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SUSTAINABLE DEVELOPMENT AND URBAN PLANNING REGULATIONS IN THE CONTEXT OF CLIMATE CHANGE MANAGEMENT MEASURES

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Abstract. The purpose of this paper is to evaluate recent and upcoming changes in urban planning legislation in the Republic of Lithuania, which acknowledge the necessity of introducing climate change management tools. Sustainable development is a core principle of the Spatial Planning Law of the Republic of Lithuania since 2014. Special attention to the management of climate change is given at the national and municipal levels, and recent legislative initiatives are proof of this. Methodology – this analysis is based on evaluating the main applicable documents and introduced amendments. The theoretical publications, statistical data, and judicial practice are also observed while interpreting the given normative rules. This paper specifically analyses the legal requirements enshrined in Lithuanian law that are intended to foster sustainable development. New amendments to manage climate change are also analysed. In addition, the solutions of the Vilnius Master Plan are presented, as they introduced the principle of sustainable development before it became a national rule, as well as climate change management measures. Findings – the analysis reveals that national regulation only sets out the principles for spatial planners, and it is left to local governments to make final decisions on what exact measures may be introduced for the purpose of ensuring sustainable development and climate change management via spatial planning. This is a cause for concern and should lead to renewed calls for a coherent and ambitious approach to introduce the specific measures at the national level – at least in the by – laws to ensure consistent and unified application. Despite the vague wording employed by the regulations, the Vilnius Master Plan actively encourages the introduction of measures which could help in ensuring sustainable development and climate change management via spatial planning. Originality/value – this article is the first to analyse the newly adopted principle of sustainable development in the light of climate change management via spatial planning regulations in the Republic of Lithuania. In addition, the present analysis contributes to worldwide studies on sustainable development and climate change measures by filling a gap from Lithuania’s side, showing recent regulatory changes as a good practice to other jurisdictions.

Keywords: sustainable development; urban planning; spatial planning; environmental law; climate change; land use law

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Additional disciplines: law; ecology and environment; construction engineering; transport engineering; environmental engineering

1. Introduction

Sustainable development has been a major area of policy focus since a framework for the principles of sustainable development was laid down at a United Nations (UN) Conference on Environment and Development in 1992. On 1 January 2014, a new Law on Spatial Planning came into force in Lithuania, which ultimately was aligned with the internationally agreed principles of sustainable development.

Sustainable development is becoming an increasingly topical issue due to the ground-breaking international accord to curb global warming reached under the Paris Agreement. There is a vast body of theory and research regarding sustainable development which is increasingly being translated into new laws and regulations to encourage its practice.

This paper consists of two main parts. Firstly, it analyses the most relevant research of other scholars to better understand the relationship between sustainable development and climate change management via spatial planning. Secondly, it examines the national regulations in four sub-chapters: the analysis of the current legal regulations; the analysis of the changes on the way, through the lens of how they reflect climate change management measures; the examination of the main by-law regulating spatial planning; and an assessment of the newly drafted Vilnius Master Plan. Finally, the conclusions drawn from this analysis are presented.

European Union (EU) regulations on climate change management are not discussed in this Article because of two main reasons. Firstly, during the research and drafting of this article, the newly appointed European Commission was just beginning to prepare their package for climate change management. Secondly, the scope of the planned package is so large that it would require a separate study.

This paper does not challenge the reality of climate change. Climate change was defined in the Law on Financial Instruments for Climate Change Management of the Republic of Lithuania, adopted back in 2009. Paragraph 5 of Article 2 defines climate change as: climate changes which, directly or indirectly, appear due human activity in the changing composition of the Earth's atmosphere, and which do not fall within natural climate fluctuations ranges observed at regular time intervals.

The research was performed, and the paper was written using the following methods. The method of *logical analysis (induction, deduction, synthesis)* was used in discovering the relevant rules of law and then formulating the respective findings. With the help of this method's inner logic, the meaning and purpose of certain laws was investigated. The method of *systemic analysis* enabled the authors to investigate the relationships between the rules identified, which cannot be explored in isolation. The *teleological method* of analysis was used to identify the purpose of certain legislation. The *documents analysis method* was used to examine the laws identified, along with other documentary sources. The *comparative method* helped to highlight the relevance of the analysed topic.

