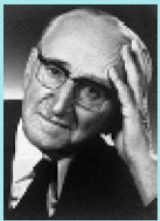




Ordnungspolitische Diskurse

Discourses in Social Market Economy



**Bartosz Bartniczak and
Michał Ptak**

**Green Jobs in the Renewable
Energy Sector**

Discourse 2015 – 1

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Michał Ptak**

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Abstract

Green jobs exist for a long time. However, for some time dynamics of their creation is increasing and they are created in more and more sectors. Green jobs are created as a result of the development of new environmentally friendly technologies or through the "greening" of the next sectors of the economy. Despite the widespread use of the concept of green jobs there is a lack of a universally accepted definition of this concept and consequently can not be strictly defined sectors where these jobs are created. The purpose of this article is to present the situation related to the creation of green jobs in one of the fastest growing sectors in the world which is the renewable energy sector. The article analyzes the situation in selected countries, as well as in selected areas of renewable energy. The article presents also the support mechanisms that affect the development of the sector and thus to create jobs.

Keywords: green jobs, renewable energy sector

Bartosz Bartniczak, PhD.
Michał Ptak, PhD.
Wrocław University of Economics
Fakulty of Economy, Management and Tourism
Nowowiejska 3, 58-500 Jelenia Góra, Poland
bartosz.bartniczak@ue.wroc.pl Michal.Ptak@ue.wroc.pl

Green Jobs in the Renewable Energy Sector

1. Definitions of green jobs.

The idea of green jobs is a relatively new concept. The literature does not provide a universally accepted definition of green jobs. Examples of some commonly used definitions are following. According to Sprenger green jobs demand skills, which are related to the environment.¹ The United Nations on the other hand define green jobs as positions in different sectors that help to preserve or restore the quality of the environment.² Work in economic sectors that reduces a negative environmental effect and that leads to both socially and economically sustainable behaviour is the European Commission's perspective on the subject.³ Workers in green jobs can be managers and technicians who use their green skills responsibly in exchange with non-green organisations, as well as people who work in green organisations.⁴ Green Jobs can also be defined as jobs that contribute to the reduction of the environmental impact of enterprises and economic sectors towards sustainable levels.⁵ The Michigan Department of Energy, Labour and economic growth see green jobs as directly involved with the support of a company's green products or services.⁶ Another definition for green jobs could be the following: "Jobs that contribute to protecting the environment and reducing the harmful effects human activity has on it (mitigation), or to

¹ See Sprenger (1997) p.26.

² See United Nations Environment Programme (2008) p. 36.

³ See European Commission (2009) p. 5.

⁴ See Ehmcke, Philipson, Kold-Christensen (2009) p.7.

⁵ See R. Keivani, J. Tah, E. Kurul, H. Abanda (2010).

⁶ See Michigan Department of Energy, Labor & Economic Growth (2009).

helping to better cope with current climate change conditions (adaptation)".⁷ Green jobs depend on the environment and work towards a greener economy.⁸

Analysis of these definitions allows us to conclude that the jobs which could be treated as green must meet certain specific conditions. Among these conditions are that they must be created in the environmental sector or in a sector whose activities contribute to the improvement of the environment. Creating green jobs should contribute to reducing negative impact on the environment. It is also underlined that green jobs are those which employ people with environment skills.

2. Green jobs and jobs in renewable energy sector

According to the definition of International Energy Agency (IEA) renewable energy is obtained as a result of natural processes and constantly replenished⁹. Polish regulations define renewable energy as non-fossil energy sources, including wind, solar, aerothermal, geothermal, hydrothermal energy, hydropower, waves, currents and tides, the energy obtained from biomass, biogas, agricultural biogas and bioliquids¹⁰. Among the main factors in favor the development of renewable energy sources we could pointed out creation of new jobs both in the phase implementation of the investment and its operation¹¹. Due to the fact of its rapid development, this sector is one of the sectors with the most dynamic job creation. Definitions of green jobs show that green jobs are created in sectors that contribute to reducing the pressure on the environment. As a result, jobs created in the renewable energy sector can be considered green.

