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The Impact of Abandoning Fossil Fuels and the Development of Renewable Energy on the Global Labor Market

Fossil fuels and renewable energy

Worldwide, more than 80% of total primary energy supply is still based on fossil fuels. According to the encyclopedic definition:

Fossil fuels are energy resources of organic origin, found in the earth's crust [...]. They are the result of the impact of pressure and high temperature on plant and animal remains in anaerobic conditions, these processes take millions or even billions of years [...]. They have no substitutes, they are all non-renewable resources. They contain carbon, which is oxidized to carbon dioxide when burned [...]. Fossil fuels include: hard coal, lignite, crude oil, natural gas, peat¹.

A complete departure from fossil fuels is not possible and it seems that it will never be, because their economic applications are very extensive. On the other hand, the use of these deposits will not always be unlimited – someday they will run out. For example, currently in the global economy and social life, hard coal is used,

¹ A. Mogilska, G. Kuźnar, W. Nowitski, *Paliwa kopalne [term]*, mfiles.pl/pl/index.php/Paliwa_kopalne [accessed: 12.02.2023].

among others, in for: production of plastics, in pharmaceuticals, in electricity and in the chemical industry. The biggest problem and challenge in the 21st century will be the resignation from the use of hard coal in thermal energy in industrial and household furnaces. Lignite is used for electricity, heat, agriculture and horticulture. Of course, crude oil is used on a massive scale in the petrochemical industry, in the production of plastics, in electricity and heat. It is the departure from hard coal and oil that is particularly important for environmental protection and the global development of renewable energy².

„[...] Within 200–300 years, man will burn hydrocarbons, which nature took millions of years to produce”³. The forecasts presented by the World Energy Council are appalling.

If the economy and society continue to use fossil fuels as much as they have so far, in one of the pessimistic variants, oil will be exhausted in about 44 years, and natural gas in about 55 years. On the other hand, with the current consumption of hard coal, it will only last for 205 years, and lignite for 247 years⁴. Actions taken today will affect tomorrow and future generations. The natural environment, including soil, air and groundwater, are polluted by such harmful substances as: dust, soot or gases (especially sulfur oxides or nitrogen oxides). In turn, the combustion of carbon dioxide (CO₂) contributes to a large extent to the emission of environmentally harmful greenhouse gases. In order to reduce pollution and harmful substances for the environment, it is no longer enough to reduce fossil fuels or use devices and filters that reduce emissions. You need to change your thinking and the way you act. Actions should be comprehensive and implemented in many areas, in particular in industry, households, energy and heating, services and transport.

² See: L. Gawlik, E. Mokrzycki, *Fossil Fuels in the National Energy Sector – Problems and Challenges*, “Polityka Energetyczna” 2017, vol. 20, no. 4, pp. 5–25.

³ A.G. Chmielewski, *Environmental Aspects of Burning Fossil Fuels*, inis.iaea.org/collection/NCLCollectionStore/_Public/32/032/32032329.pdf [accessed: 14.01.2023].

⁴ *Ibidem*.

Importantly, already today people have begun to notice that they have the right to live and work in a clean environment, free from pollution. This was probably due to the increasing incidence of diseases, including occupational diseases and incapacity for work, among employees who have to deal with harmful factors in the workplace. Numerous cases of cancer, cardiovascular diseases, asthma and allergies make people claim the right to live in a harmless work environment⁵.

The UN Assembly responds to the needs of humanity. The United Nations Environment Program is run. On July 28, 2022, the UN Assembly adopted Resolution (A/76/L.75) recognizing the right to a healthy environment as a human right⁶. A clean, healthy and sustainable environment is everyone's right. The United Nations, recognizing that climate change and environmental degradation are among the most urgent threats to the future of humanity, in the resolution calls on states to step up their efforts for a "clean, healthy and sustainable environment".

The resolution took a long time to come, because it was not until 1972. Five decades ago, in the Stockholm Declaration of 1972, the Member States recognized the right to an "environment of a quality that allows dignified life and well-being". Undoubtedly, such a general formulation should have been developed, which was done, but it is a pity that it was not until 2022 that the resolution indicated that, recognizing that sustainable development exists in three dimensions:

- social,
- economic,
- environmental (as regards the protection of the environment, including, among others, ecosystems).

⁵ For example, in Poland many cases are brought before the courts regarding the negative impact of smog on health or unjustified downloading of the so-called climatic fees in spa towns that actually exceed exhaust emission standards. In addition, there are many employee cases in labor courts in the field of occupational diseases.

⁶ Resolution (A/76/L.75) of the United Nations, digitallibrary.un.org/record/3982508?ln=en [accessed: 15.01.2023].

Cooperation and development in these three fields contribute to the well-being of people and their full use of socio-economic and environmental balance

Also recognizing that the impact of climate change, unsustainable management and use of natural resources, air, land and water pollution, poor chemical and waste management, resulting loss of biodiversity and decline in ecosystem services interfere with the enjoyment of a clean, healthy and sustainable environment and this environment – and therefore, paradoxically, it is man who can contribute to the fact that he will not effectively use his rights, including the human right to live in a healthy environment. Subsequently, the resolution recognized that, while reaffirming that international cooperation plays an essential role in providing assistance to developing countries, including highly indebted poor countries, landlocked least developed countries, small island developing States, their human, institutional and technological potential. Even worse, the human rights consequences of environmental damage are felt by individuals and communities around the world, but women and girls and those segments of the population that are already vulnerable, including indigenous peoples, children, the elderly, and people with disabilities. Addressing climate change and environmental degradation is important, leadership, decision-making and the full, equal and meaningful participation of women and girls and the role women play as managers, leaders and protectors of nature are essential. In the resolution, countries recognized that environmental degradation, climate change, biodiversity loss, desertification and unsustainable development are just some of them the most urgent and serious threats to the capacities of present and future generations. States have a duty to respect, protect and promote human rights, including in all activities undertaken to protect environmental challenges, and to take measures to protect the human rights of all through various international instruments. The responsibility of all companies to respect human rights and the above-mentioned aspects should be strongly emphasized.

The summary of the resolution indicated that:

1. The right to a clean, healthy and sustainable environment is recognized as: human rights;
2. It is noted that the right to a clean, healthy and sustainable environment is related to other laws and applicable international law;
3. Reaffirms that the promotion of the human right to a clean, healthy and sustainable environment requires the full implementation of the Multilateral Environmental Agreement under the principles of international environmental law;
4. States, international organisations, businesses and other relevant stakeholders are urged to adopt policies, strengthen international cooperation, enhance capacity building and continue to share good practices to scale up efforts to ensure a clean, healthy and sustainable environment for all⁷.

