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ELECTRICITY TARIFF DYNAMICS AND THE ECONOMIC DETERMINANTS OF REGIONAL ENERGY COOPERATION

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Abstract

This paper examines the dynamics of electricity tariffs and the economic determinants of regional energy cooperation, with a particular focus on post-Soviet countries and the South Caucasus during the period 2022–2025. The analysis is based on a combined dataset drawn from international sources, including the International Energy Agency (IEA), the World Bank, and global electricity price databases. The methodological framework integrates comparative statistical analysis, time-series evaluation, group-based comparisons, and cross-sectional econometric modeling. Electricity tariff dynamics are analyzed using index-based and relative change indicators, while structural differences in access are assessed through the Electricity

Access Index (EAI), which incorporates overall, urban, and rural electrification rates. To identify the key determinants of electricity access, a multivariate regression model is applied.

The results indicate the emergence of distinct tariff subregions within the post-Soviet space: high-price zones (Baltic countries), medium-price zones (South Caucasus), and low-price zones (Central Asia). Empirical findings reveal that rural electrification is the primary determinant of electricity access, whereas GDP per capita and tariff levels do not exhibit statistically significant effects. Armenia maintains a relatively stable but comparatively high tariff position in the region, largely due to a regulated pricing system and a diversified energy mix. The findings suggest that electricity tariff dynamics are shaped by the combined influence of resource endowment, market structure, regulatory frameworks, and regional integration processes. The paper highlights the importance of targeted tariff policies, infrastructure investments, and cross-border energy cooperation in ensuring energy affordability, efficiency, and long-term energy security.

Keywords: electricity tariffs, energy cooperation, electricity access, post-Soviet countries, South Caucasus, energy economics.

Introduction

Electricity is a fundamental input in modern economies, underpinning production processes, technological progress, and household welfare. As a non-storable good with network characteristics, electricity markets exhibit distinctive structural features, including natural monopoly segments, high fixed costs, and significant regulatory oversight. These characteristics imply that electricity pricing is not solely determined by market forces but emerges from the interaction between resource endowments, market structures, and regulatory regimes.

The cross-country variation in electricity tariffs reflects deep structural heterogeneity. Differences in generation technologies, fuel mix composition, infrastructure quality, and institutional capacity lead to substantial disparities in cost structures and pricing outcomes. Countries endowed with abundant hydropower or fossil fuel resources often exhibit lower marginal costs, whereas economies reliant on imported energy or capital-intensive technologies tend to face higher tariff levels. At the same time, technological progress—particularly the diffusion of renewable energy—has introduced new dynamics into electricity markets by altering cost structures, intermittency patterns, and investment requirements.

From a theoretical perspective, electricity tariff formation can be understood within the framework of regulated market structures. Traditional public utility theory emphasizes cost-of-service regulation and price-setting mechanisms aimed at ensuring cost recovery and system reliability. In contrast, modern regulatory approaches—such as incentive-based regulation and liberalized market designs—seek to enhance efficiency while maintaining affordability and security of supply.

In recent decades, global energy systems have undergone significant transformation driven by decarbonization policies, the expansion of renewable energy sources, and increasing demand pressures. These changes have heightened the complexity of electricity markets, amplifying price volatility and reinforcing the importance of regulatory frameworks in stabilizing tariff dynamics. In this context, regional energy integration has emerged as a critical mechanism for improving efficiency, reducing costs, and enhancing energy security through cross-border electricity trade and infrastructure interconnections.

The post-Soviet region and the South Caucasus provide a particularly relevant empirical setting for analyzing these dynamics. These countries share a common legacy of centrally planned energy systems but have followed divergent paths in market liberalization, regulatory reform, and integration into regional and global energy networks. As a result, the region exhibits pronounced variation in tariff structures, access levels, and institutional arrangements.

Against this background, this study investigates the dynamics of electricity tariffs and the structural determinants of regional energy cooperation in post-Soviet countries and the South Caucasus over the period 2022–2025. The primary objective is to analyze tariff dynamics, assess regional heterogeneity, and identify the key economic and structural factors influencing regional energy cooperation.

Electricity price formation in modern energy economics is increasingly conceptualized as a multi-dimensional process shaped by the interaction of market structure, regulatory design, generation mix, cross-border integration, and technological change. Rather than being determined solely by cost factors or competition, electricity tariffs emerge as equilibrium outcomes within regulated market systems [1]. Empirical evidence suggests that electricity market liberalization does not produce uniform pricing outcomes. Knittel and Roberts [5] demonstrate that price behavior in restructured electricity markets is highly sensitive to market concentration and regulatory oversight. Similarly, Bacchiocchi et al. [1] find that liberalization effects vary significantly across European Union countries. A growing body of literature focuses on the impact of renewable energy on electricity prices. Ballester and Furió [2] show that renewable energy expansion affects both price levels and volatility, while Clò et al. [3] confirm the presence of the merit-order effect, whereby renewable energy reduces wholesale electricity prices. Recent studies emphasize the importance of system flexibility and infrastructure development. Gaffney et al. [4] highlight the need for balancing mechanisms and grid investments, while Joskow [6] underscores the critical role of transmission expansion in achieving efficient energy transitions. Another important dimension concerns the relationship between market integration and electricity prices. Klopčič et al. [17] find that increased cross-border electricity flows can contribute to lower consumer prices, although this effect depends on institutional quality and market maturity. Institutional analyses by the International Energy Agency [8–10; 22] and the European Commission [11–12] indicate that electricity prices remain structurally elevated following the 2022 energy crisis, reflecting persistent cost pressures and structural changes in global energy systems. At the regional level, OECD studies [13–14] highlight that electricity tariff dynamics in the South Caucasus are strongly influenced by regulatory frameworks, state participation, and subsidy mechanisms. In Armenia, sectoral stability is closely linked to regulatory efficiency and infrastructure modernization [15].

Methodology

The methodological framework of this study is based on an integrated approach that combines comparative statistical analysis, time-series examination, group-based comparisons, index and relative calculations, as well as cross-sectional econometric estimation. The primary objective of the research is to analyze electricity tariff dynamics, identify regional disparities, assess structural inequalities in electricity access, and examine the economic determinants of regional energy cooperation.

The subject of the study is the temporal variation of final electricity tariffs across countries and country groups, as well as the structural characteristics of electricity access levels. Particular emphasis is placed on post-Soviet countries, the South Caucasus, and neighboring regions, alongside a broader global comparative sample that enables the evaluation of different pricing and access models.

The empirical foundation of the study is constructed through the integration of international and national statistical sources, including data from the World Bank [16], the International Renewable Energy Agency (IRENA) [8].

The dataset includes final electricity tariff indicators across countries for the period 2022–2025, overall electricity access rates, urban and rural electrification levels, GDP per capita data, as well as comparative averages for selected countries and regional groupings.

To ensure cross-country comparability, all tariff indicators are standardized in U.S. dollars per kilowatt-hour (USD/kWh). Electricity access indicators are expressed in percentage terms, while GDP per capita is measured in current U.S. dollars. This standardization enables consistent temporal and cross-sectional analysis.

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Descriptive statistics of the main variables used in the study are presented in Table 1.

Table 1

Descriptive Statistics of the Main Variables Used in the Study

Variable	Mean	Min	Max	Std.Dev
Access (%)	90.5	14	100	19.62
Rural access (%)	85.38	3.4	100	28.64
Price (USD/kWh)	0.167	0.006	0.465	0.109
GDP per capita	23635	357	188055	31772

Table 1 indicates that the average level of electricity access is 90.5%, although significant cross-country variation is observed.

The correlation between the variables is presented in Table 2.

Table 2

Correlation Matrix of the Main Variables Used in the Study

	Access	GDP	Price	Rural
Access	1	0.34	0.19	0.95

GDP	0.34	1	0.55	0.35
Price	0.19	0.55	1	0.2
Rural	0.95	0.35	0.2	1

The strongest relationship is observed between overall and rural electricity access (0.95), confirming the critical role of infrastructure in shaping access outcomes.

Research Design and Analytical Framework

The analysis is conducted in five sequential stages.

In the first stage, the temporal dynamics of electricity tariffs are examined to identify trends of increase, decrease, or relative stability over the period 2022–2025.

