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K. Pajak,
DrHab (Economics),

O. Kvilinskyi,
PhD (Economics),

O. Fasiecka,
PhD student (Economics),
Poznań University of Economics and Business, Poland

REGIONAL ENERGY SECURITY (BASED ON POLISH EXPERIENCE)

Introduction

Wielkopolska Region is located in the central-western part of Poland. It is the second largest and third most populated region with the area of 29 826.5 km2, which represents 9.5% of the country. The greater part of its area - about 65% consists of agricultural, then forests and forests with shrubs – 26.7%. Only 5.2% of its area is built-up and urbanized land [as of 1.01. 2013 Statistical Office in Poznan].

The administrative structure of Wielkopolska shape 35 districts, including 31 rural districts and 4 cities and towns: Poznan, Leszno, Kalisz and Konin. The smallest administrative units are 226 municipalities, including 19 urban, 90 rural-urban and 117 rural. There are 109 cities in the voivodship - the largest number in Poland as well as 5456 rural municipalities. [Voivodeship. Subregions - the districts - the municipalities in 2013, the US in Poznan 2013].

Rural areas in Wielkopolska cover an area of 28 335 km2, which represents 95% of its surface. Rural settlement network consists of 3851 villages, 117 of them are rural municipal centers. These areas have a population of 1531.5 thousand people representing 43.9% of the total number of inhabitants of the province and 10% of rural areas of the country [Greater 2013-2020 Rural Renewal, Office of the Marshal of Wielkopolska 2013]. 64% of rural population is of working age and the number of people working in the country is over 620 thousand. It remains at a similar level in recent years. The vast potential of human resources in the region is a prerequisite for the development of new economic activities in rural areas, including renewable energy.

Farmers in Wielkopolska work on an area of about 1939.3 thousand ha of agricultural land, which accounts for 65% of the whole province. In 2013, 1475.1 thousand ha was a sowing area. Nearly 1.23% of farmland in Wielkopolska is occupied by orchards, and less than 14% by permanent meadows and pastures [GUS 2013]. In addition, farmers in the region carry the highest in Poland agricultural production, occupying leading positions in crop production and livestock. They also excel on the country level in the collection of cereals (15.5% of the harvest in Poland), sugar beet (23%) and outdoor vegetables (14.1%), whose acreage is significant on a national scale. Greater agriculture also has a dominant position in the production of animals for slaughter - 20.5% nationally. Participation in cattle production is 22.2% and 24.1% in pigs. In addition, the region produces the highest in Poland number of poultry chicken and chicken eggs, which shares in the country amounts to 27.7% sequentially and 33.1% [Yearbook of agriculture, GUS 2014]. A high percentage of arable land and a large crop and animal production in the region provide excellent conditions for the use of biomass energy. In 2013 around 123 228 agricultural holdings were located in Wielkopolska [GUS 2014] More than 76% of them are holdings of up to 10 hectares, so the small-area and not the strongest economically ones. Only 0.93% of farms were large holdings [Local Data Bank in 2014].

Wielkopolska Region has the largest number of cities in Poland. According to GUS data from 2013, 109 cities, representing 13.1% of all cities in the country are located here. It is inhabited by a total of 1,920.1 thousand people or 8.23% of the urban population of the country. The region's urbanization level measured by the share of urban population in the total population of the region is 55.5%. Compared to other provinces this percentage is relatively low, as compared to the average of the country, which has a value of about 60.6%. The low level of urbanization of Wielkopolska comes from the presence of small towns up to 20 thousand residents on its territory. Average number of inhabitants is almost 17 616 people, one of the lowest rates compared to the average of the country being placed at the level of 25 701 people [Area and population in territorial in 2013, CSO 2013].

Greater settlement network creates a hierarchical system, and its largest conurbation is Poznan. Due to the significant role in the Polish settlement system and socio-economic contribution to the processes of development, the city gained the status of metropolitan center. Its significant contribution to socio-economic and cultural life of the region is mostly due to the population potential as well as the economic, and scientific ones. This resort in conjunction with the district of Poznań creates an area which is home to the most intense urbanization processes in the whole region. Poznan is therefore a key element of the spatial structure of Wielkopolska and together with functionally interdependent environment creates Poznań Metropolitan Area. This area is

considered the most important generator of growth for the whole region, bringing together the largest part of the development potential and providing the competitive potential of the region. Evidence of this are high growth rate in economics, investments, science, technology, and social and cultural life [Report on the development and growth of the Wielkopolska region in 2010; Wielkopolska Spatial Planning Office, 2011; Pająk, Dahlke, Kvilinskyi, 2016].

1. The consumption of electricity and heat in the Wielkopolska region in the years 2005-2013

The energy consumption of heat and electricity in Wielkopolska is a derivative of many factors related to local government, level of industrialization, population of the region, its labor market and the processes urban development. Total electricity consumption each year is on average about 10.8 - 11 GWh. Detailed calculations by industry is presented in Table 1.

