

REDUCING THE FOOTPRINT OF GROWTH

EXECUTIVE SUMMARY

Message 1. With 77 percent of its population living in urban areas and producing more than 84 percent of its GDP, as well as an estimated 75 percent of its GHG emissions, Mexico needs to focus on making urban development greener, more efficient and resilient, and socially inclusive. This requires developing a sound urban land management system that could be the basis to: (i) increasing urban densities in search of efficiency and livability; (ii) providing the urban layouts needed to promote bus rapid transit systems and non-motorized transport; (iii) using land based financing instruments to provide infrastructure in new low-income housing developments; and (iv) integrating risk reduction policies in urban development instruments.

Message 2. The estimated cost of environmental degradation in Mexico was estimated to be 6.3 percent of GDP in 2008. While Mexico has undertaken effective measures to control air contamination and the costs associated with it, the costs of land and water degradation due to solid and liquid wastes have been increasing at higher annual rates, harming human health, the environment, and the economy. Two areas require particular attention: (i) developing integrated solid waste management strategies at national, state, and municipal levels; and (ii) addressing the problems posed by hundreds of contaminated sites and planning for their redevelopment as brownfields.

Message 3. Energy production and consumption are the largest source of GHG emissions in Mexico, with a total share of 60%. Enhancing energy efficiency is therefore a key element in promoting low carbon development for the country. The needed policy reforms include: (i) revising energy subsidies; (ii) expanding the use of energy efficiency labels and standards for buildings, urban infrastructure, transport, and waste management; (iii) promoting energy-efficient self-sustained companies; and (iv) encouraging the participation of banks in energy efficiency retrofitting projects.

OBJECTIVE

Reducing the footprint of growth requires a focus on three key issues:

- Transforming urban areas into greener, more efficient, resilient, and socially inclusive cities, better able to capture the economic benefits associated with urbanization.
- Ensuring sound management of the brown environmental agenda to provide the conditions for continued sustainable economic green growth while preventing and minimizing negative impacts and risks for human health and the environment.
- Promoting energy efficiency in housing, transport, urban infrastructure, and waste management to enhance the sustainability and competitiveness of the Mexican economy.

KEY CHALLENGES

Urban management

Urbanization is associated with economic growth and prosperity but also with negative environmental externalities. Population growth and rapid urbanization have had marked impacts on resource conservation in and around urban areas, as well as on environmental pollution. Urban areas have become major contributors of carbon emissions; cities around the world are responsible for 75 percent of all greenhouse gas emissions.¹ Intensive use of built-up areas in cities leads to increased traffic congestion, air pollution, lack of affordable housing, lack of vegetation, and loss of open green space. Urbanization can also exacerbate exposure to hazards as well as social and spatial exclusion, which can in turn be associated with the prevalence of crime and violence.

Urban density is a key factor in capturing the economic benefits associated with agglomeration economies and mitigating the negative externalities. Scale economies in production, movements of labor and capital, and falling transport costs can interact to produce rapid economic growth in cities. City density also has important impacts on sustainability, since it is associated with reductions in carbon footprint, greenhouse emissions, and resource intensity. Data from the 100 largest cities in the world shows the strong negative correlation between density and CO₂ emissions as well as between density and per capita water consumption, electrical use, and solid waste generation.

The growth pattern in Mexican cities reduces their potential to promote green urban growth. 77 percent of Mexico's population resides in urban areas and although the pace of urbanization has slowed since the 1940s, the concentration of economic activity in certain regions continues to increase², to a point that the seventy largest cities produce 84 percent of the country's GDP. A worrisome trend observed in the past thirty years is the expansion of urban areas at a much higher rate (one to seven) than the growth of population (one to two), according to a recent study conducted by SEDESOL on 10 metropolitan areas and 50 cities.³

The housing sector has contributed disproportionately to the expansion of urban areas, through low-density single-use large housing developments built on the outskirts of urban areas. Mexico initiated a radical transformation of its housing sector in 2000. Aided by macroeconomic stability and policy reform, the country successfully increased the supply of low-cost housing by around 1 million units each year between 2006 and 2011. Most of these new units have occupied around 60 percent of the land in new urban settlements. As housing developers further seek to produce more housing units (for which substantial subsidies are available) while reducing the cost of land (for which no financing is available), they acquire rural land plots distant from city centers. These plots are later transformed into urban land on a plot-by-plot basis. The result is a patched urban pattern that exacerbates social exclusion, with dispersed housing developments that lack adequate services. The increased distance to the city implies higher transport costs for new dwellers. Estimates suggest that households in a sample of new developments spend as much as half of their family income on transportation and allocate an average of two hours a day to get to and from employment or education centers.⁴ This comes

at a great cost—urban sprawl cannot be reversed, and communities are compelled to live with the inefficiencies and costs of this shortsighted strategy.