In my opinion, this human right to live in a clean, healthy and sustainable environment can be implemented through the development of renewable energy, through financial subsidies, support programs and public awareness. However, it is necessary to specify what renewable energy is in order to know how to improve human rights in this area.

For example, the Statute of the International Renewable Energy Agency (IRENA) indicates that renewable energy means all forms of energy produced from renewable sources in a sustainable way, which include, among others:

1. bioenergy;
2. geothermal energy;
3. hydropower;
4. ocean energy, including tidal energy, wave energy and ocean thermal energy;
5. solar energy and
6. wind energy⁸.

⁷ *Ibidem*.

⁸ Statut Międzynarodowej Agencji Energii Odnawialnej (IRENA), przyjęty w Bonn dnia 26 stycznia 2009 r. [Statute of the International Renewable Energy Agency (IRENA)], Dz.U. 2010, nr 203, poz. 1345 [Journal of Laws of 2010, no. 203, item 1345].

Generally speaking, a renewable energy source is a renewable, non-fossil energy source/sources, including wind energy, solar energy, aerothermal energy, geothermal energy, hydrothermal energy, hydropower, wave, current and tidal energy, energy obtained from biomass, biogas, biogas agricultural and bioliquids⁹.

In Poland, as in many other European countries, it was necessary to implement numerous directives into the national legal order under the so-called Green Deal, which in turn implements the provisions of the so-called of the Paris Agreement¹⁰, adopted at the Paris Climate Conference (COP21) in December 2015. This is the first ever universal, legally binding global agreement on climate change. The European Union formally ratified the agreement on 5 October 2016, which entered into force on 4 November 2016¹¹. The Covenant seeks to intensify the global response to the threat of climate change, in the context of sustainable development and poverty eradication efforts, including through:

- (a) limiting the increase in global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this will significantly reduce climate change-related risks and their impact consequences;
- (b) increasing capacity to adapt to the negative impacts of climate change and supporting climate change resilience and low greenhouse gas emission development in a way that does not jeopardize food production;
- (c) ensuring that financial flows are consistent with a path towards low greenhouse gas emissions and climate resilient development.

⁹ Definition provided in the Polish Renewable Energy Sources Act: ustawa z dnia 20 lutego 2015 r. o odnawialnych źródłach energii [act of 20 February 2015 on Renewable Energy Sources], Dz.U. 2015, poz. 1378 [i.e. Journal of Laws of 2015, item 1378].

¹⁰ Paris Agreement, OJEU L282/4 19.10.2016, eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22016A1019(01) [accessed 17.02.2023].

¹¹ Source: *Paris Agreement on climate change*, consilium.europa.eu/en/policies/climate-change/paris-agreement [accessed: 17.02.2023].

With the above regulations in mind, regulations on renewable energy sources have been regulated in Poland¹² with the aim of:

- 1) increasing energy security and environmental protection, inter alia, as a result of the effective use of renewable energy sources;
- 2) rational use of renewable energy sources, taking into account the implementation of the long-term economic development policy of the Republic of Poland, the fulfillment of obligations arising from concluded international agreements and increasing the innovativeness and competitiveness of the economy of the Republic of Poland;
- 3) shaping mechanisms and instruments supporting the production of electricity, heat or cold, or agricultural biogas in renewable energy source installations;
- 4) developing an optimal and sustainable supply of electricity, heat or agricultural biogas to end users from the installation of a renewable energy source;
- 5) creating new jobs as a result of the increase in the number of new installations of renewable energy sources commissioned for use;
- 6) ensuring the use of by-products or residues from agriculture and industry using agricultural raw materials for energy purposes¹³.

In 2021, the International Energy Agency (IEA) published the report "The Role of Critical Minerals in Clean Energy Transitions", which describes the future demand for raw materials in the context of the energy transition. The transition to a low-carbon economy will result in a huge increase in demand for critical raw materials, with the energy sector being the main force driving the market for these raw materials. That is why it is so important to search for, identify and document mineral deposits and to protect them by law. International cooperation in securing access to raw materials

¹² Importantly, in Poland, the government issued uchwała nr 39 Rady Ministrów z dnia 1 marca 2022 r. w sprawie przyjęcia "Polityki Surowcowej Państwa" [resolution No. 39 of the Council of Ministers of March 1, 2022 on the adoption of the "State Raw Materials Policy"], M.P. 2022, poz. 371 [item 371].

¹³ See: *Prawo energetyczne. Ustawa o odnawialnych źródłach energii. Ustawa o rynku mocy. Ustawa o inwestycjach w zakresie elektrowni wiatrowych. Komentarz*, red. M. Czarnecka, T. Ogłódek, Warszawa 2020.

and ensuring cohesion of strategies implemented by companies of significant importance for the economy of a given country will be important. International correlation should also facilitate access to clean energy research and technologies in the field of renewable energy, energy efficiency and advanced and cleaner fossil fuel technologies. Individual countries should raise public awareness and promote investment in energy infrastructure and clean energy technologies. There's only in the perspective of a few or a dozen or so years, the impact of moving away from fossil fuels and the development of renewable energy on the global labor market will be very large. The demand for workers in the renewable energy sector will be huge. There will also be a need for scientists, specialists and people who can skilfully manage in low-emission economy sectors.

EU activities in ecological transformation

In addition, the EU has implemented a long-term strategic vision of a modern, competitive and climate-neutral economy for the period until 2050. In November 2018, the European Commission presented its plans and actions to be taken to achieve climate neutrality¹⁴. The European Green Deal presented by the European Commission in December 2019 is related to the above. It is a package of various types of political initiatives aimed at directing the EU on the path of ecological transformation, achieving climate neutrality by 2050 and creating a just and prosperous society with a modern and competitive free market economy. As the Council of Europe underlines: the transition towards climate neutrality will open significant opportunities in terms of economic growth, new business models and markets, job creation and technological

¹⁴ A Clean Planet for all. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, Communication From The Commission To The European Parliament, The European Council, The Council, The European Economic And Social Committee, The Committee Of The Regions And The European Investment Bank, Brussels, 28.11.2018 COM(2018) 773 final, eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0773 [accessed: 17.02.2023].

development¹⁵. The initiatives to be implemented by individual EU countries in the implementation of the European Green Deal are as follows:

- The “Fit for 55” package assumes the implementation of the Green Deal objectives into specific legal provisions and changes to the existing legislation in the field of climate, energy and transport. The introduction of new legislative initiatives aims to align EU legislation with the EU’s climate goals.
- In the European Climate Law, Member States have committed themselves to reducing greenhouse gas emissions in the EU by at least 55% by 2030. This will allow the achievement of the goal of achieving climate neutrality by 2050.
- EU strategy on adapting to climate change. In March 2022, the EU Council approved the EU strategy on adaptation to climate change. The strategy presents a long-term vision according to which the EU society is to become climate change resilient by 2050. The need to protect the population against extreme weather events resulting from climate change is emphasized.
- Forest strategy and non-deforestation imports.
- EU Chemicals Strategy for Sustainability.
- Clean, affordable and safe energy (including the issue of new and used batteries).
- Circular Economy Action Plan.
- European industrial strategy.
- Strategy “Farm to fork”.
- EU biodiversity strategy 2030. It is to help rebuild Europe’s biodiversity by 2030 aimed at: extending protected land and sea areas in Europe, restoring degraded ecosystems by reducing the use and harmfulness of pesticides.
- The EU’s European Industrial Strategy, which aims to support industry, innovation and economic growth in the green and digital transitions. The European strategy could become a global driving force in the transition to climate neutrality in connection with the growing digitization.

