RUDN Journal of Economics
Вестник Российского университета дружбы народов. Серия: Экономика
ISSN 2313-2329 (Print); ISSN 2408-8986 (Online)
2022 Vol. 30 No. 4 499–511
http://journals.rudn.ru/economics

ЭКОНОМИЧЕСКИЕ И СОЦИАЛЬНЫЕ ТРЕНДЫ: РАЗВИТИЕ МИРА ПОСЛЕ COVID-19

ECONOMIC AND SOCIAL TRENDS: POST-COVID-19 DEVELOPMENT

DOI: 10.22363/2313-2329-2022-30-4-499-511
UDC 339.9

Research article / Научная статья

Global environmental agenda: Developments ahead, sustainable energy-ecological dimensions for Russia, Japan, and Southeast Asia

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Abstract. The study explores the contemporary situation within the global environmental agenda. This topic is vital to humanity and significant in sustainable development for years ahead. It has been already widely acknowledged that if proper measures aimed at environmental protections aren't taken in the foreseeable future the Earth will face a huge, large-scale, and multidimensional crisis that will affect many aspects and directions of global development ahead. Thus, in 2021, despite the ongoing COVID-19 pandemic, global leaders held several events in the framework of which they made attempts to come closer to understanding and working out new environmental parameters and ecological standards under which the countries will act approximately up to the middle of the 21st century. The goal of eliminating or drastically reducing coal use, as well as focusing on the development of renewable energy sources, are regarded as critical pillars of the new environmental strategies.

Keywords: decarbonization, climate summit, ecology, renewables, green energy, coal, South East Asia, Russia, Japan

Article history: received June 10, 2022; revised August 14, 2022; accepted September 02, 2022.

For citation: Mishchenko, Y.V. (2022). Global environmental agenda: Developments ahead, sustainable energy-ecological dimensions for Russia, Japan, and Southeast Asia. *RUDN Journal of Economics, 30*(4), 499–511. https://doi.org/10.22363/2313-2329-2022-30-4-499-511

Глобальная экологическая повестка: развитие и аспекты устойчивого энерго-экологического развития для России, Японии, Юго-Восточной Азии

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Аннотация. Исследуется современная ситуация в области глобальной экологической проблематики. Эта тема крайне важна и актуальна для всего человечества и имеет больше значение для устойчивого развития на годы вперед. Уже широко признано, что, если в обозримом будущем не будут приняты надлежащие меры, направленные на защиту окружающей среды, весь мир столкнется с огромным, масштабным и многоаспектным кризисом, который затронет многие аспекты и направления глобального развития в будущем. В подтверждение этого в 2021 г., несмотря на продолжающуюся пандемию COVID-19, ведущие мировые лидеры провели ряд мероприятий, в рамках которых предприняли попытки приблизиться к новому уровню понимания и разработки новых экологических стандартов, в соответствии с которыми страны будут действовать примерно до середины XXI в. Цель отказаться или, по крайней мере, резко сократить использование угля, а также сосредоточиться на развитии возобновляемых источников энергии рассматривается в качестве важнейших столпов новых экологических стратегий и реалий.

Ключевые слова: декарбонизация, климатический саммит, экология, возобновляемые источники энергии, зеленая энергетика, уголь, Юго-Восточная Азия, Россия, Япония

История статьи: поступила в редакцию 10 июня 2022 г.; проверена 14 августа 2022 г.; принята к публикации 02 сентября 2022 г.

Для цитирования: *Mishchenko Y.V.* Global environmental agenda: Developments ahead, sustainable energy-ecological dimensions for Russia, Japan, and Southeast Asia // Вестник Российского университета дружбы народов. Серия: Экономика. 2022. Т. 30. № 4. С. 499–511. https://doi.org/10.22363/2313-2329-2022-30-4-499-511

Introduction

Today, the environmental agenda has become a global trend of sustainable development. It is in demand more than ever in the world community, since it is the environment that will largely determine the standards of life for humanity and our future generations. And already, at present, economic circles, entrepreneurship, and businesses are understanding this prevailing trend in the modern world trend and actively implementing it into their activities.