In the second stage, a cross-country and regional comparative analysis is performed to determine the formation of high-, medium-, and low-tariff zones across different countries and regional groupings.

In the third stage, structural inequalities in electricity access are assessed through the comparison of overall, urban, and rural electrification indicators.

In the fourth stage, the stages of electrification development and the main patterns of structural disparities in access are evaluated.

In the fifth stage, an econometric estimation is conducted to identify the key economic and structural determinants of overall electricity access.

Time-Series Analysis

To evaluate electricity tariff dynamics, a comparative time-series approach is applied. For each country, electricity tariffs are treated as a time-dependent variable:

$$P_{it} = \alpha_i + \beta_i t + \varepsilon_{it} , \quad (1)$$

where: P_{it} — *electricity tariff in country i at time t*, α_i— country-specific baseline (intercept) level, $\beta_i t$ — coefficient capturing the time trend, ε_{it}— stochastic error term.

The relative change in electricity prices is calculated using the following formula:

$$\Delta P_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \times 100. \quad (2)$$

This indicator allows for the assessment of the percentage change in electricity tariffs relative to the previous period. The cumulative change relative to the base period is measured using an index-based approach:

$$I_{it} = \frac{P_{it}}{P_{i0}} \times 100 , \quad (3)$$

where P_{i0} denotes the electricity tariff in the base period.

Cross-Sectional and Group Comparative Analysis

To assess cross-country differences in electricity tariffs, a relative difference indicator is employed:

$$RD_{ij,t} = \frac{P_{it} - P_{jt}}{P_{jt}} \times 100 , \quad (4)$$

where $RD_{ij,t}$ indicates the extent to which the electricity tariff in country *i* is higher or lower relative to country *j* at time *t*. This approach is particularly useful for assessing Armenia’s tariff position in comparison with neighboring countries and post-Soviet economies.

To identify regional and institutional differences, group averages are also calculated:

$$\bar{P}_{g,t} = \frac{1}{n_g} \sum_{i=1}^{n_g} P_{it} , \quad (5)$$

where $\bar{P}_{g,t}$ denotes the average electricity tariff for group g at time t, and N_g represents the number of countries included in the respective group. This approach is applied to compare the European Union (EU), the Eurasian Economic Union (EAEU), the Commonwealth of Independent States (CIS), the South Caucasus, post-Soviet countries, and the global average.

To assess the degree of group homogeneity, the standard deviation is also employed:

$$\sigma_{g,t} = \sqrt{\frac{1}{n_g} \sum_{i=1}^{n_g} (P_{it} - \bar{P}_{g,t})^2}. \quad (6)$$

Assessment of Structural Inequality in Electricity Access

To evaluate structural differences in electricity access, indicators of overall, urban, and rural electrification are employed. The disparity between urban and rural access is defined as a measure of structural inequality:

$$Gap_i = U_i - R_i , \quad (7)$$

where: Gap_i — the urban–rural electrification gap in country i, U_i — electricity access rate of the urban population, R_i— electricity access rate of the rural population.

This indicator enables the identification of countries where the spatial distribution of energy infrastructure is most uneven.

In addition, a composite electrification index is calculated:

$$EAI_i = 0.5T_i + 0.25U_i + 0.25R_i, \quad (8)$$

where: EAI_i — Electricity Access Index, T_i — overall electricity access rate, U_i — urban electricity access rate, R_i — rural electricity access rate.

This index allows for the classification of countries according to their overall level of electrification development.

Classification of Electrification Development Stages

In this study, countries are classified into three stages based on the level of overall electricity access:

- Stage I — Energy Poverty: when access is below 50%,
- Stage II — Energy Transition: when access ranges between 50% and 95%,
- Stage III — Universal Access: when access exceeds 95%.

This classification enables a comparative assessment of countries' positions along the electrification development spectrum and helps identify those where the primary challenge remains at the initial or intermediate stages of electrification.

Econometric Estimation Approach

To identify the economic and structural determinants of electricity access, a cross-sectional multivariate regression model is employed. The dependent variable is the overall electricity access rate, while the explanatory variables include GDP per capita, electricity tariffs, and rural electricity access.

The econometric model is specified as follows:

$$Access_i = \alpha + \beta_1 GDP_{pci} + \beta_2 Price_i + \beta_3 RuralAccess_i + \varepsilon_i, \quad (9)$$

where: $Access_i$— *overall electricity access in country i*, GDP_{pci} — GDP per capita, $Price_i$— electricity tariff level, $RuralAccess_i$ — electricity access rate of the rural population, ε_i—

stochastic error term.

The purpose of the model is to identify the key factors driving variation in national electrification levels

From a theoretical perspective, it is expected that GDP per capita and rural electricity access exert a positive effect on overall access, while the impact of electricity tariffs may be ambiguous. Specifically, tariffs may reflect either affordability constraints that limit access or, alternatively, more advanced and investment-intensive energy systems characterized by higher cost structures.

To evaluate the economic foundations of regional energy cooperation, a simple price differential indicator is also employed:

$$TI_{ij,t} = P_{j,t} - P_{i,t} \ , \quad (10)$$

where $TI_{ij,t}$ reflects the electricity tariff gap between countries *i* and *j* at time *t*. If this difference is positive, it theoretically creates conditions under which the country with lower electricity tariffs may gain a competitive advantage in electricity exports, the location of energy-intensive production, or mutually beneficial energy cooperation.

At the same time, this indicator is interpreted with caution, as actual cooperation outcomes depend not only on price differentials but also on the availability of cross-border transmission infrastructure, technical capacity constraints, political relations, and the regulatory environment.The results of the econometric model estimation are presented in Table 3.

Table 3

Econometric Estimation Results of the Determinants of Electricity Access

Variable	Coefficient	Std.Error	p-value
GDP per capita	0.0000036	0.000022	0.869
Electricity price	0.309	6.143	0.960
Rural access	0.649***	0.021	0.000
Constant	34.94	1.91	0.000
R-squared	0.902		

Note: *** p<0.01, ** p<0.05, * p<0.10

The results indicate that rural electrification has the most significant effect on electricity access (0.649, $p < 0.01$). At the same time, GDP per capita and electricity tariffs are not statistically significant. The model exhibits strong explanatory power ($R^2 = 0.902$).

Fig. 1 Relationship Between GDP per Capita and Electricity Access

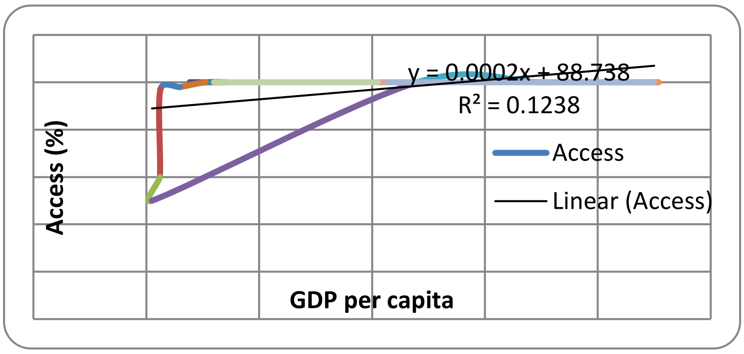


Fig. 1 indicates a weak positive relationship between GDP per capita and electricity access. However, this relationship is not statistically significant, which is consistent with the econometric estimation results.

To ensure the reliability of the model estimation, a series of diagnostic tests were conducted. Multicollinearity was assessed through correlation analysis and the Variance Inflation Factor (VIF). The results indicate that VIF values remain within acceptable thresholds, suggesting the absence of significant collinearity among the explanatory variables.

In addition, heteroskedasticity was tested using the Breusch–Pagan test. The findings suggest that the variance of the residuals does not violate the homoskedasticity assumption. Where necessary, robust standard errors were applied to improve the reliability of the estimates.

To verify the stability of the results, additional estimations were performed using alternative model specifications. In particular, logarithmic transformations of the variables were applied to account for potential non-linear relationships. The results preserve the signs and statistical significance of the main coefficients, indicating the robustness of the estimates.

