

Renewable Energy and its Importance on the International Level

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Abstract

The renewable energy is becoming more and more popular due to its role as a mean against the climate change. Therefore, its importance on international level is growing with every single day and a lot of funds are being invested in its development.

But is the goal of zero emissions really feasible before year 2050? The answer could be found in the rise of the green energy. During the previous year the world has undergone many changes that have affected all spheres of public life, as well as the global economy. In times of crisis, the renewable energy has traditionally performed significantly better than its competitors – the fossil fuels.

This analysis is intended to create a brief summary of the current situation about the renewable energy, its sources and the overall impact on the international business. The paper outlines some key factors about the green energy such as power capacity, global production, investments, key players and cultural factors for the future expansion. The findings were made through analysis and synthesis of empirical information, content analysis of various publications on economic and environmental topics. The results lead to

the logical conclusion that renewable energy will continue its future expansion.

Keywords: renewable energy sources, international business

JEL: Q42, Q56, F18, F23, F64

Introduction

The previous year will be remembered as a turning point in human history. The changes began with the health crisis at the beginning in Asia and the subsequent measures to reduce its effects in many parts of the world. In Europe, the measures began from March. Due to the risks for people, many restrictions were made, but they gradually affected the economy as well. This in turn put pressure on markets and industry. By doing so, the transition from one phase of the business cycle to another became a fact. Despite state support and funding, it has become clear to economists and politicians that the crisis cannot be avoided. The world economy has entered a phase of recession and decline.

Globalization has a very important role in the development of modern society. Without its manifestation, the world would not be the same. Its effects stimulate foreign trade, scientific and technological progress, but they also hide some threats that should not be underestimated. The current trend is that every next global problem spreads at an ever-

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increasing rate over time, but with mutual assistance between different countries and institutions, it can be overcome more easily and with a greater range of available resources than in the past. This means that the international business is also affected in many areas. Transport, tourism and hotel services are in a particularly difficult position. But unlike the previous economic crisis, the current one is asymmetric. It harms the mentioned sectors, but also benefits others. The IT industry and healthcare products are making significant profits. This is due to the increased use of the Internet and online services during the restrictions and the concerns of the people for their health.

The renewable energy sector is no exception from that rule and has also been affected in a way by the crisis. For the purpose of the current analysis renewable energy sources, green energy and renewable energy will be used as synonyms. There is a certain decline in its production, use and trade at the moment. But we can expect a significantly faster recovery than other sectors such as tourism and transport. The reason is that a high number of governments are investing heavily and stimulating green energy in order to reduce the carbon dioxide emissions into the atmosphere and to counter the Global Warming phenomenon. Furthermore, after the previous crisis, renewable energy recovered in a much shorter time than other sectors. Due to the increase in subsidies and government plans for additional incentives, we have no reason to think that green energy will not recover soon.

Methodology

The main purpose of this article is to find out more about the importance of renewable energy globally and to answer the question:

What is the current situation with the renewables and to what extent their impact on the economy could be expected to rise? The author does not claim to be exhaustive on the topic, but instead examines the impact of renewable energy on international business through the prism of some important details about the green energy such as power capacity, global production, investments, key players and cultural factors.

The working hypothesis is that the renewable energy has the potential to become the prime energy source for this century with the current increase in its investments and this is confirmed by the findings, on which basis future trends and a short-term prognosis are outlined.

The methods of analysis and synthesis of empirical information, plus content analysis are applied in this paper. The literature review in its core covers only a few but credible, authoritative and reliable sources such as the International Renewable Energy Agency, the International Energy Agency, the Organisation for Economic Co-operation and Development, the Frankfurt School of Finance & Management in cooperation with the United Nations Environment Programme Collaborating Centre for Climate & Sustainable Energy Finance and others.

