



Paper 2a: Toward Sustainable Financing and  
Strong Markets for Green Building:  
Green Building Market and Finance in Mexico

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## **Introduction**

The purpose of this report is to describe, from an economic-financial viewpoint, the main elements that influence the green building market, and to emphasize that Mexico must implement financial policies if it aims to reduce carbon emissions and optimize the country's natural resources.

There is no real estate market for green building in Mexico, and in fact, there is no market differentiation for buildings with the characteristics of green building. Instead, green buildings are listed in the commercial and low-cost residential sections.

Of the eight financial institutions consulted (five Mexican and three international), five responded that they had not supported any projects with green building characteristics and that they did not have any special or particular financing plans for green building. They did report, however, that their mortgage departments would be willing to assess such characteristics and that they would turn to their international banking departments to be able to finance green developments.

## **Basis for Financing**

Financial institutions seek not only firm loan guarantees, but also to ensure, in the best way possible, that the project they are supporting will generate sufficient funds to cover the debt. To this end, they use certain elements of comparison, to allow them to more reliably estimate the project's future flows. And they prefer to support projects in which the developer has proven experience in the business.

With regard to other methods for financing and developing the real estate market, in addition to those granted by banking institutions, especially worth noting are stock market certificates and infrastructure and real estate trusts.

*Stock market certificates.* The real estate sector uses two instruments to place individual mortgage loans on the Mexican Stock Exchange (*Bolsa Mexicana de Valores*—BMV): 1) mortgage-backed bonds known as *Boris*, which are equivalent to Mortgage Backed Securities (MBS) in the United States, and which have been issued since 2003, with a total of more than US\$3.068 billion placed on the stock exchange since that time;<sup>1</sup> and 2) *Cedevis* or certificates issued by the Institute of the National Fund for Workers' Housing (*Instituto del Fondo Nacional para la Vivienda de los Trabajadores*—Infonavit), which has placed more than US\$1.7 billion on the stock exchange since 2004.<sup>2</sup>

*Infrastructure and real estate trusts.* The antecedents of these instruments, known as *Fibras*, are the Real Estate Investment Trusts (REIT) in the United States and Real Estate Income Trusts (REIT) in Canada. Although *Fibras* were approved in Mexico in 2005, they are still not operating. It is expected that they will be traded on the Mexican Stock Exchange shortly, since the first request for authorization was presented in 2006, and talks are underway with a number of issuers.

## **Construction Market**

Historically, real estate in Mexico has been owned by local investors, however with the growth in activities associated with the North American Free Trade Agreement (NAFTA) as well as increased transparency in the real estate market, investments with foreign funds and foreign direct investment are increasingly more common in this sector.

Properties are classified in four categories (A+, A, B and C), depending on their specific characteristics. Categories A and A+ correspond to properties with the highest ratings in construction quality, location, technology, security and operations. Some characteristics of green building might be found in these two types of real estate.

Real estate responds to economic activity. In Mexico, the greatest economic activity, aside from the oil industry, is concentrated in Mexico City, its neighboring states, and the states in the country's northern region that export manufactured products. Meanwhile, most of the tourist activity takes place along the Caribbean coast and all along the Pacific coast.

One of the characteristics that investors seek is investment security, and in Mexico's case, this security, as measured by transparency, has improved significantly since 2004. The Jones Lang LaSalle Transparency Index gives Mexico the top position in Latin America.<sup>3</sup>

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<sup>1</sup> Report from the Federal Mortgage Company (*Sociedad Hipotecaria Federal*) on mortgage-backed bonds.

<sup>2</sup> This amount (converted to dollars at an exchange rate of 11 pesos to the dollar) was taken from a BMV press release.

<sup>3</sup> Jones Lang LaSalle, "Investment Case for Mexico," *Advance*, February 2007.

## Offices

The highest concentration of offices is found in the country's largest cities: Mexico City, Monterrey and Guadalajara. The combined market value of office space in these three cities (a total of 3.5 million square meters) could surpass US\$80 million annually.

