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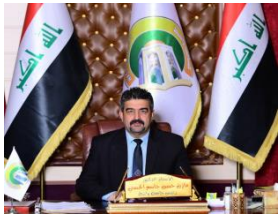
SPEECH OF THE PRESIDENT OF WASIT UNIVERSITY



Iraq is a country that brims with potential, in a region that brims with potential. So it is important features to invest in energy field, especially solar energy and wind energy. This requires policies and incentives development to produce them and reduce the use of fossil fuel that increase global warming gases (the effective factor in climate change), in response to the requirements of sustainable development, reduce environmental deterioration, loss of biological varieties, and environmental protection from desertification that has been sweeping green areas. Therefore, it is important to get sunlight advantage to generate electricity in several applications, including power and water desalination plants. There are great Iraqi efforts being made in energy and water support field to reducing emission. The aim of this to meet the obligations of the Climate Agreement application. Also, to confront the danger of climate extremism by supporting green policies as a national strategy to support the sustainable green economy and

renewable energies within the national initiative to support energy and reduce emissions. Wasit University adopted and get support for this initiative and based on the Ministry of Higher Education and Scientific Research/ Iraq advice to spread a culture of energy support and reducing emissions through a series of scientific activities. Thus, Wasit University issued a guide for energy concepts and renewable energy. We ask God for success and support in the service of our country .

Prof. Dr. Mazin Hasan Jasim Al-Hassani

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RENEWABLE ENERGY CONCEPTS

1. INTRODUCTION

1.1. Energy Concepts

It is one of the most important basics and pillars for human life, which are important in the conduct the life. Based on that, mankind has been completed its important achievements over the life including the Internet, manufacture of aircraft, space stations and communications devices, furthermore, medicine, industry, agriculture, commerce, construction and modern transportation improvement.

In general, energy can be defined as the ability to carry out the effective tangible activities (meaning of work), and one of its simplest forms is the individual's energy. It can be derives it from the body cell to accomplish its daily activities. Therefore, energy is transformed from one form to another and cannot be created or destroyed.

1.2. Energy History

People through the life have been able to exploit the earth's resources for their benefit, as they were able to generate thermal energy (fire) by rubbing solid bodies together with herbs. The purpose of that was for cooking, heating and even to protect themselves from

predatory animals. They were also able to use wind energy to grind grain, as well as for cooling their houses by making several outlets in the walls of the house for circulating the air into it.

The ancient antiquities exploration campaigns has been also proved that human in some ancient civilizations made genius use of wind energy to extract water from the ground. As well as the sun energy had a share of human daily life. Humans have been dried fruits and fish by exposing them to the sun for the purpose of preserving them for long periods. Also, the human knowledge of the ability of oils to set fire and produce thermal energy for lighting. This happen has been continued until the modern centuries, when humans were able to exploit the energy stored in fossil fuels including oil, coal, gas and fuel is a natural fuel. It can be used to produce energy and it is generally extracted from fossil materials such as coal, black oil, and natural gas. Fossil fuel is called like that because it comes from the biomass of living organisms that were formed long time ago. The bodies of organisms inside the earth have been transforming for different transformation processes, until the formation of these substances with a high content of energy.

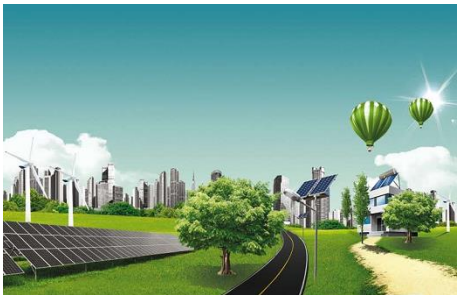


Figure (1): renewable energy

The meaning of fossil is derived from the verb (digging), meaning organisms that are buried, decomposed and petrified in the ground due to many factors, and by digging the earth's crust for extracted. The fossil fuels using has been released gases and exhausts that damage the environment as well as its harm to human health. The danger of using fossil fuels has been causes the occurrence of global warming, which means that the Earth is not able to get rid of the excess heat that it comes from the sun during the day, because of the release harmful gases.

2. THE CONCEPT OF RENEWABLE ENERGY

As we described above and how humans exploited it, we need to know more details about the renewable energy. It is a term to all forms of energy that produced

from natural resources and do not result any waste that causes harmful to the environment and human. Recently, the concept of renewable energy has been linked with the process of producing electric energy from natural sources. In many countries (even oil countries), they have produced and encouraged the use of renewable energy instead of the fossil fuels that are expected to be depleted.

2.1. Forms of renewable energy

The most important sources of natural energy that have been invested to produce energy are the sun, air, water and land. Among these main sources, energy production methods have been devised in an environmentally friendly that it is not harmful to human health. In the following chapters, each form of renewable energy will be explained:

2.1.1. The Sun energy

The sun is the source of life and earth energy. The solar energy that reaching the surface of the earth turns into two main forms: the first one is chemical energy and thermal energy, each one manifests itself in several manifestations that lead to the emergence of a number of energies. The sun's rays fall on the leaves of plants, it is saved in the plant in the form of organic chemical

energy, and it forms a structure of plants. The accumulation of large quantities of these organisms during the years, and their subjection to appropriate conditions of oxidation and reduction, it has been transformed the chemical energy stored in them into other chemical energy that constituted a source of fossil fuels from oil, gas and coal.

