Building Urban Climate Change Adaptation Strategies: The Case of Russian Arctic Cities

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Weather, Climate, and Society

BUILDING URBAN CLIMATE CHANGE ADAPTATION STRATEGIES:THE CASE OF RUSSIAN ARCTIC CITIES

--Manuscript Draft--

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Abstract:	Russian Arctic is a highly urbanized region, with most towns built in the Soviet era to facilitate extraction industries and provide provision and maintenance to military facilities. Global environmental and development changes, as well as national political decisions open up Russia's Arctic to massive investment, industrial and socioeconomic development. How do Russian Arctic cities, towns, and municipalities reflect on new opportunities in terms of designing their climate change adaptation strategies at a local level? Starting with theoretical discourse on urban climate change adaptation strategy, this research examines state-of-the-art, challenges and trends in planning for adaptation measures in Russia's Arctic industrial centers. Special attention is given to a comparative analysis of cities' climate change adaptation strategies. The role of civil society institutions and business community in the adaptation strategy planning process is explored. Moreover, conflict sensitive approaches to ensure participatory processes to design and implement adaptation measures are discussed. The field component of research is based on cities of Apatity, Arkhangelsk, Murmansk, Norilsk, Salekhard, Severodvinsk and towns of Monchegorsk, Nickel and Vorkuta. The study concludes that in spite of significant challenges identified, the total "balance sheet" of the Arctic cities' efforts to enhance their adaptive capacities is quite positive: Russian northern urban settlements try to adequately address existing challenges via planning for sustainability approach.
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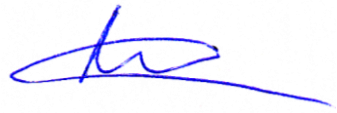
Dear Mr. Editor,

On behalf of my co-authors, I'd like to submit our manuscript entitled "BUILDING URBAN CLIMATE CHANGE ADAPTATION STRATEGIES: THE CASE OF RUSSIAN ARCTIC CITIES" to be considered for publication in your special collection. We hope our findings are relevant and interesting for your readership.

We declare no conflict of interest.

With kind regards,



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BUILDING URBAN CLIMATE CHANGE ADAPTATION STRATEGIES: THE CASE OF RUSSIAN ARCTIC CITIES

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ABSTRACT: Russian Arctic is a highly urbanized region, with most towns built in the Soviet era to facilitate extraction industries and provide provision and maintenance to military facilities. Global environmental and development changes, as well as national political decisions open up Russia's Arctic to massive investment, industrial and socioeconomic development. How do Russian Arctic cities, towns, and municipalities reflect on new opportunities in terms of designing their climate change adaptation strategies at a local level? Starting with theoretical discourse on urban climate change adaptation strategy, this research examines state-of-the-art, challenges and trends in planning for adaptation measures in Russia's Arctic industrial centers. Special attention is given to a comparative analysis of cities' climate change adaptation

strategies. The role of civil society institutions and business community in the adaptation strategy planning process is explored. Moreover, conflict sensitive approaches to ensure participatory processes to design and implement adaptation measures are discussed. The field component of research is based on cities of Apatity, Arkhangelsk, Murmansk, Norilsk, Salekhard, Severodvinsk and towns of Monchegorsk, Nickel and Vorkuta. The study concludes that in spite of significant challenges identified, the total "balance sheet" of the Arctic cities' efforts to enhance their adaptive capacities is quite positive: Russian northern urban settlements try to adequately address existing challenges *via* planning for sustainability approach.

KEYWORDS: Arctic Zone of the Russian Federation, climate change, adaptation strategies, urban planning, sustainability, environment.

1. Introduction

The Arctic Zone of the Russian Federation (AZRF) is a highly urbanized area since the Soviet time, when cities and towns were created to develop extraction industries and support a formidable military infrastructure in the region. Recent climate and developmental changes generate quite contradictory processes in the region and affect northern urban communities. On the one hand, these changes are conducive to further exploitation of Arctic natural resources as well as to the development of maritime routes in the region. Furthermore, this can contribute to a more dynamic development of the Russian Arctic's economy, including revival and sustainability of the AZRF cities.

On the other hand, the same processes can increase vulnerability of aging urban infrastructure, impede industrial activities, slow down the influx of labor force and potentially result in further degradation of local ecosystems. The recent catastrophe at the Norilsk power station (May-June 2020), when the foundation of the storage tank

sank due to thawing permafrost and 20,000 tons of fuel spilled into a nearby river, demonstrated once more time negative implications of warming in the Arctic.

