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THE ROLE AND PLACE OF THE BIOSPHERE ECO-CITY IN THE MODERN MODEL OF HUMAN DEVELOPMENT

This article explores the significance of biosphere eco-cities in contemporary human development by examining their evolution in response to the challenges faced by traditional urban development models. It explores the key characteristics of biosphere eco-cities, which are guided by the principles of sustainability and have unique features that distinguish them in the modern development landscape. Trends in the development of biosphere eco-cities, such as green technology and regenerative design, are discussed. The importance of biosphere eco-cities for achieving global sustainable development goals, including the UN Sustainable Development Goals, is highlighted. The concept of a biosphere eco-city envisages the creation of urban spaces that prioritize environmental sustainability, striving to achieve a harmonious balance between human activity and the natural environment. These cities integrate the principles of environmental protection, resource efficiency, and social well-being into their design and development. Biospheric eco-cities are key to addressing the challenges posed by rapid urbanization, environmental degradation, and climate change. They seek to create urban environments that are not only sustainable but also contribute to the overall well-being of their inhabitants. This approach is essential to achieving a more balanced and sustainable human-nature relationship.

Keywords: biosphere eco-city, sustainability, urban development, environmental protection, human-nature relationship.

JEL classification: Q56

РОЛЬ І МІСЦЕ БІОСФЕРНОГО ЕКО-МІСТА В СУЧАСНІЙ МОДЕЛІ ЛЮДСЬКОГО РОЗВИТКУ

У цій статті досліджується значення біосферних еко-міст в сучасному розвитку людини, вивчаючи їх еволюцію відповідно до викликів, що стоять перед традиційними моделями міського розвитку. Вона досліджує ключові характеристики біосферних еко-міст, які керуються принципами сталого розвитку і мають унікальні особливості, що відрізняють їх в сучасному ландшафті розвитку. Обговорюються тенденції розвитку біосферних еко-міст, такі як зелена технологія та регенеративний дизайн. Висвітлено важливість біосферних еко-міст для досягнення глобальних цілей сталого розвитку, включаючи цілі ООН зі сталого розвитку. Концепція біосферного еко-міста передбачає створення міських просторів, що надають перевагу екологічній стійкості, прагнучи досягти гармонійного балансу між людською діяльністю та природним середовищем. Ці міста інтегрують принципи охорони довкілля, ресурсної ефективності та соціального благополуччя у своє проектування та розвиток. Біосферні еко-міста є ключем до вирішення викликів, що постають внаслідок швидкого міського зростання, знищення довкілля та змін клімату. Вони прагнуть створити міські середовища, які не лише стійкі, а й сприяють загальному благополуччю їх мешканців. Цей підхід є ключовим для досягнення більш збалансованого та сталого відношення між людиною та природою. У ландшафті сталого міського розвитку канадські біосферні еко-міста (БЕМ) виходять як зразки екологічної відповідальності, активно прагнучи до глобальної культури сталості. На передньому краї цього руху стоїть організація Біосферні еко-міста Канади, організація з чіткою та переконливою місією, яка є двигуном розвитку та інформування про міські екосистемами. Концепція біосферного еко-міста (БЕС) являє собою зміну парадигми міського розвитку в бік сталого розвитку та екологічної гармонії. У цьому есе досліджується значення біосферних еко-міст у сучасному людському розвитку шляхом вивчення їхньої еволюції у відповідь на виклики, з якими стикаються традиційні моделі міського розвитку. У ньому розглядаються ключові характеристики біосферних еко-міст, які керуються принципами сталого розвитку та мають унікальні риси, що вирізняють їх у сучасному ландшафті розвитку. Концепція біосферного еко-міста передбачає створення міських просторів, пріоритетом яких є екологічна сталість, спрямована на досягнення гармонійного балансу між людською діяльністю та природним середовищем. Такі міста інтегрують принципи захисту довкілля, ресурсоефективності та соціального добробуту у свій дизайн і розвиток.

Ключові слова: біосферне еко-місто, сталість, міський розвиток, охорона довкілля, взаємини людини з природою.

