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Article

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Reference: Stadniczeńko, Dawid (2020). Development and challenges for the functioning of the renewable energy prosumer in Poland : a legal perspective. In: International Journal of Energy Economics and Policy 10 (5), S. 623 - 630.
https://www.econjournals.com/index.php/ijeep/article/download/10225/5328.
doi:10.32479/ijeep.10225.

International Journal of Energy Economics and Policy

ISSN: 2146-4553

available at http: www.econjournals.com

International Journal of Energy Economics and Policy, 2020, 10(5), 623-630.

Development and Challenges for the Functioning of the Renewable Energy Prosumer in Poland: A Legal Perspective

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Received: 06 May 2020 **Accepted:** 23 July 2020 **DOI:** https://doi.org/10.32479/ijeep.10225

ABSTRACT

The study centers around one of the principal challenges of the Polish economy - the development of prosumer renewable energy sources. Poland has the biggest portion of coal inconclusive energy utilization. The development of renewable energy sources is the main test even with environmental protection challenges and EU pressure. Right now, Poland data are taken from World Development Indicators (WDI) of Prosumer renewable energy, nonrenewable energy, economic growth and analyze the effect of prosumer renewable energy under the EKC hypothesis. ARDL applied to evaluate the effect of prosumer renewable energy and economic growth on carbon emission and Results demonstrate that prosumer renewable energy has a huge negative effect on Poland's condition which implies it is valuable for Poland's Economy and furthermore there exists the EKC hypothesis. Besides, economic growth has a beneficial outcome condition in start later it negatively which results in healthy environments. In this way, the Polish Govt. received Prosumer renewable energy sources and environmentally well-disposed innovations at each phase of the creation procedure is significant for improving the environment.

Keywords: Polish Economy, Prosumer Renewable Energy, Energy Consumption, EKC Hypothesis
JEL Classifications: Q2, K32

1. INTRODUCTION

Energy development in recent years is increasing at a special pace. The awareness of society is playing a positive role in this increasing phenomenon with an increase in environmental protection. The main achievement of the European Union was to set a goal for the reduction of greenhouse gases by using different renewable energy sources and their commitment to increase renewables in recent years to clean the production, manufacturing, and consumption of energy.

The European Union countries which are working efficiently on renewable energy sources can be identified (e.g., Sweden, Finland, Latvia - source: Eurostat, Share of energy from renewable sources, 2020). Furthermore, the EU countries who are facing challenges to change their energy resources from fossil fuel to renewable energy can also be identified (e.g., Poland). According to the researchers, Poland has a significant increase in total energy consumption which is confirmed from Figure 1 and Table 1, which increases the challenges of adequate power resources to produce energy (Baum et al., 2013).

According to Figure 1, which shows the relationship between total energy consumption, prosumer renewable energy consumption and nonrenewable energy consumption. Nonrenewable energy consumption in the main part of total energy as compared to prosumer renewable energy consumption. The data is taken from (World Bank, 2020) so, the nonrenewable energy is the main part of energy consumption in Poland as compared to prosumer renewable energy consumption.

Conversely, renewable energy resources such as solar or wind energy are already increasing in the markets, available from low to high-end prices (Brijs et al., 2015). It is obvious that the necessary

Figure 1: 5 years average of prosumer renewable, nonrenewable, and energy consumption

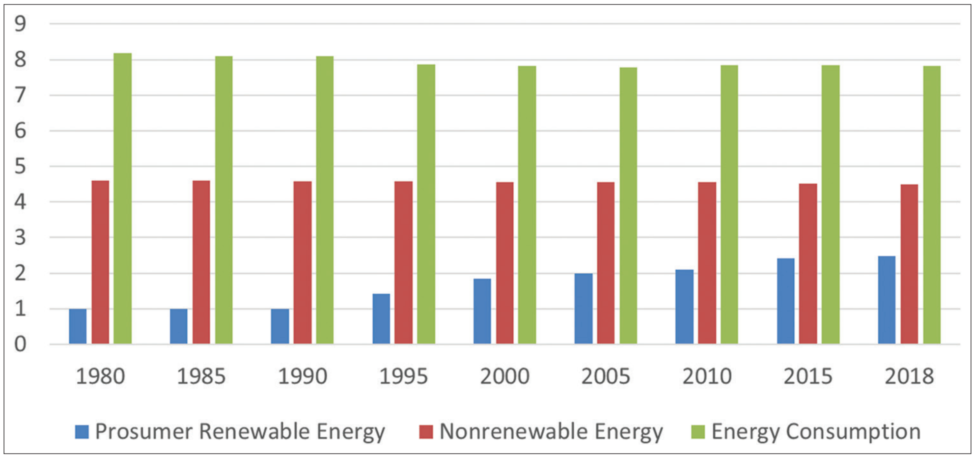

Table 1: 5 years average of prosumer renewable, nonrenewable, and energy consumption

