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The potential of using the renewable energy aiming at environmental protection

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Abstract: Renewable energy is becoming the least expensive option. Recent transactions in Denmark, Egypt, India, Mexico, Peru and the United Arab Emirates show that renewable electricity is being offered at $ 0.05 / kWh or even lower . This figure is much lower than the costs of fossil fuel and nuclear power generation in these countries. The winning bidder in two recent auctions for offshore wind power projects in Germany did not need government support but rather wholesale prices. This shows that renewable energy can become the least expensive option.

Keywords: renewable energy, environmental protection.

I. INTRODUCTION

Why has renewable energy sources recently been developed to meet some of the energy needs of mankind? The answer is simple: Renewable energy sources have too many "downsides" (compared to traditional energy sources). When traditional energy sources are abundant and cheap, nobody wants to use energy sources with many "downsides". What are the disadvantages?

Unstable: Almost all renewable energy sources have this feature, which is easy to recognize this feature of wind energy, solar energy, ocean waves energy, tidal energy and so on. A little more aware of hydropower. Therefore, when planning national energy development policy, it is not possible to rely fully on these less stable sources of energy.

Low energy density: The size, area of land occupancy and the extent of the impact of renewable energy projects are always much higher than traditional energy sources. Meanwhile, the installed capacity and especially the guaranteed capacity is small.

High-tech, high-tech mining techniques: These are the characteristics of wind energy, solar energy, wave energy, and tidal energy.

High maintenance costs: Because unit capacity of the unit is not high, the power output is low, the installation area is wide ... so the operating costs increase.

With these "downsides", renewable energy sources are more expensive than traditional energy sources. As stockpiles of traditional energy sources are increasingly exhausted, prices on the market go up, with the rest of the world re-considering the use of renewable energy sources (and non-traditional energy sources such as And found that in addition to the above mentioned disadvantages, it has the advantage that traditional energy sources are not competitive, that is "renewable - long-lasting Long & sustainable - environmentally friendly ".

Why renewable energy sources grow slowly?

The main issue is that we have equated the "Energy" that we need to use in our lives and the production of "electricity" from renewable energy. Indeed, energy needs need to be fulfilled in many ways: energy, heat, power, etc., where energy is easily transported and transformed into other forms of energy, electricity. In addition, electricity also plays an irreplaceable role as the energy source used in semiconductor electronics used in life. According to the above analysis, it is possible to use renewable energy sources in households without necessarily converting them into electricity and converting them into used energy. That is, it is possible to cut short the energy conversion cycle: Primary energy - mechanical energy - electricity - energy use (mechanical - thermal - photovoltaic). This makes the transition of primary energy to energy use shorter, simpler, more efficient, easier to implement. To prove this, we only need to take, for example, hotels that buy electricity for the service business for use in water heaters and lighting (solar), paradox: Price of electricity sold for high service business. The hotel buys electricity for hot water (converted to heat). The technique of turning solar energy into heat is not too complicated. So when calculating the economic benefits, it is no coincidence that hotels are usually the leading unit in equipping solar water heaters. This is generally the effect of two factors: High economic efficiency (indirect efficiency due to electricity prices sold to high service businesses). The technique is not too complex, efficient & effective (due to a lot of intermediate energy conversion steps).

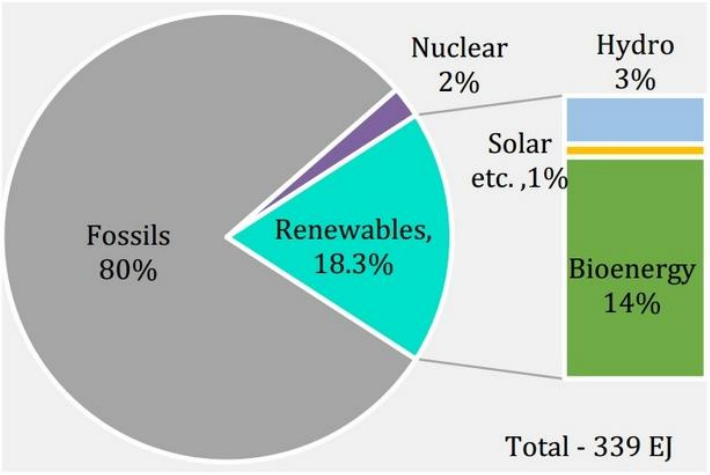

Figure 1. Gross final energy consumption of energy sources in 2011 (Source: IEA statistics)