For these reasons, planning for city climate change adaptation (CCA) and sustainable development (SD) strategies in the Far North is especially important because it helps to cope with the above challenges and avoid costly mistakes in developing the region and urban communities with fragile ecosystems and socioeconomic structures.

There were some efforts undertaken by various international organizations and individual researchers to study and measure cities' CCA and SD strategies, including the UN Sustainable Development Goals (2015), 1996 UN-Habitat City Development Index (Flood, 1997), UN-Habitat City Prosperity Initiative (UN-Habitat, 2013), UK Smart Cities Index (Huawei, 2016), and some scholarly publications (Bobylev et al., 2013; Davidson et al., 2019; Prakash et al., 2016; Ruiz et al., 2014; Sergunin, 2018a; Suter et al., 2017). There are few publications on some specific aspects of the AZRF cities' CCA and SD strategies (Joenniemi and Sergunin, 2014 and 2016; Kenny, 2017; Orttung, 2017 and 2020; Sergunin, 2018b, 2019 and 2020). However, the question of how Russia's Arctic urban settlements *plan* (not implement) their CCA/SD policies, has not been given a due attention either by international institutions or world academic community. The research gap in this area remains unfilled.

The novelty of this research is that it contributes to the discussion on how major AZRF urban communities organize the CCA/SD strategy planning process. Along with this general objective, this study attacks four more concrete unexplored research questions: First, to examine whether the CCA and SD concepts are integrated into the urban development strategies and whether they are a real priority for the AZRF municipalities? Second, to figure out which local government and societal institutions

are involved in the policy planning process and whether this sphere of local politics is transparent and open to public discussions? Third, to find out which aspects of the CCA and SD concepts – economic, ecological or social/humanitarian ones - are given priority in the municipal development strategies? Finally, to discuss whether the AZRF municipal CCA/SD strategies aim to solve short-term/most pressing problems or they suggest long-term policies built on sustainability principles and oriented to solve fundamental socioeconomic and ecological problems of the AZRF urban communities?

This research is based on several empirical cases, including major Arctic industrial centers - Nickel, Monchegorsk, Murmansk, Arkhangelsk, Severodvinsk, Vorkuta, Salekhard, and Norilsk.

2. Theoretical framework

This study is based on the assumption that CCA is a response to global climate change and, at the same time, an integral part of the SD strategy. The Intergovernmental Panel on Climate Change (IPCC 2014: 1758) defines adaptation as: "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects". This adjustment includes many areas such as industries, infrastructure, agriculture, social security and health care systems, and education.

According to the IPCC (2014: 1758), adaptation actions can be considered as either incremental adaptation (actions where the central aim is to maintain the essence and integrity of a system) or transformational adaptation (actions that change the fundamental attributes of a system in response to climate change and its impacts).

Adaptive policy can occur at the global, national, or local/municipal scale, with outcomes dependent on the political will in that area. Scheraga and Grambsch (1998: 87) identify nine fundamental principles to be considered when designing adaptation policy: (1) the effects of climate change vary by region; (2) the effects of climate change may vary across demographic groups; (3) climate change poses risks and opportunities; (4) the effects of climate change must be considered in the context of multiple stressors and factors, which may be as important to the design of adaptive responses as the sensitivity to change; (5) adaptation comes at a cost; (6) adaptive responses vary in effectiveness, as demonstrated by current efforts to cope with climate variability; (7) the systemic nature of climate impacts complicates the development of adaptation policy; (8) maladaptation can result in negative effects that are as serious as the climate-induced effects being avoided; (9) many opportunities for adaptation make sense whether or not the effects of climate change are realized. These principles are partially used to assess the AZRF municipal CCA strategies' effectiveness.

Along with CCA theories, urban planning methodology is important for our study. As any theory, planning is a set of concepts, principles, definitions, methodological approaches, hypotheses and assumptions on city development strategy. Whittemore (2015: 77) identifies eight planning theories: "a rational-comprehensive theory, an incremental theory, a transactive theory, a communicative theory, an advocacy theory, an equity theory, a radical theory, and a humanist or phenomenological theory". Three of them - the rational-comprehensive, advocacy and humanist approaches - are better suited for applying to the study of the AZRF urban CCA strategies.

