Energy Price Formation and Energy Consumption by Households as a Factor of Ensuring Energy Safety

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ABSTRACT

The objective of the article was to analyze the issue of developing energy price formation by various countries in the context of component structure of the cost per energy unit for households. For conducting the research the principles "Expenses +" and Regulatory Asset Base were used. A methodological author's approach related to the estimation of pricing level for energy resources based on Energy Pricing Index was proposed. The highest gas prices are in Sweden, Denmark, Portugal, France and Ireland that relates not so much to gas market as to the prime cost of green electricity. The specific feature of the price policy in European countries is the establishment of higher gas prices for households than for industries. Unlike Russia, "cross-subsidization" has completely opposite content. The value of gas price in European countries does not depend on whether this country is its producer on its territory. However, there is an inverse relation between the production level of energy resources and the level of economic development. In view of the low EPI based on overestimate network costs and actual lack of the components' differentiation of the fixed price, the low level of pricing efficiency is observed in Moldova, Ukraine and Serbia.

Keywords: Energy Resource, Green Electricity, Price Formation, Rent, Sustainable Development
JEL Classifications: O13, P28, Q4

1. INTRODUCTION

Modern socio-economic development supposes the need in state regulation of economic processes. The state impact on economic processes is a target system that covers legislative, executive and control aspects and ensures an intensive economic growth, economic and social stability, and the proper international status of the state. Prices and price formation are parameters, which define the efficiency of economic processes, and it determines the effectiveness of state regulation of the economy. The effective price formation contributes to the adaptation of the production to social needs. An adequate price level of any economy provides its economic growth, an effective competitive environment, focuses the production on an innovative trend, ensures the reduction of production costs, accelerates the turnover of production capital,

improves the quality of goods and services, as well as their consumer demand.

Forms and methods of state governance of market processes and pricing processes significantly differ in various countries in different periods. So, the activity of governments in the USA, Canada, Japan, China and the EU countries demonstrates a significant state influence on market processes in order to mobilize resources of the society in long-term planning for ensuring a basic level of human development in the society (Ju et al., 2017; Akhmetshin et al., 2018).

In countries with more developed market economy, nowadays a rather complicated price system was created. The system is stipulated by both the internal specific of economic activity and

the characteristics of the external institutional field of national economies. Governments are realizing certain administrative and legal, as well as socio-economic mechanisms that allow studying both the ratio and level of prices, and also the processes of internal price formation. The means and methods of state price regulation in different countries have national, climatic features, focused on raw materials, political and economic conditions, and are determined by the reputation of the state in the global economy. Therefore, today real-time pricing strategies are being investigated for the use by on demand response programs. The main issue is that consumers react differently to price adjustment at different periods. The latter has contributed to the development of the approach that offers fundamental guarantees of the efficiency upon minimum assumptions about the dynamics of load and flexibility of consumers, even in cases when consumers are hostile and take strategic actions (Kim and Giannakis, 2016; Alkhateeb and Sultan, 2019).

In industrialized countries, the state control over the prices of goods of national economies is performed from 5% to 50% (Siddiqui, 2017). Pure monopolies constitute a significant part of the economic complex of any country. These entities take advantage of their monopoly status in the form of the inefficiency in service rendering, trying to gain an additional income or covering extra costs for the account of consumers of electric energy that are important for the well-being of citizens, the formation of the cost item of the production of enterprises, etc. (Basu, 2019). These circumstances determine the importance of the implementation of the antimonopoly policy of the state, first of all, the creation of conditions for competition in a particular sector and the prevention of abuse of monopoly position.

Traditionally, the USA holds the largest share of state influence on market processes (about 5%). The antitrust department of the Ministry of Justice and the Federal Trade Commission control the prices of industries. The USA is authorized by law to monitor electricity tariffs. The state impact on price formation in the USA is spread mainly on the products of pure monopolies – power economy, and at the states' level – electricity. Special units of the Federal Trade Commission apply direct state regulation of prices for electricity, utilities, agricultural products, certain retail goods in legally defined volumes (Downie, 2019).

In Japan, in the framework of limited state influence on market processes the bureau of prices at the economic planning agency regulates about 20% of consumer prices in the country, publishes the analytic "Report on prices" every year and provides consumers with the price information online. The state within volumes specified by regulatory acts manages tariffs on electricity, gas, etc. (Kim, 2019).

