



SHIN-PEI TSAY

VICTORIA HERRMANN

# RETHINKING URBAN MOBILITY

SUSTAINABLE POLICIES FOR  
THE CENTURY OF THE CITY



**CARNEGIE**  
ENDOWMENT FOR  
INTERNATIONAL PEACE

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She has been interviewed and quoted by the *New York Times*, the *Wall Street Journal*, and NPR's *Marketplace* as well as other local and industry publications, and she is a sought-after speaker. She was a finalist in the international design competition "Reinventing Grand Army Plaza," for which her work is published in the monograph. Tsay is a LEED-accredited professional and also reviews books for the Urban Design Forum's quarterly journal, *Urban Design Review*.

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# PREFACE

Rapid urbanization presents national leaders and policymakers with new challenges on many fronts. This report on urban transport policy is a response to these shared issues, which were identified through interviews and consultations with national policymakers concerned with providing mobility infrastructures for their booming urban populations without compromising the economy or environment. The investigation was further enriched by a two-day symposium in October 2012 on national policy for urban transport. National and local policymakers as well as transport experts convened at the Carnegie Endowment for International Peace to discuss common challenges and potential solutions. The findings in this report build on the policymakers' firsthand experiences and insights and detail tested strategies for addressing common issues.







# SUMMARY

**EACH WEEK, MORE THAN 1 MILLION PEOPLE MOVE** from rural areas to cities around the world, placing huge demands on existing infrastructure—and especially on existing transport systems. Booming cities need contemporary mobility systems capable of transporting increasing numbers of people while doing the least possible harm to the natural environment. Multiple actors, including national and local governments, must work together to create environmentally and financially sustainable urban transport systems.

## THE MAKINGS OF A MOBILITY CRISIS IN THE NEW URBAN AGE

- Cities consume 60–70 percent of the world’s energy supply and emit 70–80 percent of total global carbon emissions.
- More than 50 percent of the world’s population lives in cities. Urban transport defines the access of these city dwellers to wealth and well-being.
- Countries with the highest rates of urbanization also have high rates of personal motorization, which in turn leads to more carbon emissions. This will continue to contribute to catastrophic climate change if cities do not develop more sustainable transportation options.

- Some countries have difficulty executing their national urban transport policies due to fragmented local authority, weak financial regulation, poor project decisions, and inadequate performance-evaluation criteria.

## **HOW GOVERNMENTS CAN DEVELOP SUSTAINABLE TRANSPORT SOLUTIONS**

**Set and enforce an expansive, long-term vision for sustainable urban mobility at the national level.** The national government should coordinate authority, organize power, and promote cooperation across the various tiers of government to achieve this vision.

**Augment local governments' capacity to implement projects that further the overarching sustainable transport vision.** At the national level, local mobility plans should be mandated to align with national transport goals, affirm local ownership of projects, and implement practices to improve the knowledge and motivation of staff on the ground.

**Establish clear funding and financing channels for transport systems.** Governments should coordinate regional, local, and private contributions as well as federal financial-assistance programs.

**Improve project development and selection.** The government should set concrete national standards around data collection and provide localities with methodology to evaluate project outcomes according to various performance indicators, including equity, safety, and environmental impacts.

**Generate comprehensive cost-benefit analyses at the local level for proposed projects.** These analyses should address social, environmental, and economic issues relevant to the local context and include specific, confirmed funding sources for all projects and initiatives.

# CITIES, PEOPLE, CARS, AND CLIMATE

**IN 2010, THE WORLD EXPERIENCED A GREAT TRANSITION**—more than 50 percent of people lived in cities for the first time in human history. Each week, 1 million rural residents, or two times the population of The Hague, move to cities around the globe. Over the next four decades, billions of people will continue to migrate to urban areas until more than 75 percent of the global population lives in cities.

An enormous amount of infrastructure is needed to accommodate this growth in urban areas—estimated to cost over \$350 trillion in new investment when usage of that infrastructure is taken into account.<sup>1</sup> The urban population is growing so quickly that housing, transportation, energy, and water systems need to be built simultaneously, ideally in an integrated way, to provide the greatest public access while doing the least harm to the natural environment for as long as possible. Of that investment, \$33 trillion is required to move people and goods, and an additional \$169 trillion is needed for private and commercial real estate development that will support the growing population.<sup>2</sup>

**Each week, 1 million rural residents move to cities around the globe.**

This alone highlights the compelling need to identify new sources and types of innovative financing, from both domestic and international financial institutions, to underwrite such

a historic migration. More importantly, it calls for policies to guide development so as to promote sustainability and equity.

The resource needs and resulting economic output of cities are tremendous. Cities already account for 66 percent of total world energy use—a share that may increase to 80 percent within the next thirty years. In the United States, cities represent over 70 percent of direct energy use and generate over 75 percent of gross domestic product (GDP). Productivity, and in turn energy demand, is concentrated in urban areas worldwide. Cities generate 80 percent of today's global GDP.<sup>3</sup> And because economic activity is closely linked to energy consumption and thus carbon output, cities represent 70 to 80 percent of the world's greenhouse gas emissions. To take advantage of their economic potential and minimize their environmental harm globally, cities must be managed intelligently.

Historically, cities were created for mutual defense as well as for market exchange. Transportation was by foot or oxcart, so trade required the dense clustering of populations. However, as regional and national states came into existence and took over the job of civil defense, cities grew organically, though they were still limited in scale.

Then came the Industrial Revolution, and soon transportation included canals, steamboats, rail, transit, and, finally, private motorized transport. National policy in urban development, which became more common in this era of industrialization, took the form of managing land use and waste and building some infrastructure to protect the public

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## **Cities represent 70 to 80 percent of the world's greenhouse gas emissions.**

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from potentially toxic industrial activities. It also worked to secure people's basic needs, such as access to clean water.

As fossil fuel engines took over the job of moving people and goods, cities spread out across the

landscape. Sprawl—a type of growth first observed in the United States that uses the private car as the primary determinant of wholesale land use and transportation needs—is a direct result of national policies that subsidize single-family-home housing, manage land poorly, and prioritize highways over other types of transportation. The practices in planning that led to sprawl have become standard in the United States, and aspects of such policy, such as designing highways to solve urban congestion problems instead of planning for alternative mobility systems, have become the norm worldwide.

Sprawl has created long-standing problems in terms of human health, economic development, the natural environment, and climate change on a national basis. The social and environmental costs, such as public health expenditures on obesity, respiratory illness, and other ailments associated with auto-centric planning, have exceeded the available resources

of individual cities. These new challenges have transformed urban growth and development from a concern of cities alone to an issue of vital importance to national governments.

National governments face a number of common challenges in the development of their primary centers of economic growth and their primary vehicles for promoting their citizens' common aspirations for a better quality of life—their cities. Development that is sustainable in that it safeguards long-term economic, environmental, and social priorities is paramount to realizing these aspirations given the pressures that arise from rapid urban growth. Burgeoning cities need sustainable mobility systems now, and the opportunity to build infrastructure should not be at odds with the opportunity to guarantee continued prosperity.

There are four primary areas of concern for sustainable urban transport policy: strengthening national leadership and reinforcing sustainable outcomes, empowering localities, using funding and financing structures to guide local action, and maximizing the project-development process to ensure successful execution of urban-transport efforts.

These core concerns emerged from discussions with policymakers in large countries confronting the task of constructing sustainable transport for the booming urban populations that have resulted from rapid industrialization and economic growth.

But nation-city partnerships have historically struggled to achieve common goals. There is no single set of national urban transport policies that, if rigorously studied, broadly adopted, and effectively applied, guarantees a successful result. It is possible, however, to examine lessons learned from such nation-city partnerships around the world. Taken in sum, stories from more mature economies dominate because they have the most attempts, mistakes, and lessons learned (though that is not to suggest that solutions cannot be found elsewhere).

**Sprawl is a direct result of national policies that subsidize single-family-home housing, manage land poorly, and prioritize highways over other types of transportation.**

## **MORE PEOPLE, MORE CARS**

How well a country manages its cities will determine its global competitiveness, especially for cities that are experiencing urban population growth from industrialization. Pressure from today's growth raises the stakes. Over the last few decades, increasing numbers of rural workers have migrated en masse to urban agglomerations to seek economic

opportunities and basic services. Greater Mumbai alone almost doubled in population in ten years. In 2001, the population was only 12,877,470. In 2011, it swelled to 21,753,486,<sup>4</sup> an unanticipated boom.

Urban areas across the globe have expanded in relation to overall population growth. In China, where total GDP is among the highest in the world, the urban population's annual growth rate is 2.3 percent, more than four times the national annual growth rate of the total population. In India, the annual growth rate of the urban population is double that

of the national growth rate of the total population. The urban population boom is highest in countries like China and India,<sup>5</sup> where existing cities have the fastest-growing populations and where there will be the greatest number of new cities with more than 750,000

## How well a country manages its cities will determine its global competitiveness.

inhabitants by 2050.<sup>6</sup> For Brazil, Mexico, and the United States, the urban population is already a clear majority of the population. The Brazilian population is 87 percent urban. In Mexico, this figure is 78 percent, and in the United States it is 82 percent.

Though urban workers contribute significantly to their country's economic success, swiftly growing urban populations can overwhelm existing infrastructure and services, especially transport systems. To get to work and school, and to access other services, urban dwellers need to be able to easily traverse the city and get wherever they need to go.

Moreover, global energy demand is projected to grow an average of 2.2 percent per year until 2020, and rapidly growing developing countries account for 85 percent of that growth. China alone represents one-third of total energy-demand growth. This stems mainly from high demand for cars and appliances among the newly emerging middle class (see table 1).<sup>7</sup>

Passenger cars and light-duty trucks have been the greatest sources of transport-related carbon in the world for the last two decades. Escalating demand for private cars in particular contributes to increasing amounts of transport-related carbon.

A complex regime of culture, business interests, and policies reinforces the preference for private cars and, distressingly, it is common for urban transport policy worldwide to be hindered by policies that work at cross-purposes. Rapid motorization, noted by the rise of car ownership and the increase in distances traveled by car, especially in developing countries, can result from rising levels of income, national economic-growth strategies rooted in auto manufacturing,<sup>8</sup> the entrenched social perception of the private car as a status symbol, or the failure of cities to provide viable alternatives to personal motorization.<sup>9</sup>

**TABLE 1 | URBANIZATION AND ECONOMIC GROWTH**

	<b>GLOBAL</b>	<b>BRAZIL</b>	<b>CHINA</b>	<b>INDIA</b>	<b>MEXICO</b>	<b>UNITED STATES</b>
POPULATION	7,095,217,980	201,009,622	1,349,585,838	1,220,800,359	116,220,947	316,668,567
ANNUAL GROWTH RATE OF TOTAL POPULATION	1.10%	0.83%	0.46%	1.28%	1.07%	0.90%
URBAN POPULATION	50%	87%	47%	30%	78%	82%
CHANGE IN ANNUAL LEVEL OF URBANIZATION (2010–2015)	1.85%	1.10%	2.30%	2.40%	1.20%	1.20%
GDP PER CAPITA (IN U.S. DOLLARS)	12,400	12,000	9,100	3,900	15,300	49,800
GDP GROWTH RATE PER CAPITA (ANNUAL PERCENT IN 2011)	—	1.8	8.8	4.9	2.7	1

SOURCES: World Bank, “GDP Per Capita Growth (annual %),” <http://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG>, and Central Intelligence Agency, “World Factbook,” [www.cia.gov/library/publications/the-world-factbook/index.html](http://www.cia.gov/library/publications/the-world-factbook/index.html).

As each country’s economy develops, increases in per capita income make personal motorization possible for more urban households.

Vehicles are traveling greater distances in the developing world, and the number of miles they cover threatens to grow exponentially as car ownership increases.<sup>10</sup> It seems as if the rest of the world is trying to catch up to the United States, which possesses the highest car-ownership rates in the world at 802 vehicles per 1,000 people.<sup>11</sup>

Based on the experience of the United States, all this encourages national investment in infrastructure that supports car use, such as fuel-supply systems (gas stations) and car-priority street designs like wider streets, narrower sidewalks, and more on-street parking and parking lots. And when cities do not provide effective public transit or safe spaces to walk or bike, urban dwellers increasingly turn to cars, the most energy-consuming form of transportation.



This pattern is now appearing in China, Brazil, Mexico, and other large countries that have available land and new development opportunities. In Brazil, the Ministry of Finance heavily supports auto manufacturing and road infrastructure in order to create jobs and spur economic growth. A similar policy exists in China, yet both countries also

have national policies espousing sustainable transport. Countries that have not yet reached this level of car ownership have an opportunity to reduce the demand for cars by providing other types of transportation infrastructure.