<b>Offices market (A+ and A)</b>				
	Inventory (m <sup>2</sup> )	Available (m <sup>2</sup> )	Unit value (US\$/m <sup>2</sup> )	Market value (US\$)
Mexico City <sup>a</sup>	3,079,739	316,761	24.00	73,913,736
Guadalajara <sup>b</sup>	79,000	21,725	15.25	1,204,750
Monterrey <sup>a</sup>	365,720	42,643	18.00	6,582,967
<b>Total</b>	<b>3,524,459</b>	<b>381,129</b>		<b>81,701,453</b>

<sup>a</sup> Figures as of June 2006, in Colliers Internacional, *Reporte de oficinas. Ciudad de México*.

<sup>b</sup> Figures as of December 2005, in Colliers Internacional, *Presentación de Fibras and Reporte del mercado inmobiliario 2005*.

We can see how the market has evolved favorably since, despite annual investments, the availability rate dropped from approximately 23 percent in 2002, to nearly 10 percent in 2006.

## Industrial bays

The majority of Mexico's industry is concentrated in three regions: the central, northern and Bajío regions. The annual value of the industrial market is over US\$105 million, with an inventory of 23.5 million square meters.

The *central region* includes Mexico City and its metropolitan area, as well as the cities of Puebla and Toluca. This region has a significant potential for growth, since the index of square meters of "A" type industrial buildings per capita is a third of this index for most US cities.<sup>4</sup> The *Bajío region*, which includes Guadalajara, Querétaro, San Luis Potosí, Guanajuato and Aguascalientes, is an area with a high degree of fertility and is characterized by high-technology agricultural production. The *northern region*, which includes Tijuana, Mexicali, Ciudad Juárez, Chihuahua, Saltillo, Monterrey, Laredo, Reynosa and Matamoros, is characterized by increasing integration with the US economy. The greatest real estate development in this region during the last year took place in the logistics and distribution areas.

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<sup>4</sup> Ibid.

### **Industrial market (type “A” bays)**

	Inventory <sup>a</sup> (m <sup>2</sup> )	Unit value (US\$/m <sup>2</sup> )	Market value (US\$)
Central region <sup>b</sup>	5,590,000	5.00	27,950,000
Bajío region <sup>c</sup>	4,180,000	4.40	18,392,000
Northern region <sup>d</sup>	13,730,000	4.29	58,833,050
<b>Total</b>	<b>23,500,000</b>		<b>105,175,050</b>

<sup>a</sup> Square meters according to Jones Lang LaSalle, Investment Case for Mexico, *Advance*, February 2007.

<sup>b</sup> Figures up to first quarter of 2006. Unit price corresponds to the Mexico City metropolitan area, according to the *Índice de Mercado* report by CB Richard Ellis.

<sup>c</sup> Average price corresponds to Guadalajara, according to Colliers.

<sup>d</sup> Average price corresponds to Monterrey, according to Colliers.

### *Stores*

Most of the real estate in this sector is owned by the occupants or by specialized developers. Companies for opening shopping centers have accelerated foreign direct investment. Specifically, the number of supermarkets and department stores has increased by more than 10 percent during the last year, with a total of 13,062 in the country, covering 15 million square meters.

To estimate the size of this real estate market, we need only look at data from the National Association of Supermarkets and Department Stores (*Asociación Nacional de Tiendas de Autoservicio y Departamentales*—ANTAD) that report a total of 12,154 stores, covering more than 11 million square meters. Of these stores, 1,595 are supermarkets, 860 are department stores, and 9,699 are specialized stores. Another interesting piece of data is that Wal-Mart now owns 908 stores, and 120 of them opened their doors in 2006.<sup>5</sup>

### *Tourism*

Information on the number and square meters of buildings dedicated to the tourism sector is not available. However, there is no doubt that the figures are very significant, since: a) Mexico is the world's eighth most popular destination for tourists; b) there has been an increase of more than 12 percent in private investment in this sector during the last three years, and c) according to Jones Lang LaSalle, Mexico occupies the top position in Latin America in the index on investment transparency.<sup>6</sup>

<sup>5</sup> Wal-Mart México, *Informe Anual 2006*.