Urban sprawl has been associated with the exceptional expansion of private motorized transportation. Over 1996–2006 Mexico’s vehicle fleet nearly tripled. Moreover, dispersed urban patterns make public transport systems unviable because these depend on higher densities to become cost-effective. In addition, transport is one of the largest and fastest growing sectors in Mexico in terms of greenhouse gas emissions and energy consumption.

The provision of infrastructure in far way housing developments is extremely costly. Since 2000 about 60 percent of the newly urbanized land has been dedicated to housing as the country strives to reduce the housing deficit, which is estimated to be around 9 million. Yet 5 million vacant houses (14 percent of the total housing stock)⁵ have been abandoned because they lack minimum infrastructure services (38 percent) or because added transport costs for the household makes them unaffordable.

Poor urban and land use planning is a key factor underlying the increase in disaster risk. Mexico is prone to a wide range of natural hazards, including earthquakes, hurricanes, and floods. Although the country has made important progress in: (i) responding to natural disasters through the creation in 1996 of the National Fund for Natural Disasters (FONDEN) with a minimum annual allocation of 0.4 percent of total programmable public expenditure; and (ii) developing innovative risk financing and insurance strategy including risk transfer instruments like the catastrophic bonds issued in 2006 and 2009, it has been less successful in the area of prevention and risk reduction. In fact, vulnerability to adverse natural events is rising along with the expansion of Mexico’s cities, the growth of its population, and the increased concentration of physical assets, combined with poor urban and land use planning.

Brown agenda

As urbanization and economic growth have steadily increased in Mexico, the brown environmental agenda has become crucial. Issues include the insufficient number of solid and hazardous waste disposal facilities; the pollution of rivers in urban areas and of coastal environments by municipal sewage and industrial effluents; and serious air, water, and land pollution, especially in urban centers. The estimated cost of environmental degradation in 2008 was approximately 6.3 percent of GDP.⁶ While Mexico has taken significant policy and related actions in attempting to deal with the brown agenda, present conditions clearly demonstrate the need for improving current policies and developing new policies and actions. This section addresses two areas: solid and hazardous waste management and contaminated sites.

Estimated municipal solid waste generation was approximately 38.3 million tons a year in 2009 and continues to grow each year. It has increased approximately 16 percent since 2003,⁷ and while approximately 87 percent of it is collected, only 64 percent is reportedly disposed of in either 88 sanitary landfills or 21 controlled sites.⁸ The 2009–2012 National Waste Management Program proposed a minimum of 50 new sanitary landfills, of which it appears that only a few have been started. Approximately 53 percent of sanitary solid waste is organic material. And

while this presents an excellent opportunity for waste-to-energy projects, only a limited number of them have become operational. While many municipalities have initiated recycling programs (primarily focused on aluminum, glass, certain plastics, and paper), in 2008 only 3.3 percent of Mexico's total urban waste was recycled.

Approximately 9.1 million tons a year of improperly managed hazardous waste are reportedly generated by Mexican companies. Reported estimates of inadequate hazardous waste disposal range from 60 to 80 percent of the total produced.⁹ Substantial quantities of mining waste and petroleum sector wastes are also generated in Mexico. An additional average daily production of special wastes of approximately 17,149 tons is reported, including 13,130 tons of construction waste and 3,201 of sludge waste from municipal wastewater treatment plants.¹⁰ There is not adequate management or infrastructure for the treatment or disposal of the special waste generated.¹¹

Although Mexico has developed some good environmental legislation and protection strategies for waste management,¹² they are not being properly implemented, especially locally, and are not sufficient. While many municipalities have developed Municipal Programs for Integrated Prevention and Management of Waste, many—especially smaller ones—have not.¹³ Limitations in municipal legal and political frameworks result in an ineffective implementation of integrated waste management,¹⁴ such as a lack of technical and management capacities as well as recurrent difficulties in the financing and sustainable operation of the necessary infrastructure. Moreover, the private sector lacks incentives. Environmental awareness is only beginning to take hold among the general public and political decision makers. Municipal waste financing mechanisms have had limited success.

