

ADB

Urban Development Series

Changing Course

A New Paradigm for
Sustainable Urban Transport



Asian Development Bank



ADB

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A New Paradigm for
Sustainable Urban Transport

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Foreword

Cities are the engines of economic activity and play a vital role in national development, but are becoming overwhelmed by congestion and the associated costs this incurs to both people and business. Rapid urbanization and an unprecedented increase in private motorized transport are creating a crisis across the region; left unchecked, this will seriously restrict economic growth and quality of life.

As a result of increased motorization, local air quality is deteriorating, resulting in serious health implications, significantly higher accident rates than those in developed countries, and rapid increase of transport contributions to global greenhouse gases. The poor are often marginalized with transport policies focusing on congestion relief, which all too often results in more road space being made available for the privileged few who own private cars. Travel time and costs eat into the socioeconomic activities of urban dwellers. Ultimately all will suffer.

There is an urgent need to change course in how urban accessibility is addressed. The new paradigm for sustainable urban transport calls for a people-focused approach, one that manages demand for travel and promotes accessibility over mobility. At the heart of the approach is the promotion of nonmotorized and public transport systems, coupled with pricing mechanisms that ensure private vehicle usage covers the full costs of externalities.

Urban development is prioritized under the Asian Development Bank's (ADB) long-term strategic framework (Strategy 2020), and ADB's Urban Community of Practice acknowledges the important role transport plays in urban development. This publication, part of the *Urban Development Series*, looks to enhance knowledge on the role that sustainable urban transport can provide to support countries across Asia and the Pacific as they tackle the urban transport challenges.

We hope that this series will contribute to the discussion on the sustainable development of Asian cities, helping develop forward-looking urban policies and practices to manage the challenges ahead.



Hun Kim
Chair, Urban Community of Practice
Asian Development Bank

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Abbreviations

ADB	Asian Development Bank
BRT	bus rapid transit
km	kilometer
LGU	local government unit
PPP	public–private partnership

NOTES

In this report, “\$” refers to US dollars.

Executive Summary

Analysis of a Problem

Recent decades have witnessed an increasing number of attempts to manage developing cities sustainably. Transport action is widely recognized as central to these endeavors. Huge resources and vast efforts have been invested in refining and improving what is essentially the same approach.

Few informed observers today consider this approach effective. The condition of most developing cities is deteriorating and where sustainable management is concerned, we are going downhill. Evidence from a number of Asian cities shows that today's transport policies are often unsustainable, few policies are implemented (usually just main roads within the city), and when implementation does occur, little is known about the extent to which outcomes meet expectations. In other words, Asian cities are facing a crisis of policy, of planning, of implementation, and of governance. This crisis is imposing huge costs at a time of formidable challenge. More daunting still is the realization that tomorrow's problems will be even greater than today's. Trying harder is no longer a credible approach: fundamental change is required. The research summarized by the Asian Development Bank (ADB) in this paper leaves no doubt that it is time to change course and adopt a new paradigm for sustainable urban transport.

Changing course does not mean starting from scratch. The experience of sustainable cities around the world reveals much of what is required and 40 years of applied research in city and transport development affords us a rich understanding. In short, we already know much of what to do. The interesting question is why that knowledge has not translated into results. To validate and support a new approach, it is imperative that we first understand what went wrong.

ADB's analysis suggests that the principal problems have been the following:

- Too often, transport plans stem from transport model black boxes and not from empirical evidence. Models have substituted for sound policy.

- Transport planning has been considered a task for the experts, and stakeholders exercise little influence. Users, residents, and other affected parties have been disenfranchised.
- Expert planning has been found wanting. Planners' core assumptions were that the future could be predicted, that funds were available, and that projects could be implemented. In reality, the future is extremely unpredictable, affordability is always a constraint, and implementation is readily thwarted. As a result, planning was not fit for purpose.
- As a result of the above, transport plans have been closer to “wish lists” than to feasible strategies. Planners failed to prioritize goals and neglected to make projects resilient and adaptable to an unpredictable future.
- City institutions have thwarted effective urban management and decision-making bodies frequently proved to be unable to deliver the plans, projects, and policies promised.
- The transport sector has not been managed systematically. Risk analysis, risk management, and performance assessments are rarely conducted and outcomes of projects and policies are seldom evaluated to see if they are successful.
- Too often, politics have won over technocratic advice. This is not to argue that decisions should always follow technical recommendations, but when technical advice is poor or is ignored, outcomes do not match hopes and expectations.
- Inadequate enabling environments established by central governments have created an ambiguous and uncertain framework for decision making and have undermined efforts at the city level.

The New Paradigm

Based on its analysis of what went wrong, ADB developed a new paradigm that reflects the best knowledge and practices of sustainable urban transport programs around the world. ADB's new paradigm has five core elements:

1. Transport policy is based on what works. In addition to technical specialists, stakeholders—including end users—also participate in the policy-making process to ensure that plans and projects reflect actual needs.

2. Land-use planning is part of the solution. The former link between land use and transport planning is recreated to facilitate the provision of public transport and reduce the need for travel.
3. Transport demand is managed alongside supply, and projects are centered on traffic restraint and the greater use of public transport. No longer is road traffic capacity automatically expanded in response to demand forecasts.
4. Transport plans and projects reflect a wider city vision or spatial strategy. They are also affordable, adaptable, and implementable. Furthermore, policy makers recognize that soft measures such as public transport advertising, internet shopping, telecommuting and teleconferencing, and better information are effective ways to influence behavior.
5. Policy effectiveness is demonstrated to a skeptical stakeholder community.

Taken together, these elements comprise a fundamental change of direction. As a result, ADB's new paradigm for sustainable urban transport offers the prospect of a much more effective management of the region's cities in coming years. As great as the challenges are, commitment and resources can empower stakeholders to make changes and accomplish what everyone is clamoring for: to place cities on a more sustainable trajectory.

This report expands on the need for a new paradigm and identifies its implications for management, financing, transport, and land-use policy. Following the tenets of the paradigm, ADB's future urban transport interventions will also help build capacity to speed up positive change.

Part A: The Need for a New Paradigm

What Is the Problem?

This section is a story in two parts. In the first, the past is explored to reveal that insofar as urban transport is concerned, many Asian cities have been like the fabled “emperor” who wears little or no clothes. The second part describes a future that, while requiring a marked change in direction, offers Asian cities all the promises and benefits that sustainable urban transport can bring. It is a message of past mistakes, of current challenges, and of hope for the future.

Today’s predicament

We start with the present condition of today’s towns and cities. Despite the best efforts of transport specialists, more and more cities today are experiencing increasing traffic congestion (more severe congestion in more areas), more pollution, more traffic accidents, and more greenhouse gases. Rudyard Kipling wrote that “transport is civilization”¹ but today’s transport policies deliver the opposite of a civilized quality of life. Cities are usually sprawling, with the “haves” escaping to areas with better living conditions and the “have-nots” trapped and increasingly marginalized. Furthermore, the trends appear adverse. Car ownership is doubling every 3–7 years in many Asian cities and public transport is experiencing a significant loss of transport mode share. The 1-lakh Nano car (\$2,500) has just been launched and the demand for more roads and expressways is constantly on the rise. City leaders have become increasingly frustrated, not knowing which way to turn:

“We feel overwhelmed.”

“Our cities are spreading further and further.”

“Problems are growing.”

¹ R. Kipling. 1905. *With the Night Mail: A Story of 2000*. 2020ok.com/books/90/with-the-night-mail-a-story-of-2000-a-d-14590.htm

“Our citizens are suffering.”

“Everything we try fails.”

As a result, most city leaders fear that they are facing the inevitable degradation of citizens’ quality of life, even as many cities grow more prosperous and stakeholders demand that leaders act now to save the planet. “How,” they ask, “do we stabilize and reverse this vicious spiral of decline?”

Tomorrow’s challenge

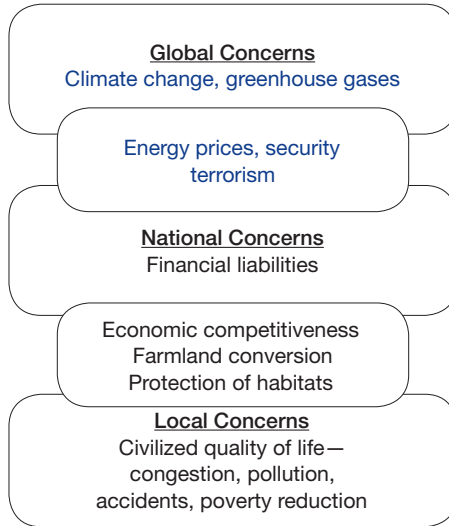
Substantial evidence shows that cities are becoming more, not less, challenging to manage (this is true of businesses as well). Our future is characterized by the increasing pace of change, growing unpredictability and risk, an urgent policy agenda, and greater stakeholder demands. Thus, not only are current policies leading to progressive decline, but the challenges on the horizon loom larger still. This situation requires city leaders to reorient themselves dramatically so as to focus on what is important, to collaborate with other actors, and to manage their cities strategically.

Figure 1 illustrates recent changes in the policy agenda. Seven years ago, climate change and terrorism (in blue text) were low on or absent from the policy agenda. Now, institutions around the world are investing vast resources in an attempt to achieve stability in these areas. At the same time, oil prices have been extraordinarily volatile in the past few years. The consensus is that the price of oil will remain high and variable and will exert a strong influence on gas prices and the price of most electricity. Transport planners are struggling to determine the implications of this scenario for the competitive positions of different modes of transport and to create strategies that will meet needs in an unpredictable future. In the meantime, former issues have not gone away—far from it: poverty reduction remains ADB’s overarching goal. But these new concerns underline the planet’s interconnectedness, influence policy responses, and affect urban transport policy.

In short, the principal issue today is that of great uncertainty. Uncertainty defines today’s global credit crunch and is likely to persist in the future. Uncertainty poses an immense challenge to city and transport system managers and planners as it requires them to design different projects and strategies appropriate to a very different, and a very unpredictable, tomorrow.

It seems clear, then, that the core challenge that faces the transport sector today is **managing dynamic complexity**. Planners and managers

Figure 1: The Challenging Policy Agenda



Note: Issues in blue text have emerged since the year 2000.

Source: Asian Development Bank.

tend to focus on the latest urgent problem instead of adopting the balanced strategy required to stay on course. Climate change is one such problem: few question its importance, but it would be imprudent to implement climate change mitigation policies without considering their wider implications for transport and urban development.

What went wrong

To resolve how to meet this challenging policy agenda, we must first determine how urban transport policy went so widely off track. In this section, ADB provides an analysis of what went wrong as a basis for looking ahead. This analysis uses various sources, including ADB's study of five Asian cities completed in 2007, *Sustainable Urban Transport*.²

Table 1 summarizes the experiences of the five cities studied by ADB in 2007–2008. ADB's analysis found the following:

- Transport policies were frequently unsustainable and had mixed results.

² ADB. 2007. *Technical Assistance for Sustainable Urban Transport, Final Report – City Case Studies*. Manila. TA 6350-REG.

Table 1: Problems Experienced by the Five Cities

Criteria	Changzhou, People's Republic of China	Colombo, Sri Lanka	Dhaka, Bangladesh	Harbin, People's Republic of China	Kathmandu, Nepal
Was the policy sustainable or unsustainable?	Unsustainable and infrastructure-oriented, but some projects not part of the original policy turned out to be sustainable.	Unsustainable because it lacked vision and measurable targets and could not be implemented.	Mixed	Unsustainable and infrastructure-oriented	Infrastructure-led, institutional accountability at national and local levels
Was the policy implemented?	Major infrastructure implemented that was not in the plan	Minimal implementation	Policy approval delayed, minimal implementation	Major infrastructure implemented	Minimal implementation
Was the implemented policy successful?	Success unknown	Minimal implementation	Policy approval delayed, minimal implementation	Success unknown	Minimal implementation
What was the basis of the transport plan?	Model-based, very ambitious and unconstrained by affordability; no risk analysis (a predictable future was assumed)	Model-based, ambitious and unconstrained by affordability; no risk analysis (a predictable future was assumed)	Model-based, ambitious and unconstrained by affordability; limited risk analysis (a mostly predictable future was assumed)	Model-based, very ambitious and unconstrained by affordability; no risk analysis (a predictable future was assumed)	Model-based, ambitious and unconstrained by affordability; no risk analysis (a predictable future was assumed)
How was governance?	Strong institutional capacity; some conflicts of interest	Profound problems	Profound problems	Problems in technical areas	Profound problems

Source: Asian Development Bank.

- None of the cities implemented a sustainable policy, and Changzhou alone implemented some sustainable transport policy elements, none of which had been planned. In the three cities outside of the People's Republic of China, few projects were implemented at all. In Colombo, for example, only one of 265 "priority projects" pushed through.
- Policy makers were unable to say whether the policies implemented succeeded as planned, because implementation was not assessed.

- All of the transport plans surveyed were based on transport models. None reflected affordability and all were overly ambitious.
- All city plans were developed under highly optimistic assumptions about the city's future (economic growth, affordability, and vehicle growth). None stress-tested projects and strategies; rather, all plans assumed a predictable and optimistic future. Only Dhaka made a systematic attempt to consider risk.
- Changzhou alone had strong, empowered institutions. The other four cities had profound governance problems.

ADB's experience suggests that these five cities are representatives of developing cities in Asia. Transport policies varied: some were more sustainable than others, and the more unsustainable policies were oriented around infrastructure. Implementation was patchy: sometimes infrastructure (particularly large-scale road development) was constructed, but often, few projects were pursued. Only exceptionally were sustainable policies followed. Almost without exception, transport plans turned out to be "wish lists" that failed to confront hard questions about affordability, ability to implement, merit, and strategies; furthermore, projects rarely planned for an unpredictable future. In addition, most cities faced a range of governance issues, often profound, that were either ignored or resisted resolution.

