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ANALYSIS OF PECULIARITIES OF SMART SUSTAINABLE DEVELOPMENT IN NORTHERN CITIES

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Harsh weather conditions of the Arctic create certain obstacles to the development of modern cities and are also particularly sensitive to climate change. The magnitude of the temperature increase in the Arctic is twice as much as the world average. To solve these problems the Arctic cities require "smart" solutions to become more sustainable and effective and be able to adapt to harsh northern conditions and climate change influence.

The aim of the research is to find out the main solutions for smart and sustainable strategies implemented in the Arctic cities based on international experience. The case study was chosen as the main research method, based on information about several Arctic cities as Reykjavik (Iceland), Umea (Sweden), Oulu (Finland) and Anchorage (USA).

Our analysis showed that the main features of northern cities caused by climatic conditions primarily include low temperatures, strong winds, heavy rainfall, insufficient solar radiation. Such conditions require the generation of more amount of energy for heating of buildings, which leads to an increase in greenhouse gas emissions and, consequently, an increase in temperature and climate change influence. Also, the conditions of northern cities can adversely affect the physical and mental state of people, which leads to an increase in the incidence of disease.

For the sustainable development of northern cities, it is important to consider the natural specifics of the Arctic region and, first of all, pay attention to those smart decisions that could help adapt to it.

Several measures of adaptation to climate change are of great importance for these cities. The main method of combat with climate change is the reduction of greenhouse gases by using alternative energy, electric vehicles, energy-efficient buildings, smart heating and lighting systems. Reducing the concentration of pollutants in the atmosphere also has a positive effect on public health. Harsh climatic conditions also lead to high requirements for the design of buildings: foundation, surface layers, insulation, roof, etc.

Cases of Arctic cities demonstrated that such smart instruments as smart lighting and heat supply systems, intelligent building management, electric cars, alternative energy sources, smart parking, heated sidewalks could be used for solving problems such as emissions and pollution, irrational use of natural resources, climate change, disease incidence, problems of transport infrastructure and navigation, excessive money spending.

The result of the case-study shows that smart solutions being implemented in Arctic cities mentioned above correlate with many UN Sustainable Development Goals SD, especially the goals 7, 8, 9, 11, 12, 13. Most projects in the Arctic are aimed at improving energy efficiency, which corresponds to goal 7 – «Affordable and Clean Energy» and goal 12 – «Responsible Consumption and Production». Measures to combat climate change are goal 13 – «Climate Action».

In this way, climate-friendly, smart and energy-efficient approaches and technologies will create a combined effect to improve the sustainability and viability of northern cities, as well as to improve the quality of life of the population in cold natural conditions.