Years	Prosumer renewable	Nonrenewable	Energy consumption
1980	0.987612	4.594079	8.177327
1985	0.993889	4.592415	8.105801
1990	0.994689	4.583603	8.094567
1995	1.408383	4.56941	7.856013
2000	1.845702	4.565265	7.822501
2005	1.990513	4.564496	7.768242
2010	2.093354	4.544805	7.842499
2015	2.419248	4.509992	7.843475
2018	2.466668	4.502197	7.817588

changes should be implemented for significant changes. The fossil fuel energy systems are decentralizing significantly and giving the way to use renewable resources (Brown et al., 2019). Some researchers think that the decentralized energy systems are more economical because of fossil fuel models if there is the appropriate valuation of the carbon emission but the interventions should be implemented to reduce greenhouse gas emissions (LCOE, 2019; Wegner et al., 2017).

As the above-mentioned systems are unpredictable, therefore, prosumption system can be used as it is a new phenomenon to produce energy. In human civilization development, the manufacturing and the consumption of goods prepared by the producer was the characteristic very early stage which is changing nowadays to a new form with the introduction and development of new technologies and techniques. The term prosument was introduced in 1980 for the 1st time which is the combination of two terms; the producer and consumer. An individual who can produce and consume the energy will fall into the category of the prosumer. The energy can be produced at a very small scale by an individual therefore it can effectively modulate the consumption (Parag and Sovacool, 2016; Hussain et al., 2020).

The prosumer energy can be operated and applied to any area and has a wide variety of renewable energy resources. It is very legitimate and operates in any climate condition. By taking it into consideration, it is very necessary to impose different policies for energy consumption to increase the stakeholders and individuals to invest in this energy capacity is to decrease import dependence (Vlahinić and Jakovac, 2014). The use of prosumer of energy will increase social benefits and bring savings in the long run by using active consumption methodologies. The use of decentralized energy resources will result efficiently and reduces network losses. Furthermore, investment in manufacturing equipment for this type of energy will provide instant cashback and high returns. The energy storage development, transmission development, local and distribution networks, and their management are the additional benefits of using prosumer energy.

However, renewable energy adoption is not homogenous. For instance, the researchers (Nastasi and Basso, 2016) diagnosed an issue of in the transition process of renewable energy usage in linking heat and electricity production. There are many factors such as institutional framework, infrastructural framework, investment, and scientific reasoning which affect the adoption of renewable energy. The carbon dioxide emission is different for different countries. According to the statistics, the adoption rate is faster in emerging countries (BNEF, 2015). The utilization of renewable energy can be more effective with the help of adequate integration levels of interests and objectives, locally as well as globally.

The administrative agreement, institutional agreements, and infrastructure issues may increase the barriers to deploy renewable energy. Furthermore, it can also lead to a higher than anticipated cost because of the barriers. Therefore, it is very necessary to deal with the barrier first to deploy renewable energy. The purpose of this study is to focus on the roles of strategies and policies to overcome the structural barriers and to check the effect of prosumer renewable energy and income on environmental degradation. Our purpose is, therefore, the find out the prosumer renewable energy resources' effect on carbon dioxide emission. In particular, we will also examine the economic growth's effect on the environment of Poland.

2. LITERATURE REVIEW

Recently the works based on the association between economic growth and the use of renewable energy increased. Such as, (Sadorsky, 2009) explored the factors of renewable energy with

