



ENVIRONMENTAL ASPECTS OF THE CONSTRUCTION INDUSTRY DEVELOPMENT IN LATVIA

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Abstract. The importance of environmental aspects in construction is growing during the time. The aim of the research is to analyze environmental aspects of construction industry development and related regulations in Latvia, including the last green building certification development tendencies. The analysis, historical, document review and logical access methods have been used in the research. The article also includes overview of the international experience. The results of research show growing importance of environmental aspects in construction process and the necessity for market participants and industry development to consider them.

Keywords: *Construction, environment, green building certification, green buildings, Latvia, real estate market, sustainability.*

INTRODUCTION

Green building development is important at all levels. Green building analysis at the international level was analyzed by many scientists (Mattoni et al., 2018; Reed, R. G.,Krajinovic-Bilos, & Reed, M. A. J., 2017; Tambovceva, Geipele, I., Geipele, S., 2011), importance of housing renovation and its problems were analyzed by Šnīdere, Geipele, Stāmure (2017), green neighborhood was analyzed by Tam et al. (2018). Practical aspects of sustainable construction in Latvia were analyzed by Stāmure, Kamola and Geipele (2015), planning and management problems of energy efficiency planning were analyzed by Actiņa, Geipele, Zeltiņš (2015). Environmental aspects of construction and sustainable real estate market development aspect were analyzed in the previous research as well (Kauškale et al., 2017; Kauškale et al., 2016, Kauškale, Geipele, 2017; Kauškale, Geipele, Riemenschneider, 2016; Kauškale, Riemenschneider, 2016). *The aim of the present research* is to analyze environmental aspects of construction industry development and related regulations in Latvia, including the last green building certification development tendencies. The object of research is construction industry. The subject of research is green building development in Latvia. The analysis, historical, document review and logical access methods have been used

in the research. The research includes the overview of international experience and the latest tendencies of green building development in Latvia.

1. GENERAL REGULATIONS AND PROBLEM OVERVIEW

Sustainability aspects are considered in the world in different areas and at different levels. For instance, sustainability aspects of Olympic Games were considered in *RIO Olympic Games Sustainability Management Plan* (published in 2013) and *Tokyo Olympic and Paralympic Games High-level Sustainability Plan* (published in 2016), as shown in Table 1. These plans included a variety of aspects connected with sustainable development.

Table 1. Rio Olympic Games Sustainability Management Plan (2013) and Tokyo Olympic and Paralympic Games High-Level Sustainability Plan (The Tokyo Organising Committee of the Olympic and Paralympic Games, 2016) [developed by authors]

2016 RIO Olympic Games Sustainability Management Plan	Tokyo 2020 Olympic and Paralympic Games High-Level Sustainability Plan
<ol style="list-style-type: none"> 1. Water treatment and conservation 2. Environmental awareness 3. Use and management of renewable energy 4. Games neutral in carbon, air quality and transport 5. Protection of soils and ecosystems 6. Sustainable design and construction 7. Reforestation, biodiversity and culture 8. Shopping and ecological certification 9. Solid waste management 	<ol style="list-style-type: none"> 1. Climate Change (Low Carbon Management) 2. Resource Management 3. Natural Environment and Biodiversity 4. Consideration of Human Rights, Labour and Fair 5. Operating Practices 6. Involvement, Cooperation and Communications (Engagement) 7. Tools for Realisation of the Plan <p>and includes (The Tokyo Organizing Committee of the Olympic and Paralympic Games, 2016):</p> <ul style="list-style-type: none"> – Promotion and education of the importance of sustainability; – Measures aimed at enhancing understanding and sharing of the importance of sustainability among staff, volunteers, related corporate entities, athletes, spectators, citizens, etc. through the Tokyo 2020 Games; – Measures for taking sustainable actions and contribution to the realization of a sustainable society.