The supporters of the rational-comprehensive approach believe that problem and priority definition as well as a strategy design are the prerogatives of experts who are

the only persons capable of doing proper planning. A rationalist-type planner, the "technician", used to be neutral to politics and prefers to rely on technical rather than policy-oriented information with regard to problem-solving. The systems approach usually complements this planning approach. Representation of urban communities as systems suggests their vision as entities possessing certain structure consisting of elements with some functions. People, goods, services and capital should operate within the framework set by the urban structure. To make the urban system more efficient and/or sustainable structural components, their functions, as well as system's rules and procedures should be changed. Such technocratic approach is the dominant one in the AZRF urban planning because all levels of the Russian government – the local, regional and federal – firmly believe that only experts/specialists have relevant knowledge and skills to produce a proper urban CCA strategy.

In contrast with the rational-comprehensive approach, the advocacy theory is based on the assumption that planners are not neutral players or 'technicians'; rather, they use their expertise and power to push forward the interests of specific actors. While decision-makers exercise planning, they have to take into account the interests of many actors – governmental and non-governmental. For example, Soma et al. (2018) identify government,- stakeholder- and science-based initiatives at the municipal level. This makes the planning process much more pluralistic and complicated. Given a variety of actors in the AZRF cities – governments, companies, military, indigenous peoples, trade unions, NGOs, etc., the municipal planners try to take into account their interests by integrating their needs into the urban development plans and involving them both to the policy planning and implementation process.

A humanist or phenomenological approach prefers to emphasize "the unique ways that different groups come to possess knowledge, and the difficulty with which

one group's knowledge can be translated for others given the diversity of human experiences and perspectives" (Whittemore 2015: 78). This theory challenges the rational-comprehensive approach by stressing the fact that various actors can view the same problems confronting planners differently. For example, various stakeholders, such as the municipal government, extractive industries, environmentalists, and indigenous peoples, can radically differ by their visions of a resilient/sustainable Arctic city. This creates a puzzle for urban planners who are often unable to reconcile these conflicting interests in the local CCA strategy documents.

Moreover, in real life the municipal planners are not free from some emotions, sympathies and antipathies which inevitably affect their decisions and make the overall planning process less rationalistic. As some 'humanists' underline, in reality the rationalist/technocratic-type of planning never happens. Along with rationalistic considerations, the municipal planners should take into account other factors and policy inputs that may reflect different (and not always rational) perceptions of and perspectives on existing problems and urban development priorities (Reich, 1975: 11).

Despite the obvious collisions between these theoretical approaches all three ones can be found in the AZRF city development plans and practical policies. Among the AZRF urban planners, we do not see one theory substituted by another. Though the rational-comprehensive theory is seen by many planning specialists as inadequate, this paradigm still retains its dominant position in the present-day academic discourse. Other approaches are also unable to thoroughly explain urban developmental problems and suggest proper CCA strategies for the future. Scholars continue to develop new planning theories but they have to return from time to time to the traditional ones.

3. Materials and method

The data for this research are drawn from various sources:

- urban development strategies/plans;
- city administration reports on the implementation of the above strategies;
- analytical papers produced by various expert centers and NGOs;
- media publications.

Eight AZRF urban settlements were selected for this study: Nickel, Monchegorsk, Murmansk, Arkhangelsk, Severodvinsk, Vorkuta, Salekhard, and Norilsk. They were chosen on the basis of three criteria: the size of population (largest cities), industrial significance for the region and country and gravity of climate change-related problems that pose challenges to their sustainability. In some cases, such as Monchegorsk, Nickel, Norilsk, Severodvinsk and Vorkuta, two or even all three criteria are applicable.

Based on previous research (Kenny, 2017; Orttung, 2017; Sergunin 2018a; Suter et al., 2017) and comparative analysis of the AZRF cities' development strategies and plans, a system of indicators for urban CCA/SD planning was developed and taken as an organizing principle for this study (see Table 1). These indicators reflect most important aspects of the CCA/SD strategy planning process and, for this reason, allow an assessment of efficacy of this process. The value of each indicator ranges from 0,0 to 1,0.

The value of indicators for each city/town was defined differently. Some indicators, such as, for example, "Does the municipality have a climate change adaptation strategy or its elements?", "Are all three components of SD represented in the municipal strategic documents?", "Does the municipality pay attention to the environmental problems?" and so on are developed on the basis of the qualitative

content-analysis of municipal strategic documents. In total, 12 municipal development plans, socioeconomic forecasts and target programs designed by eight AZRF urban settlements were studied.

The data on other indicators, such as, for example, “Has a municipality all three types of strategic documents (strategy, prognosis and target programs)?”, “Is there a special planning office in the city/town?”, “Are the plans publicly available, e.g. on a website?”, “Does the city administration engage the local business community in the strategy planning process?” are driven from municipalities’ websites, local mass media and other sources.