2. Theoretical background

There are a variety of studies on climate change management. This is also the case regarding sustainable development principles in spatial planning. Further still, there are pieces of research that cover both of these issues. After a wide-reaching research process, the following main findings of the relevant research may be cited.

Sustainable development and climate change are worldwide topics in urban planning legislation. As J. R. Nolon (2009) indicates after examining legal regulation on sustainable development in the USA, the task of creating an integrated system of law to promote sustainable development, manage climate change, and reduce energy consumption is not as complex or novel as it seems. I. J. Losada, A. Toimil, A. Munoz, A. P. Garcia-Fletcher, and

P. Diaz-Simal (2019) discuss the new Spanish Coastal Law, which in addition to many other implications includes the compulsory development of a Spanish Strategy for Coastal Adaptation to Climate Change (SSCACC) and its submission to Strategic Environmental Assessment. A report from Ghana indicates a demonstration of the unclear nature of policies, and a lack of focus on climate change issues in urban planning (Cobbinah, Asibey, Opoku-Gyamfi, & Peprah, 2019). Researchers from Taiwan claim that the spatial planning bill introduced, on 18 December 2015, several new changes to secure its goal of nationwide sustainable development, but this also started a battle between the promoters of economic development and environmental conservation supporters (Huang, 2018)

Despite nationwide regulations, realistic climate change measures are essentially a concern of municipal level legislators. As I. Anguelovski and J. Carmins (2010) indicate, the traditional view of climate governance is that local action is shaped by international agreements and national policies, the priorities of funders, and ideas advanced by non-governmental organizations and transnational networks. Some cities act in response to these actors and the pressures they exert. However, the majority are motivated by internal goals and take independent action to advance their climate agendas. P. Mukheibir and G. Ziervogel (2007) note that climate change increases the likelihood of extreme weather events such as droughts, floods, and heat waves, as well as more gradual changes in temperature and precipitation. The authors presented and discussed an overarching framework which would facilitate the development of a Municipal Adaptation Plan (MAP). The example of the city of Cape Town (South Africa) illustrated some of the sector-level assessments and potential climate threats, as well as resource mobilization issues that need to be addressed during the development and implementation of a MAP. The city of Cape Town is at risk from projected climate-induced warming and changes in rainfall variability. This makes resource management and infrastructure planning more challenging and increases the urgency of the need to adapt city-level operations to both current climate variability and future climate change. To date, however, the focus of adaptation planning has been at the national level and has not adequately addressed municipal-scale adaptation.

Detailed measures which could be introduced to ensure sustainable development and mitigate climate change consequences are analysed by various researches. Especially in heavily affected regions. For example, Turkish researchers – while analysing measures to mitigate heat waves, floods and lack of water – indicate that, from the perspectives of massive architectural, spatial, and landscape designs and solutions, climate is among the major factors that play important roles (Toy & Demircan, 2019). Researchers from Iran systematically propose some solutions for cooling urban neighborhoods (Ramyar, Zarghami, & Bryant, 2019). Current planning approaches and policies should effectively deal with environmental challenges, especially when looking at sustainable storm-water management (Pappalardo & La Rosa, 2019), which is also topical in Lithuania. Meanwhile, within the Indonesian regulations, flood mitigation systems that work by identifying spatial planning criteria related to housing and settlement planning and disaster mitigation are essential (Mardin & Shen, 2019). Finally, the study on *Urban Planning and Water-related Disaster Management*, edited by G. Huang and Z. Shen (2019), is worth mentioning, from which the most noteworthy output is the notion that water management is multifaceted. Furthermore, the approaches to dealing with water-related issues are diverse, such that wise water governance including the incorporation of wise water management into urban planning should be pursued in order to achieve an integrated solution for sustainability.