The analysis of pricing processes in the countries of the European Union testifies for supranational control over prices in the framework of the commonwealth, which is carried out by the EU commissions in trends, and the decision is made by the Council of Ministers of the EU. Within the EU, up to 15% of prices are controlled at the national level. The best practice of the EU is an example of the successful integration of various competitive communities into a single energy market. Considering the state management of prices for services of pure monopolies, on the recommendation of the EU in most countries subsidies are not popular, but prices for public goods and services are justified. This refers to electricity, water and gas supplies, communications, transport (Friedrich et al., 2019). Pricing processes in the EU countries give rise to the increase of the efficiency of the up-to-date market, providing consumers with socially significant goods and services. At the same time, consideration of the specific of pricing processes in the EU countries reveals the national peculiarities of price formation in the European Union (Woroniuk et al., 2019).

The Competition Department of the Ministry of Economy, Finance and Budget is responsible for the regulation of prices in the public sector of the French economy. First, these are pure monopolists (electric power, gas and transport sectors), as well as some competitive market segments (commercial and domestic banks, individual enterprises and insurance companies). In the first situation, the state forms and affects all economic parameters of the functioning of monopolized industries, including investment volumes, labor costs, and prices of finished products. In the second version, the state has minimum impact on changes in economic indicators of the economic activity of these sectors, while stimulating them to increase the level of competition along with the private sector.

For monopolists the state elaborates socially acceptable economic indicators, and provides competitive industries with effective institutional frameworks. The specifics of the French economy determine the correlation between regulated and free prices for goods and services: approximately 20% of prices in the country are regulated by the state, and the rest are based on free market prices. We should pay attention to the additional peculiarity of France, as an industrialized country, that in its economy the state regulation of prices has been performed for a rather long time. Moreover, the price liberalization did not suppose an absolute cessation of the interference into the process of price formation by the state. The change of the trend from direct impact to companies' management (at the microeconomic level) to the system of governing the processes of their functioning at the macroeconomic level for the economy caused only a change in the means of influence. Thus, a strict and active policy of government interference was transformed into indirect methods of influencing price formation in the market. At once, after the adoption of the decree on price liberalization, the decree was adopted regarding the development of price competition among industrial companies. Its provisions prohibited setting up of various trade unions and associations of manufacturers, wholesalers and retail trade organizations, as well as importers. At the same time, entrepreneurs were forbidden to conclude agreements in terms of the establishment of "minimum" or "recommended" prices for industrial goods and products (services) (Moreau, 2019).

The feature of contemporary price formation in France, based on which the latter differs from other countries, is to focus primarily on the economic analysis of the market instruments,

the establishment of legal liability of economic entities for violation of competitive behavior, compliance with the principle of "economic freedom." To perform these and other functions in France there are about three thousand state price inspectors and about a hundred departments. At the same time, in a large city there are 10-12 inspectors. The key task of state inspectors is to control state price discipline. The state inspectors may record a violation of pricing rules in the form of an act and transfer it further to a financial tribunal. The latter directly takes a decision regarding sanctions against legal entities that have violated the law (Huenteler et al., 2020).

In Spain, the government regulation and price control are based on the Law "On Protection of Competition." First, the law covers the production of goods and services, which is monopolized. The list of goods and services subject to compulsory prices is regularly published in commercial newsletters. This mainly relates to the products of some private companies and public enterprises. Approximately 10% of prices in the consumer pricing system is undergone the state control. The high council for prices at the ministry of economy and finance is a key supervisory body, which monitors the price formation in Spain. The Government Economic Affairs Commission develops and controls the pricing of tariffs for gasoline, diesel fuel, gas, electricity, kerosene and fertilizers for pure monopolies. According to estimates of the Spanish Ministry of Energy, the government has not only maintained a constant price level over the past 3 years, but also has reduced the electricity tax rate by 2.8% (Perez-Mora et al., 2019).

For last 25 years the European Commission considered more than 350 cases of mergers and monopolization. In the EU countries there was a range of means conducted in view of the control of vertical and horizontal integration with the purpose of mitigation of possible issues through:
– Closed nature of processes of corporate mergers and takeovers
– High level of the concentration of energy markets and the possibility to take advantage of market authorities
– Decrease of the international competition because of the lack of connecting capacities between various energy systems
– Complex and non-transparent approach towards pricing, as well as the method of tariffs' formation on electricity and prices on gas for end users that has been influenced by the regulatory establishment of their level below market ones, interfering the appearance of new suppliers (Bartalevich, 2017).

Today the key challenges, which the EU faces, require re-thinking of a competitive policy in energy markets. They are as follows:
– Share increase of renewable energy sources in the production and end consumption (Saint Akadiri et al., 2019)
– The need mainly in the use of the demand flexibility (primarily from households and small and medium-sized businesses, municipalities and public authorities) to stimulate competition (Ergunova, 2018)
– The internalization of external effects through the trading of emission quotas, which stipulates the need in a government support not only for renewable energy, but also for power economy with low carbon dioxide emissions

– The necessity to increase the confidence of electricity producers in gaining of future revenues, since the diversification of electricity production sources and the need for technical and technological renewal of existing capacities together with fluctuations in demand in the primary market, create volatility of the situation for producers (Moreno and Díaz, 2019)
– Regulated wholesale and retail prices reduce the effectiveness of new investments, especially in conditions of a financial and economic crisis (Georgiou and Rocco, 2017).