⁷ See Martinez-Fernandez, Hinojosa, Miranda (2010) p.26.

⁸ See European semester thematic fiche green jobs: employment potential and challenge.

⁹ See About IEA, Directorate of Sustainable Energy Policy and Technology.

¹⁰ See Ustawa z dnia 20 lutego 2015 r. o odnawialnych źródłach energii, Dz. U. 2015, poz. 478.

¹¹ See Diagnoza stanu przedsiębiorstw sektora odnawialnych źródeł energii (2012).

3. Green jobs in the renewable energy sector

According to Renewable Energy and Jobs Annual Review published by The International Renewable Energy Agency renewable energy sectors employed in 2014 about 7.7 million people around the world. As you can see China was a country with the largest renewable energy employment (Table 1). China accounted for 44% of the global renewable energy employment. Renewable energy sectors employed in China 3.4 million people. The number of employees in the renewable energy industry was three times higher than in the European Union countries and nearly five times higher than in the United States¹².

Table 1. Employment in renewable energy sector in 2014

Specifications	World	China	Brazil	European Union	United States
Solar PV	2495	1641		164	.
Liquid biofuels	1788	71	845	98	282
Wind Power	1027	502	36	320	73
Biomass	822	241	.	343	152
Solar Heat- ing/Cooling	764	600	41	37	.
Biogas	381	209	.	66	.
Small Hydropower	209	126	12	41	8
Geothermal	154	.	.	104	35
CSP	22	.	.	15	174
Total	7662	3390	934	1188	724

Source: The International Renewable Energy Agency (2015) p.16.a)

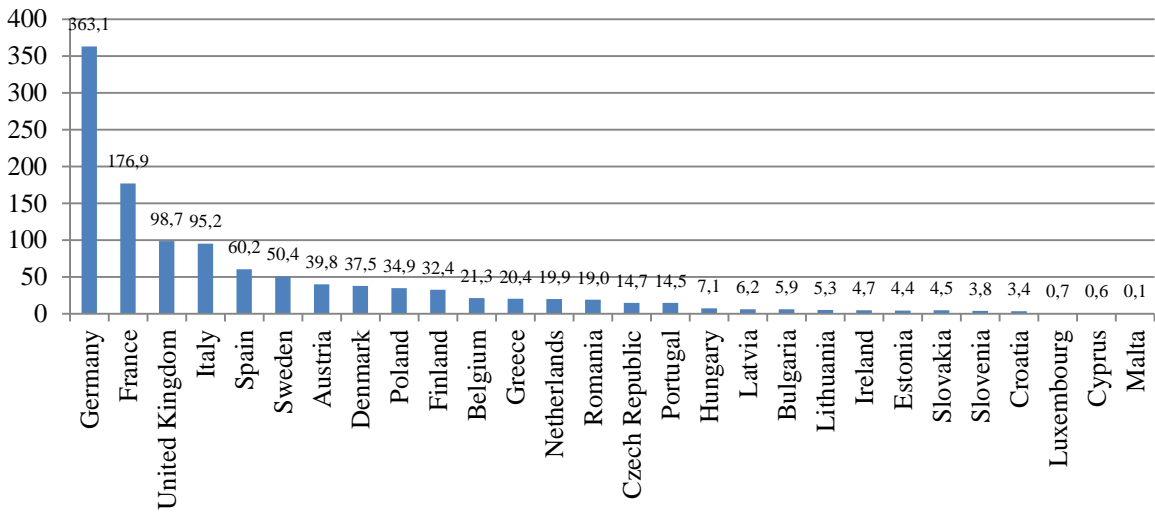
Data for 2013–2014.

According to the EurObserv'ER Report the number of employees in the renewable energy industry in the European Union was 1 million and 150 thousand of which nearly one third was in Germany (Figure 1). Other three countries with the largest renewable in Europe energy employment were France, United Kingdom and Italy. Renewable energy workforce in the four countries accounts for two thirds of the total green energy jobs in the European Union.¹³

¹² See The International Renewable Energy Agency (2015).

