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The Impact of the Poland Foreign Trade On Its Real CO_2 Emissions

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Abstract: CO_2 emissions are a global problem. This means that nothing or very little will change if only particular countries are involved. The purpose of this paper is the attempt to show the real CO_2 emissions of the Poland as well as the impact of its trade on CO_2 emissions in other countries in the world and in the EU in 2015. This study was conducted on the group of countries that are the major emitters of CO_2 in the world including most of the EU members. Actual CO_2 emissions were achieved by applying the actual emission factor. This takes into account the transfer of CO_2 in export products and services as well as those imported by particular countries. It has turned out that the real CO_2 emissions in the Poland are significantly lower from the gross values which represent the CO_2 emissions in the particular countries. It is also important to indicate that isolated actions of a single country within the European Union itself do not deliver the intended global and regional target - positive changes in CO_2 emissions reduction. The approach presented in this paper significantly influences the level of realization of the UE energy policy objectives.

Keywords: the EU energy policy, CO_2 emissions, exports and imports of the Poland.

JEL codes: Q37, Q40, Q53, Q56

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1. Introduction

We live in global world and as a consequence the activity of particular countries has direct or indirect impact on others. It does not mean therefore that all countries are functioning in the same way and following the same rules. Some countries are contributing significantly to reduction of global CO_2 emissions in energy sector bearing high costs in comparison with other countries, nonetheless it does not bring intended effects as real reduction of CO_2 emissions. This study is to

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confirm the issue. Some countries' struggle with CO_2 emissions does not deliver on the other countries' struggle with this issue. Given that CO_2 emissions are global problem, the struggle of several countries does not change much in the global aspect. Fundamental question comes to mind whether in the activity of global changes should not be engaged all countries by introducing solutions that would require similar approach to the CO_2 issue.

The European Union (the EU) and Poland are occupying a leading position in terms of the value of international exchange (in 2016 the Poland was on the 19 position regarding global export and import). This means that Poland, regarding economic, depends on other countries the same way these countries depend on Poland. All actions planned and realized by the EU as well as Poland have international overtones. The EU and Poland, as the key economy of member state, may use its position in the international arena by implementation of its policy, encouraging other countries to achieve solutions in similar way. Poland with all members of the EU could achieve that with the use of relevant instruments.

The main purpose of this paper is the attempt to show the real CO_2 emissions in the Poland as the member of the EU, as well as the impact of trade on CO_2 emissions within its key trade partners. However, it is not about gross value of emissions but about the real volume with the regard to the CO_2 transfer in export and import products and services. Substantial element of this paper is to indicate that isolated actions like changes in the Poland energy industry will not bring intended targets till the moment when the level of other members of the EU involvement as well as the biggest world economies will not be similar.

2. Trade in Poland in 2015

In 2015 Poland was on the 23th position in the world export and the 20th position in the world import [AM]. The Poland total export reached USD 188 billion while the total import USD 195 billion. In this paper 65 biggest trade partners of the Poland were included. They were presented in Table 1. The Poland export to these countries is on the level of 94,77% (USD 178,167 billion) of total export of the country. In 2015, according to data from Table 1., Poland export to the EU countries was at the level of 74,65% (USD 140,35 billion).

It means that there are close connections between the Poland and the rest of the world (members of the EU mainly), however not so close as in the case of Germany – the biggest

economy of the EU. Through its world position, Poland as a member of UE can influence its trade partners but not as well as the Germany.

Table 1. The Poland export in 2015 in USD billion.