<sup>6</sup> See note 3, above.

The characteristics just mentioned, together with statistics on the number of retired people in Canada and the United States purchasing a home in Mexico, suggest a major market for Mexico, specifically in the areas of Los Cabos, the Pacific Coast and Rivera Maya.

### **Residential Construction (Market-price Housing)**

Although the growth index for housing construction has been greater than the population growth index in the last 30 years, the increase in the number of individuals at the age of establishing their own household was greater than the increase in housing construction during the last two decades. And this led to a deficit in new housing.

After the 1995 crisis in Mexico, banks withdrew from the lending market, and consequently the possibilities for financing were limited to government entities and specialized financial companies (*Sociedades Financieras de Objeto Limitado*—Sofoles). To counteract this situation, the Federal Mortgage Company (*Sociedad Hipotecaria Federal*) was established, and in 2001 the number of bank loans began to once again increase at an accelerated rate, although not reaching the level of financing before 1995. In 2005 a total of 56,474 bank loans were granted, in comparison to 85,200 in 1994.

Financing by banks was particularly evident in the upper-class real estate sector, where a significant portion of bank financing was invested.

#### **Sale of new homes<sup>7</sup>**

Percentage of annual variation

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Middle class	68.9	17.3	-1.6	7.3
Upper class	76.6	10.5	16.4	37.0
Plus	42.3	40.2	-10.4	-6.4

### **Public or Affordable Housing Construction**

There is also a deficit in new housing corresponding to public or affordable housing construction, and this deficit is even more notable given that the majority of the Mexican population is classified as low income.

After the 1995 crisis, the participation by banks in mortgage financing was practically zero. The growth in this sector during the years following the crisis was due particularly to the financing provided by Infonavit and the Housing Operation and Financing Trust (*Fondo de Operación y Financiamiento Bancario a la Vivienda*—Fovi).

<sup>7</sup> *Servicio de Estudios Económicos de BBVA*—Bancomer, *El potencial de la vivienda en México*, with data from Softec.

### Sale of new homes<sup>8</sup>

Percentage of annual variation

	2002	2003	2004	2005
Public	3.8	8.8	7.7	11.8
Affordable	25.0	33.4	-6.0	47.4

The main actors in this sector are the government, through the National Housing Commission (*Comisión Nacional de Vivienda—Conavi*), the Housing Fund of the Institute of State Workers' Social Services and Security (*Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado—Fovissste*), the Federal Mortgage Company (*Sociedad Hipotecaria Federal*) and the National Trust Fund for Low-Income Housing (*Fideicomiso Fondo Nacional de Habitaciones Populares—Fonhapo*), and the country's major construction companies, such as URBI, GEO and Homex.

This type of housing is generally for the lower-middle class of the population, and most of the final users are from this sector.

#### *Market structure*

In June 2001 the Mexican government created the National Commission for Housing Development (*Comisión Nacional de Fomento a la Vivienda—Conafovi*) with the objective of defining and coordinating national housing policy. It also created the Federal Mortgage Company (*Sociedad Hipotecaria Federal*), a national housing bank that absorbed the assets of the Housing Operation and Financing Trust (*Fideicomiso de Operación y Financiamiento a la Vivienda—Fovi*), which until that time had operated in connection with the Central Bank (*Banco de México*). The Federal Mortgage Company operates as a second-tier development bank, and works to facilitate the mobilization of private savings into the residential mortgage market.

Housing subsidy policy was ultimately consolidated with the creation of Fonhapo. It is important to note that in Mexico subsidies are implemented on the supply side of the housing market, and currently there is a transition underway from implicit subsidies to direct subsidies for financing the acquisition of housing.