Further analysis showed that six mutually reinforcing factors contributed to this status quo:

Absence of a city development strategy.³ Too often, transport planning took place in a vacuum. The city had no city vision or spatial strategy to indicate the direction in which it should expand and it was unclear what transport action was required to deliver.

Unsustainable transport policies. In many cases, even if transport policies were implemented as planned, core problems were not tackled effectively. In fact, many transport plans appear to have been outputs of a transport model-driven process in which traffic growth was routinely met with large infrastructure projects. This contrasts with the transport policies of more sustainable cities, which adopt the opposite approach.

Ineffective transport planning. Regarded as a task for experts, transport planning left little room for stakeholder influence or buy-in.

³ "City development strategy" is the term used by the Cities Development Initiative for Asia. Synonymous terms are a city or urban spatial strategy, a city structure plan, and a city development framework.

Transport planning was based on the completely unrealistic assumptions that the future could be predicted, that affordability was not a constraint, and that implementation would be possible. Planners used deterministic transport models with optimistic inputs whose outputs were too readily accepted. The result was plans that were seldom realizable. When everything is a priority, nothing is a priority.

Little implementation. All plans were characterized by a disconnect between what was planned, what was budgeted, and what was implemented. This represents a seriously dysfunctional process. Planning had little impact, and where implementation did occur, it did not affect core priorities.

Little data about the success or failure of implementation. In cases where plans were implemented, little was known about the extent to which they were successful. While some risk analysis and management and performance assessments took place, planners simply did not assess the degree to which the implementation of policies resulted in the achievement of policy goals.

Governance problems. Too often, technocratic endeavors were used to justify political decisions rather than to provide sound advice that helped set priorities and inform political action. Stakeholders wielded little influence and government failed to enable a productive policy environment.

Taken together, these problems are extensive. With so much gone wrong with the existing approach, a strategic change is clearly in order.

What Must Happen Now?

Looking to the future, we start with more than an understanding of what went wrong: we have substantive knowledge about how to proceed. Forty years of empirical research provide deep insights, and cities that are developing sustainably have much to tell. Too often, however, policy makers have ignored the evidence. In other words, actors are not doing what they should know to be necessary.

Evidence from sustainable cities

Barcelona; Bogotá; Curitiba; Dublin; Hong Kong, China; London; Munich; Seoul; Singapore; Stuttgart; Vancouver; Zurich—these cities have been recognized as having developed sustainably in important aspects. None has done so by accident, but by purposeful action that has been maintained over time. ADB's analysis shows that all of the successful policies and projects pursued by these cities addressed the following three issues: policy (what

to do), management (how to do it), and financing (what to do it with). While no simple best practice can turn a city around, planners can embark upon a more sustainable form of urban transport development by employing the following principles:

- City leaders must be capable of addressing the dangers that face the city and of marshalling the political power necessary to create the conditions for improvement. They must recognize the importance of future development that is largely in their hands.
- Stakeholders must understand enough of the fundamentals of sustainable land-use and transport policy to share a strategic vision of the role of transport. A virtuous circle of politics without politicking and accountable management (often democratic control) is the goal and a technocratic approach is a constant theme.
- City leaders must be willing to make difficult but necessary decisions.
- Political institutions that make decisions about transport projects must have the authority to implement those decisions. Power to make transport-related decisions should be situated at the same level of government as the power to decide about funding. It is of little use for megaproject decisions to be made by bodies that lack the power and the funds to ensure that decisions are carried out.
- Stakeholders must recognize that improvements do not come cheaply. Complete financial realism is essential. Citizens must pay more and city governments must find ways to increase municipal income. In addition, authorities must demonstrate that funds are well spent.
- Cities must follow processes to manage strategic risk. Strategic risk management is the only way to manage cities and transport systems proactively.
- Great care must be taken in committing to and developing megaprojects, which are by nature more risky than smaller projects. Decision makers must ensure that the appeal of free, central government financing does not distort their strategic imperatives.

A city typology of transport development paths

The last 40 years have produced an important body of empirical research that has led to strong conclusions about city forms and transport policies for large cities. Using this research and observations on the evolution of Asian cities in recent decades, National University of Singapore transport

expert Paul Barter⁴ developed a city typology of transport development paths in 2004. This typology allows developing cities to assess their position and the travel direction of their existing policies. They can then identify an alternate path that takes current concerns of climate change, pollution, and energy use into account, while improving the overall functioning of the urban economy and addressing issues of social inclusion and equity (Figure 2).

Barter's typology is based on his and others' observation that in most Asian cities, periods of high economic growth are often associated with the very rapid establishment and expansion of transport infrastructure systems. The decisions that a city makes at these times are critical because they lock the city into a certain development path that has strong implications for city efficiency and residents' quality of life—and for the city's use of energy and its greenhouse gas emissions.

Two key arguments run through Barter's research. The first concerns a desirable development path for Asia's usually dense cities. The author argues that

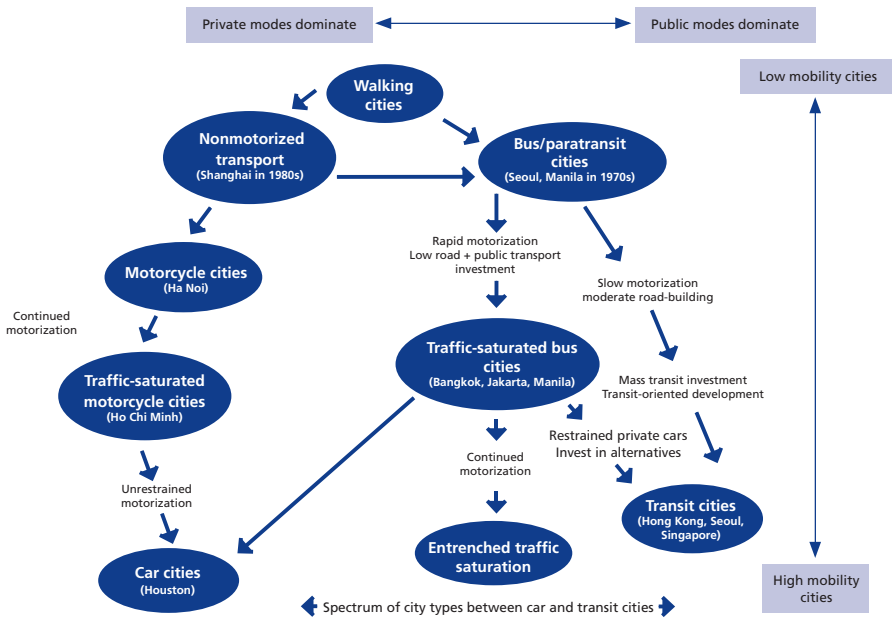
a realistic and relatively low-cost urban structure/transport strategy for newly motorizing Asian cities is to accept high urban densities but to try and [and] slow motorization and aim to enhance non-automobile alternatives in order to prevent unacceptable local pollution and congestion.

This strategy also helps counter the rapid rise of greenhouse gas emissions.

Barter's second argument is that a sustainable transport strategy must remain focused on the overall purpose of transport planning, namely, improving residents' access to services. This requires planners to concentrate on planning for proximity. Transport policies based on meeting long-term strategic requirements also offer great potential to reduce greenhouse gases and energy use. Yet, planners often orient their work around technological means of meeting these goals to the exclusion of the greater objective of creating a sustainable city. Policy can become distorted as a result.

⁴ P. A. Barter. 2004. A Broad Perspective on Policy Integration for Low Emissions Urban Transport in Developing Asian Cities. Draft paper for the international workshop Policy Integration towards Sustainable Energy Use for Asian Cities: Integrating Local Air Pollution and Greenhouse Gas Emissions Concerns. Institute for Global Environmental Strategies. Institute for Global Environmental Strategies, Kanagawa.

Figure 2: Barter's City Typology and Transport Development Paths



Note: The model shows intended or potential transport development paths for developing cities.

Source: Adapted from Paul Barter. 2004.

ADB's new paradigm

The growing severity of environmental and social problems linked to the transport policies of Asian cities today confirms that trying harder is no longer a credible approach; the very direction of travel policy needs to change. Furthermore, crucial numbers of actors—policy makers, politicians, technocrats, professionals, nongovernment organizations, and civil society—have come to realize that the way that the transport sector is presently being managed is not working. Cities are facing a crisis in terms of policy, planning, implementation, and governance. They are also facing a skeptical stakeholder community that must be convinced that the new paradigm is indeed the better way.

ADB's new paradigm for sustainable urban transport calls upon actors to change policies and approaches, to deliver different plans and projects, and to convince stakeholders of the relevance and effectiveness of the

new approach. The defining features of ADB's approach are policy that is defined not by theory but by evidence; demand that is managed to supply, not supply that is expanded to meet anticipated demand; plans and projects that are implementable, affordable, relevant, and adaptable to a changing future; and, of critical importance, the demonstration of policy effectiveness and relevance to skeptical stakeholders.

Table 2 summarizes the defining features of the change in approach. It highlights the imperative to manage demand to supply.⁵ Ways to meet these goals include the following:

- focusing on public transport; the growth of public transport is central to ADB's strategy;
- recognizing that traffic restraint is an essential part of the package;
- adopting land-use planning as part of the solution so that land-use planning can both facilitate the provision of public transport and reduce the need to travel; and
- exploiting soft measures such as telecommuting, teleconferencing, internet shopping, public transport marketing, and better information as means to influence behavior.

In addition to calling upon actors to adopt new ways of working, the paradigm also requires them to modify their approach to risk. Managing risk is central to turning a reactive style of urban transport management into a proactive approach. Proactive risk management produces transport strategies that face up to hard choices, give substance to the city vision, and create projects that are robust and adaptable. It also deploys performance/asset management and project development processes that deliver increasingly predictable success.

Another important aspect of the new paradigm is the role of different constituencies. In the new paradigm, policy is no longer the preserve of technical specialists. Instead, this paradigm marks a transition from technical, model-based policymaking to evidence-based policymaking supported in some respects by models and influenced by the inputs of users and other stakeholders. Although the paradigm is based on empirical observation and robust technical analysis, it goes beyond technical considerations and puts the one-size-fits-all approach to urban transport to rest. However strong the emerging consensus on the need for a new approach, it is time to

⁵ See European Commission. 2007. Green Paper: Towards a New Culture for Urban Mobility. COM (2007) 551 Final. Brussels. This paper argues for a new urban mobility culture.

Table 2: Old and New Urban Transport Paradigms

Aspect of Transportation Policies/Plans	Old Paradigm	New Paradigm
Goal	<ul style="list-style-type: none"> To provide mobility Road capacity is increased to meet forecasted increase in demand A traffic-centered approach 	<ul style="list-style-type: none"> To provide accessibility Demand is managed to road capacity and public transport is central A people-centered approach
Basis	<ul style="list-style-type: none"> Deterministic model forecasts by technical experts Lack of stakeholder engagement 	<ul style="list-style-type: none"> Plans are based on sustainable policies and strategic planning Robustness, technical soundness, and stakeholder support are criteria for plan adoption
Preparation for an uncertain future	<ul style="list-style-type: none"> The future is largely ignored and sensitivity testing is trivial 	<ul style="list-style-type: none"> Preparation for the future is central; more relevant strategies and projects result
Content	<ul style="list-style-type: none"> Building projects, roads within the city Frequent megaprojects 	<ul style="list-style-type: none"> Management and integration of the existing transport system Focus on public transport New roads shape the city's expansion and secondary roads catalyze infill development Megaprojects are pursued only after careful study
Financing	<ul style="list-style-type: none"> Affordability is assumed and only limited attention is paid to whether the plan can be implemented 	<ul style="list-style-type: none"> Affordability is an input and financial and technical planning proceed together Focus on the possibility of implementation and on operations
Stakeholder involvement	<ul style="list-style-type: none"> Plans devised by technical experts using transport models; little stakeholder influence 	<ul style="list-style-type: none"> Strong stakeholder involvement and influence Technical inputs are fit for purpose Strong consensus is a requirement
Implementation	<ul style="list-style-type: none"> Implementation is a problem to be sorted out later 	<ul style="list-style-type: none"> Implementation processes are put in place and impediments are addressed early
Governance and institutions	<ul style="list-style-type: none"> The planning process is often politicized Technical analyses often provide justification for political decisions 	<ul style="list-style-type: none"> The planning process is technocratic and informs hard political decisions Improved governance is a prerequisite The focus is on creating an enabling environment

Source: Asian Development Bank.

recognize that no single model—metros in every city, for example—is the answer. By calling upon transport planners to work in concert with other key stakeholders, the paradigm ensures that all of those concerned participate in the design and implementation of relevant, sustainable urban transport policies, policies that will change the face of Asian cities—for the better.

Part B: Content of the New Paradigm

ADB's new paradigm comprises three components: management (how to manage the transport sector), financing (how to provide the means to manage the sector), and policy (what to do). In practice, these components interact with each other: what to do depends on what is affordable and both depend upon players' capacity to determine the right strategy, implement that strategy, and monitor performance.