Statement of the problem. The role and place of biosphere eco-cities in the current model of human development in Canada requires attention and consideration. Growing urbanization and climate change pose new challenges to society in terms of sustainable development. In this context, it is important to analyze the

impact of biosphere eco-cities on improving the quality of life of city residents, preserving the environment, and supporting economic growth.

Analysis of recent research and publications. The scientific works referenced herein provide insights into the practical implementation and assessment of

eco-city concepts, offering a multidimensional perspective on the ecological, social, and economic aspects of urban development. Researchers like Xu Boqian and Lin Zhongjie [1], Wilson J., & Grant J. [2], Isman M., Archambault M., Racette P., Konga C.N., Llaque R. M., Lin D., Iha K., & Ouellet-Plamondon C.M. [3], Hes D., Bush J. [4], Russo A., Cirella G.T. [5], Li J. [6], Yang T., Sun W., Liu J., Wang D., Zeng G. [7], Nguyen T.H., & Vu G.H.T. [8] and others contribute valuable knowledge to the discourse on biosphere eco-cities. Their studies explore topics ranging from ecosystem service values and ecological footprints to the integration of ecology in city design and planning, providing a comprehensive understanding of the challenges and opportunities associated with eco-city development.

Highlighting previously unresolved parts of the overall problem. The scientific world has not studied some aspects of the role and importance of biosphere ecocities in the current model of human development in Canada, in particular, there is a lack of research on the impact of biosphere ecocities on the economic sustainability of cities, their competitiveness and ability to attract investment, as well as the process of including different social groups in decision-making and the use of urban ecosystems.

Objectives of the article. In the landscape of sustainable urban development, Canadian Biosphere Eco-Cities (BECs) emerge as exemplars of environmental responsibility, actively striving for a global culture of sustainability. At the forefront of this movement is Biosphere Eco-Cities Canada (BECC), an organization with a clear and compelling mission, serving as the driving force behind these urban ecosystems.

Summary of the main results of the study. The biosphere eco-city (BEC) concept represents a paradigm shift in urban development towards sustainability and ecological harmony. This essay explores the significance of biosphere eco-cities in contemporary human development by examining their evolution in response to challenges faced by traditional urban development models. It delves into the key characteristics of biosphere eco-cities, which are guided by sustainable principles and possess unique features that distinguish them in the modern development landscape.

The biosphere eco-city concept involves creating urban spaces that prioritize ecological sustainability, aiming to achieve a harmonious balance between human activities and the natural environment. These cities integrate principles of environmental protection, resource efficiency, and social well-being into their design and development.

They are crucial in addressing the challenges posed by rapid urbanization, environmental degradation, and climate change. They strive to create urban environments that are not only sustainable but also contribute to the overall well-being of their inhabitants. This approach is essential in achieving a more balanced and resilient human-nature relationship.

Those cities address challenges posed by traditional urban development models by adopting sustainable practices. These challenges include ecological degradation, overconsumption of resources, and the social and economic disparities associated with conventional urbanization.

Biosphere eco-cities adhere to sustainable principles such as renewable energy use, waste reduction, green infrastructure, and biodiversity conservation. These principles guide their development to minimize

environmental impact and promote long-term resilience.

The biosphere eco-city model stands out with features like green building designs, efficient public transportation systems, waste recycling programs, and the integration of nature into urban spaces. These unique features contribute to the overall sustainability and livability of these cities.

Globally, the Carbon Footprint (CF) is the largest component of the Ecological Footprint, making up 65% of the total Ecological Footprint (Global Footprint Network, 2016a) in 2011. Canada had the 6th largest per capita EF globally, at 8.19 gha per capita in 2011. Similar to most high-income countries, the CF of Canada represents a large percentage of Canada's total EF (65%, Fig. 1). Here we present data using the year 2011 as the reference year to be consistent with the methodology to derive the National Consumption Land Use Matrix (CLUM) [3].