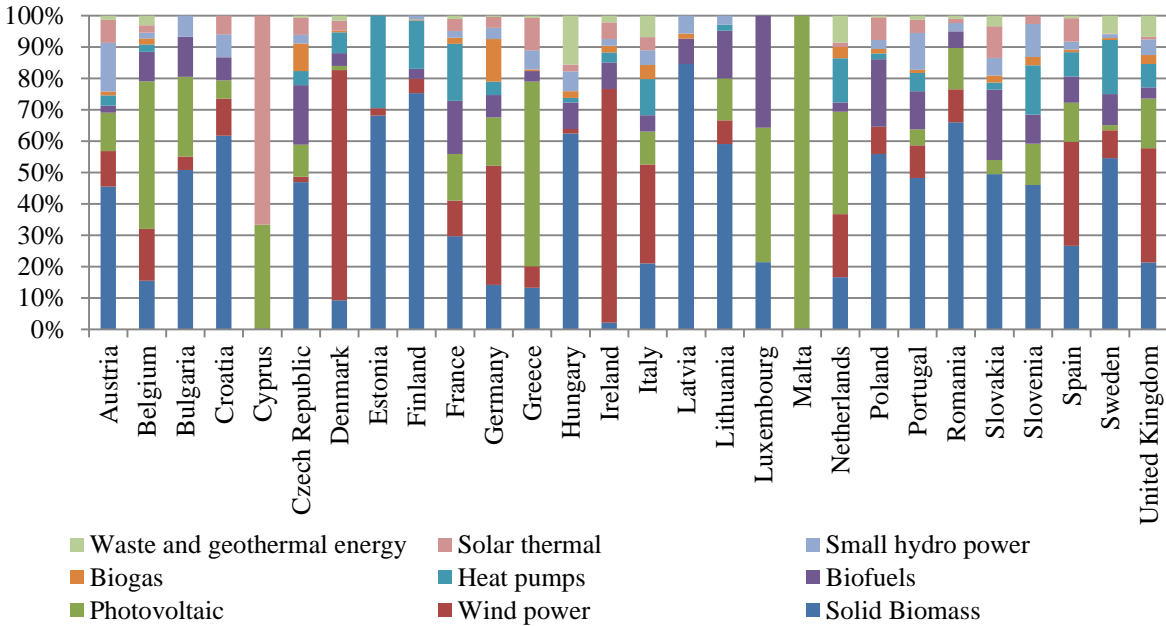
¹³ See 14th EurObserv'ER Report (2015)

Figure 1. Jobs in renewable energy sector in European Union (2013, thousands)



Source: 14th EurObserv'ER Report (2015), p. 137.

Figure 2. Breakdown of renewable energy employment in the European Union countries (%)



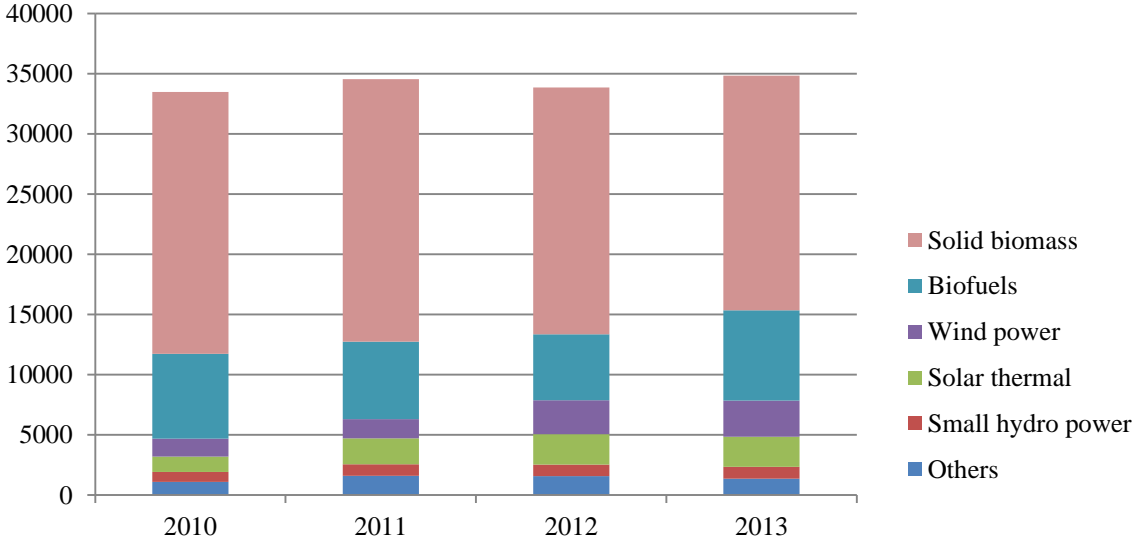
Source: 14th EurObserv'ER Report (2014) p. 137.

