ENSURING THE FINANCIAL, SOCIAL AND ENVIRONMENTAL SUSTAINABILITY OF CITIES

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Urbanization is one of the defining feature of 21st century development for developing countries (as it was, in the 20th century, for rich countries). The bulk of the world population will live in the future in cities. The urban population now represents half (47%) of total—32% of the total in low income countries but 99% in high income countries (United Nations Population Division). London grew sevenfold and New York almost 60-fold during the 19th century. Bombay's population grew from 775,000 in 1900 to 12.5 million in 2011. Making cities sustainable, both socially and environmentally, is therefore a high priority and making the finances of cities sustainable is also essential since healthy public finances are a *sine qua non* condition to make the necessary urban investments and provide decent services to all.

In economics, theoretical advances over last 20 years have led to a renaissance of urban economics (Krugman, Henderson, Glaeser, etc). There have also been advances in empirical studies on cities but most of the evidence comes from rich countries. There is very little solid evidence on developing countries on many issues (with a few exceptions: e.g., UN-Habitat).

In spite of these advances, urban knowledge is often very academic and at a loss to answer the practical policy questions that urban policy-makers may have. At the World Bank, for instance, in spite of 50 years of lending experience, there is a reservoir of knowledge on water supply, transport, etc but we are often at a loss to answer the more complex, systemic issues that rise in an urban context.

Urban issues are by nature cross-cutting. They correspond to three major themes of economic development—*growth*, *equity* and *sustainability.*[1] Urban studies are a mix of economic, institutional & technical analysis. They often require experts on

- macroeconomics / growth theory
- public finance, decentralization, governance
- investment climate and manufacturing
- land management & housing policy
- poverty analysis and service delivery
- water and urban services
- transport, ICT and other infrastructure
- environment (e.g. energy efficiency) and climate change

[1] These themes have been featured in recent World Development Reports on *Economic Geography* (2009), *Equity* (2006) and *Climate Change* (2010).

In World Bank bureaucratic terms, this means close collaboration between SDN, DEC, PREM, FPD, HD, WBI and Regions – which is not always easy to achieve.

In this presentation, I present five hypotheses about cities. Of course they would need to be mores seriously analyzed and confirmed empirically.

- Long term sustainability is closely linked to the creation of jobs and opportunities for all its (skilled and unskilled) inhabitants.
- Sustainability is not a function of GDP level or wealth. It is related to governance, good institutions and—to a lesser extent—performance of the private sector.
- Financial sustainability in the long term—and making sure that public finances and credit of the city do not deteriorate—is essential.
- Cities must be managed with flexibility so as to adapt to unforeseen new circumstances and today's investment decisions should not lock cities out of options tomorrow.
- The use of efficient technologies is important but the focus on common business sense (sustainable financing, consumer preferences; and incentives for providers), good governance and good institutions is just as important to create sustainable, dynamic and livable cities.

Opportunities and Social Sustainability

Urbanization offers many challenges (pollution, crime, etc.) but also many opportunities. Because it brings diverse peoples closely together, urbanization generally promotes social transformation and innovation. Urban areas offer agglomeration externalities — productivity-increasing benefits from locating near other producers or economic activities. These benefits explain the emergence of high-technology regions like Bangalore in India, Munich in Germany or Seattle in the US. In expensive (= high-rent) cities, only activities that add substantial value can be profitable. These pressures push urbanites to come up with new forms of organizations, products and services that carry more value added. Higher profitability and more choices tend to attract more talent to the city, pushing up rents and fueling the need to find yet more productive activities. This feedback mechanism is the principal reason cities accelerate innovation, while diversifying and intensifying social and economic activity.

Opportunities for businesses depend on the business climate. For example, the World Bank's *Doing Business* captures several dimensions of the regulatory environment as they apply to local firms in 185 economies. The report provides quantitative measures of regulations for

- starting a business,
- dealing with construction permits,
- getting electricity,
- registering property,
- getting credit,
- protecting investors,
- paying taxes,
- trading internationally,
- enforcing contracts,
- resolving insolvency, and
- employing workers (and labor regulations)

Cities that rank highest on the ease of doing business are not those where there is no regulation—but those where governments have managed to create rules that facilitate interactions in the marketplace without needlessly hindering the development of private businesses. Cities are likely to do better if regulation keeps compliance costs for firms low. Cities that apply a risk-based approach to regulation as a way to address social and environmental concerns—e.g., by imposing a greater regulatory burden on activities that pose a high risk to the population and a lesser one on lower-risk activities—are also likely to do better.

Opportunities for citizens, whether we are dealing with employment, education, health care or basic services, tend to be much higher in cities. When people have opportunities, they are empowered. Empowerment is a direct consequence of opportunities. For example, social norms restricting the role of women are often less strictly enforced in urban areas and urban households typically reduce household size because of space constraints.

