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SUBURBANIZATION AND SUSTAINABILITY IN METROPOLITAN MOSCOW

ROBERT J. MASON and LILIYA NIGMATULLINA

ABSTRACT. Although Soviet-era urban-growth controls produced relatively sustainable metropolitan development patterns, low-density suburban sprawl has accelerated markedly in modern Russia. Distinctive features of Moscow's development history are its greenbelt, which dates from 1935 and is becoming increasingly fragmented, proliferation of satellite cities at the urban fringe, conversion of seasonal dachas into full-time residences, the very exclusive Rublevo Uspenskoe Highway development, and today's crippling traffic congestion. The recent economic crisis has slowed development and actually increased the supply of "economy-class" single-family homes, for which there is much pent-up desire but insufficient credit availability to meet the demand. A renewed commitment to sustainability's triple bottom line—environmental quality, equity, and economic prosperity—will require greater government transparency and fairness, stronger planning controls, and an expanded public transportation system. *Keywords:* Moscow, Rublevka, Rublevo Uspenskoe Highway, Russia, suburbanization, sustainability.

If there had been a U.S.-Soviet post-World War II suburban sprawl race, the United States would have won hands down. Indeed, Soviet policies tightly restricted metropolitan development, whereas America's national policies encouraged low-density suburban expansion and left critical growth-management decisions to local governments. But in the post-Soviet era weak planning controls have allowed Russia's major metropolises to start sprawling, American style. After briefly reviewing the relevant international contexts of metropolitan development, we examine Soviet and post-Soviet suburban development and the potential roles of climate and sustainability planning in shaping metropolitan Moscow's future.

GLOBAL POSTWAR SUBURBANIZATION

Rapid, land-consumptive postwar suburbanization has been part of the shared history of the United States, Canada, and Australia—free-market economies with vast land bases. Kenneth Jackson saw the contemporary American experience as unique in these respects: middle-class as well as wealthy citizens resided in suburbia, suburbanites lived rather far from their workplaces, home-ownership rates were exceptionally high, and yards were very large (1985). Metropolitan regions have tended to be highly fragmented and uneven, as multiple governments compete for tax revenue, provide duplicative, inefficient municipal services, and enact regulations designed to segregate residents by class and race. The resultant sprawl incurs high fiscal and environmental costs (Mason 2008).

European countries tend to have more centralized planning systems, more compact cities, and much more efficient intercity and intracity public transportation

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systems than does the United States (EEA 2006). Yet Europe's cities are hardly immune to sprawl (Richardson and Bae 2004; Couch, Leontidou, and Petschel-Held 2007). Indeed, most core cities, not only in Europe and the United States but also in Australia, New Zealand, and Japan, have lost population in recent decades. Although urban abandonment and concentrated poverty are not as extreme in those nations as in the United States, growth outside their central cities is outpacing growth in their core.

Postsocialist Eastern European countries are experiencing shrinking cities, rapidly rising rates of automobile ownership, and relaxation—if not near collapse—of planning controls. Like Moscow, Central and Eastern European cities are characterized by large, socialist-era housing estates near the inner-city periphery. This metropolitan development pattern protected agricultural land near cities and provided modest, but serviceable, high-density housing for workers. Most of these cities are now experiencing rapid commercial and residential growth at the urban fringe, in conjunction with revitalization and reurbanization of center cities in the wake of industrial relocation (Pichler-Milanovic, Gutry-Korycka, and Rink 2007, 107).

Sprawl is taking place, even where metropolitan populations are declining; indeed, it is encouraged by the construction of ring roads around many cities, as well as investor preferences for greenfield rather than brownfield development (Van Kempen, Vermeulen, and Baan 2005). Still, most central cities remain vibrant and compact, with thriving central business districts and still substantial—if declining—daytime and nighttime populations. In part this is a function of the unaffordability, for most residents, of single-family homes. Most Eastern European governments do recognize the ecological, economic, and social consequences of metropolitan sprawl, but because of the low priority given to regional planning by prevailing neoliberal policies, they fail to sufficiently address these issues (Pichler-Milanovic, Gutry-Korycka, and Rink 2007).

SOVIET SUBURBANIZATION

As with Eastern Europe, Russia's metropolitan development trajectory is quite distinct from the patterns in Western Europe and North America. The Soviet Union inherited a predominantly rural population living in small, wooden, single-family houses. In the early 1920s only Moscow and Leningrad had populations of more than 1 million. Under the Stalinist politics of rapid industrialization and collectivization of rural land, millions of people moved from the countryside to the industrializing urban centers. Housing was in short supply, for investments in industries outpaced those in housing production. Even as recently as the 1976–1980 period industrial investment exceeded housing investment by 150 percent (Hewett 1988, 314). Moreover, World War II had brought severe deterioration in housing conditions, leaving more than 25 million people homeless (Martinot 1997, 21).