The effect of thermal solar energy becomes apparent when the sun's rays fall on the atmosphere, which leads to uneven heating, thus, to the occurrence of air currents, and as a result the emergence of wind energy and the evaporation of huge amounts of sea and ocean water constitute a source of water energy on Earth. The direct heating of the surface of the seas and oceans leads to increase the surface temperature while maintaining a low temperature at the bottom. The energy is known as thermal energy in the seas and oceans.

The tidal energy is directly related to the sun depends on close or far it is from the earth. It is believed that the underground potential energy in the earth's interior is energy derived from the sun; However, most modern theories assert that the Earth goes back to the sun in its origin, as it separated from it and its outer crust cooled, while its depths are still inflamed, radiating heat to all

directions. Human began using solar energy since the third century BC. This was by using mirrors to focus the sun's rays. It has been developed greatly until the use of this energy in satellites that are supplied with solar energy through Photovoltaic.

The advantage and disadvantage of using solar energy:

Solar energy, like other energy sources, has its advantage and disadvantage aspects.

First: advantage aspect:

1. Stock and quantity of solar energy is a huge, in terms of its stock: the sun is an endless source of energy. In terms of quantity: The amount of solar radiation that reaches the Earth is equivalent to several times the energy needs of mankind.
2. The solar energy is free, so its use depends on the initial fee only.
3. Solar energy is distributed over the surface of the Earth, and it reaches everything, so no need to transmit and distribute it.
4. The difference in the distribution of solar energy between the equator and the poles, its distribution according to latitudes is almost uniform, and depends on the geographical area, which

facilitates the process of studying and using it and exchanging information and studies about it.

5. It is practical in terms of use, as it can be converted into other types of energy such as thermal, mechanical and electrical energy.
6. This energy is unparalleled in some special uses in relation to human and plant life, such as large projects that depend on evaporating huge amounts of water, photosynthesis and others.
7. The solar energy is a clean source of energy in terms of its impact on the environment and human.

Second: the disadvantage aspects:

1. The solar energy is one of low intensity when compared to conventional types of energy.
2. The continuity of solar energy during the day. It is only available for certain hours per day, which causes practical issues in the use.
3. The consumer is ignorance of the importance of this energy, which requires the development ways to understanding and guidance plan in proportion to the social transformations that accompany the use of this energy.

4. The energy system that human used through during industrial development causes in a specific life system, and the new solar energy system could require a qualitative change in some of the foundations of this system.

The importance of solar energy:

Recently, solar energy has been considered the most important renewable energy source. Because traditional energy including fossil fuel is threatened with depletion, as well as the effects on the Earth's environment in terms of pollution and increase in Earth temperature. This is caused climatic changes in the Earth's atmosphere. Therefore, many countries are efforts to direct towards investing in solar energy, and allocating funds to develop it.

Several research on the exploitation of solar energy as one of the most important alternative energy sources for oil and gas. The largest research and applications have been given to the field of converting solar energy into electricity, which is known as Photovoltaic. This source of energy is the important in developing countries, as the availability of electrical energy has become one of the greatest factors for creating infrastructure. In addition, the production of electricity

from solar energy does not require centralization in generation, and it is used in the same region or place. This saves a lot of transportation costs. This method depends on converting sunlight to electrical energy, and there are many materials in natural have been used in the manufacture of Photovoltaic. This is combining with a specific electrical and engineering system to make solar panel, which in turn exposes to the sun's rays at a certain angle to produce the largest amount of electricity.

Solar energy has been become as alternatives related to renewable energy; the extent of its benefit is connected to the presence of sunlight throughout the time of use. Accordingly, it seems that what is required (in addition to the development of electrical and thermal conversion of solar energy) is to develop a technology for storing that energy during the period of solar radiation invisibility. There are several technical methods for storing solar energy, including thermal, electrical, mechanical, chemical and magnetic storage etc. Solar energy storage research is one of the interesting areas of development needed in solar energy applications. They need only equipment to convert electromagnetic energy to electrical or thermal energy. Although these costs currently exceed the cost of conventional energy

production, they do not give a clear picture of its future because it is constantly decreased to ongoing and future research.

Solar energy uses:

Since long time ago, human has benefited from the solar energy radiation in many applications, such as drying agricultural crops and heating homes. They have been also used in other areas that mentioned in historical science books. In 212 BC, Archimedes burned the Roman war fleet in the war by focusing solar radiation on Enemies ships with hundreds of metal shields. In the Babylonian era, women priests used polished gold vessels like mirrors to focus solar radiation to get fire. Also, human tried to use and exploit solar energy, but in a small and limited extent. But, the great development in technology and scientific progress reached by human, new scientific horizons opened in the field of solar energy exploitation.

Thermal uses:

The thermal are including heating and water heating systems for domestic and industrial purposes. It is one of the most practical basic uses of solar energy systems in the buildings. Solar energy is the best way for cooling and heating including water desalination systems,

agricultural crop drying systems, solar stove, and cooling system. If we get more solar radiation, we can get better cooling, and solar cooling devices are more efficient. However, the cost of solar cooling is higher than the current price of cooling from three to five times its normal cost. This is because the high cost of solar cooling materials, heat collection equipment and electricity generation.