Table 1

Consumption of electricity in Wielkopolska in 2013

Lp.	Specification	Province																Total
		dolnośląskie	kujawsko-pomorskie	lubelskie	lubuskie	łódzkie	małopolskie	mazowieckie	opolskie	podkarpackie	podlaskie	pomorskie	śląskie	świętokrzyskie	warmińsko-mazurskie	wielkopolskie	zachodniopomorskie	
1	**Total consumption**	12874	7429	5559	3306	11644	12459	22970	4781	5065	2754	7229	25078	4590	3515	11287	5848	146390
1.1	Own consumption in power plants and thermal-electric power station (including power plants of heating boilers)	1359	138	46	77	3484	516	1955	550	164	67	213	2940	691	23	1240	642	14104
1.2	Own consumption in heat plants	15	15	16	0	16	14	23	8	9	19	16	31	9	23	28	31	272
1.3	Mining and quarrying	2097	34	273	41	1218	328	13	38	51	32	17	3931	63	11	593	12	8754
1.4	Industry and construction	3368	3573	2378	1383	1951	4318	8297	1953	1849	790	2700	7390	1879	966	3289	1834	47918
1.5	Water supply, management of waste	292	130	70	63	143	215	389	54	79	69	146	488	50	97	206	141	2631
1.6	Transport	281	169	116	100	353	288	849	99	75	89	329	469	126	61	475	227	4104
1.7	Small final customers sector	5462	3371	2659	1642	4479	6781	11444	2079	2838	1689	3809	9829	1772	2334	5457	2963	68607
1.7.1	Agriculture (only use for production purpose, without consumption in households of farmers)	103	79	70	41	96	114	243	58	55	49	92	153	35	87	207	57	1539
1.7.2	Residential (with consumption in households of farmers)	2119	1435	1392	718	1906	2631	4587	810	1186	862	1774	3557	754	990	2567	1155	28442
1.7.3	Others	3241	1858	1198	883	2477	4036	6615	1210	1597	777	1943	6119	982	1256	2684	1751	38626

Source: GUS: http://stat.gov.pl/download/gfx/portalinformacyjny/pl/defaultaktualnosci/5485/6/7/1/se_zuzycie_paliw_nosnikow_energii2012.pdf [15.10.2014]/.

From the data in Table 1 the indication is that in the region of Wielkopolska there is a significant on a national scale electricity consumption. (%) Especially high percentage of the transport sector, agriculture, mining and quarrying. On the other hand quantity the biggest consumers of electricity and heat are industrial and construction industries and households. Worth noting is that in these sectors lie at the same time greatest opportunities to save energy and heat, thereby reducing the amount of CO2 emissions.

The largest heating networks in Wielkopolska are located in Poznań, Kalisz, Konin, Leszno and Pila. The average annual heat sales are almost 21 262 TJ. in detail is presented in table 2.

Table 2

Heat consumption in Wielkopolska comparing with other regions

Lp.	Wyszczególnienie	Województwo																Kraj
		dolnośląskie	kujawsko-pomorskie	lubelskie	lubuskie	łódzkie	małopolskie	mazowieckie	opolskie	podkarpackie	podlaskie	pomorskie	śląskie	świętokrzyskie	warmińsko-mazurskie	wielkopolskie	zachodniopomorskie	
1.	**Total consumption**	23592	43324	28556	9693	21717	33347	103860	17799	13164	11948	37218	45521	7455	12649	29405	22744	461994
1.1	Industry and construction	6853	31146	18815	4194	4901	19585	66525	13073	6011	4777	23019	15491	1948	4452	14257	11959	247005
1.1.1	in which of own production	4816	30447	18235	2657	3509	17036	61162	9523	4610	4341	21671	10727	1620	4243	10276	8429	213301
1.2	Transport	94	81	57	6	121	122	781	34	36	39	205	180	24	21	103	86	1989
1.3	Small final customers sector	16645	12096	9685	5494	16695	13641	36554	4692	7118	7132	13995	29850	5483	8176	15045	10700	213000
1.3.1	Agriculture	402	–	–	–	191	86	–	–	69	242	–	–	–	10	–	–	1000
1.3.2	Residential	13485	10043	8040	4561	13702	11252	30347	3896	5851	5720	11617	24781	4551	6780	12490	8882	176000
1.3.3	Others	2758	2054	1645	933	2802	2302	6207	796	1197	1169	2377	5069	931	1386	2556	1817	36000

Source: GUS 2014: Consumption of fuels and energy carriers in 2013, Warsaw, s. 13.

2. Power lines setup in Wielkopolska region

In the region of Wielkopolska national transmission grid system consists of the lines of 400, 220 and 110 kV, and of an extensive system of electric substations and transformers. These objects are important elements of the transmission network, they also allow for transferring of the substantial power from the power plant. The electricity in the region is transferred via a distribution network of stations 400/220/100 and 220/110 kV. The main energy producers in the region include:

– Pątnów Power Stations Groups I and II - Adamów – Konin SA (ZE PAK), having about 14% share of the Polish electricity market and the second largest domestic producer of electricity manufactured from lignite. The total installed capacity of ZE PAK is

2,734 MW, which represents about 12% of national power;

– Dalkia Poznań ZEC – electrical power and heating stations Karolin and Garbary in Poznan; total thermal energy produced amounts to 979 MW, electrical one to 276 MW;

– Power Station Kalisz – Piwonice, generating 106 MW of thermal power and 7 MW of electric power, O Energy Poznan, Zakład Elektrowni Wodnych Sp. z o.o. – a team of 5 hydroelectric power stations on the river Gwda (Podgaje, Jastrow, Ptusza, Dobrzyca, Kosice) with a total power of about 30 MW [Wielkopolska Spatial Planning Office in Poznan in 2010].

