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The Impact of the Government Policy on the Energy Efficient Gap: The Evidence from Ukraine

Oleksii Lyulyov [1], Tetyana Pimonenko [1,*], Aleksy Kwilinski [2], Henryk Dzwigol [3], Mariola Dzwigol-Barosz [3], Vladyslav Pavlyk [1] and Piotr Barosz [3]

[1] Department of Marketing, Sumy State University, 40007 Sumy, Ukraine; alex_lyulev@econ.sumdu.edu.ua (O.L.); pavlyk.vladyslav@gmail.com (V.P.)
[2] The London Academy of Science and Business, 120 Baker Street, London W1U 6TU, UK; a.kwilinski@london-asb.co.uk
[3] Department of Management and Logistics, Faculty of Organization and Management, Silesian University of Technology, 26-28 Roosevelt Street, 41-800 Zabrze, Poland; henryk.dzwigol@poczta.fm (H.D.); Mariola.Dzwigol-Barosz@polsl.pl (M.D.-B.); piotr.barosz@barosz.pl (P.B.)
* Correspondence: tetyana_pimonenko@econ.sumdu.edu.ua; Tel.: +38-05-4268-7934

Abstract: This paper aims to check the impact of investment and institutional determinants on the energy efficiency gap. The findings of the bibliometric analysis confirmed the growth of research interests in identifying the core determinants of the energy efficiency gap. The central hypotheses are: the increasing quality of the institutions leads to an increase of green investments in the energy sector and the dual relationships between investment and institutional determinants lead to additional synergy effects, which allow boosting the decline of energy efficiency gaps of the national economy. For the analysis, the times series were collected from the World Data Bank, Eurostat, Bloomberg, for Ukraine for the period of 2002–2019. The following methods were used: the unit root test—for checking the stationarity of data—and the Johansen test and VEC-modelling—for the cointegration analysis. The findings prove that to reduce the energy efficiency gaps in Ukraine by 1% next year, it is necessary to increase green energy investments by 1.5% this year, and the political stability and public perception of corruption by 3% and 1%. The increase of the public perception of corruption by 1.47 points and of political stability by 2.38 points leads to maximising the recovery speed of the Ukrainian energy sector. Thus, while developing the policy to decrease the energy efficiency gaps, the Ukrainian government should consider the level of public perception of corruption and political stability.

Keywords: energy policy; gap; sustainable development; green economy; energy

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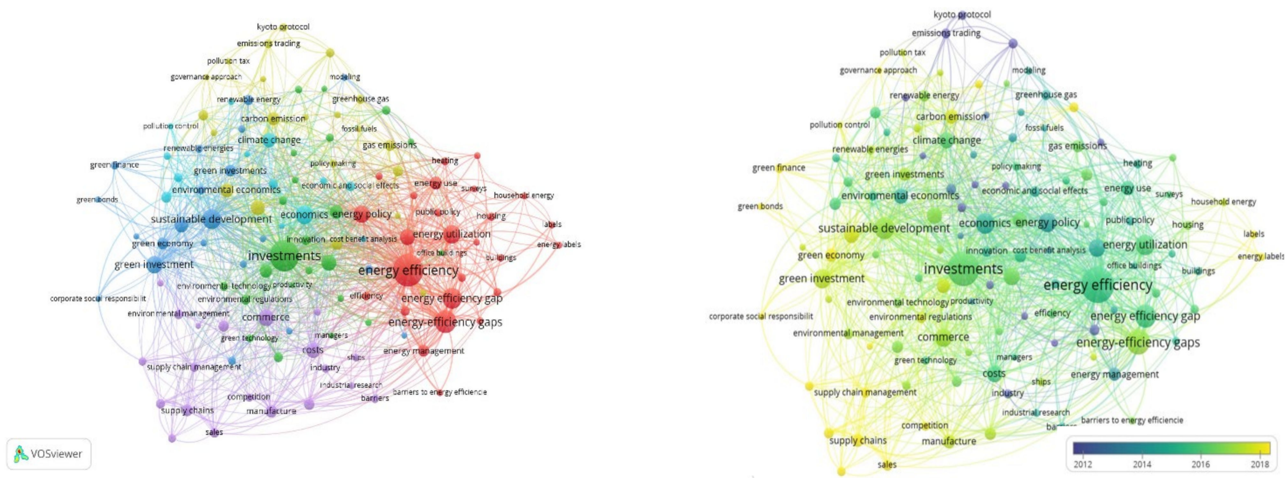
1. Introduction

