



## CHAPTER ONE

# Russia's Arctic Cities

## *Recent Evolution and Drivers of Change*

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Siberia and the Far North figure heavily in Russia's social, political, and economic development during the last five centuries. From the beginnings of Russia's expansion into Siberia in the sixteenth century through the present, the vast expanses of land to the north represented a strategic and economic reserve to rulers and citizens alike. While these reaches of Russia have always loomed large in the national consciousness, their remoteness, harsh climate, and inaccessibility posed huge obstacles to effectively settling and exploiting them. The advent of new technologies and ideologies brought new waves of settlement and development to the region over time, and cities sprouted in the Russian Arctic on a scale unprecedented for a region of such remote geography and harsh climate.

Unlike in the Arctic and sub-Arctic regions of other countries, the Russian Far North is highly urbanized, containing 72 percent of the circumpolar Arctic population (Rasmussen 2011). While the largest cities in the far northern reaches of Alaska, Canada, and Greenland have maximum populations in the range of 10,000, Russia has multiple cities with more than 100,000 citizens. Despite the growing public focus on the Arctic, the large urban centers of the Russian Far North have rarely been a topic for discussion or analysis.

The urbanization of the Russian Far North spans three distinct "waves" of settlement, from the early imperial exploration, expansion of forced labor under Stalin, and finally to the later Soviet development

of energy and mining outposts. To understand the current dynamics, opportunities, and challenges defining the region today, examining the history of the region's development is an important first step.

This chapter provides an overall introduction to the book. We begin with a concise overview of the history of Russian Arctic development from the imperial era to the present. The second section offers a general typology of Russian Arctic cities to emphasize the differences among them. The third section lists the three drivers of change affecting the future of Russia's Arctic cities: centralized decision making, energy development, and climate change.

## **Arctic Urban Evolution from the Tsars to Post-Soviet Russia**

### *Tsarist Era*

Indigenous peoples have long inhabited the Russian Arctic, and while many still live in the region today, the majority of the population is Slavic in origin, as a result of migration from the south. The first round of Siberian settlement followed Russia's conquest of the region in the sixteenth and seventeenth centuries, and was of relatively low intensity. The crown established frontier outposts to defend the newly gained territory, and the growth of these military settlements provided a limited amount of economic opportunity, primarily in the form of fur trapping (Bobrick 1992). The total population of Siberia remained relatively small until around 1800, when political, social, and technological factors converged to make large-scale settlement possible.

By 1800, the Russian Empire effectively had claimed most of the territory of Siberia, yet it remained sparsely populated and largely unproductive (Bobrick 1992). Agriculture was significantly more difficult to pursue in Siberia than in the warmer and more fertile lands of European Russia. By the time that the *Chernozem* (the belt of fertile soil across Southern Russia) was completely divided up between various subjects of the empire, the excess population of Russia needed new land to cultivate, and Siberia presented a potent opportunity. The southern reaches of the territory were increasingly accessible after a number of surveys had been completed in the early 1800s, and their climate was warm enough to support small-scale agriculture (Hill and Gaddy 2003). As the government increased its focus on settling Siberia, a growing number of immigrants began flowing in. Older settlements, such as Krasnoyarsk, entered a phase of rapid growth, and new cities, such as Novosibirsk, were founded.

While a number of factors drove increased settlement in Siberia, the largest single influence in the pre-Soviet era undoubtedly was the construction of the Trans-Siberian Railroad, which began in 1891. Previously, networks of rivers and portages had been the only way to travel across the vast distances of Siberia, with voyages taking weeks or even months to complete. Further, large-scale trade was impossible due to the complicated and lengthy transit system. The imperial authorities were cognizant of Siberia's transport problems, and construction of the Trans-Siberian Railroad was pursued to both ensure reliable transportation between European and Asian Russia as well as to give the military greatly increased deployment ability across the vulnerable eastern frontier. The Trans-Siberian's construction greatly facilitated access to the burgeoning Siberian cities, and it became the chief transport artery for Asiatic Russia long before the entire network was completed in 1916. During the course of the nineteenth century, the population of Siberia grew by between four and five million inhabitants, with the majority of new immigrants arriving during the largest phase of railway construction between 1891 and 1900 (Gilbert 2002). While Southern Siberia grew rapidly during the pre-Soviet period, the Far North remained almost unpopulated until political and technological developments finally opened the frontier in the early twentieth century.

### ***Stalinist/Gulag Era***

While the nineteenth century saw a vast expansion of development in Siberia and the Arctic relative to previous levels, the early Soviet period ushered in an era of growth that dwarfed all previous phases. The Russian Revolution of 1917 proclaimed the victory of the urban proletariat in a country that was overwhelmingly rural and agrarian, with rural peasants comprising over 80 percent of the population (Hill and Gaddy 2003: 66). In order to facilitate the transition of the agrarian economy to an industrialized socialist model, the new leadership undertook rapid urbanization, resulting in the total urban population of the USSR growing over 6 percent per year between the 1920s and 1941 (Goskomstat 1998: 32–33). Most of the initial growth occurred in the already-important cities of the European USSR, such as Moscow, Leningrad, and Odessa, as industrialization had yet to proceed in any concentrated fashion east of the Urals. In addition to the socialist mandate that cities must be the core of the state, much of the state-driven urbanization in the USSR aimed to reverse the population shrinkage in major cities caused by the conflict and privations of the Russian Civil War.