The limitations in the scope of the research arise from the idea for it to be only a brief summary of the topic and include the following:

- The used data is from the period between 2004 and 2020 with focus mostly on the previous decade and the times, when there was a shift in the phases of the business cycle. The information is collected from free and non-confidential sources;

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- To avoid confusion and in order to simplify certain parts of the analysis as a means to adapt it to a wider range of readers, the terms 'green energy', 'renewable energy' and 'clean energy' are used as synonyms. In fact, there is a difference between them with not all renewables to be wholly green and clean. Some of them like large-scale hydropower, biomass and geothermal power plants emit a certain amount of pollution directly or indirectly. Furthermore, nuclear power is not directly subject to the current analysis, even if it is considered as an example of 'clean energy' since it does not pollute the air and hence is a zero-emission source;
- Particular attention is paid to the leading countries in the world that have the greatest impact on the renewable energy business. Only Bulgaria is included as a separate example for a county, which is in its initial stages of implementing renewables and it making progress with each day.

The result from the implementation of the research methodology in this paper is that the current level of development of the concepts and the related economic and international context are partially and briefly presented. Therefore, the article could be used as a basis for future in-depth studies on the same topic.

Renewable energy around the Globe

Nowadays, the large international corporations, which have made significant profits from the exploitation of fossil fuels over the past one hundred years, must change their way of doing business or face extinction before the end of the century. Some of them are already investing a lot of money in their R&D departments in order to be part of the

pioneers of the new energy market and to have a fair share in it. Many governments are also involved in the transition process with their policies and measures aimed at facilitating the integration of renewable energy sources into business and ensuring the further development of its infrastructure.

Still the business has a negative effect on nature. But that may change in the near future. Renewable energy sources are a possible solution. They have a smaller environmental footprint compared to conventional energy sources and have a suitable alternative for preserving the environment for future generations. Economic globalization has the opportunity to help develop green energy if investments and researches in this sector increase.

The companies working with renewable energy are increasing with each passing year. Numerous government measures by leading countries in this sphere, such as the United States, China, India, Australia, Japan, the United Kingdom, Germany, the Netherlands, France and the Nordic countries, are stimulating a smooth transition from fossil fuels to renewable energy. Bulgaria is also one of the countries where renewable energy sources are widespread and the green energy comes mostly from hydropower. According to the data of IRENA in 2018 (Renewable energy statistics, 2020), the energy produced from water sources is around three times more than the one which is produced from wind. On top of it, the hydropower alone supplies more energy to the local households than all other renewable energy sources combined. At the current moment the ratio is similar and water is still the leading energy source from the list of renewables.

Bulgaria strictly complies with the EU's targets for the usage of green energy. We can

assume that the favourable natural conditions, the Bulgarian entrepreneurial thinking and the relatively good business climate have also contributed to this. Therefore, for companies in Bulgaria, the transition to green energy is not only recommended, but becomes a necessity over the time.

Energy production from renewables

Nowadays the renewable energy sources (or renewables for short) are competing with the so-called conventional energy sources, based on fossil fuels. The share of renewable

energy is gradually increasing, but there is still widespread usage of fossil fuels due to various circumstances. The transition is slow, but government measures and programs are encouraging this change. Investors are also more interested in green energy and alternative sources than ever before. This affects the usage and implementation of energy from renewables and increases its scale. This can be confirmed by the following figure (Global trends in renewable energy investment, 2020):