In December 2019, the new climate strategy "Green Deal Policy" was accepted at the UN summit COP25, which promotes the transition to a circular and carbon-free economy. Considering this, together with the EU accession vector of the Ukrainian development, it is necessary to synchronise the national energy policy with the basic principles of the EU energy policy. The results of the comparative analysis of Ukraine and EU countries showed that Ukrainian energy efficiency was lower compared with the EU countries. At the same time, the level of energy efficiency increased in 2019 compared to 2018. However, this increase resulted from the industrial production decline due to the political instability in Ukraine, not from improving governance in the energy sector or extending green innovations in the energy sector, which contribute to attracting green investment. Considering the experts' estimation, Ukraine has a huge potential to become an energy-efficient country and to boost its transformation into a carbon-free economy. In this case, in Ukraine, one of the main goals is to decrease the energy efficiency gap of the national economy. At the same time, the experience of the EU countries confirmed that the energy efficiency gap could be decreased if the government provides an effective policy based on the empirically justified targets and the core bullet points of "Green Deal Policy".

Findings of the scientific research on the energy efficiency gaps confirmed that scholars mostly analysed the energy gap from a technical viewpoint. The scientists in [1–12] analysed the energy efficiency gap at the company level as a result of insufficient technologies in the industrial sector. Moreover, the researchers in [13–21] defined the internal factors which influenced the company's performance, involving energy efficiency. The bibliometric analysis (by means of the software VOSViewer v.1.6.10.) of 10,357 papers (with keywords: energy efficiency, energy efficiency gap, energy gap) published in a Scientific Journal indexed in Scopus and Web of Science showed that the scholars began to investigate the impact of the institutional quality and green investment on energy efficiency gaps. Thus, in Figure 1a, the investment (green cluster) was the mediator between sustainable development (navy blue cluster) and good governance (yellow cluster). Moreover, the overlay visualisation (Figure 1b) confirms that issues of the energy efficiency gap that has been studied since 2017. The relations between energy efficiency gaps, social and economic effects, and carbon trade have been studied since 2012. Scientists have been investigating the issues of green investment, green finance, and green bond concerning energy efficiency gaps since 2018 (Figure 1a). Thus, the authors of [22–24] proved that social and economic growth of a country influenced the energy sector development. The findings of the bibliometric analysis allowed defining the energy efficiency gap as a discrepancy between potentially possible and actual levels of the national economy's energy efficiency due to the use of inefficient technologies of production, transportation and use of energy, limited green investment for energy renewal, and asynchrony of certain measures of the energy sector's state regulation in the national economy.



(**a**) network visualisation (**b**) overlay visualisation

Figure 1. The finding of co-occurrence analyses: network and overlay visualisation (source: developed by the authors).

The scientists in [25–31] proved that institutional determinants should be considered while estimating different types of gaps. Moreover, in [32–40], the authors analysed the investment market development in Ukraine, allocating the core determinants which limit the green investment in the energy sector. The scientists confirmed that innovation technologies allowed achieving direct and indirect effects in the energy sector [41–46]. Salman [47] studied the link of economic growth, greenhouse gas emissions, and energy consumption and defined the institutional quality as a mediator in that relation. The findings in [47] confirmed the long-run relation among institutional quality, economic growth, and energy consumption. Despite the considerable background in the analysis of the energy sector development and a decline of the energy efficiency gap, the issues of estimating institutional, economic, and ecological impact have not been investigated yet.

This paper aims to check the impact of investment and institutional determinants on the energy efficiency gap in the case for Ukraine for the period of 2002–2019.

This paper is organised as follows: the second section "Materials and Methods" provides the compilation of the scientific approaches to testing the hypothesis of the link between the range of the determinants and the energy efficiency of the national economy, the explanations of hypothesises and methods to test them; the third section "Results" presents the analytical results of the cointegration test between the selected parameters in the short and long run; the fourth section contains the conclusion based on these findings.

