

FEATURES OF RENEVABLE ENERGY SECTOR INVESTMENTS

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ABSTRACT

Renewable energy has a very important place in terms of meeting the energy needs of countries with domestic resources, reducing their dependence on foreign sources, ensuring sustainable energy use by diversifying resources, and minimizing the damage to the environment as a result of energy consumption. Today, part of the world's energy consumption from renewable sources is not at the desired level.

Global energy demand is expected to increase in 2022, more than offsetting the 4% contraction in 2020, according to the latest IEA forecasts. While many energy companies remain in a fragile financial situation, supportive monetary policy and government support is required for developers to plan infrastructure developments and investments in new projects.

Keywords: *renewable sources, investment, policy, energy sector*

INTRODUCTION

The increase in the world population and technological developments have increased the energy needs of societies. The decrease in fossil energy sources and their destructive effects on the environment have led human beings to alternative energy sources. In general, energy sources are sources that allow energy to be produced by any means.

The energy resources in the world are divided into two places as classical and alternative sources. Wind, hydroelectric, hydrogen and geothermal resources are offered as alternatives to conventional energy resources [17]. The most important feature of these resources, which are based on constantly existing factors in nature, is that they are renewable and do not harm nature. Renewable energy has a very important place in terms of meeting the energy needs of countries with domestic resources, reducing their dependence on foreign sources, ensuring sustainable energy use by diversifying resources, and minimizing the damage to the environment as a result of energy consumption [19]. Today, part of the world's energy consumption from renewable sources is not at the desired level. Despite the high level of dependence on fossil fuels in the current situation, the use of renewable energy has been increasing over the years. Increasing investments in this sector will allow more use of renewable energy [1-3].

World energy investment is expected to increase by over 8% to a total of US\$2.4 trillion in 2022, well above pre-Covid levels in all sectors, technologies and regions. Investments are increasing in all parts of the energy sector, but the main increase in recent years has come from the energy sector – particularly in renewables and grids – and increased spending on end-use efficiency [3].

Investment in oil, gas, coal and low-carbon fuel supply is the only area where overall investment fell below pre-pandemic levels in 2019. This is despite very high fuel prices creating an unprecedented unexpected drop for suppliers. The net income of the world's oil and gas producers will double by 2022 to an unprecedented \$4 trillion.

Key features of renewable energy

Renewable energy systems are usually derived from energy absorbed by the earth system directly from the sun. Solar and wind energy are flow systems. It means they must be used as they are produced. For these energy sources, an external energy storage system must be added

to save energy when they are not flowing [3-6, 15]. Renewable energy sources differ according to their characteristics. Basically, they are grouped as “solar”, “wind”, “geothermal”, “hydraulic”, “biomass”, “wave” and “hydrogen” energies.

Table 1.

Types and sources of renewable energy

Renewable energy types	Source of energy
Solar energy	Sun
Wind energy	Wind
Geothermal energy	Groundwater
Hydraulic Energy	Rivers and Streams
Biomass Energy	Biological Wastes
Wave Energy	Oceans and Seas
Hydrogen Energy	Water and Hydroxides

Source: “Renewable Energy Sources”, BBC.; Karagöl, E.T., Kavaz, İ., Dünyada ve türkiye’de yenilenebilir enerji, SETA, 2017

As can be seen in Table 1, the sources of renewable energy are always sources found in nature. However, the advantages and disadvantages related to the use of renewable energy have been determined by the researchers.

Key benefits of renewable energy sources include [15]:

- ✓ Renewable energy sources. Since it exists in nature, it can be renewed quickly by itself, it does not run out of use.
- ✓ Prevents global warming, environmental and air pollution.
- ✓ It reduces the dependence of countries on foreign energy.

They are considered sustainable and clean energy sources. This is considered one of the control methods to avoid exhaust emissions. Erosion prevention is an important advantage in terms of preventing environmental pollution and especially water pollution.

The main disadvantages of renewable energy sources include [8-11]:

- Installation costs of power plants required for renewable energy sources are high.
- Lack of knowledge, technical and expert staff.
- Although renewable energy sources are not limited, they are not always available at the same level. It is influenced by natural phenomena, the change of day and night and seasonal changes.