Furthermore, the model was estimated using different combinations of explanatory variables to test the sensitivity of the results to sample composition and variable structure. The findings show that the main conclusions remain unchanged, confirming the overall validity of the model.

The selected econometric model is grounded in the theoretical frameworks of energy economics and development economics, according to which electricity access is determined by both economic development and structural factors. GDP per capita reflects the population's purchasing power and investment capacity, while rural electrification captures the spatial development of energy infrastructure. Electricity tariffs are included as an indicator of affordability and cost conditions, which may either constrain consumption or reflect the level of system development.

Thus, the model integrates economic, structural, and institutional factors, providing a comprehensive assessment of the determinants of electricity access.

Limitations

The methodology of this study is subject to several limitations. First, electricity tariffs may be reported for different consumer categories across countries, which in some cases limits direct comparability.

Second, tariff structures may include taxes, subsidies, or social adjustments in certain countries, while in others such components are absent or treated differently.

Third, the econometric analysis of electricity access is cross-sectional in nature and primarily captures structural associations rather than strict causal relationships.

Fourth, the assessment of the economic preconditions for regional energy cooperation cannot be reduced solely to price differentials and requires additional technical and institutional data, including transmission capacity, infrastructure connectivity, and regulatory harmonization.

Moreover, the use of cross-sectional data inherently constrains the identification of causal relationships.

To address potential limitations, it should be noted that the model is cross-sectional and may be affected by structural heterogeneity across countries. The relationship between income and electricity access may be non-linear due to saturation effects, while electricity tariffs may reflect both affordability constraints and cost-recovery mechanisms.

Methodological Conclusion

Overall, the methodological framework of this study integrates descriptive statistics, time-series analysis, index and relative calculations, structural assessment of electricity access, and cross-sectional econometric modeling.

Such a combined approach enables not only the characterization of electricity tariff dynamics and regional disparities, but also the identification of the structural factors that shape electrification levels and the economic potential for regional energy cooperation.

Results and Discussion

In recent years, electricity price dynamics have been shaped by both structural transformations in global energy markets and internal changes within national energy systems. Empirical evidence suggests that in a number of advanced economies, price fluctuations are driven by a combination of fuel market volatility, increasing penetration of renewable energy sources, and network constraints.

More specifically, available evidence indicates that increases in wholesale electricity prices are often driven by changes in the generation mix and capacity constraints, while the expansion of renewable energy sources contributes to higher price volatility. These developments reflect a dual dynamic in energy markets: a long-term transition toward decarbonization alongside short-term price instability.

At the same time, the experience of European countries demonstrates that a high-tariff environment can adversely affect industrial competitiveness, particularly in energy-intensive sectors. Comparative data show that in certain economies, electricity prices significantly exceed international averages, thereby constraining production activity and reducing investment attractiveness.

At the global level, electricity demand growth continues to be driven by electrification, industrial expansion, and digitalization processes. In this context, developing economies act as the primary drivers of demand, while in advanced economies electricity price dynamics tend to be more sensitive to policy measures and structural changes in market design.

Meanwhile, external shocks continue to exert a substantial influence on electricity prices. Disruptions in energy supply chains and geopolitical tensions can lead to sharp price increases, especially in regions dependent on imported fuels. This underscores the importance of energy security and diversification as key stabilizing factors.

For instance, in Australia, wholesale electricity prices increased sharply in the fourth quarter of 2024 due to declining coal production and grid constraints [18]. At the same time, solar generation reached record levels, highlighting the growing variability of electricity markets [19].

In the United Kingdom, high electricity prices became a major challenge for businesses in 2023, negatively affecting competitiveness in energy-intensive sectors [20].

Reduced wind power generation in Germany led to increased reliance on fossil fuels and rising electricity prices across Europe in early 2025 [21].

According to the International Energy Agency, global electricity demand is expected to grow at an average annual rate of approximately 3.4% during 2023–2026, driven primarily by emerging economies [22]. In contrast, wholesale electricity prices in the United States declined in 2024 due to increased natural gas availability and renewable energy expansion [23].

Electricity prices are also influenced by global shocks, particularly those affecting hydrocarbon fuel markets. The geopolitical disruptions associated with the Russia–Ukraine conflict in 2022 led to significant increases in electricity prices worldwide, especially in Europe.

According to Cable.co.uk data, electricity prices in 2024 were highest in Bermuda (USD 0.458 per kWh), while Armenia's electricity price remained relatively low at approximately USD 0.112 per kWh [24].

Statista data for March 2024 indicate that electricity prices in European countries such as Italy (USD 0.43 per kWh), Ireland (USD 0.41), and Denmark (USD 0.36) are among the highest globally [25].

According to GlobalPetrolPrices data, the global average electricity price in the fourth quarter of 2024 was approximately USD 0.150 per kWh for households and USD 0.146 for businesses. Europe remains the highest-cost region, while Asia records the lowest average prices [26].

European Commission data show that the average electricity price for households in the EU reached €0.2889 per kWh in the first half of 2024, with the highest prices observed in Germany, Ireland, and Denmark [12].

According to International Energy Agency datasets, electricity price monitoring now covers more than 140 countries and provides detailed insights into pricing structures, including tax components and regional variations [9].

Elevated electricity prices may also slow down the transition to green technologies, as higher energy costs reduce investment incentives in renewable energy systems [19, 20].

Table 4

Electricity Tariffs and Their Dynamics in Former Soviet Union Countries, 2022–2025 (USD/kWh)

Country	**2025**	**2024**	**2023**	**2022**	**2024/2022,%**
Estonia	0.286	0.291	0.319	0.393	74.0
Lithuania	0.271	0.267	0.36	0.502	53.2
Latvia	0.28	0.256	0.295	0.317	80.8
Moldova	0.17	0.138	0.115	0.147	93.9
Armenia	0.111	0.112	0.103	0.104	107.7
Belarus	0.083	0.075	0.092	0.091	82.4
Ukraine	0.08	0.064	0.039	0.039	164.1
Georgia	0.067	0.062	0.076	0.077	80.5
Russia	0.065	0.058	0.064	0.059	98.3
Kazakhstan	0.055	0.05	0.045	0.045	111.1
Azerbaijan	0.047	0.047	0.047	0.047	100.0
Tajikistan	-	0.045	0.049	0.051	88.2
Turkmenistan	-	0.03	0.025	0.024	125.0
Uzbekistan	0.035	0.023	0.026	0.026	88.5
Kyrgyzstan	0.014	0.013	0.01	0.01	130.0

Note: *The table presents the average final electricity tariffs for households in former Soviet Union countries, expressed in USD per kWh. The data are reported for September 2022, March 2023, and March 2024, allowing for an assessment of electricity tariff dynamics across the region. The indicator "2024/2022, %" reflects the relative change in tariffs, calculated as the ratio of March 2024 values to those of September 2022. Data for 2025 are presented based on available statistical sources and estimates. For Tajikistan and Turkmenistan, data for 2025 are not available due to limitations in statistical reporting and data availability in the relevant sources.*
Source: *Compiled by the author based on data from Global Petrol Prices, Cable.co.uk. Electricity prices and pricing in 230 countries. Retrieved from https://www.globalpetrolprices.com/electricity_prices/*
Electricity price and production data were collected from multiple sources, including Global Petrol Prices (Electricity Prices), Cable.co.uk (Electricity Prices in 230 Countries), the International Energy Agency (IEA, Global Electricity Statistics), the International Renewable Energy Agency (IRENA, Electricity and Energy Development in the South Caucasus), the World Bank (Electricity Production and Consumption by Country), the Statistical Committee of the Republic of Armenia (Electricity Production and Energy Statistics of Armenia).