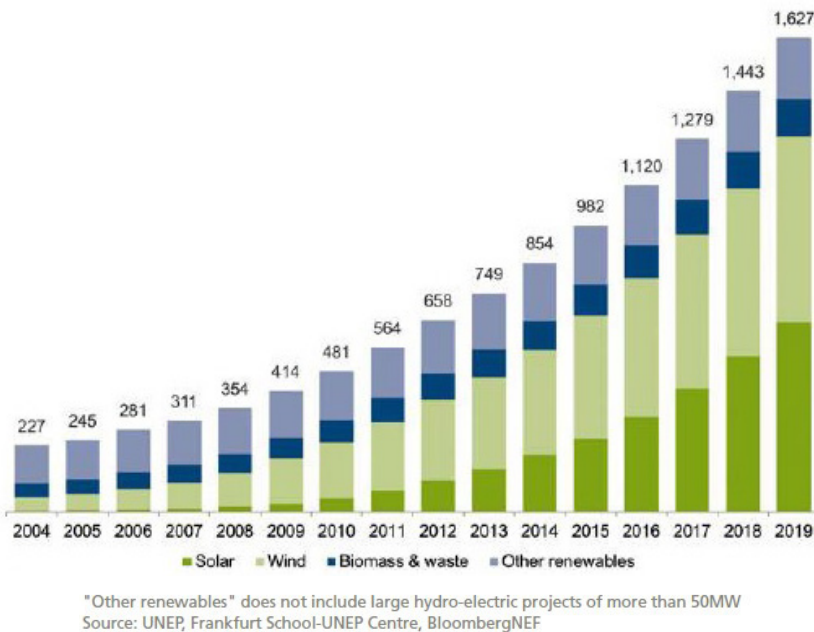


Figure 1. Global capacity in renewable power by different sources, 2004-2019, GW

The figure clearly shows the rapid growth of installations which provide renewable energy. The overall capacity has risen several times since 2004, measured in gigawatts. Over the past decade, investments in solar panels and wind plants, alongside the new innovations in technology and energy storage, have led to a huge increase in the amount of energy

received from these two sources. The already mentioned government support in countries like China, the United States and the European Union has also contributed to this. But it is important to mention that the numbers do not include large hydro-electric projects of more than 50 megawatts. If included, the numbers will be significantly higher since hydropower

from large installations has a big share in the total energy produced from renewables.

Barriers to renewable energy

Many consider renewables as something that has only positive sides. From the point of view of a clean environment and its preservation for future generations, this applies in full force to the green energy. But from an economic point of view, there are some considerations that should be mentioned. Before moving on to the investment trends we should point out the main problems and barriers to the renewable energy, which are especially significant for the developing countries around the globe.

A research (Overcoming Barriers to Authorizing Renewable Power Plants and Infrastructure, 2013), conducted by the International Renewable Energy Agency (IRENA) regarding renewable energy in Southeast Europe, could serve as an example of the different kinds of barriers on the explored topic. They are also valid for other countries and can be grouped as follows:

- Market, technical and regulatory barriers – the first group includes various barriers which are caused by different reasons such as political instability, lack of transparency, gaps in local legislation, lack of proper instructions and procedures to carry out strategic programs, the local energy market is not very competitive and integrated with a lot of third-party access to the grid, not adequately applied balancing rules, lack of transparency in cross border capacities and statistical information. Some countries also face problems with the consistency in Value Added Tax (VAT) treatment for the energy sector, obsolete and insufficient infrastructure for the transmission and distribution

of energy and even the inability of the power system to integrate new variable generation plants for renewables;

- Economic and financial barriers – in the developing countries most of the renewable energy projects are small in size and banks are reluctant to finance them in favor of the major projects, state-regulated electricity tariffs generally fail to cover the real costs of electricity supply because it is politically popular to keep them low, limited and uncertain funding outside of the EU programs, lack of fiscal and tax incentives as well as lack of innovative financial instruments other than grants. In some cases, there are additional taxes and fees leading to confrontation between industry and government;
- Administrative barriers – they are mostly focused on bureaucracy obstacles and non-transparent administrative procedures; the legislation is sometimes too complex with high transaction costs for required permits and unnecessarily stringent technical requirements, etc. Therefore, some of the small and medium investors are not able to enter the market;
- Lack of awareness, capacity and professional skills – the biggest issues from this group are insufficient professional expertise among local authorities, the lack of a political will to implement the new green energy projects and the insufficient knowledge among investors in renewable energy projects.