2. Materials and Methods

A focus of current scientific research is to confirm empirically a mutual link among institutional environment, the efficiency of economic, social, and ecological development, the dynamic of energy consumption from renewable energy, and the energy efficiency of a national economy. For this, scientists have used the various economic and mathematical models [48–56] (Table 1).

Table 1. Approaches to testing the hypothesis of the link among institutional environment, efficiency of economic, social, and ecological development, the dynamic of energy consumption from renewable energy, and the energy efficiency of the national economy (source: compiled by the authors).

Year	Method	Variables	Relationship	Source
1993–2004	GMM	Carbon dioxide emissions, GDP, energy consumption, quality of the institutional environment, the openness of the economy, financial development, inflation rate.	Yes	[50]
1980–2012	ARDL	Carbon dioxide emissions, GDP, energy consumption, level of urbanisation, the openness of the economy, foreign direct investment.	Yes	[51]
1996–2010	OLS; GMM	Carbon dioxide emissions, GDP, energy efficiency, quality of the institutional environment, the openness of the economy, financial development.	No	[52]
1980–2015	OLS; GMM	Carbon dioxide emissions, GDP, energy intensity, level of urbanisation, the openness of the economy, foreign direct investment, population growth in the country, the inequality rate.	Yes	[53]
1990–2007	OLS	GDP, globalisation index, gas emissions, financial development, quality of the institutional environment.	Yes	[54]
1991–2017	GMM	GDP, globalisation index, gas emissions, financial development, quality of the institutional environment.	Yes	[55]
2015	ECM	Renewable energy; GDP; quality of the institutional environment.	Yes	[56]

GMM—Generalised Method of Moments; OLS—Ordinary Least Square; ARDL—Autoregressive Distributed Lag; ECM—Error Correction Model; GDP—Gross Domestic Product.

The assessment of the energy efficiency gap was based on the findings in [57,58]. It should be noted that technological determinants were beyond the framework of the economic research. In this case, the paper focused on analysing investments and institutional determinants due to implementing the state policy on reducing the energy efficiency gap. The investment determinants were explained by the volume of green investment, which directs to the energy-efficient technologies. The efficiency of government regulation described institutional determinants. Agreeing with the authors of [57,58], the institutions of the national economy should be developed based on the concept of "Good Governance". Thus, six indicators of Worldwide Governance Indicators (WGI) were chosen for this research:

- Political and civil liberties (WGIVIA);
- Government political stability (WGIPS);
- Freedoms and qualifications of public authorities (WGIGE);
- Public confidence in government action (WGIRL);
- Public perception of corruption (WGICC);

- The government's ability to implement policies and regulations (WGIRQ) [59].

The World Bank calculated a broader range of institutional indicators, unlike Transparency International, which estimated the index of corruption only. Moreover, the World Bank used the unification methodology for all indicators, which allowed eliminating the scaling issues. Considering the Word Bank methodology, the indicators of institutional quality was estimated using the scale from −2.5 (low quality) to 2.5 (high quality).

Considering the abovementioned, the main hypothesises of the paper are:

H1: the increasing quality of the institutions leads to an increase of green investments in the energy sector.

H2: the dual relations between investment and institutional determinants lead to additional synergy effects, which allow boosting the decline of energy efficiency gaps of the national economy.

In the first stage, the impact of the World Governance Indicators (WGI) (as the indicators of the institutional quality) on energy efficiency gaps in the national economy was analysed using model 1. It allowed allocating the most significant indicators among WGI for the further steps of the analysis:

$$PE = \alpha_0 + \beta_i WGI_i + \varepsilon \quad (1)$$

where α_0 is a constant; β_i refers to the searching parameters; WGI_i refers to the indexes of the institutional quality; PE refers to the energy efficiency gaps (calculated based on the findings of the paper [58]); and ε refers to the errors.