The integration of European energy markets creates a situation, in which any government intervention in one national market affects price distortion in other related markets. The latter can lead to instability of the whole system, volatility of spot prices and production volumes, refocusing of investments upon projects to create new capacities and transfer them to less optimum projects (Kim and Giannakis, 2016). Within such conditions the motives for state interference into the operation of energy markets have been revised upon the following areas - government intervention is justified when competition policy in the electricity market should be coordinated with the objectives of other areas of government policy. At the same time, the deterioration of competition can be justified only in certain cases determined by constituent agreements. So, the state interference is deemed as justified if suppliers or consumers do not carry out activities aimed at protecting the environment; when new technologies are supported that are not yet competitive, but they are expected to become such ones in the course of implementation and acquisition of best practice (Zhou and Yang, 2016).

Natural resources represented by such state-owned companies as Saudi Aramco (the Kingdom of Saudi Arabia), ADNOC (UAE), Equinor, Statoil (Norway), etc. all the same, they are accounted as mineral resources and belong to the state (they are in state ownership). Certain political forces (state government, ruling political parties) and business groups (co-owners of mining companies) use the information as a key argument in favor of the fact that revenues from natural resources are distributed in the interests of the country and society as a whole. However, even the leading role of the state in re-distribution of these revenues does not protect it from privatization by certain social groups. Even so, some countries have successfully solved the issue. For example, the state oil companies of Kuwait and Yemen belong to the ruling dynasties, but because of the re-distribution of natural resources, the countries could provide a high standard of living and social protection for their population, as well as develop a sustainable infrastructure (Darvishi, 2018). Norway, the United Kingdom, the United States and other countries have accumulated and allocated resources not only for national needs, but also for the development of the social sector and domestic investments. Although in Venezuela, the state monopoly on oil production has not yet disposed of the general poverty (Downie, 2019; Joskow, 2019).

The state has to promote, first, the development of new generating capacities in consortia of producers and consumers

of electricity, if there is no competition violation. Secondly it must support an energy-saving activity, in particular without financial investments (cancellation of regulated tariffs, promotion of Smart Home projects, inspiring to implement the information and communication technologies with the purpose to optimize energy consumption, etc.), including measures to realize the "aquis communautaire" norms in the national legislation (Reçi and Kokaj, 2016).

In order to regulate the production of fuel and energy resources, and increase the efficiency of their use, price and tariff management is used. Many factors influence the prices of complex kinds of fuel and energy resources. For instance, supply and demand, world market prices, expenses, state regulation policy and control over the functioning of the fuel and energy complex, investment policy and the like (Ibrahim, 2019).

The prices on energy resources directly affect the energy consumption level. The prices on energy resources shall help to solve the following main tasks: To advance the production development in accordance with market needs, to ensure self-financing of the production; to create a base sufficient for state budget formation, to provide the solution of social and production issues by the state; to give rise to economic competitiveness used in the open market; to contribute to the growth in consumption of finished product – the increase of producers' revenues and their remuneration due to the production of natural products. The effective pricing in any economy ensures its growth, forms a competitive environment, focuses the production on the innovative trend, helps to reduce production costs, accelerates the turnover of production capital, improves the quality of goods and services, as well as their consumer demand. Thus, the purpose of the article is to study the issues of the formation of energy pricing by different countries in the context of the component structure of the cost per energy unit for households with nominal parity of prices.

2. MATERIALS AND METHODS

Statistical data for the research are based on the information of the Statistical Office of the European Communities, Global Competitive Index and Global Sustainable Development Index of the countries. For conducting the research there were used principles "Expenses +" and Regulatory Asset Base, which coheres tariffs with indices of the reliability, energy supply quality and the increase of energy efficiency.

The research process comprises main five phases:
1. Definition of key trends and gas price dynamics for households in studied countries.
2. Analysis of the structure of prices in various countries, as well as the verification of the components of the similar price in various countries.
3. Definition of key trends and power supply price dynamics for households in studied countries.
4. Analysis of the structure of power supply prices in various countries, as well as the verification of the components of the similar price in various countries.

5. Definition of Energy Pricing Index and identification of its relations with the level of sustainable development and the competitiveness of countries.

In the research an author methodological approach towards price formation for energy resources based on EPI (Energy Pricing Index) was proposed. The Index can be calculated using the formula (1):

$$EPI_{ij} = \frac{1}{\sum_{i=1}^{n} \frac{Scomp_i}{Scost_i} + \sum_{j=1}^{n} \frac{Scomp_j}{Scost_j}} \quad (1)$$

whereas, $Scomp_i$ – share component unit price of energy (for example, taxes, fees, duties); $Scost_i$ – share of cost per unit of energy; i – gas price component; j – electricity price component.