One may wonder why migrants in search of economic opportunities end up in slums marked by pollution, crime and disease. This is as true for Mumbai today, as it is for the London of Charles Dickens in 1840 or the New York of Jacob Riis (author of *How the other half lives*) in 1880. The answer is: the perception that opportunities are better. Well-run modern cities have demonstrated that pervasive ills are not inescapable. The problems result primarily from nonexistent or poor planning and a lack of good governance. The development of these organizational traits may, in fact, be the most important and long-lasting effect of urbanization because it paves the way for socioeconomic development at the national level.

But to make sure that the urban population can take advantage of those opportunities, and that their quality of life is improved—particularly for the least fortunate— the municipality must limit urban congestion, crime, and environmental degradation; invest in human capital formation; in mobility and transport; in political and cultural life; in housing and services for the poor; in security and police—and provide good services.[2]

McKinsey Urban Sustainability Index

Category	Indicator	Description
Basic Needs	Water supply	water access rate (%)
	Housing	living space (sq. meters per capita)
	Health	Doctors per capita
	Education	student-teacher ratio primary school
Resource Efficiency	Power	Total electricity consumption (KW-hour/GDP)
	Water demand	water consumption (liters per capita)

[2] There are many aggregate measures that are indicative of opportunities. Place of residence, parents education, occupation, race are the most significant variables linked to opportunity. Bourguignon, Ferreira, and Menéndez (2007) use Brazilian household survey data to establish what kind of outcome inequality may be attributed to circumstances (in particular place of residence and family background) and what may be attributed to effort. Their analysis reveals a sizable inequality of opportunities in Brazil and shows that urban residents have potentially more opportunities than rural residents. One indicator of the opportunities facing new cohorts of workers in a particular region could be, for example, the growth rate of towns or employment in rural areas, or employment by industry in the broader economy.

	Water recycling	ratio of industrial waste recycle & utilized (%)
	GDP % from heavy industry	heavy industry GDP/Total GDP
Environmental	Air pollution	Concentration of SOx, NOx and PM10 (mlgr/m3), [1]
cleanliness	Industrial pollution	industrial sulfur dioxides discharged per GDP (tons/local currency
	Wastewater treatment	wastewater treatment rate (%)
	Waste management	domestic wastewater collected & transported (10,000 tons per capi
Built environment	Urban density	persons per sq. km of urban space
	Mass transit usage	passengers using public transit (bus, trolley, metro)
	Public green space	square meters per capita of green space
	Building efficiency	building heating efficiency
Commitment to	Green jobs	number of environmental professionals per capita
future sustainability	Investment in environm. Protection	amount of environmental sanitation funds/GDP

Source: The urban sustainability index: A new tool for measuring China's cities, Tsinghua University, Columbia University, and McKinsey, November 2010 (www.urbanchinainitiative.typepad.com/files/usi.pdf)

1 Sulfur oxides, nitrogen oxides, and particulate matter.

Environmental Sustainability

The rule of thumb about how socioeconomic indicators increase with a city's population is increasing returns to scale: cities increase faster than a linear relation to their population would predict (Scientific American 2011).For example, if the population of a city doubles, we systematically observe an average increase of around 15 percent in variables such as wages and patents produced per capita (whether the city grows from 40,000 to 80,000 or from 4 to 8 million). If eight million people live in one city, their economic output will typically be about 15 percent greater than if the same eight million people lived in two cities of half the size.

When the size of a city doubles, its material infrastructure -- anything from the number of gas stations to the total length of its pipes, roads or electrical wires -- does not. Instead these quantities rise more slowly than population size: a city of eight million typically needs 15 percent less of the same infrastructure than do two cities of four million each. On average, the bigger the city, the more efficient its use of infrastructure, leading to important savings in materials, energy and emissions.

These patterns of increased productivity and decreased costs hold true across nations with very different levels of development, technology and wealth. The pattern seems to hold true everywhere because the same basic social and economic processes are at work, whether in Sao Paulo's favelas, under Beijing's smog-filled skies or along Copenhagen's tidy streets.

Urban infrastructure, e.g. modes of transportation or communications can shape development for decades or centuries—a duration that extends beyond infrastructure lifetime. Urbanization plans, risk management strategies, infrastructure development for water management or transportation, and building design and norms have consequences over periods of 50 to 200 years. Urbanization plans influence city structures over even longer timescales. And infrastructure and urban plans influence the spatial distribution of activities beyond their lifetime. For example, constructions

are supposed to last up to 100 years. Moreover they will have to cope in 2100 with climate conditions that, according to most climate models, will be radically different from current ones. So, when designing a building, architects and engineers have to be aware of and account for the future changes that can be expected. Table 1 below shows examples of sectors involving long-term planning, long-lived investments, irreversibility in choices, and exposure to changes in climate conditions.