(USD/kWh)

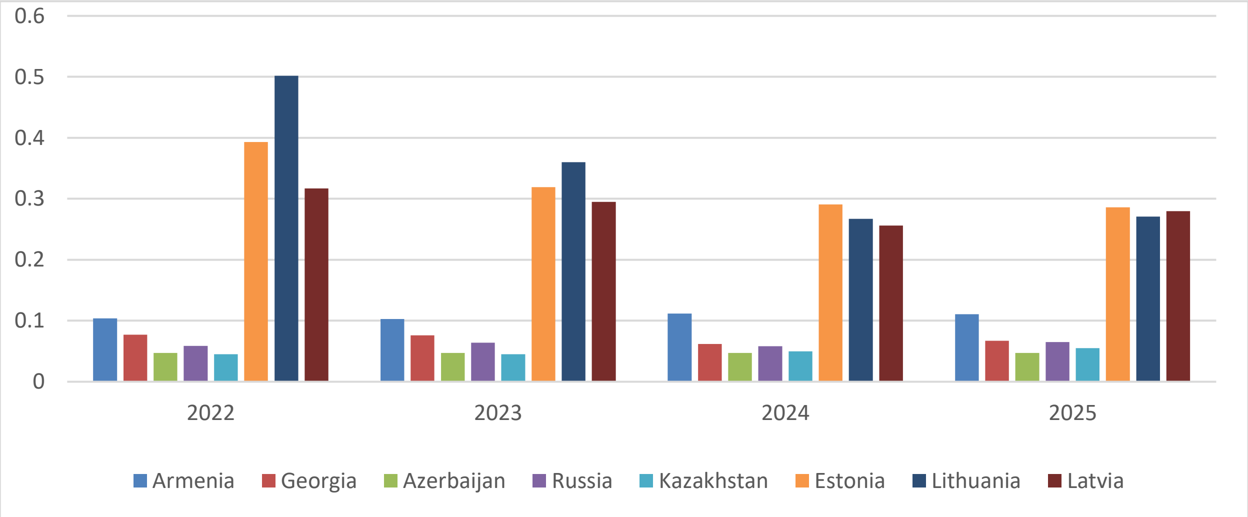


Fig. 2 Comparative Electricity Tariffs in Selected Countries, 2022–2025

The presented data indicate that electricity tariff dynamics in former Soviet Union countries during 2022–2025 have been heterogeneous, reflecting substantial differences in energy development trajectories, regulatory frameworks, and market structures across the region. Although these countries historically operated within a unified economic system, the post-Soviet period has been characterized by divergent institutional transformations in energy sectors, varying subsidy policies, differing degrees of integration into international markets, and unequal resource endowments. These factors have resulted in the emergence of a multi-polar tariff structure.

As a consequence, at least three distinct tariff subregions can be identified within the former Soviet space: the Baltic states, the South Caucasus, and Central Asia, each characterized by its own economic logic of price formation.

First, the highest tariff levels continue to be observed in the Baltic countries—Estonia, Lithuania, and Latvia. Although a decline in tariffs was recorded in 2024 compared to 2022, data for 2025 suggest the emergence of a stabilization phase, without a significant further decrease. Specifically, in 2025 electricity tariffs reached USD 0.286 per kWh in Estonia, USD 0.271 in Lithuania, and USD 0.280 in Latvia. These figures reflect not only a persistently high price environment but also the deep integration of these countries into European energy markets. The elevated price levels in 2022 were largely driven by the European energy crisis, volatility in natural gas markets, and accelerated efforts to reduce energy dependence on Russia. Therefore, the relative stabilization observed in 2024–2025 should not be interpreted as a return to lower, pre-crisis price levels, but rather as the establishment of a new equilibrium at a comparatively higher price range. In other words, in the case of the Baltic states, the evidence points to a «new normal» of elevated electricity prices rather than a full price correction.

In contrast, the South Caucasus exhibits a more moderate and relatively stable tariff environment. Armenia, Georgia, and Azerbaijan are characterized by lower electricity tariffs, although notable differences persist among them. In Armenia, electricity tariffs in 2025 amounted to USD 0.111 per kWh, showing minimal deviation from both 2024 and 2022 levels. This indicates a relatively stable tariff policy throughout the observed period, with only limited fluctuations. Such stability can be attributed to the country’s diversified energy mix—combining nuclear, thermal, and hydropower sources—as well as the continued presence of a regulated tariff-setting system.

In Georgia, electricity tariffs reached USD 0.067 per kWh in 2025, reflecting a moderate increase compared to 2024 while remaining at a relatively low level. This may be explained by the country’s substantial hydropower potential, alongside emerging cost pressures within the domestic energy system.

In Azerbaijan, by contrast, tariffs remained effectively unchanged over the period 2022–2025 at approximately USD 0.047 per kWh. This stability reflects a state-controlled tariff regime, supported by abundant oil and gas resources, which allows the country to maintain low electricity prices with relatively limited exposure to international price fluctuations.

In Central Asian countries, the lowest tariff zone continues to prevail, primarily driven by two key factors: the relative abundance of natural resources and tariff policies that are heavily subsidized for social and political purposes. This group is particularly represented by Kyrgyzstan, Uzbekistan, Tajikistan, and Turkmenistan, where electricity tariffs remain significantly lower not only compared to the Baltic states but also to the South Caucasus.

However, these low tariff levels do not necessarily imply efficiency or market equilibrium. On the contrary, they often reflect underlying structural issues such as cross-subsidization, state financial support, underinvestment, and infrastructure depreciation risks.

In Kazakhstan, electricity tariffs reached USD 0.055 per kWh in 2025, continuing the upward trend observed since 2024. In Kyrgyzstan, tariffs stood at USD 0.014 per kWh, also maintaining a gradual upward trajectory. Uzbekistan similarly recorded an increase in 2025, with tariffs rising from USD 0.023 to USD 0.035 per kWh. These developments suggest that even traditionally low-tariff systems are subject to gradual adjustments over time, driven by rising production, distribution, and investment costs, as well as the progressive rationalization of subsidies.

At the same time, the absence of 2025 data for Tajikistan and Turkmenistan limits a comprehensive assessment of their recent dynamics. Nevertheless, available data for 2022–2024 indicate that these countries have also maintained relatively low tariff positions.

The cases of Moldova and Ukraine are particularly illustrative of high energy vulnerability and the impact of external shocks.

In Moldova, electricity tariffs reached USD 0.170 per kWh in 2025, exceeding not only those of most South Caucasus and Central Asian countries but also showing a significant increase compared to 2024 levels. This can be explained by high dependence on energy imports, constraints related to energy security, and structural fragility of the domestic energy system.

In Ukraine, the situation is even more complex. Electricity tariffs increased to USD 0.080 per kWh in 2025, compared to USD 0.064 in 2024 and only USD 0.039 in 2022. Although the absolute level remains moderate relative to some countries, the magnitude of the increase reflects deep systemic disruptions.

Under conditions of ongoing conflict, damage to energy infrastructure, loss of generation capacity, disruptions in supply chains, and additional reconstruction costs have necessitated continuous tariff adjustments. The Ukrainian case highlights an important analytical distinction: low absolute tariff levels do not necessarily imply system stability, and relative dynamics may provide a more accurate reflection of structural stress.

Russia and Belarus represent relatively stable electricity pricing systems, albeit based on different economic logics.

In Russia, electricity tariffs reached USD 0.065 per kWh in 2025, showing a modest increase compared to 2024 while remaining within a relatively low and controlled range. This largely reflects the availability of abundant domestic energy resources and relatively low-cost generation.

In Belarus, tariffs increased to USD 0.083 per kWh in 2025, reversing the decline observed in 2024 and indicating a moderate upward adjustment.

Both cases illustrate that domestic resource availability, centralized state control, and direct or indirect tariff regulation continue to mitigate the impact of global energy market fluctuations on domestic price formation. However, even in these systems, the data for 2025 suggest the emergence of gradual price adjustments.

Synthesis and Policy Implications

The inclusion of 2025 data provides an additional opportunity to assess not only post-crisis recovery but also the direction of emerging tariff trends. While the Baltic countries exhibit relative stabilization in 2025, with only minor fluctuations, a clearer upward trajectory is observed in several other countries. In particular, Moldova, Belarus, Ukraine, Georgia, Russia, Kazakhstan, Uzbekistan, and Kyrgyzstan recorded higher tariff levels in 2025 compared to 2024. This suggests that following the initial shock phase of 2022, the region has entered a second stage of tariff adjustment. In this phase, price dynamics are driven less by direct crisis-related effects and more by underlying structural factors, including rising production and distribution costs, investment requirements, exchange rate fluctuations, and regulatory adjustments. In this context, 2025 can be interpreted as a transitional period, marking the shift from crisis-driven adaptation toward a new structural price equilibrium.