Developing countries in which the automobile becomes the preferred mode of transport risk adopting the American pattern of carbon waste. Until recently, the United

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**When cities do not provide effective public transit or safe spaces to walk or bike, urban dwellers increasingly turn to cars, the most energy-consuming form of transportation.**

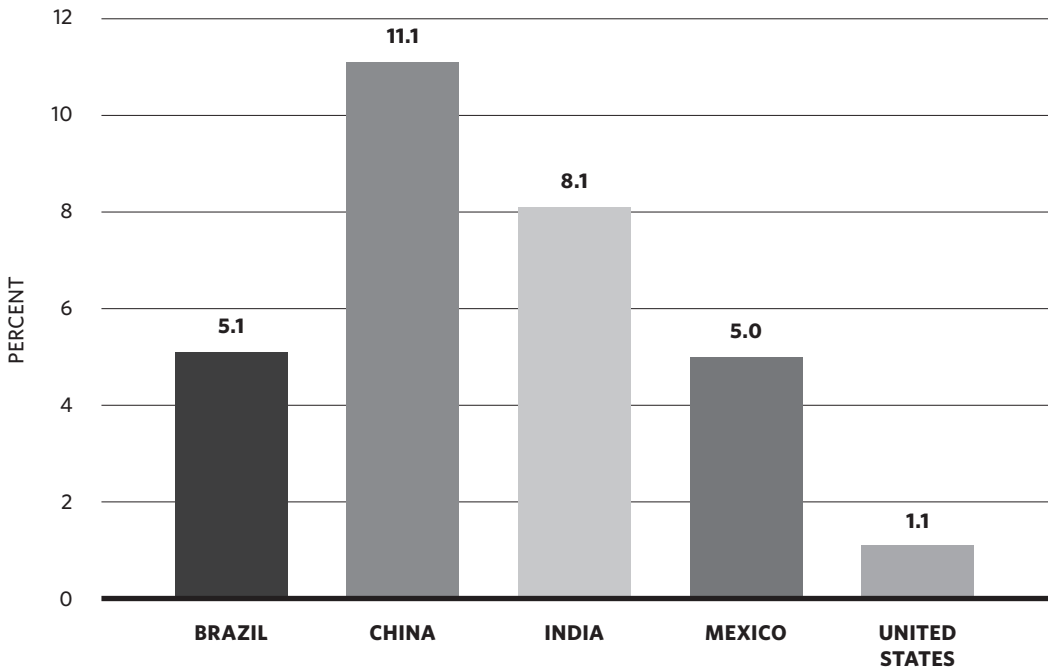
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States was the largest emitter of carbon per capita, and 31 percent of carbon emissions is directly correlated to the nation's auto-dependent transport system.<sup>12</sup> It continues to be the greatest emitter of on-road, transportation-related carbon.<sup>13</sup> To avoid catastrophic climate change, cities worldwide must pursue a different and more sustainable path of transportation development.

Global car ownership is expected to triple by 2050, and transport-related carbon dioxide (CO<sub>2</sub>) emissions are projected to increase by 57 percent worldwide between 2005 and 2030. The transportation sector in Asia and Latin America is the fastest growing in terms of emissions and will contribute the largest share of the global increase in transport-related CO<sub>2</sub> emissions.<sup>14</sup>

The transition to more sustainable transport systems needs to happen now, before infrastructure investment locks in automobile dependence. Rapidly growing urban populations with higher levels of GDP per capita correlate to higher rates of car-ownership growth (see figure 1). The fastest-urbanizing countries—China and India—lead in per capita GDP growth rates, at 8.8 percent per capita GDP in China and 4.9 percent per capita GDP in India. They also have the highest growth rates for auto ownership.<sup>15</sup> Based on 2005 figures, by 2030 China and India will hold 390 million and 156 million of the world's projected fleet of two billion cars, respectively, as compared to the 78 million and 20.8 million they held in 2010.<sup>16</sup>

**FIGURE 1 | ANNUAL CAR OWNERSHIP RATE OF GROWTH, 2002–2030**



SOURCE: Joyce Dargay, Dermot Gately, and Martin Sommer, “Vehicle Ownership and Income Growth, Worldwide, 1960–2012,” *Energy Journal* 28, no. 4 (2007): 163–90.

## **A SUSTAINABLE APPROACH**

Given the far-reaching effects that transportation has on energy consumption and carbon emissions, sustainable transport systems will be a key building block for future thriving cities. Sustainability is a general term that encompasses economic, environmental, and social factors. A sustainable approach therefore includes social benefits, such as reducing fatalities related to traffic, as well as long-term economic development goals. According to the Institute for Transportation and Development Policy, a nongovernmental organization (NGO) focused on environmentally sustainable transport, sustainable urban transport “provides efficient access to goods, services, job markets, and social connections while limiting short- and long-term adverse consequences for environmental, social, and economic services and systems.”<sup>17</sup>

This approach differs from business-as-usual transportation planning that tends to focus on road-capacity expansion and maximizing the distance and speed of vehicle movement. To manage growing urban populations and maintain economic growth, urban transport systems need to be sustainable and offer multiple ways of moving about a city, not just facilitate the flow of traffic.

A three-part strategy can help ensure a sustainable approach to urban mobility. The first priority of this approach entails avoiding carbon-intensive mobility systems, such

as private-vehicle use. Shifting to multimodal systems, such as public transport, walking, and biking, constitutes the second priority, while the third involves improving existing infrastructure, vehicle technology, and fuels.

This strategic approach enhances performance by targeting both the supply of and demand for trans-

port. It allows cities to build on existing infrastructure and offers them more mobility options when selecting specific technology in which to invest.

Mobility systems do not just ensure access to opportunities and basic services for urban citizens; they also have the potential to meet long-term national and global concerns of economic growth, environmental protection, and prosperity. Any such framework, however, requires strong, cooperative governance from the locality and the national government.

The urgent need to integrate sustainability concerns into the management of cities creates room for a higher level of government to instigate the shift. In fact, fulfilling goals across all localities necessitates strong national leadership and clear guidance toward a more sustainable, inclusive, and prosperous urban future. Such leadership can create a clear framework for local governance and a clear charter for nation-municipality (and state-municipality) relationships.

## **INTEGRATING SUSTAINABILITY INTO TRANSPORTATION**

While urban areas with relatively more wealth can lead the pack, as a whole, cities cannot construct sustainable transport systems alone. Creating these systems requires the simultaneous cooperation, construction, and funds of multiple actors, including the national government. Such an endeavor demands significant resources and coordination. For

**To avoid catastrophic climate change, cities worldwide must pursue a different and more sustainable path of transportation development.**

instance, municipal budgets may lack adequate funds for multiyear infrastructure investments and need assistance from national budget allocations or other outside sources. A position of authority higher than the city level may also be needed to compel cooperation between local agencies or help maintain a focus on broader economic, environmental, and social goals. Higher-level involvement can also prevent projects in specific situations from being driven by purely parochial interests that could potentially keep them from achieving the goal of sustainability.

Fulfilling sustainability outcomes in cities demands national as much as city leadership. National-level leadership is required to grow an economy that creates and maintains value and equitable growth for all members of society. National policy can protect the environment by encouraging economic growth with social benefits through intelligent management and protection of natural resources, both of which could also reduce conflict over resources between regions or localities. Further, safeguarding the well-being of both current and future generations requires national policy to set long-term goals and redistribute resources that would support or supplement local efforts to provide equal opportunity and ensure a generally good quality of life for populations.

Without national policy to level the playing field, localities that pursue progressive sustainability policies could be negatively impacted by less sustainable policies in other localities,<sup>18</sup> resulting in a net negative impact on the entire country. National-level governance can prevent those localities avoiding regulation from negatively affecting the rest of the country. Beyond preventing the flow of negative impacts from one locality to another, national policy can further encourage or reinforce positive local efforts.

National policy can organize the hierarchy of power, set long-term objectives, and then supplement or support local efforts to ensure that sustainable transport goals are met. It augments the strength of cities because it can redistribute resources and supplement funding so all regions are supported appropriately to facilitate the best and most transparent system to implement sustainable transport.

Newly minted national-level urban transport policies attest to the recognition by federal governments of the need for sustainable urban transport, but success varies widely across nations and between regions. Though national policy in each country takes different forms, Brazil, China, India, and Mexico are all grappling with the challenges of implementation at various stages of development (see table 2).

Countries with long-standing national transportation policies, like the United States, would benefit from updated policy based on shifting demographics and the growth of on-road transport carbon, especially in the short term.<sup>19</sup> Even the European Union (EU), which contains some of the most mature multimodal transportation systems, needs to

**TABLE 2 | NATIONAL LEGISLATION**

	<b>NATIONAL LEGISLATION</b>	<b>NATIONAL LEGISLATION INTENT</b>
<b>BRAZIL</b>	National Policy of Urban Mobility (drafted 2008, passed 2012) and Growth Acceleration Program (2012)	First piece of legislation that includes motorized and nonmotorized mobility and seeks to advance integrated perspectives on urban mobility; integrate urban transport and transit, land-use zoning, and planning; and introduce concept of sustainable cities.
<b>CHINA</b>	11th and 12th Five Year Plans, transportation sections (2001 and 2006); 2005 State Council Opinion #46; Fluid Traffic Project	Prioritize public transit and reduce congestion by requiring municipalities to take public transit measures. Fluid traffic project required 36 cities to reduce congestion.
<b>INDIA</b>	National Urban Transport Policy under Jawaharlal Nehru National Urban Renewal Mission (JnNURM, 2006)	To provide quick, affordable, comfortable, reliable, and sustainable access for the growing number of city residents to jobs, education, recreation, and other needs.
<b>MEXICO</b>	Public Transportation Federal Support Program (PROTRAM) and Urban Transportation Transformation Project (PTTU) under National Development Plan	PROTRAM focuses on modernization projects for urban and suburban public transport, mainly for cities with over 500,000 inhabitants. PTTU focuses on encouraging the use of clean technologies in urban transport.
<b>UNITED STATES</b>	Intermodal Surface Transportation Efficiency Act (ISTEA, 1991), which was amended as the Safe Accountable Flexible Efficient Transportation Equity Act (SAFETEA-LU, 2005) and replaced by Moving Ahead for Progress in the Twenty-First Century (MAP-21, 2012); Clean Air Act Amendments of 1990	“Develop National Intermodal Transportation system that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner.”

SOURCES: John Pucher, Zhong-Ren Peng, Neha Mittal, Yi Zhu, and Nisha Korattysaroopa, “Urban Transport Trends and Policies in China and India: Impacts of Rapid Economic Growth” *Transport Review* 27, no. 4 (July 2007): 379–410; “Look on Brazil,” *Financial Times*, July 2012; Ministry of Cities, Brazil website, [www.cidades.gov.br/index.php/progsemo/256acoesprogramamobub](http://www.cidades.gov.br/index.php/progsemo/256acoesprogramamobub); Renato Boareto, “Mobilidade Urbana para a construção de cidades sustentáveis,” *Contribuição para os Programas de Governos Municipais*, 2008; Jose Barat, “O Financiamento de InfraEstrutura Urbana: os Impasses, as Perspectivas Institucionais, as Perspectivas Financieras,” Institute for Applied Economic Research (IPEA)/Foundation of Managed Development (FUNDAP); The Energy Resources Institute (TERI), “Review of Comprehensive Mobility Plans,” 2011.

rethink its regional cohesion goals and its supranational and national policy issues as they relate to the development of urban areas.

Across the world, the transition from a rural to a majority-urban world requires cooperation in the management of urban growth that now exceeds anything yet experienced. Cities new and old have newfound pressures from billions of urban dwellers seeking to make a brighter future. Urban transport will define their access to wealth and well-being.

# LEADING FOR SUSTAINABLE URBAN TRANSPORT

**STRONG NATIONAL-LEVEL GOVERNANCE IS NECESSARY** to sustainably manage rapidly growing urban populations and global economic and environmental challenges. It is particularly necessary to prevent the construction of infrastructure that will become obsolete or incompatible with long-term economic and environmental concerns. To avoid locking in infrastructure in this way, a new policy approach to and a nation-city partnership for mobility systems are needed.

Governance structures inherently define authority. With multiple levels of governance, conflicts over power frequently arise. Nations with federal, state, and local tiers of government—such as Brazil, India, Mexico, and the United States—typically emphasize the state’s power over the city’s. In highly centralized countries, like China, complications arise when national structural policies hinder local growth (see table 3).

**Strong national-level governance is necessary to sustainably manage rapidly growing urban populations and global economic and environmental challenges.**

**TABLE 3 | GOVERNANCE STRUCTURES OF LARGE COUNTRIES WITH URBAN PRESSURES**

	<b>BRAZIL</b>	<b>CHINA</b>	<b>INDIA</b>	<b>MEXICO</b>	<b>UNITED STATES</b>
<b>GOVERNANCE STRUCTURE</b>	Federal Republic	Communist State	Common Law	Federal Republic	Federal Republic
<b>NUMBER OF STATES/ PROVINCES</b>	26	23	28	31	50
<b>NUMBER OF CITIES</b>	5,565 (2010); Brazil also has federated municipalities, which are counted separately from cities and have significant power	288 (2010)	~456	~217 with over 100,000 inhabitants (2001)	381 Metropolitan Statistical Areas having an urban core of at least a 50,000 population count

SOURCES: Institute of Geography and Statistics, Brazil, "Census 2010," [www.ibge.com.br/home/estatistica/populacao/censo2010/tabelas\\_pdf/Brasil\\_tab\\_1\\_1.pdf](http://www.ibge.com.br/home/estatistica/populacao/censo2010/tabelas_pdf/Brasil_tab_1_1.pdf); Chinese Ministry of Public Security, "Number of Cities at Prefecture Level and Above, 2011," [www.stats.gov.cn/tjsj/ndsj/2012/html/K1101e.htm](http://www.stats.gov.cn/tjsj/ndsj/2012/html/K1101e.htm); India Ministry of Urban Development, "Urban Agglomerations (UA)/Towns: Census of India 2011," <http://moud.gov.in/urbanmorphology>; National Institute of Statistics and Geography, Mexico, "Census 2010," <http://www3.inegi.org.mx/sistemas/TabuladosBasicos/Default.aspx?c=27302&s=est>; United States Census Bureau, Population Division, "Table 1. Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2010 to July 1, 2012 (CBSA-EST2012-01)," March 2013, [www.census.gov/popest/data/metro/totals/2012/tables/CBSA-EST2012-01.csv](http://www.census.gov/popest/data/metro/totals/2012/tables/CBSA-EST2012-01.csv).

There are hundreds of cities in most countries, plus a significant number of state or provincial governments, all of which have incongruent, locally contextualized desires. As these numbers continue to grow, the need for a clear organization of power and coordination becomes stronger.