Level of investment in renewable energy sources

Today, high prices are forcing some countries to protect their sources of supply. This goal helps accelerate investment in fossil fuels [18]. However, past crises and energy security are pushing countries to invest more in energy efficiency, clean electricity and various clean fuels. In other words, one way to respond to an acute energy crisis is to use renewable energy sources.

Investment in clean energy is expected to exceed \$1.4 trillion in 2022, accounting for nearly three-quarters of the growth in total energy investment. In the five years since the signing of the Paris Agreement in 2015, the average annual growth rate of investment in clean energy has been just over 2%. Since 2020, this has increased to 12%, well below what is needed to meet international climate targets, but still an important step in the right direction. The highest levels of clean energy investment in 2021 were in China (\$380 billion), the European Union (\$260 billion) and the United States (\$215 billion) [16].

China has recorded remarkable investment growth in both wind and solar project finance. The country's large-scale solar energy investments increased by 173 percent compared to the previous year and reached 41 billion dollars. It also invested \$58 billion in new wind projects, an annual increase of 107 percent.

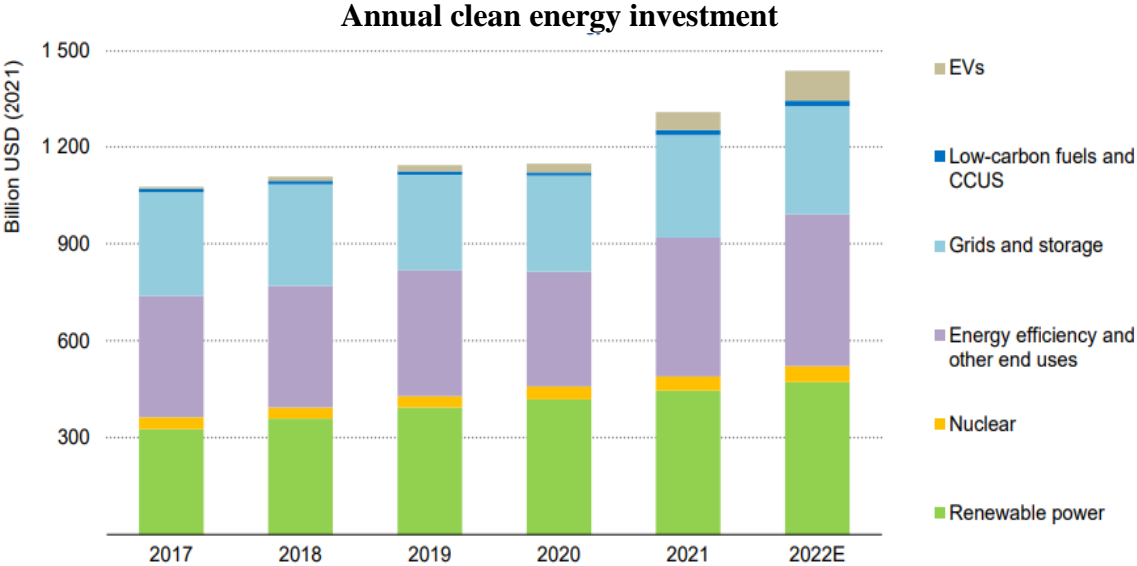
Offshore wind power was another sector that saw a sharp increase in investment reaching \$32 billion, up 52 percent from the previous year. The UK, France and Germany are just some of the countries that increased their offshore wind targets in the first half of 2022 and are signaling more support for technology investment [16].

Global investment in renewable energy totaled \$226 billion in the first half of 2022, setting a new record for the first six months of the year. According to Renewable Energy Investment Tracking Program 2H 2022 published by BloombergNEF, the increase in investment reflects the increase in demand for clean energy sources to cope with the ongoing global energy and climate crises [16].

According to the report, investment in new large and small-scale solar projects increased by 33 percent compared to the first half of 2021, reaching a record \$120 billion. Wind project financing increased by 16 percent compared to the first half of 2021, reaching \$84 billion. Both sectors have recently faced increased input costs for key materials such as steel and polysilicon, as well as supply chain disruptions and increased financing costs. But according to BloombergNEF, today's numbers show investor appetite is stronger than ever, partly due to the very high energy prices seen in many markets around the world.