Energy Infrastructure in region includes grid operated by three companies:

– PSE Zachód SA with its corporate seat in Warsaw (West Branch in Poznan) managing the high voltage electricity network of 400 kV and 220 kV;

– Grupa Energetyczna ENEA SA, managing electricity network in the sub-regions of Pila, Poznan and Leszno;

– Energetyka Kaliska SA, a Energa Group company managing electricity network in the area of Konin and Kalisz subregions [Greater Regional Action Plan on Sustainable Energy in the field of renewable energy sources and energy efficiency, Marshal Office of Wielkopolska, 2011].

The state of the region's energy infrastructure is unsatisfactory, both qualitatively and quantitatively, which can lead to risks in the supply of energy and fuel. Especially medium and low voltage power lines indicate insufficient technical condition, mostly in rural areas [Executive Board of the Wielkopolska Region in 2014] requiring modernization and reconstruction. Further development of electricity transmission systems as well as expansion and improvement of the functioning network is necessary in order to increase energy security and reduce energy losses in transmission and distribution. Priority in the development of renewable energy sources is also building a smart energy networks to enable reception of energy from microgeneration and development of electricity prosumption (Smart Gird) [Wind energy in Poland, TPAHorwath 2013].

Table 3

Power lines setup in Wielkopolska region between 2015 and 2013

Installed capacity of electricity and heat [kW]									
	2005	2006	2007	2008	2009	2010	2011	2012	2013
The meter for Wielkopolska region	3 091 400	3 085 700	3 082 000	2 908 800	2 858 000	3 035 200	3 057 600	3 101 900	3 270 100
Population numer in Wielkopolska	3 372 417	3 378 502	3 386 882	3 397 617	3 408 281	3 446 745	3 455 477	3 462 196	3 467 016
The meter per capita in Wielkopolska	0,9167	0,9133	0,91	0,8561	0,8385	0,8806	0,8849	0,8959	0,9432
The meter for Poland	35 404 900	35 714 700	35 844 800	35 596 400	35 762 300	36 058 200	37 595 200	38 203 400	38 654 100
Population numer in Poland	38 157 055	38 125 479	38 115 641	38 135 876	38 167 329	38 529 866	38 538 447	38 533 299	38 494 659
The meter per capita in Poland	0,9279	0,9368	0,9404	0,9334	0,937	0,9359	0,9755	0,9914	1,0041

Source: Own work on the basis of the data of GUS [Central Statistical Office]; http://stat.gov.pl/bdl/app/dane_podgrup.display?p_id=630013&p_token=0.39684295025654137.

A Table 3 content analysis shows that the installed capacity of electricity generation and heat is increasing in recent years. For the Wielkopolska meter for specified period increased by 178 700,00 kW, while for Poland by 3 249 200,00 kW. Increase of power in the region grew by 5.78% while in the country by as much as 9.17%. A significant decrease in the total installed capacity between 2007 and 2008, which amounted to almost 173 200kW is also worth mentioning. Another positive phenomenon associated with economic development is the fact that in the years 2005-2013 the meter per capita both in Wielkopolska and in the country was consequently growing. In the Wielkopolska region it increased from 0.9167 to 0.9432 kW kW per capita. The same dynamics is observed in Poland, where the meter of 0.9279 kW per capita in 2005 rose to 1.0041 kW in 2013. The growth rate of the test meter stand-alone basis for Wielkopolska amounted to 2.89% and 8.21% for the Polish.

Period between 2005 and 2013 shows the increase in investment in renewable energy. While in 2005 the rate in Poland per capita amounted to 0.1008 MWh in Wielkopolska it reached 0.0268 MWh size in 2013. The table 5 presents detailed power from RES as of March 31, 2014.

Table 4

Electricity production from renewable in Wielkopolsce region between 2015 and 2013 (MWh)

Electricity production from renewables [MWh]									
	2005	2006	2007	2008	2009	2010	2011	2012	2013
The meter for Wielkopolska region	90 400	136 000	314 900	513 800	586 400	927 600	1 009 500	1 319 300	1 280 600
Population numer in Wielkopolska	3 372 417	3 378 502	3 386 882	3 397 617	3 408 281	3 446 745	3 455 477	3 462 196	3 467 016
The meter per capita in Wielkopolska	0,0268	0,0403	0,093	0,1512	0,1721	0,2691	0,2921	0,3811	0,3694
The meter for Poland	3 847 300	4 291 200	5 429 300	6 606 000	8 678 700	10 888 800	13 136 900	16 878 900	17 066 600
Population numer in Poland	38 157 055	38 125 479	38 115 641	38 135 876	38 167 329	38 529 866	38 538 447	38 533 299	38 494 659
The meter per capita in Poland	0,1008	0,1126	0,1424	0,1732	0,2274	0,2826	0,3409	0,438	0,4433

Source: Own work on the basis of the data of GUS [Central Statistical Office]; http://stat.gov.pl/bdl/ app/dane_podgrup.display?p_id=630013&p_token=0.39684295025654137.