In the early years of the Soviet Union, more widespread settlement in Siberia became a major priority for government planners. Taking advantage of technological improvements such as ice-breaking ships, the government's desire to populate the eastern regions of the country began to seem much more realistic. Despite such advances, however, officials had little success encouraging greater migration rates, even with the provision of higher salaries and concerted ideological campaigns meant to bring greater numbers of people to help exploit Siberia's vast resources.

After the lack of success with initial drives to encourage the movement of European Soviet citizens to Siberia and the Far North, the Gulag assumed the central role in the industrialization of Asiatic Russia. While the forced labor system in the USSR started out primarily as a way to either reform or dispose of political prisoners and violent criminals, repeated demands for more workers in developing regions forced authorities to rethink the provision of labor within the country. Regional authorities began demanding access to the growing pool of convict labor, and repressions increased quickly in scale to meet the new labor demands, especially after the initiation of several grand projects such as the White Sea–Baltic Canal (Applebaum 2003: 73). It cannot be said definitively whether labor demands were primarily responsible for the growth of the camps (Stalin's motives being inscrutable at best), but the escalating need for convict laborers, combined with the increasing political repressions, caused prisoner numbers to swell to over a million by 1934, having been just over 20,000 five years earlier (Applebaum 2003: 91).

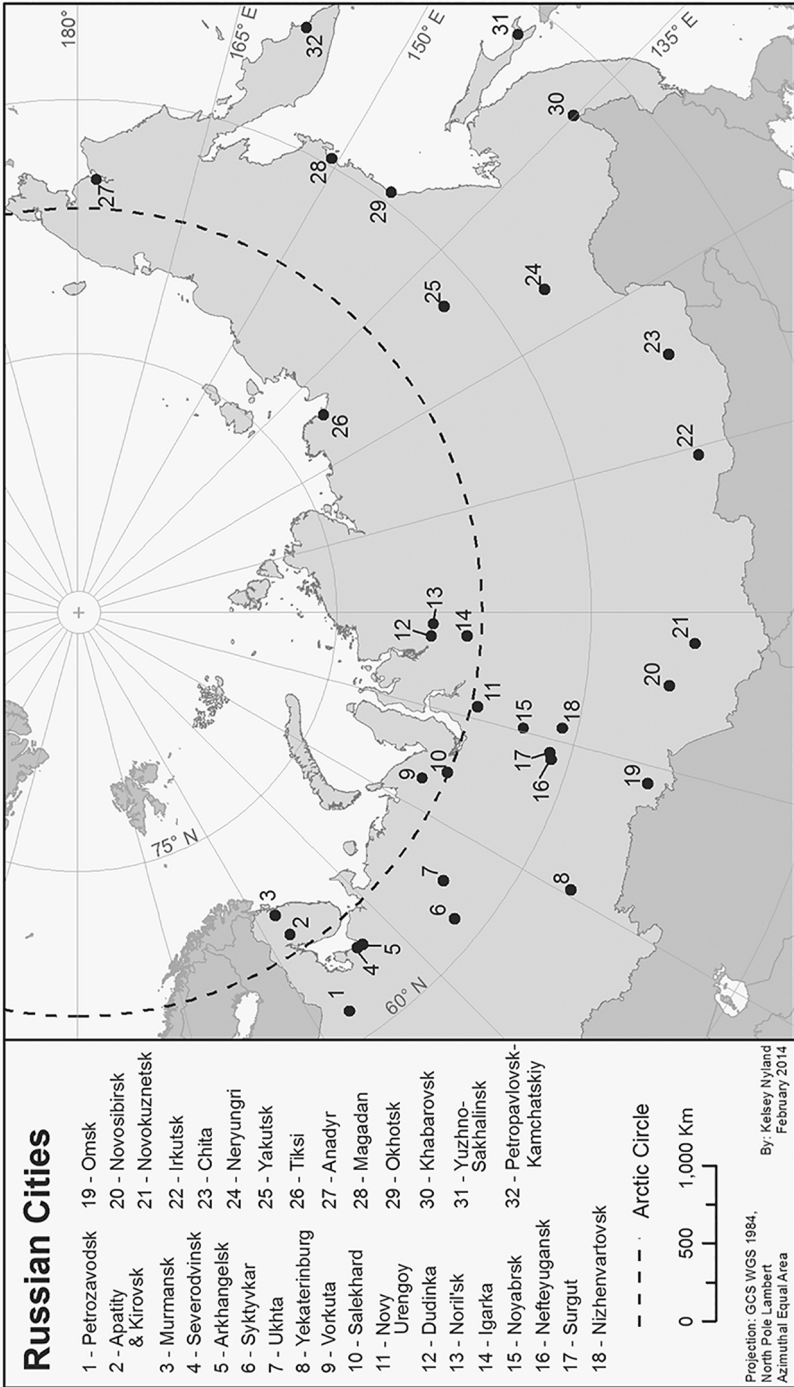
Prisoner labor was seen as an almost infinite reserve for the exploitation of Siberia's vast resources, and the state's total power over the economy allowed far greater numbers of workers to be sent to Siberia and the Far North than the market would have dictated (Hill and Gaddy 2003). The industrialization of the USSR, as guided by the five-year plan system devised by Stalin, demanded massive exploitation of natural resources to fuel the building of factories and infrastructure, and the need to supply these resources resulted in major expansions of forced labor colonies. In an effort to satisfy the Engels Dictum, which asserted that socialist development must be spread equally across a country's territory, much of the new industry in the Soviet Union was planned to be built in previously undeveloped and remote regions (Koropecjy 1967). As the most untouched region of the country at the time, the Far North became particularly attractive for expansion. New technologies made access to the remote (but resource-rich) northern regions more viable, and the ideology of the