Management

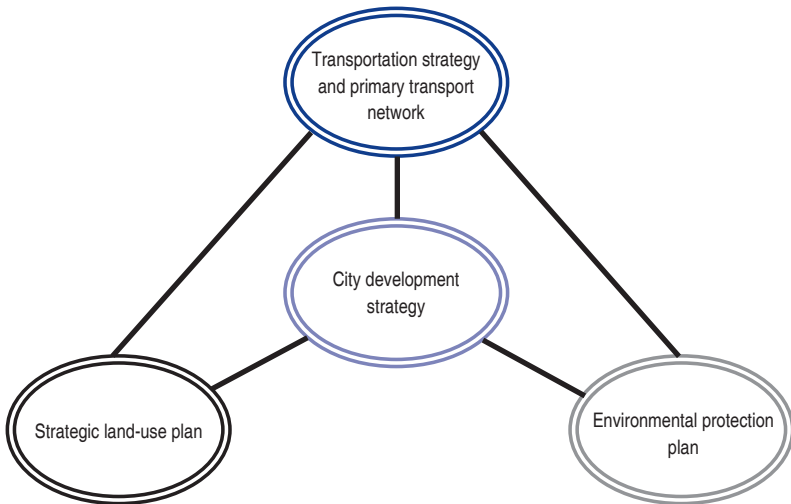
Institutions and governance

In this section, ADB identifies how institutional and governance arrangements can support sustainable urban transport policies and practices. This simple objective encompasses a multitude of challenges. The fact that every city has a unique character, history, and development experience complicates the search for broadly applicable solutions. Still, there is an approach that leads to sustainable solutions—albeit solutions that require careful tailoring to local needs.

The foundation of this approach is the creation or existence of a single city authority with powers over its commuter catchment area for strategic planning, transport, environmental protection, and substantial self-financing (Figure 3). To be fully effective, transport solutions increasingly require a package of measures that include transport management, environmental upgrading, and public transport improvements. When the responsibility for these measures is vested in a single organization, the measures can be implemented concurrently and major improvements become possible. While examples are limited, some cities are following this approach, most notably London.

While the powers of the city authority structure proposed here are greater than those of existing structures, the city authority must still coordinate with the central government. The central government will always play a role in the management of major cities, local government units, and in some cases, major developers. Table 3 details the responsibilities of various levels of government in sustainable transport policy. To be most effective, the policy requires, first, that all three levels of government have the power to act, and

Figure 3: The City Authority as an Instrument for Effective City Management



Source: Asian Development Bank.

Table 3: Planning Responsibilities of Different Levels of Government

Planning Level	Responsibility	Institution
Strategic	<ul style="list-style-type: none"> Development of a structured process for the entire urban area. The core purpose is to guide public and private sector decision making and provide the basis for sector planning 	<ul style="list-style-type: none"> City authority that coordinates with central government and local government units (LGUs)
District and/or Local	<ul style="list-style-type: none"> Local planning to bring land into effective development Enforcement of minimum standards to control land use 	<ul style="list-style-type: none"> LGUs
Site Specific	<ul style="list-style-type: none"> Localized planning for large developments. This normally requires LGU involvement but may be led by private developers Negotiations with communities as required (as in Kathmandu or in the case of land readjustment in Japan) 	<ul style="list-style-type: none"> LGUs and/or developers

Source: Asian Development Bank.

second, that they act jointly across the city catchment area. Achieving this degree of integration requires purposeful action.

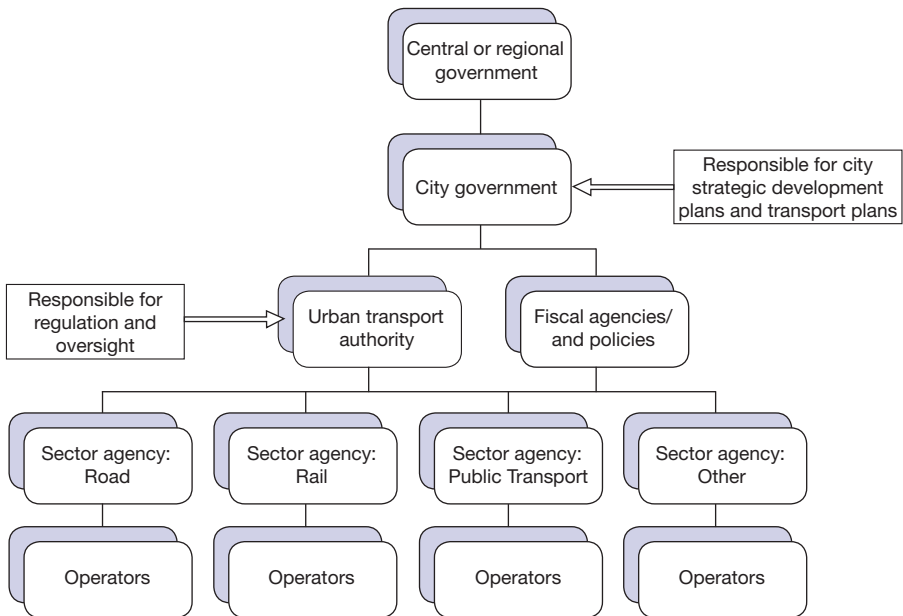
Figure 4 outlines a typical institutional structure for a sustainable urban transport program. As shown, the city authority is responsible for strategic planning and transport and has substantial financing powers. This organization of the city authority is not intended to be prescriptive, and takes time to achieve; it only evolves as responsibility is demonstrated and trust with the central government grows. But it can serve as a framework on which local conditions may be superimposed.

Insofar as governance is concerned, the lessons learned by sustainable cities suggest that sustainability requires purpose, integration, and consistency in its planning and technocratic management activities. It also requires fiscal realism and the establishment of an effective civil service through structured human resource development programs. The central government should create an enabling environment that promotes accountability, participation, predictability, and transparency. The central government also has the task of allocating responsibilities to various tiers of government and nongovernment entities such as national, city and local government units, contractors, and different sectors of civil society. Ideally, the allocation or recognition of responsibilities is accompanied by a proportional adjustment in financial authority.

While legacy conditions may constrain the adoption of these principles, an institutional structure that reflects the themes of integration, sustainability, and pragmatism is essential. It is critical that cities create a citywide transport authority supported by appropriately resourced units explicitly charged with a full range of transport-related responsibilities. These units must work together toward strategically determined objectives echoed in municipal plans and in transport plans. Of equal importance are systems to monitor and evaluate institutional performance.

How do cities apply these principles to their own circumstances? The key is a diagnostic study. A diagnostic study examines how the urban transport sector is organized and evaluates the efficiency and capability of the agencies involved in terms of their goals, the financial resources available to them, and the major sector issues they face. The goal of the study is to conceptualize what is needed. Translating this concept into practical and effective action is another matter: this requires commitment, political will, and pragmatic leadership in a turbulent environment. In this regard, sustainable cities have shown that it is possible to take advantage of windows of opportunity to make rapid and purposeful progress. Effective capacity building is necessary to prepare for these opportunities and this is where partnerships between cities and international financial institutions can be especially valuable.

Figure 4: Typical Institutional Structure of a Sustainable Urban Transport System



Source: Asian Development Bank.

Institutional and governance-related framework

In suggesting a framework for institutional configurations and governance principles for sustainable urban transport, ADB recognizes that developing city institutions vary enormously. Each reflects the unique history of its country and city and there can be no single best model. For that reason, ADB created a framework that allows cities to adapt the configurations and principles suggested to achieve proactive city management (Table 4).

As promising as this framework appears, getting from here to there is never easy. Developing cities should not hesitate to adopt a pragmatic approach that encourages solid progress in the right direction. Just as sustainable urban transport demands pragmatism, the adoption of a reasonable, location-specific action and implementation program also necessitates the recognition that progress may be iterative rather than linear, with challenges and pitfalls along the way. An attitude of flexibility and responsiveness will go a long way, as will recognition that the demands of purposeful action, continuity, realism, and integration must be balanced against issues of technical development, market dynamism, and social and/or economic change.

Table 4: ADB's New Institutional and Governance-Related Framework

Characteristic	Old Model	New Model
Decision-making authority	<ul style="list-style-type: none"> Weak powers distributed across local government units (LGUs) Central government dominates 	<ul style="list-style-type: none"> Strong city authority with powers over the commuter catchment area As cities grow, the boundaries of this area may have to be expanded
Decentralized powers	<ul style="list-style-type: none"> Strong central government Weak or no city authority Weak LGUs with little financing 	<ul style="list-style-type: none"> Strong city authority sets strategy and coordinates with the central government and LGUs Both the city authority and the LGUs have financing powers
Integrated land-use and/or transportation and/or environmental strategies	<ul style="list-style-type: none"> Little integration and competing interests 	<ul style="list-style-type: none"> City authority has powers over multimodal transport, land use, and environment protection Debate of pros and cons is a prerequisite to the adoption of a strategy
Enabling environment	<ul style="list-style-type: none"> Often weak Political benefits take precedence over benefits to end users Ineffective private sector participation 	<ul style="list-style-type: none"> Implementation processes are in use Effective measures to attract private sector participation are in place
Governance	<ul style="list-style-type: none"> Closed processes with little stakeholder influence An unpredictable environment that may be suborned by inappropriate influences 	<ul style="list-style-type: none"> An open, participatory, and accountable approach and a predictable environment under the rule of law Competition and public-private partnerships are encouraged and beneficial foreign direct investment is attracted
Institutional structure	<ul style="list-style-type: none"> No strategic transport authority Duplication, omission, or complex allocation of responsibilities among agencies 	<ul style="list-style-type: none"> Strategic transport authority provides policy leadership and coordination Responsible agencies implement policies Separation of policy, procurement, regulation, and the delivery of services
Role of international financial institutions	<ul style="list-style-type: none"> Promote sustainable urban transport policies without the necessary support or resources Technical assistance projects are often ineffective Many loans are for megaprojects Implementation delays and cost overruns are common 	<ul style="list-style-type: none"> Long-term partnerships with cities committed to implementing sustainable urban transport policies Technical assistance programs provide necessary support Loans are for strategic priorities Results are widely disseminated

Source: Asian Development Bank.

Implementation processes

It does not take long for city leaders to run up against challenges of implementation. ADB's research found implementation to be either patchy or scarce. Furthermore, it was often confined to major roads. In instances where plans were actually implemented, administrators knew little about the results. There was little evidence of effective asset management or performance monitoring.

This poor record can be explained by governments' failure to create processes to translate strategies and plans into operation. These processes are features of sustainable cities. Putting them in place does not require more effort per se but rather more effective effort. Most developing cities routinely deploy considerable planning and engineering resources; much could be accomplished by directing these resources more effectively.

Managing Uncertainty

Today's future is tremendously uncertain. However uncomfortable, this fact must be reflected in the way authorities manage cities and plan transport strategies and projects. It is essential that cities and transport sectors be managed proactively. To do this, planners must analyze and manage strategic risk, as is common practice in leading international organizations.

The chief executive officer of broker Aon Corporation met 1,800 chief executives, chief financial officers, and risk managers in the Americas, Asia, and Europe over 2 years. He drew the following conclusions:

- Misunderstanding risk can be fatal. First on the list of issues that successful chief executives think about every day is risk.
- The magnitude of risk is increasing. Whether terrorism, a pandemic, or global warming, the severity of risk is on the rise.
- Risk is growing more complex.
- Risk scrutiny—and management scrutiny—is also growing.
- Risk solutions are three parts opportunity and one part downside protection. “I believe that behind every great idea is a view on how to think about risk in ways that other people haven't” (chief executive officer, Aon Corporation).
- One's view of risk and how one thinks about risk must not only be scrutinized, it must also be managed.

Too often, the public sector in developing cities is reactive, buffeted by events, and struggling to keep on course. Although relatively new, risk management has the potential to quickly transform a city's management style from reactive to proactive. Practice in this domain varies considerably and sometimes advances significantly in a few short years. Despite changes and variations, however, those who have introduced risk management processes discover great benefits: surprises are eliminated, emerging trends are identified, and good corporate governance begins to grow.

As stated earlier, managing uncertainty also means changing the content of a transport strategy. This means designing projects that are fit for an unpredictable future. Resilience must be built into the design of critical infrastructure, and projects must be adaptable. On this last point, much greater levels of adaptability could be built into projects than is currently practiced. To make projects more adaptable, planners should create a technically sound strategy that has robust performance in the uncertain future and enjoys stakeholder support. In today's environment, it is of little use to focus on optimizing the technical aspects of projects that assume a certain future.

Four Processes

To formulate coherent plans, to identify and develop effective projects and policies, and to manage the transport system proactively, one must employ strategic processes. Together with champions and institutional capacity, these processes are fundamental to the delivery of sustainable urban transport. The following four core processes are involved (Table 5):

An integrated urban land-use and transport planning system. This system should be integrated across national and city governments (national government has a major influence on cities). It should link transport, city development, and environment protection. A multimodal viewpoint is the best approach.

An urban transport planning cycle. This cycle should comprise a logical sequence of tasks that go from setting broad city goals and implementing projects and policies to monitoring the performance of the transport system.

A megaproject development process. This process should develop, implement, and operate megaprojects such that projects meet broad expectations. The process may be influenced by requirements for securing private sector participation.