The choice of technology leads to path dependence. The clearest example of path dependence is that of the standard gauge for railways (4 feet 8-1/2 inches or 1.435 meters) throughout North America, Europe and half of the world's railway routes. It has been the most common gauge throughout the history of modern railways since the late 1820s though it is not the most technically and economically optimal, and has not been chosen because of its superior performance or lower costs.

Sectors with irreversibility, high inertia and high exposure to climate

Sector	**Time scale**	**Exposure**
Water infrastructure (e.g., dams, reservoirs)	30–200 yr	+ + +
Land-use planning (e.g., in flood plain or coastal areas)	>100 yr	+ + +
Coastline and flood defences (e.g., dikes, sea walls)	>50 yr	+ + +
Building and housing (e.g., insulation, windows)	30–150 yr	+ +
Transportation infrastructure (e.g., port, bridges)	30–200 yr	+
Urban planning (e.g., urban density, parks)	>100yr	+
Energy production (e.g., nuclear plant cooling system)	20–70 yr	+

source: Hallegatte, 2009

Making decisions on these kinds of investments therefore require anticipating the long term technological and socioeconomic environment, the demand for infrastructure and the constraints under which they will function. This brings large uncertainty in the decision-making process, for instance from demographic or economic projections. Past evidence suggests that our ability to predict the future is limited but that uncertainty has to be taken into account before decisions are made. Climate change adds a layer of deep uncertainty that make decisions even more difficult. The possibility of radical changes in environmental conditions under which infrastructure perform cannot be ruled out, and their design needs to take this possibility into account.

There are two ways to manage uncertainty. The first is for decision makers to use available decision-making methodologies, from simple heuristics (e.g., adding safety margins to all design characteristics to cope with larger-than-expected extreme events) to sophisticated methods (e.g., based on subjective probability and cost-benefit analysis). These techniques are described in Hallegatte et al 2012. The second way to take the future into account and manage uncertainty is simply common sense, making sure that today's investment decisions do not lock cities out of options tomorrow so that they can adapt to unforeseen new circumstances.

Flexible vs. inflexible strategies can be illustrated by opposing China’s strategies in energy and transport. China has been very innovative when it comes to renewable energy. About 17 percent of China's electricity came from renewable sources in 2007, led by the world's largest number of

hydroelectric generators. Technology development and increased amounts of investment in renewable energy technologies and installations have increased markedly throughout the 2000s in China, and investment in renewables was part of China's economic stimulus strategy. China is one of the four largest producers of wind power (with the United States, Germany, and Spain) and is the world's largest manufacturer of solar panels. Researchers from Harvard University and Tsinghua University have found that the People's Republic could meet all of its electricity demands from wind power by 2030. Despite this, Wen Jiabao stated in March 2012 that China would end its "blind expansion" into wind and solar energy, and diversify into nuclear power, hydropower, and shale gas.

By contrast, when it comes to transport, China adopted a rather inflexible strategy. Its investment have been heavily car-based and essentially follow the United States model. In the last five years, China has built 20,000 miles of expressways, finishing the construction of 12 national highways a whopping 13 years ahead of schedule and at a pace four times faster than the United States built its interstate highway system. Over the last decade, Shanghai alone has built some 1,500 miles of road, the equivalent of three Manhattans. China's urban population is projected to grow by 350 million people by 2020, effectively adding today's entire U.S. population to its cities in less than a decade. China has already passed the United States as the world's largest car market, and by 2025, the country will need to pave up to an estimated 5 billion square meters of road just to keep moving. China's love affair with the car has blossomed into a torrid romance. In April, nearly a million people poured into the Beijing International Automotive Exhibition to coo over the latest Audis, BMWs, and Toyotas. But China is in danger of making the same mistakes the United States made on its way to superpower status -- mistakes that have left Americans reliant on foreign oil from unstable parts of the world, staggering under the cost of unhealthy patterns of living, and struggling to overcome the urban legacy of decades of inner-city decay.

Lots of things will change in the next 30 years. We know that in three decades, technologies will be different, incomes much higher, and institutions (hopefully…) more mature. Decisions about investments have to be made today, but these decisions—even when they have an element of irreversibility—must leave room for adaptation and reforms in the future. Cities have to be prepared to adapt to changes, not only economic, financial, demographic/employment changes resulting from rapid urbanization—in a very uncertain international economic context—but also exogenous changes like climate change.

Retrofitting to improve urban living

The planning of new eco-cities generates buzz, but retrofitting existing metropolises to be environmentally friendly and sustainable would be more effective because they already house so many people. Readying today's cities for the future will require both high-tech and low-tech changes. [3]

[3] David Biello, How green is my city, Scientific American; Sep 2011, Vol. 305 Issue 3, p66-69

We cannot rely on new construction to fully address the challenges of feeding, housing and transporting urban populations in ecologically sound ways.[4] We need other solutions that take the future into account. Today's cities are by many measures greener than suburbs -- among other things, urbanites use less energy and emit less carbon dioxide per household than their suburban counterparts do because they live in closer quarters and use public transportation. But it is not enough to be green. Cities need to be sustainable, too. Existing metropolises will not be able to sustain themselves if left to operate on a business-as-usual basis -- demand for resources will outstrip supply as the number of people inhabiting cities swells from more than three billion today to more than six billion by 2050.