Based on the findings, the statistically significant indexes of the institutional quality were selected for the next step—checking a link among selected indexes of the institutional quality, green investments, and energy efficiency gaps. For this purpose, the VEC-model and Johansen test were used. It allowed defining the targets of the investment and institutional determinants, which lead to an annual decline of the energy efficiency gap and to boosting the energy sector development. The approach developed contained the following stages:

1. Collecting the statistics data for developing the economic model. The information base was obtained from World Data Bank, Eurostat, Bloomberg [59,60].
2. Checking the stationarity of the selected data.
3. Checking the cointegration among the selected indicators.
4. Checking the hypothesis H1: the short- and long-run relations among energy consumption, green investment in the energy sector, and selected statistically significant indexes of the institutional quality.

Considering model 1, the economic model for testing H2 could be presented as follows:

$$PE = F\left(GI,\ WGI_{st\_sign}\right) \quad (2)$$

$$\Delta PE_t = \phi + \sum_{i=1}^{n} \alpha \Delta lnGI_{t-i} + \sum_{i=1}^{n} \beta_k \Delta WGI_{st\_sign} + \eta ECT_{t-i} + \mu_{it} \quad (3)$$

where PE refers to the energy efficiency gaps; GI is green investment; WGI_{st_sign} refers to the selected indicators WGI, which were of statistical significance; ECT is a parameter that describes the long-term relationship between the time series of the energy efficiency gaps, the green investment in the energy sector, and the selected indexes of the institutional quality; ϕ is a constant; α, β, γ, η are regression parameters; μ is a statistical error; i = 1, . . . , N; t = 1, . . . , T; and Δ is the operator of the first difference of the model parameters.

The stationarity of the data was checked by Unit root test, Levin, Lin and Chu, Im Pesaran and Shin, Fisher Chi-square tests. Using the Johansen test, the cointegration among the selected parameters was done. The analysis was performed using EViews10 software for Ukraine for 2002–2019.

3. Results

In the first stage, in order to select the statistically significant indicators, the WGI indicators were analysed. The descriptive statistics and graphical interpretation of the WGI dynamic are shown in Table 2 and Figure 1.

Table 2. The descriptive statistics of WGI for Ukraine, 2002–2019 (Source: developed by the authors).

Indicators	WGICC	WGIGE	WGIPS	WGIRL	WGIVIA	WGIRQ
Mean	−0.929107	−0.610141	−0.706059	−0.770681	−0.167167	−0.509538
Median	−0.933391	−0.602826	−0.301881	−0.781080	−0.086799	−0.535406
Maximum	−0.721898	−0.413419	0.173132	−0.681343	0.090666	−0.220075
Minimum	−1.131518	−0.833841	−2.020833	−0.818796	−0.671051	−0.628818
Std. Dev.	0.127285	0.129428	0.829295	0.040268	0.240096	0.113551
Skewness	0.138090	−0.202555	−0.704571	0.788212	−0.868263	1.199495
Kurtosis	1.702139	2.229579	1.744602	2.575122	2.538935	3.632513
Jarque-Bera	1.247175	0.536678	2.522876	1.888156	2.286575	4.359951
Probability	0.536018	0.764649	0.283246	0.389038	0.318769	0.113044
Sum	−15.79483	−10.37239	−12.00301	−13.10157	−2.841842	−8.662145
Sum Sq. Dev.	0.259223	0.268026	11.00368	0.025944	0.922337	0.206301

Mean—an average of the data series; Median—a median of the data series; Maximum—the maximum value of the data series; Minimum—the minimum value of the data series; Std. Dev.—standard deviation; Skewness—a measure of the asymmetry of the distribution of the data series around its average; Kurtosis—a numerical characteristic of the probability distribution of the actual random variable of the data series; Jarque-Bera—test to check the normal distribution of the data series; Probability—p-value, using the Harke-Bera test; Sum Sq. Dev.—the sum of squares of deviations; WGIVIA—political and civil liberties; WGIPS—government political stability; WGIGE—freedoms and qualifications of public authorities; WGIRL—public confidence in the government action; WGICC—public perception of corruption; WGIRQ—the government's ability to implement policies and regulations.

The findings in Table 2 confirmed that only two indicators were positive. Thus, in 2007, the government political stability (WGIPS) amounted to 0.173, while in 2018, political and civil liberties (WGIVIA) accounted for 0.09. This confirmed the low institutional quality in Ukraine in 2002–2019.