Still, through much of the twentieth century the powerful central government endeavored to keep cities compact and well served by public transportation. Urban growth was concentrated mainly in the suburban reaches of large metropolitan ar-

eas, in satellite cities of 20,000–100,000 residents and with urban infrastructure, industries, and institutions (Andrusz 1984, 240). In the 1980s and 1990s, as Moscow expanded, some of the nearest satellite cities were incorporated into the capital (Figure 1). Western-style suburbanization, with extensive tracts of single-family homes, was not a widespread Soviet phenomenon. People who did reside in suburban single-



FIG. 1—Moscow's satellite cities are home to 20,000–100,000 residents and contain urban institutions, industries, and infrastructure. Shown in this panorama is Solntsevo, a satellite city until 1984, when its cluster of high-rises was incorporated into the city of Moscow (Photograph by Kastej, July 2007; reproduced courtesy of the photographer)

family houses often lacked access to infrastructure and services—such as running water, electricity, and gas—that were available in cities. For these reasons, most Soviets favored high-rise apartment living; indeed, the directives of the State Committee on Construction Affairs, the main institution responsible for planning and construction (Ruble 1999), greatly circumscribed their choice.

Khrushchev-era housing consisted mainly of five-story panel blocks built from inexpensive materials. Their hasty and extensive construction produced a form of urban sprawl within large cities (Morton 1984). Apartment buildings constructed in the 1970s and 1980s generally were taller than their predecessors and to some extent prevented cities from sprawling. With the accelerated construction of multi-story houses, single-family home ownership declined rapidly. At the same time, populations of satellite towns built in and around major cities like Moscow, Leningrad, Nizhniy Novgorod, and Samara were increasing. By the 1980s the urban population share had increased to 64 percent and the number of cities with a population of more than 1 million rose to twenty-three (p. 73). People migrated because urban life provided not only employment opportunities but also free housing (Kerblay 1983).

Since 1860—about the time that many U.S. cities started to find it politically difficult to annex territory—Moscow's official borders have expanded six times, swallowing suburban areas in the process. In 1860 the city's area was only 22 square miles, but by its last expansion, in 1984, it occupied 384 square miles (Ioffe and Nefedova 1998, 1327; Gritsai and van der Wusten 2000), with high-rise apartment

complexes covering much of the annexed territory. In contrast, the area occupied by the Moscow Forest and Park Protection Belt—or greenbelt (Figure 2)—did not expand proportionally. The 1935 General Plan of Moscow Reconstruction initially set the greenbelt area at 556 square miles. In the 1960s, when Moscow experienced its largest areal expansion, the greenbelt area did increase, but only to 664 square

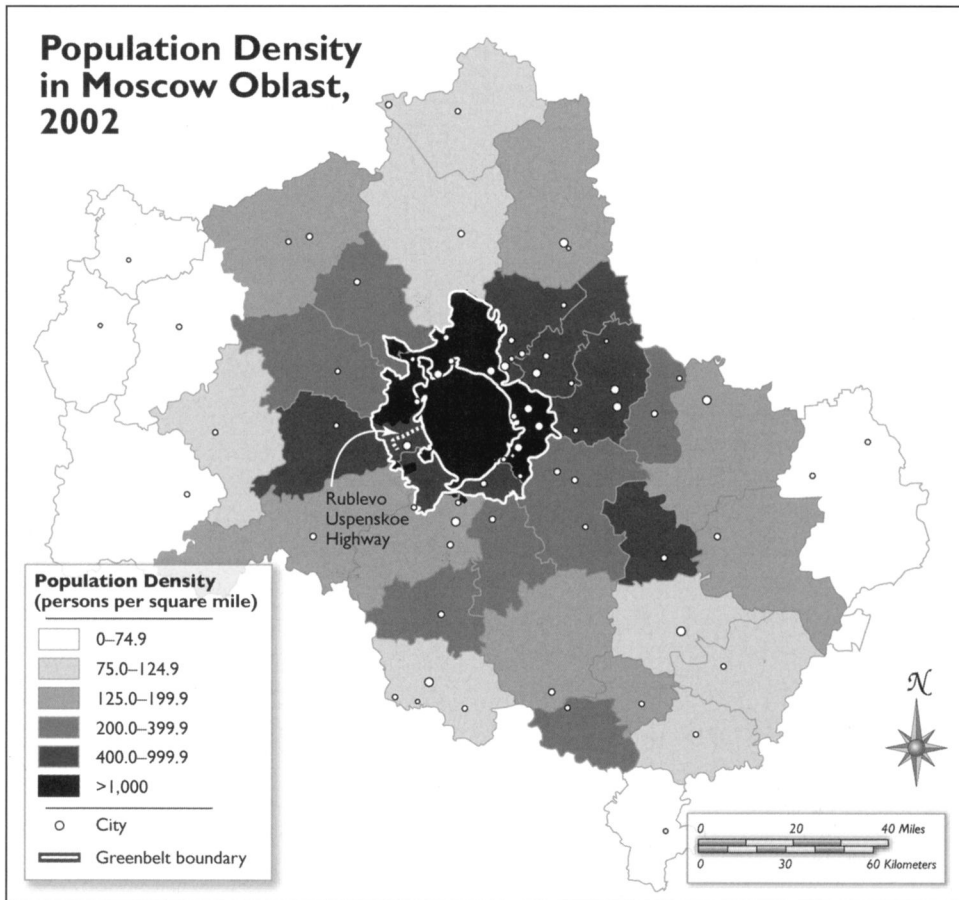


FIG. 2—Population density varies widely in Moscow Oblast. *Source:* fsgs 2002. (Cartography by Gerry Krieg, Krieg Mapping)

