THE CONCEPT OF A “WARM” CITY IN THE ARCTIC: BASIC IDEAS OF COMFORT IN THE URBAN ENVIRONMENT (THE CASE OF WESTERN SIBERIA, RUSSIA)

Abstract. Arctic architecture has continuously been developing as a fusion of approaches: from creating cities under domes to bringing mainstream built environments up to high latitudes. It still is a frontier for urban studies, design and architecture. This article reports a work currently in progress and aims to introduce the concept of an emotionally “warm” Arctic city.

We perceive Arctic city cold both in physical and mental ways. Physical coldness is connected to the material urban environment. In the case of the Russian Arctic (particularly, Western Siberia), architecture and urban design became ideological tools of “normalising” the region during vast industrial development in the last century. Hence, a city in the High North replicates the visual appearance and infrastructure of a Soviet/Russian city in a temperate climate. The unadapted urban environment adds to the emotional “coldness” of Arctic city. Most industrial cities in the Russian Arctic function as a base for the fly-in-fly-out (FIFO) method for the ongoing oil and gas mining development. The city is perceived as a temporary state of living, influencing one’s physical and mental well-being and shaping unsustainable attitudes towards the region.

The concept of a “Warm” city is a system of design and architectural tools aiming to make physically comfortable and emotionally mindful for inhabitants of the Arctic city. By analysing global and local examples (theoretical and practical works), we discuss opportunities to create an urban “shell” for protecting and sustaining human physical and mental wellbeing in the extreme environment of the Arctic.

Keywords: Arctic design, Arctic architecture, urban design, built environment, Arctic urbanisation

Introduction. The modernistic colonial narrative was developed in the 20th century in soviet ideology to support industrial development and as a direction for reclamation of so-called empty remote Arctic space [1]. It became a ground with a “lunar landscape”, where architecture and urban design aimed to neutralise harsh climate [2]. It has always been a fusion of “superstructures under domes”, “new regionalism”, and “importing a mainstream modernism” in Arctic architecture and urban design [3].

Northern urbanisation still appears as a “frontier of urban studies” due to exceptionally extreme conditions of the region, which forces us to search for ways to sustain and develop cities [4]. Arctic architecture and design have already been established as consistent topics of research. The methods of addressing the northern context in the urban environment are outlined in architectural, urban studies, and design [5, 6]. However, despite being the largest Arctic country, Russia is not included in the discussion (considering readily available publications) [3]. While Arctic architecture and design is still looking for its own identity, it is essential to abandon the “colonial” attitude towards focusing on human needs [7].

This article reports a work currently in progress and introduces the “Warm” city concept and general research foundation. The emotional “coldness” of Arctic city is considered to be an objective, which possesses the same level of impact on human adaptation as actual physical cold. We suggest the “Warm” city concept as a toolkit for expanding the potential of architecture and design to create a physically and emotionally comfortable urban environment in the Arctic. By
analysing global and local examples (theoretical and practical works), we discuss opportunities for architecture and design to build the system, aiming to create (1) comfort of everyday interaction with the city and (2) visual/emotional perception “warmness”. This basis sets up an urban “shell” for protecting and sustaining physical and mental wellbeing in the extreme environment. Increased and improved co-creation and participation in city life, together with a friendly urban realm, build trustworthy relationships with citizens and, therefore, develops responsibility towards the place’s future.

The article is structured as follows: after describing the used data and methods, it concerns the historical context of soviet Arctic urbanisation (the north of Western Siberia in particular). Then it outlines the current state of development and urban environment in the Russian Arctic cities (with an example of Novyy Urengoy) to demonstrate the relevance of the ongoing research. It leads to defining the concept of developing a “Warm” city concept and discussing specific design and multidisciplinary approaches/ideas applicable within the project.

Methods. The research is based on analysing local and global examples (theoretical and practical) of Arctic design and architecture. This also includes interdisciplinary sources, i.e., economics, management, psychology, sociology, and research on Arctic architecture, urban design and planning.

The case study of the research is the city of Novyy Urengoy. We used first-hand data from the field (9 semi-structured interviews converted into five data narratives according to the topics revealed; participant observations; photos, and videos of the spatial/environmental settings).

Results and discussion. In this article, we are looking at the mental/emotional “coldness” of Arctic city as equal to the actual physical coldness of the extreme climate. We understand “coldness” as an overall image formed by human perception and sense of space. This image can be described as “unfriendly” and “uncomfortable”. In terms of our concept and based on conducted research of Soviet/Russian Arctic urbanisation, we suggest the following elements, which add to the so-called “coldness”. Firstly, the urban environment is not adapted to Arctic conditions. Therefore, everyday interaction with the urban environment is uncomfortable. Secondly, close relations between fly-in/fly-out (FIFO) or drive-in/drive-out (DIDO) work and Arctic industrial cities define the temporary state of life, cyclical pattern of life divided into two parts, leading to lack of belonging.

