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CONDITION AND PROSPECTS OF EMPLOYMENT IN THE RENEWABLE ENERGY SECTOR

Abstract

This article considers the condition of the labour market in the sector of renewable energy, the employment and prospects of its development in each RES sector over the countries, the dynamics of employment growth in the RES, including large hydropower are presented. The energy sector affects the dynamics and sustainability of the economy as a whole, affecting all its areas from job creation to resource efficiency and the environment. Accelerating the implementation of RES will give an impetus for economic growth, will create new workplaces, improve people's welfare and contribute to the making climate protection in the long term. Doubling the share of RES will increase direct and indirect employment in the sector by 2030. The number of workplaces in the sphere of RES will grow in all technological areas, however, to persist a high concentration of workplaces in those areas where today the highest labour employment is observed, namely, bioengineering, hydropower, and solar energy. Throughout all production and marketing chain of RES, the majority of workplaces will be provided due to supply of fuel, production of installations and the equipment. The new workplaces appearing in the process of further development of RES offset and will block losses of workplaces in the field of fossil power.

Key words: renewable energy, “green” economy, employment, labour market, energy efficiency, energy saving, climate protection.

Jobs are a crucial factor in the development of the economy and society. They not only provide people with livelihoods and improve well-being but also serve as an instrument for solving broader social problems – poverty reduction, social cohesion, skills development, gender equality and stability in post-conflict communities. Therefore, the creation of employment opportunities is a necessary and priority component of sustainable low-carbon development, the so-called “green” growth.

The energy sector affects the dynamics and sustainability of the economy as a whole, affecting all its areas – from job creation to resource efficiency and the environment.

Renewable energy sources (RES) create jobs 12 times faster than other sectors of the economy. According to a new report published by the Environmental Protection Fund, the number of jobs in solar and wind energy is increasing by about 20% per year. Since 2012, when 7.14 million people worked in the field of renewable energy, the number of jobs in the green energy sector has grown by almost 4 million [1].

Accelerating the introduction of renewable energy will give an impetus to economic growth, create new jobs, increase the well-being of people and contribute to the long-term climate preservation.

Doubling the share of renewable energy will increase direct and indirect employment in the sector to 24.4 million people by 2030. The number of jobs in the field of renewable energy will increase in all technological areas. In contrast, a high concentration of jobs will remain in those areas in which there is the highest employment today, namely bioengineering, hydropower and solar energy. Throughout the entire renewable energy production and household chain, most jobs will be provided through the supply of fuel (raw materials for bioenergy), the production of plants and equipment [1].

New jobs that appear as RES develops further compensate for and cover up job losses in the field of fossil energy sources. However, the macroeconomic benefits of green jobs depend on goals for the short and long term. The developing renewable energy and energy efficiency sector are typically distinguished by the greater complexity and broader use of manual labour (at the stage of production of components, installation and maintenance of facilities) than is required for the extraction and transportation of fuel in a more automated and capital-intensive fossil industry. For example, a photovoltaic panel creates at least twice as many new jobs per unit of energy generated compared to

technologies that use coal and natural gas. As a result, the replacement of technologies that use fossil fuels with RES can lead to the creation of more jobs.

Meanwhile, according to the International Labor Organization, in order to make up for the loss of jobs caused by the economic crisis that began in 2008, 280 million additional jobs were created in the world by 2019.

In 2016, the renewable energy sector supported direct and indirect employment of about 8.3 million people, which means an increase of 1.1% compared to 2015. Given the employment in the sector of large hydropower plants, this figure in 2018 reaches 11 million jobs [2]. Employment dynamics in the renewable energy sector, including large hydropower for 2014–2018 presented in Figure 1.

