable energy industry is rapidly expanding its workforce . The benefits of renewables are clear and straightforward. New analyses show that traditional approaches must be reconsidered because traditional solutions are not meeting the new challenges: environment, economy, and social well being. Renewable energy can be one of the new solutions to minimise future environmental degradation, assure reliability of services, and provide better services at lower overall costs . Renewable energy technologies, particularly hydropower, traditional biomass, solar thermal and wind, are well established in world markets (or are rapidly establishing themselves, e.g. photovoltaics), and have established industries and infrastructures. Other renewables are fast becoming competitive in widening markets, and some have already become the lowest cost option for stand-alone and off-grid applications. The capital costs for many renewable energy technologies have been halved over the last decade and are expected to halve again over the next decade. The following table, prepared for the World Energy Assessment, provides an overview of the renewable energy sources, the technologies involved and their uses (see Table 2.2)

Table 2.2
Categories of Renewable Energy Conversion Technologies

Technology	Energy Product	Application
Biomass energy		
Combustion (domestic scale)	Heat (cooking, space heating)	Widely applied; improved tech. Available
Combustion (industrial scale)	Process heat, steam, electricity	Widely applied; potential for improvement
Gasification/power production	Electricity/heat (CHP)	Demonstration phase
Gasification/fuel production	Hydrocarbons, methanol, H2	Development phase
Hydrolysis and fermentation	Ethanol	Commercially applied for sugar/starch crops; production from wood under development
Pyrolysis/production of liquid fuels	Bio-oils	Pilot phase; some technical barriers
Pyrolysis/production of solid fuels	Charcoal	Widely applied; wide range of efficiencies
Extraction	Biodiesel	Applied
Digestion	Biogas	Commercially applicable

One of the main benefits of solar thermal systems is that there are no emissions. This is particularly beneficial for solar cooking as it avoids indoor air pollution. The benefits of renewables are clear and significant. Getting the energy framework to reflect the full and total costs of the environment and energy security is a challenge. However, doing so creates a framework where renewables can compete fairly with other technologies that are also needed in the energy mix, thus leading to a sustainable and vibrant energy sector.

Life cycle analysis shows that all renewable energy technologies emit significantly less carbon dioxide and other emissions than the three major fossil fuels. Carbon dioxide emissions based on life cycle analysis from coal for electricity generation are more than four times higher than for photovoltaics, which are seen as the worst of the renewables. Tables 4.1 and 4.2 describe these emissions in more detail [8].

Table 4.1
Life Cycle Emissions from Renewables

	Energy Crops Current Practice (g/kWh)	Energy Crops Current Practice (g/kWh)	Hydro Small-scale (g/kWh)	Hydro Large-scale (g/kWh)	Solar PV (g/kWh)	Solar Thermal Electric (g/kWh)	Wind (g/kWh)	Geotherm (g/kWh)
CO2	17-27	15-18	9	3.6-11.6	98-167	26-38	7-9	79
SO2	0.07-0.16	0.06-0.08	0.03	0.009-0.024	0.20-0.34	0.13-0.27	0.02-0.09	0.02
Nox	1.1-2.5	0.35-0.51	0.07	0.003-0.006	0.18-0.30	0.06-0.13	0.02-0.06	0.28

Table 4.2
Life Cycle Emissions from Conventional Electricity Generation in the UK

	Coal Best Practice (g/kWh)	Coal FGD & Low NOx (g/kWh)	Oil Best Practice (g/kWh)	Gas CCGT (g/kWh)	Diesel Embedded (g/kWh)
CO2	955	987	818	430	772
SO2	11.8	1.5	14.2	-	1.6
Nox	4.3	2.9	4.0	0.5	12.3

Biomass-Generated Synthetic Natural Gas (Syngas).