GDP per capita has an important role in clarifying the dynamic linkage with renewable energy consumption per capita for 18 developing economies. The same related assumptions were described by (Salim and Rafiq, 2012) in the case of 6 developing countries (Menegaki, 2011) recognized European economies neutrality; (Apergis and Payne, 2012) stated two-way causation in case of Central America; (Salim and Rafiq, 2012) explored primary sources of renewables for pollution reduction and refining economic growth in developing economies, and the outcomes of (Tugcu et al., 2012) mixed through G-7 nations. (Bowden and Payne, 2010) explained at the sectoral level for the US causation linkage amongst economic growth, renewable and nonrenewable energy. For the residential sector, an optimistic effect was recognized on real GDP due to renewable energy use. (Alper and Oguz, 2016; Bhattacharya et al., 2016) instituted causation linkage between renewable economic growth and the use of energy in the case of Slovenia, Poland, Estonia, and Bulgaria. In view of new European Union participants, they recommend heterogeneous outcomes in using renewable causes. (Manzano-Agugliaro et al., 2013) explored an exceptional analysis of the scientific study globally on energy renewables. Their study revealed that renewable energy examination is vastly focused in a few economies. (Jebli et al., 2016) additionally, highlight the consumption ion of renewable energy and trade openness are effective policies on the way to sustainable development. (Destek, 2016) approved the economic growth and renewable energy consumption relationship by using the recently industrializing economies on economic conditions. (Bhattacharya et al., 2016) in this respect explored the literature. Causal association between renewable energy consumption and economic growth was shown to differ. Although reviewing the present literature, the study determine that the diverse outcomes are due to the alterations in assessment methods, variation in credit or tax structure for renewable placement, phases of economic development of sample economies and the altered stages of exploration measured in each study. In this research, we encompass the present literature comprising the part of renewable energy use and institutions in explanation economic growth through different nations.

Environmental degradation produces social costs. Increasing the emissions of carbon dioxide rises the mission of the cleaning environment and therefore inspires renewable energy consumption. Mostly the existing economies (Menegaki, 2011; Salim and Rafiq, 2012) highlight the decrease in the level of emissions due to the change to renewable energy. In the same way, the latest research, (Paramati et al., 2016) proposed that clean energy use and GDP per capita is an important factor in the reduction in the level of CO_2 emissions per capita in 20 developing countries. (Omri et al., 2015) examined trade openness and CO_2 emissions as main drivers of renewable energy use per capita by using the panel of 64 economies. In view of global distress in excess emissions of greenhouse gases, it is anticipated that carbon emissions have an indirect significant impact on renewable energy implementation.

Rendering to the increasing size of researches, various institutional situations may make fluctuating encouragements for the creation of energy strategies. Researchers such as (Painuly, 2001) deliver a hypothesis to categorizing obstacles to renewable energy dispersion, regulatory and legal structures and financial incentives are recognized as institutional obstacles, where lack of institutional mechanism. On the other hand, more responsive and open democratic systems may achieve better than relatively autocratic nations in executing environmental strategies (Bernauer and Koubi, 2009), while others are not convinced as (Ward, 2008). Additionally, due to pollution better quality institutional and institutional activities allow regimes to adopt externalities. Political situations and better government are also capable of instrument appropriate subsidies, tax rates besides linked strategies with the energy sector to decrease the level of CO_2 emissions. To our information, not a single research discovered the part of renewable energy and the concluding decrease in emission levels.

A panel of OECD nations portrays the positive effect of exchange on GDP per capita by utilizing a reversed U-molded environmental Kuznets curve (EKC). There are some different investigations that clarified that the travel industry is a significant factor for environmental conditions. (Jebli and Youssef, 2015) clarified the instance of Tunisia by demonstrating the dynamic causal connection between yield, squander utilization, CO_2 emissions, and ignitable renewables and worldwide the travel industry. Their outcomes demonstrate that an expansion in carbon emission is because of waste utilization, universal the travel industry and flammable renewables.

The EKC (Environmental Kuznets Curve) framework suggests U shaped an inverted association between the CO_2 emissions (a measure of environmental deprivation) and income per capita. In initial phases of economic expansion along with industrial development income per capita leads to higher CO_2 emissions and starts to decrease as the income per capita remains to upsurge past a beginning point. The technological improvement, emerging energy mixture and different mixtures of strategies which may support in decreasing the externalities from greenhouse gasses. Studies such as (Bilgili et al., 2016; Manzano-Agugliaro et al., 2013) established that the hypothesis of EKC is not robust for discrete economies in view of renewables as an energy source, while the analysis was recognized for the full panel (Acaravci and Ozturk, 2010; Al-Mulali et al., 2015; Halicioglu, 2009; Luzzati and Orsini, 2009) amongst others, on the EKC framework deliver assessments of the literature.