There are reportedly more than 700 contaminated sites in Mexico, and the number has been steadily increasing over the last few years.¹⁵ Roughly half of the contaminated sites are under federal jurisdiction (for example, hazardous waste generators) and half are under municipal or state jurisdiction (such as municipal landfills or dumpsites that received hazardous wastes, special waste generators, and disposal facilities). Contaminated sites can result in very significant human health impacts, often associated with poor or marginalized communities due to their proximity to industrial areas/sites, and also can result in significant environmental impacts. These contaminated sites in urban areas also represent a major deterrent to economic development.

Mexico has established some important policy actions to help address contaminated sites. They include the General Law for Prevention and Integral Management of Wastes and its associated regulatory standards (for example, Norma Oficial Mexicana for heavy metals and polychlorinated biphenyls). In 2011 the National Program for Remediation of Contaminated Sites was established, with its main objectives being to reduce the number of contaminated sites where human health and natural resources are affected, reintegrate remediated contaminated sites into the economic cycle, and contribute to urban renovation and the improvement of living conditions in inner cities. Successful cleanup of more than 50 contaminated sites with a responsible party have been reported, including 13 large-scale sites.¹⁶

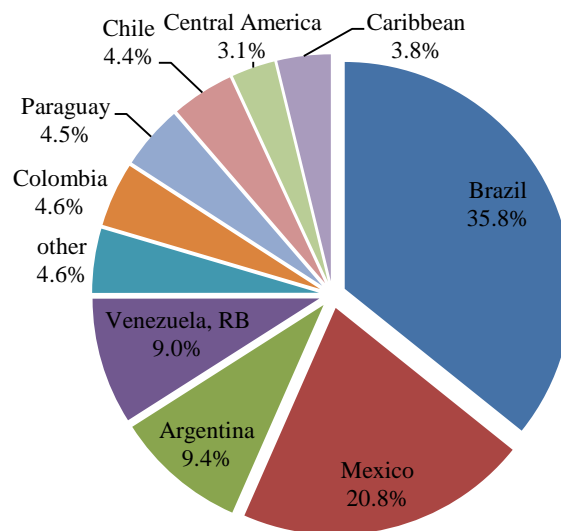
However, effective implementation of the National Program for Remediation of Contaminated Sites in Mexico faces several obstacles. The lack of financial resources is typically the principal reason that remediation projects are not implemented. Other key obstacles include:

- Government institutions without appropriate management and technical skills.
- Lack of standard and consistent technical guidelines for remediation.
- A legal framework that is not consolidated with respect to sustainable soil use, sustainable city planning, and the revitalization of inner city areas.
- Lack of risk communication procedures and guidelines related to contamination.
- Incomplete information system to provide the decisionmakers with solid information for sustainable land use and site revitalization.
- Lack of financial mechanisms to support public and private sector remediation efforts.

Energy efficiency

Enhancing energy efficiency is essential to reduce the footprint of economic growth in urban areas. Recent studies in Mexico confirm the extent of the energy-efficiency potential that could be tapped at low cost and show that the investment required in all electricity efficiency interventions is significantly less than the investment in power plants that would otherwise be needed.¹⁷ The case of Mexico is of special interest because it is the second largest power producer in Latin America and the Caribbean and the largest consumer of hydrocarbons for power generation (figure 1).