No.	Country	Export in billions of USD	No.	Country	Export in billions of USD
1	Germany	47,90	34	Portugal	0,702
2	Great Britain	12,90	35	Ireland	0,639
3	Czech Republic	11,40	36	South Korea	0,637
4	France	10,20	37	South Africa	0,575
5	Italy	9,50	38	Egypt	0,544
6	Netherlands	8,39	39	Brazil	0,515
7	USA	5,33	40	India	0,501
8	Russia	5,12	41	Hong Kong	0,488
9	Spain	5,05	42	Algeria	0,472
10	Hungary	4,86	43	Kazakhstan	0,370
11	Sweden	4,60	44	Israel	0,346
12	Belgium	4,47	45	Vietnam	0,241
13	Slovakia	4,39	46	Malaysia	0,205
14	Austria	3,34	47	Argentina	0,187
15	Romania	3,24	48	Thailand	0,186
16	Turkey	3,19	49	Kuwait	0,131
17	Denmark	2,96	50	Azerbaijan	0,125
18	Ukraine	2,77	51	Chile	0,116
19	Lithuania	2,67	52	Pakistan	0,113
20	Norway	2,61	53	Uzbekistan	0,111
21	China	2,23	54	Indonesia	0,106
22	Switzerland	1,92	55	Qatar	0,103
23	Finland	1,53	56	Venezuela	0,091
24	Canada	1,38	57	New Zealand	0,086
25	Belarus	1,19	58	Colombia	0,085
26	Mexico	1,10	59	Peru	0,080
27	Japan	1,04	60	Philippines	0,054
28	Singapore	1,04	61	Iran	0,049
29	Bulgaria	0,89	62	Turkmenistan	0,048
30	Saudi Arabia	0,80	63	Bangladesh	0,023
31	United Arab Emirates	0,78	64	Ecuador	0,019
32	Greece	0,72	65	Trinidad & Tobago	0,003
33	Australia	0,71			

Source: own study based on [AM].

The relation of the Polish export to its GDP in percentage terms is an important issue for the further considerations. The highest percentage of the Polish GDP is exported to Germany, Great Britain, Czech, France and Italy (Table 2.).

Table 2. Polish export in percentage of Polish GDP terms in 2015.

No.[1]	% of Ex	No.	% of Ex	No.	% of Ex	No.	% of Ex
1	10,04%	18	0,58%	35	0,134%	52	0,024%
2	2,70%	19	0,56%	36	0,134%	53	0,023%
3	2,39%	20	0,55%	37	0,121%	54	0,022%
4	2,14%	21	0,47%	38	0,114%	55	0,022%
5	1,99%	22	0,40%	39	0,108%	56	0,019%
6	1,76%	23	0,32%	40	0,105%	57	0,018%
7	1,12%	24	0,29%	41	0,102%	58	0,018%
8	1,07%	25	0,25%	42	0,099%	59	0,017%
9	1,06%	26	0,23%	43	0,078%	60	0,011%
10	1,02%	27	0,22%	44	0,073%	61	0,010%
11	0,96%	28	0,22%	45	0,051%	62	0,010%
12	0,94%	29	0,19%	46	0,043%	63	0,005%
13	0,92%	30	0,17%	47	0,039%	64	0,004%
14	0,70%	31	0,16%	48	0,039%	65	0,001%
15	0,68%	32	0,15%	49	0,027%		
16	0,67%	33	0,15%	50	0,026%		
17	0,62%	34	0,15%	51	0,024%		

Source: own study based on [AM].

In 2015 Poland imported products and services worth in total USD 195 billion. In this paper 65 trade partners of the Poland, who accounted for 95,69% of Polish import, were considered (Table 3.). During the period considered Poland imported mainly from the following countries: Germany, China, Italy, Russia and Netherlands. Polish import from the EU countries was at the level of 61,76% (USD 120,43 billion) in the considered period. Within the import area we can observe closer relations between Poland and countries that do not belong to the EU in comparison to its export.

[1] No. refers to No. of the countries from Table 1.

Table 3. Polish import in USD billions in 2015.

No.	Country	Import in billions of USD	No.	Country	Import in billions of USD
1	Germany	47,50	33	Bangladesh	0,8330
2	China	21,80	34	Belarus	0,7640
3	Italy	10,70	35	Thailand	0,7020
4	Russia	10,70	36	Indonesia	0,6590
5	Netherlands	7,60	37	Portugal	0,6220
6	France	7,51	38	Argentina	0,5790
7	Czech Republic	7,36	39	Bulgaria	0,5670
8	Belgium	5,45	40	Mexico	0,5150
9	Great Britain	5,20	41	Greece	0,4940
10	US	4,91	42	Canada	0,3840
11	Spain	4,34	43	Israel	0,3360
12	Slovakia	4,18	44	Australia	0,2960
13	Sweden	3,63	45	Philippines	0,2890
14	Austria	3,61	46	Pakistan	0,2670
15	Hungary	3,28	47	South Africa	0,2270
16	South Korea	3,23	48	Saudi Arabia	0,1790
17	Turkey	2,82	49	Hong Kong	0,1530
18	Japan	2,49	50	Ecuador	0,1520
19	Norway	2,46	51	Egypt	0,1330
20	Denmark	2,37	52	Chile	0,1300
21	Ukraine	1,97	53	United Arab Emirates	0,1240
22	Switzerland	1,76	54	Colombia	0,0900
23	India	1,72	55	New Zealand	0,0446
24	Romania	1,64	56	Algeria	0,0406
25	Finland	1,60	57	Peru	0,0338
26	Ireland	1,51	58	Iran	0,0321
27	Vietnam	1,46	59	Uzbekistan	0,0273
28	Lithuania	1,27	60	Venezuela	0,0224
29	Kazakhstan	1,02	61	Qatar	0,0176
30	Singapore	0,99	62	Azerbaijan	0,0120
31	Malaysia	0,94	63	Trinidad & Tobago	0,0001
32	Brazil	0,85	64		