It concerns the development of megaprojects. Because of their scale, cost, and impact, some projects, such as metros (subways), expressways,

Table 5: Four Strategic Processes

Process	Description	Key Stakeholders	Strategy	Output of Process
Integrated urban land-use planning system	Strategic engagement of key stakeholders provides the technical basis and political support for the city strategy, creating a context conducive to successful transport planning.	City authority working with business and civil society	Prepare city plan	Strong consensus behind a realistic and relevant city plan
Urban transport planning cycle	Strategic engagement of key stakeholders provides the technical basis and political support for city transport projects.	City authority working with national government, business, and civil society	Prepare city transport strategy or plan; identify priority projects and estimate their cost	Strong consensus behind a realistic and relevant city transport strategy or plan
Megaproject development process	Strategically important infrastructure is developed in stages to ensure its relevance, its effectiveness, and its success once operational.	City transport authority, working with civil society and the private sector	Prepare several studies, including the concept study, the business case, and bidding documentation	Robust project specifications, development of a business case, and a project development process that delivers success
Transport asset and performance management process	This process creates the capacity to proactively manage city transport assets, to measure and monitor sector performance, and to make results widely available.	City transport authority and civil society	Create an asset register; establish a performance monitoring system	Knowledge of the extent and condition of transport assets, knowledge of processes for their proactive management, knowledge of transport system performance, and wide dissemination of performance results

Source: Asian Development Bank.

and airports, are considered megaprojects. These require careful treatment, since despite their popularity, they frequently fail to deliver the benefits expected. In addition, they have high opportunity costs. These problems argue for changes in the megaproject development process. The guiding principles are as follows:

- From conceptualization to operation, the megaproject development process must become far more continuous and focused on key decisions and operations than is current practice.
- Decision making needs to take place without premature political or financing commitments.
- Central governments must create an enabling environment that incentivizes city authorities and private sector concessionaires to work in the public interest.
- Operators must be involved in all stages of the project to ensure that actors remain focused on operations (the core purpose of the investment).
- Authorities must ensure that new megaprojects are fit-for-purpose.

A transport asset and performance management process. This process should facilitate the proactive management of the city's transport system and should create pressure for improvements.

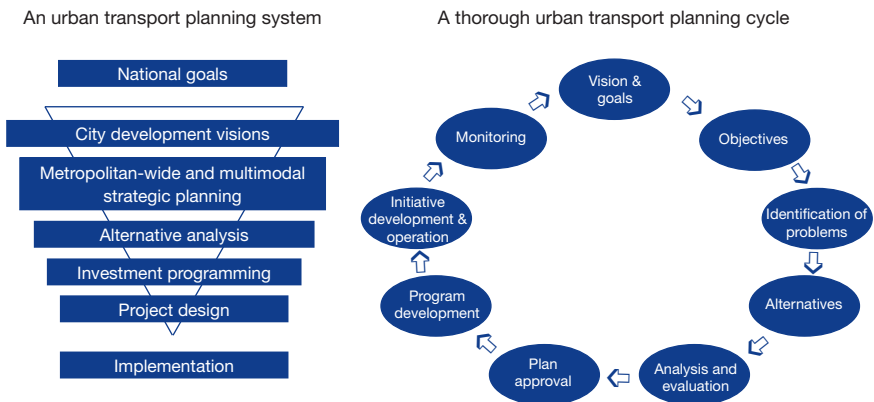
It is also the management of transport assets and performance assessment and monitoring. Transport systems comprise valuable assets such as roads and equipment. These deteriorate and require investments for their maintenance, upgrading, or replacement. Politicians and city authorities of most developing cities ignore this responsibility, seeming to find new projects more appealing than the mundane management of the city's asset base. For this reason, asset management is often an "elephant in the room." Actors fail to recognize that the good functioning of the public and private transport system depends on well-managed transport assets without which the city would cease to function.

In addition, city authorities need to understand how the performance of the transport system changes over time to know if their policies are effective. This requires measuring and monitoring asset condition, performance, transport demand, and stakeholder satisfaction. To perform these tasks, cities must invest in surveys, data collection, and technology. Measuring change is neither easy nor inexpensive, and as a result, it rarely takes place. Few city government departments make use of asset management techniques

developed by private business. ADB (2000)⁶ noted that the private sector could help fill this gap by maintaining and operating concessions. This would allow governments to tackle problems of maintenance and rehabilitation while becoming more familiar with performance-based contracting.

Figure 5 illustrates the steps in the first two of the four strategic processes: an integrated urban land-use and transport planning system and a transport planning cycle. The first diagram depicts the urban transport planning system recommended by the International Bank for Reconstruction and Development (the World Bank) for India. In India, the national government took the lead in catalyzing urban transport planning in many cities. Its system places transport planning within the context of a city development strategy and demonstrates the value of integrating national and city development goals and making transport planning multimodal. The second diagram shows a strategic transport planning cycle that comprises the tasks necessary to ensure that policies and projects are relevant and effective.

Figure 5: Two Strategic Processes: An Integrated Urban Transport Planning System and a Thorough Urban Transport Planning Cycle



Source: K. Fang, 2007. *India: Sustainable Transport Program. Proposed GEF Project*. World Bank Transport Forum. Washington, DC: World Bank.

⁶ ADB. 2000. *Developing Best Practices for Promoting Private Sector Investment in Infrastructure—Roads*. Manila. www.adb.org/Documents/Books/Developing_Best_Practices/Roads/default.asp

Box 1 shows how the City of London communicates its performance to its stakeholders.

Box 1: City of London Performance Indicators

Every local authority in the United Kingdom is required to produce an annual monitoring report that charts its progress in achieving the policy objectives of its local plan. Objectives cover business development, housing, air quality, parking, and other aspects of civic life. Quantified performance indicators are identified for monitoring purposes and the results are made public to allow comparison between authorities. This creates pressure for improved performance. The City of London goes to great lengths to market its performance as a way of attracting foreign investment and to help ensure future prosperity.

Source: www.cityoflondon.gov.uk/Corporation/LGNL_Services/Council_and_democracy/Performance/Council-performance_indicators.htm

Performance assessment and monitoring is also central to ownership. Transport projects must go beyond ribbon-cutting to include practices to help actors identify and understand the successes and the problems encountered in implementing new sustainable urban transport processes. This improves policy and helps create broad acceptance of the approach. In the event of a partnership, ADB expects to work with the city authority in conducting periodic reviews against agreed targets with the objective of providing assistance where and when it is most effective. This way, ADB provides flexible and effective support in a structured manner.

Experience suggests that benchmarking city transport is not straightforward and that benchmarks have not been developed as far as necessary. The key issues are as follows:

Stakeholders' motivations. Too often, technocrats monitor performance to satisfy the requirements of international financial institutions, not to improve policy or inform the public. Without genuine buy-in by city authorities, performance monitoring will remain an uphill struggle.

Megaproject performance assessment. It is relatively straightforward to assess the extent to which plans are implemented and it is not difficult to do the same for policies, but determining the success of megaprojects is more difficult. Planners must define the criteria that will help them evaluate stakeholder satisfaction and measure results against expectations. This requires data and surveys.

Measuring the performance of the transport sector. Even more difficult than measuring the success of megaprojects is measuring the

performance of the transport sector as a whole. Data must be reliable if planners are to identify year-by-year trends and formulate an effective policy response. Measurements must address both the sector's performance and its impact on society, the economy, the environment, and land use.

Key Issues

Several key issues lie at the heart of effective implementation. These consist of the enabling environment created by the central government, the need for a new form of strategic planning, the creation of a staged decision-making process centered on risk analysis and risk management, the need for a long-term financial and technical planning, and forecasts and appraisals that are fit for the decision-making purpose.

Enabling environment. Central government economic or financial oversight agencies are responsible for creating an enabling environment that allows for the development, implementation, and monitoring of effective plans and projects. The guidance furnished by these agencies encourages city governments and private sector partners to act responsibly and to implement national objectives. When this guidance is complex, detailed, and subject to frequent change, it confuses and undermines success, but when it is strategic, is confined to important issues, and is subject to only periodic change, it can be very effective. This has been Singapore's approach.

Strategic planning. It is a truism that if everything is a priority, then nothing is a priority. Planners must confront the fact that resources are limited, decision making must be based on knowledge and fact, and analysis must precede commitments. Major businesses routinely engage in strategic planning, deploying considerable intellectual resources and management time to define corporate objectives and priorities, consider future scenarios, strategize, create implementation processes, monitor their strategies, and adapt to circumstances as they arise. This is common practice in sustainable cities as well. Typically, these cities define a vision that sets broad goals and induces stakeholders to coalesce in its support. The vision consists of a summary city business plan that looks into the plan's advantages and disadvantages and builds upon its strengths. The vision also comprises a geographical analysis that identifies where expansion should be channeled (for example, where service costs are low and where healthy living conditions exist) and where development should be restricted (for example, in environmentally sensitive areas). Also known as the city development strategy, this plan sets course toward a city type as identified in Barter's typology.

To developing cities, strategic planning does not come naturally. Faced with overwhelming challenges, cities usually focus on here-and-now problems. Of course all cities plan, but their plans often flatter to deceive.

Furthermore, for all their detail, plans tend to be unrealistic and ineffective. More proactive city management requires a clear sense of direction and priorities and an understanding of what is needed to ensure economic growth and the physical expansion of the city. To determine this, planners must conduct strategic planning with strong stakeholder engagement to develop a vision that opens up and captures opportunities. Such planning must take place not only when creating the city development plan but also when formulating transport plans and deciding on projects.

Staged decision making. Private companies and sustainable cities make decisions in stages and only commit to implementation once consequences are understood. Table 6 shows the gateway process that the United Kingdom applies to public–private partnerships. In developing cities, this practice is frequently reversed: weak plans are approved for political reasons and project viability is hardly questioned.

Table 6: United Kingdom Gateway Review Process for Public–Private Partnerships

Function	Stage	Key Tasks Before Gateway Process
Establish business need	Strategic assessment	Identify high-level options for meeting business need
Develop business case	Business justification	Produce high-level (strategic outline) business case
Develop procurement strategy	Procurement strategy	Outline business case, define procurement route
Procure competitively	Investment decision	Conduct competitive tendering and award contract, produce full business case
Award, implement contract; outline design	Outline design decision	Approve detailed design
Produce detailed design	Detailed design decision	Approve construction
Take delivery proposals, start annual payments under private finance initiatives	Readiness for service	Conduct commissioning
Create management contract for services (where applicable)	Benefits evaluation	Confirm achievement of business benefits

Source: Office of Government Commerce, HM Treasury, United Kingdom. www.ogc.gov.uk/what_is_ogc_gateway_review.asp

Long-term financial planning. When technical planning precedes financial planning, planners make decisions without understanding their financial consequences. This often lands cities in unexpected and serious trouble. Financial and technical planning must proceed together. One way to ensure that long-term financial planning is prudent and disciplined is by obtaining a city credit rating: once earned, a good rating is jealously guarded. With long-term financial planning in place, the city benefits from a virtuous circle: an attractive investment climate draws business and foreign direct investment, these investments pressure actors to sustain good practices, and good practices draw more business and foreign direct investment.

Forecasts and appraisals. Too often, these two critical inputs do not fit the purpose. To correct this situation, appraisal frameworks must be based on core strategic objectives, forecasts must be reality-checked, and the impacts of uncertainty must be formally assessed. In many developing cities, this approach is far from the norm. Instead, city objectives are unclear, forecasts are not reality-checked, and unpredictability is largely ignored.

Financing

Sound financing is central to sustainable development, and for transport projects, it is essential that sufficient funds be available. However, these simple observations belie practice and reality. Who pays, how they pay, how spending is prioritized, and what role the private sector plays in financing—these are all elements that interact, causing important challenges to surface. The core issues are the following:

- Sustainable urban transport policies are expensive and improvements are costly. For these policies to be implemented, citizens must pay user charges, contribute more taxes, or find innovative ways of increasing city income.
- Cities must act prudently in the face of a turbulent and uncertain future. Financing for core activities and projects must be secured and financing mechanisms must provide flexibility. City authorities face a number of risks that they may be unprepared to manage: some may be better transferred to the private sector. Decision on this matter must be based on a clear understanding of core priorities.
- Actors often confuse funding (who pays) and financing (how do payers access funds). Funding can only come from three sources: (i) taxpayers (the city or national taxpayers of today or, in the case of loans, of tomorrow); (ii) transport system users (public riders, toll payers, and

others); and (iii) other beneficiaries (employers, property owners, and others). The private sector may arrange up-front financing but it itself does not provide funds.

- Experience shows that most funds must be obtained from users through tolls, charges, fare boxes, or taxation. In the case of loans, future taxpayers, not present taxpayers, pay. Innovative financing may contribute some funds and even a small proportion of a large sum may be substantial. However, the hope that innovative funding is the answer to sound city transport finances is unlikely to be realized.
- According to economic principles, users, other beneficiaries, and polluters should pay for the benefits they receive or for the costs they impose. Taxpayers should only pay when no other practical mechanism exists.
- Financing must be prudent. Cities may obtain credit ratings in order to borrow on attractive terms. Credit ratings reinforce the essential discipline of long-term financial planning.
- In general, responsibility is reinforced when city authorities have a major stake (are at risk) in the development of megaprojects. This prevents cities from competing for free central government funds that distort strategy and undermine good governance.
- Earmarking financing for specific activities and projects reduces planners' flexibility to respond to changing circumstances. Urban transport funds are a more flexible solution.
- Megaprojects pose a particular challenge because they often require much greater financing than expected. Sometimes these overruns last throughout their operating life. A prudent authority ensures that its priorities are not thrown off course and that overall finances are not undermined by committing to megaprojects before their consequences are fully understood.

Affordability and priorities

How can a prudent city authority determine affordability? The uncertain nature of the future means that affordability, too, is uncertain. As a result, some activities and projects should be considered essential while others should only be considered important or desirable. There is merit in defining a public sector budget envelope that secures funding for essential activities and projects and only promises funding for other activities and projects

Box 2: Affordability and City Management: Manila

In 1982, the city of Manila in the Philippines created an institutional context that allowed priorities to be roughly determined against available financing. The city developed an investment strategy for all municipal sectors: highways, public transportation, water supply, sewerage and sanitation, garbage disposal, housing, social infrastructure, and others. Working from past expenditures and future prospects, planners identified a set of projects that could definitely be financed (the “core investment” program) and a second set of projects that could be implemented if additional funds became available (the “core plus” program). They used a transparent, comprehensible system to separate unambiguously good from unambiguously bad projects and to classify the remaining projects using objective criteria and different weights for different scenarios. They did not seek precision or attempt to dictate outputs in detail. The strategy established the robustness of each project under a range of scenarios and provided a basis for dialogue among government agencies that questioned the rankings. Considerable progress was the result.