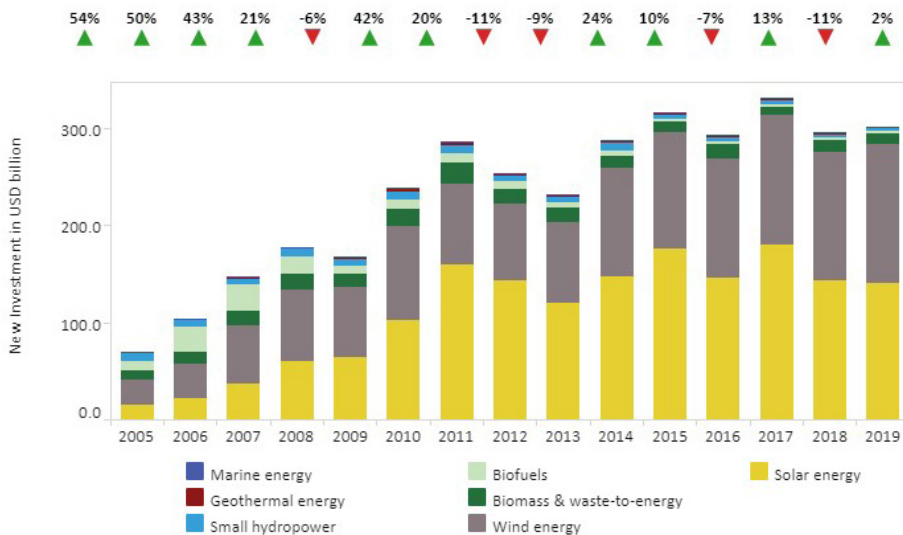
Other problems to the renewable energy which affect all countries in the world are connected to market distortions (economic crisis, trade barriers), restricted access to technology due to the confidentiality (patents) and competition between the

leading companies, high construction costs, insufficiently qualified personnel to operate with renewables, insufficient infrastructure for the transmission and storage of electricity. All those issues have a certain impact on the whole economy and on the investors' preferences.

It is worth noting that in recent years many of the already mentioned barriers are in the process of being overcome, especially in the developed countries and with the help of programs like the European Green Deal and others. That is why the total number of barriers decreases with each passing year. The leading factor for this progress and for the whole process of energy transformation to a cleaner and low-carbon energy system are the governments. They set the rules and guarantee the framework of the energy market, give incentives to the investors and help to increase the renewable energy capacity through various programs. After the successful implementation of such measures comes turn for the society and private investments.

Investing in green energy

The increase in energy production does not necessarily mean an annual increase in investment. Although both are interrelated, investors make their decisions based on a number of factors and depending on the current market trend. Sudden phenomena such as economic crises or shocks can lead to a decline in investor interest, as well as times of uncertainty and reduced state support for the sector. This means that in troublesome years such as 2009 and 2013 the investments in renewables plummeted. During the previous year the situation was similar, but the good news is that the sector usually recovers in a very short time. It seems that the European green deal will also help to increase the private investments in the sector. All this information can be illustrated with the following figure (all ups and downs are on year-to-year basis and reflect the changes in the amount, measured in percentage):



Source: IRENA

Figure 2. Global trends in renewable energy investments, 2005 to 2019, USD billions

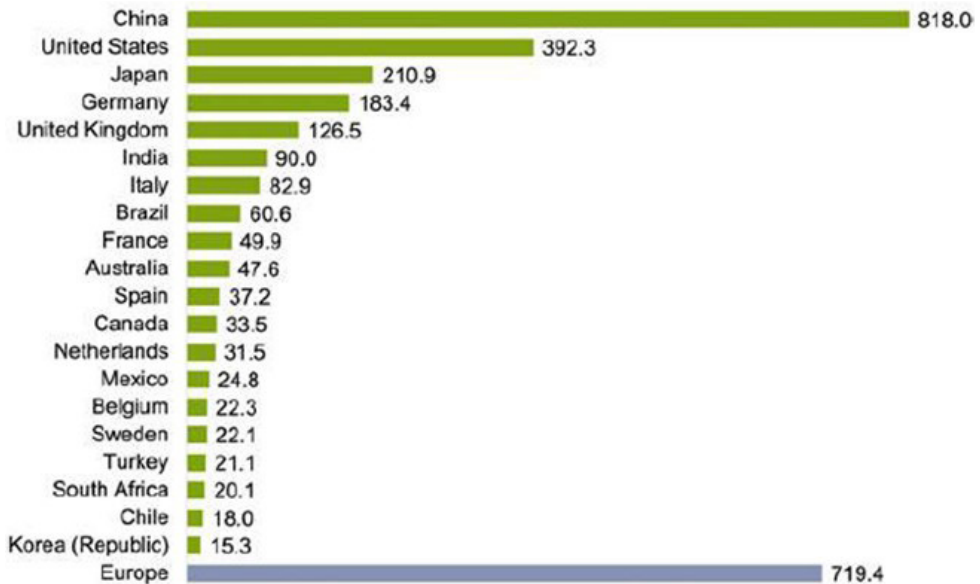
As can be seen from the data of IRENA (Finance and investment trends, 2020), the investments in green energy vary each year. On several occasions there was a decline in the numbers as for example in 2009, 2012 and 2013, but soon after that a new upsurge followed. More worrying is the plateau in 2018 and 2019, where there is a clear decline in cash inflows and an outflow of investors. The reasons should be sought in the reduction of subsidies in some countries, innovations in the field of hydrogen energy and fluctuations in the energy market caused by the change in the prices of conventional fuels. As a conclusion it can be stated that despite the fluctuations, the overall investments have doubled their size in the period between 2009 and 2019.