¹⁵ Source: *European Green Deal*, consilium.europa.eu/en/policies/green-deal [accessed: 18.02.2023].

- And the most important of the above in the context of this study is the so-called Just Transition¹⁶. The European Union has put in place a Just Transition Mechanism to financially and technically support the regions most affected by the transition to a low-carbon economy. This will help to mobilize at least EUR 65–75 billion over the period 2021–2027 for: people and communities: expanding employment and reskilling opportunities, making housing more energy efficient and fighting energy poverty; enterprises: making the transition to low-carbon technologies more attractive to investors, providing financial support and investing in research and innovation; Member States or regions: investing in new green jobs, sustainable public transport, digital connectivity and green energy infrastructure. The first pillar of the Just Transition Mechanism is the Just Transition Fund, with a total budget of EUR 17.5 billion. The fund provides targeted support to regions dependent on fossil fuels and carbon-intensive sectors. It is intended to reduce the socio-economic costs of the green transformation. The fund will support investment by new businesses, research and innovation, clean technologies and emission reduction, retraining workers and job search assistance¹⁷.

Economic, social and technological progress must take place in harmony with nature – “Transforming our world: The 2030 Agenda for Sustainable Development”

In order to answer the question in which direction the global economy and the labor market should go in relation to environmental protection, reference should be made to the fact that the United Nations General Assembly (UN) adopted on September 25, 2015, resolution A/RES/70 /1, post-2015 development agenda:

¹⁶ Regulation (EU) 2021/1056 of the European Parliament and of the Council of 24 June 2021 establishing the Just Transition Fund PE/5/2021/REV/1, OJEU L 231, 30.6.2021, pp. 1–20, eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1056 [accessed: 18.02.2023].

¹⁷ Source: *European Green Deal, op. cit.*

“Transforming our world: the 2030 Agenda for Sustainable Development” (hereinafter: resolution)¹⁸. The resolution was unanimously adopted by all 193 UN member states. There are only 7 years left until the end of the program implementation, and there is still much to improve in the 17 Sustainable Development Goals established. Each country pursues the goals on its own, but the assumptions for all are the same. Indicated in Resolution 17 Goals. Sustainable Development can be divided into 5 general areas, i.e. people, planet, prosperity, peace, partnership. Within each of these areas, specific tasks are detailed – there are 169 of them in total. Considering the impact of moving away from fossil fuels and the development of renewable energy on the global labor market, I will focus in particular on areas such as people, planet and prosperity. In the first area, the UN aims, not only in the perspective of 2030, but also in the future, to eliminate poverty and hunger in all their forms and dimensions, and to ensure that all people can fulfill their potential with dignity and a sense of equality while living in a healthy environment. When will it be possible? When countries strive to implement the policy of full productive employment within the framework of a sustainable economy – aimed at environmental protection but also the development of industry and new technology. It is therefore necessary to put an equal sign between the formulations: work = industry = planet. The link between labor law – business law and environmental law should be promoted. One cannot exist without the other. Economic, social and technological progress must take place in harmony with nature and the environment in which we live. In this context, it is so important that the planet is protected from degradation, inter alia, through sustainable consumption and production, sustainable management of its natural resources and taking urgent action on climate change, so that it can serve the needs of present and

¹⁸ Resolution A/RES/70/1, UN of September 25, 2015 of the Post-2015 Development Agenda: Transforming our world: the 2030 Agenda for Sustainable Development, source: A/RES/70/1 Transforming our world: the 2030 Agenda for Sustainable Development, un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf [accessed: 14.01.2023].

future generations¹⁹. When the two above areas are implemented at least in part, it will be possible to achieve prosperity again, at least in part. As emphasized by the UN, it wants to ensure that all people can enjoy the benefits of a prosperous and satisfying life, and that economic, social and technological progress take place in harmony with nature. The goals expressed by the International Renewable Energy Agency (IRENA) remain consistent with the above, which claims that the contribution of renewable energy to environmental protection can be achieved by reducing the pressure on natural resources and reducing deforestation, which will result in climate protection, economic growth and social cohesion. This in turn will lead to poverty alleviation and sustainable development; access to energy resources and their security; in regional development and intergenerational responsibility.

In accordance with this UN resolution, the Sustainable Development Goals 2030 were defined as follows:

- Goal 1. End poverty in all its forms worldwide.
- Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
- Goal 3. Ensure healthy lives and promote prosperity for all people of all ages.
- Goal 4. Ensure quality education for all and promote lifelong learning.
- Goal 5. Achieve gender equality and empower women and girls.
- Goal 6. Ensure access to water and sanitation for all through sustainable management of water resources.
- Goal 7. To provide everyone with access to sources of stable, sustainable and modern energy at an affordable price.
- Goal 8. Promote stable, sustainable and inclusive economic growth, full and productive employment and decent work for all.
- Goal 9. Build sustainable infrastructure, promote sustainable industrialization and support innovation.
- Goal 10. Reduce inequalities within and between countries.
- Goal 11. Make cities and human settlements safe, stable, sustainable and inclusive.
- Goal 12. Ensure patterns of sustainable consumption and production.

¹⁹ K. Piwowska, *Agenda na rzecz zrównoważonego rozwoju 2030*, kadry.infor.pl/wiadomosci/5678238,agenda-na-rzecz-zrownowazonego-rozwoju.html, 21.02.2023 [accessed: 22.02.2023].

Goal 13. Take urgent action to combat climate change and its effects.

Goal 14. Protect and use our oceans, seas and marine resources sustainably.

Goal 15. Protect, restore and promote the sustainable use of terrestrial ecosystems, sustainable management of forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.

Goal 16. Promote peaceful and inclusive societies, ensure access to justice for all and build effective, accountable and inclusive institutions at all levels.

Goal 17. Strengthen the means of implementation and reinvigorate the global partnership for sustainable development²⁰.