Figure 1 presents data on global clean energy investments.

Figure 1.



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Notes: Energy efficiency and other end-use includes spending on energy efficiency, renewables for end use and electrification in the buildings, transport and industry sectors. Low carbon fuels include modern liquid and gaseous bioenergy, low-carbon hydrogen, as well as hydrogen-based fuels that do not emit any CO2 from fossil fuels directly when used and also emit very little when being produced.

Source: *World Energy Investment 2022, p.11*

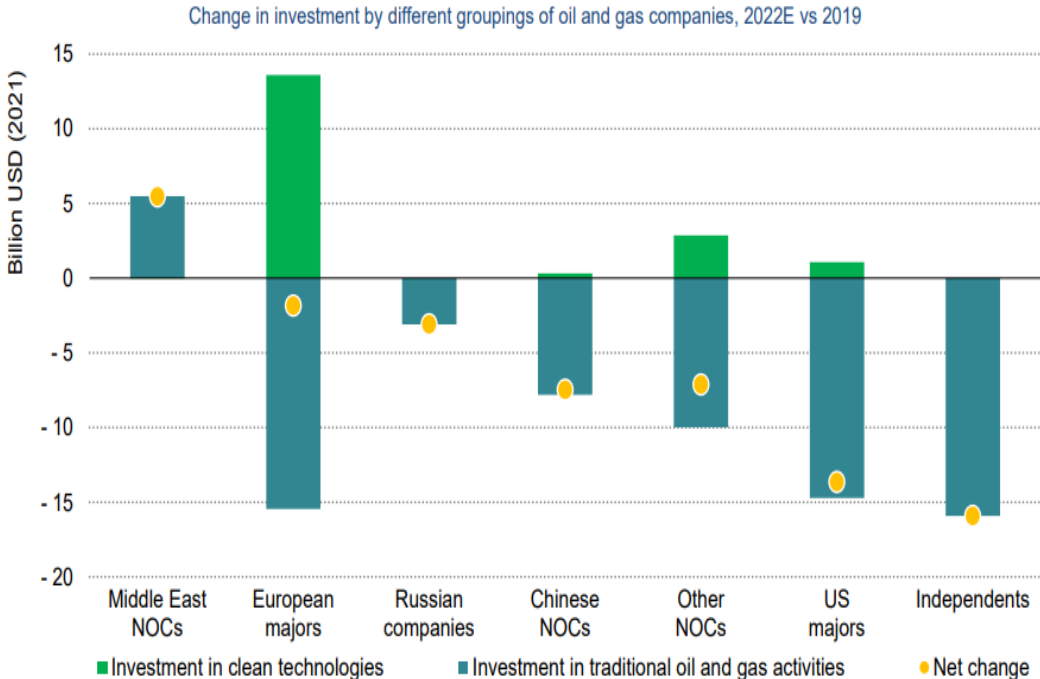
As Figure 1 shows, after being stable for several years, global clean energy spending has finally accelerated. Renewable power sources are at the center of the positive trend. Although costs have risen in recent time, clean technologies such as wind and photovoltaic solar remain the cheapest option for new electricity generation in many countries. Renewable energy sources, grids and storage account for over 80% of total investment in the energy sector.

Another key area of growth is investment in efficiency improvements. In 2021, investment in building efficiency increased by 16% annually. Many countries, especially Japan, China and some European countries, are increasingly focusing on high energy efficiency standards for new construction.

Although the investments made in the energy transition are relatively positive, they are not considered sufficient. Namely, according to the important Net Zero Roadmap until 2050 by the IEA, the level set to sustainably meet the growing demand for energy services is not being met. The amount of money funneled into traditional energy sectors, including oil and gas, has declined in 2020 due to the global shock caused by the COVID-19 pandemic. The pandemic has reduced available investment funds in emerging economies for a sustainable recovery. Accelerating these investments and financing for the transition to clean energy in emerging market and developing countries must be increased [13-15]. In the 2020s, IEA climate-based scenarios focus on improving fuel efficiency. At the same time, it aims to create a basis for the rapid expansion of low-emission liquids and gases. There is a wide range of investment strategies in various areas of the oil and gas industry.