Coordination between levels of government can be tricky, especially for sustainability. Each tier of government has different outlooks on its priorities, made more arduous by the limitations on its ability to influence or define different areas of taxation, regulation, and development priorities. By clearly organizing power across these various levels, national governments could reduce friction at the local level to support local projects, especially on sustainable urban transport policies across multiple tiers, coordinate local desires, and balance long-term and short-term goals across the levels of government.

The most significant role national governments can play is to set the vision for sustainable transportation from which the roles, responsibilities, outcomes, and priorities can flow. But more is needed. Setting up institutions and establishing governmental authority at the level that is best suited to provide a coordinated perspective across the entire urban

transport system is critical to any national vision's sustainability and, in turn, to the sustainability of the mobility network in its entirety.

While national policy sets the broad context in which urban transport systems should be executed, national leadership can empower localities to translate and apply national regulations. Policy initiatives taken by the national government should work to empower local or regional authorities while providing clear conditions on the expected outcomes. National policy must work to organize roles and levels of authority, support regional planning, and engage multiple stakeholders in achieving a vision for sustainable urban transport from the outset. Cooperation at the national, regional, and local levels is critical to enforcing the foundation of national urban mobility policy—the vision.

## **SET A NATIONAL VISION FOR SUSTAINABLE MOBILITY**

A few of the world's largest countries—Brazil, India, and Mexico—have relatively new urban mobility laws that incorporate the three pillars of sustainability, but all have had difficulty executing and enforcing those laws. Weak local action and the slow deployment of funding plague implementation, but pressure to take action is mounting. Brazil must prepare for an inundation of visitors to the upcoming World Cup and subsequent Olympic Games. India's urban migration outpaces the government's ability to provide enough basic services. Mexico's cities are burdened with air pollution as well as the basic need to provide adequate services for its millions of urban inhabitants (see table 4).

“Lack of institutional capacity” is the most frequently cited culprit for the shortcomings of national governments' ability to facilitate strong local action. Institutional capacity refers to weak processes, structures, and policies that lead to ineffective management or insufficient direction to create sustainable urban transport systems. To address this and build a strong institutional framework, effective management processes and structures must flow from a national vision for sustainable urban transport.

A vision can include intended social, economic, and environmental outcomes that recognize a transportation system's impact on land use, health, environment, equity, social cohesion, and economic opportunities and returns. It can reset conventional, unsustainable practices in mobility, such as building roads without thought to destinations, and push transport policy in a new direction. And a vision provides the “common, universal goals or outcomes.”<sup>20</sup>

A strong vision that is applied to urban contexts, as demonstrated by India's recently developed National Urban Transport Policy (part of the Jawaharlal Nehru National



**TABLE 4 | URBAN MOBILITY LAWS IN REPRESENTATIVE LARGE COUNTRIES**

	BRAZIL	
LEGISLATION	Growth Acceleration Program (PAC) I and II	National Policy of Urban Mobility (multiple programs under this umbrella)
ADMINISTRATOR	Brazilian Development Bank (BNDES)	Fiscal responsibility by Caixa Econômica Federal and policy responsibility by National Secretariat for Transport and Urban Mobility (SeMob) under Ministry of Cities
YEAR OF PASSAGE	2007	2012 (drafted 2008)
ALLOCATION PERIOD	PAC I (2007–2010); PAC II (2011–2014)	2012–2017
ALLOCATION AMOUNT (in U.S. Dollars)	PAC I: \$306 billion; PAC II: \$582 billion	Federal General Revenues
LOCAL MATCH (in U.S. Dollars)	Municipalities up to 50,000 inhabitants: 3%; priority municipalities: 5%; remaining municipalities: 10%	Nearly 50%
OTHER SOURCES FOR URBAN TRANSPORT (in U.S. Dollars)	Climate Fund under BNDES: \$49.4 million for urban transport; National Monetary Council line of credit: \$6.2 billion to finance concessions by state and municipal governments in PAC II	—

SOURCES: John Pucher, Zhong-Ren Peng, Neha Mittal, Yi Zhu, and Nisha Korattysaroopa, “Urban Transport Trends and Policies in China and India: Impacts of Rapid Economic Growth,” *Transport Review* 27, no. 4 (July 2007): 379–410. “Look on Brazil,” *Financial Times*, July 2012; Ministry of Cities, Brazil website, [www.cidades.gov.br/index.php/progsemo/256acoesprogramamobub](http://www.cidades.gov.br/index.php/progsemo/256acoesprogramamobub); Renato Boareto, “Mobilidade Urbana para a construção de cidades sustentáveis,” *Contribuição para os Programas de Governos*

Urban Renewal Mission), is intended to guide investment in an integrated fashion. Specifically geared toward achieving sustainable outcomes, the National Urban Transport Policy outlines a fundamental shift that clearly prioritizes moving people over moving vehicles. This policy articulates the change in priority by stating the centrality of “incorporating urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement; encouraging integrated land use and transport planning; ... bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus; ... enabling the establishment of quality focused multi-modal public transport systems; ... [and] reducing pollution levels through changes in traveling practices.”<sup>21</sup> The language employed sets the broad parameters by which all of India’s urban-transport actors can respond appropriately.

	INDIA	MEXICO	
	National Urban Transport Policy (NUTP) under Jawaharlal Nehru National Urban Renewal Mission (JnNURM)	Public Transportation Federal Support Program (PROTRAM)	Urban Transportation Transformation Project (PTTU)
	Ministry of Urban Development	National Development Bank (BANOBRAS)	National Development Bank (BANOBRAS) manages National Infrastructure Fund (FONADIN)
	JnNURM: 2005; NUTP: 2007	2009	2010
	JnNURM: 2005–2011	2010–2017	2012–2014
	\$20 billion (JnNURM total)	Total fund amount including all sources, international and domestic: \$2.694 billion	\$104 billion
	—	FONADIN: \$767.5 million; local government: \$737.5 million (almost 50%)	Typically varies from 20% to 50%
	—	International Bank for Reconstruction and Development: \$150 million; Clean Technology Fund (international): \$200 million; domestic private sector: \$839 million (included in total fund amount above)	—

Municipais, 2008; Jose Barat, “O Financiamento de InfraEstrutura Urbana: os Impasses, as Perspectivas Institucionais, as Perspectivas Financieras,” Institute for Applied Economic Research (IPEA)/Foundation of Managed Development (FUNDAP); The Energy Resources Institute (TERI), “Review of Comprehensive Mobility Plans,” 2011.

## MAXIMIZE SUSTAINABILITY BY ADVANCING REGIONAL COORDINATION

Of course, simply having a vision is not enough. The processes and structures at the national level must be coordinated and compatible with a sustainable vision. At a minimum, clear protocols guiding coordination between social, economic, and environmental ministries at the national level must exist. For instance, in Europe, transport issues are often addressed holistically with environment, energy, or other infrastructure issues under one ministry’s roof, and there is additional coordination with national land-use and natural-resources ministries. To overcome the challenge of multilevel, multi-agency coordination, many countries simply need to add capacity to institutions at the national level to carry out the vision.

Moreover, though India has established ideal language for an effective policy, the highly fragmented nature of local urban management causes many of its urban mobility projects to languish. Thus, national policy must also organize and strengthen institutional authority at regional and local levels to further sustainability goals in urban transport.

A national-level program that has recognized the effectiveness of regional and local authorities and successfully created more accountability is the United States' Partnership for Sustainable Communities, a collaboration between the federal agencies for transportation, environmental protection, and affordable housing. This program allows communities to apply for federal grants without state approval so long as they provide a cost-benefit analysis. A separate Transportation Investment Generating Economic Recovery (TIGER) program, funded by the American Recovery and Reinvestment Act of 2009, opened federal funding to organizations other than state departments of transportation as long as the project provided a cost-benefit analysis that included social, environmental, and economic issues. Because municipal or regional authorities are most familiar with what is appropriate for local conditions, those cost-benefit analyses completed by a coalition of local stakeholders were more relevant to the project than those analyses outsourced to a professional transportation-engineering firm.<sup>22</sup>

The British Parliament recognized the importance of institutionalizing input from a variety of sectors and levels of government and legislated a multi-sector, multi-stakeholder authority to manage London and its region. The Greater London Authority (GLA) coordinates counsel from different sectors across the 32 boroughs of London and the City of London Corporation to guarantee inclusion of different departments and long-term goals in decisionmaking. Through its multidisciplinary foundation, the GLA ensures that programs like London's cycling infrastructure and Source London, the mayor's strategic plan to increase the network of publicly accessible charge points for electric vehicles, are coordinated with land use so that charging stations can be sited where they will be of most use. Without the GLA, such coordination would most likely fall by the wayside as no single local authority would be responsible for coordinating the triad of land use, energy distribution, and environmental protection.

A different model, the Consorcio Regional de Transportes de Madrid (CRT), convenes 20 elected members from local, state, and national governments into a regional authority to serve as the primary interface between supranational governance, the European Commission, the state of Spain, and municipal governments sharing jurisdictional boundaries. The meaningful participation of many different levels of government demonstrated cooperation and provided a forum through which potential conflicts could be negotiated, a factor that enabled the CRT to persuade the European Commission to mandate and partially fund its sustainable urban transport plan. With its regional approach, CRT was able to launch its innovative Madrid Interchange Plan, intended to actualize transfers between

public transit systems across multiple metropolitan regions. Regional cooperation not only manifested itself in the form of transit stations for smooth transfers but also facilitated the provision of integrated transit data to enable seamless travel throughout the area.<sup>23</sup>

In addition, a strong local authority backed by a coalition assembly can help to secure support and engagement across different city departments. It is important to note that the institution and its authority, rather than the political capital of the individual at its helm, must be strong due to the typically short tenures of local politicians. In the London system, for instance, responsibility for all aspects of London's transportation system rests with the mayor's office, making program execution and continual planning possible.<sup>24</sup>

The authority of regional transit bodies can be augmented significantly to produce economically sustainable outcomes if it includes revenue generation from adjacent land development. The Mass Transit Railway Corporation Limited of Hong Kong successfully manages a complex transit system that is profitable in both capital construction and operations. But what contributes most to its success as an organization is its power to develop and manage real estate, a right granted to the regional authority by national legislation in 1975 because of an evaluation that discovered that the Mass Transit Railway authority had been unable to meet public demand. This additional authority allows the transit organization to streamline its operations. Most significantly, the regional authority's effectiveness is shored up by the revenue it generates from land-development deals.<sup>25</sup>

## **SOCIAL SUSTAINABILITY**

A national vision that promotes a social goal related to mobility, such as one calling for no fatalities from transportation, provides a strong framework around which all actors can coalesce and compel cooperation or reduce conflicting viewpoints. Vision Zero, an innovative road-safety policy adopted by the Swedish Parliament in 1997, required an institutional restructuring that included all actors that in some way influence the design and function of the transportation system. The policy aimed to achieve a road network with zero traffic fatalities or life-threatening injuries,<sup>26</sup> a departure from the conventional notion that some fatalities from traffic crashes are a reasonable price to pay for a functioning transport system. Vision Zero recognized the role of multiple sectors in influencing the transport system, thus demonstrating how policy can ameliorate potential conflict over who should be at fault.

Vision Zero compelled cooperation among unlikely allies to achieve its goal. National agencies for natural resources, roads, and rail cooperated to examine their policies that touched transportation and create solutions resting on geographic specificities. For

example, while fast intercity expressways employed soft barriers or removed trees to minimize the risk of fatality should crashes occur, urban areas looked to reduce private car use altogether given the constraints on land, the higher population density, and the fact that more vulnerable users, such as the elderly and children, are on the streets. Swedish trade unions, environmental groups, and road-safety organizations developed a ranking system for heavy freight transports to help businesses comply with higher safety standards.<sup>27</sup> The system, known as Q3, ranks the working environment, environmental impacts, and road safety requirements of all heavy-goods transportation infrastructure. The new policy also involved the business community by imposing road-safety and environmental standards on the commercial procurement of transportation. Even if a business did not provide goods or services specific to transportation, all businesses that relied on the transport system were engaged in promoting the goal of no fatalities.

This institutionalization of shared responsibility between government, citizens, and the private sector culminated in one of the world's most successful road-safety policies. Since its inception, central safety barriers have reduced head-on collisions by 80 percent, and lowering speed limits in urban areas has reduced injuries to cyclists and pedestrians by 50 percent in spite of a steady rise in the country's motorization.<sup>28</sup>

# THE IMPORTANCE OF AUGMENTING LOCAL CAPACITY

**NATIONAL GOVERNMENTS CAN BOLSTER LOCAL EFFORTS** to implement sustainable urban transport in a variety of ways. They can create the environment and conditions through which local action can simultaneously fulfill a national vision and meet the demands of local context. National policy can set standards for and centralize knowledge, institute exchanges, and accelerate the dissemination of best practices. Fostering global exchanges of knowledge and creatively prioritizing sustainable modes of transportation are necessary steps to augment local capacity and guide funding and projects to the greatest benefit to society and the environment.

## MANDATE LOCAL PLANNING

The first step for national governments in connecting local projects to national goals is to mandate local planning. Not only does this generate a blueprint for executing urban mobility systems, it also creates the conditions under which local officials can cooperate. Making a local mobility plan a national requirement stimulates engagement in the planning process and reinforces the need for multiple parties and stakeholders to work together, creating a platform to discuss environmental, social, and economic outcomes.

India's experience provides insight into parameters for success in local planning. The country's National Urban Transport Policy requires a Comprehensive Mobility Plan (CMP) for localities to receive funds from the federal government. This is similar to the

practice in many Western European countries (notably France, Germany, Switzerland, the Netherlands, Spain, and the Scandinavian countries) that tie project funding to comprehensive, concrete plans.

Yet, a recent assessment of India's CMPs showed that simply mandating the planning was not enough.<sup>29</sup> The CMPs that were developed did not reflect funding realities, making plans irrelevant. They did not engage the public, which meant they did not have adequate public support. And they were not developed in cooperation with regional or state plans, which carry more legal weight.