Figure 1. Market share of total electricity production, 2009

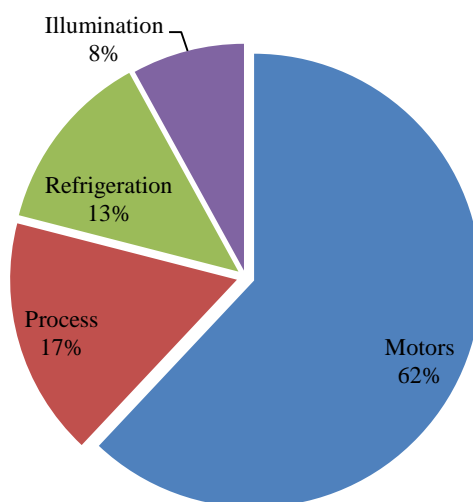


Source: World Development Indicators database (2009).

Energy efficiency opportunities in urban areas are considerable in air conditioning, lighting, and refrigeration, as well as in transport. Average energy demand could be reduced 28 percent if inefficient equipment were replaced. Replacing incandescent lamps with efficient halogen lamps may reduce electricity consumption for lighting by 30 percent.¹⁸ In 2010, 23 million homes had refrigeration equipment. With the current standard for refrigerators, in some cases, savings of up to 60 percent can be achieved, compared with equipment manufactured before 1993.¹⁹ The transport sector, which accounted for 45.5 percent of all energy consumed in Mexico in 2010, also has untapped opportunities for energy efficiency gains. According to the 2009–2012 National Program for the Sustainable Use of Energy, energy consumption in this sector could be reduced from 1,739 TWh to 2,736 TWh by 2030.

The industrial sector provides interesting opportunities to implement policies to reduce energy consumption. Motors represent 36 percent of national electricity consumption and 62 percent of industrial sector consumption (figure 2). Any initiative promoting more efficient motor equipment will have a major impact on electricity demand. The state oil company PEMEX and state power company CFE have vast opportunities to enhance energy efficiency. The main areas of opportunity for PEMEX’s lie in its production processes and the reduction of high levels of gas flaring and venting. The amount of gas that is currently flared and vented is significant, approximately equal to Mexico’s total gas imports (which amounted to about a quarter of Mexico’s total gas demand in 2008). Energy efficiency opportunities in CFE are in generation, transmission, and distribution.

Figure 2. End uses of electricity in the industrial sector



Source: FIDE 2008

Energy efficiency in water pumping is critical. The use of efficient equipment for water pumping offers a potential reduction in electricity consumption of 15–20 percent.²⁰ The Mexican government has also developed a variety of programs to replace inefficient systems with efficient ones, but this has not achieved great success, mainly as a result of the high subsidy to electricity for water pumping.

POLICY OPTIONS

Urban management

There is a need to strengthen urban and land use planning. At the federal level, responsibilities for urban transport, land use and environmental protection, disaster risk management, and housing are *divided* among several agencies without coordination mechanisms. At the state and municipal levels, low capacity and limited resources have restricted urban and land use planning functions to the preparation of plans for specific investment projects and to the development of intricate land use regulations, without any comprehensive assessment of population growth, housing and basic service needs, land use and pricing trends, growth corridors, and social issues. As a result, typically, cities do not develop a strategic vision of the future (and plan accordingly) rather they only lay out unarticulated sector programs. An urban and land use planning system capable of: (i) coordinating efforts among agencies that deal with urban development issues; (ii) designing comprehensive policies to manage urban growth; (iii) defining guidelines for efficient municipal urban and land use planning; (iv) integrating prevention and risk reduction policies; and (v) developing strategic studies related to the future of Mexican cities, is very much needed, and could be housed in a new agency. This agency could integrate various responsibilities and teams currently scattered amongst several ministries.

One of the functions of a land use planning system would be to design a range of instruments, including market-based ones, to promote compact cities. These include transferable development rights, additional transferable rights, and dual tax rates. Transferable development rights can be one of two types: the right to convert rural land to urban use, and the right to build at greater densities than normally allowed by zoning laws. Dual property taxes that tax land differently from buildings are useful to avoid idle land in the center of the city and to promote the supply of serviced urban land. Another tool is densification subsidies to attract people to the center. Mexico has started to foster densification through public policies and programs, such as the guidelines and sustainability criteria within the *Esta es Tu Casa* program of Mexico's National Housing Commission. Moving forward, cities need to develop market instruments to leverage private resources into densification.