The index considers the structure of the unit price of energy and enables an integrated evaluation of the pricing effectiveness upon some energy resources. EPI can include different components of energy price formation. In the research, there were used two key components – prices on gas and electricity.

6. Comparison of evaluation results upon EPI with Sustainable Development Global Index (SDGI) and Global Competition Index (GCI).

SDGI consists of 17 sub indices according to the stated objectives: SDG 1 (no poverty), SDG 2 (zero hunger), SDG 3 (good health and well-being), SDG 4 (quality education), SDG 5 (gender equality), SDG 6 (clean water and sanitation), SDG 7 (affordable and clean energy), SDG 8 (decent work and economic growth), SDG 9 (industry, innovation and infrastructure), SDG 10 (reduced inequalities), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production), SDG 13 (climate action), SDG 14 (life below water), SDG 15 (life on land), SDG 16 (peace, justice and strong institutions) and SDG 17 (partnerships for the goals) (Sachs et al., 2019).

GCI specifies the competitiveness of countries based on the ranging in a definite sequence. GCI consists of 113 variables, which, in their turn, are combined into 12 control indices that define the country competitiveness.

Taking into account the methodological framework of these indices, the analysis of pricing components in the energy market of various countries is reasonable to be carried out (Schwab, 2018).

For investigating the peculiarities of energy pricing and power consumption by households, we used a range of data from 25 European countries (Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, France, Georgia, Hungary, Ireland, Latvia, Lithuania, Moldova, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Sweden, Turkey, Ukraine and the United Kingdom), as well as the Russian Federation, which is the main exporter of energy resources (especially, gas) for the majority of selected countries.

3. RESULTS

Nowadays prices in the fuel and power sector do not have free market formation, since the inflation level and the expectation of producers' benefits significantly affect the dynamics of prices, but they are practically not influenced by changes in consumer demand. Energy resources prices for consumers may crucially vary due to the irregular distribution of resources and high transportation costs.

The fuel and power sectors of most countries are characterized by the formation of pure monopolies. This contributes to cost overestimate by manufacturers in order to unjustifiably raise prices. Moreover, the service quality is often lowered. States today are actively interfering the pricing process in the fuel and power sector. So, the price regulation can occur both at the international level and domestically.

There are two approaches used to determine the price of natural gas in Europe: one unites the gas price with the price for the total volume of alternative energy resources in each specific country – residual fuel, coal, oil; and the second one, used in long-term contracts, links the gas price to the price for the total volume of oil products on the exchange with a certain time interval. Gas prices for consumers in different countries can essentially differ (Figure 1) and take into account the influence of tax and social state policy.

The gas price, showed in Figure 2, may vary significantly within the region. The consumption volumes, place of residence, the presence of central heating and the like can influence it. The highest gas prices were recorded in Sweden, Denmark, Portugal, France and Ireland. These countries are also leaders in energy production based on renewable energy sources. So, such a high price level is not associated with the development of the gas market, but rather with the formation of the total prime cost of green electricity. Thus, the key factor in gas pricing in these countries with such a high level of gas prices is environmental (Figure 2). Sweden is also the country with the smallest share of gas in the energy balance – only 2%. This also confirms why the gas price in this state among the countries of the European Union is high.

If we compare the structure of almost identical prices of different countries, we can define their critical component difference. For example, in Ireland, Portugal and France the price makes up around EUR 21. At the same time, in France the price comprises the largest part of ecological dues – 9%, compared with Ireland (5%) and Portugal (1%), which has the lowest net cost (29%), 15% value-added tax, and other fees are also present. In Lithuania, Luxembourg and Estonia the price is around EUR 11. In the price structure of Estonia the largest part of ecological dues (9%) and the smallest network costs (10%), compared with Lithuania (19%) and Luxembourg (30%).

In Ukraine, for instance, the largest component in gas price for population is the revenue ("margin") of National Joint-Stock Company "Naftogaz of Ukraine" that amounts to 40% of total funds provided from the gas consumed by citizens, 39% is revenues to the State budget of Ukraine (VAT, rent, fee in the form of a targeted allowance).