3. MODEL AND DATA

According to the (Bölük and Mert, 2014; Farhani and Shahbaz, 2014), carbon dioxide emissions (CO_2) depends on prosumer renewable energy RENG, economic growth (GDP), GDP square and nonrenewable energy consumption NRENG.

$$CO_2=f(GDP,GDP^2,RENG,NRENG) \quad (1)$$

According to EKC hypothesis equation 1 will become like below;

$$CO_{2t}=\gamma_o+\gamma_1\ GDP+\gamma_2 GDP^2_t+\gamma_3 RENG_t+\gamma_4 NRENG_t+\epsilon_t \quad (2)$$

Where ϵ_t represents the error term of equation and γ_o to γ_4 shows the intercept and slopes of equations which represents the magnitude effects of exogenous variables to carbon emission level.

Where used carbon emission metric ton CO_2, GDP is measured by GDP constant 2010 $US, Renewable energy=RENG is proxied by "Renewable energy consumption (% of total final energy consumption)," and nonrenewable energy = NRENG is proxied by "Fossil fuel energy consumption (% of total)." Annual data are obtained from the World Development Indicators of the time period of 1980-2018. Transform the data into the elasticities used the logarithm of the data which helps in the interpretation of the data. For the sake of EKC hypothesis the coefficients of γ_1 and γ_2 are respectively positive and negative. For the better environment the expected sign of γ_3 is negative and alternatively the γ_4 the sign should be negative or positive both will help to environment friendly.

Summary statistics of variables are shown in Table 2.

According to Table 2, which confirms that all the variables follow from the normal distribution because the prob. value of the Jarque Bera test is >5% which confirms that we accept the null hypothesis which confirms that all the series follows the normal distribution. The mean value of carbon emission is 2.20 metric ton and economic per capita growth is 26.50 with 1.72 units of the mean value of renewable energy out of total energy.

We used the secondary data, so checking the characteristics of secondary data is very important for example to check the order of integration and then move to estimate the impact of prosumer renewable energy, renewable energy and economic growth on the environment. For checking the order of integration using the two tests Augmented Dickey-Fuller and Philips perron test and after that to verify the EKC model is valid in Poland or not and further to estimate the long and short-run estimates by auto regressive distributive lag (ARDL) model.

Table 2: Summary statistics

Variables	CO_2	GDP	GDPSQ	NRENG	RENG
Mean	2.205614	26.50119	702.4459	6.500601	1.720936
Median	2.123709	26.4662	700.4599	6.536806	1.877449
Maximum	2.569506	27.17326	738.3859	11.91149	2.477503
Minimum	2.017187	26.07399	679.8532	2.064669	0.72497
Std. Dev.	0.172978	0.36943	19.62814	3.308964	0.585084
Skewn	0.781729	0.350477	0.360986	0.203649	-0.34619
Kurt	2.090683	1.632224	1.643777	1.843288	1.645954
J. B	5.315796	3.838488	3.835951	2.443796	3.758359
Prob.	0.070095	0.146718	0.146904	0.29467	0.152715
Obs.	39	39	39	39	39

4. EMPIRICAL RESULTS

4.1. Unit Root Test

In this section want to check the series either it has the unit root or not. Because we used the time series data and it has the problem of a unit root. According to results of unit root if the series is not stationary and we analyzed them without knowing their order of integration then the results and regression are not valid and that regression is called spurious regression. Although the regression has the highest coefficient of determination and passes all the tests. To overcome that problem there are multiple unit root tests but in this study, two tests will be applied to check the order of integration and those tests are Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root test and their results are shown in Table 2. The result indicates that all the series have a unit root at a stationary level and they become stationary at the first difference at the significance level of 1%. Summary of unit root test is explain in the Table 3.

4.2. ARDL Bound Cointegration Test

Before moving to ARDL results, first of all, check the cointegration in the model. In this study used the ARDL bound test whose null hypothesis is there does not exist the cointegration in the model and alternative is cointegration is exists in the model. Bone test results are presented in Table 4, the value of calculated F statistics is >5% significance level. Which indicates that there exists the long-run relationship between prosumer renewable energy and environment (CO_2) with other instrumental variables in the case of Poland.

$$CO2_t = \theta_o + \sum_{i=1}^{p} \theta_1 \Delta CO2_{t-1} + \sum_{i=0}^{p} \theta_2 \Delta GDP_{t-1} + \sum_{i=0}^{p} \theta_3 \Delta GDP^2{}_{t-1} + \sum_{i=0}^{p} \theta_4 \Delta RENG_{t-1} + \sum_{i=0}^{p} \theta_5 \Delta NRENG_{t-1} + \theta_6 CO2_{t-1} + \theta_7 GDP_{t-1} + \theta_8 GDP^2_{t-1} + \theta_9 RENG_{t-1} + \theta_{10} NRENG_{t-1} + \varepsilon_t \quad (3)$$

According to equation 3, Δ used for the difference and that is because of variables are not stationary at a level and they become stationary at level, θ_o shows the intercept of the equation and θ_1 to θ_5 gives the elasticities of the short-run equation and θ_6 to θ_{10} gives the coefficients for the long-run equation.

