Public Subsidies – a Condition Sine Qua Non for the Energy Sector in Bulgaria?

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Abstract

The current paper deals with the provision of public subsidies within the energy sector in Bulgaria. In light of the liberalization of the domestic market and its integration into the internal electricity market of the EU, the question about public subsidies' persistence has been raised. Several arguments are given in support of further subsidization, both on the market for electricity and for capacity (cold reserve provision) in Bulgaria. Public subsidies secure funding for the positive externalities generated by the energy sector in a sustainable way. The public sector also provides financial support for the emerging Bulgarian market of capacity. Nevertheless, energy subsidies need a revision in terms of their restructuring in line with the EU ambition for leadership towards low-emission and climate-neutral economy by 2050.

Keywords: public subsidy, electricity sector, positive externalities, price "Obligations to the public", capacity market, cold reserve provision, market liberalization

JEL Code: H23, Q41, Q48

Introduction

The liberalization of the energy market in the EU dates back to 1996 when the First Energy Package was adopted. It initiated the unbundling of electricity generation, transmission and distribution, at that time vertically integrated in monolithic enterprises. The Package envisaged competition among producers with access to the grid at affordable prices. The Second Energy Package followed suit in 2003 requiring free entry of foreign power providers and the option for end-consumers to choose their suppliers. Later, the Third Energy Package provided for separating production and retail from transmission services and establishing a public regulatory body in all member states (Pepermans, 2019).

Public energy subsidies constitute transfers of financial resources from the government/its institution(s) to electricity producers, users, and/or their related parties. The former can be provided in different ways – as budgetary and extra-budgetary outlays, tax incentives, loans with subsidized interest rates, preferential access to natural resources and markets, etc. (EEA, 2004). According to an axiomatic rule, the liberalized market and public subsidies are incompatible. Nevertheless, in 2017 the total amount of energy subsidies worldwide was $637 billion, and it is estimated that by 2050 they would decline to $475 billion per year, i.e. 25% lower than in 2017 (IEA, OECD). The worldwide deployment of public subsidies begs the question of their economic rationale in light of the ongoing process of energy market liberalization.

1. Public subsidy and the energy sector's obligations to society in Bulgaria

The output of the energy sector is an essential input for any economic activity. Despite its crucial position throughout the value chain, the energy sector has so far been associated with damages to the environment – greenhouse gas (GHG) emissions, climate change, deteriorating public and individual health's status, etc. They are all consequences of fossil fuel combustion in the course of electricity generation. Fossil fuels have been slowly replaced by renewables in order to reach climate neutrality (Fit for 55; EU Green Deal). Along with water, biomass and wind, the improved energy efficiency constitutes another energy source as it helps use less non-renewables.

The latter are cheaper than the renewables and technologies based on them, which is true only in terms of the private marginal cost for electricity provision. Should the externalities generated also be taken into account, the social marginal cost of clean power turns out to be less than the cost of power produced from fossil fuels (Timmons et al., 2014). Such cost effectiveness can be attributed to the less negative externalities derived from green electricity with reference to its impact on the environment, climate, public and private health. As the electrical power's production from renewables reduces the negative externalities, its social marginal costs also decrease. In other words, clean power contributes to a healthier environment, which is its positive externality. Electricity from fossil fuels also provides positive externality since the former contributes to the reliability of the current system of power provision (supply).

In a more abstract way, energy security and efficiency together with environmental and public health protection are subjects of study in public finance and public sector economics. There is a case of a market failure where the provision of a private good is associated with positive externalities throughout its final use (Musgrave et al., 1989; Rosen et al., 2021; Brown et al., 1998). The above-mentioned case fits into the constellation on the energy market. Within its consumption, the private good (electricity) simultaneously generates private and social benefits. The latter encompass energy security and efficiency, better environmental and public health protection. Their provision imposes additional cost on power plants, leading to marginal private costs exceeding the marginal social ones.

In order to return to an efficient outcome on the energy market, a public institution (the government, the public energy regulator or any other authority in charge) intervenes to financially support power companies for the additional benefits generated. Through subsidizing them, the government secures their further provision since it is beneficial for the society. Thus, the efficient market operation provides an argument for the consistent deployment of public subsidies for the energy sector.