state suggested that concerted effort in the development of communism would be able to overcome the harsh conditions that had previously prevented any large-scale settlement of the region in the past (Koropecjy 1967: 235).

During the expansion of the Gulag, many cities were founded primarily as labor camps in the Far North, most with a focus on exploiting a single natural resource exclusively through prison labor. Cities such as Vorkuta (1932), Norilsk (1935), Igarka (1929), and Magadan (1929) began functioning during the early years of the Gulag, while older Siberian and northern cities received large influxes of prison labor as well (see Map 1.1). The large semiurban camps were augmented by many smaller satellite camps for logging and other smaller-scale industries meant to support the operation of the central locations. The purges of the mid-1930s greatly increased the available number of inmates to supply the ever-growing labor demands of the camp system, such that by the height of the purges in 1938, there were 1,800,000 Gulag prisoners in the USSR, with a further 1,000,000 in exile (Applebaum 2003: 113).

The rapid industrialization of the USSR during the 1930s required huge inputs of raw materials, and the abundance of such materials in the Far North meant that some of the largest camps developed in the region. The Pechora coal basin near Vorkuta began production to augment the already proven resources of the Donbass in Ukraine; the mining and smelting plants of Norilsk supplied crucial metals that were badly needed to produce steel and advanced machinery; and still other camps were primarily developed as earners of foreign convertible currency, such as the gold mines of Kolyma in Eastern Siberia and the lumber exporting ports of Igarka and Arkhangelsk (Shabad 1969).

The boom in Siberian population due to prison camps had resulted in unprecedented growth in the region, especially in places far from the Trans-Siberian Railroad, where the vast majority of the pre-1929 population had lived. Remote cities in Siberia experienced immense growth, with many more than doubling their populations due to prisoner influxes (Applebaum 2003: 113). The beginning of war with Germany in 1941 provided further stimulus to the already rapid growth rate, as the swift German advance forced a huge share of Soviet industry to be relocated far away from the front lines, which generally meant placing factories in Siberia. While much of the industry in Siberia had been redundant with European regions for reasons of strategic duplication, the occupation of mines and factories in Europe by the enemy meant that numerous Siberian enterprises became the sole



Map 1.1. | Russian Cities

provider of their respective materials. In addition, many arms factories were located in the major cities along the Trans-Siberian Railroad (for easy transport access), while the more remote Arctic mines and plants could be used to supply these primary factories by seasonal river supply, or in the case of more rare and valuable materials, by air (Adams 1983).

Cities like Vorkuta and Norilsk received their largest boosts after the original primary supply centers for coal and nickel, which had been near the German front, were shut down, and thus saw their equipment evacuated by rail and barge to Siberia and set up in the secondary locations. In this fashion, previously smaller-scale factories and plants grew significantly in size in the matter of a few months. After the war's end, many of the industries that had been moved to Siberia as a result of hostilities were simply left where they were. The evacuations of people and equipment boosted the development of Siberian regions in a major way. Krasnoyarsk Krai alone experienced population growth of 75 percent between 1940 and 1945 (Shabad and Mote 1977). The wider geographic distribution of industrial centers fit neatly into the ideological framework of the Engels Dictum, and the strategic lessons learned in World War II demonstrated that further industrial development in remote regions would provide greater survivability in the case of another European land war.

### ***Late Communist Era***

Stalin's death in 1953 heralded the beginning a new era for urbanization and industry in the Far North, as forced labor fell out of use by the end of the 1950s. In order to adapt to the new economic conditions, northern cities would have to make significant and difficult adjustments. When prisoners in the northern camps were freed, a great deal of them chose to immediately leave for their original homes, and an abrupt population crisis hit the industries of former Gulag cities (Prociuk 1967). In general, the USSR was in a difficult situation regarding the economy: rebuilding the western part of the country after the devastation of the war took enormous resources, and the now rapidly changing demographics of labor forced a complete restructuring of industrial production.