Realization of Olympic Games involves a complex process of construction of real estate objects. Sustainable construction principles are also of high importance for a sustainable real estate market development. For example, sustainable construction as implemented in the UK (Cabinet Office and Infrastructure and Projects Authority of UK, 2016) are defined as follows, “*Sustainable Construction is a Government initiated policy imperative to improve the social, economic and environmental performance of the UK construction industry*” (Roy Stewart, n.d., retrieved 2017).

Sustainable construction can be defined also in the following way (Kalnciems, n. d.):

- construction, the purpose of which is to significantly reduce the impact of the construction and operation of the building on the environment during its life cycle, and to ensure the economic benefit of the building construction, as well as the comfort and safety for the residents of this building;

- export-capable construction industry that can achieve long-term growth by efficiently solving the current problems of the wide range of the customers, while planning also the future developments.

Another important definition that should be considered analyzing the topic is the definition of Real Estate Market Management System, “The Real Estate Market Development Management System determines the theoretical basis and management of practical operation processes in real estate transactions at all levels of the hierarchy, developing a set of principles, methods, infrastructures, forms and organizations, tools for real estate management, business processes and development of business activity scenarios” (Geipele, 2015, p. 49).

On the basis of the previous research (Kauškale, Geipele, 2017 Kauškale, Geipele, Riemenschneider, 2016), and taking into account previously mentioned information, the authors offer two definitions of sustainable real estate market development:

1. *Sustainable Real Estate Market Development is such a development that includes economic, social, environmental, political, technological and legal aspects of real estate market development, long-term national and real estate market development policies, conservation and preservation of the environment, housing affordability issues and development, which contribute to the quality of life of society during the entire real estate market cycle period.*

2. *Sustainable development of real estate market is a stable and balanced development of real estate market that meets the present needs of real estate market participants without compromising the ability of future generations to meet their own needs, realized by all market participants and at all levels.*

The second definition is based on the definition of sustainable development concept provided in Brudtland Report (Our Common Future) (World Commission on Environment and Development, 1987). Sustainability participants by levels, activities, regulations and key participants in Latvia are shown in Table 2.

Table 2. Main sustainable real estate market development influencing regulations and key participants by levels in Latvia [developed by authors]

	Market participants	Laws, regulations and documents influencing sustainable real estate market development
International level	Government of the country, International organizations and unions, European Parliament, European Environmental Bureau, International real estate organizations – e.g. FIABCI	2030, 2050 Sustainable Development Goals Regulations, directives; The Rio Declaration on Environment and Development; UNEP, Principles of Sustainable Development, 2002; Lisbon Strategy; EUROPE 2020 strategy; Commission strategy aiming to achieve a new sustainable and greener economy; Europe 2050 energy strategy The Ten Principles of the UN Global Compact (Human Rights, Labour, Environment, Anti-Corruption Directive 2004/18/EC of the European Parliament and of the Council on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts**; Directive 2004/17/EC of the European Parliament and of the Council coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors**; Directive 2014/24/EU and Directive 2014/25/EU and other documents and regulations**
National level	Government, Parliament, Government institutions In Latvia: Saeima (Landbook Privatization Bureau, SJSC “State Real Estate”, “Latvia’s State Forests”, government and privatization agencies	Regulations, directives, laws: Competition Law; Immigration Law; National Development Plan of Latvia for 2014 to 2020; National Industrial Policy Guidelines for 2014 to 2020; Latvian Convergence Programme for the year 2013 to 2016; Latvian Stability Programme for 2014 to 2017; Latvian long-term Energy Strategy 2030, etc.
Industry	Organizations such as LANĪDA, municipalities and their owned real estate objects; Latvian House Manager Guild; Latvian House Manager and Maintenance Provider Association; Association of Property Appraisers in Latvia	Unions, competition law and other industry regulation influencing laws and regulations: Public Procurement Law of Latvia and green public procurement regulations and aspects; Construction Law of Latvia; the regulations of the Cabinet of Ministers, quality standards and other regulations and documents