Source: own study based on [AM].

From the point of view of considered issue more significant is the data concerning Polish import from one of its main trade partners in the percentage terms in regard to GDP of particular partners (Table 4.). Slovakia, Czech Republic, Lithuania Hungary and Ukraine are the countries from which Poland imported the highest rate of their GDP in 2015.

Table 4. Amount of Polish import in the percentage terms of GDP of trade partners.

No.	Country	% of GDP imported partner	No.	Country	% of GDP imported partner
1	Slovakia	4,805%	32	Great Britain	0,182%
2	Czech Republic	3,978%	33	Thailand	0,178%
3	Lithuania	3,098%	34	Ecuador	0,152%
4	Hungary	2,711%	35	Argentina	0,145%
5	Ukraine	2,189%	36	Israel	0,112%
6	Belarus	1,415%	37	Philippines	0,099%
7	Belgium	1,198%	38	Pakistan	0,099%
8	Bulgaria	1,134%	39	India	0,082%
9	Netherlands	1,013%	40	Indonesia	0,077%
10	Austria	0,960%	41	South Africa	0,072%
11	Romania	0,927%	42	Japan	0,057%
12	Denmark	0,787%	43	Chile	0,054%
13	Russian	0,784%	44	Hong Kong	0,050%
14	Vietnam	0,756%	45	Brazil	0,047%
15	Sweden	0,733%	46	Mexico	0,045%
16	Finland	0,690%	47	Egypt	0,040%
17	Norway	0,637%	48	United Arab Emirates	0,034%
18	Italy	0,588%	49	Colombia	0,031%
19	Kazakhstan	0,554%	50	Saudi Arabia	0,028%
20	Ireland	0,534%	51	USA	0,027%
21	Bangladesh	0,427%	52	New Zealand	0,026%
22	Turkey	0,393%	53	Algeria	0,025%
23	Spain	0,364%	54	Canada	0,025%
24	Singapore	0,339%	55	Azerbaijan	0,023%
25	Malaysia	0,316%	56	Australia	0,022%
26	Portugal	0,313%	57	Peru	0,018%
27	France	0,311%	58	Qatar	0,011%
28	Switzerland	0,263%	59	Venezuela	0,009%
29	Greece	0,255%	60	Iran	0,008%
30	South Korea	0,235%	61	Trinidad & Tobago	0,001%
31	China	0,197%	62	Kuwait	0,000%

Source: own study based on [AM], [IEA, 2016], [WB].

The economies of the considered in this paper countries along with the Poland economy generated together, in 2015, 90,05% of world GDP. [WB] Poland and its main trade partners are significant emitters of CO_2 in the world.

3. The emission of CO_2 in Poland and its 63 main trade partners in 2015

The main aim of the European energy policy is to achieve the so-called 3 × 20% until 2020. This involves reduction of CO_2 by 20% in relation to 1990, the increase in participation of renewable energy industry to the level of 20% and improvement in the efficiency of energy use by 20% in comparison to 1990.

It should be also emphasized that indicated aims are interconnected. The improvement in the efficiency of energy use and the increase in participation of renewable energy industry influence significantly on reduction of CO_2 emissions. The reduction of CO_2 emissions could also mean the changes in other aims of the EU energy policy.

3.1. Gross emission

The reduction of CO_2 emissions is one of the priority of the EU energy policy. The assumption indicates the reduction of CO_2 within the members of the EU by 20% in comparison to 1990. It concerns also Poland. However, this assumption concerns only the EU and except the encourages there is no other possibility for the EU to convince other countries in the world to undertake similar actions.