Table 3: Unit root test

Tests	Augmented Dickey-Fuller (ADF)			Phillips-Perron (PP)			Results
Variables	Critical	t-Statistic	Prob.	Critical	t-Statistic	Prob.	
CO_2	−3.533	−1.886	0.6417	−3.533	−1.886	0.6417	I(1)
d(CO_2)	−3.533	−6.379***	0.000	−3.533	−6.379***	0.000	
GDP	−3.533	−2.486	0.3325	−3.533	−2.400	0.3736	I(1)
d(GDP)	−3.533	−4.344***	0.0074	−3.533	−4.427***	0.006	
RENG	−3.533	−2.761	0.2197	−3.533	−2.633	0.2688	I(1)
d(RENG)	−3.533	−4.894***	0.0019	−3.533	−9.532***	0.000	
NRENG	−3.533	−1.600	0.774	−3.533	−1.676	0.7421	I(1)
d(NRENG)	−3.533	−5.465***	0.0004	−3.533	−5.466***	0.0004	

***,** and * show 1%,5% and 10% level of significance respectively

The bound test verifies that there exists the long-run relationship between renewable and nonrenewable energy, economic growth and carbon emission in Poland. Because Bound test calculated value is 5.02, which is >5% significance value which concludes that there exists the long-run relationship in the model.

4.3. Long Run ARDL Results

ADF and PP confirm the order of integration of variables, they concluded that all series have a unit root at a level and they are stationary at a level so the results of ARDL are more accurate and reliable as compared to traditional methodologies. So we used ARDL to check the Environment EKC hypothesis in the presence of prosumer renewable energy in the case of Poland. The elasticities of prosumer renewable energy and GDP, the square of GDP is represented in Table 5.

Results indicate that prosumer renewable energy has a significant and negative effect on the environment (carbon emission) level, on the other hand, the nonrenewable energy has insignificant but has also a negative impact on carbon emission in the case of Poland. Furthermore, if there increase in 1% in the prosumer energy which leads to decrease in carbon emission by 2.49% which are also confirmed by (Al-Mulali and Ozturk, 2016; Bento and Moutinho, 2016; Bilgili et al., 2016; Jebli et al., 2016) on the other hand 1 % increase in the NRENG also leads to decrease in the carbon emission by 0.29% which ultimately improve the environment condition. So it is clear that with the low carbon emission level is produced from the prosumer renewable energy as compared by the nonrenewable energy level which means that to make the environment healthy prosumer energy plays a vital and significant role in Poland as compared to nonrenewable energy consumption. So, the regulatory authorities or policymakers executed to control of the consumption of nonrenewable sources and advised the factories honors, businessman and electric organization to move to the sources which consume the prosumer renewable energy factors instead of nonrenewable energy. So, the Polish govt. took the charge to and freely share this policy with the economy and suggested they clean the environment by moving to prosumer renewable energy sources because the prosumer energy helps to a healthy environment.

Table 4: Bound test

Bound test		
F-stat		5.02
Critical bound		
Sig. (%)	**I_0**	**I_1**
10	3.03	4.06
5	3.47	4.57
2.50	3.89	5.07
1	4.4	5.72

Table 5: ARDL *long*-run estimates

Variable	Coefficient	Std. error	t-statistic	Prob.
GDP	91.95374*	53.13453	1.730583	0.104
GDPSQ	−1.75844*	1.006856	−1.74647	0.1012
RENG	−2.493***	0.657	−3.797	0.002
NNRENG	−0.29018	0.200829	−1.4449	0.1691
C	1204.133*	700.3885	1.719236	0.1061
Model diagnostics				
R square				0.983776
Adjusted R square				0.963226
DW				1.899263
LM test				0.2129
Heteroskedasticity				0.9562
Ramsey Reset				0.139