In response to these new conditions, a dual solution arose in the actions of the Soviet government: labor-intensive industries were located in the European USSR or near extant rail transit networks, while electricity- or raw materials-intensive industries, such as mining and smelting, would take place in Siberia, near plentiful sources of mate-

rials and electricity that could be generated from hydroelectric dams, coal, and natural gas (Shabad and Mote 1977). To a certain extent, it appears that these changes in location policy constituted an abandonment of the early efforts to ensure equal distribution and Stalinist economics. While Soviet planners seemingly no longer intended to bring development in Siberia to the same level as European Russia, the imperative to distribute industry across the national territory still caused planners to focus a disproportionate level of investment on the remote and inaccessible regions of Siberia and the Far North up until the collapse of the USSR (Hill and Gaddy 2003). Nonetheless, this trend toward resource-based economies in Siberia, instead of the prioritization of production favored by the USSR as a whole, foreshadowed Russia's eventual post-Soviet transition to a deindustrialized economy.

### ***The Manpower Problem and the Northern Shipment***

The initial development period following World War II in the Soviet Union had been primarily focused on rebuilding after the devastation caused by four years of war, and as this rebuilding phase came to a close, the country focused on expanding its industrial base. In the postwar Soviet political mindset, Siberia represented the perfect place to expand industry. In ideological terms, location policy and conquering the wilderness to build advanced industry helped the Communist Party achieve its political goals. Military strategy emphasized the benefits of placing industry with military value far from Russia's borders. And, in practical terms, the vast expanses of Siberia contained enormous reserves of every conceivable raw material, from oil to diamonds.

By the 1960s, Siberia and the Far North had become permanent focal points for new projects and investments; the decade saw the discoveries of the first major oil, natural gas, metal, and mineral resources in decades, and new technological methods allowed for the scale of production to be increased far beyond what would have been possible in previous years. The largest single push for developmental expansion came in 1968 with the discovery of the Samotlor oil field in the Khanty-Mansiy Autonomous Okrug in Western Siberia, the first of several "supergiant" oil and gas fields to begin production in the region (Wilson 1987). Large gas fields, like Medvezhye and Yamburg, were discovered further north in the Yamal-Nenets Autonomous Okrug in the 1970s, and these regions of Western Siberia quickly became the largest destinations for investments in the USSR (Shabad



1987). The feverish expansion of oil and gas activities sparked the construction of entirely new cities in Siberia, in what can be seen as the “third wave” of economic and demographic expansion in the region, as distinguished from early imperial settlement and the forced labor expansions under Stalin. Cities such as Novyy Urengoy were built from the ground up, and older ones, such as Surgut, experienced massive increases in population and investment. By the 1980s, Siberia held by far the largest energy and resource reserves in the USSR, with over 80 percent of oil reserves, 90 percent of natural gas, and 90 percent of coal (Wilson 1987). Clearly, the natural resource-based economy of the Soviet Union depended on Siberia as its almost singular resource base.

In order to support the concerted urbanization of Northern Siberia and the Arctic from the 1960s onwards, the government exerted huge efforts through the “Northern Shipment” process (Heleniak 2001). The Northern Shipment effectively consisted of two separate components: subsidies and pay raises granted to individual workers to encourage them to move and remain in the north, and large subsidies for transportation and basic economic resources for northern settlements.

Labor shortages had been a critical problem in the USSR since the introduction of five-year plans in 1928, before large-scale settlement of the Siberian Far North began (Connoly 1987). After the abandonment of forced labor between 1953 and 1957, populations in many northern cities began to decline precipitously, as freed workers moved away en masse. Planners identified the growing gap between labor needed for economic plans and the continued population drain from Siberia as the single largest obstacle to continued development, a phenomenon that came to be known as the “Manpower Problem” in Siberia. According to S.G. Prociuk, the author who coined the term, the environmental difficulties paled in comparison to labor issues in the Far North, noting that “whatever the natural difficulties at the present stage of developing Soviet Siberia may be, they seem to be less than those of transplanting skilled and unskilled manpower to those regions for operating and maintaining new installations (Prociuk 1967: 192). In Krasnoyarsk Kray alone, Prociuk estimated that no more than 12 percent of newly recruited workers even finished their contracts before returning to their original places of residence (Prociuk 1967). The 1.4 million people who moved to Siberia between 1956 and 1960 were offset as between 1.4 and 2 million people left the region during the same period (Prociuk 1967).

In order to reverse these severe declines, the Soviet government devised the “Northern Benefits,” an improved system of monetary and

social incentives to lure workers to the north and encourage them to remain there for longer periods (Heleniak 1999). Wage augmentation had already been introduced before in certain Gulag camps, both with free and nonfree labor, but the wages offered from the 1970s onwards were unprecedented in their scale in the Soviet Union (Borodkin and Ertz 2003). These programs included not only wage increases, but also extra leave time, paid vacation, and other inducements that were uncommon or completely absent in other regions (Connolly 1987). Additionally, underfulfillment of work norms could not be used as grounds for curtailing bonuses in the Far North, which was one of the most attractive advantages offered (Armstrong 1960).