For these reasons, environmental issues have become the focus of attention among scientists globally. In recent years, in particular, its relevance has become extremely high. In this study, the author attempts to analyze the latest and most significant events in the international environmental agenda of 2021, the most significant decisions taken by the global community to strengthen commitments in the field of environmental aspects of sustainable development. The author tries to estimate the scope of interests of different countries in joining new global environmental initiatives as well as to predict how, from a technological point of view, different countries of the world will be able to make the transition to clean energy if they abandon traditional, hydrocarbon-derived energy. In addition, an important research question formulated by the author is the assumption that despite the fact that not all countries of the world are yet ready to officially sign up to the most complex and latest environmental obligations, nevertheless, the frames of a new global environmental consciousness have already been formed so clearly and firmly that countries and major global corporations have to take this into account while making their economic and business decisions.

Materials and Methods

A combination of some widely used methods forms the methodological basis of this research. Notably, the methods used in this study include both qualitative and quantitative tools. Qualitative tools of research are traditional survey analytic methods like systematization, deduction, induction, and retrospective and dynamic analysis. Quantitative methods include statistical analysis, ranking, etc. The study's primary purpose is to identify the current global ecological situation and what kind of effort the countries are making to soften or prevent the crisis in this field.

The author in the research relied on various works published in such Russian and international scientific journals as Energy Policy, Climate Policy, Energy for Sustainable Development, International Economy, Politics and Governance, etc., and information and statistical data from the official websites of specialized energy-related international organizations and corporations, like British Petroleum Global, International Renewable Energy Agency, Japan's Agency for Natural Resources and Energy. To aid the research, statistical data and materials from the United Nations and Asian Development Bank were also analyzed and used.

Results and Discussion
Contemporary CO_2 Emissions Situation

In late October — November 2021 two major global events took place in the field of ecology and environmental protection. The two world ecological summits were some of the most important global events in 2021, bringing together many world leaders and showing that there are still some important unresolved issues in the world, in addition to COVID-19, which also still need to be given high priority. Ecology and the fight against environmental pollution are among such issues of paramount importance.

Table 1

Carbone Dioxide Emissions Worldwide, 2020

Country, Region	Million tonnes	Share in global emissions, %
Total World	32 284,1	100
USA	4457,2	13,8
Russia	1482,2	4,6
India	2302,3	7,1
China	9899,3	30,7
Japan	1027	3,2
Indonesia	545,4	1,7
Malaysia	256	0,8
Philippines	127,4	0,4
Singapore	211	0,7
Thailand	277,1	0,9
Vietnam	283,9	0,9
Asia Pacific	16778	52
Africa	1254	3,9
Middle East	2110,1	6,5
CIS	2039,5	6,3
Europe	3596,8	11,1
North America	5348,1	16,6
Central and South America	1157,7	3,6

Source: BP Statistical Review of World Energy 2021, BP Global. P. 15.

The data in Table 1 shows that the world's largest greenhouse gas emitters are located in the Asia-Pacific region, North America (USA), and Europe. China remains the largest CO_2 producer in Asia. In total, Japan and the Southeast Asian countries — key emitters of greenhouse gases — account for 8,6 % of global CO_2 emissions. This is significantly less than the United States (13,8 %) and China (approximately a third of global emissions), but it is almost twice as much as Russia pollutes the environment. It proves the high importance of the environmental agenda of the current global summits, including for Japan and Southeast Asian countries, in the context of determining their further actions, commitments, and cooperation to reduce their carbon footprint.

So, among its urgent tasks till 2050, Japan has designated a complete "decarbonization", which would mark the culmination of many years' efforts to create a "low-carbon society". This concept implies the construction of a new model of a society with a high ecological consciousness, which strives to gradually abandon the use of fossil fuels by reducing the demand for energy resources and reducing the

energy intensity of GDP. In 2020, Japan already showed one of the lowest in the world levels of energy intensity of GDP: 0,076 koe/ $15p. Indonesia also has quite a low energy intensity of GDP indicator: 0,071 koe/ $15p. Other Southeast Asia, though has a mild situation in these terms, generally shows worse indicators. Russia is the country with the 4th largest level of energy intensity of GDP — 0,204 Koe/ $15p in 2020 which may be considered quite energy inefficient[1].