The success of more comprehensive plans in France, which has one of the most thoughtful models of regional planning, supports the findings of the recent assessment of India's plans. French plans include not just a project priority list but also an integration of land use; energy consumption; and environmental, social, and economic objectives. These plans also assume the responsibility of thinking through alternatives—what is known as scenario planning—to generate a more robust understanding of the trade-offs being chosen.

Indeed, France's nationally mandated Urban Transport Plans (PDUs) are locally developed plans for inclusive transportation networks with substantial connections to other issues and sectors that are influenced by transport. PDUs, instituted by the 1982 Law on Domestic Transport and made compulsory under the 1996 Air Quality Law,<sup>30</sup> require local communities to prepare transportation development plans.<sup>31</sup> These plans prioritize the interaction among modes of transport, the appropriate allocation of roads, the promotion of more energy-efficient modes, and the harmonization of travel and development policies. PDUs have been very successful in building local capacity in French cities, and 94 percent of transport authorities consider the plans a good and useful tool in crafting policy.<sup>32</sup>

Under the Urban Solidarity and Renewal Law, France also requires a territorial coherence scheme (SCoT), a local planning document used by the central government to incorporate land use, housing, transport, and commerce into a single sustainable urban planning design to prevent sprawl. Though the scheme was established in 2000, it continues to be updated to work in tandem with local master plans. Each SCoT balances concerns about urban renewal, mixed-use real estate development, and preservation of the environment through land-use, transport, and construction decisions. Additional indicators such as energy efficiency; biodiversity and ecosystem conservation; reduction of greenhouse gas emissions; and balance of spatial distribution of shops, services, and residences are integrated through local sustainable development under a SCoT.

Operating under the guidelines of a SCoT, Lyon, a French city of approximately 720,000, constructed a local vision called a "city of short distances" to balance economic and population growth, environmental protection, and social equity through land-use and

transport planning. The principle thrust of Lyon's plan was to create multiple city centers containing commercial facilities, education, sports, services, and residences within walking and cycling distances of each other, with public transportation acting as a main pillar to enhance energy-efficient travel between neighborhoods.<sup>33</sup> Such a plan prioritizes equal access to basic services and recreational activities for all Lyon residents and meets environmental goals as well.

## **AFFIRM LOCAL OWNERSHIP OF TRANSPORTATION PROJECTS**

Successful construction and management of an urban transport project relies on the ownership local authorities assume over their urban transport systems. When confronted with limited proprietorship, local agencies hold themselves less accountable for the efficient and effective implementation of the project, leading to lackluster performance. This can dampen the progress that is made on developing and implementing more than just the project at hand. It can also set a precedent for suboptimal local involvement in future projects. This need is intensified when trying to institute sustainability as part of the outcomes desired.

Nearly all countries require a mobility plan in order to receive federal funds. For example, in Brazil, localities are expected to meet the planning requirement strictly with local funds, leading to few local plans being executed.<sup>34</sup> By contrast, the Indian government offers 40–60 percent of the funds necessary to create comprehensive mobility plans, leading to more local planning for India's cities.<sup>35</sup>

Successful planning requires a mix of local and national financial support. The planning process should receive partial funding from national allocations so plans are achieved and executed but also include local contributions to help foster a sense of local ownership. In France, for instance, local PDU plans for transportation development are partially funded by national allocations and local revenues.

To ensure that funding is easily accessible and managed by the local authority, the national government could devolve project funding directly to an entity in the metropolitan area, whether that is in the form of a city agency, a metropolitan organization, or a state government. The state of California allocates 75 percent of its capital transportation funds to its metropolitan planning organizations (MPOs). The authority to control funding provides MPOs with resources to connect regional planning with investment decisions and encourages interdepartmental coordination. Giving local planners authority over their budgets requires clear guidelines on the use of the funds and clear expectations on outcomes, which in turn helps to build capacity by forcing them to make decisions and act.



## INVEST IN KNOWLEDGE

Local capacity is highly dependent on the knowledge and motivation of staff on the ground. Setting standards, exchanging experiences, and knowledge sharing are often-overlooked means of building local capacity. These practices not only encourage cooperation regionally but also can deepen transnational relationships.

The Latin American Association of Integrated Transport Systems and Bus Rapid Transit (SIBRT), created by a consortium of NGOs in partnership with the Brazilian Ministry of Transport, centralizes and shares “best practices of management and operating of urban public transportation.”<sup>36</sup> A variety of stakeholders diversify its knowledge base. Moving beyond its Latin American borders, SIBRT’s best practices and case studies are shared with other cities looking to implement bus rapid transit systems (BRTS). The role of the organization is significant enough that other regions seek to replicate its model. In 2012, SIBRT’s presentation at the Asia BRTS Conference was not only on case studies of BRT in its cities but also on the structure of the umbrella organization itself, which it put forward as a successful model of a regional organization for the new Asia BRTS Association.<sup>37</sup>

This sort of program-based city-to-city peer sharing can traverse national boundaries and highlight common challenges faced by cities to encourage cooperation and build local knowledge. The European Commission launched the CIVITAS (for “City-Vitality-Sustainability”) Initiative in 2002 to support cities introducing ambitious urban mobility projects. CIVITAS Plus cities are “living laboratories” that work together to pilot a given theme aimed at improving urban transport.<sup>38</sup> These nearly 200 cities in 31 countries collaborate to achieve the EU’s ambitious sustainable urban mobility benchmarks, a means of formalizing the knowledge gleaned from the cities’ experiences. CIVITAS also facilitates study tours for transport officials from around the world to experience how the European pilots operate in reality.<sup>39</sup>

Likewise, local capacity can be boosted from the top through the development of design and engineering standards. Such standards communicate a framework of the physical system so that all involved stakeholders, officials, and staff can develop a common understanding. Such standards can be quickly institutionalized. The New York City Department of Transportation developed a street design manual, vetted by the Office of Management and Budget and New York City lawyers, that is now standard for surface transportation capital projects that are nontransit. Not only did the street design manual enable its in-house road crews and engineering consultants to understand street design and engineering that suited the context of New York City, it also allowed the city to streamline its approval process for such street improvements. The manual paved the way for a number of sustainable transportation improvements, such as physically protected bicycle lanes and safer pedestrian waiting areas at intersections. Standards for innovative urban transportation projects such as the Institute for Transportation and Development

Policy's Bus Rapid Transit Standard and the National Association of City Transportation Officials Urban Bikeway Design Guide could help national and local officials get on the same page in terms of their understandings of the urban context for sustainable transportation by providing a single source of proven, best-practice design guidelines.

Like professional exchanges across nations, nongovernmental, nonpartisan institutions for the research and development of transportation strategies and project designs can bypass politics surrounding local transportation projects. For example, the nonprofit sector stepped in to assist the Mexico City government in creating a travel survey when the initial design of the survey proved inadequate.<sup>40</sup> Such institutions can be housed in academic establishments, where the institutes could be a consortium of university and external experts and practitioners. Well-respected, federally funded research institutions include the United Kingdom's Transport Research Laboratory, the International Transport Forum at the Organization for Economic Cooperation and Development (OECD), and the Transportation Research Board funded by the National Academy of Sciences in the United States.

In addition, national governments and nongovernmental institutions can strengthen domestic local capacity for planning, operational effectiveness, and financial management through technical assistance programs. The China Sustainable Energy Program's Transportation Program is a successful example of central government partnering with civil society to provide support to localities pursuing national transport goals. A nonprofit organization sponsored by the National Development and Reform Commission,<sup>41</sup> the program assists local Chinese agencies, experts, and entrepreneurs with development and regional implementation, while the successes and failures of its activities inform the further evolution of national mobility policy. The Senior Policy Advisory Council and the Dialogue Partners of the China Sustainable Energy Program, both of which collectively include several ministry-level officials and directors, provide strategic input and guidance for regional policy and developments directly from the national government.<sup>42</sup> In France, the federal government augments the capacity of local authorities to prepare Urban Transport Plans by providing its cities with specific, technical requirements based on long-term national goals, such as improving safety across all modes, the development and expansion of public transport networks to include walking and cycling, the reorganization of parking, and the reduction of negative impacts of all transportation on the environment.

## **ENGAGE THE PUBLIC FOR LONG-TERM SUSTAINABILITY**

National policymakers often cite their need for local public participation, but their reasons for recognizing the need may be rooted in reducing risk, not expanding civic engagement. Because changes to the built environment in many cities are associated with

disruption—or, worse, eradication—of daily routines or ways of life, engaging the public to inform them of the intention, purpose, and phases of projects is important. Stories, such as the one from New Delhi in which there were riots on the street when a lane of

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**Because changes to the built environment in many cities are associated with disruption of daily routines or ways of life, engaging the public to inform them of the intention, purpose, and phases of projects is important.**

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traffic was taken for a bus rapid transit system, are common across the world.<sup>43</sup> Creating space for public input can ameliorate tension or even spur public officials to take action more quickly because they are less likely to confront public dissatisfaction.

At a minimum, the government should post notices to inform the public about upcoming projects or solicit input on project priority lists. MPOs that are federally

funded in the United States are required to post transportation-improvement project lists every two years, though the ability of the MPO to reach its audience varies greatly across the country due to each organization's institutional and cultural context.<sup>44</sup>

Though the national government's role in mandating public participation is limited, the federal government can issue guidelines, even nonlegislated, to direct all agencies to respond to the public. Since 2009, the U.S. Office of Management and Budget has issued, in collaboration with senior officials from the White House, memos on budgeting that call for the inclusion of “place-based” strategies and a reminder that federal agency budgets should respond to the needs of all constituents and geographies down to the individual citizen, not only the states.<sup>45</sup>

Public engagement can also provide a forum through which the people can express their dissatisfaction with—and possibly even prevent—unsustainable urban transport projects. While this is not within the realm of national policy, being aware of public engagement strategies can help federal governments support local initiatives or resolve disputes. In 2004, when the Tokyo government announced its plans to bring a highway through the compact, narrow streets of Shimokitazawa, a neighborhood that has so far escaped the post–World War II large-scale development common throughout the rest of the city, citizens protested in the streets. There was no other public forum in which to express their disapproval.<sup>46</sup>

In its most valuable form, public participation can provide detailed knowledge that only locals would be able to offer and can even inform how project phases are developed. To

ease the knot of traffic at Grand Army Plaza at the center of Brooklyn, the New York City Department of Transportation utilized multiple levels of public input collected in creative ways, from a multi-stakeholder community coalition to an international design competition. It then phased in street-design improvements over a few years to soften the impact of the changes. During the project process, the agency collected data on the changes along the way to document the benefits of the improvements in traffic circulation as well as pedestrian and cyclist safety.<sup>47</sup> Encouraging the inclusion of public participation in project proposals submitted for national funding helps encourage transparency and civic engagement.

With the advent of easy-to-use technology tools for planning, local governments have more opportunities today to engage the public meaningfully. Federal mandates can help encourage them to take advantage of these new options for public participation. When Nicole Freeman was appointed bicycle director for the city of Boston and tasked with updating the city's bicycle master plan, she crowdsourced cyclists' desired paths. Using Google Maps, Boston cyclists noted their routes on a shared map. The collective set of tracks defined popular routes and gave the city a solid impression of where bicycle infrastructure was needed.

And technology helps even with more complex issues. The North Carolina DOT published an online calculator on its website so the public could understand the trade-offs involved with selecting certain transportation projects over others.<sup>48</sup>

**Creating space for public input can ameliorate tension or even spur public officials to take action more quickly because they are less likely to confront public dissatisfaction.**

## OVERCOMING TRANSIT BIASES

According to national policymakers consulted for this study, the inclusion of more modes of urban transport in policies requires a cultural shift in public opinion. Public engagement is a cornerstone of that shift.<sup>49</sup>

For decades, road projects received the majority of funding over urban transport globally, which reinforced the message that roads are the priority investment. Municipal

officials tend to favor one public transit mode over others. Rail-transit investments are widely supported by both local planning agencies and federal government financiers, citing their environmental, social, and compact development benefits.<sup>50</sup>

Those who select local transport projects in developing countries like Brazil and China, moreover, view metro systems as a mark of modernization and thus seek to build rail over bus infrastructure in spite of rail's high cost and limited flexibility. This bias is further amplified by lobbying from local private contractors that benefit from more expensive rail projects, according to transport ministry officials from a cross section of countries.<sup>51</sup> The status associated with owning a car cannot be ignored either.

This preference for one mode is prevalent among the public in developed countries as well. In Switzerland, 75 percent of transit riders preferred trams to buses, given identical service levels. In Germany, 63 percent preferred regional rail over an equivalent bus system, particularly among the young and educated. While these studies are not conclusive, they suggest that preference for a given mode of transportation stems not from the concrete benefits it offers but from predetermined emotional and social notions, like nostalgia and perceived bus-ridership demographics.<sup>52</sup>

Creative strategies, even if established from the top, can promote the sort of change in public opinion that is necessary to generate demand for sustainable transportation and increase transparency in spending federal dollars. The Cycling Embassy of Denmark instigated a cultural shift that will be crucial to the success of sustainable urban transport. By promoting cycling as a national priority, it elevated the role of bicycles as a respected mode of urban transportation. Established in 2009 by the national government, the Cycling Embassy's network of private companies, local authorities, and NGOs strengthens public awareness and support for urban cycling networks through regular meetings and events.<sup>53</sup> The Cycling Embassy structure has spread throughout Europe, with new embassies in Great Britain and the Netherlands.<sup>54</sup>

# CONNECTING FUNDING AND FINANCING TO PERFORMANCE AND IMPLEMENTATION

**WHAT CAN BE FUNDED DETERMINES WHAT GETS BUILT.** It is therefore critical that national policies for sustainable urban transport be directly tied to parallel funding and financing structures. New transport systems require both up-front, onetime capital for construction and ongoing funds for operations and maintenance. All told, hundreds of trillions of dollars will be dedicated to building the urban environments required to accommodate increasing numbers of city dwellers, and a strong national role is needed to help provide, enable, and guide this massive investment.