If you go in the direction of installing photovoltaic panels, DC storage, AC inverters, using electricity as a conventional energy source for solar energy use in hotels will not grow as compared. Compare costs and operating costs today. What should be done to make these renewable energy sources quickly used in life, form a sustainable, environmentally friendly development mechanism? Part of the answer to the above analysis is: "Use renewable energy as the alternative energy source for electrical energy for proper energy use." What is more important, what is the need to do to accelerate the use of renewable energy sources in our lives in order to form a sustainable, environmentally friendly development mechanism? We must quickly perform the following tasks:

1. Analyze the demand for energy (photovoltaic-electric) and the capacity of renewable energy sources available in each locality.

2. Introduce research programs to apply renewable energy equipment for proper use (not necessarily converted into electricity).

3. Using renewable energy as a source of solar energy: Design standards for ventilation and natural lighting of buildings, strict inspection of the implementation. The study offers housing designs in well-ventilated residential areas & natural lighting to show and promote the people.

4. Maximize small and micro hydro in the direction of: Design takes advantage of hydropower, minimizing environmental impact (flow hydro). Strengthen the capacity to design, manufacture and use domestic machinery and equipment, and proceed to fully utilize domestic small-scale hydro-electric equipment. There is an incentive mechanism (in terms of price & investment incentives) so that small hydropower projects have reasonable profitability, attract social capital, and create jobs for local people.

With the above comments on the development and use of renewable energy in Vietnam, it is believed that only by reducing the capacity needed to use renewable energy sources in place, Energy will be better solved, the demand for electricity consumption will be significantly reduced, energy efficiency in the region will be higher, contributing to the country's sustainable development & body Environmentally friendly.

With that potential, the World Wide Fund for Nature (WWF) and Vietnam Sustainable Energy Alliance (VSEA) have developed the "Sustainable Scenario for Vietnam Power Sector - Vision to 2050". Of these, 3 are devoted to energy development in Vietnam: a common development scenario, a sustainable energy development scenario, and an optimal sustainable energy development scenario.

In particular, if developed under the normal development scenario, still rely on fossil fuels and technology backward, but not very effective, causing a lot of greenhouse gas emissions. With the remaining two scenarios, by 2050, renewable energy could meet 80 to 100 percent of the country's electricity demand, both technically and economically, to reduce carbon emissions by 80 percent. Assessing on this scenario, Dr Nguyen Thang Long said: "In the future, 100% renewable energy scenario is feasible with all countries in the world. In Vietnam, we need to control a milestone of 20% and then consider the impact of that renewable energy source to make the necessary regulatory adjustments". Talking about sustainable energy development scenarios in Vietnam, Dr. Nguyen Trinh Hoang Anh, Renewable Energy Specialist at CleandED Center for Clean Energy and Sustainable Development, It encourages facilities and enterprises to produce renewable energy to both use and sell electricity by generating electricity to the grid, on the energy storage system.

II. SOURCE OR RENEWABLE ENERGY

1. Hydroelectricity energy

Hydroelectricity is the source of electricity produced from water energy. Most of the hydroelectric power is derived from the potential energy of water contained in dams that spin the turbine and generate electricity. Water sources can be from rivers or man-made as streams flowing from high lakes down through pipes and flowing out of the dam. Hydropower is a popular, competitive source of renewable energy. It plays an important role in the current integrated electricity system (contributing more than 16% of global electricity production and about 85% of renewable electricity worldwide). Moreover, hydropower helps stabilize fluctuations in supply and demand. This role will become more important in the coming decades, as the share of renewable sources of change - primarily wind energy and solar energy - will increase significantly. The contribution of hydropower to carbon sequestration is twofold: providing clean renewable electricity and contributing electricity to the national grid. In addition, the hydropower pedal helps control water supplies, floods and droughts, and water for irrigation. However, hydropower development should also take into account waterway and recreational activities.