At the same time, it should be taken into consideration that all these countries have different trajectories of energy and ecological development based on their individual socio-economic history and peak years of industrial productivity and emissions. The so called "Eastern Bloc" countries, which include Russia, all sustained a decline in emissions after the collapse of the Soviet Union (Lamb, Grubb, Diluiso, Minx, 2022). Japan is closer to the group of "long-term decline" countries, which have undergone a continuous period of emissions reductions since the 1970–80s. The group of developing countries is another story. Nowadays, the carbon footprint of China dominates globally, but many poorer developing countries will peak their emissions later than China. If developing nations' emissions don't decline immediately after reaching their peak levels, then developing countries will inevitably occupy nearly all of the global carbon budget (Anderson, Broderick, Stoddard, 2020).

The G20 Summit in 2021 and its top ecological agenda

On October 30–31, the G20 Summit on environmental commitments was held. The G20 leaders reaffirmed their commitments to solving several important issues for the whole world. The leaders noted their concern about how the current protracted COVID-19 crisis affects the possibilities of practical implementation of the United Nations 2030 Agenda for Sustainable Development (Weiland et al., 2021).

The participating countries confirmed the relevance of approaches to the objectives of the Paris Climate Agreement and declared the need to contain "global warming" at 1.5 °C (Falkner, 2016). The countries also noted their readiness to gradually move to "carbon neutrality" in the energy sector by the middle of the 21st century. The EU and Japan have already designated 2050 as the planned date for achieving this goal. China and Russia have determined for themselves the possible fulfillment of this task by 2060. Indonesia sets a goal to become carbon neutral by 2070[2]. Indonesia probably gives itself more time to achieve this ambitious goal, as it is still among the top ten countries — the largest emitters of greenhouse gases in the world[3].

[1] BP Global (2021). BP Statistical Review of World Energy 2021. Retrieved May 15, 2022, from www.bp.com/en/global.

[2] Indonesia Can Achieve Net Zero Emission Before 2070 (2021). *Institute for Essential Services Reform* (IESR), Indonesia. Retrieved May 14, 2022, from http://iesr.or.id/en/indonesia-can-achieve-net-zero-emission-before-2070

[3] Climate Transparency Report 2021: Real Climate Change Impacts, Indonesia Needs to Increase its Climate Action. Institute for Essential Services Reform (IESR), Indonesia. Retrieved May 14, 2022, from https://iesr.or.id/en/climate-trasparency-report-2021-real-climate-change-impacts-indonesia-needs-to-increase-its-climate-action

COP-26 and a global resolution on coal

In 2001, it was predicted that non-conventional fossil fuels would become a future key arena at the intersection of climate and energy policy. China (around 130 coal-related projects, including 48 relatively new ones) and Russia are considered actors who have paid little attention to halting fossil fuel extraction. Thus, "Coal Elimination Treaty" seems appropriate in these circumstances (Kühne et al., 2022).

On November 4, on the sidelines of the 26th session of the Conference of the Parties of the UN Framework Convention on Climate Change (UNFCCC), a statement on the transition from coal to clean energy was signed, in which 46 countries announced their decision to completely abandon the use of coal in the future. Developed countries are ready to do this in 2030 or "as soon as possible after this deadline", and developing countries — in 2040 or "as soon as possible after this deadline". Indonesia and Vietnam rank 7th and 9th in the world, respectively, in the use of coal power, but they also signed this statement, as did Singapore. Among the countries that have not yet made commitments to abandon coal, there are large coal producers and consumers — China, the USA, India, Japan, Australia, and Russia[4]. The reluctance to sign this statement by the US can probably be explained by the fact that some American states still depend heavily on coal. However, the USA has stated that by 2035, it intends to phase out coal-fired thermal power plants. China, USA, India, Australia, Russia, and Indonesia are among countries where coal industry is still currently quite material while nearly one fourth of total CO_2 equivalent emissions globally still come from coal industries (Newell, Simms, 2020).