National governments, however, are not the only actors providing financial support to cities in response to this great transition—regional, local, and private contributions from vested commercial interests play a vital role in supporting the development of sustainable urban transport. National financial-assistance programs must thus effectively manage many channels of potential funding and financing investments to ensure both fiscal soundness and the achievement of broad policy goals. Beyond fulfilling the national vision, national governments can use funding and financing mechanisms to empower localities to take ownership of and, in turn, responsibility for their mobility projects.

It is important to note the distinction between funding, which requires revenue generation of some kind, usually through a tax or fee, and financing, which is the creation of a financial vehicle that promises private investors a return on investment. Financing strategies are primarily used to fill a funding gap for large infrastructure projects. Some

financing strategies are better when applied to capital costs, while others are better for operational costs. It is common for transportation authorities to mix financing strategies depending on project goals and funding gaps.

By strengthening the connection between specific funding mechanisms and project types, national governments can guarantee that those who stand to benefit from the infrastructure help fund the project in an amount that is relative to the benefits they will receive. Thus, the national contribution should, in principle, parallel national goals and objectives, while regional and local contributions are aligned with benefits of more regional and local significance. Private beneficiaries—especially those who own or control property that will benefit from an urban transport project—should also contribute a proportion of the increased value received to underwrite the project itself.

There are two main ways for a national government to connect public resources to sustainable urban transport. The first is through a direct transfer of resources—including cash payments or grants of land, buildings, or other physical assets—to municipalities for project support. The second is through loans, loan guarantees, tax credits and other financial subsidies, and credit enhancements, such as pledging to guarantee bonds issued by municipalities if they cannot pay the principal or interest. In both cases, federal funding and financing assistance should be closely aligned with broad public goals, such as congestion reduction, environmental sustainability, multimodal coordination, equity, and public health and welfare.<sup>55</sup>

Some federal resources are allocated by formula or discretion to a state, province, or regional authority. These authorities then have the choice of devolving a portion of the funding to cities to advance national or regional aims. Though sometimes cooperative, these intermediary governmental bodies can also block local efforts to raise funds for achieving local sustainable transport objectives by refusing to provide the authority needed to implement the program or project. For example, when New York City attempted to enact congestion pricing to manage travel demand in the central business district during peak hours in 2007, the measure passed the city council but failed in the New York state legislature. This not only limited the city's options for curbing vehicle traffic but also blocked federal funding to the city.

Going forward, most cities facing rapid population growth will need to diversify their transportation funding streams. Long-term system-development projects as well as ongoing system maintenance and operational costs necessitate diverse, systemic funding and financing streams. However, many municipalities are prevented by law from enacting excise fees or other pricing schemes for the use of local transportation systems absent permission from intermediary governmental bodies. National policy can help to ease these provincial-local tensions by rewarding projects that have outside funding sources, thus incentivizing cooperation.

## **CORRUPTION TAKES A TOLL ON FUNDING**

Corruption is often associated with bribery or the misallocation and divergence of funds from public projects to private and political party purses. The media have highlighted a handful of accounts of such misallocations in transportation projects. But in the case of Brazil, the specter of corruption has been just as detrimental as dishonesty itself.

Having entered into force in April 2012, Brazil's urban transport policy is very new and has yet to be implemented. But it has already been dwarfed by the Growth Acceleration Program (PAC), which funds similar projects to support the forthcoming 2014 World Cup and 2016 Summer Olympic Games. The administrator of PAC stepped down in July 2012 amid allegations of bribery (Transport Minister Alfredo Nascimento had bribed contractors bidding for ministry business and channeled the funds to his own political party, Partido da Republica).<sup>56</sup> As of yet, only 14 percent of PAC funds have been distributed.

The PAC scandal has made it even harder to initiate the distribution of funds through the Urban Mobility Program. Out of a couple billion dollars of intended urban transport funding for 2012, only \$11,500 had been disbursed as of July 2012. Administrators reviewing project proposals are slower to green-light projects because they are afraid of raising suspicions of corruption. This inaction is especially troubling given the pressure to build sustainable infrastructure before Brazil steps onto the world stage as the host of the World Cup and the Summer Olympics.<sup>57</sup>

## **NATIONAL MEASURES FOR FUNDING URBAN TRANSPORT**

Revenues for national funding of urban transport are often derived from a range of taxes, such as national excise taxes on gasoline, freight-related fees for trucks, or sales taxes on purchases of commercial vehicles and equipment. These funds can either be directed toward a nation's general revenues or sequestered into a fund dedicated to transportation. Because these taxes reflect usage of the transport system, either through purchasing gasoline or replacing vehicle equipment due to wear and tear, these strategies are often considered "user fees."

Some countries commit specific excise taxes to specific national infrastructure projects. The funds are held in "lockbox" transportation funds that stipulate that revenues directed to them be dedicated to transportation. The intention is to provide a predictable source of revenue over multiple years that can be used to fund transportation



infrastructure. Such revenue is generated primarily from fuel taxes and marginally by other fees on transportation-related goods and services. Thus, a lockbox policy connects the amount of private travel to infrastructure building. It is one way of ensuring dedicated funding. Such policies are rare globally.

## **Most cities facing rapid population growth will need to diversify their transportation funding streams.**

Dedicating funds secured through the taxation of a given mode of travel, such as a gas tax, can lead to favoring the construction of

infrastructure for that specific mode and risk overlooking other modes that may not generate similar revenues. In the United States, the wide application of the gas tax at federal, state, and even sometimes urban levels has contributed to the perception of the gas tax as a “user fee” in which the major source of funding for transportation is private vehicle drivers. A common yet entrenched misperception is thus that the majority of funds should be allocated to benefit those drivers and road construction. This overlooks the social, environmental, and economic external costs that result from private car use, and it has led to an overbuilding of highway infrastructure at the expense of more balanced transportation systems, especially in urban areas. To overcome this challenge, it is important to have an understanding of the entire system and to provide a national purpose with a clear intent in the application of funds.

Over the last few decades, transportation systems have become more complex. They now require increased revenue for maintenance and improvements. Raising the gas tax would appear to be common sense in most countries, but increasing it can be difficult for political reasons. The countries that have successfully raised the gas tax to generate funds for reconstruction, or to manage private car use, often succeed by using the new revenue to provide other high-quality transportation options, such as easy-to-use bus rapid transit systems that are seamlessly integrated with rail and bicycle networks.

### **PRICING FUEL**

Countries around the world tax transport fuel to generate revenue for general government spending and transportation infrastructure improvements or to promote ecological sustainability. Fuel taxes primarily, though not always, target gasoline and can come in the form of an excise or duty tax at the point of import, a value-added tax

such as a sales tax, a carbon tax based on the carbon content, or a user fee determined by the level of use.

Hong Kong, for example, imposes a \$6.82 per liter tax on leaded petrol, a \$6.08 per liter tax on unleaded petrol, and a \$2.89 per liter tax on light diesel oil to generate government revenue.<sup>58</sup> In Norway, motorists are charged with two taxes, a road-use tax and a CO<sub>2</sub> tax. The road-use tax, at \$0.83 per liter of sulfur-free petroleum, is charged for road maintenance. The CO<sub>2</sub> tax, at \$132.91 for 20 grams of CO<sub>2</sub> per kilometer over the first 115 grams per kilometer (increasing incrementally), is meant to address the air pollution and carbon emissions that result from vehicle use.<sup>59</sup> Imposing high taxes on fossil fuels is one method of reducing personal motorized travel and incentivizing low-carbon fuel alternatives such as natural gas, biodiesel, or electric battery automobiles. In some cases, it also incentivizes travelers to choose public transit or biking and walking.

In other countries, however, taxes on fuel are highly politicized and remain low or nonexistent at the insistence of the citizenry. The United States, for example, imposes a federal excise tax on gasoline at \$0.18 per gallon and \$0.24 per gallon for diesel fuel. The majority of revenue from this tax is deposited into the Highway Account, which is used for road construction and maintenance. Approximately 11–15 percent goes to the Mass Transit Account to support public transit and other modes of transport.<sup>60</sup> The tax, however, has not been raised since 1993 due to political opposition and has significantly affected the funds available to improve and construct new transportation projects.

In an attempt to raise additional revenue, states on average add \$0.30 to gasoline and diesel in local taxes.<sup>61</sup> Higher fuel taxes in the United States at the federal level could encourage consumers to buy efficient cars, drive less, or carpool.

In June 2012, Brazil cut its fuel tax, known as the CIDE tax, to zero as a means of keeping gas prices stable in the face of rising inflation.<sup>62</sup> As a large country dependent on road networks for the effective transportation of goods, particularly food, the Brazilian government is forced to look to other revenue streams for its transport budget.

Many developing countries artificially lower energy and transport fuel prices to their citizens through petroleum-product subsidies, paying the difference from other government resources. However, this comes at a high fiscal cost, increasing public debt and limiting other government spending. Petroleum subsidies also have unintended consequences, such as fuel adulteration, smuggling, and benefits that mostly favor those who are better off.<sup>63</sup>

The national government's role includes helping to define the priorities for infrastructure. It can do that through the allocation of funds, which can be determined by a formula, competitive grants, or a combination of both.

Formula funding allows local governments to rely on a predictable amount of funding over multiple years. The national government can establish standard indicators that demonstrate improvement on a program basis, which is similar to the French system.<sup>64</sup>

But overreliance on formula funding can create a sense of entitlement among subnational governments. In the United States, a forty-year-old national policy of providing over 80 percent of federal transportation program funding by formula to state departments of transportation has created an expectation that federal transportation funding will continue unabated regardless of state performance.<sup>65</sup> Further, relying too heavily on funding that is determined by formula without considering performance means that the original federal intent of and goals for the U.S. program have no bearing on project selection.<sup>66</sup>

Formula funding that includes measurements that reflect economic and environmental policy goals, is paid out incrementally, and is based on performance may be the best way to prevent cost overruns and ensure that projects meet broad policy goals.<sup>67</sup> Countries with comprehensive transportation and regional plans, such as France, Sweden, and Switzerland, tend to have stronger connections between performance and funds, with indicators that reflect system outcomes instead of single-project measurements. Conventional transportation-allocation formulas tend to emphasize simple measurements such as population and projections of how far vehicles will travel.<sup>68</sup> Other considerations that better capture system performance, such as access to basic services or job sites by measuring population and employment density within a certain commuting distance, could help the local authorities provide a level of service that is more responsive to the needs of the community and increase the efficiency of their investments. This performance measure acknowledges the transportation system's ability to heighten economic productivity and underscores the need for baseline data.<sup>69</sup>

Removing some of the emphasis on formula grants and balancing them with more competitive grants would help guide local project decisions and allow for better oversight. Competitive grants or flexible funding might be better suited for addressing capital-intensive system expansion, integration, or other improvements. U.S. states applied

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\$53 billion in flexible funding from 2007 to 2011 to transportation projects with the most need regardless of mode.

The national government can also create specific revenue-generation mechanisms that connect the role of transportation to facilitating access to labor markets. France requires employers with more than nine staff and operating in cities of more than 10,000 people to contribute to the cost of public transportation investments and operations through a special tax.<sup>70</sup> Such laws give cities the power to provide further incentives for workers to take public transit rather than drive. In Paris, employers must reimburse employees for the cost of a season's transit pass.<sup>71</sup>

When local transport projects fail to meet larger goals, penalties are appropriate. Without sanctioning the governments responsible for projects when they underperform, funds would risk being wasted. The European Union subtracted \$1.3 billion from the 2007–2013 transportation budget for the Czech Republic because the country's projects did not stay within the budget or advance EU policy goals. Road freight in the Czech Republic had increased from 57 to 79 percent of total vehicle kilometers traveled between 1995 and 2010, yet the Czech government continued to ignore freight rail solutions in favor of highway construction, reinforcing the use of roads for freight. As a solution, the European Commission called on the Czech Republic to create a transport sector strategy that will serve as the basis for its transport program in the 2014–2020 EU budget. This will be the country's first such integrated plan.<sup>72</sup>

How transportation revenues are generated and allocated nationally includes which funding structures are created to disburse them, to which institutions they are entrusted, and which processes are established to assure that they are in fact dedicated to national sustainable development goals. These factors are crucial to the success of any national effort to promote the sustainable development of cities.

## **LOCAL FUNDING AND FINANCING STRATEGIES**

Across the world, local authorities have increased their range of options to finance transport projects, and such diversity of financing options should be encouraged by national governments. The flexibility this provides is offset by these authorities' limited ability to generate funding via excise taxes and other pricing schemes, which are generally perceived to be the responsibility of state, provincial, and national governments. To support local financing options, national governments can provide additional federal financial and technical assistance, such as the development of several versions of model contracts, to enhance the ability of cities to finance urban transport infrastructure.

The most appropriate package of funding and financing will depend greatly on the local context. A study comparing three models of funding and financing urban transport in Norway shows that, while there are comparative benefits among state, local, and private funding models, the fiscal success of urban transport projects is usually highly dependent on the urban context and the available assets within the immediate environs of the specific project.<sup>73</sup> Strategies should reflect the context of the transport project and consider local issues, such as population density, commercial development, local travel demand, parking policies, and traffic-safety laws.<sup>74</sup>

This principle can also be observed when employing the financing strategy of value capture, defined by a Brookings Institution study as the “family of public finance mechanisms that raise funds in proportion to the increase in land value associated with new or improved public infrastructure.”<sup>75</sup> It is called “value capture” because the goal is to secure part of the value a given project adds to an area in order to finance the transportation project itself. Value capture is possible only when there is strong land-use management to guide decisions by the developers and transportation planners toward the most financially favorable combination of uses.