Figure 2.

Change in investment by different groupings of oil and gas companies, 2022E vs 2019



Source: World Energy Investment 2022, p.17

Figure 2 reveals that only the Middle East NOCs are planning to spend more in 2022 than in 2019.

As mentioned before, one of the important problems encountered in the field of renewable energy is financial problems. “Global Hydrogen Trade to Meet The 1.5°C Climate Goal” Research has listed these problems [8].

The three main cost-related business aspects of hydrogen are:

1. high cost of capital throughout the entire value chain;
2. high energy cost due to efficiency losses in the 2nd conversion steps;
3. High shipping cost.

Regarding capital cost, hydrogen technologies are produced in relatively small volumes, resulting in high specific costs.

Figure 3 indicates that investment and capital costs for renewable resources are high. Different researches suggest that the cost gap can be closed with direct economic measures or indirect policies. For example, set capacity targets, electrolyzer production capacity targets, or hydrogen quotas for certain industries do not provide economic support, but they do affect production

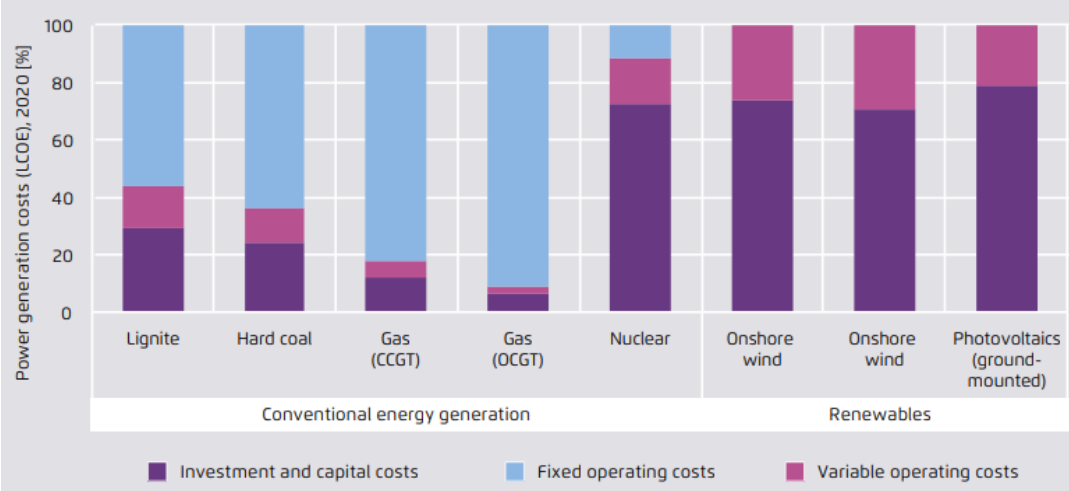
volume, promote economies of scale and effectively lead to lower costs. This has a direct impact on the cost gap [7-11].

Thus, within the framework of the economic measures taken, we can divide the vehicles used into two parts. These are those who deal with the capital cost and those who deal with the operational cost or the cost premium. They can be targeted to the supply side (electrolysis) or downstream applications (Figure 4).

One of the policy tools that can be used for cost of capital is direct financial support in the form of grants and loans to improve capital recovery.

