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Methods to Evaluate Electricity Policy from Climate Perspective

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***Abstract* – Nowadays government policies to mitigate climate change are of a wide variety and they are evaluated before and after implementation. Much research has been conducted on how climate change policy will affect the climate. However, there is very little research on policies that are not intended to mitigate or reduce climate change and which, from the policy makers' point of view, have no relation to climate change. The goal of this study is to review the electricity policy in Latvia and the aspects that can be evaluated under this policy, and apply multiple-criteria analysis to determine on what spheres the electricity policy leaves the most positive impact – is it climate or are they consumers and other electricity market players? The outcome of the analysis shows that, at the national level, the most positive impact on climate is provided by the National Energy and Climate Plan, indicating that climate is taken into consideration mostly only under complex multi-sectoral legislation.**

***Keywords* – Climate change; electricity policy; multi-criteria analysis**

1. INTRODUCTION

A well-functioning internal energy market is crucial to provide Europe with secure, sustainable and affordable energy supply [1]. To ensure such an internal energy market, it is necessary to implement a sound national electricity policy, which may include the development of national legislation, regional cooperation, different political decisions (such as development of national and cross border infrastructure). All these actions are closely related to different monetary investments both from the national and EU financial resources. The EU internal energy market can be related to both the electricity and gas markets; however, to narrow down the research, this article will further focus on the internal electricity market. All the actions performed to ensure a well-functioning internal energy market can be viewed and evaluated from different perspectives – how much will it cost? will it be sustainable? what political or technical problems of the internal electricity market will it solve?, etc.

In this time of climate change and ever-increasing EU-level ambitions for mitigating climate change until 2030 by reducing greenhouse gas emissions, by increasing renewable energy use and by improving energy efficiency [2], it would be essential to evaluate both the political and technical actions in the electricity sector from the climate perspective, i.e., to measure the impact on climate. In a case study, this article will define the current draft legislation and concepts in electricity policy in Latvia, the criteria for their evaluation to evaluate the impact of this draft legislation and concepts on the determined criteria, including climate.

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2. METHODS AND PROCEDURES

Policy-making is a complex process, where it needs to be considered that decisions may lead to significant changes and socio-economic impact. In the context of climate change, the policy decisions are often evaluated only from the perspective of the actions they envisage for improving the climate. This can become a problem. For example, will the increase in carbon prices to promote the electrification also increase the electricity price and thus reduce the availability of energy for those, who cannot pay more? This would basically lead to energy poverty. Or, another example – can the support for biofuels lead to harsh land use change and eventually to water and food shortage? There are also specific policy examples in Latvia, which provide situations, where it is intended to be helpful on the one hand, but unfortunately the policy introduces negative side effects, such as the case of energy efficiency measures for manufacturers versus economic benefits for energy-intensive manufacturers under the mandatory procurement payment scheme, where the manufacturer may opt for keeping the economic benefit instead of introducing energy efficiency measures [3]. To evaluate the policy impact, it is necessary to have an impact assessment [4].

As it is further discussed, this research is focused on energy policy from two aspects – there is the actual draft legislation, which is one part of energy policy, and there are concepts and physical projects (such as infrastructure projects), which make the other part of energy policy.

When new physical infrastructure projects are implemented, the environmental impact assessment is used to evaluate the possible impact that this project can leave and the necessary actions to mitigate those impacts. Each project's impacts on environment are systematically compiled. The analysis of impacts begins with identification of the impacts and after that the impact assessment and forecasting take place. The impact assessments and forecasting phase of the analysis is very essential as it shows the risks for the environment [4], [5].

Modelling is the imitation of real-life situation with mathematical equations in order to forecast the future developments of a situation. It is an analytical instrument, which allows to quantify the aspects that may affect the environment. Often the models use IT technologies (computer models) to forecast the chemical and physical impact of an action in the environment. A model can help to explain the environment as a system and to research the impact of different environmental components as well as to give forecasts on their behaviour [4].

When showing a version of simple environmental system mathematically, it is possible to understand, examine and compare reasonable alternative scenarios. The development of a model includes derivation of mathematical equations. As per the research of Okpala et al., the development process of a model is the following:

1. Conduct monitoring of the system;
2. Gather existing data;
3. Make a link by using mathematical equations;
4. Calibrate the equation;
5. Validate the model;
6. Use the model for forecasting [4].

It is important to set the purpose of the model to explain the usage of a specific model. The purpose of the model will influence the necessary modelling works. Mathematical modelling and forecasting verify, how effectively a limited amount of data is used in decision making. Meanwhile, the conceptualization of a model is a process, where data, which reflects the circumstances are systematically compiled in order to describe the environment as the behaviour of the system and to research the impacts of different environmental components.

The tools of conceptualization of a model sets the approach for modelling and the model of the program [4].