As for Russia's refusal to sign this statement, this may be explained by the terms of such agreements. The readiness to abandon coal by some "weaker" countries can mean that the initiators of this agreement will allocate them certain financial resources (it was announced that $12 billion was distributed to some countries to save tropical forests after the signing on November 2 the pivotal COP26 Glasgow Leaders Declaration on Forests and Land Use). However, Russia is a voluntary donor, not a recipient of climate financial funds, so neither our country nor China would be given financial assistance. Thus, for our countries, this step remains rather a matter of voluntary responsibility and manifestation of ecological consciousness. While Indonesia and Vietnam are probably interested in being among the recipients of various global climate finance programs' funds.

Still, whether developed countries will abandon coal by 2030 and developing countries — by 2040 is debatable and far from certain. It is not yet so clear how the countries are going to achieve it technologically. If the main burden in the future energy mix is planned to be put purely on renewable energy sources, then Japan's case should be taken into consideration. Thus, the country is highly advanced in technology and cares for environmental protection. But Japan's decarbonization has actually failed to improve drastically for 25 years. Japan's carbon emissions per unit of gross domestic

[4] Almost 50 countries announced at COP 26 that they would abandon coal in the future. *TASS,* 04.11.2021. Retrieved May 14, 2022, from https://tass.ru/obschestvo/12845893

product (GDP) have remained virtually unchanged since the 1990s; Japan still produces about 2.5 tons of CO_2 for every $10,000 of its GDP.

China is also successfully developing and implementing renewables in its energy mix. It is Asia's leading country in terms of the use of hydropower, wind and solar energy. But at the same time, China still remains the largest world producer of CO_2 emissions (30,7 % of global amount). It means that while renewable energy implementations are undoubtedly beneficial to the environment, they are still difficult to quantify precisely. Japan and China's situations show that right now it is difficult to predict whether the deadlines for coal abandonment would really be met. There is always a possibility that a large-scale, global energy transition from hydrocarbon use to the use of clean energy will occur only after the depletion of hydrocarbons.

In the framework of COP26, the Asian Development Bank launched the Energy Transition Mechanism program with the Philippines and Indonesia as participants, which aims to reduce the use of coal and decommission the coal infrastructure by 50 % over the next 10–15 years. Targeted funds will be used for the early termination of operation or conversion of coal-fired power plants and for the development of clean energy. The President of the Asian Development Bank, Masatsugu Asakawa, said that this program will contribute to the fight against climate change in the Asia-Pacific region, and Indonesia and the Philippines can become pioneers in excluding coal from the energy balance of the region and shifting their economies to the path of low-carbon development. The Ministry of Finance of Japan announced the allocation of $25 million grant to the Energy Transition Mechanism[5]. The step is reasonable as Indonesia, Southeast Asia's largest economy, ranks globally among the major countries in terms of coal-fired power plant expansion. Even despite falling costs for key renewable energy sources like solar and wind power generation, their role in Indonesia's power sector has remained modest (Ordonez et al., 2022). Partly this fact can be explained by the following circumstances: many developing countries, including Indonesia, Vietnam, etc., used to receive international financing for both coal and renewables. Thus, total coal financing in 2013–2017 received by Indonesia was $17884 million, and by Vietnam, $9644 million. In the same period, Indonesia received $1711 million and Vietnam $154 million of total renewables financing (Edianto et al., 2022). It shows that 5 years ago, coal financing still prevailed in ASEAN. But recently, the situation has started to change. Thus, since 2019, Vietnam has emerged as the leader in wind energy and solar energy development in ASEAN. It had the largest installed solar and wind capacity in 2019, even overtaking Thailand. By 2021, the country's total capacity of solar PV reached 16500 MW, which surpassed the original 2020 target of 850 MW (Do et al., 2021).