Figure (2): Solar heaters

Figure (3): Solar dryers

Figure (4): Heater works with solar

Figure (5): Modern solar stoves

Electrical uses:

The converting solar energy to electrical energy is one of the important parts. These systems are easy to installation and operation, reliability in production, no need for continuous maintenance, no environmental pollution, and the operational life is more than 25 years. These systems can be divided according to the electrical capacity into three sections:

1- Low power applications include the following devices and systems:

- Computers, electronic games and watches.
- Radio and low power media charge.

Figure (6): Solar energy cells

Figure (7): Solar energies on the top of homes

2- Medium capacity applications, including the following systems:

- Lighting - Visual Radio
- Vaccine refrigerators and serums
- traffic lights and alarms
- ceiling fans. Emergency phones - Electric fence charge.

3- Medium and high capacity applications, including the following systems:

- Water pumping - Centimeter wave communication stations
- Earth satellite stations. - Protect oil and gas pipelines and metal installations from corrosion
- Supplying the public electricity network.

Figure (8): Solar energy pumps

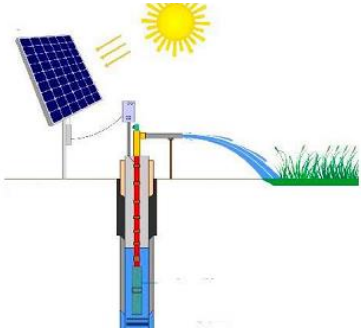


Figure (9): Solar pump

The problems of using solar energy:

The main issue facing researchers in the areas of solar energy is the presence of dust and trying to clean solar energy devices from it. The best way to reduce the dust is to use continuous cleaning methods, that is, at intervals that do not exceed three days for each period. These methods differ in countries depending on the dust and the weather in that country.

The second problem is to store the solar energy and its benefit during the night, cloudy, or dusty days. The solar energy storage depends on the nature and quantity of solar energy, the type of use and the period of use in addition to the total cost of the storage

method. It is not necessary to use storage devices to reduce the cost and benefit instead of solar energy. The topic of solar energy is one of the subjects that need more scientific research and new discoveries. The third issue solar energy is the occurrence of erosion in solar complexes due to the salt in the water that used in the heating. Closed courses and free salts water is the best solutions to reduce the problem of erosion and rust in the solar complexes.

2.1.2. Wind energy

Air energy is caused by its movement, as it is called (wind speed). The intensity varies according to its place from the surface of the earth. The fall of sunlight on earth or water such as the oceans, the seas, and others are causing the high temperature in some areas than others. This causes the difference in density and atmospheric pressure occurs. Wind is transferring the high pressure to the low pressure areas and the deviation wind movement occurs. From that, physical phenomenon known (influence of Coriolis) is causing as a result of the earth rotation around its axis. Therefore, a number of researchers consider that air energy is part of the sun's energy.

Figure (10): different types of wind turbines

Two types of electrical power generation facilities came from wind energy. This is according to the location of the turbine column that producing electricity: the first one is the horizontal wind turbines, the most efficient and the most electric energy production in the form of air feathers installed on it, which produces an increase in horizontal turbocharged. the next type is the vertical turbine, which takes different forms of air feather, which the researchers designed to produce the largest amount of electrical energy through it (Figure 10).
However, there are defects that can be found on the use of wind energy. For example, wind turbines near houses that may cause them some people disturbances due to the sound noise that issued by turbines. Also, these turbines can hurt the birds and the high cost of maintenance.

2.1.3. Water Energy

Air is a clean energy that can be use it production of electrical energy. The types of energy investment water depends on the mechanism of its movement, whether the water is falling from certain altitudes and carrying a kinetic energy to rotate the turbine to produce electrical energy. High water currents and waves in the rivers, seas and oceans that also have high rotation energy. The first mechanism is the most common and productive energy through to great dams or waterfalls from high altitudes, as this water carries an energy to rotate the turbine feathers associated with an electric energy generator (Figure 3a).

A

B

Figure (11): Water turbine produces energy

Second mechanism is similar to the work of air turbines, as there are other types of machines with innovative designs that produce energy by relying on water energy. This is called a (water snake). It is focused on the sea surface and absorbs the energy of water ripples at the

surface transformed into kinetic energy exploits to produce electricity (Figure 4a). Another example is the creation of a closed room near the sea and oceans beach in which a hole containing rotating feathers that looks like a fan linked to the generator of electrical energy. The energy of the water movement can be exploited during the tidal, which causes the pressure inside the room that causes the rotation of these feathers and thus the operation of generate of generator electricity (Figure 4b). On the other hand, there is disadvantage with water energy including the exposure of seas features to the disappearance of its environment in the place to be established, in addition to the high cost of maintenance, which requires diving most of the time.

A B

Figure (12): Energy production by water

2.1.4. Earth energy

In the Earth, there is a huge energy that can be extracted and invest in the best way to produce electrical energy. This inventory is mainly represented by hot groundwater, which can be extracted by digging deep wells. Because of the pressure difference, the steam enters into tubes, then the turbines are pushed the generators that produce electrical energy.