The data on the selected eight cities/towns are represented in an aggregated form in Table 1.

Indicator	Murmansk	Severodvinsk	Salekhard	Arkhangelsk	Norilsk	Vorkuta	Monchegorsk	Nickel
Does a special municipal SD strategy exist?	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Do the elements of a municipal SD strategy exist?	0,8	0,6	0,5	0,7	0,6	0,5	0,5	0,5
Does the municipality have a special climate change adaptation strategy or its elements?	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Are all 3 components of SD represented in the municipal strategic documents?	0,7	0,6	0,5	0,5	0,5	0,3	0,4	0,4
Does the municipality pay attention to the environmental problems?	0,8	0,6	0,6	0,9	0,6	0,3	0,9	0,7
Do the city development plans pay attention to the human dimensions of adaptability and sustainability?	0,9	0,6	0,6	0,5	0,7	0,5	0,4	0,6
Has a municipality all three types of strategic documents (strategy, prognosis and target programs)?	1,0	1,0	0,5	1,0	0,5	0,7	0,3	0,3
Are the municipal strategic documents of a long-term character?	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Do the urban development plans include proper problem-definition, clearly outlined strategic goals and policy alternatives?	1,0	0,9	1,0	1,0	0,9	0,8	1,0	0,9
Do the municipal strategic documents include a detailed implementation mechanism?	1,0	0,9	0,9	0,5	0,9	1,0	0,9	0,9
Do the municipal strategic documents contain indicators and/or benchmarks to monitor implementation strategies?	1,0	0,9	0,9	0,7	0,9	0,8	0,9	0,8
Does the city put out a	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0

progress report?								
Is there a special planning office in the city/town?	0,5	0,5	0,5	0,5	0,8	0,5	0,5	0,4
Do cities cooperate with regional and federal levels? Have they addressed regional and federal priorities in their CCA/SD plans?	1,0	0,5	0,5	0,5	0,3	0,5	0,3	0,1
Are the plans publicly available, e.g. on a website?	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
How transparent is the planning process? Do cities have capacity to engage communities, community inputs?	0,4	0,8	0,5	0,3	0,7	0,4	0,6	0,8
Presence of NGO's and other organizations working on CCA/SD issues and collaborating with a city administration	0,4	0,7	0,3	0,1	0,3	0,2	0,6	0,7
Does the city administration engage the local business community in the strategy planning process?	0,3	0,5	0,5	0,1	0,6	0,1	0,3	0,5
Does the municipality cooperate with the local academic community in the strategy planning process?	0,5	0,3	0,2	0,6	0,2	0,0	0,0	0,2
To what extent does a municipality acknowledge the importance of international cooperation for the success of its CCA/SD strategies?	1,0	0,5	1,0	1,0	1,0	0,3	0,1	0,2
Total	14,3	12,9	12,0	11,9	11,6	10,9	10,7	10,1

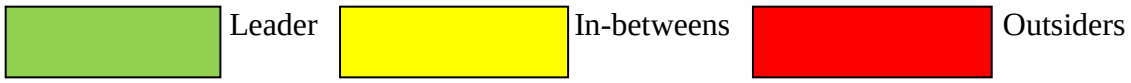

Table 1. The AZRF urban sustainable development strategy planning index.

Based on the indicator system, a comparative method was used for further analysis. As Wolff and Haase (2020) rightly put it, this research approach helps to a better understanding of urban CCA/SD strategy planning process by analyzing similarities and differences of several cases. The results of the comparative analysis are discussed in the next section.

4. Results and discussion

As follows from the data represented in Table 1, Murmansk demonstrates the best score (14,3), being an absolute leader in terms of CCA/SD strategy planning efficiency, while Nickel (10,1), Monchegorsk (10,7) and Vorkuta (10,9) have lowest

ratings falling into a category of outsiders. Norilsk (11,6), Arkhangelsk (11,9), Salekhard (12,0) and Severodvinsk (12,9) form a group in-between with average indicators. It should be noted that ratings of specific urban settlements are determined by a combination of various factors rather than depend on one or two indicators. For example, the Murmansk leadership can be explained by its relatively good record in nearly all areas of strategy planning ranging from paying attention to all major aspects of CCA/SD strategy and having a proper implementation mechanism to engaging the local stakeholders into the planning process and having well-established cooperation with international partners. On the other hand, the outsiders, such as Nickel, Monchegorsk and Vorkuta failed to demonstrate their ability to organize CCA/SD strategy planning in a proper way in many important spheres.