Source: R. J. Allport and N. von Einsiedel. 1986. An Innovative Approach to Metropolitan Management in the Philippines. *Public Administration and Development*. 6 (1), pp. 23–48.

if good financial conditions exist or if private sector financing becomes available under favorable terms. Metro Manila in the 1980s provided a practical example of this approach (Box 2).⁷

Public–private partnerships

Despite Asia’s extensive experience with public–private partnerships (PPPs), the range of PPP models to which it has been exposed has been relatively narrow, with most partnerships focusing on new-build megaprojects such as metros and expressways in major cities. Nonetheless, numerous lessons have been learned. To determine if private sector participation is the right approach, planners should

- Start with a full understanding of the main project risks; private financing is all about risk transfer;
- Use only private finance to transfer risks;
- Expect the scale of private finance to match the risks transferred; and
- Require this procurement route to provide better value-for-money than the public sector alternative.

⁷ R. J. Allport and N. von Einsiedel. 1986. An Innovative Approach to Metropolitan Management in the Philippines. *Public Administration and Development*. 6 (1), pp. 23–48.

Research shows that a wide range of PPP models can deliver any or all of the following: better projects with less or no public support, new sources of funds, step changes in capacity and levels of service (e.g., in the case of a new expressway or a new mass rapid transit system), and improved management (operation and maintenance) of existing infrastructure. The generic road concession options are rich and varied: maintenance management, turnkey (design and construction), operate and maintain, rehabilitate-operate-maintain, build-operate-transfer, and corridor management. To date, Asia has focused on the build-operate-transfer model and has shown little interest in lower-cost modalities. Elsewhere, lower-cost options are being applied and have often shown considerable promise. These options should be applied much more widely in Asian cities and towns.

It can be concluded that PPPs offer cities two important opportunities: improving the effectiveness of existing megaproject plans and extending PPPs into new areas.

Innovative financing

Lessons from sustainable cities show that innovations in both funding approaches and sources can be an important complement to a sound financing strategy.

Innovative approaches. Two approaches are worth exploring. The first consists of the creation of an urban transport fund to finance the transport sector. The second is for central governments to encourage city authorities to implement the core elements of a sustainable transport policy.

The purpose of an urban transport fund is to generate sustainable funding for city transport, the revenues from which can be allocated unencumbered by administrative rules and requirements. Ensuring that these funds are spent on transport improvements will, it is argued, help generate acceptance of deterrents such as congestion charging, fuel tax supplements, vehicle registration, and parking fees. While the merits of an urban transport fund have been debated at length, and while experts have developed a pragmatic approach that addresses the key issues of implementation and acceptability, urban transport funds have seen little actual exposure. Central governments are generally reluctant to delegate revenue-raising powers while stakeholders resist the idea out of fear of a loss of benefits.

As for central governments encouraging city authorities to implement the core elements of a sustainable transport policy, one example of this approach can be found in the United Kingdom's Transport Innovation Fund. Introduced by the Department for Transport in 2004 after city leaders had rejected proposals of congestion charging, this fund's objective

was to tackle traffic congestion using an incentive approach. Cities that committed to a strategy to tackle congestion competed for significant national funding for modal integration and improvements to their public and nonmotorized transport systems. As a political necessity, most incentives were implemented before the deterrents were introduced. This ensured that travelers who wished to adopt more sustainable practices had access to appropriate transport alternatives. The fund offered about \$400 million a year for seven years. It is still too early to evaluate the program, but if successful, it could have a strong influence on sustainable urban transport policies.

Innovative sources of funding. Various cities have attempted to obtain financing from the windfall beneficiaries of transport policies and projects as a means to continue to promote sustainable initiatives. Examples of innovative funding sources include the following:

- **Employers' taxes.** Cities in France raise considerable sums from the *versement de transport* (transport duty), a local tax on all but small employers. Lyon, a city of 1.4 million people, raises approximately \$200 million per year from this tax. The funds thus generated cover operating shortfalls and are invested in new projects. It is surprising that this approach has not been applied more widely.
- **Property development gains.** Joint development has been widely targeted as a source of financing but has proved difficult to secure. Hong Kong's MTR Corporation has been an exemplar of this approach.
- **Tax-increment financing.** Tax-increment financing is an innovative way to finance public infrastructure investments such as transit projects, roads, and utility services. Governments earmark a portion of the increase in property or sales tax revenues that result from improvements to repay the costs of those improvements. Such arrangements are regularly used in cities in the United States.
- **Climate funds.** Two recent initiatives promote actions to mitigate climate change. The first, the UN Clean Development Mechanism, has had minimal benefit for urban transport as many projects failed to qualify. Attention is now focused on a post-2012 framework. The second is a facility for which the World Bank acts as trustee: the Climate Investment Funds, two trust funds with a capitalization of over \$5 billion. One of these funds, the Clean Technology Fund, offers financing to improve fuel economy standards, accelerate fuel switching, and promote modal shifts to public transport in large metropolitan areas. It is still too early to determine if these sources will provide significant additional financing that cities could access cost effectively.

Financing framework

Where financing is concerned, ADB's new paradigm requires a marked change in approach. ADB suggests that transport decisions be made by a city authority that has the power to raise substantial revenues. When the same body that decides on projects also finances those projects, the benefits of accountable decision making are realized. Moreover, giving city authorities the power to raise their own revenues imposes a discipline of prudent financial management that is wholly beneficial. Table 7 provides an overview of ADB's financing framework. Its benefits notwithstanding, the city authority should expect the central government to be hesitant to delegate revenue-raising powers until the city demonstrates its competence and its seriousness of purpose.

In summary, transport financing should be guided by the following observations:

- The only way to respond to today's turbulent and unpredictable future is with complete financial realism. Planners should prioritize core activities and projects. Only if more financing becomes available (e.g., tax revenues exceed expectations) should they pursue additional projects.
- City authorities should consider developing a funding strategy to ensure that political priorities influence transport policies. This strategy should analyze the benefits and costs borne by different groups in society.
- Commitment decisions should be based on the results of both technical and financial planning. These two kinds of planning must proceed together to avoid embarking on projects that turn out to be unaffordable.
- When central governments fund city infrastructure, city authorities should have a substantial stake in the infrastructure's success. Competing for free central funding should be avoided.
- City authorities should determine the city's principal spending priorities and implement funding mechanisms whose flexibility safeguards the city's ability to respond to unexpected events. By not earmarking funds to specific projects, urban transport funds meet these goals.
- Great care is required in committing to megaprojects. Megaprojects can throw the city's strategy off course if forecasts are not realized. Megaprojects require in-depth study prior to commitment.

Table 7: ADB's New Financing Framework

Characteristic	Old Paradigm	New Paradigm	Comment
Affordability	<ul style="list-style-type: none"> • Affordability is assumed • An output of the planning process 	<ul style="list-style-type: none"> • The result of financial planning • An input to strategy development • The public sector budget is defined and private financing is considered extra 	There is always more demand for financing than there are available funds; planning is required to determine priorities.
Scale of financing	<ul style="list-style-type: none"> • Low to modest • Unpredictable 	<ul style="list-style-type: none"> • Much increased • Core financing secured 	Sustainable transport policies are expensive.
Financial planning	<ul style="list-style-type: none"> • Short-term focus frequently consisting of crisis management 	<ul style="list-style-type: none"> • Medium-term and/or long-term focus 	Risks are analyzed and managed.
Responsibility for financing	<ul style="list-style-type: none"> • Mainly the central government's responsibility • The availability of financing is the result of a national budgetary process 	<ul style="list-style-type: none"> • Mainly the city authority's responsibility • Central government financing has been agreed in advance 	The decision-making body has the power to raise funds.
Who pays	<ul style="list-style-type: none"> • Mainly taxpayers 	<ul style="list-style-type: none"> • Mainly transport users, polluters, and beneficiaries 	The new paradigm follows economic principles.
What is financed	<ul style="list-style-type: none"> • Major roads 	<ul style="list-style-type: none"> • Core strategic priorities 	This represents a change from reactive to proactive management.
Public financing	<ul style="list-style-type: none"> • Unpredictable • Financing focused on official development assistance (ODA) and free central government funds 	<ul style="list-style-type: none"> • Focused on developing own revenues • Possible use of an urban transport fund • ODA supports good governance 	An urban transport fund provides the city with allocative flexibility; ODA can distort or support strategy.
Credit rating	<ul style="list-style-type: none"> • Cities are not credit-rated 	<ul style="list-style-type: none"> • Cities seek a credit rating • Long-term financial planning is locked in 	Credit ratings reinforce prudent financing.

to be continued

Table 7 (continued)

Characteristic	Old Paradigm	New Paradigm	Comment
Megaprojects	<ul style="list-style-type: none"> • Driven by private sector and/or financing imperatives • Decisions based on poor technical planning 	<ul style="list-style-type: none"> • Driven by policy objectives • Private sector participates in development process • Decisions based on robust technical and financial planning 	Risks are analyzed and managed.
Public–private partnerships	<ul style="list-style-type: none"> • Some megaprojects are implemented, but the government assumes liabilities 	<ul style="list-style-type: none"> • Strongly supported in the presence of an enabling environment • Focus on mega-projects and asset management and operations • More implementation, fewer liabilities 	Private sector improves implementability and/or bankability and helps fill planning voids.
Innovative financing	<ul style="list-style-type: none"> • Strong, sometimes dominant, interest, but little financing is raised 	<ul style="list-style-type: none"> • Strong interest • Proactive city authority plans for realistic sources • Modest financing raised 	Innovative financing is a useful supplement but not a core source of funds.

Source: Asian Development Bank.

- Most city financing comes from operations and lending. Establishing robust operational net revenues from parking charges and expressway tolls is the starting point. These revenues grow as the city grows, eventually becoming an important part of total funding.
- Some cities depend on loans from international financial institutions to develop projects. City authorities should ensure that these loans incentivize good governance. This reinforces their development impact.
- In large countries with many cities, central government should consider incentivizing city authorities to adopt and implement sustainable transport policies.
- There has been much discussion of innovative funding sources. While these sources have advantages, they are usually difficult to transfer to new environments. Planners should not focus on innovative sources to the detriment of directly increasing local revenues.

- PPPs have many advantages, and once central governments create a conducive environment in developing cities, many opportunities for PPPs result. But private sector projects often require large public funding or in-kind support and affect the city in major ways. A prudent city authority develops such projects, prepares the business case, and decides the terms of procurement with care. In all cases, the city authority scrutinizes PPP proposals closely before committing to them.

Policy

Sustainable transportation policy

Today's urban transport issues are the product of the confluence of four trends of unprecedented proportion: population growth, urban sprawl, economic growth, and motorization. Urban transport also functions as a nexus between issues of urbanization, land use, energy use, and climate change.

Before energy efficiency and climate change became policy concerns, sustainable cities defined sustainable urban transport policies as access-based transport planning oriented around planning for proximity, also known as “smart growth.” To control traffic congestion, smart growth cities used two tools: public transport (the “carrot”) and demand management (the “stick”). In 2005, Wright and Fulton⁸ showed that when measures are added to control vehicles and fuels, the smart growth approach meets goals for energy efficiency and climate change mitigation.

It can be seen, then, that policies that are sustainable in terms of transport and development are, with some modifications, also beneficial in terms of energy efficiency and climate change. It follows that these two new policy concerns should not cause distraction. But too often they do, as cities seek a technological fix and discount the fact that real results come from policy as a whole. As transport emission specialist Todd Litman noted in 2008,

A gallon of fuel conserved, or a ton of air emissions avoided due to reduced vehicle travel (the result of mobility management – defined to include improved transport options, efficient incentives, and land-use management) is worth an order of magnitude more than the same energy savings and emissions reductions provided by increased vehicle fuel efficiency or shifts to alternative fuels. This occurs because mileage reductions also reduce traffic congestion,

⁸ L. Wright and L. Fulton. 2005. Climate Change Mitigation and Transportation in Developing Nations. *Transportation Reviews* 25 (6), pp. 691–717.

road and parking facility costs, consumer costs, accidents, pollution, and sprawl, and often improve mobility options for nondrivers.⁹

In the past, ADB has pursued three strands in its approach to urban transport. These strands are known as “avoid, shift, and improve.”

1. **Avoid:** reduce the need for travel by promoting city structures and urban densities that do not require large passenger–kilometers (km) and freight–km of travel;
2. **Shift:** change modal choice to promote lower fuel consumption per passenger–km and/or freight–km and manage traffic so as to reduce fuel consumption and air pollutants; and
3. **Improve:** increase the energy efficiency of vehicles and fuels by decreasing distances travelled and reduce the greenhouse gas footprint per liter of fuel consumed.

To these strands, ADB adds the rethinking of megaprojects.

Avoid: Reducing the need for travel

Accessibility requires mixed land uses in dense cities where arteries are not blocked by congestion. Historically, many Asian cities have measured up well to this ideal, with a range of services and amenities located in each neighborhood and nonmotorized transport and paratransit providing good access. In recent times, however, indiscriminate land use has forced residents to make greater use of motorized transport. The remedy is judicious land-use planning that reduces residents’ need to travel and cuts back on urban sprawl, pollution, and congestion.