[5] ADB, Indonesia, the Philippines Launch Partnership to Set Up Energy Transition Mechanism. *Asian Development Bank.* Retrieved May 15, 2022, from https://www.adb.org/news/adb-indonesia-philippines-launch-partnership-set-energy-transition-mechanism (accessed: 15.05.2022).

The feasibility of the "Energy Transition"

The world's intention to secure the environment for future generations is understandable. When major hydrocarbon producing countries deplete their reserves, the world must be prepared with alternative reliable energy sources. The cleaner energy it would be, the better for the whole global community. This ambitious task currently necessitates a significant increase in investment in clean energy transition supporting projects. In 2021, total funds reached $755 billion. Figure 1 shows that China, the US, Germany, Japan, South Korea, and some other countries are among the main investors.

	Country	Investment (Billions of US$)	% of Global Total
1	China	266	35
2	United States	114	15
3	Germany	47	6
4	United Kingdom	31	4
5	France	27	4
6	Japan	26	3
7	India	14	2
8	South Korea	13	2
9	Brazil	12	2
10	Spain	11	2

Figure 1. Top Global Investors in Energy Transition, 2021

Source: ChinaPower CSIS 6.

Russia is not among the leading countries investing in a clean energy transition. Russia is an example of an energy exporting country that may face risks and socioeconomic difficulties as a result of the clean energy transition. It definitely will have a major impact on the Russian economy, leaving less room on the world market for fossil fuels (coal, oil, natural gas) and carbon-intensive products, which traditionally form the basis of the Russian economy and Russian exports (Yulkin, 2019).

Japan's case

After the accident at the Fukushima-1 nuclear power plant in 2011, Japan had to increase its use of imported coal for more intensive use of existing thermal power plants. Japan did not sign the COP26 participants' promise to abandon coal because it also included a commitment not to participate in the construction of coal-fired power plants at home or abroad. But these emerging global realities of the new ecological consciousness have already begun to affect the implementation of some commercial

[6] How Is China's Energy Footprint Changing? *ChinaPower CSIS.* Retrieved May 15, 2022, from https://chinapower.csis.org/

projects, including those between Japan and Southeast Asian countries. In December, 2020, the Japan Bank for International Cooperation (JBIC) signed a loan agreement for approximately US $636 million for the implementation of the Vung Ang 2 coal plant project in Vietnam. It was also assumed that Japanese private financial companies would participate in joint financing (Mizuho Bank, Sumitomo Mitsui Banking Corporation, Sumitomo Mitsui Trust Bank, Mitsubishi corporation, etc.). However, under the influence of the appeal to JBIC from 128 organizations from 39 countries, in January 2021 it became known about its withdrawal from the project.

Also in February 2021, Japanese Mitsubishi Corporation pulled out of the Vinh Tan 3 coal-fired power plant project in Vietnam after pressure from activists and investors over fossil fuel investment (Nguyen & Helgenberger, 2021). These situations are unlikely to create havoc and risks for Vietnam's electricity supply, as already back in 2012, 99 % of the country's total population had access to electricity (Mishchenko, 2018). But the case demonstrates that the requirement not to support coal-fired power generation in the future and not to promote the expansion of coal use will be reflected not only in official documentation and statements by leaders of countries at global summits, but these are new realities.

Japan still receives about 30 % of its electricity through the use of coal as a primary energy source. The country plans to reduce this figure to 19 % by 2030, but the deadlines for the complete abandonment of coal use have not been set yet[7]. Also a common problem is the limited access to cheap low-emission electricity as well as electricity price uncertainty while industries try to switch from fossil fuel to electricity (Chiappinelli, 2021). Progress in introducing renewable energy sources and restarting nuclear reactors remains slow, and the country is not yet ready to make such commitments to the international community. The 6th Strategic Energy Plan, updated in 2021, provides that by 2030, the use of renewable energy sources as the main source of electricity will be a priority. Also, the document confirms that the stable use of nuclear energy will be encouraged, but only on condition of public confidence and approval, as well as compliance with the highest safety standards[8].