Costs of living in the Soviet Union were theoretically supposed to be relatively equal across all territories due to the price controls mandated by Soviet economic policy, so the wage differential programs, which offered as much as a 100 percent pay increase over similar jobs elsewhere, would have been one of the few ways to earn substantially higher actual wages (Heleniak 2001). Increased migration levels allowed many major cities in Siberia and the Far North to grow significantly, but even with the expanded system of benefits, luring workers to the north in quantities sufficient to fulfill all economic plans was not nearly as successful as the authorities had hoped (Connolly 1987). For most, the system was less attractive in reality than it seemed on paper; Hill and Gaddy estimate that Siberian costs of living were in reality closer to 35–50 percent higher than those of European Russia, and that average wage differentials amounted to only a 15–20 percent increase, meaning that actual wages in Siberia would have been lower than those in the rest of the country (Hill and Gaddy 2003). Such estimates aside, the urban population of the Far North grew steadily through the mid-1980s, and government programs and incentives no doubt played an important, if not defining, role.

In addition to the Northern Benefits to lure workers to the Far North, the authorities established a logistical and financial system to connect and supply the often remote industrial centers of the region. Due to the enormous geographical separation of Far Northern cities, they were difficult and expensive to supply with necessary basic commodities, such as food and consumer goods. Many cities were only accessible by ice roads or aircraft, so the total costs of provisioning the remotest regions could be enormous. In order to improve living conditions and slightly diversify the work force away from the raw materials sector, some of the larger Siberian cities began to produce limited quantities of basic goods, though usually not in amounts sufficient to satisfy demand (Armstrong 1960). Consequently, the gov-

ernment had to provide massive subsidies for the provision of goods to remote settlements and cities of the north, which consumed enormous financial resources. In addition to subsidizing food and fuel, the “Northern Shipment” even subsidized the costs of basic industrial inputs (coal, primary inputs, etc.). Estimates vary, but as much as 6 percent of the entire Soviet GDP was consumed by this system by the 1980s, demonstrating the incredible inefficiency and enormous total expense of maintaining the large amount of industry that had been set up in the Far North (Heleniak 2001; World Bank 2010).

### ***Post-Soviet Transition***

When the USSR disintegrated in 1991, it was clear that the future of many urban centers across the Far North was in jeopardy. The disappearance of state subsidies and political support for expensive and remote industries based in the region meant that neither the excessive populations nor large enterprises could continue in their current forms. Accordingly, much of the 1990s was characterized by deindustrialization, population loss, and political strife as the Far North struggled to reorient itself to a market economy.

Perhaps the most apparent trend during the post-Soviet transition was that of demographic decline. The single-industry cities and towns favored by Soviet planners, known as monocities (*monogorody*), often found themselves without an economic basis once the planned economy disappeared. Consequently, many smaller towns depopulated almost to the point of abandonment, and larger cities declined precipitously. Labor shedding by the industries of the Far North and the ensuing out-migration led to a decline of almost 10 percent of the region's population, 913,000 people, between 1989 and 1997 (Heleniak 1999: 171). Though the pace of depopulation has decreased since 1997, many cities have continued to shrink (for more details, see the chapter by Timothy Heleniak in this volume).

## **Russia's Diverse Arctic Cities**

Despite the numerous changes affecting the Russian Arctic since the collapse of the USSR, the region still remains primarily urban. There are stark differences across the cities and settlements, and they can be sorted according to various criteria. To provide a general overview, the fourfold typology in this section classifies the cities by the level of their economic diversity and their growth status (see Figure 1.1).

Growth Status	Economic Diversity	
	-	+
+	<i>Novy Urengoy: Energy Center</i>	<i>Yakutsk: Growing, Diversified City</i>
-	<i>Norilsk: Remote Industrial City</i>	<i>Murmansk: Diversified Transit Hub</i>

**Figure 1.1.** | *General Typology of Russian Arctic Cities*

Other authors in this volume develop different typologies that are more appropriate to their specific topics (see, in particular, chapters by Timothy Heleniak and Jessica Graybill). While the overall population of the Russian Arctic has been in decline since 1991, some Arctic urban centers have registered growth, making them notable exceptions to this trend. In particular, cities dominated by energy exploitation have fared best in avoiding population decline, as well as a small number of more southerly centers with good infrastructure and transit accessibility, such as Yakutsk. Conversely, cities with a Soviet-era economy based on lower-profit sectors, such as timber or low-value mining (coal), have had the largest population declines. Additionally, the centers that are most inaccessible and remote have had larger declines in general, due to the higher costs of transport and lower level of economic opportunity. The following cities provide illustrative examples of the different types of urban settlements in the Russian Far North—diversified transit hub, energy center, remote industrial city, and growing, diversified city.

### ***Murmansk: Diversified Transit Hub***

As the largest Arctic Russian city, Murmansk has been an important center through which much of the region's economic activity passes. Most internal shipping along Russia's Arctic coast either originates from or is received by Murmansk's port, and the city is an important industrial center for processing metals and other mine products. Additionally, Murmansk is an important military center, particularly for the navy, as the Russian Northern Fleet is based nearby. Despite its central importance for the Arctic as a whole, Murmansk's population has shrunk by over 150,000 since 1989, to just over 300,000 in 2010, and has shown no signs of growth under current conditions. While Murmansk is important as a bridge to Arctic centers (the *Atomflot* ice-breakers are based there, as is the headquarters of the Northern Sea Route, which allows ships to sail between Europe and Asia across the

top of Russia), its permanent land connections and ice-free port insulate it from many of the challenges facing other Arctic centers.