1. “Preplanned” Arctic cities

The urban environment of the Soviet/Russian Arctic was formed by historically defined approaches, where architecture was used as a tool of ideology. In our research, we assume it to be one of the factors, which adds to the “coldness” of the northern climate, so the city does not create comfortable conditions for its dwellers in the winter season due to lack of the urban realm’s adaptation.

Architecture and design, being social constructs, are shaped by a particular historical period, so the perception and role of these disciplines change together with social, economic and cultural shifts. A list of different perspectives on Arctic architecture was outlined to investigate ideologies and values which define the built environment of the North [3]. Each of the views describes architectural approaches to the region’s development. For example, “Polar Extremes” describes bringing “mainstream architectural thinking” to the Arctic region, “Arctic Regionalism” criticises the “reduction of difference” in Arctic mainstream architecture. These approaches transform and replace each other in time and space. Analysis of Arctic urbanisation in different countries of the circumpolar world also shows how historical development directly influences patterns of urbanisation, particularly in the soviet High North [8, 9]. Hence, the urban environment of current Arctic cities is formed by these large-scale processes.

In the context of ideological appropriation of the region, the Soviet Arctic city was shaped to “normalise” different from “normal” (meaning the conditions of the European part of the country) climate conditions. “Preplanned” Arctic city had no opportunity to meet the real needs of their dwellers since it was deprived of evolitional development. Its urban environment lacks “sensitive adaptation” and “responsive” mechanisms, which would naturally occur under a long period of social, economic and cultural processes [10]. So, despite the modernist megastucture concepts of the “ideal” polar city [1], the Soviet Arctic urban environment was shaped by standard prefabricated housing, which soon got affected by the climatic conditions. It resulted in the low quality of the living environment [11].

2. Cyclical Arctic city

An Arctic city can be described as “indefinite” or “endless” due to cyclical patterns of its functioning in several aspects [4]. Firstly, “endlessness” is
caused by the climatic cycle: from harsh seasonal periodicity (temperature jumps from winter to summer, polar night and day) to the process of global warming. Weather conditions also shape the instability of transport accessibility [4]. Secondly, Russian industrial cities in the Arctic are strictly connected to economic fluctuations, political interests of government and critical stakeholders. We know cases when planned soviet single-industry cities (a single-factory town or "monogorod" in Russian) became deprived of their economic base together with the fall of planned economy, which led to critical population decline and complete abandonment [12].

The cyclical pattern is also relevant to larger industrial cities: almost all energy or resource dominated Arctic cities in Russia are closely linked to the fly-in/fly-out (FIFO) or drive-in/drive-out (DIDO) work method. Such cities work as "supply centres" for the industrial development of the region, which makes it "less social or economic entities than physical collection points" [8].

For the basic methodology for analyzing fly-in/fly-out (FIFO) method in the oil and gas extractive industry of Western Siberia, we relied on a systemic approach: based on that, the structural elements of the FIFO way of living – work (being in the camp), road (long-commute travel) and home – were examined in a united social and psychological context (see Figure 1). The data analysis revealed that a city like Novyy Urengoy is perceived as fly-in–fly-out camps. The citizens' interviewing revealed that the city, in this case, adopts features of a FIFO-camp, such as a temporary state of living. It also confirms a hypothesis of a cyclical pattern of life divided into two parts, where the central part of life arises in the hometown. At the same time, the Arctic city becomes something that one should endure. In our research, we contemplate the temporary state of living in the Arctic city to be one of the factors, which are: (1) contrary to the sustainable development of the region; (2) decreases one’s wellbeing due to constant processes of adaptation and readaptation [13].

![fig_1](image)

**Fig. 1. Cycle of FIFO work**

### 3. Physical "warmness" of urban environment

Generally, two main paths for coping with cold and other climatic extremes were outlined in Arctic architecture and planning. The first one called for artificial environments to completely isolate humans inside a city with a controllable climate under one roof. Although none of the modernist projects was implemented, this approach of roofing and walling influences modern architecture and urban design in the Arctic. Researchers argue this approach falls for enduring winter time: it substitutes stress caused by harsh climate with depression caused by lack of open space[14–16]. One of the most famous Arctic architects, Ralph Erskine, saw negative consequences for human psychological wellbeing in "technologically advanced superstructures under domes" [3, 17]. In this case, Arctic design and architecture should find ways to find "beneficial aspects of winter cities" without attempts to bring "summer cities" to the high latitudes [18].
Safe and accessible public spaces is a part of Goal 11 (Sustainable cities and communities) of the United Nations Millennium Sustainable Development Goals, which includes creating “capacity for participatory, integrated and sustainable human settlement planning and management” [19]. Interaction with urban open space is the most sensitive to the climate part of life in a city. Complete isolation from outdoor space inside domes, roofs, and walls is crucial for modernist “ideal” Arctic cities. Despite that, in reality, today estimated indoor time of some High North communities is about 70–95% of the time [10, 20].

