Application of ESG certification in city farming construction and green transport infrastructure

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Abstract. Today, the problem of environmental degradation is acute for all mankind. More and more global companies are taking a course towards responsible and environmentally friendly production. According to experts, in the near future, corporations that ignore the principles of environmental conservation may lose investments from large funds. The concept of sustainable development, assessment of risks and opportunities related to climate change, respect for human rights and solving problems of society and local communities has become a global trend and will determine the economic and financial agenda in the near future. The article is devoted to the consideration of the importance and implementation of a new organization of farming and the city farming construction on the buildings with as an object of ESG certification and green transport infrastructure. The practice of using trusses on the roofs of buildings and transport objects for various purposes is revealed. A rational approach to the assessment and certification of such objects is substantiated.

1 Introduction

Sustainable development refers to the growth of economies and companies that meets the needs of the present without prejudice to future generations. Environmentally and socially responsible procurement conducted in accordance with the concept of sustainable development has already become one of the traditional procurement tools in European, Asian countries and the USA. However, the experience of the Russian Federation in the field of sustainable procurement is still of a focal nature – the procurement potential for achieving sustainable development goals is practically not used.

The request to evaluate companies based on ESG factors has historically come from responsible investors. In addition, there are more and more requests from other interested parties - employees, trade unions, local communities, executive authorities, non-governmental organizations. It is important for them what impact the company has on the environment in which they live and their children will live, what role the organization plays in achieving the universal values formulated by the UN in the 17 Global Sustainable

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Development Goals. They pay attention not to financial indicators, but to whether its activities contribute to making the world around us a better place. Good indicators for non-financial reporting (ESG criteria) have become no less important in the long term than for financial reporting.

However, the requests of investors and other interested parties are most often addressed to large businesses. They are encouraged to create green projects for which they can get "green financing", they have access to consultations from leading experts, they are stimulated by various ratings. But small and medium-sized companies are still on the sidelines of this trend. The initiator of the transition to sustainable development for them can be the customers of their goods and services, creditors, etc. Environmental economic model of risk management and in the framework of the quality management system is an important tool for them to achieve sustainable development goals [1-3].

In Europe, the USA and a number of Asian countries, responsible procurement has already become a traditional tool for influencing the entire supply chain. Private companies all over the world actively check their suppliers using such evaluation systems as EcoVadis (75,000 supplier companies from 160 countries received their rating), CSRHub, Cority, etc. However, there are no widespread mass assessment systems in Russia yet, many companies make their own questionnaires. There is also no single national standard.

The construction sector especially needs to be assessed according to ESG criteria, because in practice there are many violations at different stages of work: when approving projects, purchasing materials, hiring workers and paying for their labor, putting a building into operation. If the evaluation of companies becomes a common practice and attention is paid to this parameter, then the construction market will be forced to adopt the principles of sustainable development. In this article we consider companies with new organization of farming - the city farming construction on the buildings as an object of ESG certification and, in addition, green transport infrastructure.

2 Methods

2.1 Methodology for ESG certification of "green" companies

In the article, we reviewed the method of comparing the market of urban green roof farms with the ESG certification methodology (Methodology). Currently, Methodology has been developed for mass remote ESG certification of companies (hereinafter referred to as the Methodology), which is based on:

- International standards for disclosure of non-financial reporting (Global Reporting Initiative - Global Reporting Initiative, GRI, the US Sustainability Accounting Standards Board, SASB, etc.);
- National ESG standard;
- Recommendations of the Central Bank and the Russian taxonomy of "greens".

ESG certification is an expert assessment made based on the results of the collection and analysis of data about the company. Evaluation by Methodology can be used to evaluate any companies. Companies using ESG certification should take into account that the status is assigned in accordance with the status of the company at the date of filling out the application based on data received from the company, as well as open data from the Internet and databases. Information is collected using information technology, artificial intelligence is used to evaluate it.

The methodology is not used to evaluate individual entrepreneurs. Suppliers are evaluated on a voluntary basis at the request of the company. The assessment is based on information from several sources:
Company survey data, including attached documents;
- Information collected in automated mode by aggregators (databases with financial and legal information);
- Information from external specialized databases (Rosstat in terms of average wages, regional registers of fatal accidents of regional state labor inspections, etc.).
- To obtain a high score, the company must provide the set of documents, which including:
  - Contract with the regional operator of municipal solid waste (MSW);
  - Lease or purchase agreement for the main premises of the company;
  - Document, confirming the energy efficiency class of the company's main premises;
  - Results of calculations of greenhouse gas emissions; certificate of environmental audit;
  - Documents, confirming the availability of professional development and retraining programs;
  - Documents confirming participation in charity and environmental activity;
  - Documents confirming the existence of ethical standards and diagnostics of corporate culture in the company.