To summarize the results of comparative analysis of the AZRF cities' CCA/SD strategy planning, the following findings can be presented.

First of all, Russia's northern urban centers try to establish and further develop a proper strategy planning system. The success or failure to do that depends on whether the city leadership understands the importance of having a CCA/SD strategy or not. As local governments' strategies demonstrate, the Arctic municipalities generally acknowledge the need of having such strategies. For example, the Salekhard development plan identified climate change as an important problem for the Arctic territories and called for international cooperation on climate change mitigation and adaptation in the framework of the Arctic Council and Nordic Council of Ministers (Salekhard City Administration 2007: 106, 156)

However, none of these cities has a special CCA or SD strategy. Instead, city development plans/strategies have sections that can be titled, for example, "Sustainable

socioeconomic development", "Sustainable ecological development", "Human/social capital development", "Creating a comfortable urban environment", etc.

These documents address specific climate change-related threats and challenges, such as air pollution generated by the AZRF heavy industries and transport, forest impacts (change in forest composition, shift geographic range of forests, forest health and productivity), water resource impacts (changes in water supply, water quality), impacts on coastal areas (erosion and inundation of coastal lands, damage to port infrastructure, costs to defend coastal communities), impacts on species and natural areas (shift in ecological zones, loss of habitat and species). Unfortunately, CCA, which is an important aspect on contemporary urban agenda, was not distinctively reflected in any planning documents that we reviewed in this research.

Meantime, AZRF cities are on the forefront of climate adaptation challenges, and resiliency planning tools would be an appropriate addition to their planning. European resiliency planning approaches can be helpful, e.g. European Resilience Management Guideline (Marana et al, 2019) and ensuing standardization efforts. Perhaps only the next generation of city strategic documents will represent integrated strategies for urban CCA and/or SD rather than a set of separate strategies for each or selected sectors of city activities as it is now.

Characteristically, only large AZRF cities have all three types of strategic documents envisaged by the 2014 Russian law on strategic planning: strategy and prognosis of socioeconomic development, as well as target programs aimed to implement the above general documents (Putin 2014). Mid-size and small urban centers normally have only the third kind of documents - 'target programs' that are devoted to specific urban problems and only partially reflect the CCA/SD agenda. For instance, Nickel (a small mining community on the border between the Murmansk Region and

Norway) has only a target program on creation of comfortable urban environment but it has never adopted a full-fledged strategic document on its socioeconomic development (Administration of the Urban Settlement Nickel 2016). Noteworthy, since 2012 Severodvinsk (a quite big city by the AZRF standards with 185,000 inhabitants) abandoned the practice of having long-term socioeconomic strategies. Instead, the city preferred to adopt three-year forecasts and targeted programs (Administration of Severodvinsk 2017). The local authorities believed that less ambitious but more specific programs were more effective in terms of implementation.

However, as the above law stipulated, all tiers of Russian authorities, including the municipal ones were obliged to develop socioeconomic development strategies of their own. In May 2018, the Severodvinsk mayor organized a meeting with the local legislators, business community, experts and NGOs to discuss the prospects for the development of an integrated municipal socioeconomic strategy up to 2030 instead of a set of target programs (Severodvinsk City Administration' press-service 2018).

Another important aspect of effective planning process is whether the city administration has a special planning unit within its structure or not? Urban settlements preferring to have sectoral development plans or target programs usually split planning functions among different administrative units responsible for specific policy areas (economy, social policy, environment, culture, etc.). But most Russian northern municipalities assign planning functions to their economic departments rather than establish a special strategy planning office or involve in a coordinated manner various units responsible for other than economic policy areas. Naturally, this leads to the dominance of economic issues on the developmental agenda while the social/humanitarian and environmental problematique can be largely ignored or paid

less attention. On the other hand, this confirms our hypothesis that the rational-comprehensive approach to planning still prevails among the AZRF decision-makers.

As a result of this technocratic approach, most municipal strategies are of a single-issue rather than integrated/comprehensive character. For instance, while the Murmansk and Severodvinsk programs of socioeconomic development (Severodvinsk City Government, 2010; Murmansk City Government 2013) contain all most important components of the CCA and SD concepts, the Arkhangelsk strategic document addresses only a limited number of problems (transportation, education and health care systems, environment, preservation and development of local cultural heritage) neglecting the CCA problematique and key dimensions of sustainability, such as political, community, personal and food security (Arkhangelsk City Government 2008).