One more issue is what causes the non-transparency in gas industry, namely the increase of rates of rental payments. In view of it, let us regard mechanisms of its formation:
– Firstly, the rent arises between businessmen and owners of production or exploitation facilities. In Ukraine, state-owned companies have been levied with state-owned rents on gas production. Certainly, in this case, rental relations do not arise. This payment to the state is possible only from the private producer. Obviously, the government is aimed to impose artificially an exorbitant tax on the entire oil and gas business with the purpose to achieve only its fiscal goals
– Secondly, the rental value is formed in the market and depends on the profitability of the object of maintenance. The profit should be split into the rent to the owner and the net profit of the producer. In addition, as profit depends on the price and net cost of production, so the rental rate depends on the price, prime cost and conditions of revenue allocation. Therefore, there may be cases when the rent does not form at all. In particular, when a business is non-profit, prices are too low and costs are high.

In Ukraine, as proposed, on the contrary, to determine the price after the establishment of the rental payment. In other words,
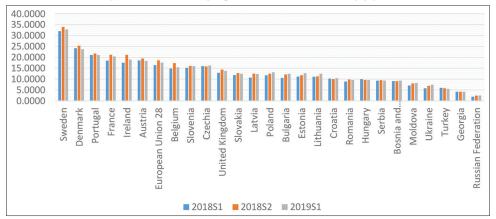
Figure 1: The natural gas price for households, euro/gigajoule

Source: Created by authors based on the data (Eurostat, 2020a, 2020b; GlobalPetrolPrices, 2020a, 2020b)
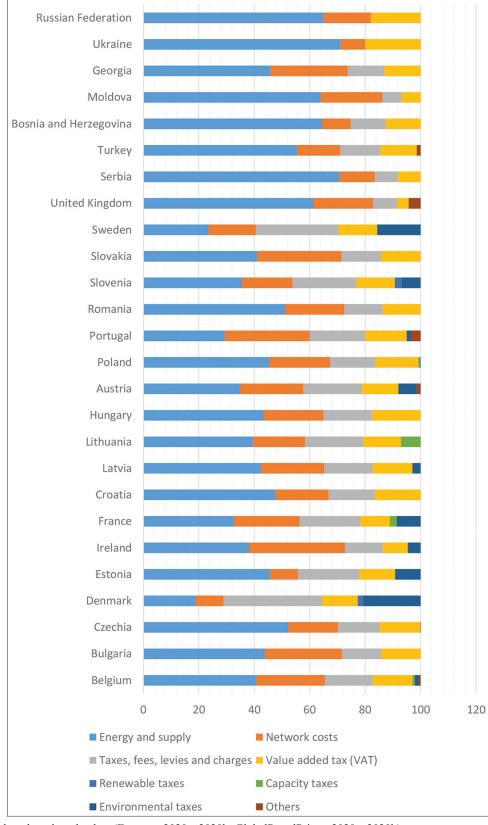
Figure 2: Gas price components for households (%)

the rent is deemed to exist always, which can be set up at the request of the owner and raised incessantly. Thus, we can state that the government artificially inflates the rental rate in order to

maximize the price of gas that is produced in Ukraine. It means that maximizing the price of domestic gas can serve only one purpose – to reduce its consumption and production, is a prerequisite for

increasing its import, which also contradicts the declared thesis of gas import substitution in the country. So, the rental payment must be decreased and charged only from private producers with the establishment in absolute measurement – for different upstream conditions. In particular, when developing new fields, the rental rate should be zero.

The specific feature of the pricing policy in the European countries is the establishment of higher gas prices for households than for industrial companies. Unlike Russia, "cross-subsidization" has fully opposite content. The gas prices in the European countries do not depend on whether this country is its producer on its territory. Moreover, in Russia the wholesale gas price for the population is lower than the one set up for households.

The price formation of an electricity unit in different countries and their regions can have significant differences. This is influenced by a number of factors, such as consumption volumes, place of residence, the presence of central heating, electric stoves and the like. In Russia, the cost of electricity may vary in different districts. For example, in the Central Federal District is 1.6 times higher than in the Siberian Federal District (Cfrenergo, 2019).

Among the European countries studied, the highest level of electricity prices was recorded in Denmark. The country is a leader in Europe in terms of the efficiency of using renewable energy sources. In 2020, the Danish government intends to increase its share to 50%. The net cost of green electricity is much higher than hydrocarbon, as well as nuclear. In this case, main part of current extra costs are financed by the population. At the same time, the electricity price composition in Denmark has the largest share of taxes among the countries studied (Figure 3). Almost all the funds obtained are transferred to financing of green energy, as well as the development of a green economy and technology.

In Norway, the most part of electricity is produced by hydroelectric power plants. This allows reducing the price and improving the availability. At the same time, there can be uncontrolled price hikes, because of an unstable hydrological situation.

The production and consumption of all types of energy in the developed EU countries are accompanied by the improvement of regulatory instruments and advancement of investments into innovations. At the state level, there is an economic support of the sectors of the heat and energy complex, and they make a significant contribution to the technological development and employment of the population.