2.2 Analysis of Rooftop Companies in City Farming Construction

Urban agriculture could be a necessary solution to feed people, potentially producing up to 180 million tons of food per year, or about 10% of the world's legumes and vegetables, according to a 2018 study. According to UN projections, by 2050 more than two-thirds of the world's population will live in cities. The Food and Agriculture Organization of the United Nations is calling for greater attention to food security, saying that rapid urbanization in developing countries is leading to nutritional deficiencies. When the lockdown was announced, people panicked and bought groceries, and supermarket shelves were noticeably empty. The situation with the coronavirus was a catalyst, showing what problems can await us in economic and social terms, when the consequences of climate change affect the lives of people in all parts of the world. It also makes us understand how extreme situations affect the processes in society that were established and worked well under normal conditions.

The process of supplying food to urban residents can be unexpectedly disrupted by force majeure: epidemics, pest infestations, droughts, floods, hurricanes, which will occur with increasing frequency due to climate change and mitigation of urban heat islands effects in greening cities [4,5]. The principles of green construction processes and environmental engineering are described in European green roof norms and guidelines [6-9]. Rooftop Republic company invests in city farming in Hong Kong. It has built 70 urban farms in this Special Administrative Region of China. Hong Kong is a great place for urban farms. There is a lot of sun here, there are enough empty roofs, which we consider as a convenient place for growing food.

The technologies underlying city farming have been actively developed quite recently in regions with the highest population density - in China, Japan, and Taiwan. And in Singapore today, a real agricultural revolution is in full swing with an emphasis on city farming. Singapore aims to increase its own food production by growing vegetables on multi-level farms. Over the past three years, the number of so-called "heavenly farms" in Singapore has doubled. The Apollo Aquaculture Group is a prime example of city farming, building an eight-story automated fish farm worth about $50 million to complement its facilities. Its specialists already now, arranging small pools on the roofs of private houses, produce more than 110 tons of fish per year.
The Chinese company Shiok Meats wants to be the first in the world to sell shrimp grown in a laboratory located on the roof of a skyscraper. The rest of the world does not lag behind in city farming. In New York City, the number of urban farms and rooftop gardens has grown to 1,500 in the past two years. In some Western countries, for example, in Germany, Switzerland and Austria, special laws have been adopted, according to which the roofs of certain structures must be greened. In London, greens are increasingly being grown underground in former bomb shelters, and abandoned subway lines are being used to grow mushrooms. There, the number of “living roofs” has almost tripled since 2008. Local authorities are confident that their further distribution can help cities solve problems such as air pollution, lack of green spaces, isolation of citizens from nature. As of 2017, Greater London had a total green roof area of 1.5 million square meters, which is approximately equal to 0.17 sq. m. per inhabitant. Today, these figures have increased. The largest agricultural project in Europe is a vertical farm in the former 6-storey Phillips office in The Hague. There, on the roof, they grow vegetables and now fashionable micro greens, and below, on the 6th floor, fish are bred. No wonder, the world has already learned how to use aquaponics. Scientists have calculated that the profitability of growing, for example, micro greens, can be 1000%, and the productivity of vertical farms is hundreds of times greater than classical farming.

In Rostov-on-Don, where it is warm and sunny much longer than in central Russia, a terrace with trees and flower beds was made in one of the business centers. It is willingly rented for a variety of events, yoga classes and photo shoots. This is one of the projects of the architect Alexander Tolokonnikov, part of the overall concept of Tolokonnikov Parks with a private botanical garden and cucumber beds. In Russia, the introduction of vertical greenhouses takes only three to four years. The first and only Panasonic agricultural laboratory in the country has opened in the Skolkovo Technopark.

Environmental aspects of the choice of building materials in architectural design are the main elements of comparison in rating systems [10-15]. Environmental aspects add significantly to the quality of urban environment and therefore ensures green roofs in farming systems in this regard as the high-tech solutions in ecodevelopment [16-19].

2.3 Analysis of the objects of green infrastructure in transportation systems

Greening urban spaces become more popular in the objects of green infrastructure in transportation systems (figures 1-2). For instance, the project of bus shelter with greening systems in Manchester has been funded by the Department of Transport, and it also allows people to charge their phones and view travel information at the bus stop (figure 3). Green spaces help with the capture of fine dust, the storage of rainwater, and the provision of cooling effects. They also enable biodiversity in the city for insects such as bees. So, the City of Utrecht Council in collaboration with advertising agency Clear Channel has transformed 316 bus stops across the city into bee stops, creating bee-friendly spaces for the endangered species [20].
Fig. 1. Green systems in metro station. Architect: Bernard Tschumi Architects with Merlini and Ventura Architects. Location: Lausanne / Switzerland. architectureframed.blogspot.com/.