At the same time, the 2025 data indicate that tariff convergence across the post-Soviet space is not occurring. On the contrary, in some subregions, disparities are either persisting or even widening, reflecting divergent development paths and institutional configurations.

One of the key findings of the analysis is that electricity tariffs in the former Soviet Union cannot be explained solely by resource endowments. While the availability of energy resources constitutes an important precondition, tariff outcomes are equally shaped by institutional arrangements, public policy priorities, subsidy mechanisms, social protection systems, the degree of external integration, and the scale of infrastructure investment needs.

Thus, even countries with similar resource bases may exhibit significantly different tariff levels depending on governance quality and regulatory models. The 2025 data further emphasize that, in the long run, the financial capacity to modernize energy systems becomes as important as resource availability itself.

From a policy perspective, the findings highlight the need for countries in the region to balance three key objectives: social affordability, the financial viability of energy companies, and the long-term modernization of infrastructure.

Excessively low tariffs may ensure short-term social acceptability but often constrain investment capacity and exacerbate infrastructure degradation over time. Conversely, rapid and substantial tariff increases may intensify energy poverty and social inequality, particularly among low-income households.

Therefore, effective tariff policy should not rely solely on market signals but must also incorporate targeted social protection, efficient subsidy design, and mechanisms to promote energy efficiency. The observed trends in 2025 suggest that many countries are currently engaged in adjusting this balance, which has become a central driver of tariff reforms.

Table 5

Comparative Electricity Tariff Levels in the South Caucasus and Neighboring Countries, 2022–2025

Country	**2025**	**2024**	**2023**	**2022**	**2025/2022,%**
Armenia	0.111	0.112	0.103	0.104	106.7
Georgia	0.067	0.062	0.076	0.077	87.0
Russia	0.065	0.058	0.064	0.059	110.2
Turkey	0.067	0.048	0.077	0.073	91.8
Azerbaijan	0.047	0.047	0.047	0.047	100.0
Iran	0.003	0.002	0.005	0.002	150.0

Source: *Compiled by the author based on data from Global Petrol Prices, Cable.co.uk, Electricity prices and pricing in 230 countries. Retrieved from https://www.globalpetrolprices.com/electricity_prices/*

Electricity price and production data were collected from multiple sources, including Global Petrol Prices (Electricity Prices), Cable.co.uk (Electricity Prices in 230 Countries), the International Energy Agency (IEA, Global Electricity Statistics), the International Renewable Energy Agency (IRENA, Electricity and Energy Development in the South Caucasus), the World Bank (Electricity Production and Consumption by Country), the Statistical Committee of the Republic of Armenia (Electricity Production and Energy Statistics of Armenia).

In conclusion, the comparative analysis of electricity tariffs in former Soviet Union countries over the period 2022–2025 reveals pronounced regional differentiation and confirms that the post-Soviet energy space no longer functions as a unified tariff zone. The Baltic countries represent a Europeanized, high-price, and integrated model; the South Caucasus constitutes an intermediate zone characterized by relative stability and mixed energy structures; while Central Asia reflects a low-tariff system often sustained by subsidies.

The incorporation of 2025 data further demonstrates that a new phase of tariff adjustment is underway in several countries, driven not only by the aftermath of external shocks but also by the accumulation of internal structural challenges.

This differentiation provides an important methodological foundation for future research, particularly when electricity tariffs are considered not merely as price indicators, but as broader measures of economic security, social accessibility, and the effectiveness of energy policy.

Comparative Analysis of Electricity Tariffs in the South Caucasus and Neighboring Countries

The analysis of the presented data indicates that electricity tariff levels in the South Caucasus and neighboring countries during 2022–2025 have been shaped by diverse economic and institutional conditions, reflecting the structural characteristics of regional energy markets. Although these countries are located within the same geographical region and, in some cases, share interconnected energy systems, their tariff policies and pricing mechanisms differ substantially due to variations in resource endowments, regulatory frameworks, and energy system organization.

The data show that among the countries considered, the highest electricity tariffs are observed in Armenia. In 2025, the tariff reached USD 0.111 per kWh, remaining virtually unchanged from 2024 (USD 0.112) and recording a modest increase compared to 2022 (106.7%). This indicates that electricity tariffs in Armenia have remained relatively stable over the analyzed period. Such stability can be attributed to the structure of the country's energy system, which combines nuclear, thermal, and hydropower generation, as well as to the presence of regulated tariff-setting mechanisms aimed at maintaining social stability.

In Georgia, electricity tariffs exhibit a declining trend over the period under consideration. While tariffs stood at USD 0.077 per kWh in 2022, they decreased to USD 0.067 per kWh by 2025 (87.0%). This development may be associated with the active utilization of the country's hydropower potential and the significant share of renewable energy sources in its generation mix, which in some cases allows for maintaining relatively competitive tariff levels.

In Russia, electricity tariffs remain relatively low but show a moderate upward trend. In 2025, tariffs reached USD 0.065 per kWh, exceeding the 2022 level (110.2%). This increase may reflect gradual growth in production and distribution costs, as well as the need for infrastructure modernization. At the same time, the country's abundant energy resources and extensive generation capacity continue to support one of the lower tariff environments in the region.

In Turkey, electricity tariffs display a more volatile dynamic. Tariffs increased to USD 0.077 per kWh in 2023, then declined to USD 0.048 per kWh in 2024, before rising again to

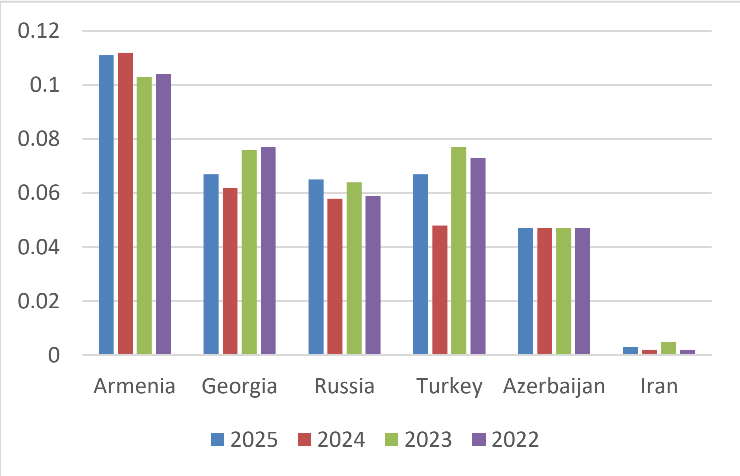
USD 0.067 per kWh in 2025. Overall, the 2025 level remains slightly below that of 2022 (91.8%). Such fluctuations are largely driven by the structure of the energy market, dependence on imported energy resources, exchange rate volatility, and regulatory policies.

In Azerbaijan, electricity tariffs remained unchanged throughout the entire period at approximately USD 0.047 per kWh. This stability reflects a highly controlled energy pricing system, largely supported by abundant oil and gas resources and state subsidies. The availability of domestic energy resources allows the country to maintain relatively low and stable tariffs while minimizing exposure to fluctuations in international energy markets.

In Iran, electricity tariffs are the lowest among the countries considered. In 2025, the tariff amounted to only USD 0.003 per kWh, which, despite representing a significant increase compared to 2022 (150.0%), remains exceptionally low by international standards.

This situation is largely driven by extensive state subsidies and the country's abundant energy resources. However, such extremely low tariff levels may generate efficiency-related challenges, including excessive energy consumption and constraints on investment in the energy sector.

Fig. 3 Comparative Average Electricity Prices Across Country Groups (USD/kWh), 2022–2025



Electricity tariff formation in the region depends on a set of interrelated factors, including the availability of domestic energy resources, government regulatory policies, market structure, and the level of technological development of energy systems.