The largest renewable energy employers in European countries are solid biomass and wind. Biomass and wind employment accounted for more than a half of the green jobs in renewables. In the European countries fewer people are employed in small hydro power, solar thermal, waste and geothermal energy industries (Figure 2).

As you can see some of the European countries' job markets are dominated by one renewable energy technology (Figure 2). For example, Malta's renewable energy employment is dominated by solar photovoltaics. Northern European countries markets (such as Estonia, Finland and Latvia) are dominated by solid biomass¹⁴.

Job markets in Denmark and Ireland are dominated by wind power. In Germany wind employment accounted for 138 thousand, that is about 38% of the total renewable energy employment in this country. Germany is the largest wind industry employer in Europe. Other important employers in Germany are biomass, biogas and solar photovoltaics¹⁵.

Figure 3. Jobs in renewable energy sector in Poland, 2010-2013



Source: 12th EurObserv'ER Report (2012) p. 94. ; 14th EurObserv'ER Report (2014), p.96.

In Poland, the number of employees in the renewable energy sectors increased in 2010-2013 by about 4 percent (Figure 3). In 2013 green energy jobs reached 38 thousands. The employment in the sector is about 10 times lower than in Germany. The Polish job market is dominated by solid biomass, as in other Central and Eastern European countries. In Poland there has been rapid growth in wind and solar water heating employment. The number of jobs in those two sectors doubled between 2010 and 2013¹⁶.

¹⁴ See 4th EurObserv'ER Report (2015).
¹⁵ See EurObserv'ER Report (2015).
¹⁶ See 12th EurObserv'ER Report (2012) p. 94.

The increase of jobs in the renewable energy sector, however is associated with their elimination in the sector of non-renewable fuels. This problem is particularly important for Poland. Mining of coal and lignite is in fact one of the main economic sectors. The process of moving on renewable energy can contribute to further closures of mines, and thus it can reduce the number of people working in this industry. Table 2 presents information on employment in the mining of coal and lignite in Poland in the years 2005-2013.

Table 2. The number of employed in the mining of coal and lignite in Poland in the years 2005-2013

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Employment in thousands	145,0	142,6	138,9	141,0	136,8	121,9	122,9	121,5	113,6

Sources. Statistical Year Book of the Republic of Poland 2008/2009/2010/2011/2013

In the years 2005-2013 the number of employed in the mining of coal and lignite decreased by over 30 thousand people. It was a decrease of nearly 22%.

4. Issues of renewable energy jobs in Poland in strategic documents

There are many strategic documents in Poland which highlight the need for green job creation and the need for renewable energy jobs. These documents include:

- Strategy for Innovation and Efficiency of the Economy “Dynamic Poland 2020”,
- Human Capital Development Strategy 2020,
- National Strategy of Regional Development 2010-2020. Regions, cities, rural areas,
- The National Action Plan for Employment for the years 2015-2017,
- Strategy for Energy Security and the Environment, 2020 perspective,
- Draft of the Polish Energy Policy until 2050.