Gross emission of CO_2 it is value of CO_2 emitted by country economy. Table 5. presents emission of Poland and its 63 trade partners. The biggest CO_2 emitters in 2015 were the following countries: China, USA, India, Russia and Japan. The EU members were responsible for 10,17% of world emission of CO_2 emissions in the period considered. It would rank the European Union on the third position among the biggest emitters of CO_2 in the world. In the same ranking Poland is on the twenty-first position.

Table 5. CO_2 emissions in MT and its share in world emission, in Poland and its 63 trade partners.

Country	CO2 emission in MLN T	% of global emission	Country	CO2 emission in MLN T	% of global emission
China	9153,90	27,32%	Algeria	137,09	0,41%
USA	5485,74	16,37%	Belgium	111,53	0,33%
India	2218,43	6,62%	Qatar	111,10	0,33%
Russia	1483,18	4,43%	Kuwait	107,88	0,32%
Japan	1207,79	3,60%	Philippines	106,52	0,32%
Germany	753,64	2,25%	Czech Republic	98,63	0,29%
South Korea	648,70	1,94%	Colombia	97,27	0,29%
Iran	630,19	1,88%	Turkmenistan	92,62	0,28%
Saudi Arabia	624,53	1,86%	Hong Kong	91,24	0,27%
Indonesia	611,43	1,82%	Chile	90,11	0,27%
Canada	532,47	1,59%	Israel	74,40	0,22%
Brazil	487,84	1,46%	Greece	73,90	0,22%
Mexico	474,22	1,42%	Bangladesh	72,86	0,22%
Great Britain	436,91	1,30%	Romania	70,67	0,21%
South Africa	436,51	1,30%	Austria	62,82	0,19%
Australia	400,22	1,19%	Belarus	56,34	0,17%
Italy	341,49	1,02%	Portugal	52,54	0,16%
Turkey	336,33	1,00%	Peru	50,77	0,15%
France	309,45	0,92%	Sweden	47,76	0,14%
Thailand	295,85	0,88%	Bulgaria	45,15	0,13%
Poland	295,85	0,88%	Hungary	44,21	0,13%
Spain	291,71	0,87%	Finland	41,31	0,12%
UAE	264,66	0,79%	Switzerland	39,06	0,12%
Malaysia	246,95	0,74%	Ireland	38,63	0,12%
Egypt	212,15	0,63%	Denmark	37,63	0,11%
Netherlands	210,12	0,63%	Ecuador	37,08	0,11%
Singapore	204,99	0,61%	Norway	36,73	0,11%
Ukraine	195,11	0,58%	New Zealand	35,73	0,11%
Argentina	189,99	0,57%	Azerbaijan	32,04	0,10%
Kazakhstan	184,78	0,55%	Slovakia	31,15	0,09%
Pakistan	179,48	0,54%	Trinidad & Tobago	26,67	0,08%
Venezuela	169,15	0,50%	Lithuania	11,16	0,03%
Vietnam	168,97	0,50%			

Source: own study based on [IEA, 2016].

If all guidelines, in accordance with the provisions of the EU energy policy, concerning reduction

of CO_2 would be applied to all trade partners of Poland, then only 17 countries out of all analyzed in this paper countries, would achieve objectives concerning reduction of CO_2 emissions already in 2015. Among those countries there is Poland, because the emission mentioned below is the total CO_2 emissions and not only generated by power engineering.

Table 6. Achievement by Polish partners of guidelines CO_2 emission of the EU energy policy in year 2015.

Country	% of CO2 emissions from 1990	Country	% of CO2 emissions from 1990
Ukraine	26,22%	Australia	146,48%
Lithuania	30,94%	Venezuela	155,06%
Romania	40,11%	Mexico	176,68%
Slovakia	56,79%	Argentina	182,79%
Azerbaijan	57,59%	Algeria	197,79%
Belarus	58,74%	Israel	212,55%
Czech Republic	61,02%	Hong Kong	221,06%
Hungary	61,31%	Colombia	225,44%
Russia	65,67%	Egypt	238,11%
Denmark	67,35%	Brazil	247,33%
Bulgaria	68,42%	Turkey	249,84%
Great Britain	73,67%	Turkmenistan	256,48%
Finland	74,60%	Peru	259,03%
Germany	75,12%	Philippines	266,69%
Sweden	76,75%	South Korea	271,32%
Kazakhstan	77,04%	Trinidad & Tobago	276,40%
Poland	79,09%	Ecuador	281,60%
France	84,08%	Chile	283,64%
Italy	85,41%	Pakistan	289,64%
Belgium	87,79%	Singapore	293,51%
Switzerland	90,23%	Saudi Arabia	299,58%
Greece	94,74%	UAE	312,51%
USA	106,29%	Iran	323,15%
Austria	110,44%	Thailand	327,70%
Netherlands	110,61%	India	367,11%
Japan	110,77%	China	394,52%
Canada	115,93%	Malaysia	419,90%
Norway	118,23%	Indonesia	447,31%
Ireland	124,81%	Bangladesh	548,11%
Portugal	128,04%	Kuwait	561,33%