Table 6

Comparative Levels and Dynamics of Electricity Tariffs Across Country Groups, 2022–2025 (USD/kWh)

Country Groupings	Electricity Price (USD/kWh), 2025	Electricity Price (USD/kWh), 2024	Electricity Price (USD/kWh), 2023	Electricity Price (USD/kWh), 2022	2025/2022,%
Top (15)	0.021	0.012	0.019	0.017	123.5
Armenia and Neighboring Countries (5)	0.059	0.054	0.062	0.061	96.7
EAEU (5)	0.066	0.062	0.063	0.062	106.5
CIS (9)	0.073	0.065	0.063	0.066	110.6
World (All Countries)	0.159	0.157	0.152	0.163	97.5
Central and Southern Europe (11)	0.231	0.233	0.263	0.295	78.3
OECD Average (34)	0.243	0.242	0.257	0.298	81.5
EU (27)	0.27	0.267	0.296	0.353	76.5
Worst (15)	0.384	0.389	0.383	0.421	91.2

Note: *The table presents the average final electricity tariffs for different country groups, expressed in USD per kWh. The data are reported for September 2022, March 2023, March 2024, and March 2025, allowing for an assessment of temporal trends in electricity prices across various regional and institutional groupings.The indicator "2025/2022, %" reflects the relative change in tariffs, calculated as the ratio of 2025 values to those of 2022. The groups "Best (15)" and "Worst (15)" represent the average tariff levels of countries with the lowest and highest electricity prices, respectively, within the sample. The "OECD average" is calculated based on the mean value of OECD member countries included in the dataset (34 countries). The groups "EU (27)" and "Central and Southern Europe (11)" reflect the average levels for the respective regional economic groupings. The "World" row represents the average value across all countries included in the dataset.*
Source: Authors' calculations based on international electricity price databases (Global Electricity Price Database, World Bank energy statistics, and other international statistical sources).

A comparative analysis of the South Caucasus and neighboring countries indicates that in resource-rich or heavily subsidized economies, electricity tariffs are typically maintained at lower levels, whereas in countries dependent on energy imports or characterized by more diversified energy systems, tariffs tend to be relatively higher. This distinction is particularly important for the design of regional energy cooperation and energy security policies, as electricity tariffs serve not only as indicators of economic efficiency, but also as key measures of social affordability and energy system resilience.

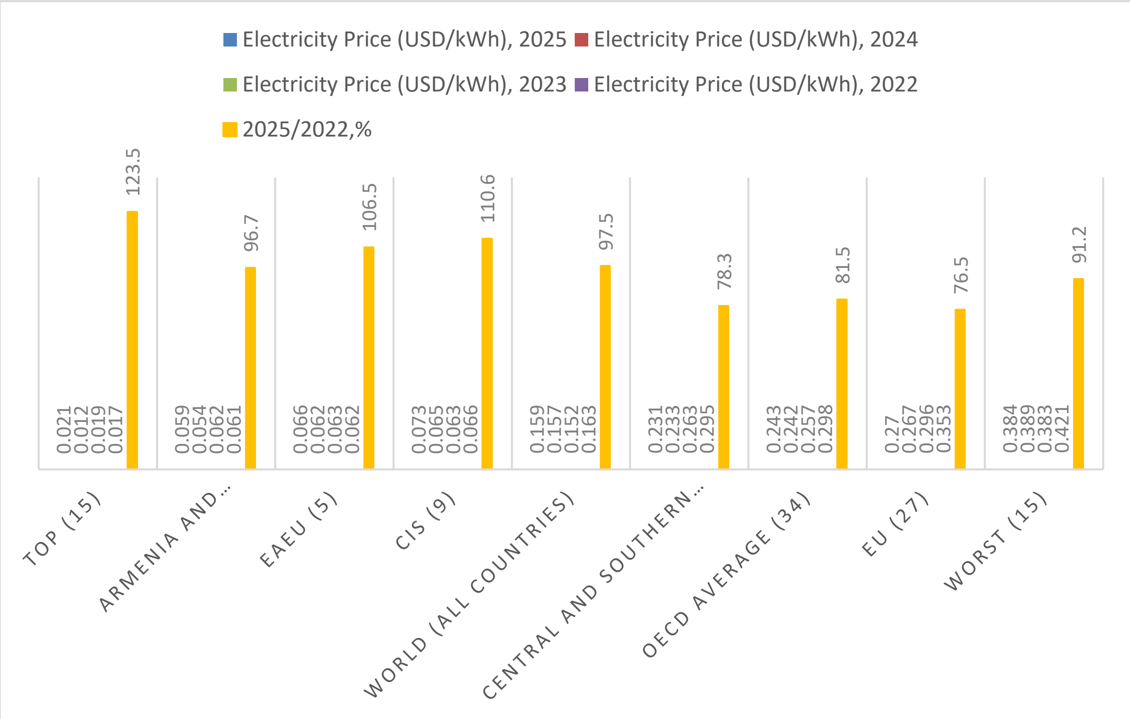


Fig. 4 Comparative Average Electricity Prices Across Country Groups (USD/kWh), 2022–2025

The analysis of the data presented in Table 6 (Fig. 4) indicates that electricity tariff levels across different country groups during 2022–2025 have been shaped by distinct economic and institutional conditions. The observed dynamics reflect both global energy market transformations and the structural characteristics of regional energy systems. At the same time, significant tariff disparities persist across country groups, driven by differences in resource availability, regulatory frameworks, market organization, and the level of energy infrastructure development.

The data show that the lowest tariff levels are observed in the “Top (15)” group, where the average electricity price reached USD 0.021 per kWh in 2025. Despite remaining relatively low, this value significantly exceeds the 2022 level (123.5%), indicating the presence of inflationary pressures even in the lowest-cost countries. These increases may be attributed to rising production costs, volatility in global energy markets, and growing infrastructure investment requirements.

In the group of South Caucasus and neighboring countries, tariff levels remain at a moderate range. The average electricity price in the “Armenia and Neighboring Countries (5)” group reached USD 0.059 per kWh in 2025, slightly below the 2022 level (96.7%). This suggests relatively stable tariff dynamics, likely supported by regulatory mechanisms and the region’s partial access to domestic energy resources.

In the Eurasian Economic Union (EAEU), electricity tariffs also remain relatively low, although a moderate increase is observed. In 2025, the average tariff reached USD 0.066 per kWh, exceeding the 2022 level (106.5%). This trend may reflect infrastructure modernization needs, rising production and distribution costs, and gradual adjustments in subsidy policies. A similar pattern is observed in the Commonwealth of Independent States (CIS), where the average tariff reached USD 0.073 per kWh in 2025 (110.6% relative to 2022).

At the global level, electricity prices remained relatively stable over the period. In 2025, the global average stood at USD 0.159 per kWh, closely aligned with the 2022 level (97.5%). This suggests that, following the 2022 energy crisis, global energy markets have undergone partial rebalancing and price stabilization. However, significant regional differences persist, reflecting structural variations in energy systems and market organization.

Higher tariff levels are observed in European country groups. In Central and Southern Europe, the average electricity price reached USD 0.231 per kWh in 2025, while in the European Union (EU) it rose to USD 0.270 per kWh. Despite these high levels, a declining trend is observed compared to 2022 (78.3% and 76.5%, respectively), reflecting the impact of policy interventions and market adjustments implemented after the energy crisis.

In OECD countries, the average electricity price reached USD 0.243 per kWh in 2025, also significantly lower than in 2022 (81.5%). This indicates that developed economies have been able to partially mitigate the effects of the energy crisis through effective energy policies and regulatory mechanisms.

At the opposite end, the “Worst (15)” group continues to exhibit the highest electricity tariffs, with an average of USD 0.384 per kWh in 2025. Although slightly lower than in 2022 (91.2%), these high price levels are typically associated with dependence on imported energy resources, limited generation capacity, and structural inefficiencies in market design.

Overall, the comparative analysis demonstrates that electricity tariff formation across country groups is determined by a complex interplay of factors, including resource endowments, regulatory policies, infrastructure development, and the degree of market integration. While some degree of price stabilization has occurred following the global energy shock of 2022, tariff disparities across regions remain pronounced.

These findings are particularly relevant for the assessment of regional energy cooperation, energy security, and the effectiveness of energy policy, as electricity tariffs serve not only as indicators of economic efficiency but also as key measures of social affordability and systemic resilience.