Two indexes demonstrated the most positive trend of improving the quality of the institutions in the recent years:

- Freedoms and qualifications of public authorities (WGIGE);
- The government's ability to implement policies and regulations (WGIRQ).

With the purpose to identify the significant indicators among WGI, the paired correlation coefficients and their statistical significance were calculated. The findings are summarised in Figure 2.

The findings showed that the correlation coefficient was not higher than 0.7, with the statistical significance being no more than 0.05. It confirmed that the integrated indicators could not be allowed for obtaining adequate results without considering the relevant weight coefficients. The results of the element-by-element assessment of the WGI impact on the energy efficiency gaps are shown in Table 3.

Table 3. Results of the element-by-element assessment of the WGI Impact on the energy efficiency gaps for Ukraine, 2002–2019 (Source: developed by the authors).

Indicators	Regression Equation	Coefficient of Determination	Statistical Significance of the Regressor Coefficient	
			Constant	WGI
WGIVIA	PE = 0.86 − 0.44WGIViA	0.077	0.00	0.279
WGIPS	PE = 0.89 − 0.02WGIPS	0.312	0.00	0.020
WGIGE	PE = 0.83 − 0.07WGIGE	0.054	0.00	0.366
WGIRQ	PE = 0.92 + 0.09WGIRQ	0.070	0.00	0.286
WGIRL	PE = 0.99 + 0.15WGIRL	0.030	0.00	0.538
WGICC	PE = 0.97 − 0.10WGICC	0.616	0.00	0.080