Fig. 2. Green systems in bus station. Location: Manchester.

3 Results

The companies with new organization of farming - the city farming construction on the buildings and in the objects of green infrastructure in transportation systems should comply with requirements:
- the load that the structure of this roof can withstand; taking into account it, the type of green spaces is selected;
- the volume of the soil layer required to accommodate the roots of plants;
- the required amount of moisture to provide plants with water; the need for drainage to remove excess moisture that the operational coating receives during precipitation or when watering plants;
- the need to protect structural elements of the roof.

The thickness of the layers for growing plants is determined by the plants that are supposed to be used when creating a roof garden. There are a number of patent documents related to green roofs. Thus, the analysis of these materials showed that patents related to roof gardening can be conditionally divided into the following areas:
- gardening of flat, inclined, wavy and tiled roofs;
- soil-bearing system for landscaping;
- substrates (structural environment) for growing plants;
- drainage elements;
- finished elements with vegetation, laid on green roofs.

And it is necessary to calculate the loads, taking into account design features.

We selected some of the largest companies with city farming construction on the buildings for evaluation: Sika Group, Beacon Roofing, Panasonic agricultural laboratory, Supply Inc, Apollo Aquaculture Group. The ESG assessment of such companies with new organization of farming is carried out in the following main areas:

- Information on the supplier/contractor's environmental impact, including estimates of greenhouse gas and pollutant emissions, impacts on deforestation and biodiversity reduction;
- Data on occupational injuries and mortality of workers;
- The company's observance of labor rights, including the reduction of financial and social inequality between men and women, as well as the inclusion of employees with disabilities;
- Fair remuneration, care for the health and development of employees;
- Availability of development strategies in the company, formulated mission, values, business ethics;
- Monitoring of the impact on suppliers (contractors, performers), and other information that allows you to form an idea of the impact of suppliers and contractors on the environment, social sphere and economy.

The company receives certain points for answering the question. If this parameter can be verified by external sources, then a positive score is given only if the information is confirmed by external data or attached documents. Depending on the number of points scored, the company can receive a level I, II or III ESG certificate (table 1).

**Table 1. Analysis of companies with new organization of farming - the city farming construction on the buildings and their compliance with ESG standards.**

<table>
<thead>
<tr>
<th>Level</th>
<th>Number of points</th>
<th>Description</th>
<th>The company name</th>
<th>ESG score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>76-100</td>
<td>High level of compliance with ESG standards</td>
<td>Panasonic agricultural laboratory</td>
<td>80</td>
</tr>
<tr>
<td>II</td>
<td>51-75</td>
<td>Sufficient level of compliance with ESG standards</td>
<td>Sika Group</td>
<td>74</td>
</tr>
<tr>
<td>III</td>
<td>26-50</td>
<td>Average level of compliance with ESG standards</td>
<td>Beacon Roofing Supply Inc</td>
<td>24</td>
</tr>
<tr>
<td>Not certified</td>
<td>0-25</td>
<td>The company has not fulfilled the necessary conditions</td>
<td>Apollo Aquaculture Group</td>
<td>21.5</td>
</tr>
</tbody>
</table>

The Sika Group companies and Panasonic agricultural laboratory are especially recognized for its strong corporate governance performance and new construction materials that were analyzed. According to the analysis, their strongest areas of ESG risk management are its global business ethics programs, its broad range of sustainable technologies and its responsible use of resources, notably in terms of urban farming management, greenhouse gas and pollutant emissions, impacts on deforestation and biodiversity reduction.
4 Conclusion

This article is devoted to the consideration of the importance and implementation of a new organization of farming in the city and the objects of green infrastructure in transportation systems with as an object of ESG certification. Progressive developers and responsible companies with new organization of farming - the city farming construction on the buildings are looking for ways to maximize roof storage capacity in green roof market. The holistic impact of the positive impact of green roofs in order to have access to plant greenery for businesses is associated with highly urbanized climates and positive benefits for health and employee growth. Many cases and multinational coverages are environmental management initiatives. These include green roof projects for identity disclosure to green space for improved corporate health and disclosure. Thus, a large green urban area, as well as increased air consumption in large volumes.

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