miles (Melamed and Nenarokova 2008). Moreover, although its area has not changed since then, the greenbelt has become increasingly fragmented, experiencing a net conversion rate of 14.6 percent between 1991 and 2001 (Boentje and Blinnikov 2007, 212). Yet the greenbelt does retain extensive forested areas, valued principally for recreation and water supply. Timber harvesting is very limited (Kleinhof, Carlsson, and Olsson 1999).

With its population of 10.4 million, Moscow is the largest city not only in Russia but also in Europe. Moreover, Moscow is very much a primate city, capturing almost 14 percent of Russia's GDP, 29 percent of retail sales, and 30 percent of direct

foreign investment and tax receipts (Blinnikov and others 2006, 66). Moscow leads the nation in politics, economics, culture, and education; indeed, a great many Russian phenomena, including suburbanization, started in and reached their greatest extent in Moscow.

Given its overwhelming primacy, Moscow experienced tremendous in-migration through much of the twentieth century. Nearby satellite cities, as well as suburban zones dominated by single-family houses, drew job seekers from all across the country. The Soviet government tried to limit Moscow's growth by introducing a system of residence permits (Polyan, Nefedova, and Treyvish 2001). However, the authorities did not limit the increase in population beyond the city limits. As a result, migrants who were unable to obtain permits in the city often settled in nearby satellite cities and commuted to workplaces in Moscow. By 1973 Moscow's daytime population had grown to 9 million, compared with only 7.4 million at night. The maximum radius of daily commuting varied between about 18 and 24 miles from the center. Railways were the most widespread means of commuting, with suburbanites accounting for 91 percent of all rail passengers (Kerblay 1983, 59). Although Moscow became one of the most suburbanized cities in the Soviet Union, the resultant landscapes hardly resembled those in the United States. With its extensive high-rise satellite developments near the urban edge, Moscow's suburbanization could be characterized as "multi-nodal peripheral development." Although such patterns can be found in European and North American cities, Moscow's nodes tend to be larger and more densely populated. In contrast with Paris, for example, Moscow's average population density generally increases as one moves outward from the city center to a radius of 20 miles (Graybill and Mitchneck 2008, 271).

In the Soviet Union housing was a strictly controlled public good rather than a commodity that could be bought and sold (Alexeev 1988). The Soviet Constitution established the right to housing, and the government recognized that right by allocating free housing to the neediest people—usually defined as those with less than 55–75 square feet of living space (p. 414)—who were on the waiting lists. The government owned 75–78 percent of all housing stock and was monopolistic in housing production and maintenance (Renaud 1992, 881). Housing provided by the state generally included apartments in high-rises with standard living space of no more than 650 square feet. Privately owned housing was often marginalized to economically and socially undesirable areas. As late as 1989, individually owned houses accounted for just 21.4 percent of urban housing in the Soviet Union. Built mostly before 1964, this housing was concentrated in small cities (Renaud 1992, 886). But from 1964 until 1987 the government prohibited construction of single-family homes in cities with populations greater than 100,000 (Morton 1984; Renaud 1992).

Suburban locales that did not host satellite cities suffered from underinvestment and often lacked basic utilities and services, such as schools and kindergartens, accessible public transportation, and grocery stores. For these reasons, most Soviets did not covet a privately owned house in a suburban area—and suburbanites became the least favored segment of society. The Soviet "ideal" home was an apartment in a mod-

ern high-rise near a subway or bus station—what American planners term “transit-oriented development.” Because of poor suburban living and housing conditions, suburbanites often wanted to move to cities. Frequently, though, they were not placed on the waiting lists. The government restricted migration into the largest cities, such as Moscow and Leningrad, in order not to overcrowd them with provincial migrants (Morton 1984).

Living beyond the city limits was quite desirable in summer, however. Tired of being confined inside their small apartments, Soviet people fled the cities as soon as their summer vacations started. Before the 1950s only a small group of Soviet elites had access to private summer houses, or *dachas*, which their employers or the state provided for them. *Dachas* were usually comfortable two-story houses built on lots ranging in size from 0.30 to 1.25 acres (Ioffe and Nefedova 1998, 1336). The majority of Soviet citizens had to seek places in state sanatoria or pioneer camps. Another option was seasonal rental of houses in small villages. Convinced that additional income made rural home owners less enthusiastic about their jobs, the government banned leasing of suburban houses, but then reversed course in the face of strong public dissatisfaction (Katsenelinboigen 1990).