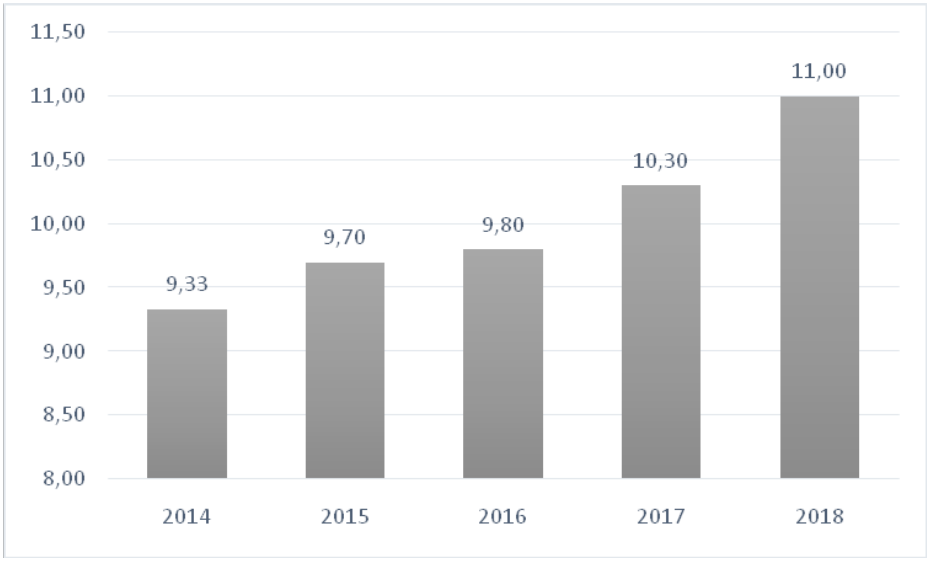

Figure 1 – Employment in the renewable energy sector from 2014 to 2018, million people

Note – Compiled by the authors based on the source [3].

The International Renewable Energy Agency (IRENA) notes that 62% of the sector's employees are located in Asia; in particular, active growth was recorded in Malaysia and Thailand. Whereas in Europe these are not the best of times, due to competition from Asian, primarily Chinese, manufacturing companies.

China is the largest employer in the renewable energy sector, employing 3.64 million people. Only one sector of the solar energy sector employs 1.6 million people, 80% of whom work in the field of industrial production, which makes up 70% of the total world production. Brazil, the second-largest employer, employs 1 million people, mainly in liquid biofuels, due to the need for labour for the production of raw materials. In the US, employment in the solar energy sector grew 17 times faster than the overall economy. In this country, the production of solar, wind and bioenergy provides more than 0.7 million jobs. In India, nearly 0.5 million people work in the field of renewable energy. Indonesia employed 223,000 people, Bangladesh – 129,000 jobs, mainly in the field of autonomous solar-powered systems. In the EU countries, 1.2 million people work in the field of renewable energy, with Germany and France providing the most jobs [1]. Installation and manufacturing of equipment continue to move to the Asia-Pacific region, in particular to Malaysia and Thailand, which has become a global centre for the production of solar photovoltaic cells.

Employment measurement trends vary with renewable energy technology. The most substantial employment is observed in the field of solar energy – in 2018, more than 3 million people worked here. It was made possible thanks to the increased production of less costly energy using solar photovoltaic panels, which increased the number of people working on such panels around the world. Also, solar photovoltaic panels are even more widely used, as they offer a cheaper way to make energy

more affordable. The sale and installation of panels, service is easy to organize in one place, while creating new jobs. The second-largest employer is the liquid biofuel sector, which has 1.8 million jobs worldwide, despite the growing mechanization of the raw material production process in major producing countries such as Brazil.

Employment in the renewable energy sector will continue to grow in line with national and global goals for the introduction of renewable energy sources and the reduction of greenhouse gas emissions.

Investing in forest conservation and restoration could increase formal employment by 20% by 2050. Concerning transport, increasing energy efficiency in all modes of transport and moving from private transport to public or non-motor transport would additionally increase employment by about 10%. Also, investments in improving energy efficiency in buildings and structures could create only 2–3.5 million additional jobs in Europe and the USA. If we take into account the need for new buildings (public facilities, hospitals, schools, etc.) that exists in developing countries, then this potential will turn out to be much more significant.