The adaptation to climate change prevails in measures which reduce the effect of climate change in various jurisdictions. As B. Smit and O. Pilifosova (2003) outline in one of the most detailed studies of climate change and our adaptation to it: climate change vulnerability studies now usually consider adaptation, but they rarely go beyond identifying adaptation options that might be possible. While analysing the situation in Saudi Arabia, I. R. Abubakar and U. L. Dano (2019) indicate that the implementation of adaptation strategies is in its infancy, with urban greening, public transportation, and green building projects gradually gaining prominence. Research in Brazil also indicates that policy concentrates more on adaptation rather than mitigation, and policy implementation there is yet to be realized (Sotto, Philippi, Yigitcanlar, & Kamruzzaman, 2019).

The latest urban studies emphasise the necessity of collecting and analysing the actual data, which is of a high importance in justifying the effectiveness of certain measures introduced by legislators and practitioners. D. Feldmeyer et.al. (2019) present the developed indicators set to measure and monitor urban climate resilience for municipalities, thereby assessing the requirements of indicators and implementing a method for adapting global approaches to the local context. Other researchers present developed multi-criteria urban sustainability systems (Ali-Toudert, Ji, Fährmann, & Czempik, 2019). D. Guyadeen, J. Thistlethwaite, and D. Henstra (2019), after evaluating the strengths and weaknesses of climate change plans in 63 of the most populous communities across Canada, conclude that Canadian municipal climate change plans prioritize climate change mitigation over adaptation, but implementation, monitoring, and evaluation are relatively weak.

To summarise, the studies of other researchers support increased backing for the introduction of climate change management measures via the principle of sustainable planning in spatial planning. They also support the observation that sustainable development and climate change management measures are a growing global trend.

This paper presents an analysis of the main legal norms in the Republic of Lithuania which enable sustainable development in the context of climate change, with the purpose of demonstrating the legal constraints and finding the exact measures which have been, or soon will be, implemented.

3. The analysis of Lithuanian national regulation

In this part of the article, legislation on spatial planning shall be discussed. Firstly, the existing Spatial Planning Law, which introduces the principle of sustainable development, is analysed. Secondly, the proposed amendments to the Spatial Planning Law, which are related to climate change management, are analysed. Thirdly, the main by-law – the rules of complex plans preparation – is reviewed. Fourthly, the sustainable development and climate change measures which are implemented within the Vilnius Master Plan shall be discussed.

3.1. Introduction of sustainable development principle in the Spatial Planning Law

On 31 March 2010, the government of the Republic of Lithuania approved the Concept to Change the Law on Spatial Planning of the Republic of Lithuania (hereafter – the Concept). The approved document emphasised the importance of adopting the principles of sustainable development throughout the construction industry. Paragraph 70 of the Concept stated that the changed regulations were expected to ensure a more systematic approach to the planning process and in the development of new construction projects. Paragraph 82.1 of the Concept indicated that better conditions for both investments and sustainable development had to be a common objective.

The wording of the Concept did not make the principles of sustainable development legally binding. Despite numerous papers analysing what sustainable development is, there is no agreement on one definition which might indicate exactly what constitutes the principle of sustainable development. The term *sustainable development* has a broad meaning and is explained by such international organizations as the UN and the EU. The term *sustainable development* is also widely discussed in the UN Sustainable Development platform and the European Commission 2030 Agenda for Sustainable Development, which are published online and are free to access.

On 27 June 2013, the Lithuanian government passed the Law Changing the Law on Spatial Planning of the Republic of Lithuania (hereafter – the Spatial Planning Law), which came into force from 1 January 2014. The principles of sustainable development were enshrined in the Spatial Planning Law from the outset. Article 1 indicates that one target of this law, among others, is to ensure the sustainable development of the territories alongside rational urbanisation by setting out requirements of a systematic nature.

The inclusion of the principles of sustainable development in the new law did not by itself establish clear rules for projects to be considered as being sustainable. Still, the inclusion of the principles of sustainable development in the Law on Spatial Planning can be considered to be a tipping point for the future enactments of mandatory guidelines to promote rules related to sustainable development and tackling climate change.