Table 5

Types and capacity of the RES installation in Wielkopolska region (state as 31.03.2014)

Type of installation	Number of installation	Power [MW]
Producing biogas from wastewater treatment plants	7	5,877
Producing from the agricultural biogas	5	4,985
Producing from landfill biogas	10	6,062
Producing from biogas of agricultural, forestry and garden residues	1	1,862
Producing from mixed biomass	3	119,5
Producing from solar radiation	2	50
Wind plants on land	137	441,64
Run-of-the-river hydroelectricity < 0,3 MW	25	1,774
Run-of-the-river hydroelectricity < 1 MW	3	1,32
Run-of-the-river hydroelectricity < 5 MW	5	8,69
Executing co-firing technology (fossil fuels i biomass)	3	0
Total	201	591 760

Source: Renewable Energy Map, URE.

Installed capacity in the Wielkopolska region affects the energy economy of local government units. Taking into account market values such as demand and supply, its detailed development is presented on the fig. 1.

Wielkopolska has favorable conditions for the development of the energy sector. The updated strategy for development of the region by 2020, a document adopted in 2012 by the Board of the Wielkopolska Region as a basis for territorial contract determines its development potentials. It includes the strategic objective of "Better management of energy", among others:

– Optimization of energy management (operational objective 3.1);

– Development production and use of alternative energy sources (operational objective 3.2);

– Improving the region's energy security (operational objective 3.3).

To others, significant in terms of renewable energy strategic objectives should be improving the environment and the rational management of natural resources (strategic objective 2), including, among others, operational objectives: protection of forest resources and their rational use, reduction of emissions of substances into the atmosphere, protection of water resources and an increase in flood security, or promotion of ecological habits. These objectives constitute evidence of RES in the region of Wielkopolska, others – causing certain limitations in this sectors' expansion.

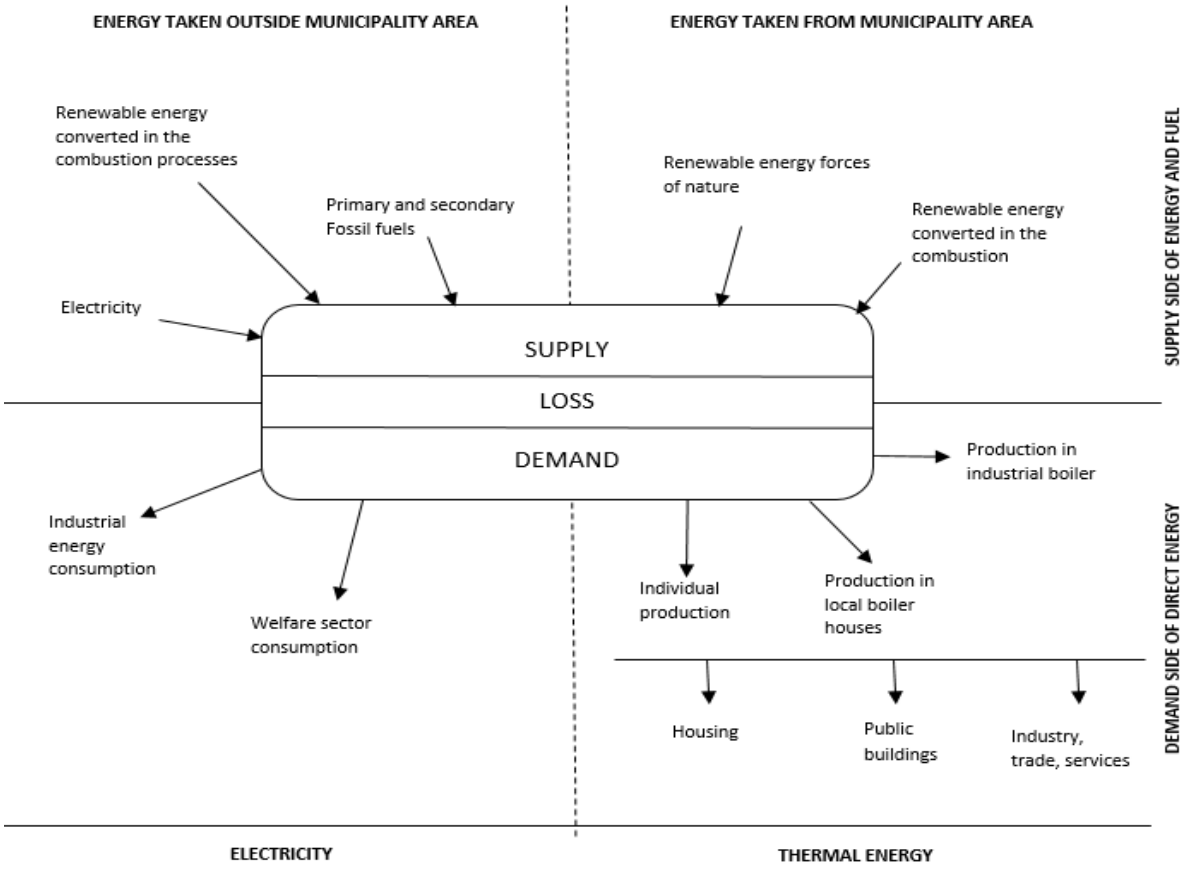

Fig. 1. Energy management in local government.

Source: Gospodarowanie energią … op. cit. , s. 88.