Figure 3

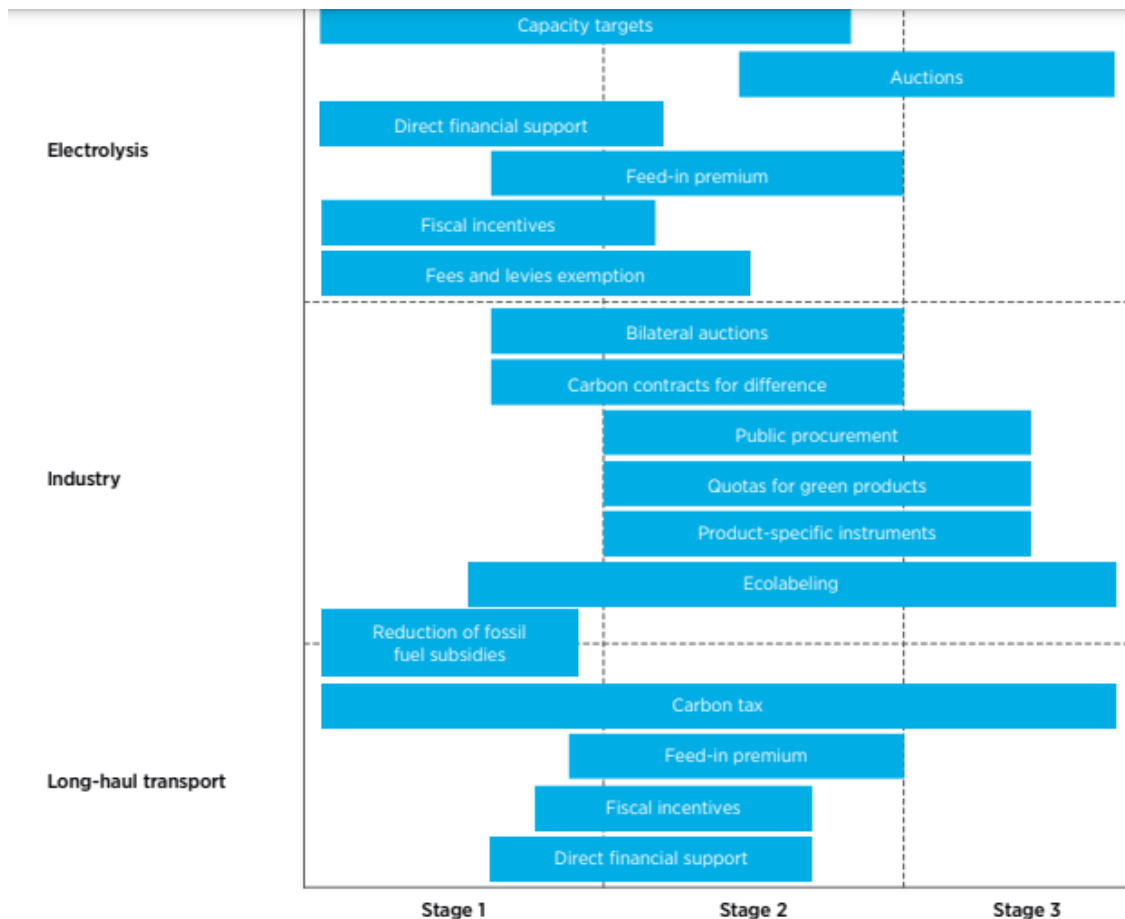
Renewables feature high fixed costs compared to conventional technologies, with the exception of nuclear



Source: Agora Energiewende, European Energy Transition 2030: The Big Picture, p.17

Figure 4.

Policies to address the high capital and operational cost across the hydrogen value chain



Source: IRENA (2021c), *Green Hydrogen Supply: A Guide to Policy Making*, IRENA, Abu Dhabi.

Guarantee premiums and exemption from taxes and duties can be used to overcome the cost contribution of electricity. Sometimes electricity can represent 60-80% of the total cost of hydrogen production [9], while taxes and fees can represent 80% of the electricity price [11]. Exemption of these taxes or use of warranty premiums on electrolyzers could close the gap between renewable and fossil-based hydrogen. This help can make a big difference in the early stages. Similar premiums can be used for finished products. For example, synthetic fuels are five to eight times more expensive than fossil jet fuel. In order to reduce this difference, technology development and productivity increase can be encouraged [11].

CONCLUSION

Countries should implement different practices in order to increase their use of renewable energy and to increase investments in this field. The volume of investments in this field can be expanded and the energy security of the countries can be ensured with different applications such as tax reductions, regulation of quotas, and loan aids.

Efficiency is one of the important factors in the use of energy resources. The use of high technologies can help increase energy efficiency. The use of such technologies also requires high investment. Energy efficiency helps maintain a stable electricity demand.

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