Value capture is widely used in Hong Kong, where new metro stations are partially funded by the rent and sale values of property next to the stations. The key ingredient here is that the Metropolitan Transit Authority of Hong Kong, a regional body that operates as a private corporation contracted by the City of Hong Kong, has the authority to enter into contracts with private-sector entities to acquire land or take other needed steps to initiate and complete new projects. It thus has the incentive to enter profitable and fiscally sound agreements and is less likely to be influenced by shifting political preferences.

Increasing taxes based on the value of land instead of the building type could encourage sustainable transportation practices and more compact development. For example, if land is taxed instead of the building, a developer may replace a surface parking lot with a higher-value project, such as a retail space, while at the same time reducing the supply of parking, which reduces the preference for driving.<sup>76</sup> The land-use tax structure is best used to fund a system-wide improvement, not a single transit development. One example is the U.S. city of Pittsburgh, which experimented with land-value taxes in 1976 and experienced a sixfold increase in commercial development while the rest of the country saw a decrease.<sup>77</sup>

It is also common for private developers to partner with governments on the creation of transit systems. Typically, the private company will offer to build infrastructure in exchange for development rights. But such partnerships sometimes falter after construction is completed and ongoing maintenance costs must be paid.<sup>78</sup> The once-popular American streetcar suburbs, for instance, which were jointly funded by developers contracted with

local governments, disappeared because developers had no incentive to continue ongoing maintenance of the systems once they made their profits on real estate transactions.<sup>79</sup>

Tax-increment financing is another popular value-capture strategy. It funds the project by borrowing against the future stream of additional tax revenue that the property is expected to generate. While the baseline property taxes before development still flow to the general fund of the locality, the increased tax revenue predicted to result from the higher property value is used to both finance construction debt incurred and leverage other development projects around transit stations. With tax-increment financing, local governments have the advantage of supporting comprehensive redevelopment plans around transit much earlier in the project-development process.

The Downtown Waterfront Urban Renewal Area in Portland, Oregon, is one successful example of tax-increment financing. To reverse the growth of suburban sprawl, Portland invested in cooperative planning for transit and land use. The city's urban renewal agency, the Portland Development Commission, used \$21.5 million worth of tax-increment financing (out of a total construction cost of \$103.15 million) to fund the first modern streetcar system in the United States in 2001.<sup>80</sup> This, coupled with a special assessments district provision, tightened the connection between land use and transportation. As a result, planning for the project was truly performance oriented and holistic. Portland's streetcar ridership significantly exceeded initial weekday ridership projections of 3,500 rides, registering 12,000 daily rides by 2009. Since 2001, the assessed land values in the downtown waterfront area have increased an average of 4 percent annually, from \$653 million to \$918 million.<sup>81</sup>

In addition to local taxing schemes, cities have the option of building and maintaining their transport systems by augmenting the revenues that come from fares with other sources, such as advertising, travel tours, and commercial rents. Ten percent of Taipei's Rapid Transit Corporation income comes from such revenue sources.

Public funds from other sectors can also pay for transportation infrastructure or maintenance. Because it is difficult to formulate the cost of travel in a way that accurately captures the number of trips completed, one approach is to treat transportation like a utility or public service. This way, payment for use is more evenly distributed across the population of travelers. German cities' transport-utility-fee approach is achieved through an internal funds transfer in cities where utilities such as gas, water, and electricity are provided through a single authority, City Public Services (*Stadtwerke*). To excise this kind of fee, German cities required authority from the national government. The state of Oregon in the United States uses a transportation utility fee to pay for the maintenance of transportation systems in twelve communities throughout the state. The city

of Mission, Kansas, excises a transportation utility fee of \$72 per year on single-family homes to finance city roads.

All these financing schemes depend significantly on one key factor—the clarity and reliability of the land-tenure or property-rights system, which is of particular concern in emerging economies. The issue remains topical even in the United States, where a land-value tax to fund city-wide infrastructure, modeled by Pittsburgh, is prevented from being used by the majority of state constitutions. Absent strong land-tenure laws clarifying who can own and develop land, there are few means to leverage its inherent value to generate a revenue stream for public funding of urban infrastructure. This is a significant structural challenge, one that cannot be tackled with policy mechanisms that are directly related to sustainable urban transport. However, national governments can reevaluate such authorities for specific provinces, special economic development zones, or even cities to expand local authority.

## **PUBLIC-PRIVATE PARTNERSHIPS**

Public-private partnerships (PPPs) in both the construction and operation of urban transport systems are an increasing presence in infrastructure projects. Current evaluations, which are based on road construction projects and not urban transport systems, suggest that a strong government role—be it at the municipal or national level—in these partnerships is necessary to retain the most benefits for the public.

The potential benefits of PPPs for urban transport projects are diverse. They include efficiency gains in project implementation, the ability to share project risk with private investors, and the ability to complete projects more quickly. Furthermore, there is the potential of greater market efficiencies through PPPs. Businesses in the private sector, such as construction companies or developers, are inherently motivated to help check rising construction and capital costs because they are risking their own capital.

Yet, a recent survey on PPPs in the transport sector conducted by the International Transport Forum suggests that caution is necessary. While PPPs are now an acceptable part of the funding portfolio, their record in delivering projects on time and on budget is mixed.<sup>82</sup> And public-sector regulations that require certain performance outcomes may be deemed more cumbersome by private investors because of the additional complexity. This raises transaction costs in the form of more complicated procurement, negotiation, monitoring, and enforcement (or evaluation) processes.

One notable case study involves the London Underground, where total transaction costs were estimated at nearly \$700 million. The cost for the bidders to submit and participate

in the process alone was over \$420 million. The government justified the amount by estimating that this only constituted 2.8 percent of the net present value of the entire project,<sup>83</sup> but the high transaction costs are hard to overlook.

Private companies are similarly cautious about investing in public transit infrastructure. No standardized contracts or terms of engagement exist nor are there standard evaluations of such contracts. The lack of models and transparency discourages private firms from financing public transportation. McKinsey & Company, a global consulting firm, warned private investors that although opportunities for financing transportation projects through public-private partnerships will grow, weak political commitment, a lack of appropriate regulatory safeguards, and poor project governance make such investments perilous in many countries. In China, funding the urban rail system is believed to be a risky emerging opportunity because there is little evidence that government agencies have created transparent, predictable mechanisms for structuring and awarding public-private partnerships.<sup>84</sup>

Of particular note, many multilateral regional development banks share the reluctance of private investors to fund urban transportation policies due to the risks associated with implementing such projects. Sometimes risks stem from inadequate governance, such as with the World Bank–funded Lagos Urban Transport Project in Nigeria. There, resettlement issues, individuals championing the project for political reasons, the process of ensuring stakeholder buy-in, and unclear ownership of road networks were among the challenges preventing the construction of a bus rapid transit project. Such issues were held against the city when funding for future urban transport projects in Lagos came up for consideration.

Though public agencies are often cautious in negotiating PPPs in construction projects, there is some evidence that these partnerships have been able to improve the efficiency of ongoing operations. In the first five years that private companies managed the London Underground, total lost customer hours, or the aggregate number of hours transit riders lost due to system failure during hours of operation, was reduced by 20 percent. The volume of train service increased by 1.7 million miles, and there were almost 125 million more journeys made on the London Underground in 2007–2008 than in 2003–2004.<sup>85</sup>

Future reliance on PPPs will increase as local governments face ongoing funding shortfalls. Anticipating this expanded private role in the operation of public services, the OECD recently published recommendations for public governance of public-private partnerships.<sup>86</sup> In particular, the OECD recommends grounding the selection of PPPs through an analysis of value for money or “the optimal combination of quality, features, and price, calculated over the whole of the project’s life.”<sup>87</sup> Such a calculation can be developed as part of the institutional framework of the national government’s evaluation process. The more transparency, the better—firms will not understand the rules unless governments make them available.



New multilateral partnerships supporting PPPs will proliferate regardless of these ongoing challenges. In 2012, a consortium of regional development banks announced their desire to combine their efforts on urban transport projects and create a fund of \$175 billion over ten years for sustainable transport projects.<sup>88</sup> The partnership, led by the Asian Development Bank along with other NGOs, would pivot transportation funding toward a potentially sustainable path. Eligibility requirements were being developed at the time of this writing, and early reports suggest that national governments equipped to conduct project evaluations will be given funding preference.

# MAXIMIZE PROJECT DEVELOPMENT AND SELECTION

**A BOTTOM-UP APPROACH IS NECESSARY** to connect execution to broad goals. Local governments are rushing to keep up with new demands in the face of the urban population's immense growth, the general lack of municipal funding, and the newness of urban infrastructure in many of the world's cities. In spite of the local nature of managing projects, national policy still has a strong role in supporting local efforts for project development, selection, and evaluation. It plays a critical part in guiding coordination among the broad goals, the design of the project, and the funding and financing. This assistance is especially important given the interdependencies among policy mechanisms and local governments' limited capacity.

The process of choosing and designing specific projects seems very distant from the position of a national government. However, there are several policy mechanisms that national policymakers can employ to ensure that projects meet long-term sustainability goals and fit into broader plans. Starting with a strong national vision, establishing conditionality that is transparently connected to funding and financing strategies, and then empowering local authorities to carry out a project will allow national policy to remain active in the implementation of local development plans.

## THINKING ABOUT LAND USE WHEN SELECTING TRANSPORT PROJECTS

Specific policy mechanisms can encourage greater integration of land use and transportation. They can have the greatest impact if they are applied during the planning process. A national benchmark for thoughtful land-use policy—such as one that limits the time needed to travel from home to work, school, or basic services to thirty minutes—could compel integrated planning.

Instituting this sort of national threshold for commuting time could induce more compact development that would support more efficient transportation systems. Compact development encourages public transit ridership and increases the share of biking and walking travel compared with more sprawled development.<sup>89</sup> In addition, compact

development patterns and higher density decrease transport-related energy consumption.<sup>90</sup> Including a land-use benchmark in transport policy would also ease the creation of public right-of-ways, which is the use of land for public transit projects that would facilitate use by transit riders, and public spaces for open movement.

National policy can also require that project proposals apportion enough space for different modes of transportation. One strategy, capacity preservation, limits the

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extent to which localities can increase road capacity for vehicles and mandates a certain amount of capacity for nonmotorized modes. It thus counteracts the instinct to simply supply additional road capacity, which can reduce the number of trips by car. For large countries with relatively more flexible land policies, such as Brazil, access management—or ensuring that different transport modes share the street—is useful. This differs from capacity preservation in that it measures the number of vehicles that use a given thoroughfare over time, not the road space allocated for vehicles. Both strategies require close coordination with land use.

Basing development on business profiles is another method of integrating land-use and transportation planning. Under this system, permits for a new business and its location are dependent on the combination of its mobility profile and the accessibility ratings. In

the Netherlands, the national government requires businesses seeking new locations to find the most appropriate site given their mobility demands.<sup>91</sup> This national-level policy compels a local practice that links land use to mobility demands. Dutch planners create mobility profiles for businesses that include an estimation of how much and what type of traffic the business will induce and also rate locations based on their level of accessibility. According to a World Bank report, locations that are “well served by public transport, ... connected to nearby neighborhoods by bike paths, and ... feature mixes of retail shops receive high accessibility marks.”<sup>92</sup> Businesses or organizations that qualify for this A-level designation have high volumes of users at all times of the day and are used for diverse purposes. A university campus is one example.

## **COST-BENEFIT ANALYSES IN PROJECT SELECTION**

A national review process that combines cost-benefit analysis with a political preference or administrative prerogative is another useful method to marry national goals with local context. Cost-benefit analyses can be generated locally, and the criteria used should be based on the broad transport goals set forth by national policy in the areas of land-use coordination, environmental impacts and safety, among others.<sup>93</sup> Projects that meet certain requirements could be exempt from lengthier approval processes to accelerate selection.

Cost-benefit analysis provides consistency and transparency to transportation decisions and strategic program choices. Assessing user benefits such as access to jobs, goods, services, and cultural institutions; quality of service; and other indicators simultaneously measures a transport system’s efficiency and equity impacts. External costs include environmental impacts, health effects, safety, and congestion, among others, while wider economic impacts include effects on productivity, agglomeration, competition, and labor markets.

This type of analysis played a key role in the evolving design and programming of London’s Crossrail project that will develop a major new railway linking Berkshire and Buckinghamshire to Essex and Kent via Greater London by 2018. The project moved beyond the traditional user-benefit and fiscal-feasibility variables and accounted for environmental and other unquantifiable impacts, wider economic effects, and congestion alleviation through traffic forecasting (including fuel prices and car costs).<sup>94</sup>

## **CREATE BASELINE DATA TO UNDERPIN MEASURING EFFORTS**

Baseline data are a vital cornerstone for all stages of a project, from selection to refining and development to evaluation and subsequent improvement. National governments can

play a strong role in setting the standards by which to guide data collection, a practice common in European countries.

Local agencies could be responsible for data collection throughout the implementation of an urban transport system, but the national government should work closely with local partners in the metropolitan region through ongoing communication and coordination. The performance of the system should be evaluated in a way that takes the specific geography and modes of transport into account. By developing and disseminating detailed indicators on availability, frequency, density, comfort, safety, pollution, land-use integration, intelligent transport system facilities, and financial sustainability for use across all localities, the national government makes performance monitoring of entire transportation systems or single projects easier for local authorities. These indicators provide authorities with an underlying basis by which to gauge performance. This performance monitoring can be used for internal decisionmaking and for reporting to higher levels of government and external stakeholders.