However, physical response to cold is integrated into our behavioural patterns, and tightly managed micro-climatic conditions appear unimportant in winter city’s usage. Urban context, management, visual attraction, cultural dimension and one’s attitude towards Arctic climate are the factors that improve winter public life [14]. Hence, the attractiveness of the Arctic urban environment calls for finding a balance between smoothed micro-climatic conditions (with tools of urban design, planning and architecture) and working towards building a positive attitude for the city’s space. The adaptive and responsive material environment creates space for urban context (combination recreational, commercial and other functions of a city) and comfortable interaction with these functions [14]. In terms of our research, we name creating physical comfort of interacting with urban space as the first level of the “Warm” city concept. This level makes a base for emotional “warming” since “attractive town” can be described as a “place whose design has been carefully considered” [21].

4. Emotional “warmness” of urban environment

One of the research mentioned above on perspectives of Arctic architecture [3] is “Psychological Arctic”, which emphasises using psychology ideas in building urban environment. Extreme conditions, created by Arctic climatic and geographical nature, set boundaries for psychological research to investigate polar night or group isolation as particular challenges for human mental wellbeing. The “Psychological Arctic” approach conceptualises architecture’s and design’s potential to address these challenges and, with “spatial means”, improve one’s emotional state [3].

This approach is based on how our conscious and unconscious self reacts to different environmental backgrounds, particularly in architectural settings. This is a crucial objective of environmental psychology [22]. Fast reactions to surroundings are rooted in our evolutionary developed survival tools, and, for example, such ideas as prospect and refuge are the two environmental qualities we rely on in estimating surroundings [23, 24]. Illustrations of these concepts are deeply connected to natural settings humans as species evolved in (just like all our cognition does): prospect allows us to visually scan information of surroundings (the example is a hill), and the cave is a perfect instance to describe the feeling of physical protection [23]. Hence, how the environment feels is a matter of unconscious cognition and is deeply rooted in emotions as an impulse for action — the mechanism developed evolutionally [25]. Based on that, psychological ideas can be applied to urban design and architecture on different levels: from working with particular parts of the environment to a city as an integral system. Therefore, so-called emotional “warmness” in our research can be investigated as (1) “warm” visual parts of the urban environment (colours, textures, smells and sound, etc.); (2) “warm” city, which includes attitude towards the place.

Senses of comfort and security (both physical and mental) are aims of “warmness” of Arctic citizens (see table 1). These feelings could potentially develop a sense of local belonging [26]. In the case of the Russian Arctic and particularly North of Western Siberia (where cities and towns are closely associated with FIFO work), this idea becomes important contrary to temporariness.

Developing the sense of local belonging or “feeling at home” works in two directions. Firstly, belonging creates mental comfort, cosiness and a “feeling of warmth” [26, 27]. Secondly, attitude towards space as something temporary (I won’t stay here long, so why would I care?) can lead to indifference to its future and a lack of sense of belonging. A city mindful of its inhabitants could shift one’s perception from “Arctic—as—a-resource—base” towards a sustainable future. The idea of urban settlements was historically developed as a space to protect its dwellers from external threats (invasion or starvation), so a “good” city can be understood as the one “enhancing human experience” [28].
Table 1

“Warm” city concept

<table>
<thead>
<tr>
<th>Issue</th>
<th>Aim</th>
<th>concept/approach/method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. level of physical sensation</td>
<td>unadapted urban environment</td>
<td>comfort of everyday interaction with city</td>
</tr>
<tr>
<td></td>
<td>city planning, urban design and architectural tools</td>
<td></td>
</tr>
<tr>
<td>2. level of mental sensation</td>
<td>lack of ways to participate in city’s development</td>
<td>developing responsibility towards city, understanding of opportunities for individual development and wellbeing (feeling safe) mutual care between city and dwellers</td>
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<td></td>
<td>environmental psychology, embodied cognition;</td>
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<tr>
<td>3. regional level/future of the region</td>
<td>one’s perception from “Arctic—as–a–resource–base”</td>
<td>shift towards sustainable future</td>
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<td></td>
<td>creating economical, cultural and educational points of attraction / opportunities (local business, educational / research centres)</td>
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**Conclusion.**

One of the directions of a sustainable approach in the Arctic is to go beyond resource extraction and perception of the region as a resource base. “Energy centres” like Novyy Urengoy function as base cities for FIFO–workers and hold the potential to continue their development in the role of “growth poles” in the High North [12]. We assume the development of economic, cultural and educational points of attraction/opportunities in industrial cities to continue changing attitudes towards the Arctic. As the first steps in our research, we propose the concept of a “Warm” city. A system of architectural and design tools are aimed to (1) make everyday interaction with Arctic city comfortable both mentally and physically; (2) shape a friendly urban environment, which will influence one’s perception of Arctic city.

The research is based on the hypothesis that we perceive the Arctic city as cold physically and mentally. The material urban environment and “warm” image of the city create a “shell” for sustaining human physical and mental well-being. It is essential that this shell is mindful of citizens and the Arctic natural environment and is aligned with sustainable development of the region and with individual growth at the same time.

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