Company	Owners, managers, employees, builders, investors, developers, brokers, banks, bank subsidiaries, acquisition officers, analysts, portfolio managers, asset managers, property managers, finance and accounting, administrators, procurists, environmental consultants, architects, surveyors, planning and zoning specialists, brokers, investment specialists, lawyers in field of real estate, notaries *	Corporate social responsibility aspects Integration of ESG criteria in management Construction Law Environmental Law ISO standards and other documents and regulations
Households	Real estate buyers and sellers	Activities on real estate market; Buying/selling/renting real estate; Housing maintenance
Individuals	Real estate buyers and sellers living behaviour	Individual decision making areas; Buying/selling/renting real estate analysis and activities; Housing maintenance

* according to S. Peca (2009);

** directives mentioned on the webpage of the Ministry of Environmental Protection and Regional Development (2017).

Construction process in the country is strongly connected with the amount of investment in the industry. For sustainability assessment it is important to define the amount of investment into environment and ecological buildings.

Environmental aspects of construction are integrated also in the Public Procurement Law (2017), where the green public procurement is defined. Green public procurement is a purchase of goods, services and works whose environmental impact during their life cycle is lower than those of the goods, services and works of the same usage objective that were purchased without applying the principles of green public procurement (Public Procurement Law, 2017). Green public procurement aims, EU directives and regulations in Latvia are summarized in Table 3.

Table 3. Green public procurement aims, EU directives and regulations in Latvia
(The Ministry of Environmental Protection and Regional Development, 2017)
[developed by authors]

Parameter	Description
Goals	The Government Action Plan 2014 stipulates that one of the Government's goals is to develop and implement the principle of "green procurement" (GP) in public and public procurement, promoting the growth of healthy food and local materials (including wood). The goal of the "Green Procurement Plan for 2015–2017" is to increase the volume of purchased goods and services at the end of 2015 by at least 15 % in financial terms from the total purchases of state and local government institutions, in 2016 – by 20 % and in 2017 – by 30 %.
European Union Directives	In the EU Member States, the procurement framework since 2004 consists of two public procurement directives which provide for the inclusion of environmental conditions in procurement procedures if the procurement exceeds a certain threshold: Directive 2004/18/EC of the European Parliament and of the Council on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts; Directive 2004/17/EC of the European Parliament and of the Council coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors. On February 26, 2014, Directive 2014/24/EU and Directive 2014/25/EU, envisaging the inclusion of environmental criteria in public procurement, which are to be transposed into national law by April 18, 2016, were adopted.
Regulations in Latvia	The Ministry of Environmental Protection and Regional Development, in co-operation with stakeholders, elaborated the "Green Procurement Promotion Plan for 2015–2017", (approved by the Cabinet of Ministers on February 17, 2015). The Green Procurement Plan describes the current situation, including identifying key issues related to the implementation of the ZERA and ZI, and includes concrete steps to address these issues. The requirements of EU Directives have been incorporated into the national law of the Member States. In Latvia, this is determined by the Public Procurement Law and the Law "On Procurement for the Needs of Public Service Providers".

Construction process is directly influenced by land management issues and regulations. "Land Management is the set of measures of the land policy implementation, the objective of which is to promote the sustainable land use and protection" (Legislation of the Republic of Latvia, Land Management Law, 2014). Evaluation Methodology of Land Use Efficiency in Land Management was analyzed by Armands Auziņš (2013) and the Sustainable Land Management Systems framework model was developed (Auziņš, Grinbergs, Geipele, 2012). Environmental issues are also relevant in terms of land use efficiency. "Land use efficiency is an indicator that includes benefits from a single land unit over a certain period of time, using it for a specific purpose" (Auziņš, Grinbergs, Geipele, 2012, p. 31). Environmental, energy, pollution, resource and transport taxes (last available information) are shown in Table 4 and Table 5.