Japan is among countries that pioneered the current global agenda on the transition to carbon neutrality. The country has been trying to form a so-called "low-carbon society" for a long time. This task was outlined in connection with Japan's obligations under the Kyoto Protocol. In 2016, Japan ratified the Paris Climate Agreement (Lu et al., 2022). By participating in these major international treaties, Tokyo contributes to countering global climate change. The expansion of commercial use of renewable energy sources is considered a priority technological solution in achieving decarbonization objectives. The planned doubling of their share in the energy mix requires not only administrative

[7] Juntaro Arai U.S., Japan, China and India missing from COP26 coal pledge. *Nikkei Asia*, 05.11.2021. Retrieved December 05, 2021, from https://asia.nikkei.com/Spotlight/Environment/Climate-Change/COP26/U.S.-Japan-China-and-India-missing-from-COP26-coal-pledge

[8] Outline of Strategic Energy Plan (2021). *Agency for Natural Resources and Energy, METI Japan.* Retrieved May 15, 2022, from https://www.enecho.meti.go.jp/en/category/others/basic_plan/pdf/6th_outline.pdf

measures to popularize them (like "green tariffs") but continuous technological improvement. In the same context, the development of smart power systems is now actively evaluating in Japan (Mishchenko, 2021). "Smart power grids" is today one of the most popular areas of development of energy technologies and R&D in Japan and the world, symbolizing the eternal dream of mankind about a robotic future. It fully reflects the current trends of the so-called "industrial revolution 4.0" unfolding in the world right now.

As for Southeast Asian countries, under the influence of the prevailing global trends of abandoning coal, decarbonization, and achieving carbon neutrality, some of them are willing to participate in these initiatives, but it is still not entirely clear at the expense of which domestic energy resources they will carry out this "energy transition". If a simple replacement of coal hydrocarbons with other sources (like natural gas) is meant, within the framework of which coal-fired thermal power plants will be replaced with gas ones over the next decades, then this process can hardly be considered a full-fledged "Energy Transition". It is obvious that now countries such as Indonesia, the Philippines, and Vietnam are trying to embark on this path using broad opportunities for access to international financing, but still it is under consideration whether these countries have the technical capabilities to implement the ambitious "energy transition" plan that they signed up for at the international summits.

Russia, as a massive hydrocarbon exporter, prefers to take a more cautious, observatory position.

Renewables and nuclear energy as "Energy Transition" options

Decarbonization of the economy is an essential process to address climate change. It can be achieved through the so called "energy transition", which means transitioning from the production and use of fossil fuels to more renewable and sustainable sources of energy (Thomas et al., 2022).

The global transition to clean energy is aimed at solving the climate problem by switching to low-carbon and carbon-free energy. Renewable energy sources and nuclear energy are two examples of new clean, environmentally friendly energy resources.

Table 2 describes the parameters of the use by Asian countries of three types of "green" energy sources: hydropower, wind energy, and solar energy. The countries are ranked in descending order of the volumes of electricity produced by them in 2019 using these types of resources. China is the leader in all three areas — it shows the largest volumes of electricity production using environmentally friendly resources. India is also one of the leaders in these areas, as well as Japan, which is usually somewhere near the top in this ranking. The paradox of the situation is that China, with all its obvious efforts and even distinctive successes in the development of renewable and clean energy, remains the world's largest emitter of carbon dioxide (around one third of global emissions).