As you can see assumptions which are directly or indirectly linked to jobs in the renewable energy sector can be found in documents which relate to energy, labour market, employment and regional development (Table 3).

Table 3. Renewable energy jobs in Polish strategic documents

Strategy for Innovation and Efficiency of the Economy “Dynamic Poland 2020”	Green jobs are suppose to be one of the results of the measures which have to be taken to in order to achieve the strategy’s objective related to increased resource and raw materials efficiency. ¹⁷
Human Capital Development Strategy 2020	The document calls for a support for creating green jobs in new sectors of the economy. ¹⁸
National Strategy of Regional Development 2010-2020. Regions, cities, rural areas	The document calls for a support for the change in the employment structure in new sectors of the economy resulting from implementation of the “green growth” principle. ¹⁹
The National Action Plan for Employment for the years 2015-2017	One of the tasks to be implemented is the support for creating green jobs, particularly in economic sectors with potential for high levels of employment growth. The aim is to reform the labor market in a way that would take into account the need for a low-carbon transformation of the Polish economy. The results of this will be an increase in employment in sectors related to low-carbon transformation, resource management and environmental protection. ²⁰
Strategy for Energy Security and the Environment, 2020 perspective.	<ul style="list-style-type: none">• Creating conditions for new jobs is one of the actions outlined in the strategy. It is extremely important for the development of modern, innovative economy. This would be possible by increasing market demand for specialists in renewable energy and energy efficiency.• It is necessary to continuously increase skills of people in the energy and environmental protection sector, among

¹⁷ See Strategy for Innovation and Efficiency of the Economy “Dynamic Poland 2020”.

¹⁸ See Human Capital Development Strategy 2020 (2013).

¹⁹ See National Strategy of Regional Development 2010-2020 (2011).

²⁰ See The National Action Plan for Employment for the years 2015-2017 (2015).

	<p>others, by providing educational and vocational guidance throughout life (so called “lifelong guidance”).</p> <ul style="list-style-type: none"> • New job creation will be encouraged with 1) financial and fiscal incentives, 2) increasing labour market demand for specialists in the field of environmental protection. The institution responsible for this task is the Ministry of Economy. Other institutions involved in the process include Ministry of Finance, Ministry of the Environment, Ministry of Labour and Social Policy.²¹
Draft of the Polish Energy Policy until 2050	New jobs will be created thanks to the development of distributed generation. ²²

For example, The National Action Plan for Employment for the years 2015-2017 calls for a reform of the labor market. The market should take into account the need for a low-carbon transformation of the Polish economy. The results of this will be an increase in employment in sectors related to low-carbon transformation, resource management and environmental protection. According to the Strategy for Energy Security and the Environment the development of modern, innovative economy is extremely important for the country. This would be possible by increasing market demand for specialists in renewable energy and energy efficiency. New job creation will be encouraged with financial or fiscal incentives and with increasing labour market demand for specialists in the field of environmental protection. The institution responsible for this task is the Ministry of Economy. Other institutions involved in the process include Ministry of Finance, Ministry of the Environment, Ministry of Labour and Social Policy.

²¹ See Strategy for Energy Security and the Environment, 2020 perspective (2014).

²² See Draft of the Polish Energy Policy until 2050 (2015).

5. Existing support schemes for the renewable energy sector in Poland

Labor market developments in renewable energy sector is largely dependent on the existing support scheme. Under the current tradable certificate scheme incentives for renewable energy producers cannot be differentiated among various types of renewable energy sources. Hence, not only cheapest technologies can be developed. The same level of support is no longer justified as it does not lead to optimal use of local resources. Furthermore the green certificate system limits economic development and new jobs creation. It seems that in 2004, when the act on the change of energy law was adopted the direct impact on labour market thanks to the “green certificate” support scheme was not fully expected and visible. In the explanatory memorandum to the bill there were no detailed estimates of the number of possible new jobs. Such estimates can be found in the explanatory memorandum to the act on renewable energy sources of 2015. According to the memorandum one of the objective of the new law is creating new jobs as a result of new renewable energy installations.²³