Another argument for the future provision of subsidies is the design of the pubic financial support per se. One of its particular features has been highlighted in public finance literature - funds needed for the positive externalities' provision are disbursed and collected among practically all end users, while the benefits (i.e. the public subsidies) are targeted at few energy producers (Buchanan et al., 1962; Peltzman, 1976; Wilson, 1974). The *diffusion of costs and concentration of benefits* have its rationale: costs become bearable and their payers – ignorant of the burden imposed. At the same time, a small group of beneficiaries becomes better off.

The "smart" cost and benefits distribution also contributes to the persistence of the public subsidies for the electricity producers (Lovi, 1964). The latter can be assigned to the "production" of different positive externalities. Green electricity does not damage the environment and public health as much as power from fossil fuels does, while co-generation facilities promote energy efficiency by producing either electricity or heat from the same primary energy source.

Parallel to the ongoing process of market liberalization, public subsidies for the energy sector apply also in Bulgaria. Two market segments operate simultaneously. On the Bulgarian Independent Energy Exchange (IBEX)[1], business-consumers contract electricity at clearing prices, while households pay for it on the regulated segment at prices approved by the Energy and Water Regulatory Commission, KEVR. This setting is unique in the EU, but it will disappear *when/if* liberalization is completed in Bulgaria (Regulation (EU) 2019/943; Strategiya za ustojchivo energijno razvitie, 2020).

Businesses and households fund the public subsidy for electricity, while KEVR approves the annual amount and structure of the additional cost incurred by power plants in order to achieve positive externalities: reliable supply, energy efficiency, environment and public health protection. The costs constitute the so-called *price "Obligations to the public"*[2] (Energy Sector Act, Art.30 (1), point 17; Art. 35). The more sophisticated the scope of the public interest in the electricity sector becomes, the more public policy aspects the price "Obligations to the public" (POP) would cover.

It consists of a sum of different kinds of subsidies. They are paid via the electricity bills by all end-consumers, the national grid operator and the electricity distribution companies. Thus, the

[1] It is the free electricity market.

[2] The translation in this paper follows the English version of the Energy Sector Act in Bulgaria.

whole amount of the price is disbursed among all liable individuals and companies, which makes the burden of the subsidy almost invisible for them. In Bulgaria, only business clients are provided with a breakdown of each component of their regular monthly electricity bills, while this is not the case with households. The latter receive bills without any details about the different “ingredients” of the electricity price.

Figure 1 below provides statistical data on the components, of which the POP consists throughout the 2017-21 period. The different kinds of subsidies reflect the obligations to the public the electricity sector in Bulgaria is charged with.

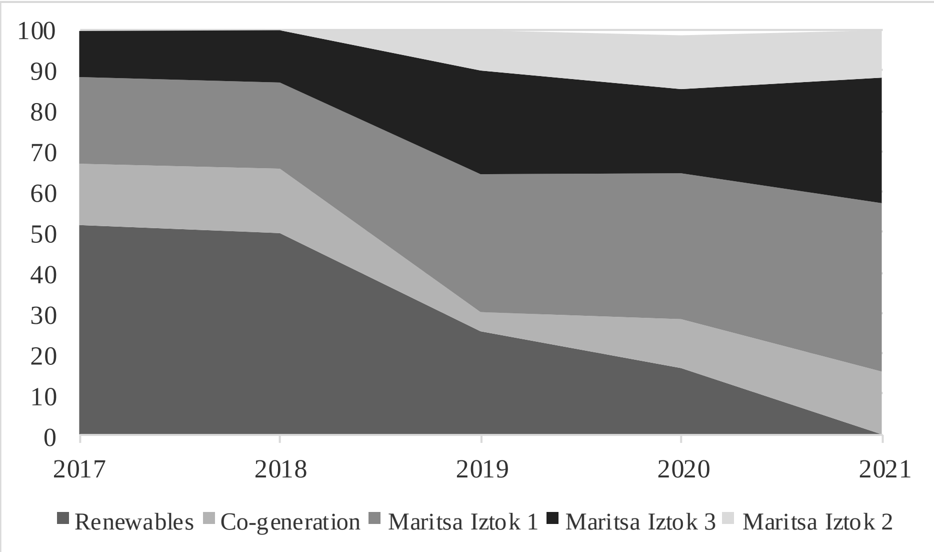

Figure 1. Structure of the price “Obligations to the public” in Bulgaria (in %)

Source: Author’s presentation based on: KEVR. Decision for price regulation in electricity sector in Bulgaria, different years.