Structural Inequality in Electricity Access and Empirical Assessment

A comparative analysis of electricity tariffs cannot be considered complete without examining the structural dimension of access, as relatively low tariff levels do not necessarily imply universal energy inclusion. In this context, electricity access serves not only as an indicator of social welfare, but also as a key measure of infrastructure development, spatial equity, and economic capacity. Therefore, a joint analysis of tariffs and access provides a more comprehensive understanding of the development levels of global and regional energy systems.

Quantitative analysis of global data shows that the average level of overall electricity access across the observed countries is approximately 87%, while access for the urban population exceeds 94%, and for the rural population stands at around 82%. This gap suggests that, at the current stage of energy development, the main challenge is no longer the absence of electrification at the national level, but rather its uneven spatial distribution. In many countries, electricity access in urban centers is nearly universal, whereas rural areas remain relatively underserved.

The estimation of the urban–rural electricity access gap indicates that in a significant number of countries this disparity is small or negligible; however, in others it remains substantial. The largest urban–rural gaps are observed primarily in Africa and in certain low-income economies, where energy infrastructure development is concentrated in urban areas. This implies that the next phase of global electrification will be determined less by the expansion of urban networks and more by the systematic electrification of rural regions.

To deepen the structural analysis, a correlation assessment was conducted. The results indicate that overall electricity access is most strongly associated with rural access levels. The high positive correlation suggests that the primary driver of improvements in national electrification rates is the expansion of rural electrification. At the same time, urban access in many countries is already close to saturation, limiting its marginal contribution to further increases in overall access.

This finding leads to an important policy implication: one of the key priorities of global energy policy should be the expansion of rural energy inclusion.

Based on electricity access levels, three stages of energy development can be distinguished. The first stage corresponds to energy poverty, where a significant share of the population lacks access to electricity. The second stage represents the energy transition phase, characterized by increasing overall access alongside persistent spatial and social inequalities. The third stage corresponds to universal electrification, where nearly the entire population is connected to electricity networks.

This classification shows that most countries in Europe, North America, and East Asia have already reached the stage of universal access, while several countries in Africa and South Asia remain in the first or second stages of electrification.

To identify the economic foundations of cross-country differences in electricity access, an econometric estimation was conducted in which the dependent variable is the overall level of electricity access, while the explanatory variables include GDP per capita, electricity tariffs, and rural electricity access.

The estimation results indicate that among the examined factors, rural electrification exerts the strongest effect. The findings show that a one percentage point increase in rural access is associated with approximately a 0.65 percentage point increase in overall electricity access. This confirms that the primary constraint on global electrification remains the uneven development of rural energy infrastructure.

At the same time, The econometric results indicate a positive but statistically insignificant relationship between GDP per capita and electricity access, suggesting that while higher income levels may facilitate infrastructure development, they do not constitute a primary determinant of access in the cross-country context. This finding suggests that countries with higher levels of economic development possess greater capacity to finance the construction, modernization, and spatial expansion of electricity infrastructure. In other words, higher income levels increase not only household purchasing power but also the ability of both the public and private sectors to support universal electrification.

The coefficient on electricity tariffs is also positive. Although at first glance the positive association between higher tariffs and higher access levels may appear counterintuitive, in a cross-country context it reflects a different economic logic. Countries with higher tariff levels are often characterized by more developed infrastructure, higher income levels, greater cost recovery, and more mature energy markets. Therefore, this result should not be interpreted as evidence of the social desirability of higher prices, but rather as an indication that more advanced and investment-intensive energy systems tend to exhibit both higher access levels and, in many cases, higher final tariffs.

Overall, the econometric findings reinforce the conclusion that rural electrification is the key determinant of electricity access.

The empirical results complement the comparative tariff analysis and demonstrate that international differences in the electricity sector should be evaluated across at least three interrelated dimensions: price, access, and spatial equity. While tariff analysis reveals competitive and institutional differences across countries and regions, the access-based and econometric analysis identifies the structural factors that determine the inclusiveness of energy systems.

From this perspective, effective electricity policy should simultaneously address tariff stability, infrastructure modernization, and—most importantly—the expansion of energy access in rural areas.

The findings indicate that in developing countries, the primary constraint on electricity access is not tariff levels per se, but rather the spatial availability of energy infrastructure. In particular, rural electrification emerges as the central driver of overall access.

Accordingly, energy policy should prioritize the expansion of rural electrification as the main pathway toward achieving universal electricity access. At the same time, tariff policy should be designed in conjunction with social protection mechanisms and infrastructure investments, ensuring both affordability for consumers and the financial sustainability of the energy system.

Conclusion

The results of this study demonstrate that electricity tariff dynamics and access levels are shaped by a complex interplay of multiple factors, where both economic development and the structural and institutional characteristics of energy systems play a crucial role. The comparative analysis for the period 2022–2025 reveals the emergence of distinct tariff subregions within the post-Soviet space, reflecting differences in resource endowments, regulatory models, and levels of market development.

The empirical findings confirm that rural electrification exerts the most significant positive influence on electricity access, while GDP per capita shows a positive but statistically insignificant association in the estimated model. At the same time, the impact of tariff levels is not uniform and depends on country-specific institutional and market conditions. This suggests that identical tariff policies may produce different socio-economic outcomes across countries.

The regional analysis indicates that the South Caucasus is characterized by a relatively stable tariff environment, albeit with notable internal differences. Armenia maintains a comparatively high but stable tariff position, largely driven by a regulated system and a diversified energy mix. In contrast, the low tariff levels observed in Central Asian countries are often associated with subsidy-based policies, which may constrain long-term investment capacity and hinder infrastructure modernization.

Overall, the study confirms that electricity tariffs should be interpreted not merely as price indicators, but as composite measures of economic efficiency, social affordability, and energy security. The limitations of the study—particularly those related to data comparability and the cross-sectional nature of the model—highlight the need for future research based on dynamic and panel data approaches.

The findings of the study allow for the formulation of several policy recommendations.

First, it is essential to develop a balanced tariff policy that simultaneously ensures social affordability and the financial sustainability of energy companies. Excessively low tariffs may restrict investment flows and delay infrastructure modernization, while sharp tariff increases may exacerbate energy poverty.

Second, targeted subsidy mechanisms should be implemented to support vulnerable groups, replacing broad and untargeted subsidies that may distort market efficiency.

Third, investment in energy infrastructure should be strengthened, particularly in rural and remote areas where electrification levels remain limited. Expanding rural electrification can significantly improve overall access and contribute to economic development.

Fourth, regional energy cooperation should be enhanced, including the expansion of cross-border transmission networks and the deepening of electricity trade. While tariff differentials may create opportunities for mutually beneficial cooperation, their realization requires coordinated institutional and technical policies.

Fifth, the development of renewable energy and the diversification of energy systems should be promoted in order to reduce vulnerability to external shocks and ensure long-term price stability.

In conclusion, effective energy policy must integrate market mechanisms, social protection, and regional integration in order to ensure the development of sustainable, affordable, and competitive energy systems.

References

1. Bacchiocchi, E., Florio, M., & Taveggia, G. (2015). The impact of electricity market reforms in Europe. *Utilities Policy*, *35*, 72–90. https://doi.org/10.1016/j.jup.2015.07.002
2. Ballester, C., & Furió, D. (2015). Effects of renewable energy on electricity prices. *Energy Policy*, *77*, 79–88. https://doi.org/10.1016/j.enpol.2014.11.038
3. Clò, S., Cataldi, A., & Zoppoli, P. (2015). Renewable generation and price effects in electricity markets. *Energy Policy*, *77*, 79–88.
4. Gaffney, K., et al. (2022). Grid flexibility and the energy transition. *Energy Economics*, *102*. https://doi.org/10.1016/j.eneco.2021.105120
5. Knittel, C. R., & Roberts, M. R. (2005). An empirical examination of restructured electricity prices. *Energy Economics*, *27*(5), 791–817. https://doi.org/10.1016/j.eneco.2004.11.005
6. Joskow, P. L. (2011). Comparing the costs of intermittent and dispatchable electricity generation technologies. *American Economic Review*, *101*(3), 238–241. https://doi.org/10.1257/aer.101.3.238
7. International Renewable Energy Agency. (2025). *Renewable energy statistics*. https://www.irena.org
8. International Energy Agency. (2024). *Electricity market report*. https://www.iea.org
9. International Energy Agency. (2025). *Electricity 2025*. https://www.iea.org/reports/electricity-2025
10. International Energy Agency. (2025). *Global energy data and policy analysis*. https://www.iea.org
11. European Commission. (2024). *Electricity price statistics*. https://ec.europa.eu/eurostat
12. European Commission. (2025). *Energy prices and costs in Europe*. https://ec.europa.eu