Sustainability is also mentioned in sub-paragraphs 1 and 5 of paragraph 1 of Article 3, where spatial planning targets are indicated. The amended law indicates that the noteworthy spatial planning targets are: to create the conditions for the sustainable development of state territory and the implementation of a consistent spatial policy, together with a functional integration policy, all of which can help create and stimulate social, economic, and environmental development; and to create a healthy, safe, and sustainable living environment and fully-developed living conditions. In addition, part 2 of Article 3 states that, when setting planning targets for a specific region, the following aspects must be taken into consideration: public needs; the landscape and biological diversity; geographical particularities and geological conditions; existing urban, engineering, transport, and agro systems; the interests and rights of third parties, landowners, and those who use the land; other immovable property within the territory; specific architectural requirements, environmental protection, public health safety, and cultural heritage; and state and public security, defence, and other needs.

The newly adopted Law on Spatial Planning consolidated the concept of sustainable development within a legal framework regulating spatial planning and did so in a reasonably flexible way. This means that what exactly constitutes sustainable development is open to interpretation, but at the same time the Spatial Planning Law provides for a legal basis to ensure that the main values are incorporated into the spatial planning process. Municipal authorities and developers will have the freedom to meet the requirements of sustainable development during the process of preparing the relevant documents. These requirements depend not only on developers and planning, nor solely on the spatial planning process, but must factor in public concerns (since public participation in the process is ensured).

Even though the Spatial Planning Law identifies the grounds for sustainable development, it does not provide exact and specific instruments to reach this goal. This means that the principles of sustainable development can be implemented through a wide scope of solutions, and these solutions essentially rely on the decisions of the project developer.

Even the Plan of Measures for the Implementation of the National Sustainable Development Strategy, approved by the government back in 2003, does not clearly identify what are the sustainable development measures in spatial planning. The adoption of the new wording of the Spatial Planning Law was identified as one of the measures itself in the section on spatial planning in the mentioned plan. Nevertheless, the strategy mentioned is a good tool of SWOT analysis and is based on the general idea that sustainable development is a combination of social, economic, and environmental interests.

Under the initiative of the Ministry of Environment of the Republic of Lithuania, the legal gap as to what sustainable development is was filled with explanatory brochures. The participants of the program Create for Lithuania, with the help of experts working in the Ministry of Environment of the Republic of Lithuania, prepared the Sustainable Development Targets Integration into Territorial Planning Processes manual. This manual explains what sustainable development is and identifies, for example, what a sustainable city is. According to the manual, sustainable cities are the cities which are: planned compactly; well-connected; safe; integrated; resistant to change; inclusive; and make a small impact on the environment (Punyte & Simonaityte, 2018). The manual is a very good tool for presenting basic aides for sustainable development, but it is still too general and practically unapplicable, especially concerning legal applicability, because it is not a document that indicates binding rules for certain projects. All of this leaves the private investors, public authorities, urban planners, and communities in an uncertain situation.

The Spatial Planning Law now encourages the principle of sustainable development. However, the law is lacking in specifics. Even more worryingly, the new requirements for spatial planning at both the municipal and state level make no mention whatsoever of climate change management measures.

Such uncertainty leads to a situation where no specific clear measures for sustainable development are determined, even in case law. Lithuania's higher courts are only mentioning (identifying) the existence of the principle of sustainable development but are not defining the substance of this principle. For example, the *Generalization on Judicial Practise Implementing the Legal Norms of Construction Legal Relations* (2010) of the Supreme Administrative Court of Lithuania indicates that the principle of sustainable development is applied to all construction cycles, without elaborating. No further comments or cases are given to analyse sustainable development. Accordingly, lower courts are also not covering the substance of this principle. For example, the Regional Administrative Court, Chamber of Kaunas (decision No. I-892-428/2014), addressed the principle of sustainable development only by stating that municipalities have an obligation to determine a planned territory's measures for the use, management, and/or protection of the planned territory in such a way as to ensure sustainable development and rational urbanization. The sustainable development principle is only mentioned when analysing the solutions of spatial planning documents (e.g. Supreme Administrative Court of Lithuania decision No. eAS-625-858/2015) or encouraging developments of the infrastructural projects of renewable energy (e.g. Supreme Administrative Court of Lithuania decision No. A-152-525/2015). To summarise, such mentions do not constitute clear evaluation of the substance of sustainable development. This might be caused by the lack of legal doctrine or evaluation criteria under which the specific project could be acknowledged to be meeting the requirements of sustainable development. Accordingly, the explanation of the substance of the principle of sustainable development relies on urban planners. This provides the wide range of opportunities for urban planners to interpret that their specific project meets sustainable development criteria, but it does not give any certainty to other confronting parties in the planning process (such as investors and communities).