I will focus on discussing several goals, the implementation of which has an impact on the global labor market in connection with the departure from fossil fuels and the development of renewable energy. The problem of balancing the above is huge, and the current generation faces global climate, economic and social challenges. In order to be able to move away from fossil fuels, it is necessary to provide everyone with access to sources of stable, sustainable and modern energy at an affordable price²¹, and by 2030, UN countries should ensure universal access to affordable, reliable and modern energy services. This is supposed to double the growth rate of global energy efficiency by 2030. However, in order to make this possible, it is necessary to expand the infrastructure and modernize the technologies enabling access to these modern and sustainable energy services.

Stable, sustainable and inclusive economic growth, full and productive employment and decent work for all must be promoted worldwide. It will be especially important ensuring appropriate training and retraining programs for employees hitherto employed in the fossil fuel economy sector – and who are to be

²⁰ Resolution A/RES/70/1, *op. cit.*

²¹ In October 2021, Polish power plants produced 15,956.6 GWh of electricity, of which 3,454.2 GWh came from renewable energy sources (21.6%). Polish households, similarly to the average households in the EU, spend the largest part of their energy consumption on space heating (65%). Water heating consumes 16% of energy, and lighting and electrical appliances 10%. About 8% of the energy used is spent on food preparation.

employed in the renewable energy sector. It will then be important to maintain economic growth per capita, taking into account national conditions, and to achieve and maintain at least 7% annual growth in gross domestic product in the least developed countries. The resolution recommends that, by 2030, we should gradually increase the efficiency of the use of natural resources in global consumption and production, and strive to break the link between economic growth and environmental degradation, in accordance with the ten-year framework programs for sustainable consumption and production, with the leading role of developed countries. As part of the development of "green energy" on the global labor market, it will be important to protect employee rights and promote a safe working environment, respecting hygienic working conditions. The resolution also stresses the need to build sustainable infrastructure, promote sustainable industrialization and support innovation. One of the main goals of the UN is to increase the quality of infrastructure and introduce sustainable development of industry by 2030 by increasing the efficiency of resource use and the use of clean and environmentally friendly technologies and production processes, with the participation of all countries, according to their capabilities.

Another of the resolution's objectives is that urgent action must be taken to combat climate change and its effects. To this end, it is necessary to: strengthen the adaptive capacity and resilience to climate hazards and natural disasters in all countries; integrate actions to combat climate change into national policies, strategies and plans; increase the level of education and human and institutional capacity, raise the level of awareness on climate change mitigation, adaptation and impacts of climate change and early warning systems against threats; promote mechanisms to increase the capacity for effective planning and management of climate change in least developed countries and small island states, including by focusing attention on the needs of women and youth and local and marginalized social groups.

On the example of Poland, it can be pointed out that:

Every year, over 400 million tons of greenhouse gases produced by the national economy enter the atmosphere. As in other countries,

most of the gases produced (over 80%) are the result of energy processes, i.e. fuel combustion by the economy and volatile emissions from fuels. The remaining greenhouse gas emissions come from agriculture (8%), industrial processes and product use (6%), and waste management (3%). Per 1 inhabitant of the country there are 11 tons of greenhouse gases released into the atmosphere annually by the economy. This is more than the EU average, where the figure is 9 tonnes and is lower than at the beginning of the decade (10 tonnes). With emission reductions in most member states, Poland moved to the 7th place among the largest greenhouse gas emitters per capita in the EU from 11th place in 2010. Buildings are responsible for approximately 38% of greenhouse gas emissions in Poland. The amount of carbon dioxide produced on average by new passenger cars registered in Poland decreased from 146 g per 1 km in 2010 to 128 g in 2018 (i.e. by 12%). These emissions remain higher than the EU average, where the amount of carbon dioxide emitted by new passenger cars was reduced from 140 g/km to 120 g/km (i.e. by 14%) between 2010 and 2018. Environmental pollution and climate change are two of the four most important threats to the world according to Poles (53% and 47%, respectively). The average area air temperature in 2020 in Poland was 9.9°C and was 1.6°C higher than the average annual long-term temperature value for the climatological normal period of 1981–2010. The year 2020 should be classified as extremely warm, if we take into account the average for Poland²².

How to enforce the above goals and make the UN member states give up fossil fuels and introduce a proper and effective employment policy in the renewable energy sector? Targets are monitored in all 193 UN member states. Indicators measuring the progress of their implementation have been assigned to each of the tasks indicated in the resolution – in total there are 231 indicators. The government in the country is responsible for reporting them. In addition, the EU, through Eurostat, within the countries belonging to it, reports progress on the implementation of tasks.

²² Source: *Cel 8: Wzrost gospodarczy i godna praca*, kampania17celow.pl/cel-8-wzrost-gospodarczy-i-godna-praca [accessed: 17.02.2022].

Energy transformation and the situation on the labor market – professional effects of the green transformation

It is necessary to consider in which fields the impact of giving up fossil fuels and the development of renewable energy will manifest itself on the global labor market. Energy transformation²³ should be understood in two categories: development of the economy, industry and new technologies in the field of renewable energy sources, but with respect and in accordance with the protection of the natural environment²⁴. This process has been going on for several (and in some cases even several dozen) years. Therefore, it should not be spoken of as the future, but as the present. This is a task to be performed here and now, although of course with a long-term perspective. It is a challenge but also a great opportunity to use labor resources from industries that are ineffective, non-perspective and low innovative. A transformation carried out wisely and consistently, step by step – will change the ecological situation and the market, for the benefit of humanity. In particular, employees and employers operating in various sectors of the economy will benefit. Due to the assumed reduction of global warming, Zienia will also benefit, and thus every creature that lives on it. Thus, the assumption is:

[...] The energy transformation is to combine social expectations (care for the natural environment and climate protection) with the strategy of economic growth (GDP growth) and industrial development (reindustrialization and employment) based on innovative technologies. The energy transformation ensures security of supply, maintaining competitiveness and global environmental balance²⁵.

²³ *Transformacja rynków energii. Gospodarka. Klimat. Technologia. Regulacje*, kier. projektu: G. Wojtkowska-Łodej, energia.sgh.waw.pl/sites/energia.sgh.waw.pl/files/inline-files/publikacja%20w%20j%20C4%99zyku%20polskim%20-%20Szkola%20Energii.pdf [accessed: 1.02.2023].

²⁴ See more: T. Młynarski, M. Ruszel, A. Szurlej, *The Concept of Energy Transition*, [in:] *Energy Policy Transition. The Perspective of Different States*, eds eidem, Rzeszów 2017, pp. 28–37.

²⁵ See: T. Młynarski, *Unia Europejska w procesie transformacji energetycznej*, "Krakowskie Studia Międzynarodowe" 2019, nr 1, pp. 31–44.