Employment in waste management and disposal will grow due to the increase in waste due to population and income growth. However, there are significant problems in this sector due to the lack of decent jobs. Recycling in all its forms already employs 12 million people in only three countries (Brazil, China and the United States). Sorting and processing of utilized materials provide ten times more jobs per ton than landfill or incineration.

In green investment scenarios, the projected job growth in the waste management industry is increasing by 10% compared to current trends. However, there is something more important than the additional employment potential in the field of waste management, reuse and disposal, namely the possibility and even the need to improve jobs in this sector. In order for jobs to be truly "green," they must meet the requirements of decent work, including by criteria such as a salary of at least the subsistence level, elimination of child labour, labour protection and safety, social security and the freedom to create associations. Improving jobs is desirable and necessary for both social and environmental reasons.

Waste management and disposal in Brazil are handled by more than 500 thousand people, most of whom are individual waste collectors who do not have an official job, with low and precarious incomes and poor working conditions. At the initiative of local authorities, approximately 60 thousand workers engaged in recycling were united in cooperatives or associations and have official jobs and employment contracts. Their income is two times higher than the income of individual waste collectors, and their families are no longer in poverty [4].

The widespread introduction and production of RES-based equipment will allow China to maintain its leading position in the world in terms of employment in the field of renewable energy. Significant growth in employment is expected in India, as this country has planned to increase the number of solar photovoltaic panels used and increase wind power utilization. It is assumed that in order to achieve the goal of generating 100 GW of solar energy alone, 1.1 million jobs will be required. Brazil will remain a principal employer, providing the majority of jobs in the sector of collecting and processing raw materials for bioenergy.

US employment will also increase as jobs appear in the bioenergy sector and the solar and wind energy sectors. A 2009 study, Clean Energy – Green Jobs, by a reputable US organization, the Union of Concerned Scientists (UCS), showed that if by 2025 25% of the energy in the US is generated from renewable energy sources, renewable energy could create three times as many jobs as a hydrocarbon with the same generation volume, providing 202 thousand additional jobs and increasing income by $ 9.9 billion and GDP by $ 7.3 billion.

It is expected that one of the largest employers in the field of renewable energy will be Mexico, which, with the help of renewable energy, intends to produce 50% of the energy by 2050.

The transition to a green economy, by its very definition, involves a particular restructuring of the economy, and special measures may be required to ensure that this transition goes smoothly for the workers it touches. Some sectors will require assistance in moving workers to new jobs. For example, in Germany, the renewable electricity industry is experiencing a shortage of skilled workers. The lack of skilled workers is felt in almost all sub-sectors of the energy sector, especially in hydropower and

the energy use of biogas and biomass. No less acute shortage of personnel is observed in engineering for the needs of renewable energy; especially lacking engineers, operators and maintenance specialists, as well as enterprise managers.

Solving this problem requires systematic access of all sectors of society to education and practical training in relevant fields, including engineering, technology, economics, science, environmental management, financial, business and commerce. A plan of professional, as well as school or university training, should be adequately developed and cover renewable energy technologies, issues of sustainability and climate change. Vocational training programs can also provide an opportunity to acquire a speciality and take advantage of the growing labour market in the field of renewable energy. The careful development of certified specialities and the classification of trained personnel, based on the level of competence and preparedness, is required.

In order to satisfy the demand for qualified specialists, efforts and measures should be aimed at developing specialities through strategic planning. Planning, which combines education and training principles in the framework of the national strategy for renewable energy, has proved its worth. National plans for renewable energy development strategies can include support policies that integrate renewable energy into the curriculum of technical and service disciplines, develop educational institutions and training centres, and provide appropriate financial support. This policy should be implemented along with the continuous interaction of industry with those responsible for the formation and implementation of policies in the energy and education sectors. Besides, scientific and technological developments are needed in order to stimulate technological breakthroughs, improve goods and services, and increase the applicability of the technology in local conditions. It can accelerate the implementation, reduce prices and serve as a solution to the specific goals of many countries of our planet.