Table 4. Environmental tax revenues in Latvia, MEuro. *Data: Eurostat (n. d.)*
(last available data on September 10, 2017) [developed by authors]

Environmental taxes							
GEO/TIME	2008	2009	2010	2011	2012	2013	2014
Agriculture, forestry and fishing	33.41	36.65	15.79	29.95	32.09	32.45	30.61
Construction	28.53	18.76	17.60	20.78	24.66	20.67	22.18
Rental and leasing activities	3.01	1.22	0.46	3.85	1.04	2.56	2.17
Electricity, gas, steam and air conditioning supply	2.06	1.91	1.47	2.69	1.99	2.12	2.42
Real estate activities	2.47	2.27	1.80	3.45	2.64	2.91	3.33
Energy taxes							
GEO/TIME	2008	2009	2010	2011	2012	2013	2014
Agriculture, forestry and fishing	0.11	0.11	0.13	0.15	0.14	0.16	0.18
Construction	0.16	0.15	0.18	0.06	0.10	0.07	0.06
Rental and leasing activities	0.01	0.00	0.01	0.01	0.00	0.01	0.00
Electricity, gas, steam and air conditioning supply	0.51	0.62	0.65	0.76	0.88	0.59	1.32
Water supply; sewerage, waste management and remediation activities	0.67	2.04	1.59	3.51	4.79	5.61	5.30
Real estate activities	0.08	0.05	0.07	0.01	0.02	0.19	0.03
Pollution taxes							
GEO/TIME	2008	2009	2010	2011	2012	2013	2014
Agriculture, forestry and fishing	0.11	0.11	0.13	0.15	0.14	0.16	0.18
Construction	0.16	0.15	0.18	0.06	0.10	0.07	0.06
Rental and leasing activities	0.01	0.00	0.01	0.01	0.00	0.01	0.00
Electricity, gas, steam and air conditioning supply	0.51	0.62	0.65	0.76	0.88	0.59	1.32
Water supply; sewerage, waste management and remediation activities	0.67	2.04	1.59	3.51	4.79	5.61	5.30

Real estate activities	0.08	0.05	0.07	0.01	0.02	0.19	0.03
Resource taxes							
GEO/TIME	2008	2009	2010	2011	2012	2013	2014
Agriculture, forestry and fishing	0.70	0.64	0.65	0.75	0.79	0.82	0.88
Construction	0.36	0.19	0.22	0.53	0.63	0.70	0.55
Rental and leasing activities	0.00	0.00	0.00	0.00	0.02	0.02	0.03
Electricity, gas, steam and air conditioning supply	0.29	0.24	0.21	0.45	0.51	1.05	0.72
Water supply; sewerage, waste management and remediation activities	2.33	0.98	1.31	2.17	2.47	1.61	2.47
Real estate activities	0.11	0.11	0.09	0.21	0.26	0.20	0.44
Transport taxes							
GEO/TIME	2008	2009	2010	2011	2012	2013	2014
Agriculture, forestry and fishing	1.22	1.04	1.33	3.73	3.93	3.39	2.92
Construction	3.38	1.93	1.93	3.84	4.45	4.35	4.67
Rental and leasing activities	0.35	0.14	0.06	1.19	0.30	0.63	0.70
Electricity, gas, steam and air conditioning supply	0.27	0.21	0.19	0.40	0.40	0.47	0.51
Water supply; sewerage, waste management and remediation activities	0.37	0.37	0.30	1.29	0.77	0.49	0.81
Real estate activities	0.22	0.20	0.18	0.55	0.37	0.40	0.44

Table 5. Environmental tax revenues in the Baltic States, total, M Euro. *Data: Eurostat (n. d.)* (last available data on October 17, 2017)
[developed by authors]

GEO/TIME	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Estonia	203.87	255.72	295.95	355.68	382.46	415.93	431.60	454.26	489.06	484.64	533.05	557.82
Latvia	287.45	346.45	385.25	437.21	449.44	431.90	432.80	497.60	537.61	558.21	630.13	658.93
Lithuania	491.98	481.52	433.42	507.56	533.52	542.78	512.22	527.68	548.13	572.34	618.95	676.88

Growth of the environmental tax revenues may be a result of increase of the environment non-friendly activities. After analysis of the international experience, in the next part the authors analyze the latest tendencies of green building development in Latvia.