The calibration of a model is a process, which sets the representative values of the model's parameters by using the available set of data. The calibration consists of changing the input data to match the environmental conditions with acceptable criteria. It is necessary that the environmental conditions of the project are correctly described. Lack of correct characterization can produce a model calibrated for a set of conditions which do not represent the real environmental conditions for the specific situation. Finally, there is the sensitivity analysis, which is a process, whereby different input data of the model are switched in a reasonable range and the relative changes are observed. Data for which the model is sensitive enough would need further research in comparison to data which is relatively insensitive. The calibrated model is verified before being used for effective forecasting [4].

Before using a specific model, it is necessary to identify the methodology, which allows to evaluate, what the essential aspects are and how they are dealt with in the energy policy. From the authors' point of view, it would first be important to separate actions based on their geographical scope – EU-level actions, regional actions (in case of Latvia, this mostly means actions taken together with Lithuania and Estonia) and national actions. The EU-level actions driven by the European Commission are already now focused on climate change. Meanwhile, the regional actions are understandably based on national interests, which often are considered only from the economic and specific narrow political point of view (e.g. national security), without considering the climate perspective. Thus, regional actions are often consistent with the national actions and it is important to evaluate the climate perspective for both national and regional decisions.

Secondly, from the policy perspective, all actions could be divided into three fields:

1. Legislative or non-legislative actions that affect the consumer such as opening of the electricity market, protection of vulnerable consumers, tariff policies, etc.;
2. Legislative or non-legislative actions that affect electricity market participants which provide services for consumers. This may include trade in general (such as trade with third countries), tariff policies, development of new services (such as demand response), etc.;
3. Legislative or non-legislative actions concerning energy security such as development of infrastructure, synchronization of the Baltic electricity grid with the European grid, trade with third countries, etc.

As it can be seen, different national actions may affect more than one of the fields set out above. From the political point of view, in most situations, the more fields the action improves, the more desirable and effective the action. Based on author's vast experience in the public administration, if the action is regional, it is an excellent opportunity for great results as the regional cooperation provides a common position on the issue and it is a more effective way to achieve goals that are similar or equal in the region.

At the same time, it is *a priori* understandable that some policy decisions do not leave any impact on the environment or it is so indirect that this impact is practically impossible to evaluate. However, with traditional modelling tools it is possible to evaluate regional infrastructure projects that are developed for energy supply security reasons and can be included in the above-mentioned third field.

There are several questions to be answered despite the geographical scope of the action:

- Will the action increase the usage of fossil fuels?
- Will this action require extensive deforestation?
- Will the action involve land use change?

– Is there or will there be an environmental impact assessment made for this action?

Several other characteristic questions can be developed. The more the answers "yes", the worse is the project.

Meanwhile, as described above, there are several existing models, which quantify the impact of a project on the environment. One of the tools, which can analyse the impact on the environment is ECO-it, which uses eco-indicators in order to determine a product's/process's environmental impact by one numerical value. It is a rather simple tool to use. The higher the result, the higher the impact. There are 5 steps needed to be followed (Fig. 1) to ensure correct use of the model [6].

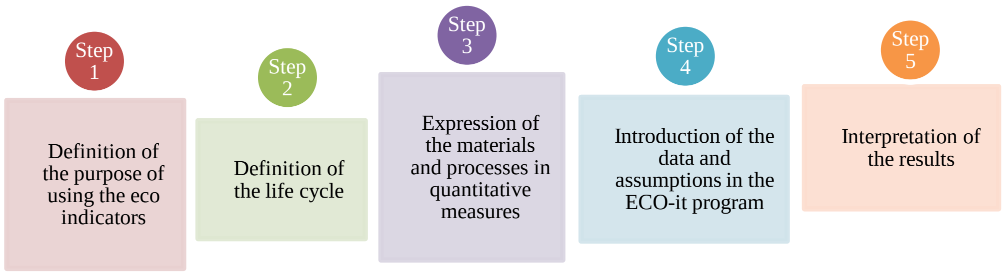

Fig. 1. Step-by-step principle implemented in the model.

In the first step, it is necessary to clearly describe the product and the product components (or in case of infrastructure projects, it can be the planned infrastructure and its' materials), which are analysed. It should be defined, whether the analysis is made as a project analysis or a comparison between different projects. At the end of the first step, the level of accuracy should be defined. If the purpose of the calculations is to define the overall impact of the product (project) on the environment, it is enough to use only the main parameters. It will result in the initial estimate results [6].

The second step includes a schematic overview of the project life cycle during its' whole live time. In the third step it is important to set the functional unit, as well as to quantify all the relevant processes from the process tree. In the fourth step, the specific components and processes are defined and included in the model with specific quantities. Finally, in the fifth step the initial conclusions need to be aligned with the results. It is essential to define the effects rising from uncertainty and assumptions and to define, whether the purpose is achieved [6].