A densification strategy for Mexican cities should be accompanied by a mobility policy. Promoting more sustainable transport policies, including mass transit and non-motorized transport, can provide numerous co-benefits in addition to reducing global emissions (box 1), including reductions in traffic congestion, a decrease in commuting times, a decrease in accidents, and improvements in public health as a result of reduced air pollution. The Programa de Transporte Masivo launched by the current administration should be maintained and strengthened, because it has initiated a transformation in the urban transport paradigm for medium size and large cities.

Box 1. Energy efficiency and bus rapid transit systems

Given the historical and projected urbanization pattern in Mexico, urban transport and related land-use planning issues will be a critical component of overall energy use by the transport sector and associated emissions. A World Bank study, the Low-Carbon Development for Mexico (2010), determined that the optimization of bus systems—namely, through integrated Bus Rapid Transit Systems (BRT)—is considered to be the intervention with the highest positive net benefits from a marginal cost abatement perspective.

Mexico is not new to such systems. The Metrobus Bus Rapid Transit System in Mexico City—with dedicated bus lanes, pre-board fare collection, clean technologies, efficient intermodal connections, and rapid boarding—was conceived as a way to simultaneously reduce traffic congestion (caused by high volumes of paratransit “colectivos” and growing private auto use) and improve transit service in a major corridor. Early results showed, along with significant improvements in mobility along the corridor, a number of co-benefits. An outstanding example is the first corridor of Metrobus where, without any specific effort undertaken to reduce carbon dioxide emissions, a 10 percent reduction in GHG emissions was generated just by reducing fuel consumption.

In the medium and long term, as BRT corridors are integrated to other networks such as the subway, clean technologies are deployed, and corridor densifications starts to settle, energy efficiency gains become even more substantial.

High-quality urban design is required to make high-density developments more acceptable.

For existing urban areas, urban redevelopment—including redevelopment of contaminated brownfields within cities—will prove essential to gauge the economic benefits of urbanization and to make densification attractive for private sector investment and labor mobility. In the future, urban planners should be required to attach price tags to their urban plans to better understand the costs and benefits of low- versus high-density development.²¹

For new developments, land-based financing instruments can pay for the provision of urban infrastructure. The underlying premise of land-based financing of infrastructure is that the benefits of infrastructure projects are capitalized into land values. As long as the special distribution of project benefits can be internalized within a well-defined “benefit zone,” it is economically efficient to finance infrastructure projects by tapping the increments in land values resulting from them. Land-based financing instruments include betterment levies, developer land sales, value capture via project-related land sales, the sale of development rights, developer exactions and impact fees, and land asset management. Most land-financing techniques generate revenue up-front, thereby reducing dependence upon debt and the fiscal risks that debt financing introduces.

Mexico has started to require guidelines for sustainable new developments. These call for investments in green spaces, social services, public transport, and other infrastructure to ensure that new developments will be socially inclusive and linked to employment and economic opportunities. Since 2010 several housing institutions have incorporated the core elements of the guidelines into their policy and programs as part of the country’s Sustainable Housing Program

(Programa Sustentable de Vivienda). Importantly, the Instituto del Fondo Nacional de la Vivienda para los Trabajadores, which finances 70 percent of all mortgages in Mexico, is aligning its operational and financial plan toward this end. But more should be done, specifically regarding the development of financial instruments to accompany green urban growth.

Land use planning and reinforced building codes are effective tools to reduce natural disaster risks and should be part of Mexico's comprehensive disaster risk management strategy. Besides strengthening FONDEN's operational efficiency and making sure that risk financing and insurance strategies and mechanisms trickle down to the states, there is an urgent need to focus attention and resources to prevention and risk reduction measures. This can be done through several mechanisms: (i) establishing a standard methodology for risk identification, assessment, and quantification to enable the federal and sub-national governments to design, prioritize, and implement disaster risk reduction programs for existing infrastructure, build resilience into new infrastructure, strengthen the public investment system, and integrate design standards for priority sectors, such as education, health, transport, water and sanitation, and low-income housing; (ii) linking federal resources for reconstruction to the development of a comprehensive disaster risk management strategy at state and local level; (iii) incorporating risk reduction policies in urban and land use planning. States are ideally positioned to play a coordinating role in disaster prevention and risk reduction as they are able to assess risk on a regional and local scale. Building sub-national capacity and creating incentives for better and informed investments at that level are key contributors to Mexico's sustainable growth. In addition, local governments need to work on preparing and enforcing strict construction standards linked to federal housing programs.