This legal uncertainty in understanding the substance of the principle of sustainable development and the shortcoming of indicators, together with the global trend towards introducing climate change management measures, led to the necessity of amending the law and creating more specific mandatory rules. Therefore, minimal requirements on green zones in the land plot or other criteria are introduced in by-laws or master plans, and even an amendment to Spatial Planning Law is prepared.

3.2. Introduction of climate change management in the Spatial Planning Law

The Ministry of Environment prepared the amendment to the Spatial Planning Law, which was accepted into the Register of Laws on 14 May 2020 and submitted to the Parliament for approval. By introducing the law via the proposal, the Ministry of Environment indicated, among the four reasons to amend the law, the target of reaching sustainable development, encouraging coordination of the social, economic, and environmental interests, and implementing measures to mitigate the effect of climate change.

Accordingly, the climate change elements are mentioned jointly with the sustainable development elements in four different articles of the amendment.

Firstly, Article 3, where the purpose of planning is indicated, is amended by including climate change among previously indicated targets. The draft of paragraphs 1 and 5 of part 1 of Article 3 indicates that the purpose of spatial planning is to create the conditions for the sustainable development of state territory. Sustainable development is set as a priority. The mentioned draft also specifies certain criteria which help to evaluate sustainable development. These criteria are: the implementation of a consistent spatial and functional integration policy; attaining territorial cohesion; dealing with social, economic, and ecological tasks, and tasks related to the consequences of climate change in complex planning; and the lastly creating a living environment and fully-

developed living conditions in residential locations that are healthy, safe, sustainable, and resistant to the consequences of climate change.

This indicated change to Article 3 evaluates climate change as an equal threat to other challenges. At the same time, it requires planners to indicate measures to combat climate change as targets while performing urban planning. This clearly pushes the topic of climate change management forward in national legislation. In addition, it may also eventually assure the tracking of climate change adaptation. The Paris Agreement articulates a clear mandate for all countries to undertake and document adaptation progress. Yet persistent challenges have prevented substantive developments in tracking adaptation and the assessment of adaptation actions and their outcomes (Berrang-Ford et. al., 2019).

Secondly, Article 11, where the objectives and tasks of the state level plan are indicated, is also considered for amendment. The draft of paragraphs 3 and 4 of part 3 of Article 11 indicates the tasks of the master plan at the national level. The first of these tasks is supplemented with the climate change element. The first task shall proceed as follows: optimize the urban structure of the state, social and engineering systems, and territorial and recreational structures, in order to foresee the strengthening of their resistance to extreme climate phenomena. The wording of the first and main task clearly indicates that planning should think over the climate change resistance measures. The second task of climate change mitigation is numerated among other tasks. The proposed wording of the task is as follows: to settle the principles for the rational use of agriculture, forests, fossils, and other natural resources, and to sustain ecological balance and the formation of the natural frame, preserving natural and immovable cultural heritage and valuable landscapes, thereby mitigating the impact of climate change and optimizing the system of protected territories.

The draft of paragraphs 4 and 5 of part 7 of Article 11 indicates the tasks of the master plan at the sub-national level. As at the national level plan, the sub-national level plan should also include the task related to climate change. The main task of the subnational level plan shall proceed as follows: to detail the urban, recreational, and other structures, and the systems of engineering and social infrastructure, strengthening their resistance to extreme climate phenomena under the principles indicated in the master plan of the state. And again, as in the national level plan, the second task shall be supplemented with, among others, a requirement to detail the maintainance of ecological balance and climate change exposure mitigation. The given wording not only introduces climate change management into Spatial Planning Law, but also requires the evaluation of the solutions of the plans in the process in light of climate change management and the introduction of certain measures.