Besides such models as ECO-it, there is a special type of environmental impact assessment that is used in strategic decision making. It is called Strategic Environmental Assessment or SEA. Therivel (2010) describes SEA as "a process that aims to integrate environmental and sustainability into strategic decision-making" [7]. It is a specific instrument that helps to avoid impacts of proposed projects [8]. SEA means that the environmental aspects are required to be integrated, when preparing any plans and programs and it needs to be used before the adoption of the actions proposed within the plans and programs [9]. As reported by the International Association for Impact Assessment, the SEA can be used for such topics as natural resources, social, cultural and economic conditions [10]. While Environmental Impact Assessment is used for projects, the SEA can also evaluate policies, decisions etc., thus it is more appropriate for government-level decisions.

SEA has three main characteristics:

1. It is used to prepare a document that needs government approval. It can be both a plan

or a program;
2. The main aim of it is to show what are the environmental effects or consequences for the proposed documents;
3. The standard methodology is very similar to EIA, with such steps as screening, scoping, assessment, mitigation, decision and monitoring [11].

For example, in Latvia, the strategic environmental assessment is compulsory since 2004 for several types of documents such as national level development plans, sectoral policy plans, national level territory planning documents, etc. However, it is not compulsory for regional-level energy infrastructure, because it is not a plan, these are projects promoted mostly by transmission system operators and the government just gives the approval and special conditions if the project receives status of a project of national interest.

To evaluate policies, it is also possible to use multiple-criteria analysis (further on – MCA), which can help to decide on the best choice by using multiple and sometimes even conflicting criteria in order to achieve the desired result [12]. MCA is also categorized as a sub-discipline of operations research, which is used in solving difficult problems with multiple points of view [13]. To aid the decision-making process, many objectives can be chosen – they can be related to economic, environmental, social, technical and other aspects. The criteria can be either monetized, non-monetized (albeit quantifiable) or qualitative, based on information. MCA allows both quantitative and qualitative criteria of outputs/outcomes/impacts to be mixed together and provide the decision-making bodies the overall results of potential consequences in the specific field of the action (or in this case policy) where the evaluation is to be completed [12]. By using MCA, there is less uncertainty regarding the monetary conversion, which is sometimes experienced. Moreover, this analysis also provides more transparency [14]. While the previously described methodologies in the case of energy policy could be used more for real technical actions, such as decisions on building infrastructure, the MCA can be used for the whole policy-making sector. Besides, it is noted that MCA methods are regularly used in energy policy and planning [15].

Under the concept of MCA, different policy scenarios can be compared by using TOPSIS method – a Technique for Order of Preference by Similarity to Ideal Solution. This concept was introduced by Hwang and Yoon already in 1981 and it is a classic MCA method. The method suggests that the best alternative is the one, which is closest to the best desired solution and farthest from the worst solution [16]. The best desired solution is the one, which has the highest benefits and lowest costs, while the opposite is true for the worst solution. Thus, the best values under the criteria are the ones that compose the best desired solution. There is also the so called Fuzzy TOPSIS, which was introduced in 2000 by Chen C.T., which is used for solving multiple-criteria decision-making problems in fuzzy environment, which means uncertainty or subjectivity of evaluations and judgements [17]. The original version of TOPSIS is usually used in MCA problems where the criteria for a decision are independent. The steps for dealing with this approach are described in Eq. (1) to Eq. (6) [18]. The input is decision data V and set of weights w, but the output is closeness measure r [19]. The first step is normalization. For each evaluation $v_{m,k}$, it is necessary to perform the following normalization:

$$u_{m,k} = \frac{v_{m,k}}{\sqrt{\sum_{k=1}^{K} v_{m,k}^2}}, \quad m = 1,...,M, \quad k = 1,...,K \,. \tag{1}$$

The second step is weighted normalization. For each normalized evaluation $u_{m,k}$, it is necessary to perform this weighted normalization:

$$p_{m,k} = w_m u_{m,k},\ m = 1,...,M,\ k = 1,...,K. \quad (2)$$

The third step is the determination of positive and negative ideal alternative by this equation:

$$\text{PIA} = p^+ = \{p_1^+, p_2^+, ..., p_M^+\} \text{ and } \text{NIA} = p^- = \{p_1^-, p_2^-, ..., p_M^-\}, \quad (3)$$

where $p_m^+ = \max \{p_{m,k} | 1 \le k \le K\}$ and $p_m^- = \min \{p_{m,k} | 1 \le k \le K\}$, m = 1, …, M.

The fourth step is the calculation of Euclidean distances from each alternative and both PIA and NIA:

$$D_k^+ = \sqrt{(p_k - p^+)^T + (p_k - p^+)}, k = 1,...,K\ , \quad (4)$$

and

$$D_k^- = \sqrt{(p_k - p^-)^T + (p_k - p^-)},\ k = 1,...,K\ , \quad (5)$$

where $p_k = [p_{1,k}, p_{2,k}, \dots p_{M,k}]$.