Shift: Changing modal choice

Both the “stick” of traffic restraint and the “carrot” of attractive public transport are necessary to reduce transport-related problems. While it is rarely politically feasible to control car ownership, controlling car use meets with less resistance. Developing cities should implement parking policies, congestion charging across cordons or within areas, carpooling and other measures. Where these policies are not possible, cities may consider fuel surcharges with vehicle license duties that reflect the vehicle’s impact on air pollution and other externalities. The net revenues from these measures should be invested in improving the public transport system to secure acceptance for necessary but unpopular policies.

⁹ T. Litman. 2008. *Smart Transportation Emission Reductions: Identifying Truly Optimal Energy Conservation and Emission Reduction Strategies*. Victoria Transportation Policy Institute. www.vtpi.org/ster.pdf

In addition to these “sticks,” two “carrots” can set cities along a sustainable path. First is the introduction of competition into the supply of public transport services. This is necessary to develop efficient, market-facing services. Second is the early integration of bus priority ways, busways, bus rapid transit (BRT), light rapid transit and/or metro systems into cities’ expansion and development plans.

Mass Rapid Transit: The Metro

Fully segregated urban rail systems, or metros, are often at the core of public policy debate about sustainable cities. London; New York; Paris; Tokyo; and more recently Hong Kong, China; Shanghai; and Singapore could not exist in their present forms without their extensive metro systems. Furthermore, no city with a metro appears to regret having gone down this path. For these reasons, some argue that rail systems are essential for large cities. Many developing city plans incorporate metros and large metro networks and most people seem to want them. The recent trend toward private financing has reinforced the desire for metros—for what could be more desirable than a metro that helps shape the developing city, with financing repaid from tomorrow’s more affluent beneficiaries.

Others argue that in developing cities, metros are actually part of the problem. They assert that metros are usually unaffordable, are ineffective in policy terms, and are unsuccessful by their own account. They also claim that metros divert attention from the core agenda of increasing the use of nonmotorized transport and buses, managing the use of cars, and building roads to shape the future city. Recent advances in BRT systems, they argue, are further evidence that metros are almost irrelevant.

Although this debate has gone on for years, the core issues remain unresolved, with no consensus on the role metros should play in developing cities. World Bank policy is indicative of this ambivalence: the World Bank was stridently anti-metro in the 1970s¹⁰ but is close to neutral today while advocating that BRT should also be considered an option.¹¹

The condition of today’s developing cities is profoundly different from that of developed cities when they were growing decades ago. In many developed cities, metro development was integrated with land development in the city hinterland and the metro was the dominant mode of transport with little competition from cars or buses. Today’s metros, in contrast, are being developed in the heart of the city with strong competition from buses and

¹⁰ World Bank. 1975. *Urban Transport*. A World Bank Policy Paper. Washington, DC: The World Bank.

¹¹ S. Mitric. 2006. *Urban Transport For Development—World Bank’s Strategic Framework for Urban Transport*. Presentation at the European Conference of Ministers of Transport CODATU XII Conference, 5–7 July 2006, Lyon, France. Washington, DC: The World Bank.

cars. Once implemented, they routinely fail to live up to decision makers' expectations, yielding poorer or much poorer financial results than expected. Furthermore, recent research on the influence of private financing shows improved delivery performance but not improved operational performance (ridership is usually one- to two-thirds of expectations).

Mass Rapid Transit: Bus Rapid Transit

In Latin America, busways have existed for more than 30 years. They have been singularly successful at rapidly moving very large numbers of passengers, mainly the urban poor, with considerable benefit. Despite planners' recommendations, however, busways did not spread overseas, where it was hoped that they would fill the gap between buses operating in congestion and metro system proposals that were difficult to justify.

A recent variation of the traditional busway, BRT systems are physically segregated busways in the center of the roadway with fares prepaid at fast boarding/alighting same-level platforms. They carry high passenger volumes (over 1 million passengers per day on Bogotá's Transmilenio) and operate at high commercial speeds (an average of 21 km per hour). A comparatively young technology that is undergoing rapid innovation, BRT systems have a metro-like appearance at a cost the fraction of that of a metro. BRT has the potential to reduce poverty by providing low-cost transport, attract car users, and improve the quality of passengers' public transport experience. It is strategically significant because it can place developing cities on the development path from "bus cities" to "transit cities" sooner than would otherwise be possible (see Barter's typology, page 13).

Asia is just beginning to apply lessons from Latin America as to the BRT concept. In April 2006, World Bank urban transport consultant Gerhard Menckhoff identified just three BRT projects in all of Asia,¹² but since then, other countries have followed with their own projects, and there are prospects for more (eight are planned for the People's Republic of China under a World Bank Global Environmental Facility alone). To be effective, BRT systems must meet several criteria:

Availability of right-of-way. BRT systems require wide corridors. If these corridors do not exist, BRT is either not a low-cost option or it may impose politically unacceptable levels of congestion on cars and other traffic.

Compatibility with existing public transport systems. To make efficient use of road space, BRT systems must employ large buses. Many

¹² G. Menckhoff. 2006. *World Bank Guidelines for the Inclusive Design of Bus Rapid Transit*. Paper presented at the European Conference of Ministers of Transport CODATU XII Conference, 5–7 July 2006, Lyon, France. Washington, DC: The World Bank.

Asian cities have extensive paratransit services, but these vehicles cannot be converted into BRT-suitable vehicles. However, eliminating existing paratransit operations is not always desirable.

Adeptness in implementation. To implement a BRT system, strong political leadership is necessary, as is the institutional strengthening of city agencies and bus operators. In addition, BRT designs require considerable traffic engineering skills and adept soft management as existing operators can readily undermine proposals. If the front-end work is done well, implementation can be rapid.

Conditions for sustainability. BRT operations are demanding and the experience of Bogotá's Transmilenio shows that operational efficiency requires constant attention and political support. If confidence in institutions and political structures is not strong, the BRT system may not be sustainable. This issue does not affect rail systems.

From these points, BRT is clearly not necessarily the answer to Asia's urban transport difficulties. The current wave of enthusiasm for BRT systems risks may replicate a bias of which rail systems are often accused—that is, choosing the current favorite no matter the circumstances. Nonetheless, BRT has great potential and should be pursued vigorously if conditions for success exist.

Making a Choice

If BRT is so effective, what are the implications for metros? In many cities, metros are the centerpiece of the city's sustainable development plan. Only in a few cities do BRT systems play this role. In part, this can be explained by a failure to understand the potential of BRT systems, but it also reflects the fact that BRT is not always appropriate. Bangkok's Skytrain, for example, could not have been developed as a BRT system as its corridors are too narrow. However, the promise of BRT does raise the threshold for the construction of metros. If low-cost busways and/or BRT systems can be justified, they will almost certainly constitute the first stage toward transit development (substantial upgrading is usually possible). For the biggest corridors in the wealthier cities, the time may come when a metro makes sense.

In short, metros are justified—given that they can be afforded—where very high-capacity transit is necessary to the growth of a dynamic central business district. Metros are critical in major metropolitan areas where very high levels of productivity can be achieved as a result of agglomeration. The costs of a metro are mainly determined by the metro's alignment—whether underground, elevated, or at grade—while ridership, revenues, and/or benefits are determined by demand, passenger income, and passenger

growth prospects. Accordingly, the development of metros should proceed with staged decision making and a constant focus on operational success. Planning should also provide for future upgrading since the benefits of planning are high while its costs are low. Metros should also be planned with complementary measures (feeder buses and BRT, integrated ticketing) to develop their support base, reinforce their positive impacts, and placate critics.

In summary, it is not possible to draw simplistic conclusions about mass rapid transit systems because every city is different and requires its own study of the options. These options perform different and complementary roles. Thus, in medium-sized, low-income cities, busways may provide mass rapid transit system for many years. If affordability increases or environmental concerns become critical, then light rapid transit may perform a similar role. In the largest corridors of major cities, metros may be justified. Secondary corridors may then justify busways or light rapid transit lines to feed the metros. Where conditions exist, suburban rail systems may be upgraded, also fed by busways or light rapid transit.

Road Development

A city's roads are its major infrastructure asset. By definition, road management balances competing demands by frontagers, pedestrians, cyclists, buses, and other traffic. But too often, road management equates to maximizing car traffic capacity to the detriment of noncar users.

An important aspect of road management is new road construction. New roads are critical to guiding city development. Radial roads create ribbon development while road networks attract area development. Within existing built-up areas, secondary roads open inaccessible areas to development. Missing links and bottlenecks often require new roads and sometimes major new expressways are built within the existing city. Some new roads, though, undermine sustainable development. For that reason, care is required when determining which roads to build.

Under a people-centered sustainable urban transport policy, road networks are developed and managed to facilitate the operation of people and goods, not private cars. Road capacity improvements consist mainly of developmental roads, strategic and/or missing links, and flyovers at bottlenecks serving nonradial transport. This approach is based on a combination of low-cost traffic management and engineering techniques, traffic enforcement measures, maintenance practices, and investments.

Table 8 provides an overview of ways in which the management and development of roads impacts residents.

Table 8: Impacts of Road Management and Road Development Practices

Objective	Impacts
To support economic growth	<p>Reducing congestion and improving the quality of transport services results in better accessibility and greater economic growth. The following strategies to achieve these goals are ranked by increasing cost:</p> <ul style="list-style-type: none"> (i) Complete the missing links in the secondary road network; (ii) Correct bottlenecks with flyovers and other means; (iii) Improve access to strategic facilities such as ports and airports; (iv) Provide principal missing links (for example, new circumferential roads); and (v) Create expressways or expressway networks.
To stimulate efficient land use and development	<p>The extent and location of new road construction at the city's periphery largely determines the city's future structure and environmental footprint. New roads can achieve greater sustainable growth for the urban area, and secondary roads within built-up areas can bring underutilized land into development.</p>
To reduce poverty	<p>Better accessibility for the urban poor and the travel disadvantaged can result from</p> <ul style="list-style-type: none"> (i) reallocating existing road space; (ii) improving roads to make room for pedestrians, bicycles, and buses; (iii) improving the road network to better serve poor settlements increasingly located at the urban fringe; (iv) reducing traffic accidents (these tend to most affect the poor); and (v) ensuring that land acquisitions for new infrastructure do not cause the poor to relocate to more inaccessible areas.
To protect the environment	<p>For better or for worse, traffic management changes and new infrastructure affect air pollution and noise. They may also cause visual intrusion and endanger environmentally sensitive areas.</p>

Source: Asian Development Bank.

Improve: Increasing the energy efficiency of vehicles and fuels

The agendas for energy efficiency and climate change require controls on vehicles, fuels, and on the use of both. Transport policy packages that include these controls greatly mitigate the globally adverse consequences of motorization by decreasing distances travelled and reducing carbon dioxide emissions per liter of fuel consumed. They also produce co-benefits by reducing local air pollution (nitrogen oxide, sulfur oxide, and particulate matter).

Achieving these objectives requires inventive technology, measures to encourage the rapid take-up of that technology, and regulation that controls in-use emissions by ensuring that vehicles are properly maintained. It also requires careful consideration of the close links between vehicle technologies and fuel technologies. New fuels permit new technologies and new technologies perform better as a result of lower vehicle weights, less aerodynamic drag, lower tire rolling resistance, and lower-friction lubricants. As King (2007)¹³ emphasized, carbon dioxide emissions must be considered throughout the life cycle of fuels. There is an ever-present danger of unintended consequences when these matters are ignored. When the contrary occurs, however, the possibility arises that “technology and the right policies will solve environmental problems [...] by 2050 so that environmental factors need not be restraints on road traffic growth. A few local areas of poor air quality need to be addressed by other means.”¹⁴

Movements in this direction include the Global Fuel Economy Initiative (also known as the 50by50 Challenge), a program to improve fuel economy by 50% worldwide by 2050; and the European Union’s adoption of the Green Paper, which promotes the use of clean, energy-efficient technologies and other measures. Whether Asia will progress on the paths advocated in these initiatives depends on the region’s openness to the latest technology and the replacement rate of the vehicle fleet in response to standards and enforcement.

Rethinking megaprojects

Megaprojects have enormous opportunity costs and are risky by nature. Not all megaprojects are beneficial; major radial expressways, for example, can increase car usage and undermine sustainable policy. In addition, build-operate-transfer projects usually require substantial amounts of public funding. The outcomes of these megaprojects are frequently disappointing. For these reasons, when developing megaprojects, great care is needed.

¹³ J. King. 2007. *The King Review of Low-carbon Cars: Part 1, The Potential for CO₂ Reduction*. The Treasury, United Kingdom. www.hm-treasury.gov.uk/d/pbr_csr07_king840.pdf

¹⁴ RAC Foundation. 2005. *Motoring Towards 2050*. London, England. www.racfoundation.org/files/rac_foundation_2050.pdf

An important aspect of most megaprojects is their financing. Considerable evidence shows that where megaprojects are concerned, PPPs should reach beyond design and construction and into project operation to be effective. Before anything, however, planners must decide which megaprojects to develop and how. The main issues are as follows:

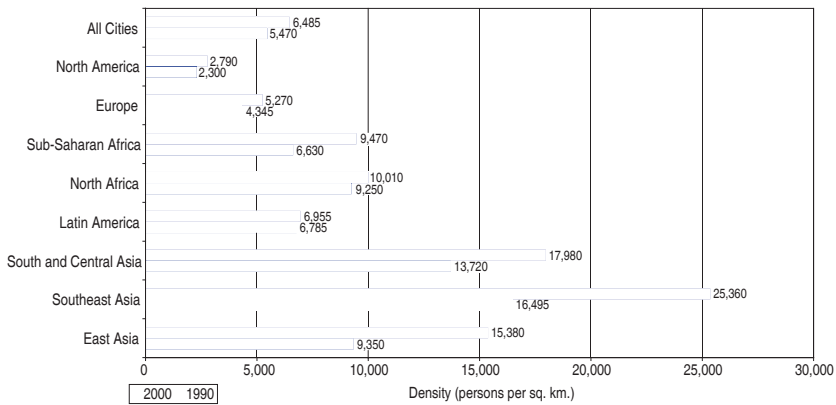
- The city's transport strategy plan should identify projects that may be appropriate for private sector financing.
- The megaproject design should identify the best geographical route for the project to follow. Too often, project design is frozen in the early stages, before alternatives have been analyzed.
- The megaproject should be integrated into the transport network. Transport systems are organic. Just as adding an organ to a body resolves problems if the body adapts to it and worsens them if the body rejects it, so the integration of the megaproject within the overall transport system is necessary to a dynamic and viable system.
- PPPs should be structured to fulfill the city's policy objectives. They should not be driven solely by financial objectives.
- Projects should be implementable and bankable. Broadly speaking, they should deliver project forecasts as planners envisioned them.
- Procurement should be based on analyzing risks and allocating those risks based on what the government can afford and what the market is willing to accept. The principle is that risk should be borne by the body best able to control it, with the sponsoring authority shouldering risks that cannot be managed by either the government or the market.
- Mass rapid transit projects should make sure to provide for system extensions.