Brown agenda

Integrated waste management strategies and solutions at the national, state, and municipal levels are crucial. Overall it is necessary to reinvigorate the implementation of the National Waste Management Program. Specifically, action is required to do the following:

- Install a significant number of new sustainable municipal or regional solid waste disposal facilities and special waste management systems (collection, transport, treatment, and disposal).
- Establish financial mechanisms to facilitate the long-term sustainability of municipal solid waste disposal systems, including both construction and operation.
- Resolve limitations in municipal legal frameworks to allow for an effective development and implementation of Municipal Programs for Integrated Prevention and Management of Waste.
- Establish conditions to allow installation of waste-to-energy projects that use the high organic material content in Mexican sanitary solid waste.
- Create market mechanisms and conditions to significantly expand waste recycling.
- Implement actions to enhance private sector actions in solid waste and hazardous integrated waste management, including waste generation reduction, so as to create market conditions that promote more waste recycling companies and establish fair, open,

and transparent conditions for promoting private sector hazardous waste disposal companies.

- Take actions to increase public awareness and thus public demand for sound waste management.

The government should develop and implement various actions to more quickly address the full range of existing issues related to contaminated sites in Mexico, associated with both the public and private sector. A National Program for the Remediation of Contaminated Sites exists but needs to be strengthened. This should include development of appropriate alternative financial instruments and mechanisms to provide the capital needed for site remediation, for both public and private sector–driven site remediation. These need to include a range of instruments, from governmental budgetary funding, remediation, and redevelopment funds, to financial mechanisms to promote cleanup at private companies’ existing operations. There is a need to establish policy instruments that promote brownfield redevelopment of contaminated sites, such as revenue and incentive frameworks to compensate developers for the risks involved in site remediation, building upon international best practices of brownfield redevelopment, legal and contractual conditions that resolve ownership issues and establish effective liability protection, and clear and uncomplicated processes for environmental licensing and land use should be developed. There is also a need to establish further regulatory guidance (for example, cleanup standards and risk assessment); improve institutional capacity to investigate, reduce, and prevent contamination, and establish policy and market instruments to address site contamination at mining and oil and gas operations.

It is also important to keep in mind policy and related actions to improve the availability, quality, and cost of Mexican-based environmental goods and services. These will produce jobs, goods, and services to measure, prevent, minimize, correct, and manage environmental damage. Cleaner industrial technologies, wastewater treatment, solid waste disposal, waste recycling, soil and water contamination investigation and remediation, noise and vibration control, environmental analytical and testing services, and environmentally preferable products should be emphasized.

Energy efficiency

Energy subsidies need to be revised. The price of energy is a crucial signal to consumers. If energy prices are distorted, energy rationalization gets harder. In general, the government should assign greater priority to public policies aimed at poverty reduction than to the use of subsidies on energy products. In this regard, it should be ensured that prices reflect the costs of providing goods and services or their international benchmarks, as the case may be.

Energy efficiency labeling, and standards in housing, transport, and small businesses, should be used. While Mexico has been implementing standards of equipment and systems, this only covers a portion of the domestic market. For this reason, Mexico’s government should promote the implementation of a greater number of standards. For instance, Mexico could move toward the adoption of standards similar to those in developed countries, creating new demand for already locally produced goods. Without creating barriers to trade, Mexico could seize the

opportunity to align energy efficiency standards for cars with those in the United States or Europe (where many of its cars are sold). Mexico could consider the whole urban environment to achieve significant energy efficiency gains, taking into account not only appliances or equipment but buildings, urban infrastructure, transport, and waste management.

The private sector can be more involved in financing investments in energy efficiency. The recent reform of the oil and gas industry represents a positive step in promoting greater efficiency in the sector and attracting investments from private companies. The development of nationally appropriate mitigation actions could also be pursued to encourage the private sector's participation through the development of industrywide coordinated efforts to phase out ozone-depleting substances and increase appliances' efficiency. It is intended that any new mechanism will be defined no later than in 2015 and its implementation will take place no later than in 2020. Finally it is expected that the Government of Mexico will play an important role in the configuration of these private sector mechanisms.