In the 1950s the government started to allocate land for collective orchards. Employees of state ministries and enterprises received parcels of land within the collectives to use for gardening, though not for constructing dwellings (Ioffe and Nefedova 1998). But by the late 1960s, with loosened regulations and Soviet adoption of a two-day weekend, people started building small houses. Government regulations dictated the style as well as size of these seasonal residences. Although they were not convenient for permanent living, these tiny dwellings, which usually lacked electricity, were comfortable enough for spending weekends (Figure 3). In the 1980s, 189 collective orchards existed in the Moscow region, and by the 1990s about 648,000 families had parcels of land in collective orchards (p. 1337). Most orchards were 5–25 miles from the city center. Initially people usually commuted by train or bus; however, by the 1980s and 1990s automobile commuting was very much on the rise. Over time people started to call their tiny parcels of land “*dachas*.” This seasonal, recreational “suburbanization” became a distinctively Soviet style of low-density living (Lovell 2003; Golubchikov and Phelps 2009).

That cities practically emptied during summer indicated that Soviet people preferred their tiny suburban parcels, with their small houses, to city apartments. Not only did orchards and *dachas* provide fruits and vegetables for fall and winter consumption, thus shoring up family supplies during the chronic Soviet food shortages, but *dachas* represented a distinctive style of living, bringing contrast to monotonous lives and a sense of belonging to a local community. *Dacha* or orchard neighbors typically enjoyed stronger mutual ties than did neighbors in city apartments, for they were linked by a common sense of place that encompassed residence, land, and shared activities. The Soviet people’s strong attachment to their *dachas* indicates that Western-style year-round suburban living might have proliferated had it been affordable and allowed by the government.



FIG. 3—In the 1960s, tiny houses and gardens began to spring up on land that the government had allocated for collective orchards, as pictured here outside Moscow. (Photograph by Liliya Nigmatullina, August 2010)

POST-SOVIET SUBURBANIZATION TRENDS

Because the Soviet command-and-control economy had no need for a legal framework to guide planning and development, none was in place when the centrally planned economy collapsed—and an urban development code was not adopted until 1998 (Golubchikov 2004). The stage was thus set for the Law on Privatization of Housing Stock, adopted on 4 July 1991, and the Basic Law on Housing Reform, adopted eight months later, to significantly change the economic, social, demographic, and aesthetic character of Russian cities. In just ten years, with two-thirds of the housing stock privatized, the vast majority of dachas and collective orchards shifted into private ownership. In only six years, the number of families possessing parcels of land in collective orchards in the Moscow region had doubled, and the land area occupied by orchards increased from 75,000 acres to 270,000 acres (Ioffe and Nefedova 1998, 1337). After 1992, Muscovites started purchasing houses in all accessible rural areas, even in such remote zones as Tver and Kaluga oblasts, situated 111 and 118 miles away from Moscow, respectively. But, in contrast with most of their counterparts in the West, people who purchased suburban residences usually retained their apartments in Moscow. Moreover, and in contrast with other parts of Russia, most homeowners in the Moscow region gained ownership of their homes but not of the land beneath them.

Among all types of Russian suburban dwellings, “cottages”—whose mass construction commenced in the 1990s—most closely resemble American single-family houses (Norsworthy 2000). These structures hardly resemble the modest rural dwell-

ings that the English term “cottage” typically connotes; rather, they are suburban, often very luxurious, single-family houses. Located mainly beyond the city limits, most of them are permanent residences, although some wealthy owners use them as second homes. Initially, cottages were relatively cheap houses, built on 0.20–0.25-acre plots of land, usually inside existing dacha settlements or on the edges of fields (Ioffe and Nefedova 1998). With the emergence of Russia’s new wealth, however, cottages increased in size and value and started to be grouped in clustered settlements with a common infrastructure. The geography of cottages in the Moscow region reveals the sharp economic segmentation of post-Soviet Russian society. Suburban housing has become a matter of prestige and an important part of the self-identification process for elites (Makhrova 2006). Increasingly, Moscow’s suburban zones are hosting exclusive gated communities that contain the wealthiest Russians (Blinnikov and others 2006).

Although the vast majority of suburban dwellers still live in comparatively affordable high-rise apartments, suburban settlements with single-family cottages and townhouses are proliferating in the Moscow region. In 2006, cottage settlements exceeded 500, whereas the number of high-rise settlements—which collectively house many more people and create much lower per capita carbon footprints—was only 100 (Makhrova 2006). Overall, regional population distribution has become increasingly uneven. Spatial concentration of suburban settlement is highest along highways and roads radiating from the Moscow Ring Road. With its concentration of cottage and townhouse communities, the west has become Moscow’s most extensively suburbanized region. Suburban settlement also is very evident in other directions, particularly to the city’s east and southeast (see Figure 2). But in these areas compact, high-density, high-rise—and more environmentally sustainable—construction still predominates over single-family housing. In recent years, population densities in the west have not increased significantly compared with those in the east. For example, in the western Odintsovskiy region population density is 5.6 persons per acre, whereas in the eastern Balashinsko-Luberckaya region it is 7.1 persons per acre (MSKMO 2009).