Connecting Canadian Biosphere Eco-Cities: A Blueprint for Sustainable Urban Living

Unlocking Sustainability: The BECC Mission

In the landscape of sustainable urban development, Canadian Biosphere Eco-Cities (BECs) emerge as exemplars of environmental responsibility, actively striving for a global culture of sustainability. At the forefront of this movement is Biosphere Eco-Cities Canada (BECC), an organization with a clear and compelling mission, serving as the driving force behind these urban ecosystems.

Mission Statement: Paving the Way for Sustainable Communities

The BECC's mission revolves around promoting the use of BEC Themes & Tools to engage Canadians in sustainability. Through this, they aim to foster a culture of cooperation and sustainability, not only at a national level but also on the global stage. The key pillars of their mission include:

- Engaging Canadians in Sustainability: Encouraging active participation in sustainable practices.
- Connecting Canadian BECs: Establishing a network for the exchange of success stories and best practices.
- Mentoring New Eco-Cities: Guiding and supporting emerging Biosphere Eco-Cities.
- Demonstrating Benefits: Illustrating how the BEC approach directly benefits Canadians.
- Global Outreach: Exporting the BEC concept to contribute to global sustainability efforts.

Unveiling the BEC Concept

Biosphere Eco-Cities: A Hub of Sustainability

Biosphere Eco-Cities (BECs) redefine urban living by emphasizing cooperation, collaboration, and sustainability Fig. 2. Currently, there are five BEC initiatives spanning Canada: Ottawa (OBEC), Toronto (TBEC), Brampton (BBEC), Edmonton (EBEC), and Vancouver (VBEC). BECC acts as the catalyst, providing support and resources for collaboration among these diverse eco-cities [9].

The BEC Toolkit: Themes and Tools for Sustainability

BECs utilize a comprehensive framework consisting of 10 Themes of Sustainability and 5 Tools of Engagement. These themes include critical aspects of urban sustainability such as transportation, energy, design, habitat, food, natural capital, waste, health, recreation, and sense of place. The engagement tools comprise a Database of Projects, Sustainability Plans, Workshops on Individual Themes, Demonstration Projects, and a Council of Stakeholders. This dynamic combination fosters a culture of sustainability

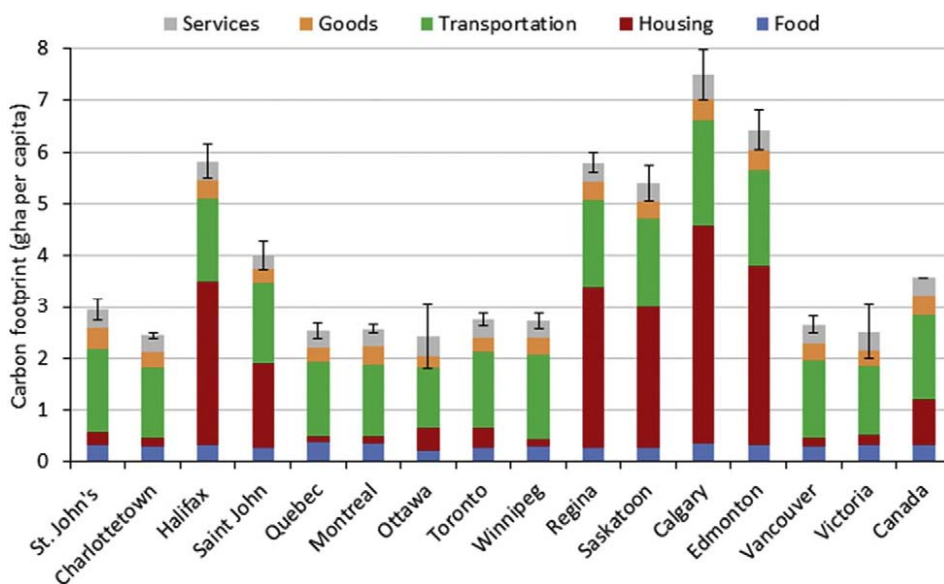


Figure 1. The system of carbon dioxide formation in Canadian cities

Source: [3]



Figure 2. Structure biosphere Eco-Cities (BECs)

Source: compiled by the author

through community engagement, cooperation, innovation, and the exchange of knowledge.