None of the considered plans clearly addressed emissions of greenhouse gas that are seen as the main source of global warming, including the High North. Methodology for doing this in AZRF context would be a challenge. Climate policy actions, which many cites of the world prioritize, e.g. controlling building quality, dense development or introduction of parking restrictions can hardly be found in the AZRF urban strategic documents.

Strategy planning units which are normally is a part of economic departments are used to be rather small and staffed with only several employees even in the largest urban centers like Arkhangelsk, Murmansk and Norilsk. That’s why for the AZRF city planning offices it is uneasy to follow the widely accepted planning management standards and principles. For the same reason, they are unable to properly interact with other municipal structures participating in strategic planning and implementation activities. Since northern city administrations often lack planning offices which have proper powers to coordinate the whole process of planning and program

implementation, it is quite problematic for these urban settlements to harmonize municipal CCA/SD plans and guarantee that all units of the local government have the same motivation and stakes in achieving the strategic goals.

In line with international planning standards, most AZRF urban development plans include proper problem-definition, clearly outlined strategic goals, policy alternatives and implementation/monitoring mechanisms, including a system of indicators. However, they are different from each other in terms of structuring strategic documents and the nature of implementation procedures and indicators. On the one hand, some city strategic documents, such as Severodvinsk (2010), Norilsk (2012), Murmansk (2013) and Vorkuta (2014) development plans, describe in detail implementation procedures and contain a system of indicators. On the other hand, some other Russian northern cities like Arkhangelsk (2008) and Salekhard (2007) prefer to outline only some general principles of implementation strategies.

The Russian Arctic cities try to develop an adequate legal framework for their CCA/SD strategies by adopting local normative acts and, as required by federal law, through coordination of their CCA/SD strategies with national and regional ones. However, in practice, this goal is achieved by different methods. While the Murmansk development plan (Murmansk City Government, 2013) aims to harmonize its strategic priorities with the regional and federal ones, many other city strategic documents (Salekhard City Government, 2007; Arkhangelsk City Government, 2008; Vorkuta City Government, 2014; Norilsk City Government, 2012) only vaguely mention the need to coordinate their CCA/SD strategies with other tiers of the Russian government.

It should be noted that Russian northern cities are often wary of Moscow's undertakings in the strategic planning sphere. In 2014, when the federal center decided to apply principles and standards set by the law on strategic planning to the municipal

level, this initiative got a rather cold reception in the AZRF cities. Moscow selected about 80 Russian municipalities representing different parts of the country to participate in the experiment. However, in the Russian North, only the Murmansk region agreed to partake this project. Several cities and towns, such as Apatity, Kirovsk, Monchegorsk, Murmansk, Olenegorsk and Polyarnye Zori, as well as the Kandalaksha, Kola, Kovdorsky, Lovozersky, Pechenga, and Tersky districts were chosen to serve as pilot subnational units. However, most of them were able to implement only certain elements of a new strategy planning philosophy. Murmansk was the only city that incorporated the 2014 law standards into its strategic documents. Emelyanova (2014) explains this by the status factor: being a capital city of the region Murmansk had more human and financial resources to successfully execute the project than other municipalities.

According to the planning theory, the success of any urban development strategy largely depends on public/community support and engagement (Ochoa et al., 2018). To this end, it is important to make the local planning process as much transparent and interactive as possible. There are several possible ways to ensure openness of the planning process and engaging civil society institutions into both strategy formulation and implementation: hearings in the so-called public chambers (which exist under the auspices of the local legislatures), dialogue with NGOs, independent expertise of municipal projects, regular opinion polls, public debates in the local mass media and so on. Unfortunately, only Severodvinsk and Nickel adopted some municipal programs to maintain a regular dialogue with NGOs on the most important aspects of the local developmental strategies (Severodvinsk City Government, 2016; Administration of the Urban Settlement Nickel 2014). Both the Vorkuta and Murmansk strategic documents (Vorkuta City Government, 2014; Murmansk City Government, 2013) refer to the local NGOs as potential stakeholders in planning and implementing municipal developmental

projects but do not provide any roadmap for such a dialogue with them. Other Russian northern urban centers largely ignore the problem of cooperation with the civil society institutions seeing the CCA/SD strategy planning process as a purely local government's prerogative. Hence, the advocacy and humanist/phenomenological theories of planning based on the assumption that urban CCA/SD strategies represent or take into account various stakeholders' interests, perceptions and experiences (that may diverge from or even confront each other) work only in a limited way.

The AZRF municipal development plans pay a significant attention to the local environmental problems.