Businesses as well as residents are moving out of Moscow, with the increase in wealthy residents playing a major part in enabling the suburbanization of commerce. Two decades ago, many people residing in the Moscow region had to commute to the city for shopping; now they have their own shopping centers, most of them situated close to highways. In 2007 about twenty large shopping centers existed outside the city center, and developers expected to build 1,300 retail establishments in the Moscow region by 2008 (Vasilenko 2007). Although the developers’ plans were not fully realized, construction of business establishments in the Moscow region continues at a relatively rapid pace.

THE ELITE RUBLEVO USPENSKOE HIGHWAY SUBURBAN DEVELOPMENT

Surrounded by secluded developments comprising old dachas of the Soviet elite and new single-family houses and townhomes, Rublevo Uspenskoe Highway is one of the shortest federal highways radiating from the Moscow Circular Motorway

(see Figure 2). Its suburban developments form a residential area 18 miles long and about 4 miles wide (Medvedkov and Medvedkov 2007, 256). Rublevo Uspenskoe Highway, or simply Rublevka, is one of Russia's best-known suburban areas.

The Rublevka case symbolizes the start of consumer-oriented lifestyles and Western-style suburbanization in Russia. The first of the new suburbanites—people with rapidly increasing incomes during the 1990s—fled Moscow to Rublevka. Since then the area has become synonymous with wealth and prestige. Indeed, Rublevka's landscapes capture the rapid transformation of social structure in Russia, from a relatively egalitarian, classless society in Soviet times to a consumer-oriented society with sharp divisions between rich and poor.

Rublevka's distinct status has a long history. In 1664, Tsar Alexey Romanov issued a decree prohibiting industrial enterprises in the upwind area to Moscow's west. As a result, Rublevka remains one of the areas of highest environmental quality in the Moscow region. Exceptional air and water quality, extensive green space, and access to the Moscow River and several reservoirs have all played key roles in securing Rublevka's elite residential status.

Today Rublevo Uspenskoe Highway is the second most developed suburban area in the Moscow region after Novorizhskoe Highway. The number of cottage settlements in Rublevo Uspenskoe Highway reached 100 in 2007 (Makhrova 2008, 3). Although the average number of houses in each settlement is sixty-nine, a few VIP cottage settlements contain fewer than twenty (p. 5). Forty percent of Rublevka's communities are within 6–12 miles of the Moscow Ring Road, and 50 percent are inside a 12–18-mile band.

Rublevka is the most expensive residential area in the Moscow region. Land prices there are not fixed; they depend on such criteria as distance from Moscow and proximity to forest and water amenities. In September 2008 the value of 0.025 acres of land in Barvikha, considered Rublevka's most elite region, reached a record equivalent to U.S.\$420,000, whereas the average value of 0.025 acres in West Moscow Oblast was only U.S.\$30,000 (Nedvizhimost' 2008). At present the maximum value of 0.025 acres of land in Rublevka is approximately U.S.\$240,000 (Gde Etot Dom 2010). The average size of an individual plot of land in Rublevka is 0.75 acres, the average house size, about 7,500 square feet. The minimum value of a cottage is U.S.\$1 million (Figure 4); the maximum is U.S.\$45 million (Cottage 2009). Real estate value depends on aesthetic character, suitability for construction, quality of existing structures, amount of land involved, and prestige of the local community. Currently, the Rublevka real estate market is saturated, with a considerable portion of profits earned locally now coming from construction and operation of elite clubs, restaurants, fitness centers, and other businesses that serve its wealthy residents.

Rublevka is referred to as the "golden community" or "golden ghetto" because of its isolation from other residential areas. Fences and walls, often more than 10 feet high, surround houses protected by elaborate security systems (Figure 5). As land values started to increase in the 1990s, many residents sold their parcels and moved away, so the vast majority of Rublevka's current inhabitants are of the new