Country	% of CO2 emissions from 1990	Country	% of CO2 emissions from 1990
New Zealand	132,11%	Qatar	701,99%
Spain	135,10%	Vietnam	945,38%
South Africa	142,82%		

Source: own study based on [IEA, 2016].

3.2. Gross emission – after considering the Polish trade

Gross emission of CO_2 was determined as the CO_2 emissions of particular country diminished by emission exported in goods and services of the country plus emission imported in goods and services from the importing country. It means that emissions of CO_2 should be increased by net emissions of CO_2. The following formulas present method used to calculate net emissions of CO_2 and gross emissions of CO_2 for one country:

$$S_E = \left(\frac{E_x}{PKB}\right)\% \times E_b - \left(\frac{I_m}{PKB}\right)\% \times E_b,$$

$$E_{rz} = E_b + S_E$$

S_E – net emissions of CO_2 of particular country;

Eb – gross CO_2 emissions of particular country;

Ex – export of particular country;

Im – import of particular country;

PKB – gross domestic product at constant prices in EUR m;

(Im/PKB)% – part of GDP of particular country that was exported to the EU;

(Ex/PKB)% – part of GDP of the EU which was exported to particular country;

(Im/PKB)%*Eb – exported CO_2 in goods and services to the EU;

(Ex/PKB)%*Eb – exported CO_2 of the EU to the particular country in goods and services;

Erz – actual CO_2 emissions. (Fortuński, 2016a)

Actual CO_2 emissions of the Poland during the period considered was significantly different from gross emission. In 2015 the Poland exported in goods and services 110,50 MT CO_2 in total and imported from their trade partners 78,44 MT CO_2. It means that the CO_2 balance was positive for Poland. Actual emissions of CO_2 in Poland have decline by 32,06 MT CO_2 with regard to gross emission in 2015. The actual emissions of CO_2 was at the level of 263,78 MT CO_2. The actual CO_2

emissions in Poland in 2015 comparing to 1990 was at the level of 70,52%. Taking into account the actual emission of CO_2 in 2015, Poland did achieve the intended objective of emission reduction by 20% and.

Net emission of CO_2 of Poland trade partners, which includes only the exchange with this country, was presented in the Table 7. China, Russia, Ukraine, India and Vietnam are the main net exporters of CO_2 to Poland in 2015. While: Germany, Great Britain, France, Italy and Czech Republic were the main recipients of the Polish net export of CO_2 in 2015. Taking into consideration only the EU countries included in this paper, it should be indicated that balance of CO_2 emissions is for the Poland positive and it amounted -57,89 MT CO_2.

Table 7. The Polish trade partners net emissions of CO_2

Country	Net emissions	Country	Net emissions
China	-16,653	Israel	0,131
Russia	-8,451	Ireland	0,190
Ukraine	-2,553	Egypt	0,252
India	-1,517	Greece	0,256
Vietnam	-1,129	Hong Kong	0,257
South Korea	-1,127	Algeria	0,259
Kazakhstan	-0,795	Portugal	0,271
Malaysia	-0,653	Saudi Arabia	0,323
Thailand	-0,410	Australia	0,351
Indonesia	-0,402	United Arab Emirates	0,394
Bangladesh	-0,297	Mexico	0,469
Argentina	-0,160	Turkey	0,656
Pakistan	-0,107	Finland	0,664
Philippines	-0,072	Canada	0,724
Belarus	-0,059	Switzerland	1,088
Singapore	-0,051	Slovakia	1,226
Ecuador	-0,045	Lithuania	1,310
Japan	-0,041	Romania	1,355
Iran	-0,017	Norway	1,385
Trinidad & Tobago	0,002	Belgium	1,437
Colombia	0,023	Austria	1,468
Chile	0,023	Denmark	1,540
Turkmenistan	0,030	USA	1,812
Peru	0,041	Hungary	1,816
South Africa	0,041	Spain	2,070
Bulgaria	0,042	Sweden	2,503
Venezuela	0,042	Netherlands	3,074