Regardless of the fact that the prime cost of the energy in Austria is much lower, taxes on energy renewal make up 17% of the electricity price for households (Figure 4), compared to Sweden - only 1%, the final price for households in these countries is almost the same and is about 12.5 euro cents. At the same time, in Sweden the component of environmental taxes is at the level of 7%, and in Austria – 3%. In addition, a significant difference in the price structure of these countries is that the price in Austria includes taxes, duties and fees, exceeding 1½ times their share in the Swedish price. If we compare the same energy price in Croatia and Portugal (10.28 euro cents), then we can identify the difference in the component of network costs. In the Croatian price, they have 3 times larger part. In Portugal, almost half of the components are duties, fees and taxes on renewable energy. Such approach is stipulated by the agreed strategy of the steady development of the country.

In Russia and Serbia there is almost the lowest price of one level (about 5 euro cents). But, Russia has 10% lower network costs, as well as there are taxes on energy renewal. Despite the fact that in Poland the network expenses are lower than in Portugal (the price is about 9 euro cents), but its composition includes a significant part of taxes on capacity (5%), renewal of energy (3%) and environmental taxes (7%). The Portuguese price has no such components due to the strategic direction of Poland towards sustainable development. Therefore, it is necessary to trace the influence of different types of pricing, to evaluate
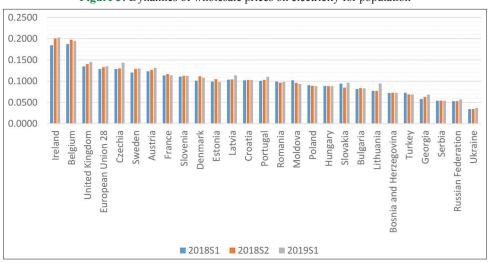
Figure 3: Dynamics of wholesale prices on electricity for population

Source: Created by authors based on the data (Eurostat, 2020a, 2020b; GlobalPetrolPrices, 2020a, 2020b)
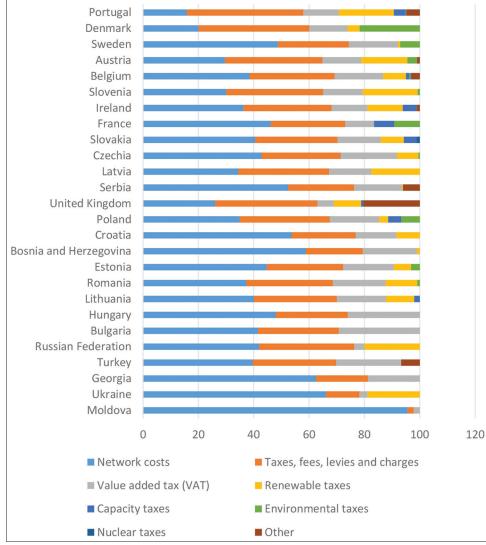
Figure 4: Components of prices on electricity for households (%)

Source: Created by authors based on the data (Eurostat, 2020a, 2020b; GlobalPetrolPrices, 2020a, 2020b)

their effectiveness by comparing EPI and country development performance according to the sustainable development global index SDGI and the global competitiveness index GCI (Figure 5).

Thus, we can define that the efficiency of pricing directly influences the level of the development and competitiveness of the country. The lower EPI is the higher effectiveness of the state development. We should highlight that there is low effectiveness of energy pricing in Moldova, Ukraine and Serbia, as EPI shows the overestimate of network costs and actual lack of the differentiation of components of the established price.

The high EPI and low SDI against GCI point out that there is a lack of effective energy price formation, which is specific for Russia. That is why; it is worth to review a structural content of gas and electricity prices in order to level up their components.

We can distinguish the following key items in the development of efficient energy pricing:
- First, gas and electricity prices for households should be determined based on market principles (considering supply

and demand) and with the differentiation of the component composition of the price structure in accordance with the country's development strategy
- Second, as an exception to the rule of energy market trade, the state can establish obligations for companies that are subjects of a "common economic interest," supply gas and electricity at regulated prices. Even so, this obligation should be clearly and transparently defined, under control, applied in a non-discriminatory manner, and have a deadline for use. The fulfillment of the obligation should not block access to the market for other companies
- Third, in case of the use of regulated gas and electricity prices in the domestic market the state must guarantee that the calculation method of the regulated price will be disclosed prior to the introduction of the price, and vice versa
- Fourth, in order to ensure effective competition and market functioning, a regulatory agency entrusted with the functions of setting regulated tariffs should be legally and functionally independent from any state body or private legal entity and have sufficient authorities for it. The decisions and procedures applied by the regulator must be impartial to all market participants.
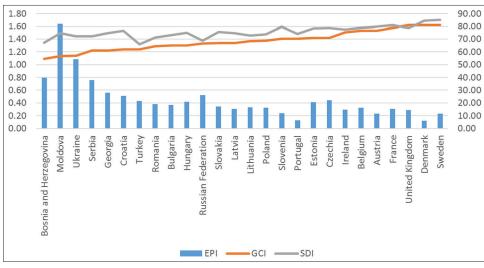
Figure 5: The efficiency of energy price formation based on EPI

Source: Created by authors based on the calculations done and data (Schwab, 2018; Sachs et al., 2019).