It is expected that the cumulative increase in employment in the renewable energy sector in Poland would amount to over 56 thousand in 2020 (in comparison to a scenario with no changes in the Polish support scheme). Table 4 presents a possible increase in employment resulting from investments in renewable energy installations. These figures assume an increase in installed capacity, which was adopted by the Ministry of Economy for the purpose of calculating the cost of support system and resulting from the KPD. Almost half of the additional jobs is to concern solar collectors, almost one quarter - of wind energy. 10% - energy biogas, and a little less - the heat pump. The estimates are largely simplified. For example, fixed rates adopted for the number of employees in terms of power, even though the experience of other countries shows that with the development of market indicators are concerned downward trend. In the case of wind power it is assumed that the number of jobs per 1 MW of installed capacity is equal for onshore and offshore installations. In the case of wind energy in turn we assumed that the number of jobs per 1 MW of installed capacity is equal for both small and large installations.

²³ See Uzasadnienie ustawy o odnawialnych źródłach energii, RM-10-33-14 (2014).

Table 4. Projected job growth in Poland thanks to law on renewable energy sources adopted in 2015

Specification	Assumption ^{a)}	2015	2016	2017	2018	2019	2020	Total
Solar panels	3,4 ppl./MW	4283	5710	4521	5710	2379	4521	27124
Wind energy	3,3 ppl./MW	2145	2162	2211	2145	2162	2211	13036
Biogas	10,4 ppl./ktoe	530	645	832	822	1373	1394	5596
Heat pumps	5,8 ppl./MW	609	667	731	812	887	980	4686
Biomass	3,2 ppl./MW	314	598	637	563	957	34 6	3415
Geothermal energy	20 ppl./MW	280	260	320	380	40	40	1320
Photovoltaics	4,4 ppl./MW	105	141	141	141	158	158	844
Water energy	3,4 ppl./MW	13	13	13	14	14	286	353
Total	x	8279	10196	9405	10587	7970	9935	56372

a) Constant level at 2011 r. (In the case of heat pumps and geothermal energy – from 2010) value applies both to jobs directly related to the development of an installation RES (production of equipments, installation, etc.), as well as indirectly (transport, etc.).

Source: Uzasadnienie ustawy o odnawialnych źródłach energii (2014).

It can be assumed that the expected impact on the Polish labour market (that is 56 thousand of new jobs) will be somewhat limited. Enterprises in the renewable energy sector (that is renewable electricity producers, financial institutions, developers, biomass producers, etc.) will look for opportunities to reduce operating costs. This may lead to labour productivity increase. As a result, employment growth may be lower by a few percent that it is expected.²⁴

It is possible that renewable energy development will affect an employment in the mining sector and in other traditional sectors. However, the impact on the employment in the mining sector can be considered negligible because of the general growing demand for energy.

²⁴ See Uzasadnienie ustawy o odnawialnych źródłach energii, RM-10-33-14 (2014).

6. Example of activities taken at regional level

In dolnośląskie province indicator “Number of direct jobs created by project” was used for the whole program process monitoring. This indicator was obligatory for every project financed under the Programme, regardless of whether the project relates to labour market, transport, energy and environment protection, entrepreneurship, innovation, competitiveness of enterprises or something else. At Table 5 you can see the number jobs which are to be created through implementation of priority axis 5 Regional and environmentally friendly energy infrastructure. As you can see the majority of new jobs is to be created under the measure 5.1 which relates to renewable energy sources (Table 5). However it can be concluded that the number of new jobs is rather small. It's just ten new jobs ²⁵.