Table 2

Renewable energy in 2015–2020

Country	Capacity, MW				Production, GWh		
	2015	2017	2019	2020	2015	2017	2019
Japan	67 486	84 187	99 269	103 490	146 098	168 028	186 259
Brunei	1	1	1	1	1	2	1
Cambodia	975	1059	1505	1589	2225	2815	4250
Indonesia	8574	9459	10 300	10 554	33 679	43 201	47 563
Lao PDR	4398	5067	6144	7437	16 008	19 521	18 972
Malaysia	7551	7333	8047	8699	16 724	28 036	28 919
Myanmar	3267	3400	3452	3448	10 875	13 507	13 229
Philippines	5625	6424	6762	6837	20 317	22 574	21 443
Singapore	251	327	490	548	2107	2242	2262
Thailand	7968	10 243	11 857	11 991	22 529	36 005	47 243
Vietnam	16 208	18 214	23 722	35 649	57 491	89 443	98 282
Russia	51 781	52 170	53 910	54 898	169 805	186 947	197 725
US	194 900	229 677	262 733	291 680	568 439	718 174	767 035
India	78 477	105 149	128 298	134 257	197 631	209 262	271 163
China	479 103	620 846	758 869	894 879	1 381 355	1 648 541	1 986 041
Total	1 852 768	2 186 145	2 542 035	2 802 004	5 516 427	6 222 600	6 963 450

Source: Renewable Energy Statistics 2021. International Renewable Energy Agency (IRENA). P. 2–9.

As for nuclear energy use in world's electricity generation, about 10 % of it comes from a nuclear source. On the whole, the Asia Pacific region accounts for almost one fifth of total nuclear energy consumption. Of course, nuclear power plants have the potential to replace coal, at least coal-fired plants[9]. Asia Pacific, more than any other regions of the world, remains dependent on coal in its generation mix (approximately 57 %), a far higher share than in any other region. Such realities define the urgent need for Asian countries to decrease the use of coal as soon as possible. One reliable way for it may be to shut down coal-fired power stations. Nuclear energy generation in Asia right now is also not high — no more than 4–5 % of the total generation mix. Renewables (without hydroelectricity) account for up to 10 % of total electricity generation. In contrast, generation in Europe is spread more evenly between renewables, nuclear power, natural gas, any hydro. North America relies on gas-fired power plants heavily but other generation options are well balanced against each other.

[9] Nuclear Energy for a Net Zero World (2021). *International Atomic Energy Agency*, Vienna, 09.202. Retrieved May 20, 2022, from https://www.iaea.org/sites/default/files/21/10/nuclear-energy-for-a-net-zero-world.pdf

Conclusion

Recent years have marked some major international summits and high profile global events in the field of ecology. Important decisions of the leading countries in the world on measures to protect the environment and counteract global warming were announced. An increasing number of countries are expecting to reach the level of "carbon neutrality". In addition, at the COP26 Conference, many countries (including those from Southeast Asia) signed a general statement of intent to abandon the use of coal in the future. This will most likely allow these countries to access international funding to implement these plans. However, it is unclear with what other energy sources coal will be replaced drastically in developing countries — whether it will be the replacement of coal-fired thermal power plants with gas-fired ones, or whether they will be able to increase the share of renewable energy sources in their energy balance over the coming decades. Japan and some other leading nations, like Russia, China, the US, etc., have not signed a statement on the refusal to use coal, but this global prevailing trend is already reflected in the parameters of international business participation in the construction of coal-fired thermal power plants abroad. Developing countries in their plants to construct new coal plants are already losing global investors. Japan started its withdrawing from such projects in 2021. Thus, we can conclude that an absolutely new environmentally friendly consciousness is being formed right now globally.

Nuclear energy is also considered a contributor to the clean energy transition as its production does not emit CO_2. However, in the event of an atomic accident, atomic power generation still poses risks of radioactive pollution, which is equally harmful to the environment and the economy. Renewables are widely considered as the future source of clean and sustainable energy. While Europe has already reached quite a good balance of various energy sources in electricity generation, including a spectacular share of renewables, and North America and Eurasian states rely on relatively ecologically friendly gas-fired power stations, the Asia Pacific region is still heavily dependent on coal in its electricity production. That is seen as a not very acceptable situation, and may also affect Asian nations' willingness to abandon coal as soon as possible. But it is more realistic to consider that a full-scale clean energy transition will take place when key hydrocarbons' reserves on the planet come closer to their depletion.

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