#### *Current status of financing for green real estate*

It is hoped that what are referred to as “green mortgages” will enter into operation at some point during 2007. These instruments have not yet been introduced on the market primarily because it is still necessary to assess their benefits and define the way in which they will be transferred, through better rates or larger loan amounts. Currently, a multidisciplinary group is carrying out an assessment and classification of the prototypes of housing constructed in different parts of the country.

As mentioned in the Residential Building Code (*Código de Edificación de Vivienda*)<sup>9</sup> established by the National Housing Commission (*Comisión Nacional de Vivienda—Conavi*):

<sup>8</sup> Ibid.

<sup>9</sup> The Residential Building Code is a guide for developing regulations at the municipal level.

States and municipalities define the standards for home building through construction regulations, laws on human settlements and housing subdivisions, civil codes and other instruments.

At the national level, nearly 100 construction regulations have been identified, of which 32 are state regulations, and the rest are municipal regulations. There is a great deal of diversity in their contents, criteria, concepts and definitions.

It is important to include sustainability characteristics in these regulations, although it is not possible to standardize regulations for all municipalities, since such characteristics depend on the geographic and climatic conditions in each location.

## **Institutional Building**

According to Conae's 2003 database on the largest federal government offices, there were 729 office buildings with a total of 3.8 million square meters.<sup>10</sup> The importance of this particular sector is evident when compared with the office market mentioned earlier, since it is slightly greater than the supply of A+ and A level offices in the country's three primary cities.

## **Conclusions**

In general we can point to significant increases in the various subdivisions of the real estate market in recent years, and given the current conditions, this rhythm of growth is expected to continue. However, there is no differentiation in any of these subdivisions for real estate having the characteristics of green building.

Financial institutions are careful to avoid financing projects that pollute, and in some cases, they seek to bring their own buildings in line with sustainable criteria. However, they lack specific models or procedures for promoting or assessing green building projects.

The secondary mortgage market in Mexico must be further developed, since it has not yet designed any specific products for green real estate. In fact, there are no measurement systems in place for quantifying the benefits that green building offers in comparison to traditional projects—which would make it possible to incorporate these benefits as indicators in valuation models.

## **Recommendations**

Financing for green building requires an economic justification, and therefore it is important to create a market niche that recognizes the benefits of this type of building. It is also important to create a tradition of green building, by providing investors, users, valuers and financial institutions with information on its primary characteristics.

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<sup>10</sup> Odón de Buen, "Importancia del consumo de energía en inmuebles no residenciales en México y su subestimación en las estadísticas nacionales," *El Reporte de la Transición Energética*, ENTE, November 2006.

As part of the infrastructure for making the benefits of green building better known, it is necessary to develop and use an assessment method that is in line with the country's economic and climatic conditions and to establish a correlation between this assessment and the measurement of benefits derived from different types of buildings.

As pointed out by Chris Corps in his background paper (2c—"Valuing Sustainability") when we speak of sustainable projects, it is necessary to incorporate ecological and public interest variables in asset valuations, and to emphasize the longer useful lives of these projects.

In the case of Mexico, it will be important to learn from the experiences of those who have designed and developed projects in Canada and the United States, in order to increasingly reduce the additional costs involved in this type of project. It will also be important to develop a program for exchanging knowledge, so the architects and designers of new projects in Mexico can learn from those experiences.

The government can potentially play a significant role in promoting and generating a market for green buildings, if we take into consideration that it is the user of nearly the same amount of square meters as the available amount of A and A+ offices in the country's three major cities. In order to finance the renovation of government facilities, one option is to use energy savings performance contracts which, according to Lean Tobias, have been successfully implemented by the US federal government. This model consists of granting long-term contracts to companies which, after an environmental audit, have identified improvements that will facilitate substantial energy savings. These contracts are used as a guarantee to obtain financing that can be used by companies to carry out their sustainability projects.