In 2017 and 2018, the subsidy rate for electricity from renewables is almost 1/2 of the total price per MWh, which is consistent with the financial incentives adopted for electricity from renewables and co-generation. Since early 2010, it is purchased at preferential prices or with premiums (Energy Sector Act, Art. 33a, 162, 162a; Energy from Renewable Sources Act, Art. 24). Both measures account for a public subsidy funded by the POP paid by all end users.

In 2021, *the unit subsidy* for clean electrical power drops to zero (figure 1). This “movement” is due to the market liberalization as more and more green electricity producers sell their output on the IBEX. There, the clearing price/MWh is higher than the weighted average one predicted and approved by the Water and Energy Regulatory Commission for the regulated market (IBEX, KEVR). As the subsidy for clean electricity is the difference between the preferential and KEVR’s prediction of the market price, green energy producers receive a consistently declining amount of subsidy per MWh.

The private thermal power plants “Maritsa Iztok -1” and “Maritsa Iztok -3” (MI-1 and MI-3) are also eligible for and receive public subsidies. Their cumulative shares in the total amount of financial support tend to increase – from 60% in 2019 to 73% in 2021. In both private power plants’contracts concluded at the time of their privatization in the beginning of the XXI century, the government accepted on behalf of end-users to pay for the electricity at higher preferential prices. Thereby, MI-1 and MI-3 are capable of securing a stable return on their investment in the long term. Both enterprises are coal-fired and in the past undertook investment programs in order to respond to the environmental stringency in the EU.

As can be seen in figure 1 above, the scope of subsidies included in the POP has widened since 2019. Along with private MI-1 and MI-3, the state-owned power plant Maritsa Iztok – 2 (MI-2) has become eligible for public financial support that compromises market liberalization. Why? Firstly, since 2014 the state-owned power plant has been operating at a financial loss. It has risen to BGN 340 mln. by the end of 2020, while new financial loss of BGN 247,2 mln. has been added by 30 June 2021 (Interim financial statement, 2021). Secondly, for the period 2013-20 MI-2 received its CO2 allowances *free of charge*, which is state aid allowed by EU law (Directive 2003/87, Art. 10c, §5). Thirdly, despite the grandfathering of carbon dioxide allowances, the state-owned power plant did not manage to refurbish its production assets in terms of a better protection of the environment and public health. Thus, MI-2 still damages air quality and public health in terms of higher SO2 and fine particle matter's concentration (European Parliament, 2019).

With reference to the arguments raised above, MI-2 does not contribute to the social commitments, to which the energy sector adheres. Nevertheless, the enterprise benefits from the public subsidy included in the electricity supply POP since with its installed capacity of 1610 MW the plant is crucial for the secure electricity generation and supply. Moreover, MI-2 employs directly more than 2 000 people, which is important to the regional and national economy (Interim report on activities, 2021).

Having regard to the different components of the POP and its dynamics throughout the considered period, it can be concluded that there are sound economic arguments for establishing the price for obligations to the public. However, its structure is worth revisiting as the MI-1 and MI-3 long-term contracts expire after 2025, while coal exit and energy transition top the current agenda of the energy sector in the EU.

The revision of the POP and its structure becomes even an emergency measure on the background of soaring wholesale prices of electricity since the beginning of the regulatory period 01.07.2021 – 30.06.2022. With reference to the prices on the IBEX since August 2021, the subsidies included in the POP, may be cut temporarily in order to contain the energy price hike for businesses and households.