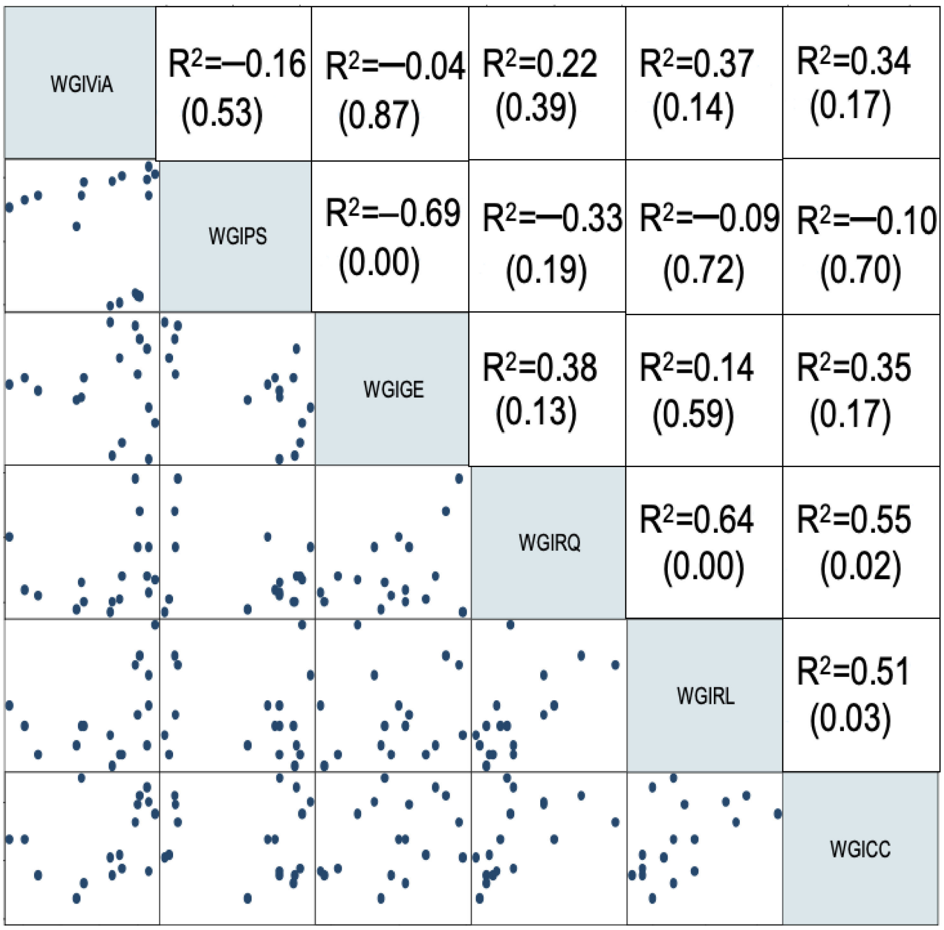


Figure 2. A correlation matrix of WGI for Ukraine, 2002–2019 (Source: developed by the authors). WGIVIA—political and civil liberties; WGIPS—government political stability; WGIGE—freedoms and qualifications of public authorities; WGIRL—public confidence in government action; WGICC—public perception of corruption; WGIRQ—the government's ability to implement policies and regulations; R2—coefficient of determination.

Thus, the general impact of instructional indicators on the energy efficiency gap was explained by the political stability—more than 30%—and public perception of corruption—60%. The relevant coefficient of the determination accounted for 0.312 and 0.616, with high statistical significance. Thus, the core indicators among WGI, which influenced the energy gap, were political stability and public perception of corruption.

The findings in Table 4 showed that information criteria defined by Akaike, Schwartz and Hannan-Quinn were higher for the model, with a lag of one year. The statistical significance of the parameters for this type of a model was higher—1%.

Table 4. Determining the optimal number of time lags for inclusion in the model for Ukraine in 2002–2019 (source: developed by the authors).

Lag	Information Criteria		
	Akaike	**Schwartz**	**Hannan-Quinn**
0	−13.69	−12.51	−13.63
1	−14.76 *	−13.15 *	−14.14 *
2	−14.28	−12.24	−13.86

*—statistical significance at the level of 1%.

In this case, in the next stage of VEC modelling in the short term, a one-year lag was considered. The results of the Johansen test confirmed the cointegration between two indicators. That conclusion was based on the fact that the null hypothesis of the Johansen test (lack of cointegration) was rejected, as evidenced by the high value of statistical significance (1%) of the indicator "Maximum eigenvalue of Hannan—Quinn" (Table 5). The findings of the cointegration analysis between the selected parameters are shown in Table 5.

Table 5. The findings of the cointegration analysis between the selected parameters using the Johansen test for Ukraine in 2002–2019 (source: developed by the authors).

Hypothesis	Rang Test	
	Follows of the Matrix	Maximum Eigenvalue of Hannan-Quinn
R = 0	53.64/(0.01)	31.64/(0.00)

The statistical significance is shown between the brackets.

Considering the findings in Table 3, the government's ability to implement policies and regulations (WGIRQ) did not have significant impact on energy efficiency gaps. At the same time, in [61], the authors maintain that the regulatory policy had a significant impact on extending renewable energy and attracting green investment. Thus, they [61] proved that the strict government regulations in the energy sector led to an outflow of green investments, which limit the extension of renewable energy. Moreover, renewable energy and green investment were the core determinants in reducing the energy efficiency gap. At the same time, the authors of [62] proved that without a strict regulatory policy in the energy sector, the country could not reduce the GHG emissions and increase its energy efficiency. In this case, the WGIRQ would be considered for further analysis as a control variable.

The findings of the Johansen test confirmed the cointegration in the chain "quality of the institutions ⇔ green investments in energy ⇔ energy efficiency gaps", with a one-year lag. In this case, in the roadmap for reforms in the energy sector of Ukraine, the government should indicate the annual target for investment and institutional determinants, the achievement of which leads to the corresponding annual reduction of energy efficiency gaps. Based on empirical results, it was established that in order to reduce energy efficiency gaps in Ukraine by 1% next year, it was necessary to increase green energy investments by 1% this year, and government political stability and public corruption indices to 3% and 1%.

In the last stage, the VEC-model was used for testing the hypothesis on the short and long-run relations among energy efficiency gaps, green investments in the energy sector, the index of political stability, public perception of corruption, and the government's ability to implement policies and regulations. The findings of VEC-model are shown in Table 6.

Table 6. The findings of the cointegration test among the energy efficiency gaps, green investment in the energy sector, the index of political stability, public perception of corruption for a short period, and the government's ability to implement policies and regulations with a one-year lag for Ukraine in 2002–2019 (source: developed by the authors).