2. THE LATEST TENDENCIES OF GREEN BUILDING DEVELOPMENT IN LATVIA

Environmental aspects are integrated in the Construction Law. The purpose of the Construction Law of Latvia (2014) is to create a quality living environment by establishing an effective regulation of the construction process in order to ensure sustainable economic and social development of the country, preservation of cultural and historical values and environmental values, as well as rational use of energy resources. Construction quality and safety in Latvia has been ensured by State Construction Control Bureau of Latvia from October 1, 2014 (The State Construction Control Bureau of Latvia, 2017).

The European Parliament and the Council of European Union developed Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 that laid down the harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC (The European Parliament and the Council of European Union, 2011). Latvian Sustainable Building Council (LSBC), NGO, was founded in 2010 as a private sector initiative with an aim to increase the sustainability of the built environment in Latvia. 2012 LSBC joined the World Green Building Council (WGBC) – an international network of more than 90 local organizations with similar main aims in 5 continents (Latvian Sustainable Building Council, n. d.).

All above-mentioned aspects influence the construction industry, as well as real estate market development. However, the sustainability concept of real estate market development is a more complex system as sustainable construction aspects are just one part of them.

The Declaration on the Improvement of the Long-Term Strategy for the Modernization of the Latvian Buildings 2014–2020, developed within the framework of the BUILD UPON project of the EU research program “Horizons-2020” has been approved (Latvian Sustainable Building Council, 2017), and the catalog on products, services and construction in the framework of Green Public Procurement has been developed, where the following groups have been created in the directory:

- Office building design, construction and management;
- Road design, construction and maintenance;
- Transport;
- Indoor lighting;
- Street lighting and traffic signals;
- Image equipment;
- Office IT equipment;
- Energy efficiency services;
- Solar collectors;

- Solar cells.

The winners in the nomination “The Most Sustainable Building in Latvia in 2016” are listed below. The buildings which have been put into operation at least a year ago and have passed at least one heating season can compete in this nomination. (Construction of Latvia, 2016):

- 1st place – reconstruction of Lūznava Manor, contractor Rezekne District Municipality, project “Ināras Caunītes arhitektu birojs”, constructor “R.A.J.”;
- 2nd place – Jurmala Art School, contractor Jurmala Municipality, project “Skonto Būve”;
- 3rd place – Creative Center “Zeimuļš”, contractor Rezekne Municipality, project “SAALS”, constructor “RE & RE”.

Currently in Latvia, BREEAM is the most popular international green building certification system, BREEAM certified real estate object can be found in Table 6.

Table 6. BREEAM certified projects in Latvia on August 31, 2017
(BRE Group, n. d.)

Building	Client	Scheme	Rating	Stage	Cert. No.	Assessor	Town	Country	
Asset Name	Developer		Score	Valid Until		Auditor	Postcode		
						Zip code			
Business Center PLACE ELEVEN	TBA	International 2013 New Construction: Offices	Excellent	Interim	BREEAM-0056-5259	UAB Vesta Consulting	Riga	Latvia	
			72.40 %				LV-1013		
Business Center PLACE ELEVEN	Hanner Group	International 2013 New Construction: Offices	Excellent	Final	BREEAM-0069-5171	UAB Vesta Consulting	Riga	Latvia	
			74.30 %				LV-1013		
FeliCity	Nare Ltd	International 2013 New Construction: Residential	Pass	Interim	BREEAM-0051-5239	IB&P Konsultācijas	Riga	Latvia	
			35.40 %				LV-1010		
FeliCity Apartments	Nāre, Ltd	International 2013 New Construction: Residential	Pass	Final	BREEAM-0062-2555	IB&P Konsultācijas	Riga	Latvia	
			36.50 %				LV-1011		