## **INCLUDE CO-BENEFITS TO PRIORITIZE SUSTAINABLE PROJECTS**

Proactively integrating co-benefits, or benefits that indirectly result from transportation projects, into the selection process of urban transport projects can bolster national sustainability goals from the outset of project development. The obvious co-benefits of sustainable transport systems are environmental, such as cleaner air quality or natural-resource conservation. Equity, and with it safety, can also be taken into consideration to enhance social benefits that are a part of meeting sustainability goals. The inclusion of these co-benefits facilitates transport selection and development.

### Environment

For an environmental impact benchmark, national policy should require the attainment of more healthful air quality, especially in urban areas. Local transportation plans could be required to demonstrate how they will contribute to the timely reduction of air pollution in metropolitan areas, as under U.S. transportation and clean-air laws, or have their federal funds withdrawn. In the European Union, jurisdictions are subject to fines if they fail to make adequate progress toward the attainment of healthful air quality (see the appendix).

Beyond local air pollution, the national government should also set benchmarks to limit carbon emissions for new projects and reduce carbon emissions for systems already in

operation. In order to avert catastrophic climate shifts, warming of the earth must be limited to 2 degrees Celsius, or 450 parts per million of carbon dioxide in the atmosphere. The International Energy Agency asserts in the *2012 World Energy Outlook* that almost four-fifths of the carbon dioxide emissions allowable by 2035 for a 2-degree scenario are already accounted for by existing infrastructure, including transportation systems.<sup>95</sup>

Transportation is one of the fastest-growing sectors of greenhouse gas emissions, while urban areas are the largest geographical emitters. Developing transport in a way that mitigates these emissions is possible and can make a tremendous impact on the earth's climate. The United Nations Intergovernmental Panel on Climate Change claims the mitigation potential for the transport sector is about 1,600 to 2,550 metric tons of carbon dioxide for abatement costs of \$100 per metric ton of carbon dioxide by 2030. This is only a partial assessment based on biofuel use and efficiency improvements in light-duty vehicles. It does not take into account additional mitigation potential from transforming urban transport systems.

A national benchmark for greenhouse gas emissions can encourage low-carbon urban transportation projects. Many countries already have a national goal for greenhouse gas reduction. For example, Mexico set the goal of reducing greenhouse gas emissions by 30 percent from business-as-usual projections by 2020 and by 50 percent from 2000 levels by 2050.<sup>96</sup> The national government could specify a percentage of the total national emission-reduction targets to be met through reductions in the transportation sector. This would incentivize low-carbon project approval and act as an unambiguous target on the way to the creation of sustainable transport systems.

Energy-efficiency standards for public transit vehicles, the encouragement of nonmotorized modes, and the incentivizing of low-carbon or carbon-neutral fuels are all ways to decrease the emissions of local projects. Including public transit vehicles in national efficiency standards can incentivize a technology shift in manufacturing to improve fuel economy and consequently reduce greenhouse gas emissions.

In the United States, the Corporate Average Fuel Economy (CAFE) standards, the most recent version of which was passed by the Obama administration in August 2012, require auto companies to raise the fuel efficiency of all cars and lightweight trucks to 34.5 miles per gallon by 2016 and 54.5 miles per gallon by 2025. This new rule has the potential to cut greenhouse gas emissions in half and reduce emissions by 6 million tons by 2025.<sup>97</sup> In an earlier version of the CAFE standards, buses, along with delivery and garbage trucks, were required to improve fuel economy by 10 percent by model year 2018, which equates to about one gallon of fuel per 100 miles traveled.<sup>98</sup>

## Equity

Equity is defined by the World Bank as the “fairness with which impacts (benefits and costs) are distributed.”<sup>99</sup> Equity in transportation planning can be difficult to assess because it comes in many forms and has varied impacts. There are also numerous ways to measure these impacts and the users in question are inconsistently categorized. This often leads to the casual dismissal of considerations of equity during the project selection and development process because they appear to be immeasurable intangibles.

But equity must be considered in selecting transport projects because the endorsement of equity in the national selection of transit projects can increase access to affordable and efficient transportation, potentially affecting peoples’ opportunities and quality of life. Transportation decisions have a major impact on people’s opportunities for mobility and accessibility. For most households, transport expenditures represent a large share of their budget, and a decision about price structure or nonmotorized mobility options can significantly affect a family’s financial burdens. Moreover, communities that do not have access to transit networks also lack access to economic opportunities and basic services, including emergency services, public services and utilities, healthcare, basic food and clothing, education and employment, and social and recreational activities. This exclusion hurts sectors of society that are already the most vulnerable—low-income households, physically or mentally disabled individuals, and those who are already socially isolated due to geographic or linguistic barriers.

Under land-use coordination, equity should be a key component in decisionmaking so that negative impacts are equally distributed, or compensated for, across the metropolitan area. Equity measures could include metrics on the spatial distribution of low-income households throughout the city, people with physical disabilities, and those who are linguistically or geographically isolated. If included in the selection process, these units of measurement would then also be considered during development. The government could determine which plans would benefit the majority of transit users by gathering input from the community on context-specific needs and values.

## Safety

Safety is another important, underutilized, objective to include while developing and selecting urban transport projects. Over 1.2 million people die each year on roads worldwide, while 20–50 million suffer nonfatal injuries. Nearly half of all those who die on the world’s roads are users who are not in private cars—pedestrians, cyclists, and those traveling on two- or three-wheelers.<sup>100</sup> The majority of crashes causing fatalities or major injuries are preventable if transportation policies truly prioritize moving people over moving cars.<sup>101</sup>

Selection processes and development guidelines set by the national government could include requirements on safety measures in infrastructure design; vehicle characteristics; and, when applicable, user behavior through engineering safer streets, enforcing traffic laws, and educating drivers, bikers, and pedestrians about sharing the road. This is the case in Sweden with its Vision Zero and the Netherlands with its Sustainable Safety Vision, which seeks to prevent the human errors that cause road crashes through proper planning, design, and improvement of roads. Both countries' policies make design a hallmark of solutions. Specific to the Netherlands, roads are categorized to determine the level of interaction between vehicles and vulnerable road users, and that information then defines a set of standards for vehicle speeds, road markings, and other design elements. For example, on urban distributor roads where motorists, pedestrians, and cyclists have high levels of interaction, vehicle speed limits are reduced to just over 30 miles per hour and separate pedestrian and bicycle facilities are built. These standards, when applied consistently and predictably, elicit desirable traffic behavior that in turn reduces the possibility for human error and human fatalities.

## **EVALUATE COMPREHENSIVELY AND CONSISTENTLY**

Nationally determined evaluation methodology needs to transcend conventional performance indicators to include equity, environmental impacts, and other less tangible measurements of success. Because the transportation system is a collection of interdependent parts, not just a set of projects, these nationally guided evaluations must capture comprehensive, system-wide outcomes. Instead of evaluating specific projects, national governments could consider evaluating regional or city transport programs as a way of reinforcing the concept that transportation is an inclusive, interdependent, multimodal network.

Comprehensive performance evaluations are flexible and can be modified to reflect the values, needs, and conditions of a particular planning situation. They can include mode share, transport diversity, freight and commercial transport efficiency, street quality, and transit-service quality. An analysis of these factors allows local and national transport authorities to assess the effectiveness of walking, cycling, motor vehicles, rideshare, public transit, and telework infrastructure. Looking at indicators like land-use density and mix as well as streetscape quality helps ensure that land use is coordinated with transport planning to maximize benefits for local businesses and residents. Beyond technical evaluation, comprehensive performance indicators also assess the equity and environmental effects of a transport system to safeguard equal access, energy efficiency, low-carbon emissions, and the preservation of high-quality wildlife habitats.

For example, South Africa has combined technology improvement with soft options to reduce carbon emissions in its transportation system by promoting a transition to electric



and hybrid-electric vehicles and encouraging the use of alternative modes of transportation.<sup>102</sup> In addition to technology investments, South Africa's Shova Kalula National Bicycle Partnership project provides a mobility alternative for short-distance movement. Building city-wide bicycle-transport infrastructure networks that connect cycling paths to other modes of transport encourages commuters at all income levels to choose nonmotorized or multimodal commuting, which lowers the city's carbon footprint.<sup>103</sup>

Similar to comprehensive evaluation methodology, indicators should be based on readily available, easily collectible data rather than relying on sophisticated and expensive technology for collection. Travel efficiency in a given country can be measured, for example, using vehicle fuel consumption, the average and variance of travel time, the speed of home-to-work trips, and departure and arrival reliability. The success of national goals on transport safety can be measured against benchmarks on annual road fatalities or crimes on public transit.

## **THE URBAN TRANSPORT BENCHMARKING INITIATIVE<sup>104</sup>**

In November 2003, the European Commission initiated a three-year project on benchmarking different aspects of 45 participating European cities' transport systems. The initiative aimed to fast track the performance-improvement process by learning from others with superior performance, to provide consistent and comparable performance data, and to establish a forum for cities and organizations to share their experiences and exchange information. The initiative looked at these cities' standards to explore and compare best-practice examples of urban transport delivery. It encouraged an incremental development process for any city that could start simply and develop further as more and better data became available.

Themed working groups in behavioral and social issues in public transport, city logistics, cycling, demand management, public transport organization and policy, and urban transport for disabled people researched specific topics and developed key indicators to be used across all 45 participating cities. The European Commission ensured the transparency of this process by making the publications, events, and online interactive benchmarking tools publically available. The initiative encompasses as many stakeholders as possible, including participants from urban transport operators, user groups, local authorities, municipalities, and the private sector.

The European Commission was able to compare and improve mobility networks of cities that are socially and geographically varied by developing a comprehensive set of evaluation benchmarks and key indicators. This central evaluation framework fostered the exchange of best practices in urban transport for cities facing similar challenges. Programs like the night buses for younger people in Bietigheim-Bissingen, Germany, cycling priority measures and greenways in Copenhagen, Denmark, and the Stillorgan Quality Bus Corridor in Dublin, Ireland, were shared and successfully replicated through the Urban Transport Benchmarking Initiative.

Thus, through the use of benchmarks, the European Commission was able to not only provide a transparent evaluation process for a diverse set of urban areas but also to establish a knowledge network that facilitated the successful implementation of urban mobility solutions through the exchange of best practices.

## **NATIONALLY LED, LOCALLY EXECUTED PERFORMANCE**

Performance-based contracts provide another a way to tie funds to performance and increase the likelihood of effective and timely project development while decreasing cost overruns. Well-defined contracts with the private sector through PPPs can incentivize effective delivery, good operations, competition, and realistic risk allocation, all while ensuring that the project meets sustainability goals laid out by the national government.

National policy can encourage the private sector to participate in infrastructure investments by mandating improved risk planning for projects as a prerequisite for entering into a contract. And risk assessments are usually included in performance-based contracts and ensure that controls for mitigation are in place before a project is implemented. National policy could provide a broad guide to help a locality conduct its risk assessment.

This approach has worked at the state level. The state of Washington required that all state agencies base new contracts on performance through an executive order signed in 2010 after it found that performance-based contracts significantly improved contractors' results. Seventy-six percent of contractors on 1,000 of Washington's DOT projects finished early or found a cheaper way to deliver the project from 2003 to 2010.<sup>105</sup> Conversely, Connecticut's DOT projects did not use performance-based contracting, and only 37 percent of the projects were executed on schedule between 2001 and 2010, with 74 percent of all projects running over budget. On average, only 53 percent of the projects pursued by state DOTs in the United States are finished on time.<sup>106</sup> Though state-to-state

comparisons will not be parallel because of different project funding procedures, on aggregate, performance-based contracts with risk assessments not only helped the Washington DOT complete projects but also provided a foundation for better baseline data collection and evaluation by tying payment to the achievement of desired results.

Similarly, the city of Guangzhou in China negotiated a performance-based contract for the operation of its bus rapid transit system that could serve as a model for national policy. The project involved contracting multiple bus-operating companies to provide service in an integrated management system, the first contract of its kind in China. Each bus operator was paid a percentage of total passenger revenue. The revenue is based on the total distance covered by buses, with the BRT control center specifying the frequency of each route at a monthly meeting between regulators and operators. The payment amount is then adjusted again based on several performance factors, including maintenance of the stipulated frequency and operational plan, passenger complaints, punctuality, accidents, breakdowns in the BRT corridor, and adherence to tasks given by the government. This process encourages the optimization of system performance. Localities could determine such detailed indicators once a performance contract is mandated nationally.

Another common approach to guiding project performance is to fiscally constrain master plans. Federal governments can condition federal funding on the identification of specific, confirmed funding sources for all projects and initiatives listed in a local transportation plan and on the reasonable availability of funding for all projects in a long-term mobility plan. The United States, for instance, requires state departments of transportation to identify all sources of funding for transportation planning and programming as well as a timeline of their availability. Revenue streams for operations and maintenance of existing transportation infrastructure are compulsory, as is funding for capital and operations of new projects.

The U.S. example is good in concept, but as the shortfall in transportation funding has increased over the last decade, fiscally constrained master plans have struggled to produce positive outcomes. All state departments of transportation have received more in federal funds than they have contributed to the federal transportation fund since 2005.<sup>107</sup> Without sufficient funding, state departments must choose between investing in new projects and maintaining existing infrastructure. New projects tend to take priority regardless of other needs because they burnish political reputations. This common dynamic resulted in deferred maintenance costs of \$130 billion in 2010—more than double the annual federal transportation budget.<sup>108</sup> This weakness could be resolved by assessing the performance of existing operations for possible improvements against the need for new capital projects and by making more federal funds available for such improvements.

# TRANSPORTATION IN THE CENTURY OF THE CITY

**THERE IS A GROWING BELIEF THAT** cities will flourish if left to develop on their own. That may have been possible when the population was much smaller, geographic reach was less extensive, the global economy was marked by city-states that acted as posts along trade routes, and the pace of change was slower. But such a belief is now misguided. With globalization and widespread advances in and adoption of technology for communication and construction, the complex challenges of mobility have increased across and within nations. Settlement and economic patterns are irrefutably urban across the globe, and they are growing. Now and well into the future, the development of sustainable urban transport systems will be imperative to ensure the livelihood and prosperity of billions of people worldwide.