The fifth step is the calculation of closeness measure for each alternative:

$$r_k = \frac{D_k^-}{D_k^+ + D_k^-},\ k = 1,...,K\ . \quad (6)$$

As has been stressed by other authors [20], one of the motivators for using MCA and particularly TOPSIS analysis is its simplicity and the fact that is does not need any specialized programs to use it and it gives the opportunity to compare the results, which would be hard to do by using other non-quantitative analysis. This and the previously mentioned reasons are why MCA is the chosen methodology for the case study in the next chapter. It is combined with the above-mentioned division into EU-level, regional and national level.

3. CASE STUDY

In this study, the author has chosen to evaluate the current drafts of legal acts, action plans and concepts that are available to the public for discussion in the electricity sector in the Republic of Latvia. This includes the proposed amendments to the Electricity Market Law and to the Law of Buffer Zones, amendments in regulations of the Cabinet of Ministers, as well as the newly drafted National Climate and Action Plan, the project for synchronizing the electricity grid of the Baltic States with the continental Europe’s electricity grid, the idea of introducing a cross border electricity transmission infrastructure tariff and, finally, three EU-level proposals. Thus, different types of possible decisions are described as follows (summarized in Table 2 in the next section):

1. Electricity Market Law amendments are proposed as a package; however, these proposals are not related to each other:
   1.1. Data hub – According to the best practices of European countries, the regulation and operation of a single electricity market data storage and exchange platform has already been implemented in several European countries (incl. Estonia) and in several implementation has started (incl. Lithuania). In addition, on 30 November 2016, the European Commission issued a so-called "Winter Package" for energy, which includes proposals for the internal market for electricity and provides for the establishment of transparent internal electricity market mechanisms that enable system users to actively participate in electricity market activities [21]. The creation of a unified, centralized data storage and exchange platform is a prerequisite for further development of the Latvian electricity market. Centralized data exchange enables to minimize the handling of manual information requests, reducing the overall cost of data processing and exchange. The proposal suggests that the biggest distribution system operator in Latvia JSC “Sadales tīkls” is the holder of the data exchange platform. JSC “Sadales tīkls” already operates an existing data exchange platform, however it is not centralized, and it is not considered a national data hub. The use of an existing data exchange platform will not lead to additional costs for market participants,
   1.2. Electricity production permit – The Ministry of Economics of Latvia has issued permits for increasing electricity generation capacity or introducing new electricity equipment since 2006, as a result the Ministry has currently issued more than 1000 permits. Legislation provides that authorization from the Ministry is the first step in increasing the capacity of electricity or introducing new electricity installations. As the practice shows, only a small proportion of the individuals who have received the permit are involved in further implementation of the permit. Thus, the permits issued do not allow for the accumulation of reliable statistics on the installed electricity generation capacities or for forecasting the development of capacity deployment, which were the original objectives of these permits. It is also concluded that, after receiving the Ministry's permission, a person will apply for new electricity connection to the system operator by re-submitting the documents already checked by the Ministry. Thus, the Ministry has decided to simplify this administrative process by stipulating that in the future only large power plants that shall be connected to the transmission system and can potentially affect the achievement of the targets set in the policy planning documents and may have a negative impact on the electrical system, are required to receive permits. The distribution system operator, on the other hand, will provide the Ministry with regular statistics on new connections to the distribution system,
   1.3. Isolated island-mode test – Conducting an isolated performance test of the Baltic States is necessary for the expected synchronization of the Baltic States with continental Europe and for desynchronization from the Russian-Belarussian power system (BRELL). During an isolated operation test, it is planned to separate from BRELL, verify the system's ability to work in isolated mode and perform the necessary system checks. During this test, the power systems of all three Baltic States will operate outside the normal operating mode under reduced

operational safety conditions and will cease the operation of the existing 12 power transmission lines with Russia and Belarus. Also, during the test, the Baltic transmission system operators will take all necessary measures, including ensuring the readiness of generators, readiness of personnel and other measures to ensure a stable and secure operation of the Baltic transmission system. However, complete disconnection from BRELL will increase the risk of system failure and system shutdown. In view of the above, it is necessary to clearly define the set of rights and obligations of the transmission system operator during the test of the transmission system,

1.4. Protected customer – according to the current wording of the Electricity Market Law, the electricity trade service for a protected customer may be provided only by one tendered electricity trader, who is also responsible for the assessment of the customer to check its compliance with the protected customer's status. Considering the current framework of the Electricity Market Law, it is difficult to receive a protected customer service for those users or sub-users who have not signed an electricity trade contract with the specific protected customer trade service provider. Therefore, the protected customer support mechanism as a social tool does not reach all the eligible electricity users, as well as contradicts the consumer's right to choose the electricity trader under the conditions of a free electricity market. The Ministry of Economics encourages the creation of a new, simpler system for providing support to the protected user, which will be managed and maintained by the Construction State Control Office. Namely, the Data Protection System, which is under the control of the State Construction Control Office, will collect data on the status of the protected customer, and will calculate the amount of support that they will be able to receive from any electricity trader wishing to provide a protected user trade service,