Country	Net emissions	Country	Net emissions
New Zealand	0,044	Czech Republic	3,146
Qatar	0,052	Italy	3,886
Uzbekistan	0,069	France	5,365
Azerbaijan	0,070	Great Britain	7,207
Kuwait	0,081	Germany	19,064
Brazil	0,090		

Source: own study based on [AM], [IEA, 2016], [WB].

It is worth to underline that the actions taken by Poland as well as some EU members in matters of implementing own energy power policy are insufficient. Despite the mentioned above fact, their effectiveness is increasing, what should allow, as a consequence, to achieve the EU energy policy objectives. However, their effectiveness is limited only to the territory of the EU. This can result from the fact that the EU energy policy is not being regarded as a sustainable development policy and is related to high costs. (Fortuński 2012, 2013, 2013a, 2016, 2016a, 2016b, Bogrocz 2008, Kaczmarski 2010, Kryk 2012, 2012a) It also indicates ineffectiveness of international agreements of reducing emissions of CO_2 such as Kyoto Agreement.

The effectiveness of this policy shows its weaknesses after taking into consideration actual emissions of CO_2. It was clearly presented that the issue of CO_2 emissions is a global problem. Benefits from isolated actions are more likely to be insignificant than it appears in statistics.

4. Conclusion

Poland themselves might by not regarded as a leader but the whole European Union is regarded as the leaders in the fight against global warming, fight for clean energy reduction of CO_2 emissions. Unfortunately, its actions are isolated what leads to the situation that even such economy as that of the Polish, which is strongly economically related to others through trade, is not able to change much within the issues. The EU and the Poland as one of the member state, leaders in world trade (19 position in international trade, 19 world economy in 2016) could use their position in international trade in order to achieve their own energy policy objectives, in particular reduction of CO_2 emissions. Trade is connected with big import of CO_2 hidden in goods and services imported to Poland and other members of the EU. Fortunately, it not affects disadvantageously on the actual emission of CO_2 in Poland, but in many UE member states affects. As a consequence,

CO_2 emissions in Poland did achieve already assumed reduction of CO_2 according to its energy policy in 2015. The results of research indicate that the CO_2 emissions is a global problem and actions of individual country or even union of countries are not able to change recent trends. It is required to consider by the EU the introduction of new instrument that would encourage the countries outside the EU to undertake effective actions towards reduction of CO_2 emissions.

For that purpose the new instrument could be introduced. It would be an ecology-energy tax. It would be applied by the EU for all trade partners, individual countries or groups of countries. Additionally, it would concern the volume in total of particular countries export to the EU.[TX]

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BARTOSZ FORTUŃSKI

Wpływ handlu zagranicznego republiki federalnej Niemiec na jej rzeczywistą emisję CO_2

Streszczenie

Emisja CO_2 jest problemem globalnym. Oznacza to, że walka jedynie części krajów w tym obszarze niewiele zmienia. Celem niniejszego artykułu jest próba ukazania rzeczywistego poziomu emisji CO_2 na terenie Polski, jak również wpływ jej wymiany handlowej na emisję CO_2 w pozostałych państwach świata i UE w 2015 roku. Badanie zostało przeprowadzone na grupie państw będących głównymi emitentami CO_2 na świecie, w tym większości państw członkowskich UE. Poziom emisji CO_2 uzyskano przez zastosowanie wskaźnika emisji rzeczywistej. Jego wielkość uwzględnia transfer CO_2 w produktach i usługach eksportowych, a także importowanych przez poszczególne kraje. W wyniku jego zastosowania okazało się, że rzeczywisty poziom emisji CO_2 w Polsce jest odmienny od wartości brutto, które reprezentują wielkości emisji CO_2 na terenie danego kraju.

***Słowa kluczowe**:* polityka energetyczna UE, emisja CO_2, eksport i import Polski.

Kody JEL: Q37, Q40, Q53, Q56

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