While the Regional Operational Programme for 2014-2020, is a document – "strategy for the operational programme's contribution to the Union strategy for smart, sustainable and inclusive growth", referring to the ongoing climate and energy strategy directly. It indicates the priority axis "3 Energy". Almost 352.2 million has been allocated to its support from the European Regional Development Fund, it represents 14,39% share in total support of the program. Priority Energy axis, covers the thematic objective "CT4. supporting the transition to low-carbon economy in all sectors ", which consists of the following investment priorities with specific objectives assigned to them:

4.1 Support the creation and distribution of energy from renewable sources – Increase the share of renewable energy in energy consumption;

4.2 Promote energy efficiency and use of renewable energy sources in enterprises – Reducing energy intensity of the economy;

4.3 Promoting energy efficiency, intelligent power management and the use of renewable energy sources in public infrastructures, including public buildings and housing sector -Reduce energy intensity of the residential and public sectors;

4.4 Promote low-carbon strategies for all areas types of territories, in particular urban areas, including the promotion of sustainable multimodal urban mobility and adaptation measures to mitigate the impact of climate change – reducing greenhouse gas emissions [Board of the Region of Wielkopolska 2014].

It is worth noting that ENEA SA as a modern energy group will spend in 2014-2020 almost 20 billion zł for investments, including 4.5 billion for investments in "green energy", which should further increase by 1.9 GW of generation capacity. The prospect of the development of renewable energy sources by the year 2025 is shown in table 6.

The role of the region in the development of energy potential cannot be underestimated. There are both planning issues, the provision of administrative decisions as well as financial support. ENEA Operator with its stable network expandability also participates in this process. Annually, it provides more than 17 million MWh of electricity to nearly 2.5 million customers in an area of over 58 thousand. km2. Infrastructure of the company consists of 111 thousand. km of power lines, including 4 600 km of high voltage 110 kV lines, 36 thousand distribution transformer stations, including 228 stations of 110 kV / MV - the main feeding points. Geographically, this is an area of 6 regions consisting of 353 municipalities.

Table 6

Prospective amount of energy produced from renewable sources by 2025

Microgeneration of installed capacity below 40 kW					
Name of source of energy	Number of hours of operation of the plant durng the year [h]	Installed capacity	Energy produced during the year [MWh]	The estimated number of units in the study area	The electricity produced during the year in total [MWh]
Sun energy	1 500	10	15	400	6 000,00
Wind	2 700	3	8,1	30	243,00
Biomass	7 500	20	150	20	3 000,00
Water	7 200	10	72	100	7 200,00
Geothermal	3 800	10	38	50	1 900,00
				600	**18 343,00**
Large plants with installed capacity exceeding 40 kW					
Name of source of energy	Number of hours of operation of the plant durng the year [h]	Installed capacity	Energy produced during the year [MWh]	The estimated number of units in the study area	The electricity produced during the year in total [MWh]
Sun energy	1 500	1000	1500	35	52 500,00
Wind	2 700	1000	2700	5	13 500,00
Biomass	7 500	500	3750	8	30 000,00
				48	**96 000,00**

Source: Biuro Inżynierskie Automatyki, Alternatywne źródła energii dla rodziny, reklamy firmy, 2015, http://www.biuro-inżynierski. com/turbina%20wiatrowa.html.

3. Impact of installed power capacity on the investment attractiveness and development of Wielkopolska

Taking into account the reports Research on the market economy and presented in them conditions for investment attractiveness of Wielkopolska Region stays at the forefront of Polish regions. In the years 2010-2014 Wielkopolska was regarded as a region of above-average attractiveness. The strengths of the area are the resources and labor costs, activity towards investors and the availability of transport. Details are presented in a fig. 2.

Also, resources and labor costs in Wielkopolska are at a high quality level. From 2010, the region ranks third in the ranking, ranking behind provinces: Śląskie and Małopolska. This position is influenced by, among other things: the number of workers, vacancies, the percentage of unemployed, wages and the influx of graduates of secondary schools and universities. Detailed specification of market needs demonstrates in detail fig. 3.

Among the determinants of investment attractiveness stands out the market capacity, which means the possibility of selling goods and services by a potential investor in the region. This allows for faster return on investment, reducing the final cost of goods through a reduction in transport costs. Parameters such as the size of the market, business investment spending and wealth of households rank among the regions of Wielkopolska in in detail is shown in fig. 4.

Also, economic infrastructure has a significant impact on the investment process. Taking into account such indicators as density of business environment institutions, the number of fairs and exhibitions, the presence of research centers and functioning of special economic zones, you will notice that in Wielkopolska is at a satisfactory level. Analyzing further the existence of special economic zones and the use of highly advanced technology and cooperation with R & D centers, this region deserves to be innovative every detail with respect to other provinces is shown in fig. 5.

Summary

Intelligent Energy - Europe Programme (IEE), it is one of the main specific programs and the Framework Programme is an instrument for the implementation of the energy policy of the European Commission. The program aims to increase energy efficiency and use of renewable energy sources. It contributes to ensure sustainable, competitive and secure energy for Europe.

Subsidized projects may be aimed at the promotion and dissemination as well as projects for the dissemination of best techniques, processes, products and practices.

