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## METHODS

OF TARIFF REGULATION IN FOREIGN POWER SYSTEMS

## MÉTODOS DE REGULACIÓN ARANCELARIA EN SISTEMAS DE ENERGÍA EXTRANJEROS

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### ABSTRACT

One of the critical sources of financing contributions to the development of the energy sector is the own funds of large city-forming enterprises of the electric power industry, which, as a rule, are possible at the expense of profits. The article attempts to analyze the methods of tariff regulation in foreign power systems. To meet the aim of the study, the cost-based method is utilized. For the stable development of the economy of any region or country, energy is a key industry. The state in which the energy sector is today results from actions and inaction taken in the economic and social spheres. The planned economic growth implies the involvement of sufficient investment in the industry. Suppose the infusion into the energy sector is not increased. In that case, we expect a deficit of the power reserve, which is necessary for uninterrupted power supply during the period of maximum load on the grid. Based on the results obtained, it can be inferred that implementing the option of a sequential transition of power grid companies to the reference level seems highly effective and advantageous.

**Keywords:** Tariff regulation, energy system, economics, energy strategy, operating costs.

### RESUMEN

Una de las fuentes críticas de contribuciones financieras al desarrollo del sector energético son los fondos propios de las grandes empresas de la industria de la energía eléctrica que forman ciudades, que, por regla general, son posibles a expensas de las ganancias. El artículo intenta analizar los métodos de regulación de tarifas en sistemas eléctricos extranjeros. Para cumplir con el objetivo del estudio, se utiliza el método basado en costos. Para el desarrollo estable de la economía de cualquier región o país, la energía es una industria clave. El estado en el que se encuentra hoy el sector energético es el resultado de las acciones y la inacción en el ámbito económico y social. El crecimiento económico planificado implica la participación de una inversión suficiente en la industria. Supongamos que no se incrementa la infusión en el sector energético. En ese caso, esperamos un déficit de la reserva de energía, que es necesaria para un suministro de energía ininterrumpido durante el período de carga máxima en la red. De los resultados obtenidos se puede inferir que implementar la opción de una transición secuencial de las empresas de la red eléctrica al nivel de referencia parece altamente efectivo y ventajoso.

**Palabras clave:** Regulación tarifaria, sistema energético, economía, estrategia energética, costos operativos.

## INTRODUCTION

In the event of an increase in the tariff, moreover unreasonable, in such a situation, it can lead to a decrease in the rate of economic growth and entail social dissatisfaction, which in turn is dangerous with possible unrest on the part of the population.

The Energy Strategy until 2030 outlines the existing difficulties in the electric power industry and the need for serious financial investments in the industry due to the depreciation of fixed assets (Nguyen, et al., 2020; Deryagin, et al., 2020; Turgaeva, et al., 2020). It describes the methods of reforming the energy system of Russia, where the accounting of financial activities, the formation of competitive relations in the industry are divided in order to reduce production costs and create financial transparency of enterprises in the domestic and foreign markets.

The decision to change the tariff (as a rule to increase) should be complex and take into account the interests of the state, consumers and producers of electricity. Thus, the high importance of the development of the electric power industry as a whole for the country's economy, the need to solve social problems, as well as the discussed difficulties of state regulation of the electric power industry.

It is advisable to consider what models of tariff regulation are used in foreign countries to form tariffs for the services of companies belonging to natural monopolies.

The first method of tariff regulation, the cost-based method, which is considered traditional and the first in evolution, is widespread in Russia, but its application does not stimulate the development of the power grid sector, since all costs are included in the tariff base (Ivanov & Strizhenok, 2017). As noted by Yu. N. Timofeeva, in Russia when applying the method of economically justified costs ("costs plus") "the investment program is short-term and does not allow high-quality implementation of costly and long-term projects".