Data prepared by the International Renewable Energy Agency (IRENA) will be used to analyze the expected effects on the global labor market and economy²⁶. In one of the more recent IRENA reports²⁷, developed in collaboration with the International Labor Organization (ILO), provides key estimates of employment in the renewable energy sector around the world. The report provides an overview of global employment in the renewable energy sector over the past few years. It identifies experiences in selected countries on the impact of shifting away from fossil fuels and employment in the renewable energy sector. The report shows that the number of people directly or indirectly employed in the renewable energy sector continues to grow, from 12 million in 2020 to 12.7 million in 2021²⁸. The most dynamically developing industry is solar photovoltaics, where employment accounts for 1/3 of 12.7 million. The energy transformation causes changes in particular on the labor market related to: energy, mining, transport, construction and agriculture²⁹.

As the number of jobs in the renewable energy sector continues to grow, it is imperative that a decent livelihood is ensured in terms of wages, occupational health and safety and workplace conditions and other rights at work. Despite the fast-growing renewable energy labor market, it is important to guarantee and uphold basic labor rights.

²⁶ It is an intergovernmental organization supporting countries in their transition to sustainable energy. It is a platform for international cooperation. IRENA promotes the adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydro, ocean, solar and wind energy, in striving for sustainable development, access to energy, energy security and low-emission economic growth and prosperity. It publishes numerous publications and reports.

²⁷ *Raport IRENA Renewable Energy and Jobs Annual Review 2022*, [irena.org/publications/2022/Sep/Renewable-Energy-and-Jobs-Annual-Review-2022](https://www.irena.org/publications/2022/Sep/Renewable-Energy-and-Jobs-Annual-Review-2022) [accessed: 16.01.2023].

²⁸ *Ibidem*.

²⁹ It is estimated that the professions of the future in this industry will be: plant breeders, organic food producers, nutrition consultants, nutritionists, food processing specialists, employees designing and producing agricultural machinery powered by low-emission fuels, biogas plants. In turn, cattle breeders and feed producers will experience less and less demand.

Already in the near future, due to the ecological transformation and technological changes in the post-industrial society, people with technical as well as digital, technological competences, knowledge and experience will be needed on the global labor market in the renewable energy sector (at all levels of education – both white-collar and manual workers). In the countries most developing ecological technology, it can be noticed due to the numerous relocations and migrations of employees from other countries. Competences of the future according to Infuture Hatalska Foresight Institut³⁰ are: creativity, negotiation skills, effective cooperation (e.g. in a team of colleagues), knowledge and experience in the field of exact sciences, the ability to share knowledge, critical thinking, the ability to negate and propose new solutions, creative problem solving, widely developed digital skills, the ability to actively learn, the ability to design products and services in the analysis and needs of market participants, including users of a given product or service. The impact of moving away from fossil fuels on the renewable energy labor market in areas such as energy, mining, transport, construction and agriculture is discussed below.

In order for the transformation on the labor market in connection with the development of green energy to be successful, the idea and the job-to-job transition model should be promoted, based on the assumption that between employment with one employer (in the industry under restructuring) and employment with another employer or starting your own business, there is no period of professional inactivity or unemployment. The process of transition from employment to employment is smooth, and the employee has continuity of work (and income)³¹.

New jobs – Green and Sustainable Human Resources Management

According to the IRENA report, employment in the renewable energy sector by 2050 may amount to as many as 42 million (*sic!*).

³⁰ Quoted in: M. Witucki, D. Zawadzka-Stępniań, M. Fedorczyk, *Prognozowane zmiany na rynku pracy wywołane transformacją energetyczną*, Warszawa 2021.

³¹ *Ibidem*, p. 33.

The ecological transformation (as a correlation of economic, labor and environmental law) generates an increasing number of jobs. Currently, countries such as The USA, China, EU countries, Brazil, Great Britain, Japan, India, Australia and New Zealand create more places for employees. In the short term, by 2030, it is assumed that the global employment in the renewable energy sector in 2030 will amount to 38.2 million. Energy jobs could grow to 139 million, including more than 74 million in energy efficiency, electric vehicles, power systems/flexibility and hydrogen³². Most employment in the renewable energy sector is in Asian countries, which accounted for 63.6% of these jobs in 2021.

According to the IRENA Renewable Energy and Jobs Annual Review 2022 Report, global employment in the renewable energy sector in 2021 is 12.7 million, up from 12 million in 2020. Nearly two-thirds of all jobs are in Asia and China alone account for 42% of the global total. Just behind Asia, there are the EU and Brazil at 10% each, and the US and India at 7% each. Many jobs are developed in wind and offshore energy. Most of it concerns production, construction, assembly, operation and maintenance. Employment in biofuels, including biodiesel, is also growing.

Many wonder where exactly you can work in the green energy industry. The labor market is wide and people with various competencies are needed, in particular for sectors related to the energy industry, mining industry, transport, construction and agriculture. There are a lot of new professions, and probably some of them are just being created or will be necessary in the future. At the moment, examples of desirable professions within the so-called green labor market are: engineer, software engineer, technologist, business analyst, project manager, consultant, architect, designer, researcher-scientist, manual laborer – contractor, e.g. in assembly and service, telemarketer, seller or sales representative. Each of the above occupations may refer to the mining industry, transport, energy, construction or agriculture. More specifically, the employees needed now are: solar project developer, renewable energy designer, biofuels engineer, clean energy analyst, wind operations leader or

³² *Report IRENA...*, *op. cit.*

wind turbine technician. Importantly, artificial intelligence will develop in a way in correlation with the above tasks – sometimes as their significant support or supplement³³.

Currently, the field of renewable energy sources used in households and in industry is developing very much. solar panels, photovoltaics³⁴ and wind turbines. Therefore, there is a need for trade sellers, consultants, telemarketers, advisors, fitters, service technicians and mechanics. The automotive industry has developed a lot in terms of the production of electric cars. New energy networks are being built. For example, a nuclear power plant is to be built in Poland by 2033, and an offshore wind power system is to be developed, the so-called offshore wind farms in the Polish Baltic will be built in 2024 at the earliest³⁵. Global employment in onshore and offshore wind increased to 1.4 million jobs in 2021 and 1.25 million in 2020. Most wind employment is concentrated in a relatively small number of countries. China alone accounted for 48% of the global total. Asia represented 57%, Europe 25%, America 16% and Africa and Oceania 2%.

The Polish Energy Policy until 2040 assumes the construction of 6 nuclear reactors, their capacity is to reach 6.1 GW. The Nuclear Energy Institute reports that one power plant (in operation) employs up to a thousand people.