Galerija Centrs	Origo	In-Use International 2015 Part 1 - Asset Performance	33.30 %	27-Feb-18	BIU00001088-1.0	Oxford Sustainable	Riga	Latvia
			Pass				LV-1050	
Galerija Centrs	Origo	In-Use International 2015 Part 2 - Building Management	11.60 %	27-Feb-18	BIU00001088-1.0	Oxford Sustainable	Riga	Latvia
			Acceptable				LV-1050	
NHC 1st office building	"ABLV Building Complex", LTD	International 2013 New Construction: Offices	Very good	Interim	BREEAM-0058-8178	Mark arhitekti	Riga	Latvia
			56.20 %				LV-1045	
Origo	Origo	In-Use International 2015 Part 1 - Asset Performance	38.60 %	13-Feb-18	BIU00001082-1.0	Oxford Sustainable	Riga	Latvia
			Pass				LV-1050	
Origo	Origo	In-Use International 2015 Part 2 - Building Management	12.10 %	13-Feb-18	BIU00001082-1.0	Oxford Sustainable	Riga	Latvia
			Acceptable				LV-1050	
Teodors and Henrihs buildings, excluding ground floor previously (Jauna Teika)	Hanner	International 2013 New Construction: Offices	Very good	Interim	BREEAM-0056-8915	Oxford Sustainable Group	Riga	Latvia
			69.33 %				LV-1039	

There is also one LEED certified project on Zala 1, Office Building in Riga, Latvia by Vastint Latvia Office / 58 716 ft², and one for LEED certification registered object – SIA Krasta SP Office / 699 654 ft², in Riga (Green Building Information Gateway, n. d.).

The *Camphill village communities* are considered to be the pioneer of ecovillages in Western Europe; these communities began to emerge in the 1930s and 1940s, and currently there are around 100 Camphill ecovillages around the

world (Ekociemati.lv, 2016a). Ecovillage is a small community of people where their needs are closely related to nature and the natural environment; the people in ecovillages live ecologically and economically in order to ensure longer life for themselves and the whole world (Ekociemati.lv, 2016b). The ecovillage movement appeared in Latvia in 1999 when the Neimaņu family began to form a small village of Camphill in its ownership in the Rencenu Parish, Valmiera, based on the anthroposophy knowledge obtained in Norway (Polis, 2010).

Governmental expenditure for environmental protection is of great importance for environmental development. Investments and current expenditure tendencies and the structure for environmental protection by environmental area in Latvia from year 2006 to 2015 are shown in Figure 1.

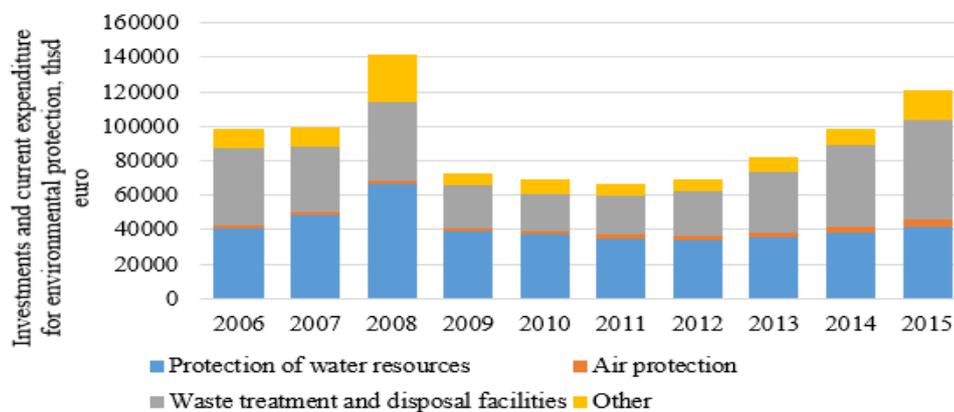


Fig. 1. Investments and current expenditure for environmental protection by environmental area in Latvia (thsd euro excluding VAT) *Data: Central Statistical Bureau of Latvia (2017).* [Figure developed by authors].