In theory, new cities could have sustainability built into their infrastructure from the start. But a larger payoff would come from retrofitting existing cities for sustainability, given how many there already are. That approach would be less costly than rebuilding cities from scratch and could still conceivably save enormous amounts of energy and water, allowing today's cities to flourish for centuries to come. Eco-cities usually fail as cities but succeed as incubators for innovation. Simple changes, such as training building superintendents in best practices, can also go a long way toward helping cities support us well into the future.

Energy efficiency

A key priority for cities adapting to a world transformed by global warming is increasing energy efficiency and reducing greenhouse gas emissions to stave off even more catastrophic climate change. Cities are significant consumers of energy and emit nearly three quarters of the world's carbon emissions.

C40, a planning group for 59 major cities engaged in efforts to combat climate change, is focused on equipping old buildings with energy-efficient features. In the U.S., the average building -- whether skyscraper, house or church --was built in the 1970s. Replacing their black-tar roofs with white roofs that reflect sunlight to keep buildings cooler in the summer or installing solar-thermal hot-water heaters, for example, can translate into major energy savings: heating hot water accounts for 17 percent of the energy used by buildings in the U.S.. C40 has partnered with the World Bank to ensure funding for such retrofitting projects, among other climate action plans for cities.

Existing cities might also benefit from installing transportation systems originally conceived of for planned eco-cities. Tailpipes in the U.S. spew 1.7 billion metric tons of carbon dioxide a year, along with a host of noxious fumes. By contrast, the electric car system proposed for Fujisawa City in Japan would produce no tailpipe emissions. Electric car systems require infrastructure, though, particularly to ensure that people can charge the cars. In Tokyo the

[4] The state-of-the-art ecocity called Dongtan on China's Chongming Island, at the mouth of the Yangtze River, was supposed to be a paradise. Energy-efficient buildings would be clustered together to encourage residents to travel on foot; only battery- or hydrogen-powered cars would be permitted in the development. Surrounding organic farms would supply food; sea breezes and the burning of husks of China's staple crop, rice, would furnish power. Canals and ponds would incorporate the local wetlands, providing restful views for humans and continued respite for migrating birds. Yet for all its grand goals, this island city-to-be remains unbuilt. China has abandoned the project. It was originally slated for completion in 2010 but has failed to proceed beyond the construction in 2009 of a tunnel and bridge linking Chongming to the mainland.

company Better Place has had success in testing a system of electric vehicles powered by batteries that, when depleted, can be quickly and easily swapped out for recharged ones at battery switch stations. In the near term, simple changes, such as converting buses to run on compressed natural gas rather than diesel, can both clean up the air and improve efficiency. Such efforts have helped Denver save more than 24 million gallons of gasoline between 2005 and 2009.

Cities must not only conserve energy and limit emissions but also diversify their energy supply. New York City recently mandated a switch from heavy heating oils to lighter, cleaner-burning fuels, such as natural gas, in a bid to improve air quality. Such straightforward decisions can demand difficult trade-offs: David Bragdon, director of Bloomberg's Office of Long-Term Planning and Sustainability, says that New York is struggling to reconcile this increase in the use of natural gas with its desire to prevent hydraulic fracturing, or fracking in its watershed because fracking can contaminate water supplies.

The largest U.S. cities have the lowest carbon dioxide emissions per capita—an unplanned by-product of greater density. Most savings comes from energy-efficient public transportation and simple walking instead of driving, which is almost 10 times more energy-intensive. Environmental efficiency becomes more challenging for developing countries where much urban infrastructure still needs to be built (India) or rebuilt (Venezuela), although the trade-offs between a need for rapid growth versus the steps to achieve clean growth remain poorly understood. Still, urbanization may ultimately remain the most sustainable solution to our planet's environmental challenges.

Water and Waste

Ensuring that sustainable supplies of freshwater continue flowing to growing urban populations is another daunting task facing the international community. Large swathes of the world are already pushing the limits of water availability. Cities throughout the western U.S., from Denver to Phoenix, for instance, are using up more than the normal flow of the Colorado River. IFPRI estimates that about half of global grain production will be at risk because of limited water by 2050. To help cities conserve, C40 has developed a list of best practices based on case studies of strategies employed by cities ranging from Austin to Tokyo. Austin, which launched its water-efficiency program in 1983 in response to a housing and commercial boom, offers a number of incentives to curb water use, including rebates for installing rainwater-harvesting systems and water-conserving toilets. Tokyo is the world leader in detecting and controlling leaks in its waterworks. It has earned this distinction by systematically checking, repairing and replacing pipes and by fixing leaks on the same day that they are identified. The planned city of Masdar in the United Arab Emirates (not a C40 city) takes a Big Brother-like approach to conserving water: showers shut off automatically after a few minutes, and each resident's water use, along with energy use, is monitored via a computerized smart grid that allows the provider to intervene if users get greedy.