1.5. Mandatory procurement payment – the amendments under this concept have several components:

- The proposal ensures that the gross capital internal rate of return is calculated by also taking into account the support provided before the Electricity Market Law came into force. Thus, the internal rate of return on the total capital investment of individual power plants is expected to be higher than before and will be subject to a reduction in financial support,
- Additional proposal which defines that for a producer, which produces electricity in a cogeneration unit with an installed electrical capacity of more than 100 megawatts, the transmission system operator shall pay the guaranteed fee for the installed electrical capacity of the cogeneration unit,
- The purpose of the amendments is to exempt net system users (e.g. households with solar panels) from payments for the variable part of the mandatory procurement component in respect of the share of electricity received by the net system user from the network to the extent that it is transferred to the network,
- The proposal requires the supervising body to monitor and control electricity producers receiving state aid, including by introducing a condition for recovering the aid paid out in accordance with the procedures established by the Cabinet of Ministers,
- The EM proposal provides for the introduction of a general condition for the provision of energy-efficient and cost-effective heat production. The current regulations of the Cabinet of Ministers do not provide for the obligation of the

electricity producer receiving state support to ensure that the heat produced in the cogeneration process, which is transferred to a third party, is used in an energy efficient and cost-effective way. Thus, there may be situations where the supervising authority has limited possibilities to control the use of heat,
   - The proposal envisages to ensure that from 1st January 2022 the support for the production of electricity from renewable energy sources is provided as a supplement to the electricity market price, not as before, i.e., by calculating the total purchase price of electricity in accordance with the procedures specified by the Cabinet of Ministers. This will facilitate the adaptation of electricity generators that receive state aid to the electricity market processes, as well as the possibility to reduce the total amount of paid state aid;
2. Law on Buffer Zones (or protection zones) has several proposals for amendments, but the most important amendment is the establishment of operational protection zones and their restrictions on oil and oil product pipelines, their equipment and structures. In addition, there are amendments to determine the width of operational protection zones for individual gas supply installations;
3. Meanwhile, the National Energy and Climate Plan for 2021–2030 is a policy planning document that will set Latvia's goals and their implementation measures in such sectors or activities as – reduction of greenhouse gas emissions and increase of CO_2 capture, increase of the share of renewable energy resources, improvement of energy efficiency, energy security provision, maintenance and improvement of energy market infrastructure, and innovation, research and competitiveness. In each EU Member State including Latvia, the Plan is being developed to meet EU targets and international commitments:
   - The commitment made by the United Nations Framework Convention on Climate Change in Paris to reduce climate change by 2030 – to reduce total greenhouse gas emissions from all EU Member States by at least 40 % by 2030 in a cost-effective way compared to 1990 [22],
   - The EU's Roadmap for moving to a competitive low carbon economy in 2050 – the EU is ready in 2050 to reduce its total Member States' emissions by 80–95 % compared to 1990 levels to move to a competitive low carbon economy [23],
   - The conclusions of the European Council of 24 October 2014 entitled "Climate and Energy Policy Framework for 2030" set targets for climate change mitigation and energy in increasing renewable energy, improving energy efficiency and establishing interconnections [24];
4. Smaller, yet valuable amendments to regulations on regulated public utilities have the purpose to ensure consistent regulation of electricity trade service and heat supply services, providing that it is necessary to regulate electricity trade for any electricity sellers (and not only the ones who trade more than 4000 MWh/year as it is now) and that the state regulates the heat supply services provided in the district heating system that meet the specified criteria;
5. One of the main priorities in the Baltic States in the last years is the so-called Synchronization project, which is the first one in this list that is actually not a legal act, but a technical project. Unlike other European Union countries, the Baltic power systems operate in parallel, synchronous mode with IPS / UPS (Unified Power System – Russia, Ukraine, Belarus, Kazakhstan, Kyrgyzstan, Azerbaijan, Georgia, Tajikistan, Moldova and Mongolia) instead of European electricity systems. The cross-border operation of the electricity markets of the Baltic States, Russia and Belarus is defined

by the BRELL agreement (Belarus, Russia, Estonia, Latvia, Lithuania) concluded by the transmission system operators of Belarus, Russia, Estonia, Lithuania and Latvia. As a result, the Baltic power system is currently managed by third countries that increase energy dependence on third countries and impact on system security issues, make it difficult to exchange information with European transmission system operators, and there is no way to ensure coordinated action (e.g. in case of power line disconnections) between the Baltic States and the rest of Europe. The integration of the Baltic States' electricity networks into the EU electricity system is one of the strategic priorities of the EU energy policy. The Prime Ministers of the Baltic States put forward the idea of desynchronization already in 2007 and the importance of the synchronization project in recent years has been highlighted in several policy documents;

6. On the same regional level as synchronization, another discussion takes place on a tariff with third countries. The issue related to energy import from third countries is open for discussion among the Baltic States for some time. In 2017, during the Baltic Council of Minister's Senior Officials Meeting, the Baltic States jointly touched upon this challenge of unequal electricity trade conditions for competition with third countries. Since then a legal and economic analysis was developed to identify possibilities to implement such a tariff. The outcome of studies foresees that it is possible to develop a common cross border infrastructure tariff for all Baltic States, which would take into account the costs of all three transmission system operators. That would be a regional solution related to energy import from third countries. Currently, the legislation of the Baltic States does not allow to introduce such a common tariff and therefore legislation amendments are necessary. The Cabinet of Ministers of Latvia has already approved the possibility to implement such a tariff regarding electricity import from third countries. Thus, the next step is for the Baltic States to agree on an approach of a common cross border infrastructure tariff and after that to appropriately change the respective legislation. Latvia is committed to work on developing the necessary amendments to the national legislation by 1st January 2020.