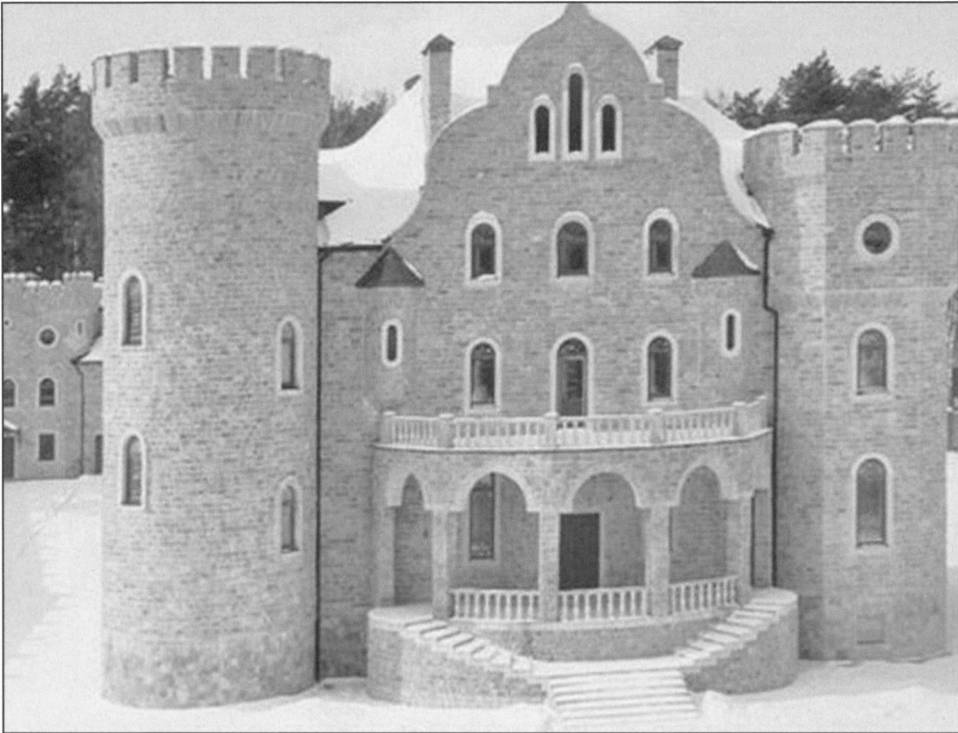


FIG. 4—The current value of this ostentatious Western-style home in Rublevka, Moscow's most expensive residential area, is well over U.S.\$1 million—the minimum value for the suburb's "cottages." (Photograph by Olga Bochenina, winter 2009; reproduced courtesy of the photographer)

elite. Being a place of residence for Russia's best-known businessmen and politicians, including former President Vladimir Putin, Rublevka functions essentially as a highly select, closed club.

The current economic crisis has affected the elite suburban housing market in the Rublevka region and other areas of Moscow Oblast. In just one year, demand for housing ranging from U.S.\$1 million to U.S.\$3 million in value increased 600 percent, whereas demand for houses valued at more than U.S.\$5 million fell by 300 percent. Yet the current economic crisis has not damaged Rublevka's long-established popularity and prestige. Among the numerous suburban highways radiating from the Moscow Circular Motorway, Rublevo Uspenskoe Highway remains the most preferred place of residence for the very wealthy.

MIDDLE-INCOME SUBURBANIZATION

Since the 1990s, migration to Moscow's new suburbs—those consisting principally of comfortable cottages—has been a privilege mainly of high-income elites. Single-family suburban housing remains costly and inaccessible because of high land values, developers' ambitions to gain as much profit as possible by constructing expensive dwellings on already expensive land, and very limited access to consumer



FIG. 5—Concern for security in the “golden ghetto” of Rublevka is great, as evidenced by the fence shown here. (Photograph by Olga Bochenina, spring 2009; reproduced courtesy of the photographer)

credit. An additional barrier to middle-class home ownership, in comparison with the United States, is the inability to claim income-tax deductions for mortgage and real-estate tax payments. As a consequence, middle-income citizens tend to purchase apartments in high-rises within the city limits.

Who constitutes Moscow’s middle class? Traditionally, middle-class status in Russia was associated with income level, university education, professional qualifications, and possession of private property, such as an apartment or a house. Place also matters: In small cities, people with incomes of U.S.\$400–\$900 per month are considered to be middle class, whereas in Moscow the income range is U.S.\$1,170–\$2,330 (Gazeta 2004). Recently, middle-income Muscovites have been provided greater opportunities to move to the suburbs. One of the most important factors driving this trend has been the 2008–2009 economic crisis, which dramatically lowered profits from suburban housing sales. As demand for expensive suburban houses dropped sharply, construction of many elite cottage settlements froze, and some projects halted sales (Solovyeva 2009). In turn, real estate developers focused their attention on “economy-class” suburban housing.

Although some real estate agencies maintain that economy-class housing should cost no more than U.S.\$176,700, which is equal to the price of a one-bedroom apartment in Moscow (NEWSru.com 2009), others suggest a much higher price range of

u.s.\$250,000–\$450,000 (V Poselke 2010). Housing quality is directly related to price. Inferior construction materials and poor insulation are typical in houses costing less than u.s.\$200,000 (V Poselke 2010); more expensive economy-class houses meet relatively higher construction standards and have access to more developed infrastructure, including roads, electricity, water, sewers, and social and educational facilities.

Other important characteristics of middle-income suburban housing are distance from the city limits and dwelling size. Middle-class suburban housing is generally concentrated in areas more than 20 miles from Moscow city. Whereas the average size of an elite suburban house can be equal to or greater than 3,200–4,300 square feet, that of an economy suburban dwelling generally does not exceed 1,180–1,620 square feet (NEWSru.com 2009).