Water must also be clean. For most cities, meeting this objective will mean not maintaining the status quo but vastly improving on it: according to the U.N., nearly a third of city dwellers live in

slums, which typically lack access to safe drinking water and sanitation services, leaving them vulnerable to cholera and other waterborne diseases.

Poor waste management is not just a problem for water quality, however. New York City, for example, has closed its landfills in Brooklyn and Staten Island and now pays as much as $100 a ton to move waste hundreds of kilometers away. Even recycling is not a panacea -- Dubuque, Iowa, halted its glass recycling program because trucking the material to far-flung processing plants added more to the city's greenhouse gas emissions than dumping it in a landfill. Even better than simply disposing of waste or recycling it, of course, would be making something useful from it. Just such a transformation is taking place in an industrial park outside the city of Rizhao, China, where Luxin Jinhe Biochemical Company makes citric acid for beverages from cassava, corn and sweet potatoes. The leftover waste flows into tanks called biodigesters, where microbes turn it into solids that can be converted into meal for animal feed and methane that can be burned for industrial purposes, such as generating electricity. In fact, capturing methane from landfills is one of the cheapest ways to cut down on greenhouse gas emissions while making a new "natural" resource.

Easy Fixes

Existing cities will need cutting-edge technology to help achieve their long-term sustainability goals. But policy tweaks and low-tech solutions can play an important role, too -- for instance, changing building codes to require more energy efficiency, which could be achieved with better insulation. Indeed, the real battle to make an existing city such as New York more sustainable may be won in the minds of superintendents managing the metropolis's roughly one million buildings. Victor Nazario, U.S. Department of Energy's Green Program Director, which trains building service workers in green operations, said that these techniques were not expensive but that it takes dedication.

These concepts are spreading worldwide, thanks to organizations that bring leading cities together to share plans that work, such as C40 and ICLEI-Local Governments for Sustainability. And when cities act, national governments notice -- taking its cue from the 259 cities in China that are striving to be low-carbon, the Chinese Ministry of Housing and Urban-Rural Development is now studying plans to encourage the use of more energy-efficient and long-lasting building materials, which could significantly enhance the sustainability of the country's boomtowns.

Boosting cities' ability to provide clean energy, transportation, food, water and waste disposal will be key strategies to ensuring a brighter future for humankind. But when it comes to eco-cities, those efforts too often prioritize aesthetics over the real-world needs of people. And it is the people who ultimately make a city sustainable or not. Municipalities worldwide are exploiting a host of creative solutions to reduce energy consumption, water use, waste and emissions, while also making it easier for people to get around.

Some examples:

SMART PARKING Digital parking meters tell mobile-phone and navigation apps when a space opens up, reducing traffic caused by drivers trolling for spaces (San Francisco)

UNDERGROUND PARKING Subterranean garages near commuter destinations eliminate the need for cars to surface (Paris)

CONGESTION PRICING Charging drivers higher rates to drive in busy neighborhoods eases traffic (Stockholm; Singapore; London)

UNDERGROUND TRANSPORTATION Commuter trains, subways and primary roads run underground in massive tunnels, freeing the ground level for easy, clean bike and pedestrian traffic (Portland, Ore.)

BIKE RACKS AND LANES Ample bike lanes and racks encourage more people to ride instead of drive; they also promote fitness (Minneapolis)

WAVE POWER Hinged cylinders anchored in the seafloor are pushed by waves, turning onshore turbines that create electricity (Orkney, Scotland)

STORM-SURGE GATES Open gates in rivers, estuaries and canals close when storm surges are expected, to protect low-lying and subterranean infrastructure (Rotterdam; London)

SOLAR HOT WATER Rooftop tanks, heated by the sun, provide domestic hot water instead of furnaces (Rizhao, China)

SOUR FILMS Photovoltaic sheets on south-facing building facades generate electricity (Berlin)

UNDERWATER TURBINES Turbines seated on the seafloor or estuary bed are spun by daily tides, generating electricity (New York City)

SOLAR POWER Panels generate electricity instead of power plants and also shade rooftops to lower a building's cooling needs (Redlands, Calif.)