Integrated land development

In coming years, virtually all of Asia's population growth will take place in urban areas. Asian cities are projected to grow by over 40 million people per year. At the same time, increasing wealth, declining household size, central area redevelopment, and other factors are causing a rapid drop in urban density (Figure 6). These trends make most developing cities likely to at least double in physical area over the next two decades. As a recent World Bank report comments,

Given the inevitability of urban growth, only proactive approaches are likely to be effective. Minimizing the negative and enhancing

Figure 6: Urban Densities in 1990 and in 2000



Source: S. Angel, S.C. Sheppard, and D. L. Civco. 2005. *The Dynamics of Global Urban Expansion*. Washington, DC: The World Bank.

the positive in urbanization requires both vision and a permanent concern for poverty reduction, gender equality and equity and environmental sustainability.¹⁵

ADB's research reveals that with the exception of cities in the People's Republic of China, few Asian cities are addressing this issue in a concerted or proactive way. Nonetheless, recent reports and conferences are beginning to appreciate its severity and to identify potential solutions.¹⁶ All of these solutions refer to increasing the quantity and quality of new land for development. Three principal ways that city authorities can influence the development of new land for urban uses are through land-use planning, through direct interventions in land development, and through the development and extension of the transport system.

Influence through Land-Use Planning

In most developed country cities, land-use planning systems, allied to the expansion of primary road, rail, and metro networks, enabled urban expansion to proceed in a controlled manner that reduced adverse environmental impacts, delivered adequate land for residential and other uses, and maintained an acceptable standard of physical and social infrastructure. These planning systems emerged as a response to many of the problems now facing developing cities: inner city slums, uncontrolled urban sprawl,

¹⁵ S. Angel, S. C. Sheppard, and D. L. Civco. 2005. *The Dynamics of Global Urban Expansion*. Washington, DC: The World Bank.

¹⁶ See, for example, the World Bank's 2005 International Urban Research Symposium, as reported in *Global Urban Development Magazine*, 2007, Vol. 3, Issue 1.

ribbon development, inadequate infrastructure, and encroachment of prime agricultural and environmentally sensitive areas. Generally, they succeeded in creating high quality-of-life cities that catered to both the rich and the poor under good environmental conditions.

Most developing cities' planning systems are modeled on the systems of developed countries. But these systems, whether operating at city, local, or site level, have been ineffective in addressing the principal urban problems of the last 50 years. Reasons for this ineffectiveness include institutional and technical weaknesses on the part of planning departments, inadequate enforcement of land-use regulations, susceptibility to political intervention, and landowners' unwillingness to submit to controls on how they develop their land. They also include inappropriate building designs and construction regulations, the use of outdated plans (three of city plans in ADB's five-city study were dated 1956, 1979, and 1986), and regulations' failure to reflect prevailing traditional land conversion and house construction processes. Given these shortcomings, it is unsurprising that ADB's study identified very few examples of effective planning systems at either the strategic or the local level.

As a consequence, Asian cities now face a proliferation of the problems that confronted Europe and the United States in late 19th and early 20th centuries, but on a much larger scale. Asian cities are growing faster than today's developed cities did, the car is exerting a degree of influence unimaginable to European, American, and Japanese cities of the past, and the urban poor in Asia today is primarily concentrated in peripheral rather than central areas. On this last point, vast fringe areas in numerous Asian cities are characterized by sprawling, low-income settlements. Unrecognized by the authorities, these settlements have inadequate physical and social infrastructure, poor housing conditions, and a lack of secure tenure. In addition, some are located in environmentally sensitive areas. Clearly, these are the slums of the future. The urban fringe is also characterized by increasing and often dominant presence of middle- and high-income residential areas. While these areas are generally built to good planning and environmental standards, they are sometimes poorly integrated into the overall urban structure. They also frequently impose long commutes on their residents due to their peripheral location and to layouts that prohibit effective penetration of public transport. Meanwhile, in the inner city, poor and low-income households' lack of access to land is contributing to the expansion of existing slums.

Land-use planning systems can be a powerful tool to address these problems. In addition to being geographically feasible, land-use plans must be also financially and politically feasible—i.e., they must be possible to implement. This requires stakeholders to accept that development is not

allowed in certain areas. It also requires authorities to enforce planning regulations and construction standards. In most developing cities, achieving these conditions will require a considerable change in attitudes, greater technical capacity in planning departments, and institutional modifications that place these departments at the heart of the urban management process. In the short and medium term, therefore, the potential for implementing effective planning systems seems limited to the relaxation of planning and building standards for informal development, of which there is an increasing number of examples. The People's Republic of China and possibly Viet Nam are exceptions to this rule.

Influence through Direct Interventions in Land Development

Given the problems associated with land-use planning, a more feasible means to improve the sustainability of expanding developing cities appears to lie in city governments exercising direct influence on the scale, location, and type of land development that takes place. Types of direct interventions by the public sector, ranked by the declining level of expenditure required, include building housing; obtaining land through expropriation, negotiation, or compulsory purchase; guiding land development¹⁷ (deciding where to locate construction); and implementing land pooling and/or land restructuring¹⁸ schemes where land for roads is obtained from landowners at minimal cost in exchange for gains that accrue once land values increase.

Urban development through land acquisition, followed by either direct construction or resale to private developers, is currently the primary method of land development in the People's Republic of China. While this model is not perfect, it has enabled the creation of large new suburbs and cities (e.g., Shenzhen) relatively free from problems of slums, inadequate infrastructure, and poor environmental quality—problems which beset many other Asian cities. Hong Kong, China; the Republic of Korea; and Singapore adopted a similar approach. Necessary conditions for this model are state ownership of land and/or strong powers of acquisition and the availability of substantial financial resources. Absence of these factors in most Asian cities precludes widespread replication of this approach.

¹⁷ With guided land development, authorities establish a road layout and landowners develop their land within this layout, usually to prescribed standards and guidelines. New York City's 1811 plan was based on guided land development.

¹⁸ With land pooling and/or land readjustment, authorities oversee a comprehensive reorganization of often irregularly shaped land holdings into a coherent structure. This approach is more interventionist and requires more government resources than does guided land development. Used for many years in Japan; the Republic of Korea; and Taipei, China; it is common in Turkey and is currently being employed widely in Kathmandu, Nepal. Land pooling and/or land readjustment often replicates the activities of informal developers over a wider area and to higher design standards.

For interventions that require less direct investments, city authorities must be willing to work directly with landowners and developers—who provide the bulk of new residential lands¹⁹—to increase land supply, improve the integration of new land into the existing urban fabric, and enhance the quality of new developments in terms of infrastructure, community facilities and built form (what developments look like, how tall they are, how much of the lot they occupy, and so forth). As a large proportion of land for lower income groups is developed by small landowners and informal developers, partnership with these constituents is essential. While there are few precedents for these partnerships on a large scale, numerous good practices exist in Latin America and some in Africa and Asia as well.

Influence through the Transport System

Access to transport is a necessary condition for land development. In the absence of access—be it by foot, cart, truck, bus, or car—development does not occur. It follows that investing in transport networks offers considerable potential for managing urban development, with road development in particular exerting a major influence on the future shape, structure, and density of the city.

While most city authorities have the power to develop roads, authorities in developing cities rarely deploy this power to guide the city toward sustainable development. Too often, they implement the antithesis of sustainable policy: major arteries within the city with little if any secondary roads.²⁰ They show little regard for structuring the expanding city by extending transport networks beyond existing urban limits. The result is a chaotic and haphazard pattern of poorly connected suburban communities, marked by ribbon development, inaccessible parcels of undeveloped land, encroachment into environmentally sensitive areas, and the juxtaposition of incompatible land uses.

The solution in most respects is obvious, but it does not take place. Above all, investing in transport should proceed hand-in-hand with designing and implementing a sound city development strategy. This is essentially how most developed countries operate. In addition, sustainable cities maintain a strong link between what is planned and what is implemented. In many parts of Asia, this would require strengthening the spatial planning process

¹⁹ Estimates for the proportion of new development that occurs outside formal controls range from 50% to 85%.

²⁰ ADB's research shows virtually no instances of proactive development of secondary roads apart from large area development schemes. Some of these schemes can be huge: for example, Shenzhen, which grew from a fishing village to a megacity in 20 years, and Putra Jaya in Malaysia. But most are smaller developments implemented by formal sector developers that mainly target middle- and upper-income groups and do nothing to enable the coordinated expansion of urban areas.

and integrating transport planning within this process with the full buy-in of all stakeholders, namely, national and city governments, public works departments, major developers, and civil society. In addition, area road networks (networks of arterial and secondary roads) should be developed in partly and soon-to-be built-up fringe areas. In partly built-up areas, the focus should be on developing secondary roads within superblocks to bring underutilized land into development while improving mass transit along major corridors. Large, low-income settlements particularly benefit from paved secondary roads that provide access to public transport. In undeveloped areas, secondary road networks should be established where development is favored. This alone will have a major impact over time. Public transport services should be provided to these areas from the outset to encourage their use. As mentioned earlier, secondary road networks, especially networks in undeveloped areas, should not be constructed “in one go” but phased.

It is sometimes argued, in defense of existing practice, that developing new roads beyond the fringe is too difficult because of problems of land acquisition and cost. But sooner or later roads are built at much higher cost and difficulty than before the land had been developed and costs had risen. This puts a premium on proactively safeguarding rights-of-way for future road networks. This is not always easy, and legal and financial issues are likely to arise. It is nonetheless crucial to reduce future costs by facilitating the orderly development of the transport network and the urban area as a whole.

In short, transport infrastructure and transport services are critical to bringing land under efficient development and catalyzing sustainable development. Planners have a choice: the business-as-usual approach, which leads to increasingly unsustainable patterns of urban expansion, or an approach that integrates land-use planning, transport planning, and the proactive construction and safeguarding of primary transport corridors and secondary road networks. In building these networks, it is not essential that roads be paved. Once rights-of-way have been established, roads can be upgraded incrementally as justified by city finances and by demand. Experiences from Bogotá, Curitiba, Singapore, and several cities in the People’s Republic of China show that this approach is indeed feasible. However, it requires players to change from a mind-set of reactive interventions and policy inertia to a mind-set of proactive solutions and the tackling of institutional issues. This will create strong links between planning, budgeting, and implementation.

Looking Forward

Sustainable urban development cannot be achieved unless issues related to urban expansion, urban poverty, and slums are addressed. For cities to address these issues, they must increase the development of land that is

adequately serviced, that is not located in environmentally sensitive areas, and that caters to the needs of the entire urban population.

To achieve this goal, many cities will have to intervene directly by developing roads instead of relying on ineffective planning systems. But where are roads required and where are they not? A good city development strategy identifies areas where development should be restricted for environmental reasons and where development should take place. It also sets out primary transport corridors. To maximize success, this development strategy should follow three key principles:

1. It should operate with a general presumption toward development, hence, increased land supply, except in environmentally sensitive areas.
2. It should encourage rather than restrict private sector development.
3. It should give strong weight to existing spatial development trends and build upon existing formal and informal private-sector developer practices that do not encroach onto sensitive areas.

To bring more land under development, cities must also adopt design and construction guidelines consistent with the needs and budgets of future low-income occupants. If standards are too high and procedures too cumbersome, they will be ignored. Cities must also promote guided land development and land pooling and/or land readjustment schemes. In addition, cities must plan for secondary road networks. Only secondary road networks can prevent ribbon development and the proliferation of tracts of underutilized city land and underserviced fringe areas. These networks can be implemented in the short term or safeguarded for future use. Costs may be reduced and recovered through land donations, developer financial contributions, betterment levies, and property taxes once plots are developed.

Where major new transport interchanges are planned, cities should ensure that appropriate development occurs in the vicinity and is integrated with the interchange itself. Through land acquisition and/or land assembly tactics and subsequent land disposal adjacent to the interchange, city authorities can promote efficient multimodal interchanges, increase accessibility, and reduce the need to travel.

Collaborating and negotiating with stakeholders is another characteristic of an integrated land development approach. This requires willingness to work with stakeholders, whether transport departments, utility agencies, landowners, or formal or informal developers. Multiparty engagement is just as crucial when a citywide strategy is being formulated as when road alignments, land ceding, and site layouts are being planned and implemented locally.