Indicators	Δ(PEt−1)	Δ(GIt−1)	Δ(WGIPSt−1)	Δ(WGICCt−1)	Δ(WGIRQt−1)
Without control variable: the government's ability to implement policies and regulations					
Δ(PEt)	0.07 (0.00)	0.15 (0.003)	0.03 (0.65)	0.01 (0.00)	–
Δ(GIt)	−0.03 (0.02)	0.11 (0.05)	0.17 (0.026)	−0.01 (0.00)	–
Δ(WGIPSt)	0.021 (0.57)	0.36 (0.74)	0.09 (0.00)	−1.20 (0.44)	–

Table 6. *Cont.*

Indicators	Δ(PEt−1)	Δ(GIt−1)	Δ(WGIPSt−1)	Δ(WGICCt−1)	Δ(WGIRQt−1)
Δ(WGICCt)	0.016 (0.34)	0.01 (0.00)	0.27 (0.61)	0.06 (0.00)	–
With control variable: the government's ability to implement policies and regulations					
Δ(PEt)	0.05 (0.00)	0.12 (0.00)	0.027 (0.63)	0.007 (0.00)	0.02 (0.44)
Δ(GIt)	−0.03 (0.00)	0.09 (0.05)	0.13 (0.023)	−0.01 (0.00)	0.01 (0.09)
Δ(WGIPSt)	0.021 (0.46)	0.32 (0.72)	0.07 (0.00)	−1.18 (0.44)	0.20 (0.04)
Δ(WGICCt)	0.02 (0.28)	0.008 (0.00)	0.23 (0.58)	0.04 (0.00)	0.06 (0.00)
Δ(WGIRQt)	0.002 (0.08)	0.022 (0.05)	0.07 (0.00)	0.03 (0.00)	0.02 (0.00)

The statistical significance is shown between the brackets; Δ—the operator of the first difference of the model parameters at time t and t−1.

The number in the corresponding cells of the matrix (Table 6) characterised the change of indicators in the t year, shown in the matrix column, depending on the change in the t−1 year of the indicator in the corresponding matrix row.

The findings allowed confirming the pairwise cointegration relations with a statistical significance of 5% in the short term among the following indicators:

1. Energy efficiency gaps and green investments in the energy sector;
2. Energy efficiency gaps and the index of public perception of corruption;
3. Green investments in the energy sector and government political stability;
4. Green investments in the energy sector and the index of public perception of corruption.

Moreover, the empirical results allowed concluding that the Ukrainian government should reorient the regulatory policy in the energy sector considering the economic and ecological conditions in the country. It could become the basis for developing the integrated energy policy considering the EU requirements.

The findings for the long-run relation are shown in Table 7. Empirical results of checking the cointegration among the selected parameters for the long term (for Ukraine in the period of 2002–2019).

Table 7. The findings of cointegration between the selected parameters in the long run for Ukraine in 2002–2019 (source: developed by the authors).

Indicators	ECMt_1	Prob.
Δ(PE)	−0.612	(0.056) ***
Δ(GI)	1.03×10^{-7}	0.64
Δ(WGIPS)	-1.01×10^{-7}	0.21
Δ(WGICC)	−0.05	0.38
Δ(WGIRQt)	−0.06	0.68

***—statistical significance at the level of 10%; Prob.—level of significance; Δ (..) is the difference between the values of the selected parameters in the t and t−1 years; ECMt_1 is an indicator in the VEC model, the value of which indicates the presence/absence of relationships (if less than 0, then there are links) between the indicators in the long run.

Considering the findings in Tables 6 and 7, the following conclusions could be made:

1. The energy efficiency gaps depended on the green investment in the energy sector, political stability, and public perception of corruption, as ECMt_1 was less than 0, and the statistical significance was 10%.

2. The green investment in the energy sector depended on the energy efficiency gaps, political stability, and public perception of corruption, as ECMt_1 was higher than 0 and the statistical significance (Prob.) was higher than 10%.
3. The government political stability did not depend on energy efficiency gaps, public perception of corruption, as ECMt_1 was less than 0, and the statistical significance (Prob.) was more than 10%.
4. The public perceptions of corruption did not depend on energy efficiency gaps and political stability, as ECMt_1 was less than 0, and the statistical significance (Prob.) was more than 10%.