First and foremost, the Russian northern urban centers now try to prevent and reduce pollution in the region rather than to focus on elimination of accumulated ecological damage (Monchegorsk City Government, 2016; Arkhangelsk City Government, 2008). For example, the Murmansk City Government (2015) believes that reduction of air pollution will help to mitigate climate change and suggested a number of specific measures to reduce dangerous emissions. These policies are viewed as more adequate and efficient ones than eliminating the environmental damage mostly created by the Soviet economic and defense activities in the North.

Rehabilitation of damaged ecosystems, including measures, such as strategic environmental assessment; targeting the priority (i.e. most problematic) areas; clean-up initiatives in those cities where such programs are still incomplete; establishing monitoring systems and so on is another priority for the urban ecological strategies.

Waste (solid and liquid) treatment is viewed by the Russian northern urban settlements as an important problem that is still waiting for its solution. Given the significance of the problem, building of waste treatment plants and/or safe storages is an

important priority for many AZRF municipalities (see, for example, Monchegorsk City Government, 2016; Arkhangelsk City Government, 2008).

To protect endangered species both on the urban territory and in the adjacent regions some AZRF municipalities launched a series of targeted programs aimed at conservation of biodiversity.

In line with international standards (Ochoa et al., 2018), building of public-private partnerships to implement ecological projects became an integral part of the Arctic cities' environmental strategies. These partnerships emerge because, on the one hand, the state lacks money for such projects and, on the other hand, companies operating in the AZRF feel their responsibility for the protection and improvement of the local environment (especially given the fact that they were and still are the major source of pollution in the Russian North). For instance, environmental cooperation between Nornickel (one of Russia's leading extractive and metallurgical companies) and Norilsk city administration as well as with several municipalities in the Murmansk Region, where this company has production, exemplifies such a public-private partnership.

Trying to promote environmental studies at the local level some AZRF municipalities financially and administratively support universities and research institutions dealing with ecological problematique (see Arkhangelsk City Government, 2008: 90; Murmansk City Government 2013: 37-38).

Promotion of ecological education and culture as well as increasing of awareness of the local communities about the AZRF environmental problems became an important policy priority for most of the Russian northern municipalities.

To develop "green" culture among the local communities and mobilize the latter for the implementation of environmental projects some Arctic urban centers establish

cooperation with civil society institutions and mass media specializing on the ecological issues.

Some Russian northern municipalities (see, for example, Monchegorsk City Government, 2016) try to organize regular monitoring of the most problematic areas in terms of ecological security: climate change negative consequences, protection of endangered species, conservation of biodiversity, control over air and water pollution, prevention of natural and technogenic catastrophes, etc.

Depending on the gravity of ecological problems, the Russian Arctic local governments differ by their opinion on the importance of this problematique for them. For example, Arkhangelsk, Murmansk and Salekhard consider ecological problems important ones but for them this issue is only one of many questions on their SD agenda.

On the other hand, the Monchegorsk, Nickel, Norilsk, Severodvinsk and Vorkuta city administrations, which face much more acute environmental problems than other northern municipalities, pay a greater attention to the ecological aspects of their developmental programs. Since the Soviet era, these urban settlements were traditionally developed as strongholds in areas, such as extractive, machine- and ship-building industries, metallurgical and chemical production.

Continued neglect of ecological aspects of the AZRF industrial activities resulted in heavy pollution of many Russian Arctic urban areas. Russian environmentalists pointed out 27 impact zones in the AZRF, which are polluted to the extent that serious threats both to local ecosystems and population's health emerged there (Map 1). The most problematic impact zones include the Norilsk industrial conurbation (more than 30% of total pollutants), West Siberian region where oil and gas production is concentrated (30%), Murmansk Region (10%) and the Arkhangelsk

Region (5%) (Ekologicheskoe Sostoyanie Impactnykh Raionov, 2012; Dushkova and Evseev, 2011). According to some experts (Kochemasov, et al. 2009), around 15% of the Russian Arctic is heavily polluted.

It should be noted that the Russian northern municipalities pay a rather little attention to the human dimension of their CCA/SD strategies identifying mainly the ecological and economic challenges and risks. The societal/human security problematique is rarely reflected in the municipal strategic documents and often limited to civil defense programs which are mainly about protection of city residents from natural disasters and technogenic catastrophes (Severodvinsk City Government, 2010; Vorkuta City Government, 2014; Murmansk City Government, 2013). Quite rarely, some city strategic documents mention the need to take care of citizens' personal security by adopting measures to curb street violence and other criminal activities (Severodvinsk City Government, 2010; Murmansk City Government, 2013).