The main objectives of the IEE program are:

1) improving energy efficiency and the rational use of energy resources;

2) promoting new and renewable energy sources and supporting the diversification of energy sources;

3) promoting energy efficiency and the use of new and renewable energy sources in transport.

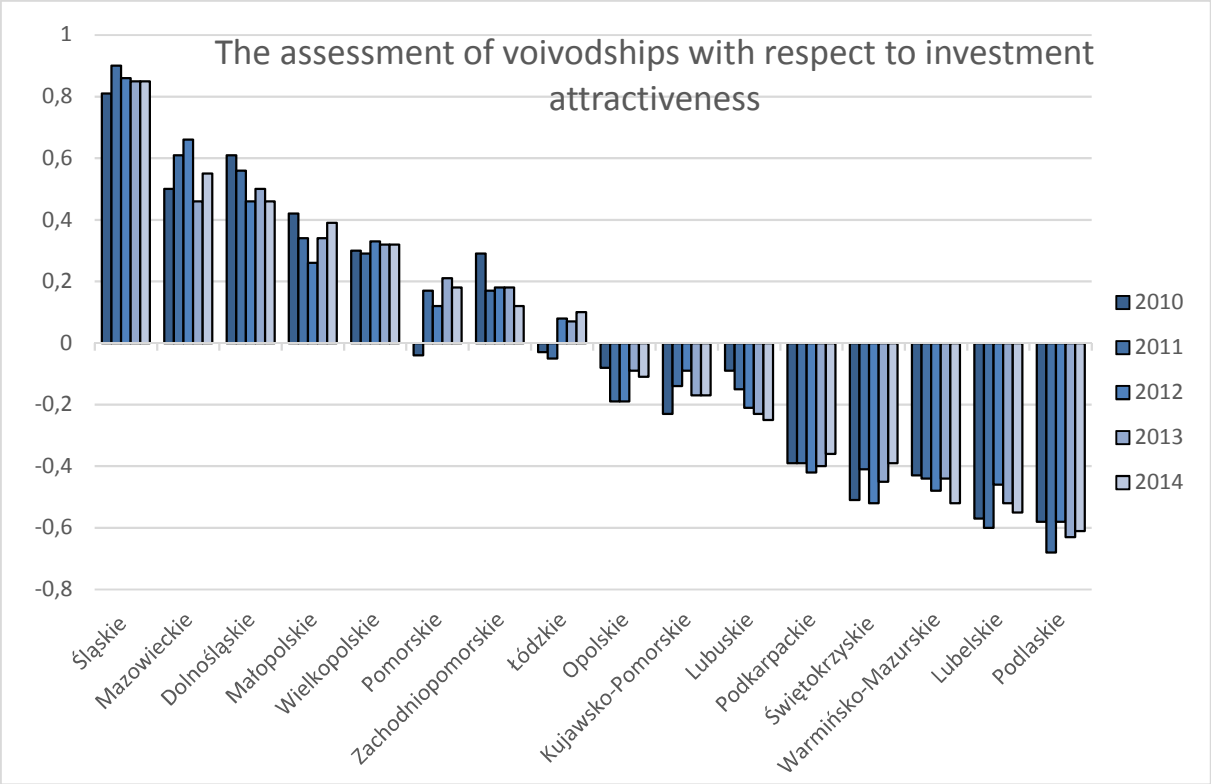

Fig. 2. The assessment of voivodships with respect to investment attractiveness

Source: Own work on the basis of Institute for Market Economics reports for the specified periods.