4. DISCUSSION

The formation of component composition of the price structure with the help of EPI can be grounded on the Extractive Industries Transparency Initiative, which is one of the mechanisms that promote transparency. Countries that have committed themselves to implement the extractive industries transparency initiative standard issue reports on payments by mining companies to the state, as well as on payments declared by the state as payments to the state budget. Thus, the process can be controlled by involved stakeholders, namely government bodies, civil society and representatives of companies (Moses, 2018).

For example, according to the Initiative standard, citizens will be able to have access to the information on tax and non-tax payments of mining companies, which helps to control their activities. In addition, this contributes to a positive investment climate, given the fact that the transparency in this sector of the economy allows investors who reduce their risks to be confident in concise regulation upon decision taking about starting investment (Sovacool et al., 2016).

The framework for determining EPI is mining revenues, which are allocated for the account of taxation. The taxation schemes for extracted mineral resources depend on the industry, in which the subsoil user operates, the volume of explored mineral resources and additional (specific) risks (Saik et al., 2018). Taxation schemes vary significantly in the context of national risk components (political, sovereign and legislative). Since the normal profitability of some investment projects on field development is higher in the country with high estimated risks, the taxation scheme should offer additional tax incentives or reduction to compensate for excess risks (Churin et al., 2019). The optimum ratio of tax instruments depends on the opportunities and preferences offered by a particular country. Thus, tax instruments oriented to the production volume are convenient from the administration point and provide stable budget revenues.

World practice specifies the means of tariff differentiation, which confirms EPI use. So, in Spain there was introduced the main principle of establishing electricity tariffs for consumers: unified national tariffs for industrial and domestic consumers, regardless of market fluctuations in the electricity price for different energy companies and regions of the country. To eliminate financial gaps of energy companies, the government established a compensation fund, the funds of which are used to regulate the financial losses of energy companies (Perez-Mora et al., 2019). In Italy single tariffs were set up in regions of the country for consumer groups, differentiated by the levels of electric power consumed (Moreno and Díaz, 2019). In Japan, tariffs for industrial and domestic consumers are differentiated by the volume of electricity consumption and regions of the country, but within 10% (Kim, 2019).

When analyzing the relationship between the EPI, the level of sustainable development and competitiveness of the country, special attention should be paid to the influence of the rent obtained from energy resources for the state economy as a factor of enhancing the talks on a balanced energy item with other countries. Since there is an inverse relationship between the level of the production of energy resources and the level of economic development, usually countries with low diversified economy generate a large amount of rents for energy resources. A higher level of energy resources in the country does not affect the formation of a higher rent. The highest revenue per product ton is observed in countries that are not among leaders in technological development of the economy and production. Thus, the level of reserves is not a key factor in the rent formation. Moreover, the global trend of the economy's dependence on the rent from energy resources is cyclical, and in recent years the dependence has been steadily decreasing (Ali and Sami, 2016; Rutledge, 2017; Filimonova et al., 2018). So, oil and gas are also the main source of tax revenues. Just as a few examples, oil and gas revenues made up 67% of budget revenues of the Kingdom of Saudi Arabia. They accounted for 90% of fiscal revenues in Kuwait, 75% of fiscal revenues in Qatar and 60% of fiscal revenues in Algeria. Besides,

oil and gas are dominated in the export of these countries. In 2018, oil and gas accounted for 80% of all exports of the Kingdom of Saudi Arabia, 90% of all exports of Kuwait, 86% of all exports of Qatar, 95% of all exports of Algeria (Tagliapietra, 2019).

Countries rich in oil and gas, as a rule, have used much higher resource rent in the form of a share in GDP. Obviously, with the exception of Kuwait, leading countries rich in oil and gas have shown remarkable growth parameters after state financial control. A country rich in natural resources can be in a strong position to strengthen resilience to external shocks from a cross-border financial crisis. Such a country could seek to perform a fiscal and monetary policy in a more aggressive manner in order to achieve macroeconomic goals compared to those countries that lack natural resources. Resource rents were the main driver for exceptional business investment growth in Australia during and after the GFC. Higher export revenues associated with resource rents are often distributed in the economy as increased salary payments, royalties, dividends and tax revenues, which can help to increase overall costs and demand within crisis period. The rental payment can also arouse a positive recovery in the economy, which, in turn, can lead to a rapid growth in stock market activity and cause positive wealth; effects that increase costs (Bashar and Bashar, 2019).