At the moment, the application of the method of justified expenses in Russia practically excludes the possibility of attracting external financial resources and significantly limits the range of areas of investment activities of the electric grid enterprise (Boyko, et al., 2019; Skrypchuk, et al., 2020; Yakovleva, et al., 2021). In Russia, the cost plus method is the basic one. To identify the prospects for its modernization, let us consider how regulation is carried out using the cost-effective method in the world. This method is widespread in the USA, as well as in Belgium and Switzerland (regulation of the electric grid complex). To address the shortcomings of traditional US regulation, the capital expenditures of grid companies, after they

have been generated but before they are included in the tariff base, undergo a prudency test and a used and useful test) (Glotko, et al., 2020). The principle of used and useful is that the public companies regulatory commission sets such tariffs that allow to cover reasonable costs and receive, for a given level of risk, a return on capital invested in useful and useful assets of the enterprise (Doskeyeva, et al., 2018; Vasilenko, et al., 2020; Prischepa, et al., 2020; Strizhenok & Ivanov, 2021; Egorov, et al., 2021). "In addition, the need for network costs is verified in the course of network planning, which, as a rule, is carried out openly with the involvement of a wide range of stakeholders (including users of electricity transmission services)."

Historically, reliability and cost-effectiveness have been a top priority for the US government in power development over the years. That is why in the country the cost method is used with elements of investment and quality control. In this regard, the US regulator takes the following measures when using this method:

- Fines / incentives are imposed in terms of the quality of the services provided.
- The economic feasibility of commissioning new capacities is being made.
- Competitive events are appointed for the commissioning of new capacities by energy companies.

The priority position in this competition is occupied by an organization offering a comparable product at a lower price.

The use of such a system of tariff regulation allows the US government to maintain a stable rate of growth in electricity prices. The share of the electricity transmission tariff in the overall structure is 9-10%. To eliminate the shortcomings of regulation by the cost-based method in Russia, it is necessary to introduce into practice the establishment of standardized rates for the main items of expenditure, such as "repair of fixed assets", "remuneration of labor", etc., that is, those items that form controllable costs. Regulation based on revenue or price ceilings is the main method of incentive regulation (Orlova, 2016; Binshtok, 2017; Malarev, et al., 2020).

In such European countries as Germany, Spain, Norway, the method of tariff regulation is used, which is based on the principles of benchmarking. Benchmarking implies putting into practice the experience of the best companies, the best technologies, etc. among peer companies. In Germany, the regulator is faced with the task of reducing costs for each group of companies in the sector, and

TCO, in turn, is interested in increasing the efficiency of activities. The revenue of a company regulated by revenue ceilings is calculated using the formula 1:

$$R_t = (1 + RPI - X) \times R_{t-1}, (1)$$

where:  $R_t$  - revenue in year  $t$ ;

RPI - consumer price index;

$X$  is a productivity enhancement factor;

$R_{t-1}$  - revenue in the previous year.

The system of tariff regulation based on the determination of the X-efficiency factor has been conducted in Germany since 2009.

The regulation period for this method is set for a period of two to five years. The practice of using this method of tariff regulation in Germany shows that the use of benchmarking models in determining the required gross revenue causes controversy among stakeholders. Tariffs for the services of grid companies from 2009 to 2011 in Germany are quite stable and compared to 2006, in 2009, the fees for services of power grid companies decreased by 20% from 0.073 to 0.0575 kWh.

However, the developed formula is difficult to understand and not transparent enough for regulated companies, which has caused a wave of lawsuits against the regulator (Kuznetsov & Suprun, 2017). Having analyzed the experience of German regulation, it should be noted that when developing a system of incentive regulation based on the principles of comparison of analogues, special attention should be paid to the procedure for its functioning, since the issue of transparency of such a mechanism is key. Basically, in the group of countries under consideration, capital costs are regulated by the return on invested capital method, and operating costs are controlled through benchmarking (Puryaev & Puryaev, 2020).

Thus, the analysis of foreign practice has shown that the process of regulating operating costs using the method of comparison of analogs is a promising direction in the development of domestic tariff regulation. Conclusion The result of the practice of applying incentive regulation in developing and developed countries is different.

## DEVELOPMENT

For example, in developed countries it is of a qualitative nature, that is, the task of the regulator is to increase competition, production efficiency, improve the quality of customer service, etc. In developing countries, on the contrary, the practice is quantitative, that is, the task of the regulator is reduced to establishing business processes, combating commercial losses, and electrifying the territory.