***,** and * show 1%,5% and 10% level of significance respectively

This also helps to improve the environment green and healthy because the EKC hypothesis supposed that in initial economic growth boosts the carbon emission and after reaching a certain level it will move to a decrease in the carbon emission level. so, the results indicated from Table 5 also verifies the presence of the EKC hypothesis in the case of Poland. Which means that GDP and square of GDP have a statistically significant effect on carbon emission level. GDP has boosted the carbon emission level by 91.95% and a square of GDP decrease the carbon emission with a magnitude of 1.75% annually. So, we can say that at the start there increase in the production level increases environmental degradation after a certain point it will decrease environmental degradation. This results confirms the EKC hypothesis and also the following studies where the EKC hypothesis is verified that are for turkey (Ozturk and Acaravci, 2010), in case of Russia (Pao et al., 2011) valid EKC hypothesis for China, (Chandran and Tang, 2013) confirmed EKC theory for ASEAN, in the European Union region (Bölük and Mert, 2014) also (López-Menéndez et al., 2014), (Dogan et al., 2017) for OECD countries and for ASEAN countries.

For results verification and regression validity, performed multiple diagnostics and these all diagnostics are required to pass for the model best fit. In this study used the R-square, Adjusted R-square which is the coefficient of determination whose value is 98% which is good which means carbon emission in explained 98% by exogenous variables which is good. Second, it Adjusted R-square which value is 96% which is also good. For checking the autocorrelation in the model used the LM test which indicates that we accept the null hypothesis because the prob. value is >5% so the autocorrelation problem does not exist in the model and this is also confirmed from the Durbin Watson statistics. Heteroskedasticity tests also confirmed that there does not problem with Heteroskedasticity in the model. Ramsey reset test also indicates that the model is consistent, according to Figures 2 and 3 which is CUSUM and CUSUM square test which to used to test the validity of regression and CUSUM and SUSUM square line is in between the 5% standard deviation line which also confirms that the model is consistent and pass all the diagnostics. Hence overall concluded that from all the diagnostics the estimated model is unbiased and consistent.

According to the Table 6, the ECM term is statistically significant and has a negative sign according to a theory which means there exists the cointegration in the model and also confirms the bound test result. ECM test also verifies that the model will move to the equilibrium stage with a speed of 50% annually. In the short