2. Capacity markets on the crossroad between public subsidy and energy market liberalization

Some features of the electricity market make it different from the benchmark one studied in economics. Firstly, either consumers or producers of electricity behave in a price-inelastic manner. Consumers usually are not capable of responding to real time prices, while producers are not willing to store electricity, which is costly and difficult (Cramton et al., 2103; Lockwood, 2017). Thus, if the capacity for power generation becomes insufficient (the supply being also price-inelastic), the demand has to be rationed through blackouts. One feasible approach to avoid them is to rely on higher spot prices, with the option of having administrative ones set for the period of insufficient capacity.

“Setting higher scarcity prices enhances reliability in providing stronger investment incentives” (Cramton, 2017). However, in order to prevent prices from rising rapidly in response to the scarce fixed supply, the government or any other regulatory body sets up an upper limit beyond which no fluctuation is “allowed”. This upper limit (cap) corresponds also to the price setting of a public regulatory body, which adopts a social function to protect vulnerable households and individuals from energy poverty.

According to some scholars, to achieve an optimal market outcome, the maximum price is to be set up to the point where the costs of the investor in a power plant's capacity equal the price the client is willing to pay to avoid blackouts (Joskow et al., 2007). Notwithstanding this efficient setting of the price cap for electricity, in reality the upper limit is lower than in theory. The experience in the past lets investors feel pessimistic that if the supply of power becomes scarce, its price will not spike high enough due to the fact that the public regulator is seeking to contain its growth. Thereby, companies that invest in capacity for power generation would not be able to cover their capital expenditure, which leads to the missing money phenomenon (Joskow, 2008).

In order to protect the electricity system from its vulnerability to high prices in case of an emergency, a quantity-based approach is adopted (Lockwood, 2017). It leads to the establishing of a capacity market for electricity. The public regulatory body adjusts in advance that amount of capacity for which the investors' cost of providing an additional unit of capacity equals the consumer's value of the lost electricity supply.

In order to secure reliable provision of power, the government is willing to pay a subsidy. The latter is owed not for mere electricity (it may be not generated at all), but for *the guarantee* provided by the power plant/s for avoiding possible blackout/s. *The security of the electricity supply* becomes a good with *external benefit* conferred to society in addition to the generated power itself. Therefore, the security of the power supply is an abstract concept very close to the notion of positive externality discussed in the previous paragraph of this paper.

The evolution of electricity markets towards liberalization shows a few clear-cut types of the mechanism of capacity's design and implementation. The first one is known as *strategic reserve* and is based on capacities for electricity generation reserved outside the energy market. The capacity becomes operational *only* in cases of an emergency for the energy supply, i.e. under extreme climate conditions and/or accident. The government payments for available capacity are determined at competitive auctions. They are organized several years or at least one year ahead of the expected "delivery" date[3]. This type of capacity mechanism has been operational in Germany and Belgium since 2018.

Another way to design a mechanism for capacity is through regularly held auctions. The particular capacities for electricity generation are determined in a centralized manner by the operator of the national grid or by the public regulator. All power plants are allowed to take part: incumbent or new; private or state-owned, etc. They bid the rate per MWh (the price) at which they are willing to "deliver" an externality in terms of the security of the electricity supply. At the auctions the clearing price is the lowest one offered for a capacity available. An auction based mechanism for capacity is cost-effective in terms of the public expenditures paid for it (UK, Italy, Poland) (Lockwood, 2017; Gawlikowska-Fyk, 2019).

A particular type of the capacity mechanism are the intermittent schemes. These are used to financially compensate consumers who are willing to change their electricity consumption at the requirement (warning) of the national grid operator. The latter determines any case of emergency occurred within the electricity system's operation. The intermittent schemes were approved by the Commission in 2018 for France and Greece.

Before choosing and implementing the mechanism for capacity, any member state asks the Commission for approval, since this institution is in charge of competition rules and their enforcement EU-wide. Therefore, any payments related to the mechanism for capacity constitute a public subsidy.

Despite energy market liberalization, few governments in the EU do not hold auctions for allocation of capacity. Therefore, the price/MWh is administered or contracted between the government and other (private) parties. Non-transparent procedures usually hide "a risk of overpayment and subsidizing" the capacity provider/s (Commission, 2016). The outcome is inflated public subsidies, detached from the respective market constellations.