Finally, there are 3 EU level proposals, which will soon be adopted:

1. Proposal for a Regulation of the European Parliament and of the Council on the internal electricity market (recast) and Proposal for a Directive of the European Parliament and of the Council on common rules for the internal market in electricity (recast) – the two new proposals are closely linked. Their primary objective is to adapt current market rules to new market conditions by increasing flexibility, allowing electricity to move freely to where and when it is most needed, using undistorted price signals and at the same time giving the consumer greater opportunities for maximum benefit from cross-border competition, providing the right signals and incentives to drive investment and make Europe's energy system more competitive and low-carbon [25], [26];
2. Proposal for a Regulation of the European Parliament and of the Council on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC – proposal for the Regulation replaces Directive 2005/89 / EC, which provided for a very broad framework of objectives to be achieved by Member States in the field of security of supply, but with little practical value. This directive will therefore be repealed as well as some of the provisions of the current Third Energy Package relating to security of supply, in particular Article 4 of Directive 2009/72/EC (requiring Member States to monitor security of supply through national reports) and Article 42 (allowing Member

States to take "safeguard measures" in the event of a sudden crisis in the electricity sector). The proposal for a regulation is based on the System Operational Guidelines and the Network Code electricity emergency and restoration, which provide technical rules for transmission system operators on how to ensure system security, including in emergency situations [27];

3. Proposal for a Regulation of the European Parliament and of the Council establishing the Connecting Europe Facility and repealing Regulations (EU) No. 1316/2013 and (EU) No. 283/2014. The proposal defines the objectives of the Connecting Europe Facility (CEF), the types of funding and rules for funding, as well as the budget for the period 2021–2027. The objectives of the CEF in the energy sector are to promote the development of projects of common interest related to the further integration of the internal energy market, cross-border and cross-sector interoperability of networks, promotion of decarbonization and security of supply, and to promote cross-border cooperation on renewable energy [28].

The criteria for evaluating all the above described draft legislation, infrastructure projects and concepts (all together further on - projects) are different modes of benefits – benefits for electricity consumer, for electricity producer, for electricity seller, for transmission and distribution system operators, for the state and finally for the climate. These criteria have different weights (100 % in total for all criteria) – it is logically and at the same time subjectively assumed that the benefit for the consumer is the most important, followed by the benefit for the producer, benefit for climate, benefit for state, benefit for seller and the benefit for the system operators in this case is the less valued criteria. It is important to stress that benefits for state can be both monetized (like a fee that is paid into budget) or it can be non-monetized, but have a different benefit, such as compliance with EU law, when it is necessary to apply EU law to national regulation (under presumption that EU penalty should not be an option). A state benefit could also be the reduction of bureaucracy in the government (it can be a time-saving, but not always a cost-saving action) or a general increase of safety measures. It was decided that one criterion can have maximum 5 points (multiplied by weight). If the project does not give any benefit for the specific group (criterion), it gets 0 points. Thus, the most points one project can get is 5, meaning that is has 5 points under each criterion, which can be only in case if the project has maximum benefit under each criterion. In the table below, the final results are shown.

4. RESULTS

The criteria were chosen based on the concept, what are the most important aspects when developing a policy at the government level. The overarching idea is always to improve the situation for the consumer, so the effect on the consumer is considered as the basis. From the expert's point of view, this is true in developing all the energy policies. If a policy does not benefit a consumer or even brings some negative effects for the consumer, it should be reconsidered. Thus, in this case study, the consumer has a 30 % weight and it has the highest rank compared to other criteria. The benefit for the consumer in this case is narrowed down to the most essential aspects – available and affordable electricity. When implementing a policy, the next important criteria is the state. If it can improve, for example, the state budget while positively affecting the consumer, this is something we would want to implement, because it is not a common situation – usually when a consumer gains by, for example, reduced taxes, the state loses. Thus, this criterion is mostly considered not from the perspective of gains, but from the perspective of costs – if it does not cost anything for the state, it is more likely to be approved. That is why benefit for the state has a 22 % weight in the criteria. In this case study we look at the state in a narrow definition, the benefit for the state is the benefit for the public administration, for the budget and for the national security. Thirdly, at this point in time, we are looking rather carefully for the climate benefits – in this case the benefits that would allow to achieve the EU 2020 and EU 3030 climate targets. It is not the first aspect to consider, but in recent years it becomes more and more valuable due to reasons described before, so in this case study this criterion has a 20 % weight. Fourthly, we are looking at the electricity producers – this is a sector specific criterion, because we cannot have electricity policy without electricity producers. And the Baltic States are in a situation, where national electricity generation is very important to avoid excessive electricity import from third countries and thus to avoid import dependency. This criterion is important not only from the security point of view, but also considering the necessity to support national renewable energy generation. Thus, the overall value for this criterion was granted 15 %. Finally, there are two criteria, which go below 10 % each. These are electricity market participants, without which it is impossible to use the electricity market – electricity traders and distribution/transmission system operators. Any regulation or project should be acceptable to them, because they ensure the operations of the market. The granted weights are 8 % and 5 % respectively. The weights of criteria are summarized in Table 1.