There is another form of exploiting the Earth's temperature, which is the possibility of harnessing volcanoes and converting its thermal energy into electrical energy in the volcanic areas inside the land of the earth, where it is content a high relative temperature. This is due to the sediment generated by volcanoes. These areas are the primary source of ground thermal energy compared to other hot ground areas. The exploitation of volcanoes in these areas is the availability of two main ways: temperature of hot water inside the earth, and the temperature of the sediment flowing on the surface of volcanoes.

On the other hand, the disadvantage that is difficult to use materials that bear the hard conditions of such an environment, as well as the cost of digging to the distant depths. There are many studies at the present time and with the modern technologies that get

attention to the possibility of producing clean energy through the exploitation of natural energy, including earthquakes and tsunami.

3. WHAT IS ENERGY SECURITY

The definition of energy security may differ according to the concept of countries ' policies and security and their need for the energy. This term means the ability of the countries to secure adequate and reasonable energy supplies and consistent with its local, industrial, transport and military requirements. There is a great possibility to meet the needs of current and future energy. Because of economic instability or the politician of the country, it will be given that the demand for energy covers a number of different forms of energy including oil for transportation, gas heating and cooking homes, and electricity for multiple uses. The safe state of energy means providing access to a variety of energy sources. The energy security is linked with energy dependence that calculates the total energy consumption that depends on imported energy. The definition of energy security have developed over the time, but it has generally included the basic idea of providing inexpensive energy and relatively stable in the future, and does not affect the environment.

International organizations have been defined the energy security as the goal of a country or the global community as a whole to maintain enough energy supplies, as well as measures to ensure access to energy resources. Also, enable the development and deployment of technologies, building sufficient infrastructure for generating, storing and transporting energy supplies, and ensuring implemented delivery contracts. Therefore, international societies and international forums must cooperate to implement the concept of energy security and enhance the exchange of benefits in the field of energy exploitation development. In addition, work to develop and generalize energy technologies to achieve sustainable development in human society, and work to establish global peace and maintain regional stability.

To ensure this stability and energy security, society must be able to continue even to find the issue of energy supplies. there are some basic issues to ensure long term stability for energy markets and supplies, but also in order to deal with short term shocks such as terrorist attacks, network disruption, weather conditions, and other similar events and the most important of those guarantees that must be taken:

- Variegation of energy sources.

- Cooperation between consumers and producers.
- Investment.
- Research and development.
- Technological improvement.
- Energy security strategies
- Exploiting resources to achieved the largest possible self-sufficiency.
- Completing the energy resources of imports from reliable supplier countries.
- Import energy from a wide range of suppliers.
- Switching the offer so that the dependence is less on imports.
- Reducing local demand for energy.
- Searching for clean energy to the environment, encouraging their acquisition and investing it.

4. OVERRIDE ON ENERGY NETWORKS

It is intended to withdraw an additional stream from the power transmission lines without passing the consumption meter and without the knowledge of the concerned authorities. The aim of it is to take more energy for free or perhaps of transcendent when there is a programmed supplier of energy, so those who transcend their homes with an additional line in which electricity when it is interrupted.

Figure (13): Override on energy networks

According to the constitution of the country, which is based on the provision of a decent life for everyone. However, the people also have a role in maintaining that service and protecting it from interruption. Whereas, sabotage or transgression on the electricity system by connecting the home meter to the power line directly that leads to greater withdrawal and larger load on the energy system as described in the in above figure.

The exposure of the energy network may works to the imposition of more huge financial budget of the country. The electricity crisis may severely harm the competitiveness of the overall economic sectors, and constitute a major social and economic challenge. Thus,

the people are forced to pay huge bills to obtain energy from private generators. In addition, the psychological effect that comes as a result of the continuous interruption of energy, which makes people in a permanent stress, especially during the summer.

There are some proposals that may contribute as solution for this problem as follow:

One :The Duty of the Higher Authorities:

a. Providing energy for continuous or long supply hours with the programming hours.
b. Providing developed, modern, and non - manipulations of energy consumption in different homes and facilities.
c. Control and continuous monitoring of any sabotage or transgression process on the energy systems.
d. Imposing strict fines and penalties for any sabotage or transgression on the systems.
e. Privatize of Energy, as some studies indicated that this system may be in the interest of the consumer, producer and investor.
f. Supporting the electricity bill for the poor families and those with limited income.
g. Encouraging people on clean energy in their homes and grant loans to buy them.

h. Installing new wires to transport energy instead of those transcendent or dilapidated.
i. Import environmentally friendly devices or that need a few operating energy, support their prices, and encourage people to acquire them.
j. Providing many energy transformers with periodic maintenance of these energy transformers and wires.
k. Publish the ads, posters and distributing brochures on the damage of energy system and we need to teach them in schools and universities.

Two: People Duties:

a. Increase the keenness on country property as they belong to all.
b. Rationalization of energy consumption and extinguishing any load occurs.
c. Pay the electricity bills and not to let it accumulate with reporting any defect in the electric consumption of measuring device.
d. Try to acquire environmentally friendly generators and buy ideal consumption home appliances.