13. Organisation for Economic Co-operation and Development. (2023). *Energy pricing and competitiveness*. https://www.oecd.org
14. Organisation for Economic Co-operation and Development. (2024). *Regional electricity markets*. https://www.oecd.org
15. Statistical Committee of the Republic of Armenia. (2025). *Energy statistics*. https://armstat.am
16. World Bank. (2024). *World Development Indicators*. https://data.worldbank.org
17. Klopčič, A. L., Hojnik, J., & Bojnec, Š. (2022). Cross-border electricity flows and prices. *The Electricity Journal*, *35*(6), 107146. https://doi.org/10.1016/j.tej.2022.107146
18. The Australian. (2024). Wholesale energy prices soar as coal falters and grid limitations increase. https://www.theaustralian.com.au
19. The Guardian. (2024). Renewables break records in Australia's energy supply. https://www.theguardian.com
20. The Times. (2023). Sky-high energy costs affect UK businesses. https://www.thetimes.co.uk
21. Reuters. (2025). Weak wind power stokes energy worries in Germany. https://www.reuters.com
22. International Energy Agency. (2025). *Global electricity demand outlook*. https://www.iea.org
23. U.S. Energy Information Administration. (2024). *Electricity price trends*. https://www.eia.gov
24. Cable.co.uk. (2024). *Electricity prices in 230 countries*. https://www.cable.co.uk
25. Statista. (2025). *Electricity price statistics*. https://www.statista.com
26. GlobalPetrolPrices. (2025). *Electricity prices worldwide*. https://www.globalpetrolprices.com

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Սույն հոդվածը ուսումնասիրում է էլեկտրաէներգիայի սակագների դինամիկան և տարածաշրջանային էներգետիկ համագործակցության տնտեսական պայմանավորող գործոնները՝ առանձնահատուկ ուշադրություն դարձնելով հետխորհրդային երկրներին և Հարավային Կովկասին 2022–2025 թվականների ժամանակահատվածում: Վերլուծությունը հիմնված է համակցված տվյալների բազայի վրա, որը ձևավորվել է միջազգային աղբյուրներից, այդ թվում՝ Միջազգային էներգետիկ գործակալությունից (IEA), Համաշխարհային բանկից և գլոբալ էլեկտրաէներգիայի գների տվյալների շտեմարաններից:

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ELECTRICITY TARIFF DYNAMICS AND THE ECONOMIC DETERMINANTS OF REGIONAL ENERGY COOPERATION

Մեթոդաբանական շրջանակը ներառում է համեմատական վիճակագրական վերլուծություն, ժամանակաշարերի գնահատում, երկրների խմբային համեմատություններ և խաչաձև կտրվածքով տնտեսագիտական մոդելավորում: Էլեկտրաէներգիայի սակագների դինամիկան գնահատվում է ինդեքսային և հարաբերական փոփոխության ցուցանիշների միջոցով, իսկ հասանելիության կառուցվածքային տարբերությունները ուսումնասիրվում են էլեկտրաէներգիայի հասանելիության ինդեքսի (Electricity Access Index, EAI) միջոցով, որը ներառում է ընդհանուր, քաղաքային և գյուղական էլեկտրիֆիկացման մակարդակները: Էլեկտրաէներգիայի հասանելիության հիմնական որոշիչները բացահայտելու նպատակով կիրառվել է բազմագործոն ռեգրեսիոն մոդել:

Ստացված արդյունքները վկայում են հետխորհրդային տարածքում սակագնային հստակ ենթատարածքների ձևավորման մասին՝ բարձր գների գոտի (Բալթյան երկրներ), միջին գների գոտի (Հարավային Կովկաս) և ցածր գների գոտի (Կենտրոնական Ասիա): Էմպիրիկ արդյունքները ցույց են տալիս, որ գյուղական էլեկտրիֆիկացումը հանդիսանում է էլեկտրաէներգիայի հասանելիության հիմնական որոշիչը, մինչդեռ մեկ շնչին ընկնող ՀՆԱ-ն և սակագների մակարդակը վիճակագրորեն նշանակալի ազդեցություն չեն ցուցաբերում: Հայաստանը տարածաշրջանում պահպանել է համեմատաբար կայուն, սակայն համեմատաբար բարձր սակագնային դիրք, ինչը պայմանավորված է կարգավորվող գնագոյացման համակարգով և էներգետիկ աղբյուրների դիվերսիֆիկացված կառուցվածքով: Հետազոտության արդյունքները ցույց են տալիս, որ էլեկտրաէներգիայի սակագների դինամիկան ձևավորվում է ռեսուրսային ապահովվածության, շուկայի կառուցվածքի, կարգավորող ինստիտուտների և տարածաշրջանային ինտեգրման գործընթացների համակցված ազդեցության ներքո: Հոդվածում ընդգծվում է նպատակային սակագնային քաղաքականության, ենթակառուցվածքային ներդրումների և միջսահմանային էներգետիկ համագործակցության կարևորությունը՝ էներգիայի մատչելիության, արդյունավետության և երկարաժամկետ էներգետիկ անվտանգության ապահովման տեսանկյունից:

Բանալի բառեր. էլեկտրաէներգիայի սակագներ, էներգետիկ համագործակցություն, էլեկտրաէներգիայի հասանելիություն, հետխորհրդային երկրներ, Հարավային Կովկաս, էներգետիկ տնտեսագիտություն:

ДИНАМИКА ТАРИФОВ НА ЭЛЕКТРОЭНЕРГИЮ И ЭКОНОМИЧЕСКИЕ ФАКТОРЫ РЕГИОНАЛЬНОГО ЭНЕРГЕТИЧЕСКОГО СОТРУДНИЧЕСТВА

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В статье проведено комплексное исследование динамики тарифов на электроэнергию и факторов, определяющих региональное энергетическое сотрудничество в постсоветских странах и регионе Южного Кавказа за период 2022–2025 гг. Эмпирическая база исследования сформирована на основе сопоставления данных международных источников, включая Международное энергетическое агентство (IEA), Всемирный банк и глобальные базы данных цен на электроэнергию.

Методологическая основа исследования включает сравнительный статистический анализ, анализ временных рядов, межстрановые и межгрупповые сопоставления, а также кросс-секционное эконометрическое моделирование. Динамика изменения тарифов оценивается с использованием индексных и относительных показателей, тогда как структурные различия в доступе к электроэнергии анализируются с применением Индекса доступа к электроэнергии (Electricity Access Index, EAI), включающего показатели общего, городского и сельского уровня электрификации. Для выявления ключевых факторов доступа к электроэнергии используется многомерная регрессионная модель.

Полученные результаты свидетельствуют о формировании выраженных тарифных субрегионов в постсоветском пространстве: зоны высоких цен (страны Балтии), средних цен (Южный Кавказ) и низких цен (Центральная Азия). Эмпирический анализ показывает, что уровень сельской электрификации является ключевым фактором, определяющим общий уровень доступа к электроэнергии, в то время как ВВП на душу населения и уровень тарифов не оказывают статистически значимого влияния. Армения характеризуется относительно стабильной, но сравнительно высокой тарифной позицией, что обусловлено регулируемой системой ценообразования и диверсифицированной структурой энергетического баланса.

Результаты исследования показывают, что динамика тарифов формируется под воздействием совокупности факторов, включая ресурсную обеспеченность, структуру рынка, институционально-регуляторную среду и процессы региональной интеграции. Подчеркивается необходимость разработки сбалансированной тарифной политики, расширения инвестиций в инфраструктуру и углубления трансграничного энергетического сотрудничества как ключевых условий обеспечения доступности, эффективности и долгосрочной энергетической безопасности.

***Ключевые слова*:** тарифы на электроэнергию, энергетическое сотрудничество, доступ к электроэнергии, постсоветские страны, Южный Кавказ, экономика энергетики.

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