It is also important to mention that the effects of the current crisis will be known when the statistical data is collected and there is a full overview of the sector. The official data for 2020 and onwards is still to be disclosed. It is expected the global players on the market to remain the same with a slight drop in the investments. Still, it is more than certain that the five top countries, which are producing renewable energy (according to the Key findings of the renewables – global status report, 2020, REN21) are going to remain the same:

- China;
- The United States of America;
- Brazil;
- India;
- Germany.

For China it is normal to be at the top of the list. Among other things, the country invests in green energy installations due to the benefits for the environment and society as a whole. Of course, there are some business interests for that, too. This is also a government measure against excessive pollution and harmful carbon dioxide emissions, especially close to large industrial centres. Furthermore, the country is spending more money in renewable energy than the entire European Union combined, according to the information for the period from 2010 to 2019.

Brazil and India are not at the top of the list despite the fact that they are amongst the largest producers but their place is taken by Japan, the United Kingdom and Italy. The reason is that the two countries already possess a developed and working network for solar and wind plants (India) and hydropower (Brazil). The United States rank second place with almost 393 billion dollars for the whole period, but still much behind the amount of China and the whole of the EU. Germany is the honourable mention in the list and the leader in investments and the implementation of green energy in the whole of Europe with more than 183 billion USD invested in the sector, which is around a quarter of the total sum for the rest of the member states. The country is successfully developing infrastructure and installations for the upcoming transfer to solely renewable energy in the near future. Furthermore, its government has plans to shut down all local nuclear reactors during the next several years. Here is the summarized information for all investments (Global trends in renewable energy investment, 2020):



Source: UNEP, Frankfurt School-UNEP Centre, BloombergNEF

Figure 3. Renewable energy capacity investments, 2010 to 2019, USD billions

Green economy and its importance for Bulgaria. The industrialized countries around the world and the European Union as an organization have come to the conclusion that the green economy is the next step in global development and technological progress must be adapted to environmental protection measures and the creation of energy systems which will operate entirely on renewables. The green economy is a way to get the most out of the cleaner energy sources available and to drastically reduce the harmful effects of factories on nature. Bulgaria as an EU member state supports these changes and is actively involved in the introduction of innovations in that sphere. The whole process offers great opportunities to reduce production costs, optimize the use of nature power supply and achieve greater profits for businesses. There are also many things that need to be attended - the renewal of the industrial network in the creation of goods,

the capital investments and needed further increase in the process of scientific, technical and research development.

There are many examples of innovations which support the concept of green economy. For example, the LEDs, which are described as the lightbulbs with the largest share in production. They are energy efficient, environmentally friendly, have a longer service life and do not need repairs. But their technology is used in many more devices such as smartphones, laptops, tablets and others. With investments in LED technology, the private sector has a key role to play in delivering green growth through trade, research and development, innovation and resource efficiency. The business should be more encouraged to look for opportunities related to the green economy, including through corporate social responsibility, life cycle and supply chain analysis, as well as through new sustainable business models.

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As can be comprehended from what has been written so far, the green economy hides many opportunities and advantages for society and the achievement of a better standard of life with care for the world in which future generations will develop. But it also hides challenges that are not only financial but also psychological - related to human attitude and temperament. Such an example could be made of lobbyism. The major players in the fossil fuel market have lobbyists who ensure the further development of this industry. But as a solution to this issue, many developed countries have stopped or reduced the subsidies for companies which are working exclusively with fossil fuels.