5. CONSUMPTION OF ENERGY

Energy consumption means the increasing demand for the use of energy in the operation of various electrical

appliances or machines, whether in homes, laboratories or in other installations. The problem is excessive energy consumption, a direct impact on the economic situation of the people and the country, as well as the environment. It requires more energy production, which in turn increases fuel consumption and pollution of the environment. Therefore, it is necessary to address this problem and find the most appropriate solutions till a permanent solution is found. There are some proposals that can be used to reduce the increasing of the consumption of energy including:

a. We should use energy -saving devices and purchased to maintain electricity and rationalize energy consumption, or replace old devices with modern devices that provide energy.
b. Using the sensor devices of movement that are self -extinguished.
c. Encourage people about the necessity of the economy and rationalization of energy consumption and guiding them to extinguish the devices or any electrical load after its use and not letting it work without need it.
d. Encourage the community to use environmentally friendly transportation, especially when moving

nearby to reduce the demand for used fuel through the transportation.

e. Encourage and support the use of non –fuel and clean capacity generators when the electricity is cut off from the government.

6. CLIMATE CHANGE IS THE MOST DANGEROUS CHALLENGE

6.1. Climate change and its effects

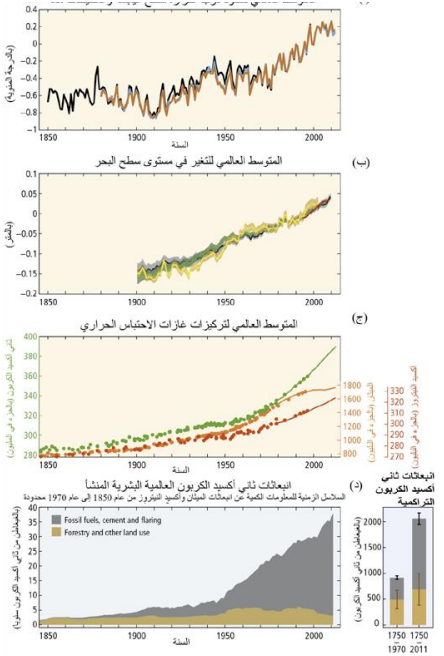
Climate Change as defined by the United Nations Framework Convention on Climate Change (1992) means a climate change that is attributed directly or indirectly to human activity that leads to a change in the formation of the global atmosphere that is observed, in addition to the natural climate volatility.

The climate is also intended to change long -term transformations in temperature and weather patterns.

These transformations may be normal and occur. For example, changes in the solar cycle. However, since long time, human activities have become the main cause of climate change. This is because burning of fossil fuels, such as coal, oil and gas.

In general, the change in the Earth's climate and it effects represents a common occupying of humanity, the increasing the gas concentrations in the atmosphere due to human activities, and the additional warning of the Earth's surface and atmosphere. It can affect natural ecological systems and humanity.

The International Climate Change Organization (IPCC) has been reported that the warming of the climate system, and many changes that have been allocated since the 1950s. One of the last three decades in a row was warmer at sea in 1958.



It is likely that from 1983 to 2012 was the warmer of 30 years during the last 1400 years in the northern earth. According to the World Health Organization, climate change is the biggest health threat facing humanity. The

effects of gas emissions and climate change cause health damage through air pollution, severe weather, heat stress, food insecurity, diseases and mental health, which causes about 13 million people dead annually.

6.2. Climate change reasons

The effect of human on the climate system is clear, and the emission of gas is at the highest level. Recently, climatic changes have been widespread effects on the human system and nature.

a. **Power generation:** The generation of electricity by fossil fuels causes a large part of the global emissions. Most of the amounts of electricity are still done by burning charcoal, oil or gas. This is resulting in carbon dioxide and nitrous oxide - that covering the earth and holding the sun's heat. Globally, more than a quarter of electricity comes with a wind energy, solar energy and other renewable energy sources from which a few gases or pollutants in the air, unlike fossil fuels.

b. **Goods manufacturing:** Usually, the manufacturing and industry produces emissions. Most of them come from burning fossil fuels to produce energy such as cement, iron, steel, electronics, plastic, clothing and other things.

Mining and other industrial processes also release gases. The machines that used in the manufacturing process often work on charcoal, oil or gas. Some materials such as plastic are made from chemicals that got from fossil fuel. Manufacturers are one of the largest contributors to gas emissions around the world.

c. **Forest cutting:** Forests cutting to create farms, pastures or other reasons are causes emissions. When the trees are cutting, trees release the carbon that they were store. Around 12 million hectares of forests are destroyed per year. Since the forests absorb carbon dioxide, its destruction also reduces nature's ability to keep emissions outside the atmosphere. The removal of forests, agriculture and other changes, it is responsible for approximately a quarter of global gas emissions.

d. **Transport:** Most of vehicle, trucks, ships and aircraft operate with fossil fuel. That is making transportation a major contributor to gas emissions, especially carbon dioxide emissions. Vehicles represent the largest part of the combustion of petrol. However, emissions that come from ships and aircraft are also continuing to increase. Transport is responsible for nearly a

quarter of the global carbon dioxide emissions. In the coming years, trends indicate that a significant increase in energy that use for transportation purposes.

e. **Food production:** Food production as well as causes carbon dioxide and methane emissions in different ways. The reasons for this are the removal of forests and the evacuation of lands for agriculture purposes, digestion operations in cows and sheep, production and use of fertilizers and natural fertilizers to grow crops, and use energy to operate farm equipment or fishing boats. All of that have been done by fossil fuels. All of this makes food production a major contributor to climate change. Gas emissions also come from food mobilization and distribution.