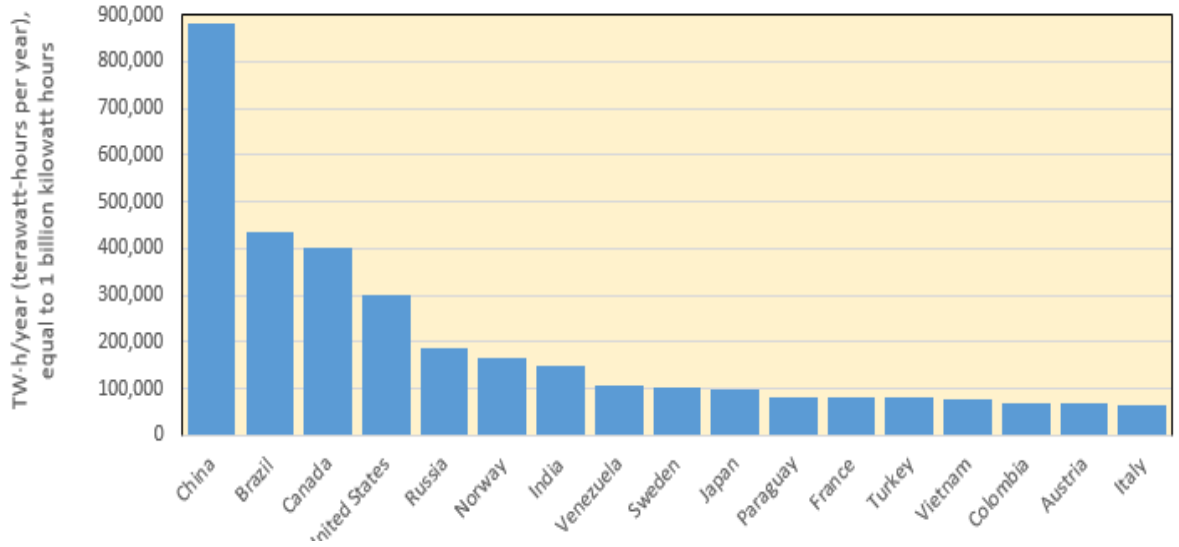

Figure 2. Using hydroelectricity in the world by country, 2012
(Source: Energy Information Agency, International Energy Statistics)

2. Bio-energy

Bioenergy is the largest renewable energy source today, supplying 10% of the world's primary energy supply. It plays an important role in many developing countries, such as energy for cooking and heating, but it often causes health and environmental impacts. The development of clean biomass-based fuels such as biofuels in developing countries is a major solution to improve the current situation and achieve access to clean energy by 2030.

Currently, bioenergy accounts for about 10% (50 exajoule (EJ = 1018 joules)) of the world's major energy. Almost all of these rates in developing countries are used for cooking and heating. The use of biomass for rudimentary and inefficient stoves has a significant impact on health (smoke pollution) and the environment (deforestation). In the construction sector, modern bioenergy used to provide heat has reached about 5 EJ in 2012. In addition, 8 EJs are used in industry, mainly for pulp and paper production as well. The food processing sector aims to provide heat for processing at medium and low temperatures. In 2012, the total capacity generated from bioenergy is 370 TWh, equivalent to 1.5% of the world's total electricity output. Technologies for generating electricity and heat from bioenergy have existed from heating systems for buildings to biogas digesters for power generation, biomass gasification plants and biomass pig. Combined biomass in existing coal-fired power plants can also be an option for achieving short-term emission reductions and more sustainable use of existing assets. In addition, new bioenergy plants are playing an increasingly important role in meeting the demand for electricity and heat.

In the medium term, capacity and output of bioenergy are expected to increase significantly. Global bioenergy output is expected to reach 560 TWh by 2018 (370 TWh in 2012-an average of 7% annually), boosted

by renewable energy targets in other countries. , As well as the rising energy demand in some emerging economies with the availability of biomass and renewable waste.