Other innovations include breakthroughs in the techniques for absorbing solar and wind energy, as well as biomass. The construction of functional facilities for their exploitation requires highly qualified specialists and will help to create new jobs or so-called green jobs. This in turn will stimulate education and specialization in this direction. The diverse opportunities for Bulgaria, which are offered by the green economy are as follows: sustainable agriculture, alternative energy sources, new jobs, opportunities for recycling of household waste, development of photovoltaic installations in the country, state support for green business and funds from European programs.

Culture and green energy

The business with renewable energy sources is dependent on the role of the cultural factor. According to the dimensions of the famous Hofstede's model, it is clear that countries which invest heavily in renewable

energy have certain similarities. For example, nations with a low power distance, such as the Scandinavian countries and the ones in Western Europe, but also Australia, Canada, and the United States, are among the main investors in renewables. They are also open to uncertainty and innovation, and the still developing green energy could be put in this category. These are industrialized countries that accept the risk and are ready to invest in something new not only for profit, but also for social purposes such as belief in technological progress, reduction of harmful emissions and protection of the natural environment for future generations. But as already mentioned before, there is an exception to every rule - this is China. This country can be defined as a phenomenon, because in addition to being considered as a technology giant, in recent years the Chinese are reversing stereotypes and they themselves are beginning to transfer activities and export their business abroad. This shows the maturation and the great economic power that their country has accumulated in the last decade. As for renewables - it is no wonder that the local government puts so big efforts in the development of power plants with green energy, along with their investments in nuclear and other types. It is interesting to note that China has also many nuclear power plants under construction.

The history of China's "green revolution" has key points:

- desire to experiment;
- government support for all industries;
- focus on renewable energy since the previous financial crisis;

- search for a measure to reduce the air pollution and carbon emission trading;
- growing need for electric power.

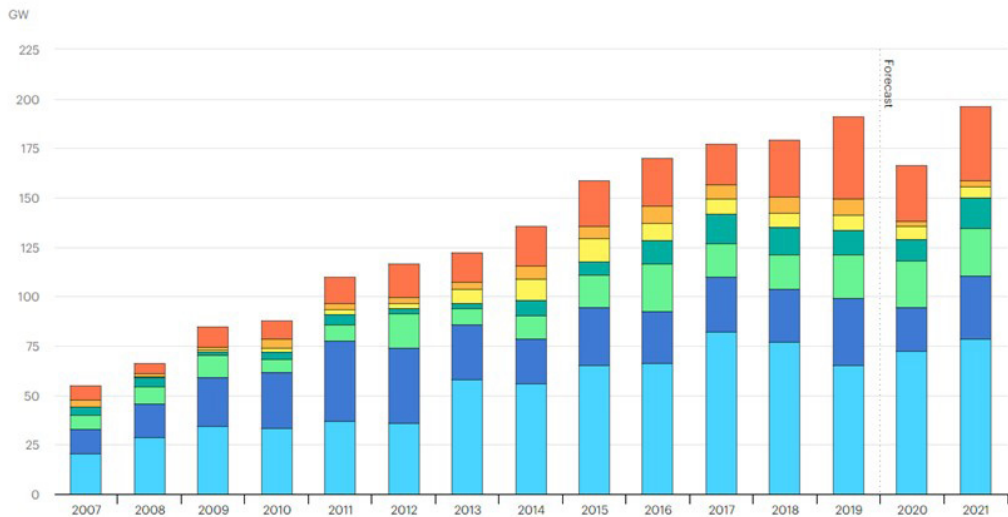
In the previous decade, many steps are done in order to pursue the EU's green policy. The new European Green Deal aims to make the local economy sustainable. But similar measures are also taken by the whole world during the recent years by OECD (Investing in climate, investing in growth, 2017). Starting with separate waste collection and ending with the exchange of experience, technology transfer, innovative approaches and following the best practices of the leading countries in the world. The power plants for alternative energy sources - photovoltaic systems, wind energy and hydroelectric power plants are also successfully developed.