Figure 2: CUSUM stability test

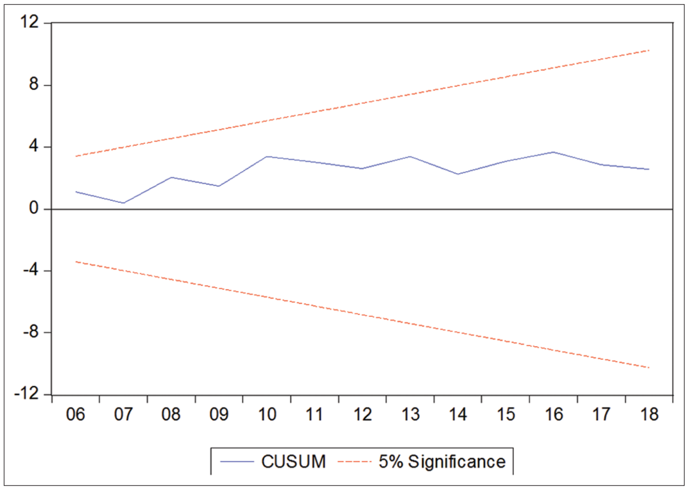

Figure 3: CUSUM square stability test

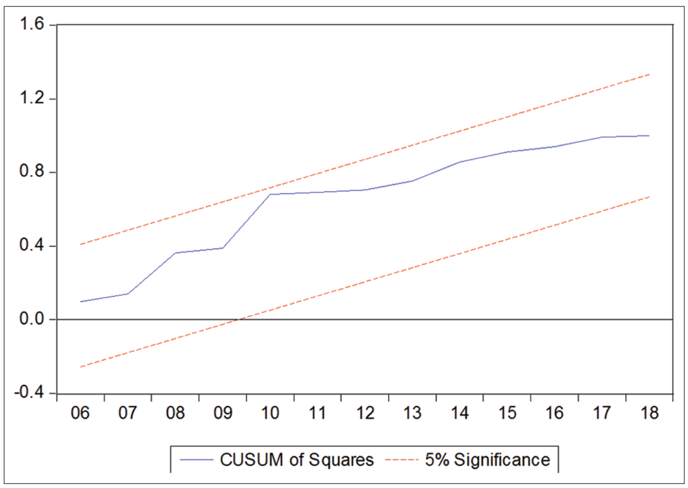

Table 6: ARDL short-run estimates

Variables	Coef.	SE	t-stat.	Prob.
D(CO_2(−1))	−0.08176	0.269279	−0.30363	0.7656
D(CO_2(−2))	0.275119	0.222295	1.237631	0.2349
D(GDP)	−22.9529	35.53555	−0.64591	0.5281
D(GDP(−1))	125.2196**	42.28073	2.961622	0.0097
D(GDPSQ)	0.456417	0.672242	0.678948	0.5075
D(GDPSQ(−1))	−2.37564	0.801297	−2.96474	0.0096
D(GDPSQ(−2))	0.020045	0.011805	1.697916	0.1102
D(GDPSQ(−3))	−0.0307**	0.01115	−2.7534	0.0148
D(RENG)	0.257192	0.182754	1.407312	0.1797
D(RENG(−1))	−0.85664**	0.254088	−3.37143	0.0042
D(RENG(−2))	−0.08475	0.068361	−1.23968	0.2341
D(NNRENG)	−0.04199	0.042825	−0.98045	0.3424
D(NNRENG(−1))	0.164008**	0.056165	2.9201	0.0106
D(@TREND())	−0.02074**	0.005232	−3.96465	0.0012
ECM(−1)	−0.50512**	0.184846	−2.73265	0.0154

run, renewable energy also confirms the long-run result which is it decreases the carbon emission level and nonrenewable energy also decreases the carbon emission level in Poland in the short run. EKC hypothesis is also verified in the short run scenario too. This means that in start economic growth boosts the carbon emission level until a certain level after achieving that pint it will decrease the carbon emission level.

5. CONCLUSION

Due to the fact that the Polish energy market relatively recently started the adventure with the concept of renewable energy prosumer, current legal and economic solutions can be described as negligible. However, this prosumer market can be described as full of legislative potential and legal and economic solutions applied in the coming years.

The objective of the study to estimate the impact of new form of energy which in prosumer energy with the help of EKC hypothesis in the Poland. In this study used the annual time series data from 1980 to 2018, then check the order of integration of the variables from the ADF and PP unit root test and that confirmed that selected series GDP, Square of GDP, Prosumer renewable energy and nonrenewable energy has unit root at level and become stationary at first difference according to that applied the ARDL model which confirms that prosumer renewable energy improve the environment good and clean and also confirmed the hypothesis of EKC is valid in the Poland. Because the GDP has positive effect to carbon emission while the square of GDP has negative effect to carbon emission.

As showed, prosumers are probably going to play a vital and empowering job as energy frameworks become progressively renewable and decentralized. These patterns will be highlighted by the expanded reception of shrewd home advancements, EVs and adaptable demand side resources. The renewable energy showcase is possibly subject to air conditions - photovoltaics, wind turbines, hydroelectric force plants (Binkowski, 2008). The essential innovative and legitimate test will characterize the standards of energy stockpiling. An intriguing test will decide the cost of potential deals of energy created, for example during a time of falling costs.

In view of the conclusions we come to, the conceivable strategy suggestions are as per the following: the utilization of energy from prosumer renewable energy source ought to stay expanded whereas the utilization of energy from non-renewable factors ought to be diminished. Regulatory strategies assume a significant job in dealing with the expansion in CO_2 emissions. On the other hand, open and private structures, organizations and manufacturing plants and the electricity business ought to be constrained by guideline to bit by bit increment the portion of renewable sources in the energy blend soon. The polish government ought to freely share that the aim of this enactment is to improve the earth. The manifestations of open consciousness of Prosumer renewable energies and a spotless domain assume a significant job in the most reduced emanation levels. The appropriation of Prosumer renewable energy sources and earth amicable innovations at each phase of the creation procedure is significant for improving the earth.

Prosumer renewable energy is the most recent concept of renewable energy so we used the renewable energy data as a proxy for prosumer renewable energy but this might be the very weak proxy for prosumer energy so this the limitation of the study that we don't have the exact proxy for the prosumer energy. Future of the study is also that is to find the exact proxy for prosumer energy and analyze the effect on energy with the renewable and nonrenewable energy and make comparison between them.

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