The creation of Energy Service Companies (ESCOs) should be promoted. ESCOs have been successfully implemented in some countries. The ESCO concept is that these companies invest their own resources in energy efficiency programs, and the costs and benefits are paid from the savings; in all cases benefits are shared from day one between the company and the investor. ESCOs could be particularly useful in the case of PEMEX and CFE. Often these state-owned enterprises are constrained by federal budget ceilings that leave them little room to invest in energy efficiency or perform at their potential. This gap, however, can be closed by ESCOs, which offer shared savings, the guarantee of investments by the ensuing efficiencies, and even the potential to unlock the required initial capital investment by tapping specialized firms.

Banks can be familiarized with energy-efficiency lending to reduce perceived risk. Lack of access to commercial financing has been a major impediment to expanding the market for energy-efficiency retrofitting projects. Banks are not accustomed to this type of project lending. They do not accept receivables from performance contracts as collateral. And they are uncomfortable with lending to project developers, such as ESCOs, which are usually poorly capitalized. A step-by-step process is needed to familiarize banks with this market to reduce perceived risk, which can enable the adaptation of loan-evaluation criteria and possibly the design of appropriate instruments. A first step would be to get financial and technical experts working jointly to identify and design financing schemes based on energy savings. Both financial and technical experts must create strategies and schemes that show the economic benefits of implementing sustainable projects.

Matrix of short- and medium-term policy reform options*

Reform area	Short-term options (1 year)	Medium-term options (2–3 years)
Urban management	<ul style="list-style-type: none"> • Strengthen and broaden the DUIS initiative to achieve intersectoral coordination (AR & LR) • Design and set in place an urban management database at municipal and metropolitan level (AR) • Strengthen PROTRAM (AR) • Support state and municipal level building codes that contribute to disaster prevention (AR) 	<ul style="list-style-type: none"> • Design market-based instruments for densification and land-based financing of infrastructure. (AR&LR) • Promote high-quality urban design and innovation through government programs. (AR& LR) • Improve coordination of territorial planning (state level) and urban development plans (municipal level). (AR&LR) • Improve quality and standardization of risk identification instruments (that is, risk atlas) and promote integration with city planning. (AR&LR)
Brown agenda	<ul style="list-style-type: none"> • Resolve limitations in municipal legal framework to allow for an effective development and implementation of Municipal Programs for Integrated Prevention and Management of Waste. (LR) • Establish financial mechanisms to facilitate long-term sustainable municipal solid waste disposal systems. (AR&LR) • Establish adequate long-term budget for implementation of updated National Waste Management Program. (AR&LR) • Develop appropriate alternative financial instruments/mechanisms to provide the capital needed for site remediation, for both public and private sector–driven site remediation. (AR) 	<ul style="list-style-type: none"> • Install a significant number of new sustainable municipal or regional solid waste disposal facilities and special waste management systems. (AR) • Establish conditions to allow installation of waste-to-energy projects that use the high organic material content in Mexican sanitary solid waste. (AR&LR) • Create market mechanisms and conditions to significantly expand waste recycling. (AR&LR) • Implement actions to enhance private sector actions in solid waste and hazardous integrated waste management. (AR) • Establish appropriate alternative financial instruments/mechanisms to provide the capital needed for site remediation, for both public and private sector–driven site remediation. (AR&LR) • Establish policy instruments that

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Reform area	Short-term options (1 year)	Medium-term options (2–3 years)
	<ul style="list-style-type: none"> • Establish adequate long-term budget for implementation of updated National Program for the Remediation of Contaminated Sites. (AR&LR) • Establish regulatory guidance (such as cleanup standards, risk assessment, and so on); improve institutional capacity in regulatory compliance to investigate, reduce, and prevent contamination. (AR&LR) • Establish framework/types of multistakeholder comprehensive sustainable environmental management planning in coastal tourism areas, including institutional and financing aspects. (AR) • Strengthen institutional capacities and enhance coordination between governmental authorities and relevant stakeholders. (AR) 	<p>promote brownfield redevelopment of contaminated sites. (AR)</p> <ul style="list-style-type: none"> • Establish policy and market instruments to address site contamination at mining and oil and gas operations. (AR & LR) • Ensure adequate resources are allocated to environmental management. (AR & LR)
Energy efficiency	<ul style="list-style-type: none"> • Use labeling and standards programs for electric appliances used in residences and small businesses. (AR) • Revise energy subsidies. (AR) 	<ul style="list-style-type: none"> • Promote access to commercial financing. (AR) • Promote the creation of energy service companies. (AR) • Capture energy efficiency opportunities in PEMEX and CFE through Energy Service Companies. (AR) • Involve the private sector in financing investments in energy efficiency. (AR) • Capture cogeneration opportunities in PEMEX. (AR)