Map 1. The AZRF impact zones.

Source: designed on the basis of Ekologicheskoe sostoyanie impaktnikh rayonov sushi arkticheskoy zoni Rossiyskoy Federacii (2010) Severnash.ru.

As the AZRF municipal development strategies demonstrate, most northern cities and towns favor intensive international cooperation in the field of CCA and SD. These northern subnational actors identify the following international institutions and forms of cross-national cooperation: the UN-related bodies (UN Development Program, UN Environment Program, UNESCO, Intergovernmental Panel on Climate Change, etc.), subregional institutions (Arctic Council, Northern Forum, Nordic Council, Nordic Council of Ministers, Northern Dimension partnerships, Barents Euro-Arctic Council), scientific organizations and initiatives (International Arctic Scientific Council, International Polar Year, International Arctic Social Science Association, etc.), region-to-region and company-to-company contacts, city-twinning and so on. The Russian Arctic cities and even relatively small towns and other municipalities consider cooperation with foreign partners not only a means of solving specific problems but also an important instrument of their capacity-building and long-term CCA/SD strategy (Joenniemi and Sergunin 2014 and 2016).

5. Conclusions

First and foremost, most AZRF urban centers accepted the CCA and SD concepts and tried to apply them in their development plans/strategies. However, it should be noted that Russian northern municipalities still lack special either CCA or – more generally - SD strategies preferring either to have sections on various aspects of climate adaptability or sustainability in their strategic documents or develop specific target programs that address concrete CCA/SD-related problems. For this reason, some

important economic, environmental and social/human dimensions of urban CCA/SD strategies are often missing or not properly harmonized with one another.

It is obvious that to properly cope with the climate change challenges the AZRF urban settlements should develop CCA/SD strategies of their own in the form of either special documents or separate sections in their development plans. Such documents should have a detailed list of concrete measures to adapt to climate change. It should be noted that, as the recent Russian Arctic doctrine demonstrates (Putin 2020), a CCA strategy has been already formulated at the federal level.

The AZRF cities consider strategy planning and having adequate urban developmental programs as an important policy priority, although sometimes they resist to Moscow's pressure to develop unified strategies for the whole region. Instead of having twin-like documents, they prefer to tailor their municipal strategies depending on the local needs and realities.

Many northern municipalities managed to establish proper legal frameworks, institutions and procedures for strategy formulation and realization, including planning offices within city administrations, clearly defined goals and division of responsibilities between various administrative units, indicator and monitoring systems, power-sharing with regional and federal authorities, etc.

The new strategy planning system was helpful in the successful implementation of some municipal projects (mostly of ecological and economic nature) during the last decade. Generally, there was an obvious trend from the AZRF municipalities' short-term survival tactics to long-term capacity-building strategies.

However, it would be premature to state that the AZRF municipal strategy planning system is perfect and in line with the best international standards. A 'complaint list' is still long and it includes numerous problematic issues.

For example, there is still a gap between strategy formulation and implementation. Unfortunately, a large number of municipal CCA/SD-related programs are of declarative nature and only few of them were executed in full.

We should also mention the non-transparent character of the municipal strategy planning procedures as well as insufficient involvement of citizens into this process. Unfortunately, both strategy formulation and realization are still of the hierarchical character (the top-down approach still dominates over the bottom-up one). Moreover, the monitoring and feed-back mechanisms are often missing or inadequate. In turn, this can lead to mistakes in identifying strategic priorities and the lack of public support for the city administration's initiatives. In terms of planning theory, this means that the rationalist/technocratic approach is still dominant among the AZRF urban planners although some elements of the advocacy and humanist approaches can be traced as well.

The AZRF municipal planning offices often are understaffed and lack expertise in strategy planning. For this reason, the AZRF municipalities have to look for external expertise and ask some Moscow- and St. Petersburg-based analytical centers to develop CCA/SD strategies for them although these centers may have a lack of knowledge of the local needs and realities.

One more problem is that quite often the AZRF municipal developmental programs lack proper funding and they are not always backed up by financial and administrative support from the top tiers of the Russian government. The Russian northern cities hope that the launch of 12 national projects in 2018 can help to solve this problem by integrating the local CCA/SD strategies to larger regional and federal programs.

To sum up, although there are numerous problems with organization of an effective strategy planning system at the municipal level, the AZRF urban centers are

generally cognizant of the need to develop proper CCA/SD strategies. They are eager to reorganize and further improve their planning strategies to solve existing socioeconomic and ecological problems and ensure adaptability and sustainability of the region.

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