The coal-fired power plants in Bulgaria usually provide cold reserve to the electricity system. The nuclear power plant in this country is excluded due to its project characteristics (KEVR, 2017). The cold reserve is allocated through auctions held monthly, half-a-yearly, annually or extraordinarily by the national grid operator, Energien sistemen operator (ESO Auction Rules, Art. 3.1.). The power plants winning the competition at the auction sign an agreement with the national grid operator (ESO), accepting its requirement to reach their maximum capacity within 9

[33] Delivery here concerns date for delivery of available capacity.

hours after warning in case of an emergency for the electricity supply (ESO Auction Rules, Art.1).

The mechanism of capacity rules foresee that cold reserve providers do not sale electricity to the public supplier, while securing reliable capacity (ESO Auction Rules, Art. 3.3 (4)). This provision requires power plants to take off the current market the assets that guarantee the cold reserve. In the meantime, the rest of their assets is used for electricity generation and sales.

In order to be more expeditiously connected to the grid in case of emergency[4], power plants in Bulgaria started to bid the so-called *additional services*. Their purpose is to maintain the frequency of the electricity transmission grid at 50 Hz. This technical feature allows renewable energy providers to connect to the grid if an emergency occurs too. In addition, large industrial consumers can also participate at the auctions. Thereby, the capacity market widens its potential and scope since big industrial enterprises are also contracted to reduce their energy consumption if required by the grid operator in periods of a peak demand.

Statistical data on the amount of public subsidy paid for the cold reserve in Bulgaria have not been published by the National Statistical Institute yet. The former is available in the archive of KEVR that consists of many decisions regulating different aspects of the water and energy sector (figure 2).

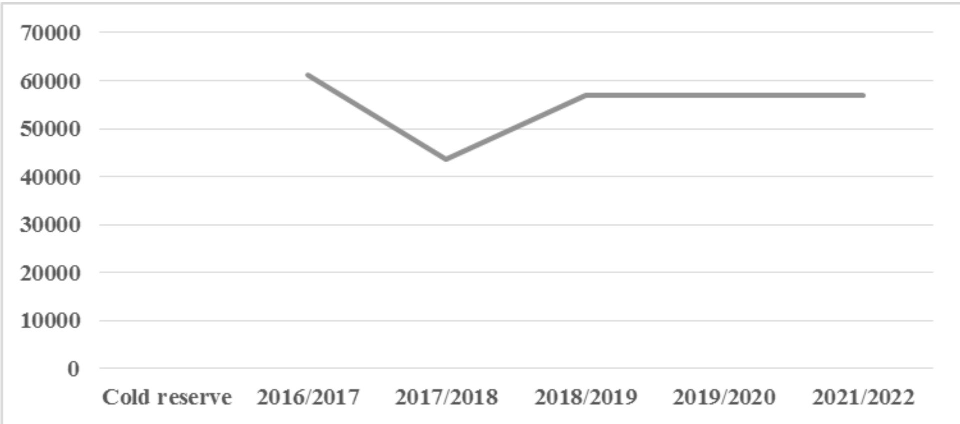

Figure 2: Government payments for cold reserve in Bulgaria, (in 000 BGN)

Source: Author's presentation based on: KEVR. Decision for price regulation in the electricity sector in Bulgaria, different years.

On behalf of cold reserve providers, the transmission system operator usually claims reimbursement for the higher costs incurred for the capacities tendered, while the Water and Energy Regulative Commission tries to contain payments' growth. In the considered period, the public expenditures for cold reserve were determined in a '*no competition'* setting in terms of providers and technology of power generation. The highest amount for capacity (above BGN 61 mln.) was paid in the very cold winter of 2017. Despite that the cold reserve has been raised from 500 MW to 650 MW (Ordinance of the Minister of Energy, 2018), since 2017-18 the public regulator has approved for three years in a row a lower amount for remuneration (approx. BGN 57 mln.). In the 2020-21 regulatory period, the government stopped holding auctions for a while and allocated the whole cold reserve capacity to the state-owned power plant "Maritsa Iztok - 2", which is a breach to competition.