The final bio-energy utilization for the average heating system could increase by 3% per year and reach 16 EJ by 2018, when bioenergy is used for OECD's heating system (adjusted by The European Union's goals up to 2020) and to a smaller extent in other markets.

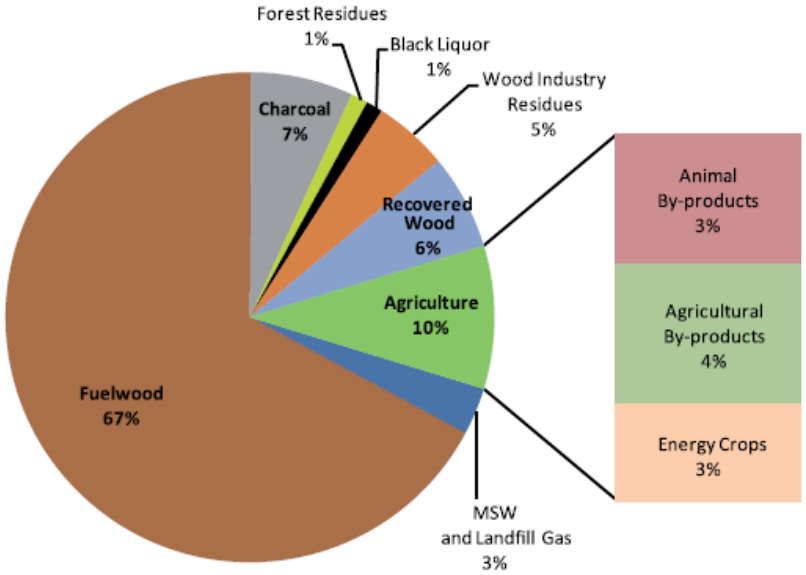

Figure 3. Share of the biomass sources in the primary bio-energy mix (Source: IPCC, 2007)

3. Solar energy

The solar photovoltaic system is a system that directly converts solar energy into electricity. The basic building blocks of solar photovoltaic systems include solar photovoltaics, which is a semiconductor device used to convert solar energy into direct current. Solar photovoltaic batteries are connected together to form PV modules, typically up to 50-200W. Solar photovoltaic modules are combined with other applications such as inverters, batteries, electrical components, and installation systems), forming a solar photovoltaic system. The modules can be linked together to provide power from a few W to hundreds of MW.

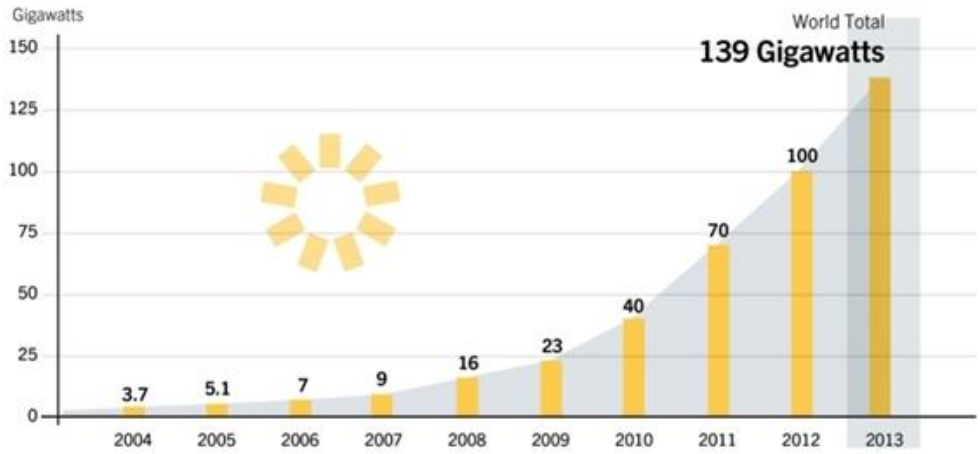

Figure 4. Solar total global capacity, 2004-2013 (Paris: REN21)

Most solar photovoltaic technologies are silicon-based crystalline systems. Thin-film modules may also include non-silicon-based semiconductor materials, which account for about 10% of the global market. The centralized photovoltaic (CPV) system, in which sunlight is focused on a small area, has just begun to be deployed in the market. The solar photovoltaic cells bring about a very high efficiency of up to 40% - but only for normal direct radiation. Other technologies such as solar photovoltaic cells are still in the research phase.