### ***Novyy Urengoy: Energy Center***

Novyy Urengoy is perhaps the most significant example of the energy-dominated “growth poles” throughout the Russian Far North, and it is one of the largest and most prosperous northern centers. While the city only grew moderately in the 1990s, its status as the primary Gazprom hub in Siberia has ensured strong governmental support, investment, and growth in recent years. The expansion of energy exploration in the Yamal-Nenets region, largely based out of existing energy centers like Novyy Urengoy, Surgut, and Nadym, as well as the continued dominance of the energy industry in Russia’s economy, will likely mean that such centers continue to be foci of development and economic activity.

### ***Norilsk: Remote Industrial City***

As the second largest Arctic city, Norilsk has been an important regional center for decades. Norilsk typifies the remote industrial centers of the Arctic, as it has no permanent transit connections, and must rely on aircraft and icebreaking ships to maintain itself. Despite the profitability of the nickel and platinum mining that dominates the city’s economy, the population declined markedly in the two decades following the Soviet collapse. A reduction in Norilsk Nickel’s workforce has driven much of this shrinkage, as well as a general out-migration from northern cities by more economically mobile citizens. While large industrial centers such as Norilsk are unlikely to disappear completely, continued depopulation is a desirable outcome for the enormous mining concern based there and the federal government so that the high costs of maintaining remote centers can be reduced.

### ***Yakutsk: Growing, Diversified City***

Yakutsk represents a small group of diversified cities in the Arctic that are growing. These are traditional regional centers that provide administrative services for the areas around them. They benefit from nearby resource production, diamonds in the case of Yaktusk or gas in the case of Salekhard. As Timothy Heleniak’s chapter points out, Yakutsk has grown extensively based on continuing in-migration from outlying areas, including by indigenous peoples.

As the above examples demonstrate, the progress of economic decline and redevelopment during Russia's transition from central planning to market mechanisms has been uneven and highly dependent on local circumstances. The energy industry remains the major driver of investment and development in most urban centers, and those locales that are further from energy exploration and reliable permanent transport infrastructure continue to face economic depression and the resultant demographic decline. A major challenge facing cities and towns of the Russian Far North is to find ways to survive through developing a degree of urban sustainability in such varying conditions, with differing levels of government investment and widely divergent economic prospects.

### **Drivers of Change in the Russian Far North**

Given the historical legacy and current diversity of Russia's Arctic cities, what forces are likely to determine future developments in these settlements? The complex interaction among human and environmental pressures to effect rapid change within the Arctic or other environments has been increasingly described through the agency of "drivers of change" (e.g. Gore 2013; Smith 2011). After the varying booms, busts, and stagnations of the Soviet and post-communist periods in the Russian Far North, several forces are combining to change the future of northern cities. Three distinct forces are at work:

- political centralization,
- energy development, and
- climate change.

All of these forces intersect in the cities of the Russian North. The combined impacts of these three drivers of change are likely to greatly alter the economy, society, and political framework for the cities of the Russian North in the coming decades. At a time when the Russian government has clearly outlined its increased focus on the Arctic and its desire to develop the extractive industries of the region, these factors are certain to become even more crucial.

#### ***Politics***

First, following the economic and social havoc in the early 1990s as Russia transitioned from a planned economy to the market, President Vladimir Putin's rise to power brought efforts to strengthen central au-

thority in Moscow and impose greater political control over the rest of the country. Because the economic future of Russia in many ways depends on the successful extraction of northern resources, the stakes for increasing governmental control have become even higher. The Putin era has therefore been a struggle between regional interests, business interests, and the federal government, with the federal government playing the dominant role. The Kremlin has sought to increase its authority in northern regions while promoting energy development and the necessary local development, working with Russia's energy companies, regional governments, and foreign investors in the process. The ways in which the political landscape has been altered and continues to evolve are critical to the development and success of northern urban centers, and the ever-present hand of the state is sure to play a critical role for northern cities for the foreseeable future.

Since coming to power, Putin has taken a keen interest in the energy sector and has personally directed its development. Therefore, the federal government has a strong presence in the cities largely run by state-owned energy firms such as Gazprom and Rosneft (Novyy Urengoy, Surgut, etc.). The incredible energy resources of regions such as Yamal Nenets make a tight relationship with the Kremlin inevitable; the *okrug* supplies more than 80 percent of Gazprom's total extractive wealth, while tax revenue from energy companies makes up in excess of 90 percent of the region's budget (Kuszniir 2006). With a central government so strongly tied to energy exploration in the Far North, northern cities are likely to see an active government presence in coming decades.

The hand of the Kremlin may often be easy to detect through state companies, yet the central government also has increased its involvement with private companies such as Norilsk Nickel and Novatek, both of which had achieved a relatively high degree of independence during the late 1990s and early 2000s. Although Norilsk Nickel was privatized in the early 1990s, government interventions under Putin since 2003 have increasingly called into question the independence of the firm. In addition to planting government-friendly representatives on Norilsk Nickel's board of directors after the departure of then-director Mikhail Prokhorov in 2008, the company was forced to take out large loans from the state during the concurrent financial crisis, further giving the state power to intervene in the affairs of the company (Humphreys 2011). For companies like Norilsk Nickel that dominate their respective monocities, governmental intervention in ostensibly private corporate affairs is a strong indication that the state will main-

tain a prominent presence in the economic and political affairs of northern cities.