A “green” economy is replacing fossil fuels with clean energy and low-carbon technologies, reducing climate impact while creating decent jobs and reducing import dependence in several countries. New technologies that contribute to energy and resource efficiency open up opportunities for growth in new directions, offsetting the loss of jobs in the brown economy. Increasing resource efficiency – the efficiency of use of both electricity and raw materials – is manifested everywhere, including in improving the waste management system, enhancing the role of public transport, green building and reducing the amount of food waste throughout the food production and consumption chain.

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Аңдатпа

Мақалада қалпына келетін энергия көздері саласындағы еңбек нарығының жағдайы қарастырылды. Жұмыспен қамту және оның даму перспективалары әрбір ЖЭК секторында мемлекеттер бойынша талданды. Ірі су энергиясын қоса есептегенде, ЖЭК секторындағы жұмыспен қамтуының өсу динамикасы көрсетілді. Энергетикалық сектор экономиканың динамикасына және тұрақтылығына тұтастай әсер етеді, жұмыс орындарын құрудан бастап және ресурс тиімділігі мен қоршаған ортаға дейін оның барлық салаларын қозғайды. ЖЭК енгізуді жеделдету экономикалық өсуіне түрткі болады, жаңа жұмыс орындарды құруға мүмкіндік береді, адамдардың әл-ауқатын арттырады және ұзақ мерзімді перспективада климаттың сақталуына өз үлесін қосады. 2030 ж. қарай ЖЭК үлесін екі еселену тікелей және жанама жұмыспен қамтуды көбейтеді. Жаңартылатын энергетика саласында жұмыс орындарының саны барлық технологиялық

салаларда артады, ал жұмыс орындарының көп шоғырлануы бүгінде ең көп жұмыспен қамтылған салаларда, атап айтқанда биоинженерия, гидроэнергетика және күн энергетикасында сақталады. ЖЭК өндірістік тізбегі бойынша көптеген жұмыстар отын жеткізу, өсімдік өндірісі мен жабдықтары арқылы қамтамасыз етіледі. ЖЭК әрі қарай дамуының арқасында пайда болған жаңа жұмыс орындар қазба энергиясы саласында жұмыс орындарының қысқаруын өтейді және орнын толтырады.

Тірек сөздер: жаңартылатын энергия көздері, «жасыл» экономика, жұмыспен қамту, еңбек нарығы, энергия тиімділігі, энергия үнемдеу, климатты сақтау.

Аннотация

В статье рассмотрено состояние рынка труда в сфере возобновляемых источников энергии (ВИЭ), проанализированы занятость и перспективы ее развития в каждом секторе ВИЭ по странам, представлена динамика роста занятости в секторе ВИЭ, включая крупную гидроэнергию. Энергетический сектор влияет на динамику и устойчивость экономики в целом, затрагивая все ее сферы, начиная от создания рабочих мест и заканчивая ресурсоэффективностью и окружающей средой. Ускорение внедрения ВИЭ даст толчок экономическому росту, позволит создать новые рабочие места, повысить благосостояние людей и внесет свой вклад в дело сохранения климата в долгосрочной перспективе. Удвоение доли ВИЭ увеличит прямую и косвенную занятость в секторе к 2030 г. Количество рабочих мест в сфере ВИЭ вырастет во всех технологических областях, при этом сохранится высокая концентрация рабочих мест в тех областях, в которых сегодня наблюдается наибольшая трудовая занятость, а именно вбиоинженерной, гидроэнергетике и солнечной энергетике. На протяжении всей производственно-сбытовой цепочки ВИЭ большинство рабочих мест будет обеспечиваться за счет поставок топлива, производства установок и оборудования. Новые рабочие места, появляющиеся по мере дальнейшего развития ВИЭ, компенсируют и перекроют потери рабочих мест в области ископаемой энергетики.

Ключевые слова: возобновляемая энергия, «зеленая» экономика, занятость, рынок труда, энергоэффективность, энергосбережение, сохранение климата.