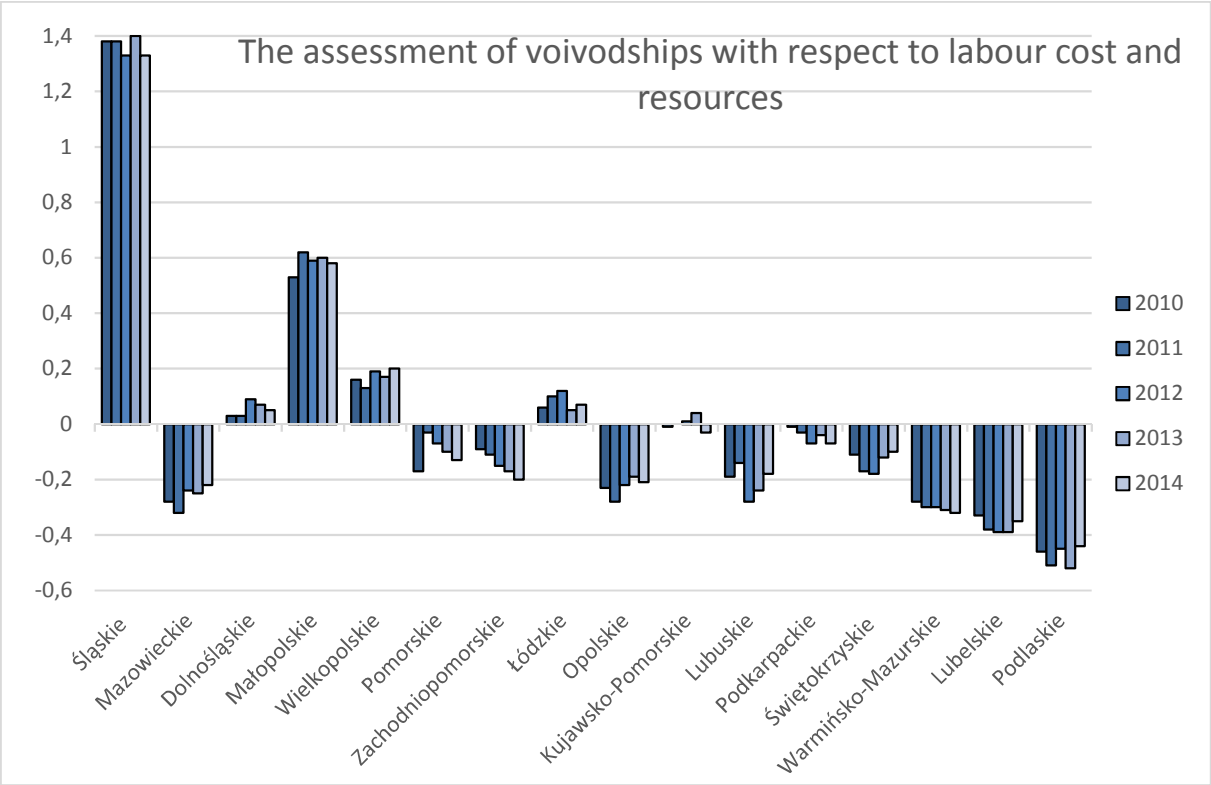

Fig. 3. The assessment of voivodships with respect to labour cost and resources

Source: Own work on the basis of Institute for Market Economics reports for the specified periods.

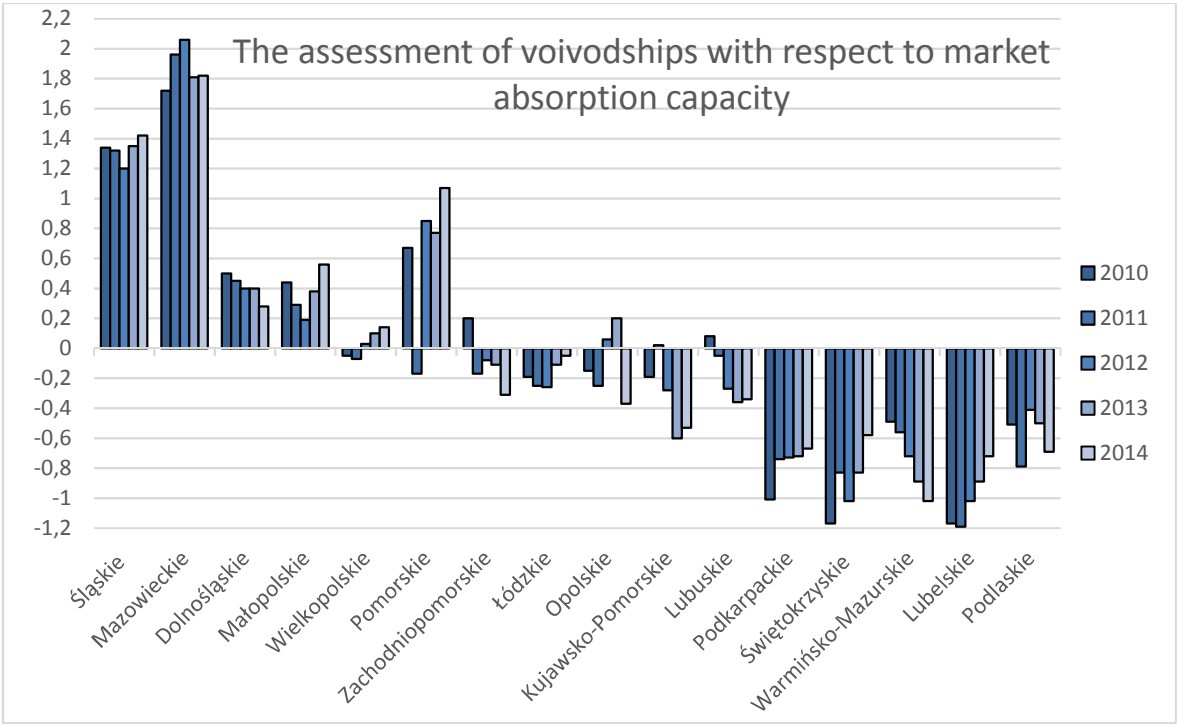

Fig. 4. The assessment of voivodships with respect to market absorption capacity

Source: Own work on the basis of Institute for Market Economics reports for the specified periods.