In order to be able to develop the energy sector in particular, IT specialists will be needed in general. Software engineers will create ever newer programs, databases and applications. A prosaic

³³ K. Piwowska, *Contemporary Neo-Luddism in the Digital Transformation of Employment*, [in:] *Artificial Intelligence and Human Rights*, eds L.M. Martin, M. Załucki, Madrid 2021, pp. 354–370; *eadem*, *Czy nowe technologie zrewolucjonizują rynek pracy?*, "Studia Prawnicze. Rozprawy i Materiały" 2018, nr 2(23), pp. 135–155.

³⁴ Installers and service technicians of photovoltaic panels are and will be needed all the time. In the assumption of 2030, approximately 23% of total energy is to be taken from renewable energy sources, and in the following years, in accordance with the Green Deal – even more.

³⁵ See more: ustawa z dnia 17 grudnia 2020 r. o promowaniu wytwarzania energii elektrycznej w morskich farmach wiatrowych [act of 17 December 2020 on promoting electricity generation in offshore wind farms], Dz.U. 2021, poz. 234 [Journal of Laws of 2021, item 234].

example is the installation of photovoltaic panels in a household and the ability to monitor the range of electricity generated and its consumption at a given moment and over a longer period via the application in the phone.

Analyzing today's impact of the Internet on society, especially on young people, it is not difficult to conclude that social activists and even bloggers, YouTubers or influencers will be needed to promote green energy online. If an ecological approach to life and work is "vaccinated" in young people now, it will be easier to implement the Green Deal on the socio-economic market in the long term. The society will successively become convinced and permanently consolidate in its thinking that climate change, economic development (including consumerism) and the development of society are inseparable. All podcasts, interviews, articles and videos should be aimed at promoting ecology in all spheres of life.

Changes in the labor market in the energy sector

Power plants producing energy from fossil sources should be replaced with energy from wind, solar or water. In practice, this means the expansion of wind farms, including offshore wind farms, further investments in hydropower plants, photovoltaics, investments in biomass and biogas sources³⁶.

The just transition promoted by the EU under the Paris Agreement, the Green Deal and regulations in individual countries takes place in such areas as: transformation of coal regions, reduction of energy poverty, new industries related to renewable energy sources and nuclear energy. In connection with these changes in the energy sector, there will undoubtedly be an increase in the demand for employees operating ecological energy infrastructure, and a decrease in the demand for employees obtaining energy from fossil fuels.

Of course, in Poland, in EU countries, but all over the world, in terms of the use of renewable energy sources in the everyday life of an average citizen, but also on an industrial scale, photovoltaic

³⁶ M. Witucki, D. Zawadzka-Stępniań, M. Fedorczyk, *Prognozowane zmiany na rynku pracy...*, op. cit., p. 13.

installations have become extremely popular. As a result, the entire infrastructure related to the design, production, sale, delivery, assembly, servicing and general handling of the panels had to be created. In Poland, this has become so popular that the government has been offering subsidies and tax reliefs for several years as part of the "My Electricity" program. In some countries, it is obligatory to document skills, e.g. mounting panels and having the appropriate certificate of Installers of Photovoltaic Systems. It is therefore necessary to have properly qualified teaching staff and organizational and training facilities. One job generates another. In turn, bearing in mind the fact that the panels are covered by a guarantee for usually 10–30 years, it will be necessary to replace them successively, but also to dispose of them. Appropriate places and additional workstations will be needed for this. So we can say that this industry is self-perpetuating.

The world set a new record in 2021, producing 132.8 GW of photovoltaic capacity installed, up from 125.6 GW in 2020. China accounted for 53 GW (40%) in 2021. It was followed by the US, India and Brazil, Germany, Japan, Republic of Korea, Spain and the Netherlands for the largest PV installations³⁷. Asian countries host 79% of the world's jobs in the photovoltaic industry. The remaining jobs are in the Americas (7.7% of total jobs), Europe (6.8%) and the rest of the world (4.9%).

Changes in the labor market in the mining industry³⁸

The Energy Policy has been implemented in Poland. It is related to decarbonisation as a process that will become more and more important not only on the Polish and European labor market but also around the world. It should be understood as a complete resignation from the use of coal in the power industry, heating, industry and households. It is assumed that by 2050 Poland will have about 14,000 to 36,000 miners employed so far in gradually liquidated mines will need support on the labor market. It is proposed to

³⁷ *Raport IRENA...*, *op. cit.*

³⁸ On the example of Poland.

gradually close mines in 2030, 2040 and 2050 (full decarbonisation). There are a lot of jobs and jobs for potential development, because eventually such positions in the mining industry will disappear as: head of the mining department, head of the mining rescue unit, manager of a small enterprise in the mining industry, manager of operations in a mining plant, mining geodesy engineer, mining production master, mining pipeline fitter, mine rescuer, mechanic and electrician of machines and devices, miner of underground and opencast mining of deposits, miner of underground mining, miner of opencast mining of deposits, operator of mining signaling devices (signaller), excavator operator, backhoe loader operator, loader operator, machinery and equipment for the extraction of peat, operator of mining and loading machines, operator of powered roof supports, bulldozer operator, aggregate and clay extractor.

The literature on the subject generally proposes four solutions that will facilitate the adjustment of employment in the mining industry to the demand for coal and reduce mismatches on the labor market in the transformation process:

- 1) a complete reduction in the employment of new employees,
- 2) relocation to other mines,
- 3) requalification,
- 4) monitoring of key positions and competencies, serving transitions between positions within the plants³⁹.

By 2030, there is a need to create up to 85,000 jobs new workplace. It is estimated that miners will be employed in industries such as industrial processing and energy related to renewable energy sources or construction. It is necessary to properly carry out successive retirement or early retirement. Mines should change their personnel policy and limit employment or even completely abandon the creation of new jobs and employing new employees in the mining sector, but also in the fossil fuels industry in general. In Poland, the beginnings of the transformation of the mining industry

³⁹ J. Sokołowski, J. Frankowski, J. Mazurkiewicz *et al.*, *Dekarbonizacja i zatrudnienie w górnictwie węgla kamiennego w Polsce*, IBS Research Report 01/2021, Warszawa; and: *eidem*, *Zatrudnienie w górnictwie węgla kamiennego w Zagłębiu Górnśląskim*, IBS Research Report 01/2020, Warszawa.

can be seen as early as the 1990s. Research shows that by the end of 2019, employment in the mining industry decreased by about 300,000 jobs (which means a decrease of 76%), more than 40 mines were closed at that time, and production fell by more than 90 million tons⁴⁰.