HIGH-EFFICIENCY WINDOWS Superinsulated windows quadruple the thermal performance of double panes and can be made from the glass in existing windows (Empire State Building, New York)

CARBON-SEQUESTERING CONCRETE Construction material made locally with carbon dioxide that is exhaled by power plants could reduce greenhouse gas emissions (Under development)

VERTICAL FARMS Food grown indoors could reduce fertilizer and freshwater use, shorten transport and recycle gray water otherwise dumped by treatment plants (Under development)

STORM-WATER PRICING Taxing property owners on the volume of storm water that runs off their property promotes retrofits that reduce wastewater volume at treatment plants (Philadelphia)

LEED NEIGHBORHOOD Residential and commercial construction done across a city region to the highest green, or Leadership in Energy and Environmental Design (LEED), standards saves energy, materials and emissions (Rockville, Md.)

GREEN ROOFS Rooftop vegetation insulates buildings against heat and cold and absorbs storm water (Chicago)

WHITE ROOFTOPS Rooftops painted white reflect heat, lowering a building's cooling cost and a city's heat buildup (Washington, D.C.)

THREE-BIN RECYCLING Requiring businesses and homes to separate trash, recyclables and compost spares landfills; collection charges drop as trash drops (San Francisco)

SATELLITE IRRIGATION Satellite control of park and lawn irrigation systems cuts water consumption and pumping power (Los Angeles)

LOW-FLOW APPLIANCES Water-saving toilets and showerheads installed in buildings save millions of gallons annually (Austin, Tex.)

HYBRID TAXIS Large portions of taxi fleets converted to hybrid vehicles reduce air pollution and greenhouse gas emissions (San Francisco; New York City)

UNDERGROUND UTILITIES Tunnels dedicated to carrying electricity, water, cable television and broadband Internet minimize damage from storms and make repairs easier (London)

SEWAGE-SLUDGE INCINERATION Solid waste extracted from sewage at treatment plants is burned to make electricity (Nashville, Tenn.; Buffalo, NY.)

GOVERNANCE OF CITIES

Ultimately it is the focus on good governance, good institutions and basic economics (sustainable financing, consumer preferences; and incentives for providers) that will create sustainable, dynamic and livable cities.

Ensuring that city authorities are politically, fiscally and administratively autonomous and accountable is an important step. Whether or not local governments command a significant share of national expenditures indicates their respective role in multi-order public governance. This is important in terms of their roles and responsibilities. For example, a local government may have autonomy but only a limited and highly constrained role as in India. This needs to be taken into consideration while making judgment on closeness of government decision making to people.[5] Ivanyna and Shah (2012) have developed an interesting index of "closeness" of local decisionmakers to their people. They show that the countries in which decisionmakers are closest to their people tend to be also those that have successful cities. In order, these are Denmark;

[5] Of course security of existence of local governments, both de jure and de facto—including safeguards against arbitrary dismissal—is important. For example, local governments in India have a constitutional basis; in Pakistan they are creatures of the provinces; and in China they are created by an executive order. The legal and constitutional foundations of local government in India and Pakistan are much stronger, but in practice and by tradition, local governments enjoy greater security of tenure in China (Ivanyna and Shah 2012)

Switzerland; Sweden; Finland; United States; Norway; Iceland; Japan; Hong Kong; Singapore; Austria; Korea and Canada.

Directly elected local governments make elected officials accountable to local residents. This political decentralization is to be assessed using several criteria: direct popular elections of council members and the executive head; recall provisions for elected officials; popular participation in local elections and the contestability and competition in local elections. Fiscal decentralization ensures that all elected officials weigh carefully the joys of spending people's money as well as the pain associated with raising revenues from the electorate and facing the possibility of being voted out. Fiscal decentralization is to be evaluated using the criteria: range of local functions; local government autonomy in rate and base setting for local revenues; transparency and predictability and unconditionality of higher level transfers; finance follows function or revenue means more or less match local responsibility; degree of self-financing of local expenditures; responsibility and control over municipal and social services; autonomy in local planning, autonomy in local procurement; ability to borrow domestically and from foreign sources; ability to issue domestic and foreign bonds; and higher level government assistance for capital finance. Finally, administrative decentralization empowers local governments to hire and fire local employment without making any reference to higher level governments, thereby making local officials accountable to elected officials; freedom to contract out own responsibilities and forge public-private partnerships; and regulation of local activities by passing by-laws (Boadway and Shah 2009).

FINANCING CITIES

New investments will be necessary in many areas ranging from transport to energy efficiency to make cities attractive.

Depending on the development of the local bond market, three situations are possible to mobilize urban finance:

- When the domestic debt markets are yet to mature and the devolution framework is weak, cities should be assisted with a mix of loans and grants while improving the devolution system.
- When debt markets are constrained by fiscal space, but devolution has been successfully implemented, municipalities can work with domestic financial institutions to lengthen maturities and reduce transaction costs.
- Finally, as markets begin to mature, and devolution is secure, he suggested the provision of instruments to link city financing with domestic markets, especially for small and medium cities.

Development agencies can act as facilitators for private capital to finance public assets. They should also allow domestic institutions to integrate cities financing needs with national debt markets and/or commercial lending. Finally they should work with cities and national governments in identifying a rational, predictable devolution of powers and revenue streams.