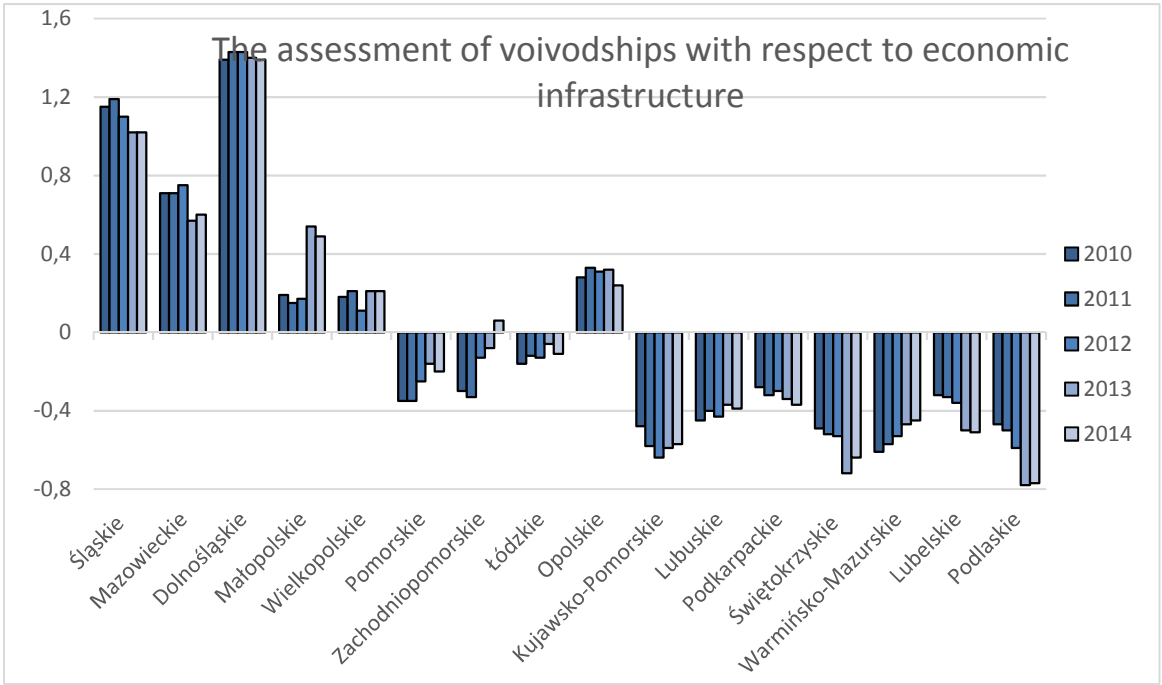

Fig. 5 The assessment of voivodships with respect to economic infrastructure

Source: Own work on the basis of Institute for Market Economics reports for the specified periods.

Projects are carried out within the following areas:

SAVE – energy efficiency projects and energy sprending efficiency,

ALTENER – projects for the promotion of new and renewable sources of energy,

STEER – energy-saving projects for transport,

Integrated actions.

Within these areas there can be distinguished issues: construction industry, consumer products, renewable energy, heating and cooling and biofuels. Projects for the promotion and dissemination as well as projects for the dissemination of the best techniques, processes, products and practices are projects which affect the most effective way to change the mindset and habits of consumers of energy. This applies both to consumer collective and individual.

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Пайонк К., Квілінський А., Фащєцька О. Регіональна енергетична безпека (досвід Польщі)

З огляду на цивілізаційні зміни двадцять першого століття, світова економіка стає на шлях низьковуглецевого розвитку. Польща як член міжнародного співтовариства, в тому числі Євросоюзу, також рухається в цьому напрямку, дотримуючись міжнародних правил збереження енергії і підтримки стабільності клімату. Енергетичний баланс та стратегії розвитку енергетичних технологій все частіше виявляють і актуалізують проблеми, пов'язані з енергетичною безпекою країни / регіону, вирішення яких, у свою чергу, є вагомим фактором у розвитку сучасної ринкової економіки. У даній статті на прикладі Великопольського воєводства проведено аналіз ринку енергетичної потужності та викладено рекомендації щодо забезпечення регіональної енергетичної безпеки в контексті перспектив розвитку енергетичного ринку.

Ключові слова: регіональна енергетична безпека, стратегічні енергетичні технології, ринок енергії, енергетичний баланс регіону, споживачі енергії, виробники енергії.

Пайонк К., Квилинский А., Фащецка О. Региональная энергетическая безопасность (опыт Польши)

Учитывая цивилизационные изменения двадцать первого века, мировая экономика становится на путь низкоуглеродистого развития. Польша, являясь членом международного сообщества, в том числе Евросоюза, также движется в данном направлении, соблюдая международные правила сохранения энергии и поддержания стабильности климата. Энергетический баланс и стратегии развития энергетических технологий все чаще проявляют и актуализируют проблемы, связанные с энергетической безопасностью страны / региона, решение которых, в свою очередь, является весомым фактором в развитии современной рыночной экономики. В данной статье на примере Великопольского воеводства проведен анализ рынка энергетической мощности и изложены рекомендации относительно обеспечения региональной энергетической безопасности в контексте перспектив развития энергетического рынка.

Ключевые слова: региональная энергетическая безопасность, стратегические энергетические технологии, рынок энергии, энергетический баланс региона, потребители энергии, производители энергии.

Pajak K., Kvilinskyi O., Fasiecka O. Regional Energy Security (Based on Polish Experience)

The global economy taking into account civilizational changes will be shifting in the twenty-first century to low-carbon development path. Poland also is heading in this direction, both as a member of the international community and the European Union state abiding energy and climate regulations. Basing on energy balance and strategic energy technology more and more often in the country / region energy security issues power market becomes visible. It shapes the conditions of market economy and contributes to its development. Article refers to the Wielkopolska region and market analysis capacity installed here and the prospects for its development in the context of regional energy security.

Keywords: regional energy security, strategic energy technologies, market power, the balance of power in the region, energy consumption, energy production.

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