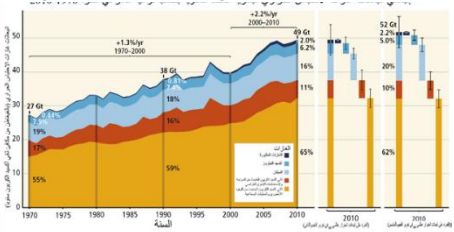
f. **Provide the energy for buildings:** Around the world, residential and commercial buildings consume more than half of electricity. They depend on coal, oil and natural gas for heating. Large amounts of gases are emitted. In recent years, increased energy demand for heating and cooling, with the increase in the possession of air conditioning devices, as well as increased electricity consumption for lighting, connected devices and

equipment has increased carbon dioxide emissions from buildings.

g. **Consuming of energy:** Use of energy, your moving, and what you eat and the quantities of food that you get rid of are factors that contribute to gas emissions. Also, it is the case for goods consumption such as clothes, electronics and plastic. A large part of global gas emissions is associated with private homes. As our lifestyles have a profound impact on our earth. The rich people are the greatest responsibility: the one percent of richest of the world's together causes more gas emissions than the poorest of 50 percent of the population.

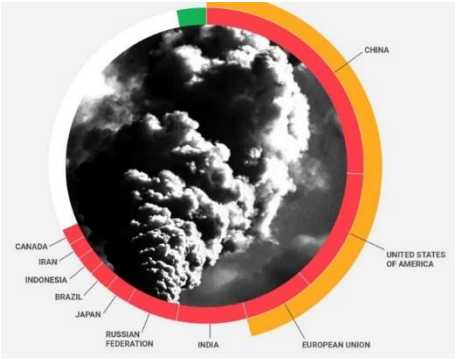
h. **Gases concentrations have been reached the highest level in two million years ago:** Gas emissions causes by burning fossil fuels that work like a cover wrapping around the earth, which leads to the imprisonment of the sun and increase temperature. Emissions are still increased. As a result, the earth is warmer ranged 1.1°C than the late nineteenth century. The past decade (2011-2020) was the warmer at all. People believe that climate change means high temperature, but high temperature is only the beginning of the story.

Because the Earth is a system, where everything is connected, changes in one area could lead to changes in all other regions.



Most emissions are released by a few countries

- 3% is released by the lesser countries that cause emissions.
- 68% is released by more than 10 countries that cause emissions by more than two -thirds of global emissions.
- 46% is released by three countries that cause emissions at a rate of more than 16 times of emissions from the hundred countries that are less caused by emissions.



7. WHAT ARE THE SOLUTIONS TO FACE THE EFFECTS OF CLIMATE CHANGE?

Many solutions of climate changes can be achieve some economic benefits and improve our life and protect our environment. Furthermore, contracts and agreements were also concluded to report the work such as: sustainable development and the United Nations agreement on climate change, as well as the Paris agreement. There are three general categories should be taken as follow:

- Reducing the emissions.
- Adapting the climate effects.

- Financing the necessary adjustments.

The transformation of energy systems from fossil fuels to renewable energy sources including solar or wind energies, will be reduce climate change emissions. However, we have to start right now. The countries are obligated to reach emissions of zero level in 2050. To maintain warming with less than 1.5°C, emissions should be reduced to half by 2030. During 2020-2030 of this decade, fossil fuel production should decrease by approximately 6 percent annually. On the other hand, adaptation to climatic consequences protects people, homes, companies, infrastructure and natural environmental systems.

It includes the current effects that are likely to occur in the future. Each place should be adapted, and priority should now be given to the most vulnerable people who have the least resources to counter climate risk. The rate of return may be high, for example, early disaster warning systems save lives and property, and may have been able to achieve benefits of up to 10 times the primary cost.

8. NET EMISSIONS

Generally, a net emission is to reduce gas emissions to the closest possible level of zero, while reabsorption of

any remaining emissions from the atmosphere through the oceans and forests.

8.1. Why the net emissions are important?

Science has been shows that in order to avoid the worst effects of climate change and maintain our earth, the global temperature must be increase to limited of 1.5°C above pre -industry levels. Currently, the Earth has become warmer of 1.1°C than it was in the late nineteenth century. To keep global warming no more than 1.5°C - as required in the Paris agreement, emissions must be reduced by 45 % by 2030 and reaching net emissions by 2050.

8.2. How can achieve zero net emissions?

Turn to net zero emissions is one of the biggest challenges that humanity faced. This will only be achieved with a complete shift in how to produce, consume and move us. The energy sector is about three quarters of gas emissions and represents the key to avoiding the worst effects of climate change. Replacing contaminated energy from coal, gas and oil with energy derived from renewable sources, such as wind or sun, can significantly reduce carbon emissions.

8.3. There is a global effort to reach net emissions?

The countries, cities, companies and other institutions undertake to reach net emissions. More than 70 countries, including the largest pollution ones including China, the United States and the European countries, have set a net goal, covering about 76% of global emissions. More than 1,200 companies, more than 1,000 cities, more than 1,000 educational institutions and more than 400 financial institutions have set the science with the goal of a net zero and joined the pursuit of zero. They pledged to take strict and immediate measures to reduce global emissions to half by 2030.