These aspects of ADB's proposed approach to land-use planning and development (Table 9) are fully integrated with the development of transport networks within the framework of the city spatial strategy. Again, the change in approach is based on a combination of incentives and deterrents. The incentives are the approval and legitimization of developments, increased land values, and the creation of road access and infrastructure. The deterrents are the ceding of land for infrastructure, increased charges, and adherence to planning and design standards.

The ineffective nature of existing systems, the lack of good precedents in developed and developing countries, and the magnitude of the institutional changes necessary makes the new approach a major challenge. Yet it is difficult to see how a long-term approach to sustainable urban development can take place without it. Strong political commitment and direction from the highest level of municipal government and a willingness to work closely with all actors will overcome many obstacles. If these conditions do not yet exist, much can be achieved by more flexible standards, by incremental construction, by safeguarding land for secondary road networks, and by enhanced developer contributions. Precedents of these measures exist.

Poverty reduction

Poverty reduction is the overarching goal of ADB and many other multilateral and bilateral agencies. In recent years, urban poverty has decreased in the People's Republic of China by over 50% and has fallen significantly in East Central Asia as well (Figure 7). In Southeast Asia, urban poverty declined by just over 10% but at 34%, the incidence remains high. Yet in South Asia, poverty has increased by over 20% with negligible change in its incidence. Meanwhile, Asian cities are projected to grow by over 40 million people per year, and growing cities often mean growing numbers of the urban poor. With the possible exception of the People's Republic of China, therefore, urban poverty is likely to remain a serious issue throughout Asia in the foreseeable future. If cities continue to pay insufficient attention to urban poverty, and if they do not address the concomitant problem of slums, it is difficult to see how anything approaching sustainable urban development can be achieved.

Characteristics and Needs of the Urban Poor

ADB's review of the research on the characteristics of the urban poor in relation to transport issues draws the following conclusions:

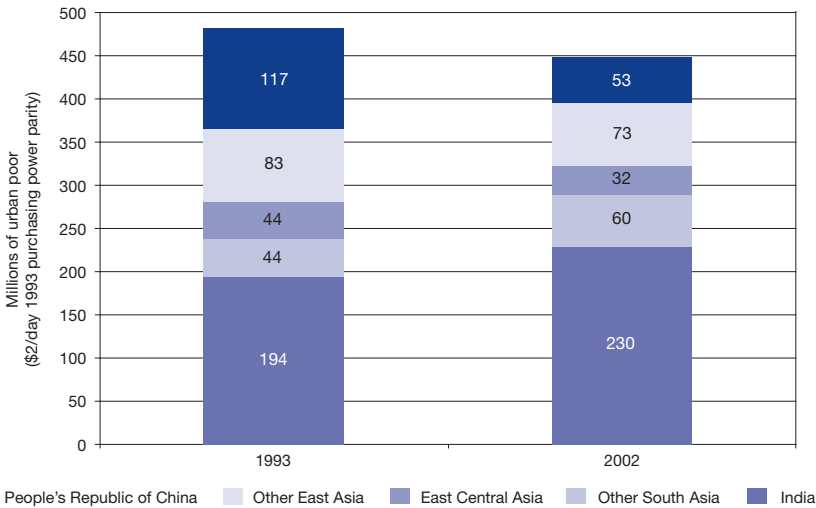
- The transportation needs of the poor and the nonpoor are generally the same. Both groups require access to work, schools, health facilities, and markets.

Table 9: ADB's New Approach to Land Use and Development

	Old Paradigm	New Paradigm
Strategic planning	<ul style="list-style-type: none"> • Nonexistent or insufficient strategic planning • Lack of integration between land development and transport networks 	<ul style="list-style-type: none"> • Preparation of a city spatial strategy to improve the quantity and quality of land development for the entire population • Zoning restrictions reduced except in environmentally sensitive areas
Local area and site planning	<ul style="list-style-type: none"> • Exists only for middle- and high-income developments; otherwise, affordability and bureaucratic procedures deter formal planning. As a result, city governments neglect the needs of residents in low-income areas. Informal sector developers operate as they wish and the slums of the future are born 	<ul style="list-style-type: none"> • Introduction of more flexible regulations; legitimization, where possible, of existing settlements • More land zoning and more regulation of land development • Better coordination between transport planners and the developers of low-income housing, off-site infrastructure, and community facilities • New interchanges reflect transit needs
Secondary roads	<ul style="list-style-type: none"> • Little investment in secondary road networks results in inefficient ribbon development and inaccessible fringe areas 	<ul style="list-style-type: none"> • Focus on planning and implementing area road networks where and when land development is desirable • Public transport services are integrated from the outset
Planning process	<ul style="list-style-type: none"> • Little engagement with stakeholders, developers, and landowners, especially with the informal sector 	<ul style="list-style-type: none"> • Stakeholders influence proceedings • Formal consultation procedures result in projects and services that are relevant and well maintained
Knowledge about city development priorities	<ul style="list-style-type: none"> • Little knowledge about city development priorities 	<ul style="list-style-type: none"> • Diagnostic studies identify spatial trends, densities, and informal development processes • Land demand projections inform the city development spatial strategy, which sends strong signals to private developers

Source: Asian Development Bank.

Figure 7: Urban Poverty in Asia in 1993 and in 2002



Source: M. Ravallion, S. Chen, and P. Sangraula. 2007. New Evidence on the Urbanization of Global Poverty. *Policy Research Working Paper Series 4199*. Washington, DC: The World Bank.

- The poor use the cheapest available travel modes, whether motorized or nonmotorized, regulated or unregulated. If incomes are very low, public transport can be unaffordable.
- Residents of low-income residential areas located on the urban fringe face particular problems: poor access roads to and within their community, the lack of affordable public transport, and great distances to employers and facilities.

Problems are lessened when poor people are concentrated in or live adjacent to central areas where public transport is affordable and widely available. These areas are, however, more susceptible to traffic accidents, especially when pedestrian and informal street trading activities are high. If congested, these areas are also more susceptible to air pollution.

Factors that most affect the transport needs of the urban poor are

- Whether the poor need access to a workplace. If most poor people are not employed, their transport needs are likely to revolve around short local trips, as is the case where poverty is concentrated among the elderly or where few women work.

- The relative location of homes and places of work. If people work close to home, transport issues are less likely to be a priority as walking to work is possible and public transport is more accessible. If many of the urban poor are located in peripheral areas, transport issues will rank higher on their list of priorities, especially where road access to and within poor areas is deficient.

Variations in these factors require different interventions and prevent generalizations about the impact of transport costs on household expenditures, the demand for public transport, and related topics. Again, these questions can be resolved by a rapid diagnostic study of the key issues affecting the travel of poor and low-income groups in the early stages of formulating a sustainable urban transport strategy. Disaggregating the travel needs of the poor from other low-income groups may not be necessary, as differences in travel characteristics are not especially marked. In many cases, transport policies should be targeted at low-income groups in general rather than the poor in particular, as many poorly served peripheral settlements contain both poor and low-income households.

Pro-Poor Transport Policy

Transport policies can affect the poor directly and indirectly, positively and negatively. Direct positive impacts occur when transport policies either target the poor, e.g., through travel concessions or by improving access to poor residential communities, or directly address poor people's travel needs. Several components of the generic sustainable urban transport policy—improved public transport and pedestrian facilities, reduced emissions and enhanced road safety—directly benefit the poor and nonpoor alike. In this sense, virtually any sustainable urban transport policy is pro-poor to some degree.

Indirect positive impacts occur where improved transport systems contribute to continued urban economic growth, the emergence of more flexible and larger labor markets, and job creation. Although measuring these impacts is difficult, economic growth that results from effective transport systems does generate significant indirect benefits for the urban poor. At the same time, transport projects can have a negative impact if they direct resources away from measures necessary to address the specific needs of poor and low-income households.

Negative direct impacts arise through involuntary relocation of the poor due to appropriation of land for road or rail construction. Identifying these impacts during the project design phase, developing mitigating measures, and formulating compensation packages are an integral part of sustainable transport policy. The absence of these measures can lead to social discontent, impoverishment and/or policy inertia as projects involving land acquisition are shunned.

Transport policies can target the poor in two principal ways. Geographical targeting consists of interventions to improve the accessibility of underserved poor or low-income settlements on the urban fringe. These interventions mostly consist of improvements in road access to and within these settlements. They could also include conditions for public transport operators to provide services to these areas, and should be a priority in cities where such settlements exist.

The other type of targeting involves the direct targeting of poor and vulnerable households or individuals principally by improving their access to public transport. Examples are fare concessions for the poor, students, the elderly, and the disabled; improved design of public transport vehicles to make vehicles accessible to the disabled; and reserved seating areas for women. In general, however, these measures are not likely to be feasible or of high priority in cities with limited financial or institutional capacity and in places where there is little centralized regulation of bus services. Unless applied in such a way that operators are fully compensated for the loss of fares, they can also have the perverse impact of reducing the supply and quality of public transport by decreasing operators' revenues and their willingness to invest.

Means to reduce poverty may not lie in transport policies alone. Better provision of social and physical infrastructure in low-income areas will reduce the need for travel. Still, improved roads are likely to be a precondition for this to occur.

In considering poverty in relation to urban transport, it is important to remember that any transport intervention can have unintended consequences. The enhanced enforcement of emission controls, for instance, can make some forms of public transport less affordable. Similarly, increased regulation of paratransit (e.g., rickshaws) or removal of vendors from sidewalks can lead to reduced incomes and impoverishment. As with adverse impacts, these unintended consequences should be identified during project evaluation and mitigation measures should be designed whenever feasible.

How can cities that lack implementation capacity, either because of insufficient political will or because of inadequate financing and institutional facilities, address both sustainable transport and poverty reduction? ADB's paradigm suggests the following:

- Support and promote nonmotorized transport and existing informal public transport services, and prioritize low-cost projects that can be implemented by existing institutions.
- Improve the capacity of existing road maintenance, traffic management, and regulatory departments.

- Identify and develop solutions to major accident black spots.
- Find ways to regulate emissions.
- Improve access to poor and low-income residential areas through upgraded secondary and tertiary roads.
- Build capacity.

These interventions have the merit of being relatively low cost and within the power of many existing city agencies, namely the departments responsible for road maintenance, vehicle inspections, air quality monitoring, and public transport. Most importantly, they bring benefits to poor and nonpoor travelers alike. If successful, these interventions can raise the public's confidence in the municipal government and facilitate more ambitious programs at a later date. While many pro-poor transport interventions have succeeded in cities around the world, these interventions are neither widespread nor are they necessarily replicable.

Finally, the key messages are as follows:

- In many Asian cities, poverty will remain a major issue in the near future.
- The transport needs of the poor vary considerably from city to city. Undertaking a rapid diagnostic survey that investigates the level, characteristics, and transport needs of the urban poor is an essential first step in formulating a sustainable urban transport policy.
- Many generic sustainable urban transport policies benefit the poor. In cities where poverty levels are high, any sustainable urban transport strategy will by nature be pro-poor. The need for specific pro-poor interventions may thus be limited. Improving access to low-income areas located in the urban fringe is likely to merit highest priority.

Cities with limited institutional, technical, and financial resources should prioritize two elements: the pursuit of low-cost projects that can be implemented by existing institutions, and the building of capacity. Sustainable transport strategies in these cities should include a short-term action plan that ensures adequate maintenance of the existing road system, provides a basic level of public transport services, improves access to and within peripheral poor and low-income areas, and reduces transport-related air pollution.

Conclusion

The crisis of urban mobility that is paralyzing many Asian cities is hardly news. Population growth and decreasing densities have led many cities to expand, and the ownership and use of private cars has vastly outstripped expectations. Although traffic congestion has long been identified as a problem, it continues to worsen in almost all of the region's urban areas. Citizens are becoming increasingly aware of local air pollution and they are experiencing a range of associated health problems. Asia's accident rates are among the world's highest and policy makers worry about greenhouse gas emissions and the threat to fuel security posed by dwindling oil reserves and highly volatile fuel prices. The urban transport sector has awakened to transport's own "Inconvenient Truth",²¹ but traditional policy and investments make it ill-equipped to respond. Meanwhile, the crisis is threatening to cripple cities' ability to stimulate economic vitality, an ability that often accounts for as much as 70% of national gross domestic product.

ADB calls for the adoption of a new paradigm that meets these challenges head-on. This paradigm manages demand for travel to supply instead of building more and more infrastructure for the seemingly unstoppable growth in private vehicles. It calls for increased governance and broader stakeholder involvement in the decision-making process to ensure that projects prioritize the travel needs of the end user. It also mandates increased realism in the decision-making process, where institutional, financial, social, and economic considerations are given equal attention to ensure inclusive and environmentally sustainable growth.

The new paradigm also calls for a fundamental shift in transport policy and advocates the "avoid-shift-improve" approach. It argues that planners should integrate land-use developments with mobility need to minimize the need for travel. Governments should promote energy-efficient modes of transport, particularly public transport and nonmotorized transport such as bicycles and walking, and seek to strengthen vehicle and fuel technologies, exploring alternate fuel sources and reducing local and global emissions.

Precedents for all of these measures exist; people have only to decide to use them. By working together, Asian cities and ADB can create safer, cleaner, more productive, more sustainable cities, and achieve a better quality of urban life.

²¹ D. Guggenheim. 2006. *An Inconvenient Truth*. Paramount Classics.

Changing Course: A New Paradigm for Sustainable Urban Transport

Most Asian cities have grown more congested, more sprawling, and less livable in recent years; and statistics suggest that this trend will continue. Rather than mitigate the problems, transport policies have often exacerbated them. In this book, ADB outlines a new paradigm for sustainable urban transport that gives Asian cities a workable, step-by-step blueprint for reversing the trend and moving toward safer, cleaner, more sustainable cities, and a better quality of urban life.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.



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