The introduction of the topic of climate change into the Spatial Planning Law at the national level should not be considered as just a declaration. The Ministry of Environment is already working on the new draft of the Master Plan of the Republic of Lithuania. The conceptual part of this plan is already prepared and was approved on 5 June 2020 by the Parliament of the Republic of Lithuania. The second proposed alternative was approved, which prioritizes climate change management measures in spatial planning (TAEM Urbanistai, 2019). The proposed alternative sets a clear path for adaptation to climate change in the Master Plan of the Republic of Lithuania. With this, Lithuania will at last not be lagging behind, as international studies show that developed countries have integrated adaptation plans and policies into their developmental agenda, and only developing countries are facilitating or yet to initiate adaptation policies into their development (Sarkodie & Strezov, 2019).

Thirdly, Article 14, where the objectives and tasks of the municipal level plan are indicated, is also considered for amendment. The draft of paragraphs 2 and 3 of part 6 of Article 14 indicates the tasks of the master plan at the municipal level. Again, climate change is included as one of the main tasks. The proposed wording indicates that the main task is to: optimize the urban structure and the social and engineering infrastructure of the planned territory, and strengthen the measures of their resistance to extreme climate phenomena. In addition, the second task also includes climate change mitigation and indicates an obligation to foresee the rational preservation and

use of: land resources, agricultural land, forests, other natural resources, climate change effect mitigation, nature's frame formation, immovable and natural cultural heritage, landscape and biological diversity preservation measures, and optimal landscaping structure. The intended amendment is an important change in the evaluation of municipal master plans and their application. These changes set the requirements for municipal planners not only to introduce certain measures, but also to establish real indicators to measure the effect of climate change mitigation.

Fourthly, Article 15, which regulates mandatory requirements for the use of territory at the municipal and local levels, is also considered for amendment. The draft of part 6 of Article 15 outlines the planning organiser's duty to indicate, in the planning works programme, the following requirements. The master plan should determine additional environmental protection in the areas of: landscaping, the protection of nature and immovable cultural heritage, climate change effect mitigation, strengthening resistance to extreme climate phenomena, public health protection, the development of urban, architectural, engineering, and social infrastructure, and other mandatory requirements.

All of the above-mentioned changes are related to one essential idea – climate change is a fact, and its mitigation should be one of the essential topics in the preparation of new planning documents. In addition, all of the measures outlined should be monitored by establishing clear indicators. Eventually, this will serve not only to help for the evaluation of certain measures, but also in providing clarity to all urban planning participants, including urban planning practitioners working at the lowest level, investors, and communities.

The intended changes should have an impact on judicial practice as well, where judges are not seeing the necessity of discussing climate change measures while analysing urban planning cases. The cases referring to climate change were associated so far with funding climate change initiatives, providing subsidies, public procurement, and the legality of the usage of such funds (Supreme Administrative Court of Lithuania decisions No. eA-2091-1062/2019; No. eA-3415-502/2019, No. A-146-330-14 and etc.; Court of Appeal of Lithuania decision No. 2-1494/2013). Thus, there is clear lack of case law in regard to explaining or indicating specific measures of climate change mitigation, which is extremely important in urban planning, while implementing sustainable development.

As already mentioned, the changes to the law only reached the Parliament of the Republic of Lithuania during the preparation of this Article. Despite the slow process of changing the Spatial Planning Law, municipal planners are already working under the principles indicated in draft law of amendments and are evaluating the climate change mitigation measures. The draft of the Vilnius Master Plan is proof of this and is analysed in section 3.4 of this Article.

3.3. Introduction of climate change management in the by-laws

The main by-law regulating the preparation of complex planning documents is the Order of the Minister of Environment on Complex Planning Documents Preparation Rules. This order was amended on 17 December 2019.

Two main changes related to sustainable development and climate change management were introduced without waiting for the adoption of the amended Spatial Planning Law.

First, an additional requirement was added to the planning works program for the master plans at the municipal level. Paragraph 83.8 indicates that the planners should foresee the complex renovation (modernization) of territories and an increase in their energy efficiency in the blocks of the cities. The same requirement was

additionally included in paragraph 112 that names the general planning solutions, and paragraph 116 that provides details of planning solutions.

Second, the wording of subparagraph 117.2.4 was amended by including a requirement to specify structural parts of the natural frame system, where the ecological chain and separate greeneries should be analysed. In addition, the natural frame, and the ecological chain as part of it, should also be foreseen within the scheme of the present situation, as the amendment of subparagraph 105.1 indicates.