Because solar photovoltaics generate electricity from sunlight, so the electricity output is limited by the time when the sun shines. However, the IEA has emphasized that the GIVAR (GIS) project offers a number of options (demand-responsive, flexible production, grid infrastructure , Hoarding) cost-effective, while addressing energy challenges.

Solar convergence devices (CSPs) are used to concentrate energy from the sun's rays to heat the receiver at high temperatures. This heat is then converted into electricity, also known as STE. A solar convergence device consists of a series of solar panels and collection devices, where the heat is converted into mechanical energy and then converted to electricity. In the middle of the system there are one or more heat or liquid heaters that can be operated, which can store heat and cooling, wet or dry systems (IEA, 2010d). The CSP equipment consists of four different versions: parabolic trough, Fresnel linear, tower and parabolic disc system.

4. Wind energy

Wind energy is the kinetic energy of the wind that is extracted to produce electricity through wind turbines. Just like other renewable energy technologies based on renewable resources, wind energy is occurring around the world and can contribute to reducing dependence on energy imports by not being influenced by The risk of fuel prices, while improving energy security and diversifying energy sources and reducing fluctuations in fossil fuel prices, can thus stabilize the cost of electricity generation over time. long. Wind energy does not directly emit greenhouse gas (GHG) and does not emit other pollutants (such as sulfur oxide and nitrogen oxide); In addition, it does not consume water. For hot or dry areas that are concerned about air pollution and the lack of fresh water to cool plants, the benefits of wind power are becoming increasingly important.

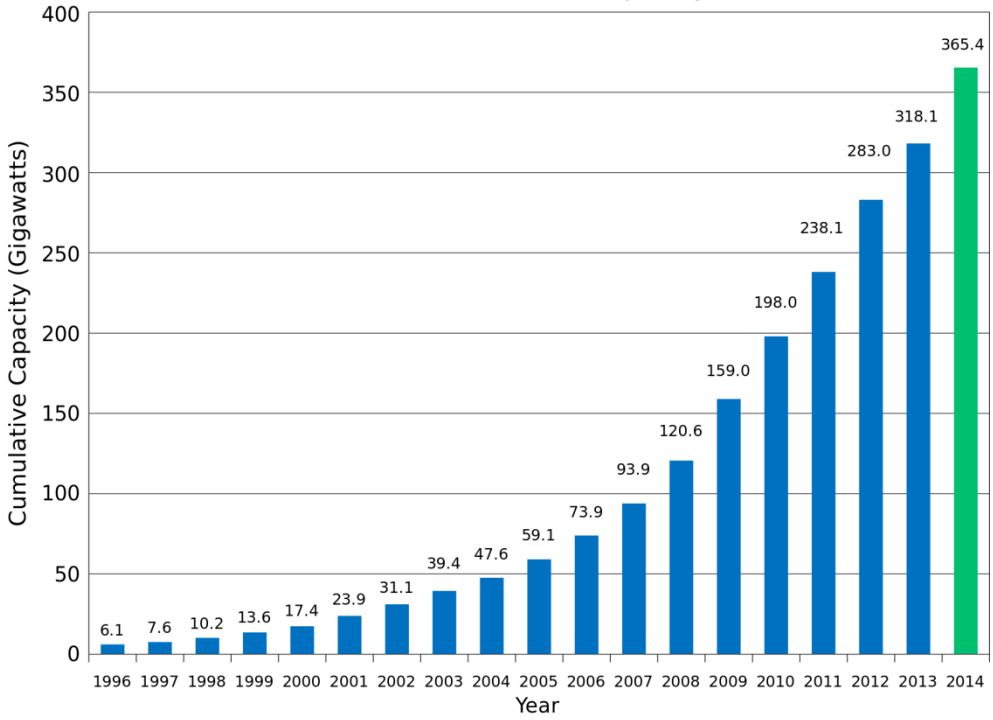

Figure 5. Global wind power cumulative capacity, 1996-2014 (Data: GWEC)