In spite of the liberalisation on the energy market, the design of the mechanism for capacity in Bulgaria seems incomplete. The rate per MWh for remunerating stability of the electricity supply shall cover the full fixed costs and part of the flexible ones. The latter consist of the purchasing cost for energy sources and CO_2 emission allowances in case electricity is generated from fossil fuels

[4] Within 15 minutes instead within 9 hours previously required in the ESO's Rules.

(coal, natural gas). Therefore, the coal exit and energy transition are going to shape the country's mechanism for capacity in the future (Ivanov, 2020; Kuyumdjiev, 2020).

Its operation envisages a transition from the strategic reserve to the genuine capacity market with some important features. Firstly, the whole capacity of the power plants winning the auction will be operable - allowing providers to sell power to the market, while keeping some capacity ready in case the electricity supply is compromised. Secondly, in light of the market liberalization, the new design allows the national grid operator to purchase available capacity via auctions – both from domestic and foreign providers (Energy Sector Act, Art. 1 and 2). Thirdly, neutrality in terms of primary energy sources, technologies, domiciles and business history is fundamental for the operation of the emerging capacity market. Fourthly, the European Commission binds coal-fired power plants' participation at the auctions for capacity with the carbon content of the primary energy sources for electricity generation.

Secondary EU law sets out more stringent requirements for capacity mechanisms, including a CO2 emission limit of 550 g CO2/kWh. If the auction based capacity market operates, the emissions performance standard will apply to the new plants from 2020 and to the existing ones from 1 July 2025 (REGULATION, 2019; Gawlikowska – Fyk, 2019). Setting the carbon dioxide limit in practice precludes the use of coal and coal-fired power plants as capacity providers in Bulgaria after 2025.

Having regard to the features of the new mechanism for capacity, some further highlights referring to the public subsidies for energy can be drawn. Firstly, the liberalization of the energy market leads to also establishing of a new market for capacity. Secondly, the latter contributes to higher cost effectiveness and better transparency of the public subsidies provision, which is due to the regular auctions. Thirdly, public outlays will persist at least until 2025 unless there are amendments to EU regulation 2019/943.

Conclusion

Despite the sound theoretical arguments in favor of public energy subsidies, the latter need a reform any time they adversely influence the economy. This concerns the subsidies for the coal-fired power plants in the Maritsa basin. The peaking energy prices provide an argument for an immediate revision and optimization of the subsidies included in the price "Obligations to the public" in Bulgaria. Its abolishment would reduce the electricity costs for the businesses and households temporarily in the short term. However, this measure is not adequate to resolve in a sustainable manner the long-term imbalances and institutional failures accumulated throughout the energy sector in Bulgaria. Beyond the electricity itself, the energy producers provide a set of social benefits, which require further provision of public subsidies.

References

1. Brown, C.V. and P.M. Jackson (1990). *Public sector economics.* Cambridge: Blackwell.
2. Buchanan J. and G. Tullock (1962) *The Calculus of Consent: Logical Foundations for Constitutional Democracy*. Michigan: The University of Michigan Press.
3. Council of Ministers of Bulgaria (2021) National Plan for Recovery and Resilience of the Republic of Bulgaria. Available from: https://www.nextgeneration.bg/ [Accessed 09/10/2021].
4. Cramton, P. (2017) Electricity market design. *Oxford Review of Economic Policy*. 33(4). pp. 589–612.
5. Directive 2003/87/EC of the European Parliament and of the Council from 13 October 2003 establishing the EU Emission Trading Scheme. OJ L 275/32, pp.78-93.
6. EEA (2004) *Energy subsidies in the European Union, a brief overview*. Technical Report №1. Copenhagen: EEA.
7. European Parliament (2019) Notice to members. [Online] Available from: https://www.europarl.europa.eu/doceo/document/PETI-CM-426986_EN.pdf?redirect [Accessed 22/10/2021).