Thus, when analyzing the methods of regulation of foreign countries, it was revealed that the practice of regulating TGO in accordance with the principles of incentive regulation is quite successful. However, when regulating Russian companies on the basis of cost benchmarking, there are many limiting factors to the application of the model used in other countries. One of the limiting factors is the scale of our country and low population density (Sychev, et al., 2020).

Best practices and guidelines.

I would like to provide below an overview of the main requirements for national regulatory bodies in terms of their independent and effective functioning based on the relevant information in the literature and the results of this study (Table 1).

Table 1. Basic requirements for regulators.

Aspect	Subregion	Key Requirements
Independence from political and market players	Explicit legal basis	<ul style="list-style-type: none"> <li>• A clear definition in the legislation of the roles (competencies and tasks) of the NRA to ensure the institutional and operational independence of the NRA.</li> <li>• Adequate legal regulations and internal rules to avoid undue political influence - clear separation from the sponsoring ministry and the ministry of energy</li> <li>• Adequate legal regulations and internal rules to avoid undue influence of NRAs by industry.</li> <li>• To ensure the institutional independence of NRAs, the respective roles of Member States and NRAs must be clearly and precisely defined.</li> </ul>
	Availability of executive instruments	Not Available
	Legal restrictions or violations of the independence of the ABO	The NRA should be continuously empowered to make final and binding decisions that are not subject to external (e.g. ministerial) oversight
	Protective measures	<ul style="list-style-type: none"> <li>• Mandatory strict rules of transparency, including open decision-making procedures based on empirical evidence / research, as well as the publication of decisions and their motivation.</li> <li>• NRAs should prepare, adopt and publish their rules for various procedures</li> <li>• NRAs should publish information about their organization and structure</li> <li>• NRAs must follow clear consultations and transparent policies, providing stakeholders with information in a timely and accessible manner and conducting open consultations</li> </ul>
	Legal measures of accountability and control	<ul style="list-style-type: none"> <li>• Subject the actions and effectiveness of the regulator to external auditors and parliamentary oversight</li> <li>• The NRA is accountable to the national parliament, not to the government</li> </ul>
	Promotion, appointment and dismissal	<ul style="list-style-type: none"> <li>• Clear and published rules for the appointment, appointment and dismissal of key employees and board members</li> <li>• The heads and board members of the NRA should be selected in a transparent manner based on objective criteria.</li> <li>• Defined terms of office for NRA executives and board members with reappointment and termination restrictions</li> <li>• NRA chapters and board members must have a diverse and complementary set of qualifications and experiences for the regulated industry and use them to serve the public interest</li> </ul>
Conflict of interest	<ul style="list-style-type: none"> <li>• Adequate rules prohibiting conflicts of interest through the development of guidelines for a code of conduct or the functioning (independence) of personnel</li> <li>• Clear incompatibility rules for board members regarding positions in regulated companies and in politics</li> </ul>	

Adequacy of human and financial resources	Funding for the NRA	<ul style="list-style-type: none"> <li>• Adequate budget level (in line with the objectives of the NRA) 4</li> <li>• NRAs should have budgetary autonomy and this should be guaranteed at all stages and in all processes</li> <li>• Divided budget line in the general state budget</li> <li>• Preliminary review of the NRA budget by parliament</li> <li>• Follow-up of annual reports should be carried out by an independent auditor who submits the report to parliament.</li> </ul>
	Staff recruitment and payment	<p>Adequate human resources (both qualitatively and quantitatively) appropriate to the objectives of the NRA and salary levels that are competitive with the regulated industry</p> <ul style="list-style-type: none"> <li>• Policymakers should not place any constraints on the HR policy of the NRA (for example, do not limit the number of staff), as long as it remains within its budget</li> </ul>
Self-reliance on basic tasks	Setting and approving tariffs and methodologies	<ul style="list-style-type: none"> <li>• Lack of legislative measures that could affect the independence of the NRA in setting tariffs</li> </ul>
	Criteria and procedures for setting / approving tariffs and methodologies	Not available
	Complaint handling	Not available
	NRA Solutions Overview	<p>Accountability: clearly defined processes and decision rationales</p> <ul style="list-style-type: none"> <li>• Providing effective mechanisms for appealing NRA decisions.</li> </ul>

Independence from political and market players, a clear legal basis for the independence of the NRA.