Table 5. Number of direct jobs created by projects financed under Regional Operational Programme for Dolnośląskie province for 2007-2013 (priority 5 “Regional and environmentally friendly energy infrastructure”)

Measure	Expected level of the indicator	The number of projects which create new jobs	The number of other projects
5.1 Renewable energy sources	10	5	6
5.2 Distribution of electricity and gas	1	1	25
5.3 Heating and CHP	1	1	7
5.4 Energy efficiency improvement	2,5	1	10
Total	14,5	8	48

Source: Urząd Marszałkowski – PSDB - Ewaluacja wpływu projektów realizowanych w Priorytecie 4 „Środowisko i bezpieczeństwo ekologiczne” i Priorytecie 5 „Energetyka (2014).

The importance of green jobs as professions with “occupations and sectors identified as key to the development of the country” is underlined in the Partnership Agreement. The Partnership Agreement is a document defining the strategy of interventions of European funds in the years 2014–2020. The agreement states that the im-

²⁵ See Urząd Marszałkowski, PSDB - Ewaluacja wpływu projektów realizowanych w Priorytecie 4 „Środowisko i bezpieczeństwo ekologiczne” i Priorytecie 5 „Energetyka (2014).

plementation of the so called 'greening of the economy' should draw on the experience of environmental economics and ensure appropriate relationships between the economy and ecosystems, among others through: the development of clean technologies and renewable energy sources, improving energy and material efficiency, a change in the model of consumption and production to a more sustainable one, the use of an integrated product policy, application of green public procurement and the creation of green jobs²⁶.

There are some measures in some of the regional operational programmes for the 2014-2020 programming period. For example in RPO for Podlaskie province at least 10% of the support provided under the measure 2.3 "Supporting the development of enterprises" within priority axis 8.iii "Self-employment, entrepreneurship and business creation" is earmarked for new jobs in smart specialisations. Smart specialisations of the region include innovation, environmental science and related sectors of the value chain, including renewables.²⁷

In RPO for Lubelskie province one of the main criteria for the evaluation of this projects financed under the programme is the improvement of professional skills in green economy sectors (transport, renewable energy sources, construction and waste management). This criterion is applied to projects financed under measures:

- 9.1 "Professional activation" within priority axis 9 "The Labour market"
- 10.2 "Outplacement" within priority axis 10 "Adaptability of employees and enterprises to change".²⁸

In many regional operational programmes assume the possibility of some preferences for projects which generate new jobs in renewable energy. However, the introduction of such measures depend on the results of research aimed at identifying the need for support for the creation of white and green jobs within the programme. The research will also determine the sectors with the greatest potential to create jobs which should be supported.

²⁶ See Ministerstwo Infrastruktury i Rozwoju (2014).

²⁷ See Regionalny Program Operacyjny Województwa Podlaskiego na lata 2014-2020 (2015).

²⁸ See Regionalny Program Operacyjny – Lubuskie 2020 (2015).

7. Summary

Creating green jobs is a major challenge facing the world today. The need to create them has been written in a number of strategic documents at national and international level. Despite the increasingly widespread use of the term green jobs, this term did not have a generally acceptable definition. The lack of clear definition makes it difficult to classify which jobs can be regarded as green. This article attempts to diagnose green jobs in the renewable energy sector. Positions created in this sector can be regarded as a green due to the fact that the production of energy from renewable sources is environmentally friendly. One of the key aspects governing the classification of jobs as green is that they arise in the environment-friendly sectors. The conducted analysis showed that the number of the jobs in this sector from year to year increases. The number of green jobs in renewable energy sector around the world can be estimated at over 7.7 million, of which 44% are located in China. In the European Union the number of green jobs in renewable energy sector is estimated at over 1.1 million, of which 1/3 is formed in Germany. In the case of Poland situation from year to year is improving, because are created more jobs in the renewable energy sector. Currently, their number can be estimated at approx. 35 thousand²⁹. An important issue for further discussion is the question of whether all the jobs created in the RES can be regarded as green. While the production of particular parts of a plant for the production of renewable energy sources occurs a significant pollution. Also important issue is the treatment of workers in the event of extending the concept of green jobs in into sustainable jobs.

²⁹ See Renewable Energy and Jobs. Annual Review 2015.

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Herausgeber:

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