Beyond state-business relations, Putin's policies since 2000 have directly increased the role of the federal government in regional politics. Regional centers lost their ability to directly elect governors in 2004, when the president took the power to appoint them directly. Although limited gubernatorial elections returned in 2012, the Kremlin retains extensive control over who can become a regional executive. The removal of the longtime governor of the Yamal-Nenets Autonomous Okrug, Yuri Neelov, and his replacement with the less independent Dmitry Kobylkin is a prominent example of the Kremlin's desire to maintain a tighter degree of control over the most economically essential provinces of the country (Kusznir 2006).

Given the reality of political centralization in Russia, Chapter 2 examines the nature of the decision-making process for the Arctic in Moscow. But there are limits to central control, and some Arctic cities have managed to develop outside of its reach. Therefore, Chapter 3 examines how two cities in the Yamal-Nenets Autonomous Okrug have pursued sustainability goals, one in the shadow of Russia's administrative edifice and one more independently. The chapter shows that there are numerous development paths even within a centralized system.

### ***Energy Development***

Second, given its economic and political importance, the energy industry is the most immediate driver of change in the Russian Arctic on the ground and its needs have played a determinative role in the shape of Russia's Arctic cities. Although resource development has always been at the heart of life in the north, from furs in past centuries to timber and mining at the zenith of Soviet expansion, the energy industry has been the primary economic enterprise in recent decades. While energy exploration was a major driver of growth in the USSR from the 1960s onwards, the deindustrialization of the Russian economy resulted in the country's ever-greater reliance on basic extraction (Jensen 1983). The energy sector could influence Russian Arctic cities in two ways: through the development of new cities, as was the practice in the past, or by directing the flows of people to, or away from, the different northern cities.

The energy boom in the Russian economy during the first fifteen years of the twenty-first century did not spur the development of new cities, so it differed from the kind of development that took place in the Soviet era. The discovery of large oil and gas resources in West-



ern Siberia in the 1960s transformed the Soviet economy, and energy resources have since become the most valuable export for Russia. As the older fields of the 1960s and 1970s decline in productivity, the industry has gradually moved northwards, increasing its presence in the Arctic and sub-Arctic regions of the country. These changes naturally spurred development in Russian cities.

The Soviet model of industrial expansion into Siberia and the Far North called for the construction of cities to support industry, so centers such as Novyy Urengoy (1975) and Nefteyugansk (1967) were built from the ground up, while others such as Surgut and Salekhard were expanded once oil and gas fields were discovered nearby. These energy cities have been among the few urban areas in the remote regions of Russia to continue to grow after the collapse of the Soviet Union, demonstrating their importance to the energy industry as a whole.

The expansions of the energy industry in the Far North underway today have moved further and further away from the previous urban centers established during the height of Soviet energy exploration, with a special focus on the more remote reaches of the Yamal Peninsula. The new projects in the region have brought large infrastructural investments to assist in the expansion of development, though the towns of the region have yet to expand significantly. The Ob-Bovanenko Railway, which connects the Bovanenkovo gas field to Labytnangi, has been one of the largest investments to date, and the presence of permanent transport infrastructure in this previously unsettled area could allow for a degree of urbanization as the local oil and gas industry continues to expand. Further developments, such as Novatek's approved plan to build a large LNG export facility at Sabbeta, could ultimately stimulate new urban settlement.

Despite this rapid energy growth, no large settlements have been constructed since the dissolution of the USSR, and it is unclear whether any further centrally planned urbanization will take place on orders from Moscow. Rather than constructing new cities in previously uninhabited areas, the strategy for the large energy companies such as Gazprom, Rosneft, and Novatek has been to rely on shift workers to supply labor to the increasingly remote fields of the north. These workers typically live in camps that do not require the construction of a full complement of city services.

Accordingly, instead of initiating the construction of new cities in the Russian Arctic, energy development has been the key variable in determining which existing cities are growing and which are shrinking. The main impact of the energy sector is felt through the way it is bringing workers to the Arctic. The emphasis on shift workers

has changed the nature of the kind of settlement that is taking place. Moreover, the fact that the energy sector is attracting workers from the Caucasus and Central Asia is changing the social fabric of the northern cities. The chapters in section II of this book will examine these trends in greater detail.

### *Climate*

The third driver of change that will affect the Russian Far North is the prospect of climate change. The climate of the region has been one of the largest influences on virtually every aspect of life for northern cities, and the predicted increase in temperature over the coming decades will force most cities to face daunting challenges, in addition to the possibility of some benefits. Transit accessibility, long one of the most difficult and expensive obstacles to urban development in the Far North, is projected to vary wildly. Sea access along the Northern Sea Route is forecast to increase markedly, while land access is almost certain to degrade at a similar pace. The increasing instability of permafrost will likely have catastrophic implications for the structural integrity of buildings and infrastructure in the region, especially as the quality of much northern infrastructure is already significantly degraded at present.