The chart on investments and current expenditure for environmental protection by environmental area in Latvia shows that the volumes of investments and expenditure for environmental protection are increasing from year 2011, but still have not reached the level of year 2008. Environmental taxes in Latvia were analyzed in Table 6.

Expectations of developers and construction confidence indicators are of special importance for construction industry development. Construction confidence indicators in the Baltic States, seasonally adjusted data, not calendar adjusted data, are shown at Figure 2.

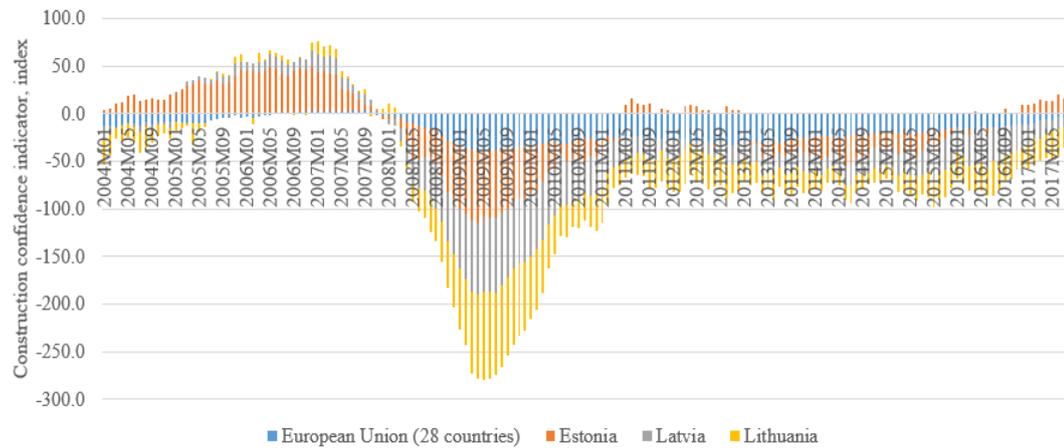


Fig. 2. Construction confidence indicators in the Baltic States, seasonally adjusted data, not calendar adjusted data. *Data: Eurostat (n. d.).* [Figure developed by authors].

Figure 2 demonstrates the cyclical development of construction confidence indicators in the Baltic States and importance of seasonal aspects in construction process. Currently, the positive construction confidence indicators in the Baltic States can be observed, that is a positive tendency also for green building development opportunities.

CONCLUSION

The article investigates the environmental aspects of construction industry development, with particular focus on the case of Latvia, it analyzes the main sustainable real estate market development influencing laws, regulations and documents by levels in Latvia, defines the concept of sustainable real estate market development.

- The results of the research show positive green construction development tendencies in Latvia, however, the number of green buildings in Latvia is lower in comparison with global experience, which impedes achievement of greenhouse gas emission reduction targets and other possible environmental improvements.
- Compliance with environmental and sustainability requirements in buildings includes a number of activities and regulations, and the observance of the above-mentioned documents and the use of opportunities is important for a sustainable development of cities and the country;
- The results of the research show that compliance with environmental requirements in construction is a necessity for market participants and industry development, and green buildings and construction is a future need as well, so gradual transition to green construction is necessary.

Construction confidence indicators can directly influence construction industry development tendencies, as well as green building development, so there

is an interconnection with green building development. The future research direction may be the analysis of practical implementation of green building and sustainability strategies at construction companies by developers and in real estate operation enterprises. Results of the research have shown that there is a high necessity for green building construction from different points of view.

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