According to the relevant Directives, member states should not only explicitly provide for the independence of NRAs in national legislation, but also indicate that NRAs should be independent from both political actors and market interests. In addition, national legislation may state that this independence should extend to its board and staff, and not just to the NRA itself. Finally, a definition of independence can be provided for in national legislation. Although the latter is not currently being done directly in any Member State, interpretation can be derived from the regulations governing the NRA in general and / or its employees and board members in particular (Belousova & Vasilyeva, 2017).

For example, the following countries have a fairly clear legal basis for the independence of the NRA:

**Spain:** Legislation states that the NRA operates with structural and functional autonomy and is completely independent from government, other public authorities and market participants. Despite these formal legal provisions, stakeholders expressed doubts about the effective independence of the NRA.

**Lithuania:** The Energy Law stipulates that the NRA makes independent decisions that should not be influenced by any state / municipal institution, company, organization or other enterprise. There is also a clear requirement that the NRA chairpersons, board members, government officials and NRA staff must act independently of all market interests and, in the performance of their duties, not seek or comply with any direction from the government or any other public or private person.

**Austria:** The law states that the NRA and its Council / staff are not bound by any government directives in the performance of their duties and must act independently of market interests. Electronic control is perceived as good practice for legal transformation, including defining the roles of the regulator and the provisions that ensure its independence from market and political actors. In addition, this seems to be done correctly as the stakeholder perception of the NRA's independence is positive. However, an Austrian court (Bundesverwaltungsgericht) recently concluded that one of the NRA members was not independent; Moreover, some lawyers have expressed doubts about the independence of the newly appointed chairman of the NRA given his previous responsibilities.

NRAs must have the legal authority to impose sanctions and fines so that this task is entrusted to a competent court, as in the case of Austria) and to request information from market participants (this applies to all reviewed NRAs).

Good practice includes Member States where NRAs also have a legal basis for the use of enforcement tools, such as in:

**France:** Under the law, the NRA can demand access to business accounts (as part of its mandate) and its president can initiate legal proceedings.

**Greece:** The law provides that the NRA, acting in accordance with the position or on the complaint, can make a reasoned decision by taking appropriate interim measures in accordance with the principle of proportionality to resolve the situation before making a final decision.

Good practice also applies to Member States where, to better reflect sectoral concerns, legislation provides general powers / instruments for NRAs and more specific powers / instruments depending on the sector (namely gas, electricity and hydrocarbons), as is done in Spain, Croatia and Romania.

Several stakeholders felt strong political involvement in the selection of NRA board members. This, in turn, was seen as a possible impact on the independence of the NRA in the decision-making process (State regulation of the economy).

In addition to strong legislative safeguards, best practices have been identified that include independent decision-making bodies within the NRA and internal rules to avoid undue influence from political and market actors. A few practical examples that were found during our field research will be further explained below:

**Germany:** Federal NRA decisions are made in the so-called “Beschlusskammern” (ruling chambers). There are 5 chambers for energy (one for capturing capital costs; two for third party access - one electricity, one gas; and two for tariffs / marginal revenue - one electricity, one gas). Chambers are responsible for deciding on relevant topics, and each has its own chairman and two vice-presidents who have the final say.

This system is considered good practice as chambers approve draft decisions prepared by staff and present their decisions to the President of BNetzA, who can propose (but cannot enforce) changes to decisions made.

This ensures a high level of independence and limits the risks of external influence on the decisions of the regulator. In addition, stakeholders see it as good practice for the independence of the NRA.

## CONCLUSIONS

Thus, it is advisable to implement the option of a sequential transition of power grid companies to the reference level. This approach provides for the establishment of controllable costs for companies with a level of efficiency below average at the level of actual costs adjusted for the efficiency improvement index.

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