The economic crisis brought significant changes in both the quantity and quality of economy-class suburban settlements. Before the crisis, economy-class suburban settlements within 20–25 miles of Moscow numbered about 70; today the number exceeds 140 (Metrimfo 2009). Cottages have become more affordable, and developers have improved the general quality of middle-class suburbs by providing electric, gas, and water services. Still, construction quality for most economy-class houses is relatively low. Even though the common belief that the end of the economic crisis will bring higher real estate prices has contributed to rising demand for middle-class suburban housing, availability of mortgage credit is very limited (Aris 2010). Despite massive pent-up demand, middle-class housing sales are limited by consumer inability to pay fully in cash or make down payments that can range as high as 40 percent of the purchase price.

Various government programs, none of which is comparable in scale to those put in place in the United States during the postwar era, have encouraged middle-class suburbanization (Aris 2010). Notable among them is the Affordable and Comfortable Housing for Russian Citizens Project. Designed to increase the proportion of suburban single-family housing, it provides funding for new housing as well as favorable loan rates and other subsidies for young families (PNP 2007). These government actions are prompted in part by the rather perplexing belief that a slowdown in high-rise construction will help alleviate traffic congestion. Middle-income, single-family-home suburbanization has indeed accelerated, suggesting that, once they have the means to do so, many people are prepared to leave the center city. As a consequence, within a 30-mile radius of the central city the amount of land available for new housing construction is decreasing rapidly.

FUTURE METROPOLITAN DEVELOPMENT

We conclude by considering Moscow's prospects for sustainable regional development. "Sustainability" is defined in multiple ways, in the service of various interests, but many definitions embrace the "triple bottom line" of environmental quality, equity, and economic prosperity (Hempel 2009). Our Moscow case study focuses on energy, ecology, and transportation, viewed within the critical, crosscutting contexts of equity and civic engagement.

Through most of the Soviet era the central government tightly controlled and concentrated urban development, resulting in a rather equitable distribution of opportunity, resources, and environmental quality across generations (Underhill 1990). By many measures, Moscow's spatial order was a model for sustainable urban development.

Rhetorically, at least, Russia's engagement with sustainable development reached a peak in the transition years of the early to mid-1990s, with enthusiastic participation in the 1992 Rio Conference on Environment and Development, commitment to Agenda 21 local sustainability planning, and President Boris Yeltsin's 1994 and 1996 sustainable development decrees (Oldfield 2001; Henry 2009, 2010). The Yeltsin administration established a fairly robust legal framework for environmental protection, but its implementation has lagged. Post-1990 planning and environmental regulatory frameworks have given much latitude for discretionary decisions, and law enforcement has faltered (OECD 1999). Jonathan Oldfield characterized the mid-1990s and beyond as a period of government "de-ecologisation" (2001).

Many critics of Russia's recent environmental policies are concerned principally with natural resources management, industrial pollution, and national parks and protected areas (Henry 2009). Our focus, by contrast, is on urban sustainability. Recent trends in Moscow's metropolitan development tend to affirm Robert Bruegmann's thinking—that when given a practicable choice, the majority of citizens will choose to live in a suburban locale (2005). Jack Underhill, writing during the perestroika era, put it thus: The old spatial order was being supplanted by a new pattern that reflected "the long-suppressed and diverse aspirations of many peoples each striving to attain their own unique historic identity and 'sense of place'" (1990, 263). Increasing wealth, widening income disparities, and limited government planning have yielded growing housing inequalities, increased traffic congestion, and suburban sprawl. Yet the current economic crisis has dampened down some of these tendencies, greatly limiting Moscow's elite suburbanization while enabling more middle-class suburbanization. The extent to which these trends will be sustained may depend largely on the speed and depth of economic recovery. Energy prices will play a special role, given Russia's extensive reserves of natural gas and oil. Higher energy prices will bolster Russia's economy and likely foster increased middle-class, as well as elite, suburbanization. At the same time, increased fuel costs at the pump may lead to greater reliance on public transportation, as well as to cost advantages for locally produced food. But rather than waiting for energy costs generally to rise, Russia could follow the lead of other European countries and impose a substantial fuel tax. Currently, Russia's gasoline prices are among the lowest in the world outside the Organization of Petroleum Exporting Countries.

In early 2005 Russia ratified the 1997 Kyoto protocol, which requires that industrialized countries collectively reduce greenhouse-gas emissions by 5.2 percent from the 1990 baseline levels. With the loss of the Soviet empire, declining industrial output, economic contraction generally, and shrinking population, Russia is not likely to be burdened with any Kyoto obligation—even though emissions intensity (emissions per

unit of GDP) remains very high (Golub and Petsonk 2004). Russia can sell credits accumulated by cleaning up polluting industries, as well as protecting forests, should “avoided deforestation” play a significant part in future climate-protection agreements. Although the proportion of forest cover in the Moscow region is large, at 40 percent, conversion to housing and commercial uses occurred at a net rate of 14.6 percent between 1991 and 2001 (Boentje and Blinnikov 2007, 210, 212). Moreover, even large metropolitan regions like Moscow Oblast constitute only a small proportion of the Russian land base that has carbon-sink potential—and no assurance exists that metropolitan forests would be privileged in any carbon-offset trading schemes.