Building a Sustainable Future: BECC in Action

BECC goes beyond being a mere network; it actively implements national sustainability projects. By facilitating collaboration among BECs, BECC plays a crucial role in the practical application of sustainable initiatives at a larger scale.

Embracing Sustainability: A Call to Action

In conclusion, Canadian Biosphere Eco-Cities, under the umbrella of BECC, are pioneers in sustainable urban living. Their commitment to engagement, cooperation, and innovation serves as a model for cities globally. As we witness the impact of their collective efforts, it's clear that the BEC concept is not just a local phenomenon but a blueprint for a sustainable future on a global scale. Join the movement, embrace sustainability, and be a part of the change.

Green Cities and Global Sustainable Development Goals: A Vision for the Future

As we delve into the descriptions of Canadian Biosphere Eco-Cities (BECs), this blueprint for sustainable urban living emerges as a powerful tool in achieving and even surpassing global sustainable development goals. Let's explore how these green cities can contribute to the realization of specific targets outlined in the Sustainable Development Goals (SDGs), with a focus on Target 11 – Sustainable Cities and Communities.

Target 11.3: Inclusive and Sustainable Urbanization

The Connecting Canadian Biosphere Eco-Cities concept aligns seamlessly with Target 11.3, which aims to enhance inclusive and sustainable urbanization globally by 2030. BECs prioritize participatory, integrated, and sustainable human settlement planning and management. Through the implementation of the BEC Toolkit, which includes engaging the community in sustainable

practices and connecting diverse eco-cities, BECs serve as living laboratories for inclusive and sustainable urban development.

Target 11.4: Protect the World’s Cultural and Natural Heritage

One of the core principles of Biosphere Eco-Cities is the protection and enhancement of natural and cultural heritage. BECs, such as Ottawa (OBEC), Toronto (TBEC), Brampton (BBEC), Edmonton (EBEC), and Vancouver (VBEC), actively work to safeguard the world's cultural and natural heritage. Their commitment to sustainable practices ensures that urban development coexists harmoniously with the environment, protecting valuable heritage for future generations.

Target 11.6: Reduce the Environmental Impact of Cities

The BEC approach directly addresses Target 11.6 by striving to reduce the adverse per capita environmental impact of cities by 2030. Through comprehensive Themes of Sustainability and Tools of Engagement, BECs focus on addressing critical aspects of urban sustainability such as transportation, energy, waste management, and air quality. By fostering a culture of sustainability, BECs contribute to a significant reduction in the environmental footprint of urban areas, showcasing a practical and effective model for global cities.

Target 11.7: Provide Access to Safe and Inclusive Green and Public Spaces

The BEC concept places a strong emphasis on creating safe, inclusive, and accessible green and public spaces. Through the Themes of Sustainability like habitat, recreation, and sense of place, BECs ensure universal access to such spaces. This aligns perfectly with Target 11.7, aiming to provide safe and inclusive areas for everyone, including women, children, older persons, and persons with disabilities.

Target 11.8: Strong National and Regional Development Planning

Connecting Canadian Biosphere Eco-Cities contributes significantly to Target 11.8 by promoting positive economic, social, and environmental links between urban, peri-urban, and rural areas. BECs act as pioneers in sustainable urban

living, showcasing the integration of national and regional development planning. The network established by BECC facilitates collaboration among BECs, strengthening the overall development planning process and fostering a holistic approach to urbanization.

In conclusion, the Connecting Canadian Biosphere Eco-Cities concept is not just a local initiative but a global solution. By aligning with and surpassing the targets outlined in the Sustainable Development Goals, BECs demonstrate that sustainable urban living is not only achievable but essential for the well-being of current and future generations. Join the movement, embrace sustainability, and be a part of shaping a future where green cities lead the way in achieving global sustainability goals.

In her article, “The Economic Benefits of Creating Green Cities,” Shenelle Perera highlights .Steps Required for Transforming Cities into Green Cities: Enhancing Natural Spaces, Promoting Local Economy, Renewable Energy, Eco-friendly Infrastructure, Water Conservation, and Fostering Environmental Awareness [10] (Fig. 3).