There are three ways to finance cities: public financing (on- or off-budget), private financing, and public-private partnerships (PPPs). Each method has associated costs and benefits, and no single approach dominates the others in all situations. Whilst direct public provision is the most traditional form of financing, a number of countries do not have the fiscal space required to fund necessary infrastructure improvements. This is certainly the case for low income countries but also for many Latin American, Eastern European and Central Asian countries whose fiscal positions have deteriorated markedly as a result of the 2008 and current global financial crises. For Africa, it is estimated that—even under an optimistic scenario in which significant efficiency gains would be made—Africa would still have an infrastructure funding gap of around $31 billion per year (Foster and Briceño 2010).

Private vs. Public Financing [6]

Private participation in infrastructure has brought additional financing and, in many cases, contributed to improvements in productivity. However, it depends on the potential for cost recovery and the quality of the regulatory framework. Overoptimistic expectations of private sector participation in the financing of infrastructure have led to major calls for "fiscal space" in public accounts (i.e., less stringent fiscal rules) to finance the necessary investments. There is increasing evidence that standard fiscal rules adopted to ensure debt sustainability have resulted in a disproportionate reduction in infrastructure spending and that the current political and ideological climate encourages policymakers to postpone large and costly infrastructure investments.

The public sector remains the dominant source of financing for water, energy and transport in most African countries. Such investments are largely financed through tax revenues and sometimes user fees. Operation and maintenance costs often rely on user fees. For poor countries which cannot access capital markets, concessional loans and grants for public infrastructure has been substantial. Following the 2008 financial crisis, there was a short-lived increase in concessional loans, infrastructure being seen by many donors as a promising stimulus measure, but levels like those seen in 2008-09 are unlikely to be sustained.

Governments still play a large role directly providing infrastructure in most developing countries, in addition to their role of regulator of the private (or privatized) sector. Studies have highlighted the efficiency gains from privatization, with telecommunications often noted as an important example.

The central question is whether government ownership and operation of infrastructure and public utilities improves living standards and enterprise productivity. On the service delivery side, low-income consumers facing public monopolies have little choice or voice in seeking improvements in access or quality. When prices are kept low by government subsidies before privatization, the benefits often accrue to middle-income and rich people rather than poor people. Similarly, evidence shows that traditional cross-subsidies associated with monopoly state-owned firms

[6] This section is partly taken from JJ Dethier and A. Moore, Infrastructure in developing countries: An overview of some economic issues, Discussion Paper on Development Policy No. 165, University of Bonn, ZEF [Center for Development Research], April 2012 http://www.zef.de/discussionpapers.html

(where some consumers are charged a price much further below marginal cost than others) often benefit the better off more than poor people (see e.g., Brook and Irwin 2003; Estache, Gomez-Lobo, and Leipziger 2001). In addition, fiscal constraints on subsidized monopolies often lead them to invest too little in expanding or maintaining services—so marginal, usually poorer, neighborhoods have little or no physical access to a variety of public services.

In many cases it is cheaper for the government to raise infrastructure funds itself rather than rely on private finance. This is true when the government has greater access to concessional finance, and when private investors make excess profits. This last point highlights that what is important from a value-for-money perspective is not the cost of private capital per se (captured by the WACC) but the price the government pays for it (captured by the IRR).

If the cost of private capital *is* greater than public capital, properly adjusted for risk, the case for seeking private investment *for a given project* rests on efficiency gains. Private investment may be a way of ensuring that the best projects are selected and that access is expanded. A large volume of work has compared the efficiency of private and public infrastructure providers, with the general consensus being that private investment has typically brought efficiency gains. Evidence from Latin American reforms for example suggest significant efficiency gains on average, after the introduction of concession contracts, ranging from 1 to 9 percent per year (Guasch 2004). A number of studies on energy find that private investment has resulted in greater efficiency—5 to 7 percent per year in Latin America for example. The number of studies analysing efficiency in the water and sanitation sector is too limited to draw any conclusions. In transport, the evidence suggests that private operators have tended to perform more efficiently. In telecommunications, the general consensus is that there have been significant improvements resulting from private investment (Estache, Perelman and Trujillo 2005).

A more important determinant of performance than private ownership is the degree of competition and the incentives created by the market structure. Estache, Perelman and Trujillo (2005) state that “across sectors, the more relevant variables include the degree of competition, the design of regulation, the quality of institutions and the degree of corruption”. Generally the evidence suggests that private participation tends to result in efficiency gains but is not a sufficient condition, depending on market and institutional conditions. This paper has focused on market determinants but institutional determinants are also important. Estache and Kouassi (2002) for example find that quality of governance significantly increased efficiency in African water and sanitation services, whilst the level of corruption significantly decreased efficiency.