TABLE 1. WEIGHTS OF CRITERIA

	Criteria	**Weight**
1.	Benefit for electricity consumer	0.30
2.	Benefit for the state	0.22
3.	Benefit for the climate	0.20
4.	Benefit for electricity producer	0.15
5.	Benefit for electricity trader	0.08
6.	Benefit for electricity distribution/transmission system operator	0.05

Multicriteria analysis (MCA) results are presented in Table 2. MCA shows evaluation of the projects, which touch upon or are closely related to electricity policy, as well as their evaluation from the expert’s point of view. In total there are 13, which were described in the previous chapter. These are not all energy-related, but are all somehow related to electricity (as opposed to gas and oil) and they are from different geographical scopes – EU level, regional level and national level.

TABLE 2. MULTIPLE-CRITERIA ANALYSIS ON THE CURRENT ELECTRICITY POLICY PROJECTS IN LATVIA

	Current projects / ***Criteria***	Benefit for electricity consumer	Benefit for electricity producer	Benefit for electricity trader	Benefit for electricity distribution/transmission system operator	Benefit for the state	Benefit for the climate	MCA results
1	**Electricity market law providing amendments on:**							
1.1	*Data hub*	1	3	5	5	1	0	**1.62**
1.2	*Electricity production permit*	1	5	0	5	4	4	**2.98**
1.3	*Isolated island-mode test*	0	0	0	5	4	0	**1.13**
1.4	*Protected customer*	5	0	2	0	4	0	**2.54**
1.5	*Mandatory procurement payment*	5	0	0	0	5	0	**2.6**
2	**Law on buffer zones (protection zones)**	0	0	0	5	2	0	**0.69**
3	**National Energy and Climate plan**	3	4	3	2	4	5	**3.72**
4	**Rules on Regulated public utilities**	1	0	5	1	2	0	**1.19**
5	**Synchronization**	1	1	1	5	4	0	**1.66**
6	**Tariff for trade with 3rd countries**	0	3	5	5	3	1	**1.96**
7	**Internal electricity market Directive & Regulation**	5	5	3	4	3	2	**3.75**
8	**Risk-preparedness Regulation**	1	1	1	3	4	0	**1.56**
9	**Connecting Europe Facility Regulation**	1	3	5	5	5	4	**3.3**

While developing a policy, policy-makers often think of amending obscure provisions, to implement clearer rulings and as the table above shows, if we look from the point of these five criteria, sometimes the new electricity policy can be beneficial for only some of the beneficiary groups, e.g., for consumer and state, but not for the climate and producer. Fig. 1 below shows more clearly the final results.