For each power generation technology with the use of renewable sources there is a limit to global prices on energy resources where the import of fossil fuels, subject to diversification of suppliers, is more profitable than the use of renewable energy sources (Chen et al., 2017). Today, the prices on energy resources in the world market is unfavorable for the development of a number of such technologies, in particular, this refers to the production of liquid biofuels. If these conditions are not met, then a country dependent on the import of energy resources with low technological power-consuming industry will inevitably go bankrupt.

We have to state that particularly such trends exist in Ukraine. At the same time, the import of energy resources has a decisive influence on the Ukrainian foreign trade balance. Apparently, the share of energy resources in the import of goods and services into Ukraine has been consistently high throughout all years of independence with a weak downward trend.

Almost all world countries both exporters and importers of energy resources as well as such countries as Ukraine – countries of energy transit interconnected under matters of ensuring energy safety (Pysar, 2018).

In this case, anyone should take into account the restricted character of the proposed EPI, since the absolute level of tariffs does not reflect the availability of electricity for the population. Therefore, for comparison, we can use the indicator of the electricity volume that citizens of the studied countries can purchase using their average incomes: the largest electricity volume per one salary can be purchased in Russia, Great Britain, Belgium, and less possible – in Ukraine, Moldova, Bulgaria (Riarating, 2020). The electricity price correlates with GDP per capita, so it becomes an important social factor and begins to be limited on the account of administrative funds.

In modern environment in order to ensure energy safety, main consumers and producers of energy resources adhere to such strategies: development of the shale hydrocarbon sector, which will help to increase its own production, reduce oil and gas import; increasing the share of renewable energy sources in the energy balance, which enables for importers to minimize their dependence on external suppliers, and for exporters – to satisfy demand and increase export by releasing carbohydrate-type volumes; the implementation of energy-efficient technologies to optimize consumption and help resisting environmental threats (Samawi et al., 2017).

5. CONCLUSIONS

Among the studied countries, the highest gas prices in Sweden, Denmark, Portugal, France and Ireland, this is associated not so much with the gas market as with the price of green electricity. Sweden is also the country with the smallest gas share in the energy balance (2%), therefore the gas in this country has the highest price among the countries of the European Union.

The structural content of identical gas prices in the studied countries showed their significant component difference: in Ireland, Portugal and France, the price is about EUR 21. In this case, in France the price comprises the largest part of ecological fees, compared with Ireland and Portugal.

In Ukraine, the issue of the reason of non-transparency in the gas industry is the increase in rental payment rates, since it is proposed to determine the price after the establishment of the rental payment. The government artificially inflates the rental rate in order to maximize the gas price that is produced in Ukraine. Therefore, the rental payment has to be decreased and charged only from private producers with the establishment in absolute measurement.

A specific feature of pricing policy in the European countries is the establishment of higher gas prices for households than for industrial companies. Unlike Russia, "cross-subsidization" has completely opposite content. Gas prices in the European countries do not depend on whether this country is its producer on its territory.

In Russia, the electricity price may vary in different districts. For example, in the Central Federal District is 1.6 times higher than in the Siberian Federal District.

Denmark is the European leader in the use of renewable energy resources and has the largest share of taxes in Europe in the electricity price. These funds are used for green energy, the development of the electric car market and the like. Regardless of the fact that the energy net cost in Austria makes up 17% of the electricity price for households, and includes energy renewal taxes, compared to Sweden (only 1%), the final price for households in these countries is almost the same and amounts to about 12.5 euro cents. At the same time, in Sweden the component of ecological taxes is at the level of 7%, and in Austria – 3%. In addition, a significant difference in the price structure of these countries is

that the price in Austria comprises taxes, duties and fees, exceeding 1½ times their share in the Swedish price.

In Russia and Serbia there is almost the lowest price of one level (about 5 euro cents). In this case, Russia has 10% lower network costs, as well as taxes on energy renewal. Despite the fact that in Poland the network costs are lower than in Portugal (the price is about 9 euro cents), but its composition includes a significant part of taxes on capacity, energy renewal and ecological taxes. In Portugal the price does not comprise such components due to the strategic trend in Poland towards sustainable development.

Pricing efficiency is interconnected with the level of development and competitiveness of the country: the lower EPI is the higher efficiency indices of the state development. Due to the low EPI based on excessive network costs and an actual lack of the differentiation in the components of the established price, there is low energy pricing efficiency in Moldova, Ukraine and Serbia. The high EPI and low SDI against GCI point out that there is a lack of effective energy price formation, which is specific for Russia. Thus, it is worth to review a structural content of gas and electricity prices in order to level up their components.

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