The interaction between the energy industry and the federal government has been and will certainly continue to be a major force shaping the Russian Far North, yet the future of cities in the region is certain to be driven by the outcomes of climate change. Climate change has already begun to make its presence felt in the Arctic due to its increased speed and strength there in what scientists describe as “Arctic amplification” (Jeffries, Richter-Mege, and Overland 2012). While it is clear that climate change is taking place, the exact ways in which it will influence urban life in the Far North are not as well understood. Certain effects of warming promise to increase transit accessibility and mitigate some of the difficulties of Arctic settlement, yet others have more ominous implications for the future of northern cities.

The most obvious implication of warming for the Arctic is that it will lessen the harshness of winter for the north. By 1983, it was estimated that work stoppages in the Arctic due to cold amassed losses of up to 33 percent of all possible working hours, a staggering drain on productivity for a largely industrial region (Mote 1983). Later analysts have attempted to quantify the direct effects of low temperatures on the Russian economy, with Tatiana Mikhailova estimating that 1.2

percent of the total Russian GDP is drained by the urbanization of Russia's coldest regions (Mikhailova 2007). A rise in temperatures could lessen the frequency of work stoppages due to cold, reduce the energy costs of heating for residents, and simply make the north a more livable place.

While the effects of temperature on the livability of the Arctic may prove to be a significant driving force for change in the future, one of the most immediately apparent climatic factors in the Arctic and Far North is the way in which transit accessibility is changing. The lack of affordable and reliable transit access to the Arctic has been a crucial obstacle to development of the region, with transit and supply subsidies from the Soviet and Russian governments, the so-called Northern Shipment consuming up to 6 percent of the national budget at different points in history (Heleniak 2001). The partial loss of these subsidies after 1992 and the resulting economic and demographic decline is indicative of how crucial the provision of transport is to the Russian Far North.

Sea transit along the Northern Sea Route and the major rivers of Russia leading to it (particularly the Ob, Yenisei, and Lena) was a consistent drain on resources in the USSR and Russia since the Northern Sea Route (NSR) was first used in the early Stalinist expansions of settlement. Even to the present, icebreakers are required for safe and reliable transport, leading costs in cities lacking other transit alternatives to remain consistently high (Hill and Gaddy 2003). The progress of climate change has already reduced sea ice along the NSR significantly during much of the year, leading to increased accessibility, and predictions of warming by 2050 that show that sea-based transit in the Arctic may be greatly facilitated (Stephenson, Smith, and Agnew 2011). The energy and mining industries of the Far North already rely heavily on the western NSR for much of their economic livelihood, but the costs of icebreaking and the seasonality of transport are significant economic drains (Ragner 2000). Whether this increased accessibility will result in a greater degree of urbanization in the Far North is difficult to tell, though reduced sea transit costs will certainly benefit industry in the region.

Tempering the increased sea accessibility of the Far North is the reduction in land access, which is currently largely dependent on ice roads, as much of the region lacks permanent road or rail infrastructure (Hill and Gaddy 2003). Warmer temperatures have begun to reduce the length of time during the year when ice roads can be used for transport in remote areas, and the significantly warmer temperatures predicted by most climate models are certain to exacerbate this effect.

A decline in the ice road season could induce a steady rise in transit costs for many northern settlements, unless mitigated by cheaper and more reliable sea access. Noncoastal settlements are likely to be the hardest hit by this trend, as air transit is prohibitively expensive for larger urban centers. Predicting how the differing changes in access will affect urban centers is difficult, and will be determined by the scale and pace of warming, as well as local geographic variation.

In addition to drastically changing the accessibility of northern cities, climate change promises to severely impact the physical integrity of the cities themselves. For cities constructed on permafrost, as many major cities of the Russian North, such as Norilsk, Yakutsk, and Vorkuta are, warming temperatures promise to increase the pace of permafrost thaw, with grave consequences for physical infrastructure. As the ground warms, the stability of building and road foundations decreases rapidly, leading to building deformation and even outright structural collapse (Mazhitova et al. 2004). The pace of deformation increases with the scale of warming, so the projected increases of the coming decades are ominous for northern cities. For example, Norilsk alone had 250 major deformations or collapses by 2003, most of which have required complete building demolition (Ilichev et al. 2003). An analysis of bearing capacity change in Igarka and Norilsk for 2041–2060 predicts declines of 61.5 percent and 40 percent, respectively, which would result in a catastrophic number of building collapses and deformations (Streletskiy 2012). For the extant larger cities of the Far North, the rapid decline in infrastructural stability may be the most difficult and expensive problem to overcome in the coming decades. Despite the awareness of the progression and risks of climate change within the academy, engagement with the topic has been sparse within the federal government. In the most recent Russian policy document on Arctic development, climate change is acknowledged as a potential factor in the region, though no steps are outlined to mitigate its effects or adjust development accordingly (Pravitelstvo RF 2013).

This chapter has launched the book by presenting the three drivers of change for Russia's Arctic cities. The following chapters will examine the nature of decision making, resource-driven migration flows, and the impacts of climate change on Russia's Arctic cities. The conclusion will tie together the main themes and assess the implications for urban sustainability.

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