The mentioned amendments are a small, though very important step. This step should improve planning quality in that the planners should start thinking of energy efficiency and the proper relationships between the urban system and the natural frame.

Still, the main by-law lacks specific regulation with requirements, i.e. exact measures, which are very important in ensuring the proper implementation of the mentioned principles.

Nevertheless, some measures may be found in other legal acts. As an example, some measures are named in the National Strategy on Climate Change Management Policy, approved by Parliament in 2012. Paragraph 99 of this document indicates that manufacturing should be concentrated in the areas of developed infrastructure, because it may help to reduce environmental pollution.

The lack of exact measures from the legislator might be justified by the fact that the legislator leaves some space to municipal authorities and is expecting municipal authorities to introduce the exact measures themselves. This rings especially true when bearing in mind the fact that the municipal master plans may implement such a function. The Supreme Administrative Court of Lithuania had formulated the practice (decisions No. AS8-115/2005, AS17-301/2007; No. AS5-324/2007) that master plans meet the requirements of the normative legal act, indicated in part 13 of Article 2, and therefore it should be considered as a normative administrative act. This means that master plans are the law to all landowners who are planning their development in a certain municipality.

Accordingly, it was chosen to analyse the wording of the draft Vilnius Master Plan. This choice was made due to the fact that this plan is one of the most discussed planning documents in Lithuania and claims to be a most modern document in ensuring the implementation of the principle of sustainable development and climate change measures.

3.4. The analysis of Vilnius Master Plan

Vilnius is the capital city of Lithuania. According to data from the website of the Lithuanian Department of Statistics, the population of Lithuania is 2,794,184, while the population of Vilnius is 639,871 (official data of the year 2019; Official Statistics Portal, n.d.). Vilnius is by far the largest city in Lithuania, and its population is growing.

The city's current master plan (Vilnius Master Plan, adopted back in 2007) at the time of its adoption already indicated that a policy of sustainable development is a key objective for the city (Part 2.1: "Development tendencies"). The principles of sustainable development were therefore being applied in the capital long before they became enshrined in national law under the Spatial Planning Law of 2014. In some jurisdictions to date, sustainable development has been the most important discourse informing planning and a powerful rhetoric for solving environmental problems (Gazzola et. al., 2018), and Vilnius is no exception.

Dissatisfied with some of the vague wording of the Spatial Planning Law, the city council resolved (in 2015) to revise and update the existing Vilnius Master Plan. Target 5.1 of the revised plan aims to supplement the existing master plan with the new criteria and indicators for the long-term sustainable development of the city. The revised plan introduced new criteria to measure the sustainability of new developments and actively encourage climate change mitigating measures. This local legislator's approach can be noted in other jurisdictions as well, as local adaptation policy and planning is critically important (Vogel, Henstra, & McBean, 2018).

The revised plan (*Vilnius Master Plan. Solutions. The Material Explaining the Solutions*, 2021) intends to shape the city's "green infrastructure" as a tool to increase its ecological potential and mitigate the effects of climate change. It is foreseen that this goal shall be reached by setting up additional limitations on the green areas of the city (limiting the possibility for construction in most vulnerable green territories), as well as by implementing several measures (policies). These include: promotion of the use of renewable energy sources; reduction of greenhouse gas emissions; channelling the rainwater near trees in the preparation of technical projects for streets, squares, parking lots and other hard surfaces (this measure can be integrated during reconstruction); providing a rational ratio of hard and water-permeable surfaces when planning territories; providing landscaping and technical measures for rainwater surplus storage and use when designing green areas; increasing the number of artificial water bodies, parks, and other green areas; installation of fountains in public spaces and ensuring their uninterrupted operation during heat; and the installation of free water dispensers in the city.

According to the revised plan, each of these measures shall be covered differently in intertwining spheres of lower level spatial planning and construction processes by means of promotion and prohibition.