Preservation of Natural Spaces:

Planning cities should incorporate extensive, convenient, and integrated green zones. This approach yields cleaner air, pure water, and a reduction in pollution levels. Simple elements like shade from trees can have a remarkably beneficial impact. Shaded areas can be 20–45 degrees cooler, reducing the need for air conditioning, a major contributor to climate change, by 20–30% [11].

Promotion of Local Economic Culture:

Encouraging locally produced goods and services is essential. This practice creates job opportunities and more resilient supply chains. Urban farming is a prime example of this, producing food on small-scale farms within cities, such as vertical farms and community gardens. This reduces carbon emissions from food production, providing residents with more accessible and nutritious options. Easy access further diminishes greenhouse gas emissions from transportation [13].

Utilization of Renewable Energy:

Investing in renewable energy production facilities (solar, wind, geothermal) and promoting their use by

NECESSARY STEPS TO TURN CITIES INTO GREEN CITIES



Figure 3. Steps Required for Transforming Cities into Green Cities

Source: compiled by the author

businesses and individuals is crucial. Additionally, advocating and incentivizing electric vehicles contribute to a reduction in greenhouse gas emissions [10].

Eco-friendly Infrastructure:

Investment in new technological advancements, such as green concrete, recycled plastic, and sustainable timber also greatly contribute to reduction in greenhouse gas emissions [11].

Water Conservation:

As water is a precious resource, it's crucial to ensure its efficient use. Green cities implement rainwater harvesting, incentives for water conservation, and intelligent irrigation systems as methods to save water [10].

Promoting Environmentally Conscious Actions:

A sustainable city can only be created and sustained if its residents are aware of their actions and committed to the cause. Citizens need to replace old habits with new, environmentally friendly, and socially conscious ones [12].

In summary, transforming cities into green cities requires a holistic approach encompassing planning, economic practices, energy usage, infrastructure, water management, and the active involvement of environmentally conscious citizens. Adopting these measures not only contributes to the achievement of local sustainability goals but also aligns with global targets for inclusive and sustainable urbanization, protection of cultural and natural heritage, reduction of environmental impact, and the provision of safe and inclusive green spaces.

As biosphere eco-cities continue to evolve, several emerging trends shape their development. These include advancements in green technology, increased emphasis on circular economies, and innovative urban planning strategies. The integration of smart city technologies and the rise of regenerative design are also becoming prominent trends, enhancing the overall sustainability of these cities.

Biosphere eco-cities are poised to make significant contributions to the broader model of human development.

By serving as incubators for sustainable practices, these cities can influence global urban development policies. Their emphasis on environmental stewardship, social equity, and economic resilience can serve as a blueprint for creating more livable and resilient cities worldwide. The holistic approach of biosphere eco-cities can contribute to achieving broader human development goals, including the United Nations Sustainable Development Goals (SDGs).

Conclusions. In conclusion, BECs play a vital role in modern human development by offering a sustainable alternative to traditional urban models. Their emphasis on ecological balance, resource efficiency, and community well-being addresses the challenges posed by rapid urbanization and environmental degradation. These cities serve as living laboratories, showcasing the possibility of harmonious coexistence between urban development and the natural environment.

To ensure a sustainable future, there is a need for continued support and integration of eco-city principles in urban planning. Governments, policymakers, and urban planners should collaborate with researchers, communities, and businesses to implement and refine the eco-city concept. This requires a commitment to long-term sustainability, investment in green infrastructure, and the adoption of policies that prioritize environmental conservation and social inclusivity. The call to action is for a collective effort to build cities that not only meet the needs of the present but also safeguard the well-being of future generations.

In embracing the principles of biosphere eco-cities, humanity has an opportunity to shape urban landscapes that promote environmental health, social equity, and economic prosperity. The journey towards sustainable urban development is ongoing, and the continued exploration and implementation of eco-city concepts are essential for creating a resilient and thriving future for all.

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