Value for money analysis is a means of comparing the cost of various approaches to delivering a given project though it is not primarily concerned with other important issues such as the selection of projects and the expansion of access. Raising prices to cost covering levels is a useful way to ensure that the best investments are undertaken. It also argues that they can help in expanding access as utilities become more financially sustainable and therefore have more capital to invest.

Private participation itself can help in expanding access if there is a potential for a return on new investments. Even with cost covering prices, private providers may exert more effort in opening up new markets. Physical access to water, telephone, sanitation, and electricity services has indeed improved after privatization in a number of countries, simply through renewed investment in physical networks by the new private owners. Economic access—through

affordable prices for poor people—is a more complicated issue because it involves the more difficult institutional and design issues associated with regulating prices or designing directed subsidies for poor people. In any case, the scope for improved access will depend on the success in achieving efficiency gains—some increased surplus—that can be passed on to poor people. Thus, in principle, with appropriate regulatory institutions, privatization and concession contracts can deliver both improved access to goods and services for poor people and better financial performance for the company.

P**ractical difficulties can arise with privatization.** First, with limited government finances, direct subsidies for low-cost services for poor people may be difficult to finance. So there is a risk in terms of whether government will be able to sustain transparent subsidies after privatization. These subsidies will compete with other budget demands, while the indirect subsidy of underpricing—and the accompanying losses in government owned utilities prior to privatization—often could be hidden for years. In addition, there is a risk that the transfer of assets at the time of privatization could empower rich people rather than poor. Poorly designed auctions can lead to one-off transfers of wealth from the public sector (taxpayers) to the new investors (domestic elite or foreign investors). If privatized firms are purchased by foreigners, foreign ownership can provoke a political backlash. Infrastructure services often involve some degree of necessity, and people may feel particularly vulnerable to the whims of a private foreign owner. When their government is the owner, they may feel that they have some leverage, even if low prices charged by a state-owned firm come with very low quality. Governments sometimes exacerbate consumers' frustration with private providers, as when they postpone needed price increases until after privatization—so that private firms, often foreign, get the blame.

Innovative Financing

Innovative ways to finance these investments by leveraging domestic capital have emerged since the 1990s. Larger cities like Johannesburg, Ahmedabad and Ho Chi Minh City, have created medium term investment plans that have repeatedly accessed local markets and established a credit relationship with the private sector in the process. Medium-size cities mobilize domestic capital through intermediaries like Findeter in Colombia, INCA in South Africa and TNUDF in India. Serious efforts to provide a greater domestic market orientation for municipalities have also been made by CAIXA in Brazil, MDFO in the Philippines, and FEC in Morocco.

For urban finance strategies to be viable, rational and predictable devolution—which is largely formula based (as in South Africa, India and Mexico)—is essential. Viability also requires the requisite legal framework for borrowing, such as the Municipal Finance Management Act (MFMA) in South Africa, Urban Local Bodies Act in Tamil Nadu, and Master Trust Structure in Mexico. Instead of foreign donors, results can also come from domestic market oriented financial intermediaries similar to those working with cities such as DBSA and INCA in South Africa, or TNUDF in India.

Other mechanisms have emerged to raise capital for municipalities.

Business Improvement Districts (BIDs) raise money from the business community, which is traditionally disinclined to fund collective investment. Through the BID money is raised without

the moral hazard of free riders thanks to the government requirement that all local businesses participate and the collection of funds through voluntarily increased property taxes. At the same time, the money is spent by the BID. BIDs are a privatization of traditional government responsibilities, giving up traditional democratic accountability in favor of efficiency.

Tax Incremental Financing (TIFs) allows government to select a neighborhood and issue a bond on the future property tax receipts it expects to receive from it. It invests the capital raised to improve the neighborhood. This is always matched by significant private investors, who are incentivized by the government fixing the property taxes for years at the present rate.

Land Banks are regional or supra-municipal public-private fund that purchases and holds land with the purpose of making the best possible use of the land. The properties purchased may be aggregated or have their borders drawn such that the most profitable portions may fund the rest. In that way a land bank pools the capital and interests of the associated parties.

Community Development Corporations (CDCs) buy and develops land, selling the housing on it at affordable rates to lower income people while retaining ownership of the underlying land. It allows residents to build up assets while giving less incentive for land speculation.

Value Capture Finance (VCF) capture the value of positive externalities (and reduced negative externalities) created by projects. Those that expect to capture, and thus profit, from the added value of the project may fund the project itself in anticipation of the positive outcome. Governments may anticipate the positive effect of their own projects and seek to benefit from it via tax (or BIDs) or market-based means (e.g. buying and selling land). The externality generating action need not be a physical development but may also be a regulatory one (e.g. increasing zoned density). Value capture financing has been used in London, Barcelona, Istanbul, Berlin, Hamburg, and Copenhagen for projects ranging from sports stadiums to row houses to metro development (Huxley 2009).