* LR= Legal Reforms; AR=Administrative Reforms, Preliminary Classification

NOTES

¹ Urban anchor, powerpoint 2012.

² Urban population growth rates for 1970–90, 1990–2010, and 2010–30 (estimates) were 3.4 percent, 1.9 percent, and 1.2 percent, respectively. During these same periods total population increased by 2.4 percent, 1.5 percent, and 0.9 percent, respectively.

³ Average data. Sedesol, la expansión de las ciudades en México 1980, 2010, and 2012. List of metropolitan areas and cities selected.

⁴ UAM-Xochimilo, Estudio de impacto de las políticas de vivienda.

⁵ Instituto Mexicano de la Competitividad (2010).

⁶ SCNM. Sistema de cuentas económicas y ecológicas de México, 2003–2008.

⁷ Secretario de Desarrollo Social, Mayo 2010.

⁸ Programa Nacional para la Prevención y Gestión Integral de los Residuos 2009–2012. SEMARNAT.

⁹ Programa Nacional para la Prevención y Gestión Integral de los Residuos 2009–2012. SEMARNAT.

¹⁰ Diagnostico Básico para la Gestión Integral de los Residuos, SEMARNAT(2006).

¹¹ Programa Nacional para la Prevención y Gestión Integral de los Residuos 2009–2012. SEMARNAT.

¹² For example, Ley General para la Prevención y Gestión Integral de los Residuos y su Reglamento y sus Normas Oficiales Mexicanos; Programa Nacional para la Prevención y Gestión Integral de los Residuos 2009–2012 (SEMARNAT)

¹³ One undocumented estimate says that approximately 200 out of nearly 2,500 municipalities may have a complete plan; Mexican GIZ Waste Management Program.

¹⁴ For example, annual budgets and a three-year mayor’s tenure do not allow for long-term sustainability planning or the capacity to access financing.

¹⁵ Communication SEMARNAT.

¹⁶ Talleres de FNM en Aguascalientes, Paseo Santa Lucia, IMMSA en Monterrey, IMMSA en San Luis Potosi, Refinería 18 de marzo, Arenque, La Venta, Azufrera Panamericana II, Pozo Dos Bocas, TAD Aguascalientes Mexico National Program for the Remediation of Contaminated Sites. Presentation by SEMARNAT at ICCL Meeting, Washington DC (2011).

¹⁷ Johnson, T., and C. Alatorre, “Low Carbon Development for Mexico.” Washington, DC: World Bank (2010).

¹⁸ Equipos de Aire Acondicionado y Principales Usos Finales en el Sector Doméstico de la Ciudad de Mérida, Yucatán; FIDE Review; Energía Racional No. 44 Jul.– Sep. 2002 (M. Maqueda et al.).

¹⁹ La Experiencia de México en Ahorro de Energía; Ing. Odón de Buen; Santiago de Chile; Julio de 2005. <http://www.cepal.org/dmri/noticias/noticias/2/22062/Odon.pdf>.

²⁰ Estudio de Mercado para Estimar la Magnitud del Potencial de Ahorro de Energía Eléctrica en Bombeo Municipal, a Nivel Nacional 2009–2030; study prepared for FIDE by Applied Technology Center de México S.A. de C.V. (L. Gámiz, January 2009).

²¹ By planning higher density residential land uses, cities can shorten the length of all linear infrastructure networks (roads, streets, water lines), thus substantially reducing the capital and life-cycle costs per household. Recent estimates suggest that initial capital costs for urban infrastructure per household in high-density (272 units per hectare) developments are more than 250 percent lower than in low-density ones (22 units per hectare).

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