Continuing high natural gas prices have created interest in using renewables to dampen natural gas demand. Renewable energy (mainly biomass) can be used to produce methane (the main component of natural gas), which could possibly substitute directly for natural gas. DOE projects that, by 2020, biomass and energy crops could produce 15% of natural gas needs. A 2005 Harvard University study, *The National Gasification Strategy*, cites a Princeton University study (*A Cost-Benefit Assessment of Biomass Gasification Power Generation in the Pulp and Paper Industry*) that says that biomass-generated “black liquor” and wood waste could produce enough syngas to support 25 billion watts (gigawatts) of natural gas-fired power plant capacity by 2020. Because CO2 contributes the largest share of greenhouse gas emission impact, it has been the focus of studies of the potential for reducing emissions through renewable energy and other means. Except for biofuels and biopower, wherever renewable energy equipment displaces fossil fuel use, it will also reduce carbon dioxide (CO2) emissions, as well as pollutants that contribute to water pollution, acid rain, and urban smog. In general, the combustion of biomass for fuel and power production releases CO2 at an intensity that may rival or exceed that for natural gas. However, the growth of biomass material, which absorbs CO2, offsets this release. Hence, net

emissions occur only when combustion is based on deforestation. In a “closed loop” system, biomass combustion is based on rotating energy crops, there is no net release, and its displacement of any fossil fuel, including natural gas, reduces CO₂ emissions [9] .

Reduce energy

consumption, increase energy efficiency, and use more renewable energy sources. Clear goals have already been set: for example, in 2020 at least 10% of the total energy demand in Germany and at least 20% of our electricity should already be generated from the renewable resources wind, water, biomass, solar energy, and geothermal energy. Current studies indicate that it is quite possible to meet these goals. For example, they calculate a share of about 25% for renewable energy in the electricity sector. The long-term goal set by the German Federal Government in its sustainability strategy to supply half of our total energy demand using renewable energy sources by the middle of this century is similarly possible to achieve . The study demonstrates that the increased use of renewable energy and job creation can permanently go hand in hand. Accordingly, employment in the renewable energy field could double by 2020 even when applying rather conservative assumptions.

Furthermore, the net impact – after subtracting all possible negative employment effects – is also a clear and sustainable positive employment stimulus. A decisive prerequisite for this favourable balance is that Germany continues to play an important role in the growth of the international renewable energy market. The study clearly shows that this will not happen by itself . Germany is now the technological leader in most renewable energy sectors [10] .

May serve as a renewable energy Maavsdth conventional energy (oil)?

With many of the experts is the protection of the environment, renewable energy sources, one of the most possible solutions to address the issue of negative climate change on the ground, raises other questions about the feasibility of the trend to expand the uses of those sources, and whether or compensation can actually bridge the shortfall in some areas of the World meet future needs of human beings in different parts of the world. In an attempt to resolve the controversy about the feasibility of the global trend of renewable energy sources, "said Ali Sayegh Chairman of the World Council for Renewable Energy, the world is witnessing what could be considered a breakthrough in the transition to the use of this energy the American energy expert, said that carbon emissions - one of the main causes of the phenomenon of climate change - will grow at a record because of the continued reliance on traditional energy sources, without other sources of renewable energy.

The European Renewable Energy Council is responsible for the renewable energy industry and the community of Greenpeace (Greenpeace) that renewable energy . The report said "could be renewable energy, along with good use of energy to provide half of the world's energy needs by 2050.

Using renewable energy can provide many benefits, including:

- Making use of secure, local and replenishable resources
- Reducing dependence on non-renewable energy
- Helping to keep the air clean
- Helping to reduce the production of carbon dioxide and other greenhouse gases
- Helping to create jobs in renewable energy industries.

Geothermal, solar, wind, hydro, biomass and wave are all examples of [11] .

Relative cost of electricity by generation source

When comparing renewable energy sources with each other and with conventional power sources, three main factors must be considered:

- capital costs (including, for nuclear energy , waste-disposal and decommissioning costs);
- operating and maintenance costs;
- fuel costs (for fossil - fules and biomass sources—for wastes, these costs may actually be negative).

We can deduce from all this is that oil will end sooner or later, and the world is called upon, now more than ever, to accelerate the development of alternative energy sources and solve their problems before facing an energy crisis to come. But what we are witnessing today is a marked slowdown in this area, especially after the continued decline in oil prices in global markets, which adversely affects the programs to develop these alternatives because of the reluctance. Many countries and companies to employ its investments in this field to the inability of alternative energy to compete with oil prices. The prevailing belief was even years ago that nuclear power and other alternative sources will account for an increasing role in meeting global energy needs.

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