Although a city's transportation system may have once been primarily a local concern, the rapid growth of the urban population, especially in emerging economies experiencing rapid industrialization, coupled with the high rate of motorization and the effects of climate change, mean that business as usual must change. Resources and partnerships that go beyond local authority are needed to solve shared challenges. An estimated \$350 trillion of investment for all future urban infrastructure is on the line. Nations need to be involved in local infrastructure decisions, and new nation-city relationships are necessary to marshal resources and address challenges.

At a minimum, national governments can set and enforce an expansive and long-term vision for what sustainability and urban mobility means. A vision is necessary. And it must include specific desired public outcomes, such as reducing carbon emissions,

limiting natural land conversion, slowing car-ownership rates, and preventing air pollution. Without a clear vision, action is uncoordinated, is undirected, and comes with high opportunity costs.

But a vision is not enough. Results from decisions and actions taken today regarding transportation systems will determine cities' future paths. At the heart of national leader-

ship for urban areas and infrastructure expansion is the need to keep a solid grip on desired public outcomes and to then empower those most suited to execute the plans to reach those goals. By granting regional authority, devolving power to subnational entities, establishing nongovernmental research centers, aligning process with funding and financ-

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**The development of sustainable urban transport systems will be imperative to ensure the livelihood and prosperity of billions of people worldwide.**

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ing strategies, and establishing standards for project selection and evaluation, national governments can steer cities toward more sustainable urban mobility networks.

This century of the city is likely to foster new relationships between the city and the nation as both seek to fulfill complementary goals. Instead of cities striking out on their own and nations relinquishing responsibility and leadership, new dynamics must be forged. Given the global scale of climate change, cooperation through on-the-ground projects may be the best way for nations and subnational entities to make progress and redefine what it means to engage globally on climate action.

## APPENDIX

# NATIONAL URBAN TRANSPORT POLICY COMPARISON

This study resulted from consultations with policymakers facing major inflection points in their nations' transport policies. Policymakers from Brazil, India, Mexico, China, and the United States were consulted. These countries are among the largest and fastest-growing nations and unions in the world in terms of both population and economy. They have established national urban transport policies in an effort to ameliorate the challenges that accompany rapidly growing urban populations and motor vehicle ownership. This appendix provides some background on their current transportation policies and their common challenges. To facilitate comparison and contextualize national urban transport policies, table 5 summarizes key pieces of legislation for Brazil, China, India, Mexico, and the United States.

## COMPARING BRAZIL, INDIA, AND MEXICO

Out of the five countries, many similarities are found within the policies of Brazil, India, and Mexico. Urban transport legislation in these countries was passed at similar points in recent history, reflecting commonalities in global and national economic conditions. These policies pool and integrate international and domestic funds for infrastructure projects. They also create a “single-stop” service center by establishing state-operated infrastructure or development bank. Their intent is to reduce redundancies and inefficiencies in implementation and reduce the amount of friction between cities and states or provinces.

**TABLE 5 | KEY PIECES OF NATIONAL URBAN TRANSPORTATION LEGISLATION**

	<b>BRAZIL</b>	<b>CHINA</b>
FEDERAL AUTHORITY	Ministry of Cities and National Secretariat of Transportation and Urban Mobility (SeMob)	Ministry of Transport, Ministry of Urban Development, Ministry of Construction, Ministry of Public Security, and Ministry of Railways, working closely with the Ministry of Housing and Urban-Rural Development
STATE OR PROVINCIAL AUTHORITY (if applicable)	Authority over metropolitan transport	—
LOCAL AUTHORITY	Mayors	Mayors, municipal governments
LEVEL OF GOVERNMENT WITH GREATEST INFLUENCE OVER URBAN TRANSPORT	Strong megacities, strong national government	Strong cities
LEGISLATION	Growth Acceleration Program (PAC) I & II/National Policy of Urban Mobility	11th and 12th Five Year Plans, transportation sections (2001 and 2006)/ 2005 State Council Opinion #46
NATIONAL LEGISLATION INTENT	First piece of legislation that includes motorized and nonmotorized mobility and seeks to advance integrated perspectives on urban mobility; integrates urban transport and transit, land-use zoning, and planning; and introduces concept of sustainable cities.	Prioritize public transit and reduce congestion by requiring municipalities to take public transit measures / Fluid traffic project required 36 cities to reduce congestion.
ADMINISTRATOR	PAC I & II: Brazilian Development Bank (BNDES)/National Policy: Fiscal responsibility by Caixa Economica Federal and policy responsibility by SeMob under Ministry of Cities	Ministry of Transport, Ministry of Urban Development, Ministry of Construction, Ministry of Public Security, and Ministry of Railways, working closely with the Ministry of Housing and Urban-Rural Construction
YEAR OF PASSAGE	2007/2012 (drafted 2008)	2001 and 2006
ALLOCATION PERIOD	PAC I: 2007–2010; PAC II: 2011–2014/ National Policy: 2012–2017	2007–2012
ALLOCATION AMOUNT (in U.S. Dollars)	PAC I: \$306 billion; PAC II: \$582 billion	—
LOCAL MATCH	Municipalities up to 50,000 inhabitants: 3%; priority municipalities: 5%; remaining municipalities: 10%	Nearly 50%
OTHER SOURCES FOR URBAN TRANSPORT (in U.S. Dollars)	Climate Fund under BNDES: \$49.4 million for urban transport; National Monetary Council line of credit: \$6.2 billion to finance concessions by state and municipal governments in PAC II	—

SOURCES: “Look on Brazil,” *Financial Times*, July 2012; Ministry of Cities, Brazil website, [www.cidades.gov.br/index.php/progsemo/256acoosprogramamob](http://www.cidades.gov.br/index.php/progsemo/256acoosprogramamob); Renato Boareto, “Mobilidade Urbana para a construção de cidades sustentáveis,” Contribuição para os Programas

	<b>INDIA</b>	<b>MEXICO</b>	<b>UNITED STATES</b>
	Ministry of Urban Development	Communications and Transport Secretariat	Department of Transportation
	State secretary of housing and urban development; varies from state to state	—	State Department of Transportation
	Unified Metropolitan Transport Authorities	Mayors	Municipal authorities, including city transportation commissioners, regional authorities, and metropolitan planning organizations
	Strong states	Strong states	Cities have operational control but funding is strongly controlled by states
	National Urban Transport Policy (NUTP) under Jawaharlal Nehru National Urban Renewal Mission (JnNURM)	Public Transportation Federal Support Program (PROTRAM)/Urban Transportation Transformation Project (PTTU)	No specific urban transportation policy, but urban transport was first accommodated for by the Intermodal Surface Transportation Efficiency Act (ISTEA, 1991), which was amended as the Safe Accountable Flexible Efficient Transportation Equity Act (SAFETEA-LU, 2005) and replaced by the Moving Ahead for Progress in the 21st Century (MAP-21, 2012); Clean Air Act Amendments of 1990
	To provide quick, affordable, comfortable, reliable, and sustainable access for the growing number of city residents to jobs, education, recreation, and other needs.	PROTRAM focuses on modernization projects for urban and suburban public transport, mainly for cities with over 500,000 inhabitants. PTTU focuses on encouraging the use of clean technologies in urban transport.	“Develop a National Intermodal Transportation system that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner.”
	Ministry of Urban Development	National Development Bank (BANOBRA) manages National Infrastructure Fund (FONADIN)	Department of Transportation
	JnNURM: 2005; NUTP: 2007	2009/2010	2012
	JnNURM: 2005–2011	2010–2017	2012–2014
	\$20 billion (JnNURM total)	Total fund amount including all sources, international and domestic: \$2.694 billion	\$104 billion
	—	FONADIN: \$767.5 million; local government: \$737.5 million (almost 50%)	Typically varies from 20% to 50%
	—	International Bank for Reconstruction and Development: \$150 million; Clean Technology Fund (international): \$200 million; domestic private sector: \$839 million (all included in total fund amount above)	—

de Governos Municipais, 2008; Jose Barat, “O Financiamento de InfraEstrutura Urbana: os Impasses, as Perspectivas Institucionais, as Perspectivas Financieras,” Institute for Applied Economic Research (IPEA)/Foundation of Managed Development (FUNDAP).



In addition to centralizing the transport program, Brazil, India, and Mexico recognize the importance of local governments by directly funding or financing urban transport projects. Brazil and Mexico do not require the state to act as an intermediary, though Indian cities, which already receive the majority of their funding from states, still require state approval for national funds. In all places, localities are expected to meet a certain set of conditions to be eligible for funding.

Further, policy language in each country is composed of thoughtful statements that require holistic, multimodal approaches to urban mobility and that recognize the need to prioritize the movement of people in dense city centers. Finally, legislation and funding requirements attempt to guide all phases of the project, from planning to delivery to evaluation, to increase the likelihood of delivering a successful project.

But in spite of the policy foundation at the national level to deliver sustainable transportation, each country faces, for a variety of reasons, two primary disappointments. First, they experience a lag in disbursing funding or, worse, funds are squandered on projects that are either of poor quality or contribute little to sustainability. Second, all three countries grapple with little or slow implementation of projects.

## **INDIA INVESTS IN URBAN RENEWAL**

India has an urban development agenda through its Jawaharlal Nehru National Urban Renewal Mission program, a national urban investment program. The urban-transport-focused part of this program is called the National Urban Transport Policy.

India reports difficulty with fund disbursement, and as of 2011, only 30 percent of transport-related funds had been disbursed.<sup>109</sup> As a fragmented democracy fraught with many levels of bureaucracy, most accounts about the effectiveness of urban transport policy in India cite “lack of capacity” as the primary reason for the lag in disbursement. Key shortcomings could be weak institutional frameworks to oversee the administration of the policy, which could include organizational structure, departmental roles and responsibilities, and workflow for project selection and oversight.

## **MEXICO AUGMENTS INSTITUTIONAL CAPACITY**

In Mexico, 42 cities have been planning major public transport projects as part of the Public Transportation Federal Support Program, most for more than two years. But only three projects have gotten as far as construction.<sup>110</sup>

The primary cause cited for the lack of implementation is the lack of institutional capacity. More specifically, the slow pace of project development is attributed to time taken for national-level review and approval of project proposals, particularly at the national development bank; challenges in subnational coordination between states and cities; and the failure of all levels of government to achieve consensus on planning and implementing projects. According to some sources, there may be too few people to review projects at the national level, and reviewers may need more appropriate knowledge and training.

## **UNITED STATES MEETS SHIFTING DEMAND**

The United States has had a federal transportation policy to build a national interstate highway system since 1956, but only in the last twenty years has it begun to seriously consider urban transport as a part of its national transportation system, starting with the Intermodal Surface Transportation Efficiency Act of 1991. Given recent shifts in demographics, urban development, and transportation demand—such as the increased demand for living in cities, the increases in alternative transport modes, and the decline in the use of private cars—more investment in sustainable urban transport is needed. Despite this increasingly widespread conception, funding for urban transport projects and programs slightly declined under the new federal transportation law enacted in June 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21).<sup>111</sup>

U.S. regional and municipal governments receive federal transportation funds in three ways. Funds are provided directly to urban areas through federal formula grants. They are also provided indirectly through formula grants for use on state highways and bridges in urban areas. These funds can be transferred—otherwise known as “flexed”—to transit projects under some circumstances. Lastly, funds are provided through federal grants distributed by competition based on project alignment with national goals and objectives.

There are also a few federal funding programs that are distributed by formula to states, which the states then distribute to local governments through competitive grants. These are mostly nonhighway bicycle and pedestrian, safety, and railroad station renovation projects called Alternative Transportation programs.

The diversity of pathways to securing federal funding reflects regional differences and demographic needs as well as the perpetual tug-of-war between U.S. states and cities over control of federal transportation dollars.

## CHINA'S UNIQUE LOCAL PROGRESS

China stands out among this group as the only centrally planned state. Its cities have high levels of autonomy and flexibility in meeting national urban transport policy mandates established by national five-year plans, which lay out strategies and policies. The national ministries serve as a guiding hand rather than an enforcement or regulatory mechanism.

China's strength at the municipal level is bolstered by its cities' authority to generate the majority of funding for local infrastructure projects from revenue produced by urban land concessions, rents, and acquisitions.<sup>112</sup> But because the economy has slowed and national funds will eventually diminish while urban areas continue to grow, the Chinese government is bullish about private investment in public projects.<sup>113</sup> Autonomy in urban governance and the Communist Party's promotional structure have also bred a healthy competitive spirit among Chinese mayors, complementing the guiding hand of national policy. Mayors pay attention to best practices when they know their peers are doing the same.

Yet, leaving the successful delivery of urban transport entirely up to the competitive nature of mayors may overlook policy friction at the national level, pitting policy objectives against one another. Mayors in China are appointed by the Central Communist Party. Advancement through the party and administration (for example, the provincial government) is determined by how fast mayors grow GDP. Short-term economic growth can be created by road construction and consequent land development. Transit projects, which have a higher economic return in the long run, take more time to plan, build, and operate.

To address this discrepancy in economic cost-benefit analyses, China has now added environmental and quality-of-life goals to judge the performance of cities. This is just the start of what could be a strong performance-driven policy, since those indicators may not be explicitly linked to transportation.<sup>114</sup>

Car-ownership goals also sometimes conflict with urban transport goals. The Fluid Traffic Project launched nationally in 2001 was intended to support municipal efforts to alleviate congestion within 32 Chinese cities. The same policy, however, also promised that each household would eventually own a car,<sup>115</sup> which would work against congestion alleviation in urban areas. Without national recognition of these divergent goals, they will reduce the municipal government's ability to manage congestion and mitigate air pollution.

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