8.4. Are we on the right path to reach a zero net by 2050?

The obligations that governments have pledged less than what is required so far. The existing national climatic plans - for the Paris agreement of 193, will lead to a significant increase of about 14 % in global gas emissions by 2030 compared to the levels of 2010. Governments need to know the biggest causes of emissions - strengthening its nationally defined contributions and taking bold and immediate steps towards reducing emissions. The Glasgow climate called all countries to reconsider the goals of 2030 and

strengthen them in nationally defined contributions by the end of 2022. They should link with the goal of the Paris agreement of the temperature. But this is not enough, we need to accelerate and make very radical and courageous decisions. Climate emergency can only be resolved with ambition, design and political plans. This is what we want to see.

ENERGY AND ENVIRONMENTAL POLLUTION

Pollution is a change in the nature of the environment or its components affects its natural balance. It is causing damage to human health or any of the other organisms. Pollution is caused either as natural reasons such as gases release from volcanoes or from artificial reasons such as manufacturing, transportation, or power stations that use petrol, as well as radiolocation waste and oil spots that are leaked to water, sewage, pesticides etc. Since a long time ago, the pollution in the world began. The minerals, copper and iron has been used in manufacture long time ago. The consequences of the process of melting these minerals and their extraction resulted in what is known as many pollutants of the environment that were monitored in ancient civilizations and through fossils (old Egyptian civilization).

In the civilization of Persian, India, China, Greece and Rome have been reported an environmental pollutants. They were monitored in all of these areas and the predominant pollutants resulting from the formation of minerals. In the past, the human dependence on energy remained a major factor to advance the wheel of human progress until the industrial revolution came up and update an unprecedented boom in the manufacturing process. This methods and updating were a great consumption of the natural resources to generate energy, caused by events of the largest environmental pollution that continues till now. This is threatening human healthy and the rest of the other organisms, such as animals, birds and fish that have already started extinction.

The power generation process is one of the largest pollution, either directly or indirectly. The forms of these such as harmful gases and particles emitted from burning fossil fuels and leakage of crude oil to the seas and oceans as well as pollutants resulting from the use of nuclear energy.

Gases release from fuel burning

When the fuel is incomplete burning, gases such as carbon dioxide v sulfur and nitrogen compounds are released.

a. **The first carbon oxide:** It is toxicity and smell gas. The first carbon oxide gas is one of the most harmful gases for human health. It leaks to the blood hemoglobin and causing preventing oxygen from reaching the blood naturally. It causes tissue damage and poisoning and may lead to death.
b. **Carbon dioxide:** increasing of this is causing damage to the human respiratory system, absorbs the temperature emitted from the Earth and prevents its leakage to the space and many other damages such as blocking the sun and preventing it from reaching the Earth naturally, thus, the temperature will increase. It is called global warming.
c. **Sulfur and nitrogen compounds:** Sulfur and nitrogen compounds that released from the energy production process have been transferred to the acids that remain stuck in the air until they fall on the ground with rain and melting in rain water, it is called acid rain. It has a highly impact on the environment. When they

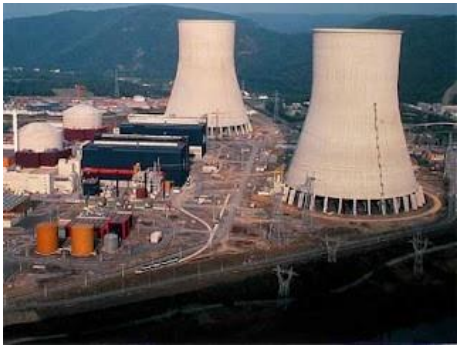
are leaking to rivers, It kills many organisms in the water.

Petrol or Oil Spots:

It is the spots that petrol or oil is leaking to the seas and oceans. It causes when transported by containers, refineries and estuaries. It is truly harmful to the environment, whether they were deposited or flooded for their impact of all aspects of life in the sea.

GLOBAL WARMING

Some scientists indicate that the Earth's temperature is keeping in high year after year. The primarily reason is to excessive use of energy resources such as gas, coal and oil. As well as, cutting tree of the forests is also the important reason. The global warming may lead to an increase the temperature of the earth and then the melting of the ice in the mountain. This leads to the high level of the water, causing drowning to many islands and coastal cities. It is also expected to lead to periods of dehydration and desertification exposed to human life and animals are a serious danger and possibly extinction of many animals.



Radiation waste that left from nuclear reactors

Nuclear energy is a relatively cheap energy production, as one tons of uranium produces energy more than hundreds of tons of fossil energy. The most prominent thing that hinders the creation of nuclear reactors is the costs as well as the high radiation waste.

In general, the radioactive waste is a big problem facing the nuclear energy because of its harmful on human health and the environment. It affects the body's tissue by damaging and exposure to cancer and many dangerous diseases. It is transmitted to successive generations with genetic. With nuclear bombs in the Second World War, it is led to the killing and injury thousands of people in a few minutes. In 1986, an

explosion occurred in nuclear reactors in the Chirinopil city, Ukraine which led to the leakage of nuclear radiation, killing 36 and about 2000 people were injured.

This was a simple introduction to the harmful effect of energy. There is an equation that the more energy demand increases; the more pollution of the environment is coming. Technology is at the same time that the damages resulting from this and impact the environment around us to threaten our health and the health of future generations, so it is necessary to expand the search for new ways to produce alternative and renewable energy.