An important prerequisite is the participation of the civil society in the whole process of transition to green economy. The role of the cultural factor helps to integrate the population to the universal norms of behaviour towards the environment. This should be done at all levels and the people should be trained to ensure the correct perception of the concept of a green society and environmental protection from a very early age. Governments must also take measures to mitigate the possible partly resistance from certain individuals or companies that accompany any change. In this case it is likely that the opposition will come from oil and gas stakeholders. But with undertaking such actions the result will be in the form of economic, social and environmental progress.

The renewable energy sector in 2020 and 2021

Most of the forecasts point out that due to the lockdowns and the uncertainty on the market in 2020, the investment levels dropped significantly, but not as much as the ones in fossil fuels. A recovery is expected in 2021. The public spending in renewables is bigger in comparison with the private capital spending. The shock is also an opportunity for the sector to be more resilient and secure in the future. Still there is a need for better networks and storage systems and the investors seek for an innovative solution about that matter.

The International Energy Agency (EIA) has made a prognosis in the middle of 2020 about the future consumption of energy. The specialists predict that in the next twenty years the world will have two directions – east, where the fossil and nuclear energy will still be dominant on the emerging markets and west, where the renewable energy sources will take the leading role as a prime provider of power supply in the developed countries. They also expect in the upcoming years the solar and wind energy to continue its growth in capacity and to receive the majority of the investments. Again, the role of the governments is the key and their decisions will show the way for the future development of the market and the usage of opportunities such as creating new jobs, reducing carbon dioxide emissions and economic development of the whole energy sector. Here is how the EIA's prognosis (Renewable energy market update - Outlook for 2020 and 2021, May 2020) for capacity growth in the sector looks like exactly:



Source: EIA

Figure 4. Short-term forecast for renewable energy capacity additions, 2007 to 2021, GW

The predictions are for just above ten percent drop in the new installations in 2020 due to the supply chain disruptions, lockdowns and other measures which hinder the progress. Before the crisis, 2020 was expected to be a record year for new capacity additions and also investments in renewables. However, due to the current situation, the prognosis is that only in 2021 the new installations will be just above the levels of 2019. The United States and the People's Republic of China are anticipated to be the key drivers for the energy sector in the next two years.

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investors seek an innovative solution about that matter.

The future trends for renewable energy sources could be summarized as follows:

- The business with renewable energy sources is part of a global system and is susceptible to various changes in the economic or political environment. The rise in their usage is mostly driven by government policies and subsidies, including in times of crisis.
- The private investors seek profits from the renewables and the governments see them as a measure for reducing the effects of global warming, so their implementation is a win-win situation. The global investments are expected to restore their levels from 2019 in 2021.
- Investing in renewable energy sources in a short-term period could help the companies to reduce the uncertainty from the changes of the prices on the volatile market for fossil fuels, but also to

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secure a cleaner and safer future for the next generations.

- The energy from renewable sources will have a major impact on the international economy in the near future, especially after the expected recovery in 2021. The long-term prognosis is they are going to become the leading world energy source in the middle of the 21st century.

Conclusion

Renewable energy is becoming more and more important for the world with each passing day. With goals for eliminating the negative effects on nature from air pollution and reducing the carbon emissions, renewable energy sources are a good option for achieving such targets and a way for overcoming the global warming phenomenon. Such a thing could be achieved not only with environmental and political measures, but also with economic ones. The business is an important aspect of every sphere in today's life and has the potential to tip the scales of our struggle with climate change.

Renewable energy capacity growth, investments and culture are important factors for understanding its role in the modern times. It is not a surprise that the current crisis affected them, but all the negatives could be removed if the government and international targets are achieved as planned, even if there is a delay. Still, the role of private funding and corporate investors should not be underestimated since they could stimulate further growth in the sector.

Future short-term prognosis includes a slow recovery for the renewables to the levels from 2019 and then further growth with not so high rates as in the booming years. The renewable energy incentives in many countries around the Globe and the falling

technology costs due to current innovations are powerful boosts for the green economy. Furthermore, the energy transition is going to accelerate its speed due to the expected consumption of available fossil fuel reserves in the not-so-distant future. All this leads to the logical conclusion that in the current century, renewable energy sources will gradually increase their importance internationally. This will serve as a new starting point in the development of future generations.

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