Land-wind power is one of the renewable energy technologies being developed at a global scale. Wind turbines take kinetic energy from the movement of air (air) and convert it into electricity through an aerodynamic rotor connected via a transmission system to the generator. Standard turbines now have three rotors on a horizontal axis, with either a synchronous or asynchronous generator connected to the grid. There are also two-bladed turbines and direct-drive (without gearboxes). The power of the turbine is proportional to the area of the rotor; So larger and lesser routers (on higher towers) use wind energy more efficiently than many small machines. The largest wind turbine capacity today is 5-6 MW, with a rotor diameter of up to 126 meters. Typical commercial wind turbines have a capacity of 1.5 MW to 3 MW.

Offshore-wind energy is generated by wind turbines installed on the sea. The installation of turbines at sea makes better use of wind resources than inland locations. So, offshore turbines achieve more than enough hours (enough generating power). Offshore wind farms can be located near large coastal power centers, often avoiding the use of long power lines to meet the demand for electricity - which can cause special offshore wind

power. Attractive to many countries that need to develop in the coastal zone or far away from land-based power development. With less competition for space than the development of inland wind farms and meeting the environmental requirements, wind farms in the sea may be larger and, in the future, able to reach capacity 1GW.

5. Ocean energy

There are currently five ocean technologies being developed to harness energy from the oceans: tidal energy; Tidal currents (sea); Wave energy; Temperature gradients; Gradient salt.

However, no technology for ocean energy is widely deployed. Tidal founts depend on traditional technology, but only a few large-scale systems are operating in the world, particularly the 254 MW Sihwa (South Korea) dam that was put into operation in 2011 and the La Rance dam 240 megawatts in France, started generating electricity in 1966. Other smaller projects were put into service later in China, Canada and Russia. Tidal projects have many variations due to the process of producing electricity from wave energy depending on the state of the sea. Technological challenges are related to the efficient collection of energy from waves or tides, in particular the requirement to survive and operate under difficult conditions. Other issues that need to be considered include impacts on marine life, marine environment and other marine benefit areas such as maritime transport, capture fisheries, etc. Up to now, OTEC related restrictions are limited to small-scale applications, although plans and design efforts are aimed at larger projects. Gradient salt technology is still in the research, development and testing phases.

6. Geothermal energy

Geothermal energy can supply basic load from high temperature hydrothermal sources; Deep aquifers with medium to low temperatures; Hot rock source. Although the use of geothermal hot springs has been known since ancient times, geothermal exploration for industrial purposes began only in the early 19th century in Italy. By the end of the 19th century, the first hot water supply system was operating in the United States, followed by Iceland in the 1920s. Geothermal power usually produces additional electricity, as it is not affected by the weather. And seasonal change. Capacity factors of new geothermal power plants can reach 95%. In 2012, global geothermal capacity was 11.4 GW and produced about 72 TWh of electricity. Geothermal supplies meet 25% of total electricity demand in Iceland, El Salvador (22%), Kenya and the Philippines (17% each), and Costa Rica (13%). For heating systems, the wider range of geothermal sources can be used for applications such as space and space heating, spas and warming of pools, warming greenhouses and soils, Aquaculture, drying in industrial processes and melting of snow.

III. CONCLUSION

The strongest development took place in the field of energy with global capacity exceeding 1,560 gigawatts (GW), an increase of more than 8% over 2012. Hydropower increased 4% to around 1,000 GW, and other renewable energy increased Nearly 17% to over 560 GW. For the first time, solar power capacity is higher than wind power; Solar power and hydro power are basically bound, each accounting for about one-third of the new capacity. Solar power has continued to grow at a rapid pace, averaging nearly 55% annually over the last five years. Wind power has the highest increase in all renewable technologies over the same period. In 2013, renewable energy increased by 56% in the global grid and has shown a higher proportion in some countries. Therefore, the use of renewable energy to replace fossil fuels is extremely urgent and necessary.

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