The use of renewable energy sources is promoted by foreseeing possibilities to use agricultural land that is not intended for urbanization to produce renewable energy (solar energy), as well as by the promotion of the development and application of renewable energy sources for heating purposes. It should be noted that guidelines for the development and application of renewable energy sources for heating purposes were set by the Vilnius Heat Management Special Plan (2018), which synergizes with the revised master plan and foresees prohibitions on using non-renewable energy resources for the heating of newly constructed or reconstructed buildings in central parts of Vilnius.

The reduction of greenhouse gas emissions shall be attained by implementing solutions aimed at reducing the usage of private automobiles and the promotion of the usage of public transportation, or private transportation which uses renewable energy sources. In addition, the revised plan foresees the conversion of industrial territories near the city centre to other purposes of use (residential, commercial etc.) and the development and application of renewable energy sources for heating purposes. These methods are expected to help reduce greenhouse gas emissions. As *Lithuania's Greenhouse Gas Inventory Report 2019* (issued in 2020) indicates, in 2018 transport and energy categories composed 30.2% and 12.1% of the total national greenhouse gas emissions, respectively.

The solutions of the revised plan also intend to implement measures which would help to use rainwater much more efficiently. It is foreseen that newly developed territories will have to match the requirements set for hard and water-permeable surface percentages, so that the sewage system of the city would not get flooded in case of bigger rain storms and the rain water would be used for the proper irrigation of the green areas of the city. Also, the green areas should have the possibility to store rainwater surplus which could later be used for irrigation.

The revised plan addresses climate change as a global phenomenon. Therefore, additional measures regarding the protection of the city's residents are foreseen in case of heat waves. The plan indicates the necessity of increasing the number of artificial water bodies, parks, and other green areas, and the installation of fountains in public spaces whilst ensuring their uninterrupted operation during heat, as well as the installation of free water

dispensers in the city. The planners are hoping that these measures will help to lower the negative effects that heat waves have on the residents of the city.

The above-mentioned measures are introduced without the prior establishment of such requirements in the Spatial Planning Law. Therefore, the Vilnius city municipality is at the forefront of the introduction of meaningful and impactful norms regarding climate change mitigation measures and, after the master plan is approved, most likely other municipalities in Lithuania shall follow the principles that have been laid out.

The importance of including climate change mitigation measures in the Vilnius Master Plan is highlighted by the fact that Article 50 of the Spatial Planning Law establishes a rule, under which the solutions of lower level spatial planning documents must not contradict higher level spatial planning documents. The same rule is applied countless times in court cases (Supreme Administrative Court of Lithuania decisions No. A-4660-556/2017; No. P-5-502/2018). Thus, every detailed plan which is a lower level spatial planning document in Vilnius city will have to be in accordance with the Vilnius Master Plan, and in some form adopt climate change mitigation measures.

Conclusions

The sustainable development principle is widely accepted, and climate change management is a reality which should also be dealt with in spatial planning. This principle was introduced in the Spatial Planning Law of the Republic of Lithuania in 2014. However, the definition of sustainable development was not explicitly provided. Further, the Spatial Planning Law lacks specific mandatory norms explaining what should be done to ensure sustainability in new developments.

The ongoing changes in the national law introduce the requirement for climate change mitigation. Still, the Spatial Planning Law is silent on the exact measures, which should be introduced to assure mitigation of the effects of climate change. A revision and improvement of the current by-law legal base is not sufficient to understand which specific measures should be taken. Mandatory guidelines could help to ensure the implementation of the principle of sustainable development principle alongside climate change mitigation measures. Meanwhile, city planners are left with the difficult task of introducing certain legal requirements to ensure sustainable development and climate change mitigation measures without any guidance or the requirement to set up indicators for the measurement of certain measures' effectiveness.

Considering that climate change mitigation is becoming one of the key parts of the drive towards sustainable development, the current revision of the master plan for the development of Vilnius strongly introduces climate change mitigation measures. Evaluating the specific measures mentioned in the paper, three main groups of measures to mitigate climate change can be identified: measures to strengthen the green areas; measures to reduce greenhouse gas emissions; and measures to promote the use of renewable energy sources. Accordingly, the first group and part of the second group of measures are directed more towards addressing the consequences of climate change. The other part of the second group of measures and all of the third group of measures are more directed towards the future and designed to combat the origins of climate change.

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