8. Energy and Water Regulating Commission (2017-21). Decision for Price Setting in the Electricity Sector in Bulgaria. Available from: www.kevr.bg [Accessed 02/07/2021]
9. Energy from Renewable Sources Act, State Gazette No 35/3.05.2011, last amend. and suppl. SG No38/8.05.2018.
10. Energy Sector Act, State Gazette No107/9.12.2003, last amend. and suppl. SG No21/12.03.2021.
11. European Commission (2019). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS The European Green Deal. COM/2019/640 final. [Online] Available from: https://eur-lex.europa.eu/legal content [Accessed 20/10/2021].
12. Gawlikowska – Fyk, A. (2019) *Capacity market for review*. *Analysis of the results of three auctions*. Warczawa: Forum Energii.
13. Hogan, W. (2013) Electricity scarcity pricing through operating reserves. *Economics of Energy and Environmental Policy*. 2(2). pp. 65–86.
14. IEA (2020) *European Union 2020. Energy policy review*. Vienna: IEA.
15. Ivanov, A. (2020). Garantirane na elektoenergijnia i mostnostnia balans na stranata v horizont 2030-2050 godina. *Energetika. Elektroenergijni rakursi.* Broy 4, Fevruari. pp. 31 – 34.
16. Kuyumdjiev, D. (2020). Budesteto na vaglishtnite centrali v Bulgaria. *Energetika. Elektroenergijni rakursi.* Broy 4, Fevruari. pp. 22-30.
17. Joskow, P. and Tirole, J. (2007) Reliability and competitive electricity markets. *RAND Journal of Economics*. 38(1). pp. 60–84.
18. Lockwood, M. (2017) The Development of the Capacity Market for Electricity in the UK. EPG Working Paper 1702.
19. Lowi, T. J. (1964) American Business, Public Policy, Case Studies, and Political Theory, *World Politics.* 16. pp. 677-715.
20. Ministry of energy (2018). Ordinance No E-RD-16-124/23.03.2018 by the Minister of Energy in Bulgaria. Available from: www.me.bg [Accessed 27/07/2021].
21. Ministry of energy (2020). Strategiya za ustoichivo energijno razvitie na Republika Bulgaria do 2030 godina s horizont do 2050 - Project.
22. Ministry of Energy and Ministry of Environment and Water. (2020) Integrated Plan for Energy and Climate of the Republic of Bulgaria.
23. Musgrave R.A. and Musgrave P.B. (1989) *Public Finance in Theory and Practice.*5-th ed. NY: McGraw-Hill Book Company.
24. Newbery, D. (2016) Missing money and missing markets: Reliability, capacity auctions and interconnectors. *Energy Policy*. 94. pp. 401–410.
25. Peltzman, S. (1976) Toward a More General Theory of Regulation. *The Journal of Law and Economics*. 19. pp. 211-248.
26. Peppermans, G. (2018) European Energy Market Liberalization: Experiences and Challenges. *International Journal of Economic Policy Studies*. 13. pp. 3-26.
27. Power plant “Maritsa Iztok - 2” (2021). Interim financial statement on the comprehensive income, 30 June 2021. [Online] Available from: https://bgenh.com [Accessed 12/09/2021].
28. Power plant “Maritsa Iztok - 2” (2021). Interim Report on activities, 30 June 2021. [Online] Available from: https://bgenh.com/storage/app/public/uploads/files/finans/2021/30.06/FS_individual_TPP_Q2_2021_BG.pdf [Accessed 05/10/2021].
29. REGULATION (EU) 2019/943 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the internal market for electricity. Official Journal of the EU, L 158/54, 14.06.2019.
30. Rosen, H. S. and Gayer, T. (2021) *Public Finance.* Global ed. McGraw-Hill Interamericana de España S.L.
31. Stoft, S. (2002), *Power System Economics.* IEEE Press.
32. Timmons, D., Harris, J. and Roach, B. (2014) *The Economics of Renewable Energy.* Global Development and Environment Institute: Tufts University.
33. Wilson, J. Q. (1974) The Politics of Regulation in: J. W. McKie, ed., *Social Responsibility and the Business Predicament*. Washington, D. C: The Brookings Institution, pp. 136-68.
34. https://ec.europa.eu/commission/presscorner/detail/bg/IP_16_1372 [Accessed 18/07/2021].