Nonetheless, substantial future economic growth—in the context, potentially, of stronger international agreements forged in the wake of the 2009 Copenhagen climate meeting—may have significant implications for metropolitan land use. Recent trends notwithstanding, Russia’s urban land use—the compactness of its cities and its public transport services—has been compared favorably with that in Europe and Japan (Mercier 2004). But this is the Soviet legacy; Moscow has hardly embraced the kind of forward-looking municipal actions—greater energy efficiency, improved public transportation, and reduced emission of greenhouse gases—that the Organisation for Economic Co-operation and Development called for in its environmental performance review more than a decade ago (OECD 1999). France, by contrast, just passed legislation that emphasizes sprawl reduction as a key component in reducing future greenhouse-gas emissions.

Russia—and metropolitan Moscow—are taking a different approach, one that may not do nearly enough to contain American-style suburbanization and exurbanization. Moscow’s 2020 plan promotes center-city land-use intensification, with many historic buildings likely to be replaced by high-rises, and speaks to the need for accommodating increased traffic (Golubchikov 2004), but it does not give much weight to expanding public transportation (Bobilev 2010). Since the early 1990s Moscow planning has been all about roads and hardly about expanding its historically magnificent, but now inadequate, mass-transit system (Gessen 2010). Moscow’s—and Russia’s—approach to air quality and greenhouse-gas emissions is weighted heavily toward technological fixes rather than urban-planning approaches.

Moreover, Moscow’s planning system provides very limited opportunity for meaningful civic engagement (Golubchikov 2004). Yet local resistance to land conversion has been on the increase as has outrage at the ability of wealthy individuals to speed through some of the city’s legendary traffic jams (Gessen 2010). Construction of a highway through a protected forest in the Khimki region, situated in the northwestern reaches of Moscow’s greenbelt and already threatened by proposed new residential developments (Golubchikov and Phelps 2009), has aroused local, national, and international concern. The Khimki case has invoked high-profile opposition from rock stars Yury Shevchuk and Bono, as well as violent attacks on local journalists who have exposed government corruption associated with the project (Chirikova 2010). The central government strongly supports the route, which would bring with it further commercial and residential development. Only in August 2010

did President Dmitry Medvedev yield to public pressure, at least temporarily, by suspending construction.

Several factors may influence Moscow's future development. Conceivably, citizen concerns about development may become powerful enough to force changes in the planning system, moving it toward greater transparency and fairness. But with respect to citizen mobilization in defense of valued lands, as well as engagement in local Agenda 21 planning, Saint Petersburg seems to have a considerable head start on Moscow (Pavlova 2009; Henry 2010). Moreover, given democracy's messiness and unpredictability, increased citizen engagement would not necessarily ensure more ecological protection or more robust sustainability planning.

Future climate commitments may lead toward more vigorous policies to rein in sprawl, promote energy-efficient housing construction, and significantly improve public transportation. As already noted, the global drop in oil prices has hit Russia's economy particularly hard, slowing suburban home sales and helping to curb sprawl. Should Russia act "locally" to impose higher petroleum taxes, this, too, could help control automobile-dependent sprawl.

Unique to Russia is the role of dachas as second homes and widely distributed farmlands. Oleg Golubchikov and Nicholas Phelps refer to this distinctive phenomenon variously as "seasonal suburbanisation," "quasi-suburbanisation," and "exurbanisation" (2009, 4). Dachas protect agricultural lands, provide local food, and serve as a comparatively low per capita land-consumption alternative to American-style seasonal second homes or year-round suburban homes. But if dacha regions continue being converted to sprawling suburbs, as is already happening in some places, then the implications for sustainability are not encouraging. Metropolitan land-use planning that seeks to restrict low-density sprawl—and keep dacha lands productive and well served by public transportation—can be a powerful means for promoting sustainable "dachascapes." Still, dachas and small farms must compete not only with housing sprawl but also with commercial agriculture, including large hog and poultry farms, with their attendant environmental impacts and local undesirability (Ioffe and Nefedova 2001).

Finally, the record heat and fires of 2010 brought renewed attention to both the consequences of a warming climate and the importance of preventive action as well as adaptive action. Indeed, President Medvedev was transformed from naysayer to believer regarding anthropomorphic influences on climate. Just how these recent events will shape public perceptions and government policy over the long term remains to be seen, of course.

Moscow's potential as a sustainable twenty-first-century metropolis is great indeed, precisely because suburban sprawl, though becoming pervasive, is still in its relatively early stages. Should the national and local governments choose to promote sound urban and regional planning, aggressively reduce greenhouse-gas emissions, expand public-transportation infrastructure, and support small-scale local food production, then Moscow may well distinguish itself as a leader in sustainable metropolitan development.

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