4. Discussion

In the framework of transitioning to a carbon-free economy, the core requirements of the energy efficiency decline are to boost reforms, implement long-term paradigms of extending sustainable development. In Ukraine, the most of legislative base was formed according to the principles of the "rent paradigm", where the traditional resources were the core driver of economic growth. It should be noted that Ukraine has already taken the powerful steps to change the old paradigm. Thus, Ukraine developed the "Concepts of Sustainable Development of Ukraine until 2030", "The Energy Strategy of Ukraine for the Period up to 2035", "The National Action Plan for Renewable Energy until 2030", "Concepts for Implementing the State Policy in the Field of Climate Change until 2030", etc. Moreover, in January 2020, the "Concepts of "Green" Energy Transition of Ukraine until 2050" were accepted. The efficiency of the abovementioned regulations depends on the quality of the institutional environment, which relates to political restrictions, minimisation of bureaucracy, democratic structure, prevention of corruption, constitutional features, transparency in decision-making, etc. The government has a core role in developing the energy system and strategy. Therefore, the attraction of direct foreign investment in the country and energy sector requires coordination and coopetition of all stakeholders of the energy market, developing an energy infrastructure. At the same time, the high level of crime and corruption in the government energy policy limits implementation of the effective mechanism to minimise the uncontrolled flows of energy and energy resources, which contributed to increasing energy efficiency gaps. Thus, the findings obtained in this paper were similar to those in [63–66]. Moreover, the same conclusion as in this research was made by the scientists in [67], using examples of EU countries and countries that are potential candidates for EU membership. The authors highlighted that the anti-corruption policy was an essential driver of the economic growth, stimulating the extension of renewable energy and reducing greenhouse gas emissions in Ukraine. Moreover, the fight against corruption also allowed identifying the transparent support systems for cleaner and renewable energy sources, which guarantees the reduction of greenhouse gas emissions. Another aspect that can impact on the energy efficiency gap through the institutional quality is the macroeconomic environment in which investment decisions are taken. In fact, in [68], the scholars highlighted that the level of riskiness and uncertainly of the investment can influence the performance of energy efficiency investment, which could affect the energy efficiency gap. This riskiness in the investment relates to the macroeconomic indicators which depend even on institutional quality. In this case, for further research, it would be useful to consider the macroeconomic environment in which investment decisions are taken, to better appraise its level of riskiness and uncertainly.

5. Conclusions

One of the core requirements of the practical policy for reducing the energy efficiency gaps should be to provide political stability and active anti-corruption policy. The findings of the Johansen test proved the cointegration between the institution quality, green investments in energy, and energy efficiency gaps. Thus, in order to reduce energy efficiency gaps in Ukraine by 1% next year, it is necessary to increase green energy investments by 1.5% this year, and the political stability and public perception of corruption by 3%

and 1%. It means that the government should provide proactive measures to recover the political stability in the country and implement the transparency mechanisms of financial reporting in the energy sector. Moreover, it is necessary to develop the national reporting system on green investment, noticing that it allowed increasing the green investors' trust to Ukraine and attracting additional financial resources to green technologies from the worldwide organisation.

The findings of VEC modelling showed that in case of significant endogenous or exogenous shocks, which would destabilize the long-term equilibrium in the Ukrainian energy sector, there was a weak rate of its return to equilibrium on its own, without the radical regulatory interventions by the government. The relevant indicator in the VEC model was 0.612, with a reference value of 0. The increase of the public perception of corruption by 1.47 points and of political stability by 2.38 points leads to maximising the recovery speed of the Ukrainian energy sector. Thus, the government should implement the complex of the coordinated and synchrony mechanisms on increasing efficiency of the energy policy.

The increase of institutional quality led to increasing green investment in the energy sector. Therefore, the mutual influence of institutional and investment determinants creates additional synergetic effects that cumulatively accelerate the dynamics of minimising energy efficiency gaps. Moreover, the government should annually indicate the targets for energy reforms with the purpose to achieve the stable development of the energy sector considering the EU requirements. Reports of reforms' implementation could increase transparency, and consequently, reduce corruption in the energy sector.

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