Following the example of Poland, which introduces numerous legal regulations, e.g. the act of 7 September 2007 on the functioning of hard coal mining⁴¹. Mines should be liquidated and hard coal mining should cease. Mining plants or their parts should be liquidated and, therefore, successive restructuring of employment should be carried out⁴² in closed mines⁴³. Employees should take advantage of mining leaves, one-off severance payments or pension rights (if they have acquired them) during this time. On the example of the above According to the Act, an employee is entitled to a mining leave of up to four years, provided that using it allows him to acquire the right to a retirement pension before January 1, 2028. Such a mining leave is treated on an equal footing with the period of mining work entitling to the acquisition of pension rights. The period of miners' leave is also taken into account when determining the right to a miners' pension. During the period of using the mining leave or leave for the employees of the mechanical coal processing plant, the employee is released from the obligation to perform work and receives a social benefit in the amount of 75%–80% of the monthly remuneration calculated as remuneration for a holiday leave. Employees of liquidated mines are granted a one-off severance pay in various amounts, e.g. 4, 8 or even 12 times the average

⁴⁰ *Ibidem*.

⁴¹ Ustawa z dnia 7 września 2007 r. o funkcjonowaniu górnictwa węgla kamiennego [act of 7 September 2007 on the functioning of hard coal mining], Dz.U. 2007, nr 192, poz. 1309 [Journal of Laws of 2007, no. 192, item 1309].

⁴² See more: M. Lis, J. Kotelska, *Restrukturyzacja górnictwa węgla kamiennego w Polsce w perspektywie oceny interesariuszy*, Dąbrowa Górnicza 2022.

⁴³ It is proposed that in the perspective of the next 30 years, mines should employ workers, because mines are supposed to exist until 2050. However, employing workers for the so-called working underground should be at the level of 1% of the number of staff from the previous year. The increase will therefore be negligible, but at the same time it will enable the functioning of the mines.

monthly salary. In some cases, the severance payment is also fixed in amount. It is necessary to monitor changes in employment in liquidated mines and to register employees who have used their rights and benefits. It is important to implement an appropriate retraining program and secure new jobs. In Poland, the entity that conducts the monitoring is Agencja Rozwoju Przemysłu S.A. In Poland, the following was prepared: "Programme for the hard mining sector in Poland" – adopted by the Council of Ministers on January 23, 2018⁴⁴.

The research shows that:

[...] the use of power coal in the economy in Poland will end in 2049, which means that we assume the least ambitious plans to abandon coal consumption in the energy sector. In the perspective of the next 30 years, we assume a falling share of households in the use of coal and a growing share of system power. We assume that the industry will limit the use of coal in a similar way to systemic energy. Individual heating in cities and in rural areas will be systematically reduced (complete cessation of coal use in 2030 in cities and in rural areas in 2040)⁴⁵.

In recent years (especially in the Śląskie Voivodeship in Poland), numerous projects co-financed by the European Social Fund have been carried out. An example is the "Energy" project, which was aimed at getting back to work as soon as possible, e.g. by miners or continuation of employment, and additionally obtaining qualifications or competences necessary for work. An important role in such projects is played by Voivodship Labor Offices or Poviats Labor Offices. What tasks are being carried out so that miners and other employees employed in the fossil fuel extraction and processing sector can actively participate in the labor market in the next 10, 20 or 30 years? These include activation programs and various labor market instruments, such as:

- 1) career counseling – i.e. diagnosis of the professional situation and development of an Individual Action Plan regarding the development of the professional path;

⁴⁴ Source: *Program dla sektora górnictwa węgla kamiennego w Polsce*, gov.pl/web/aktywa-panstwowe/program-dla-sektora-gornictwa-wegla-kamienego-w-polsce [accessed: 12.02.2023].

⁴⁵ J. Sokołowski, J. Frankowski, J. Mazurkiewicz *et al.*, *Dekarbonizacja...*, *op. cit.*, p. 13.

- 2) the possibility of psychological support in the field of self-esteem, self-confidence, effectiveness of decision-making processes and overcoming barriers related to job changes;
- 3) Employment agency – presentation by the employment office of job offers or other form of activation. Assistance in preparing application documentation for a specific job and in preparing for an interview;
- 4) Legal advice – before concluding an employment relationship, including an analysis of the proposed working conditions and remuneration rules;
- 5) Training – allowing to acquire competences or obtain professional qualifications in order to take up a new job;
- 6) Relocation allowance – is intended to cover the costs of residence related to taking up employment in at least half of the working time, other gainful employment or business activity outside the place of permanent residence. Usually, the amount of the allowance is around 10,000 PLN, paid for a period of up to 6 months.

With the above in mind, it is possible to consider which industries employees in the mining and fossil fuel industries will end up in. It seems that mainly to the sector of renewable energy economy. Nevertheless, specialists in the reclamation of post-mining areas will undoubtedly be needed as well as field workers. Despite the fact that the mines will be “extinguished”, it will be necessary to secure their remaining parts and to level their impact on the natural environment.

Therefore, it can be assumed that demand will increase in the coming years for people involved in the reclamation of mining areas and preparing them for use for other purposes (e.g. production, trade, logistics)⁴⁶.

Interestingly, if only the mines are properly secured, the tourism industry can easily and effectively develop, because it is becoming popular to transform a closed mine into a tourist attraction offering jobs to former miners.

⁴⁶ M. Witucki, D. Zawadzka-Stępnik, M. Fedorczyk, *Prognozowane zmiany na rynku pracy wywołane transformacją energetyczną*, Warszawa 2021, p. 22.

To sum up, the decarbonisation process in Poland and in the EU has an increase in the use of renewable energy, which is largely caused by the energy and climate policy of the European Union – which should be assessed positively – although the effects of these activities will be visible in the longer term.

Extraction of new minerals – the problem of illegal work of children and women

Mining minerals for renewable energy and switching to green energy has a huge impact on work and community. Mineral resources such as cobalt, copper, lithium, nickel and zinc are needed. These raw materials are necessary for the construction of solar energy – panels, wind turbines and batteries, e.g. for cars. The World Bank predicts that production of critical minerals could increase nearly five-fold by 2050 to meet the growing demand for clean energy technology and equipment. What does it involve? The fact that they occur in low concentrations and are difficult to obtain. The demand for these minerals will create many new jobs. New mines and infrastructure are and will be built. In countries at risk of poverty, with poor economic development and politically unstable, there is a tendency to force labor, forced labor of children and women, for example in a mine extracting raw materials needed to use renewable energy. Employees are exposed to the risk of loss of life, health, unworthy working conditions and exploitation. Labor law is not respected there. Environmental standards are often violated. The report indicates that 187 member states of the International Labor Organization have developed a set of international labor standards in 2022, which should lead to the observance of labor rights in the mining industry and the transition from the informal to the formal economy. There is a need to improve occupational health and safety in line with relevant international labor standards. For example, the COTECCO project in the Democratic Republic of the Congo is being implemented to improve and strengthen the legal and policy framework to eliminate child labor in the cobalt sector. The project aims to improve mechanisms for monitoring and preventing legal abuses.