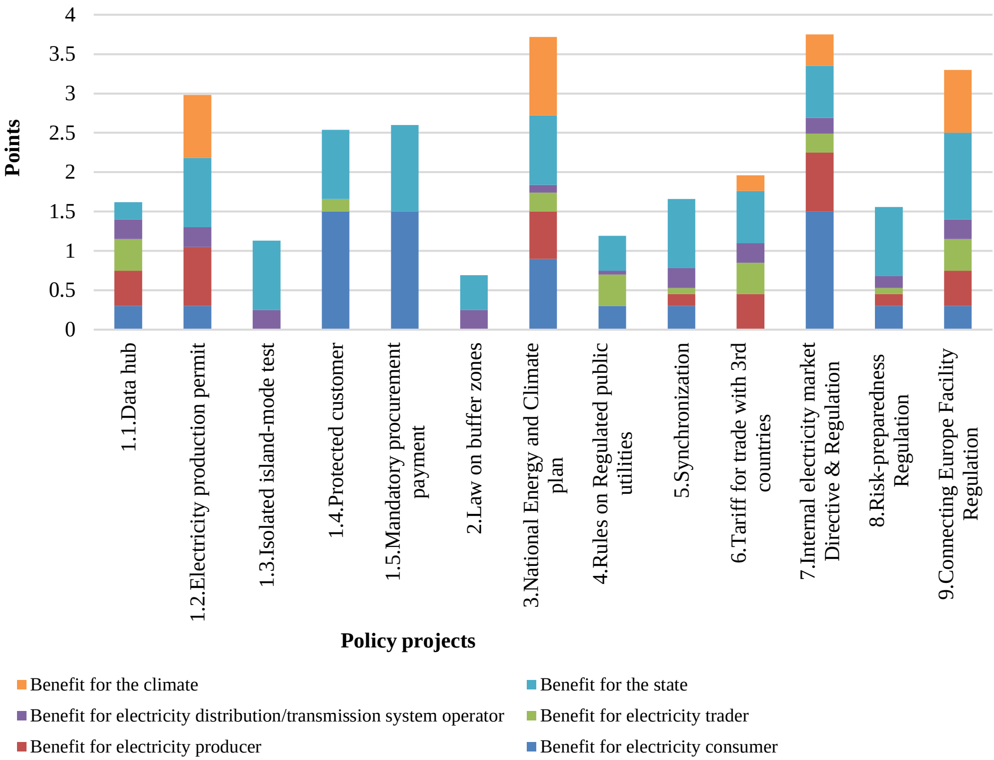

Fig. 2. Evaluation of current electricity policy projects.

As was mentioned earlier, the EU-level projects are mostly intended to improve the climate and, moreover, intended for a large group of beneficiaries, so it is not surprising that the matrix above shows that the project number 7 and 9 have one of the highest results in total.

Moreover, the highest scored national-level project (Number 3, National Energy and Climate Plan) is based on requirements from the EU, which also explains the versatile and relatable content for different affected parties. While the EU-level projects are harder to influence from the national perspective, Latvia's National Energy and Climate Plan (NECP) is based on the national views on how to develop a sustainable and efficient energy system that has benefits for all related participants. For example, according to the forecasts for 2030, with the policies and measures currently implemented, the share of Latvian renewable energy in final energy consumption in 2030 would be about 41.2 %. The NECP foresees that Latvia should have at least 45 % of renewable energy in the final energy consumption by 2030. It will therefore be necessary to implement additional measures to increase the share of renewable energy. To achieve this goal, NECP proposes several measures. For example, to apply a reduced rate for value added tax of 12 % to households for the purchase and installation of solar panels and services to households for the supply and installation of solar technology. It also encourages long-term lease contracts for basic wind farms with a total capacity of up to 500 megawatts in the country's forests and adjacent areas, to support wind and solar energy technology deployment, and to promote collaboration between scientists and entrepreneurs in the field of renewable energy sources. The plan also encourages increased natural resource tax for all fossil fuels and other important measures [18]. As can be seen from this small example, NECP would thus have a significant impact on all market participants.

In Table 1, a certain pattern is evident– the climate benefits only in cases, where all other sides (consumer, producer, traders, etc.) reap benefits. Thus, it could be argued either it is a problem or a gain, but the system only works in a complex framework.

At the same time, it is important to stress, that, as can be seen from the light green parts in Fig. 2, in most cases reviewed in this study, the most gains go to consumers and it is essential that the policy planners concentrate their effort on consumers, which is the basis of society. There is also a tendency that the consumer, state and climate (by their narrow definitions as described earlier) are the criteria, which are thought of in almost all of the researched cases. Electricity producers and traders receive much less support, even though it could seem surprising considering that Latvia has an established system of mandatory procurement component that the consumers pay for the green energy and high efficiency cogeneration energy produced in Latvia. But this only means that, the policy makers are slowly moving away from this rather unsustainable support system and focusing more on the electricity consumer, while developing new concepts for supporting renewable energy in Latvia without such high costs.

5. CONCLUSIONS

There are many methods and options that can be used to estimate the impact of a legislative initiative. Most of them, however, are of complex nature and could not really be used by the policy makers at the government level but would include the necessity to use outside sources to introduce these more complex methods.

However, based on the research, it can be concluded that there are a few not so complex methods that could be used by policy makers at the expert level in the government. The research helped to understand that if we want to look at policy making in a more sophisticated way by including all aspects of policy making, both physical infrastructure projects concepts, laws and regulations, the optimal way for that is to use multiple-criteria analysis. A case study for such a concept in electricity policy in Latvia was developed. It showed that most of the cases that were reviewed focused on finding solutions for rather specific aspects that are not connected to the climate – mostly the policy measures are intended for solving issues that are relevant for the consumers.

As regards the problem of climate, the research showed that while developing a policy in the electricity sector, the climate issues are only tackled in legislative initiatives, which cover a broad spectrum of questions, but not individually as such. Respectively, the outcome of the research provides that, at the national level, the most positive effect for climate comes from the National Energy and Climate Plan. Thus, it can be concluded that more consideration should be given to the climate perspective when developing electricity policy that focuses on specific narrow aspects, because these narrow aspects may as well actually influence the climate by, for example, indirectly promoting usage of specific energy sources.

It would be appropriate to continue the study by expanding the evaluation scheme also in terms of examining the negative impacts, because certain initiatives would may leave a negative impact on the consumers, producers, climate, etc. and not neutral or zero impact as was assumed in this case.

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