Guidelines in supporting renewable energy and reduce the emissions:

Climate studies indicate that reduce net harmful emissions to zero and stabilize the level of invasive emissions needs a climate change plans for long time. This means calculating the real cost of carbon emissions within the framework of a comprehensive set of policies that can lead to changes in both investments and behavior. It requires facilitating the transformation process for the most affected groups.

To reduce carbon emissions in development: for free future, three steps towards a carbon should be used, examples and advice on policies. These three steps put the country on a path towards reducing carbon emissions in the smoothly and organized way.

Step 1: Planning for the future

Planning to achieve the goals instead of short term, governments can choices that lay the foundations for development in the future and avoid falling into the trap of development patterns and harmful investments that can become useless in a world where carbon emissions are subject to restrictions. For example, the design of African and Asia cities is that it includes public transportation an important part of planning for the future, in which urban expansion accelerates in these cities. The investment in research and technologies that the world will need in the next 20 or 50 years is extremely important in the world.

International organizations report that the risks related to the outstanding assets, such as building coal - powered stations that governments may have to get them out of service in light of their endeavors to reduce gas emissions. The report notes that the fossil fuel power that were established in 2012 will emit about 19

billion tons of carbon dioxide during their expected operational life of 40 years, which is more than the annual emissions of all electricity generation stations working with fossil fuel that were in service of 2012. Although it is possible to withdraw it from service early, this would change the comparison of the price points used by the decision makers when balancing fossil fuels in exchange for clean energy sources.

Marianne Fai, the president of economists at the World Bank for climate change group said that "we aim to reduce emissions to zero level by 2100, not only to reduce emissions on the sidelines of the following contracts. This means adopting a very different set of measures, including structural and spatial transformations for our economies". The technical plan, the report says that reducing the net emissions to zero is possible to be investigated within the framework of strong economic growth and good planning that in four areas:

- Should be turn from dependence on fossil fuels to generate electricity to the use of clean energy that limits carbon to produce electricity.
- Increase clean energy amounts, the tremendous transformation of electricity supply can increase

the chances of obtaining clean energy and replace polluted fuels.

- Increase energy efficiency helps reduce demand.
- Maintain the safety of natural carbon slices by improving the rational management of forests and lands would help the remaining emissions equation through carbon absorption and storage.

Moreover, many steps that governments can now apply - such as developing public transportation and improving energy efficiency, provide immediate and local benefits in providing electricity and reducing the pollution.

Step 2: Determine the cost of emissions

Governments can begin to shift investments and thinking toward low carbon growth. It can be by identifying the true costs of emissions as part of a comprehensive set of policies that provide incentives to ensure low-carbon growth plans are implemented, and projects are financed. Carbon price can be treated by carbon taxes application to emissions. The failure of markets to incorporate the cost of environmental damage from gas emissions should be studied. This is an efficient way to increase revenue, while encouraging lower emissions, and it is more easily managed and

harder to evade compared to other taxes. The authors report that while carbon pricing is an important component, it is not sufficient in itself unless governments adopt complementary policies.

Complementary policies that ensure incentives for the development and widespread dissemination of green technologies could include measures such as energy efficiency performance standards, discounts on more fuel-efficient cars, and renewable energy standards that require electricity producers to generate a percentage of their production from renewable sources, all of which provide incentives for low carbon options. Policy can also reduce tariffs on low carbon goods such as solar panels and energy saving lamps. Recently, it is agreed by the countries of the Asia-Pacific Economic Cooperation.

Step 3: Transformation process

Transforming to the economy needed to achieve net zero emissions before the end of the century. It will require public commitment and support, and changes to support those most affected ones. Eliminating fossil fuel subsidies, which primarily benefit the riches people and implementing carbon taxes or cap emissions regulations are two ways to free up resources or

generate revenue that can be used to fund education, health and infrastructure services. It is directly support the poor, while reducing carbon emissions in the same time.

Stephanie Halligati, Senior Economist on Climate Change at the World Bank report that "The data of 22 developing countries shows that if we replace fossil fuel subsidies with blanket cash transfers, this reform will benefit the poorest of 60 percent."

Transformation also includes helping companies redefine their role for a cleaner world. We need to improve fuel consumption rates to meet performance standards, and developing electric and low-emissions vehicles to meet demand. The reports also indicate that at the role of the international community, noting that progress on global agreements will have "a significant impact on persuading economic of the need to neutralize future carbon emissions."

RECOMMENDATIONS

Through the above, here are some recommendations:

1. The industrialized countries (cause environmental pollution) should strive to achieve the aspirations of countries whose economies depend on fossil energy. Encourage them to implement their

commitments contained in the the United Nations Framework Conventions and the Kyoto Protocol, particularly with regard to assistance to counteract damage caused by climate change.

2. Governments and the private sector should expedite the provision of renewable sources of energy at commercial scale, and encourage the efficient use of energy, by increasing spending on research development and the formation of the necessary human resources, through regional and international partnership relations.
3. The protection of the environment must be taken into account in all development projects, and the environment and development must be linked and energy. To achieve sustainable development, this will only be achieved under rational governance and democratic institutions. Achieve sustainable economic growth, eradicate poverty, and achieve freedom, peace and security and internal stability, with respect for human rights.