Changes in the labor market in transport

According to Deloitte's report, "By 2030, according to various estimates, from 56 to even 160 million electric cars will be on the world's roads, and ten years later it will reach over 50% market share"⁴⁷. The development of low-emission transport (usually electric) will require e.g. development and promotion of the use of vehicles with alternative drive in everyday life. This should happen both in terms of transport of goods and people. Private transport should be limited in favor of public transport, the operation and drive of which should come from green energy, and not, for example, from oil or other minerals. The production of hybrid and electric cars is constantly developing – according to the assumptions of the Green Deal, cars powered by petrol, diesel oil or gas should be gradually eliminated from economic circulation. Many European cities are gradually banning the entry of such cars into the city center and eventually into cities altogether. There is a risk of losing a job by a group of employees servicing e.g. petrol stations or places where diesel oil or gas is extracted. There is already a well-developed industry for the production and disposal of batteries and car batteries. The prospect of developing electric car charging stations is already growing, but the prospect of servicing these stations by employees is small – because they are mostly self-service. Professions of the future in this industry include: electric car repair specialists, people working in the construction and operation of charging stations, battery disposal specialists. Due to the estimated increase in public transport, the industries in which new jobs will be created include: bus drivers, tram drivers, train drivers, and logistics of crossings and parking systems. In addition, micromobility (e.g. electric scooters) rented by apps, per minute, will continue to develop. Service technicians for these devices will still be needed.

⁴⁷ Source: *Deloitte: W 2040 roku co drugi użytkowany samochód będzie autem elektrycznym*, rynekinfrastruktury.pl/wiadomosci/inzynieria-i-innowacje/deloitte-w-2040-roku-co-drugi-uzytkowany-samochod-bedzie-autem-elektrycznym--64498.html [accessed: 5.06.2023].

Summary and *de lege ferenda*

The energy transition entails changes in jobs, the situation of workers, economies and regions of individual countries. Green energy is the main input to most economic activities. The scale and importance of the energy transformation in the labor market obviously depends on the policy pursued in a given country. In each country, the economic structure, industrial sectors and labor market are shaped differently. However, this does not change the fact that every country in the world should be prepared for deepening climate change. Policy must be conducted in such a way that environmental protection law correlates with economic law. Economic development and restructuring of the labor market are necessary, but taking into account a fair energy transition. The International Labor Organization, in consultation with the governments of the countries concerned, the private sector and trade unions, have developed tripartite guidelines for a just transition, these principles are: macroeconomic and fiscal policies to reduce prices; channeling funds from coal-rich countries to energy-poor countries through the Just Transition Fund; training in the skills needed to install, maintain and operate investments related to the energy transition; social protection, including informal work; social dialogue to develop a broad consensus to allow necessary and acceptable changes. Although it is difficult to find a balance between environmental sustainability and the preservation of jobs (in the interest of both entrepreneurs and employees), the above postulates must be implemented today.

De lege ferenda for a low-carbon economy and renewable energy sources, including the impact on industry and the development of the “green labor market”, is very extensive and applies to many spheres. Actions should be taken, which are also promoted under the Just Transition Fund, which allocates its funds to:

1. New transport solutions: reducing the demand for wheeled transport by replacing it with other, less energy-intensive means of transport (e.g. rail, waterways), replacing the fleet with cars powered by alternative or mixed energy sources, etc.
2. Implementing a sustainable supply chain strategy.

3. Replacing processes and products with processes and products that are less dependent on the availability of energy resources. Sustainable production, including increasing the efficiency of the use of natural resources and reducing the negative impact on the environment in the production process.
4. Investment in (research) and development related to sustainable energy services that will enable technological modernization and innovation, with a particular focus on renewable energy sectors. In this, it is necessary to increase the number of employees in the research and development sector. Investment is needed in research and innovation activities, including those carried out by universities and public research organisations, and activities supporting the transfer of advanced technologies.
5. Creation of new jobs (with decent conditions). Organizing training, reskilling courses and creating job opportunities in new places as part of green energy, and then developing qualifications for young people.
6. Supporting the development of micro-, small- and medium-sized enterprises, subsidies and development programs. Including the implementation of a mentoring program for novice entrepreneurs in the renewable energy sector. The fund allocates its funds to productive investments in small and medium-sized enterprises, including micro-enterprises and startups, leading to economic diversification, modernization and restructuring. Investment is needed in the creation of new businesses, including through business incubators and consultancy services, leading to job creation.
7. Investments in strengthening the circular economy, including by preventing and reducing waste, resource efficiency, reuse, repair and recycling.
8. Renovation and modernization of heating networks in order to improve the energy efficiency of heating systems and investments in the production of renewable energy sources.
9. Investments in artificial intelligence and digitization, technological innovations.
10. Shaping public awareness of climate change and the impact of the energy transformation on economic life in the future.

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Abstract

The Impact of Abandoning Fossil Fuels and the Development of Renewable Energy on the Global Labor Market

The impact of abandoning fossil fuels and the development of renewable energy on the global labor market is aimed at presenting the issue that affects now or in the near future most of the world's economies (plants extracting fossil deposits and cooperating with them large enterprises and international corporations) in the field of correlation with environmental protection. The above is being realized, among others by departing in the next 20 years from the policy of extracting fossil fuels, especially coal, and is related to the use and development of renewable energy. This has a significant impact on the legal status of employees and employer. The departure from the extraction of fossil fuels will result in a sudden wave of mass layoffs around the world, including in Poland, and economic migrations, so now it is necessary to prepare an action plan for the next decades in terms of retraining employees and other possible forms of their professional activation, in the new realities of the labor market. In addition, there is a need to regulate possible ways of using renewable energy in people's work, also in the context of the development of new technologies and their use in the work process. The development of the above should already result in the training of employees in new industries and create conditions for companies promoting the fight against global warming. It is important to deepen the study of the relationship between labor law and environmental protection law, which at the moment is

unjustifiably downplayed, while in a dozen / several dozen years it will have a huge impact on human life, because climate change (and “currently” the Sars-CoV-2 pandemic) are already causing a lockdown in the world labor market. There is an absolute need to identify potential problems, adopt appropriate policies and action plans, and then successively implement them, e.g. for the transition to a low-carbon economy, but without much prejudice to the employment market and global unemployment. In this context, a coherent policy of the EU and international organizations will be important, including ILO, in order to ensure environmental and social order in employment relations, in the new reality of the 1950s, the 21st century. Conclusion de lege ferenda drawn after the above-mentioned research will be aimed at presenting potential opportunities for Poland and the world in terms of the new and employment policy.

Key words: employee, fossil fuels, employment, renewable energy, labor market