It is important that the government develop a program of economic incentives aimed in the same direction as the National Development Plan and the Urban Development Plan. These incentives would be provided for the amount of time necessary to stimulate investment and to identify a market niche that, in time, would provide the economic justification for green building, thus making incentives no longer necessary.

As for regulated financial institutions, it is still necessary to promote a system of norms that would facilitate promoting and developing records on this type of project.



## Sidebars (on special topics)

### Sidebar 1

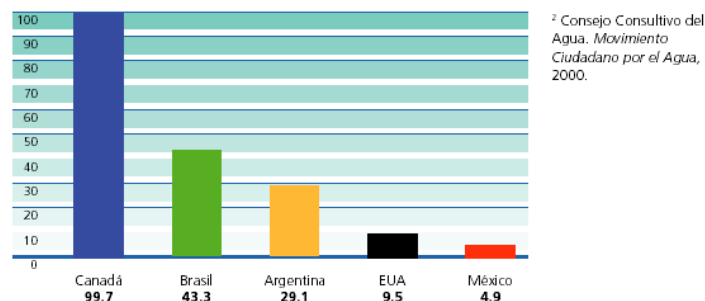
## Water and Financing Green Building in Mexico

Water is an essential resource to a country's development and the health of its residents and ecosystems. Thus, as water availability and quality are in decline in several areas of Mexico while the investment required to provide drinking water increases, this issue has been defined as a "strategic and national security matter."

### Availability

Given the current situation in terms of freshwater volume per resident, Mexico is categorized as a country with low availability, while the United States is a medium availability country and Canada enjoys high availability.

Disponibilidad promedio de agua en diversos países de América<sup>2</sup>



Source: Graph taken from the Guide to Efficient Water Use in Residential Developments (*Guía para el uso eficiente del agua en desarrollos habitacionales*), National Housing Development Commission (*Comisión Nacional de Fomento a la Vivienda—Conafovi*), Mexico 2005.

The Mexican population forecast for the year 2030 is more than 125 million inhabitants, requiring 25 percent more water than current needs. The majority of the population will be concentrated in areas with low availability. In the short term, the continued overexploitation of aquifers or bringing water from sources farther away, to satisfy growing demand, cannot be sustained.<sup>11</sup>

Mexico's northern border with the southwestern United States faces a serious water shortage, with vast regions of dry climate and low precipitation, where water extraction exceeds renewable volumes. In this regard, binational treaties have been signed with respect to water usage.

<sup>11</sup> Water Management in Mexico: Progress and Challenges (*La gestión del agua en México: avances y retos*), National Water Commission (*Comisión Nacional del Agua—Conagua*), Mexico 2006.

The forecast for 2030 shows that the Baja California peninsula, for example, in addition to recovering water through better farming practices and fostering proper use, may achieve significant water savings (up to 12 percent of the water currently used) with the promotion of green buildings.

## Financial aspects

The investment and costs of infrastructure to provide water to new homes are higher than the costs associated with the energy infrastructure. For example, the cost of providing a water supply and management infrastructure to one million homes is almost six times the cost corresponding to electricity.

Type of infrastructure	Millions of pesos	Millions of dollars	Percentage of total cost (%)
Hydraulic	10,000	909	41.9
Sewer	9,000	818	37.7
Wastewater	1,343	122	5.6
<b>Subtotal</b>	<b>19,343</b>	<b>1,849</b>	<b>85.3</b>
Electrical energy	3,500	318	14.7
<b>Total</b>	<b>22,843</b>	<b>2,167</b>	<b>100.0</b>

Note: Table prepared with data from the National Housing Commission (*Comisión Nacional de Vivienda*). Figures in US dollars calculated at an exchange rate of 11 pesos per dollar.



In addition, Mexican water subsidies are high. The cost of bringing water to consumers is up to 12.40 pesos per cubic meter. However, in Mexico City, for example, the public pays a fee of \$3.01 per cubic meter.<sup>12</sup>

Moreover, there is a certain percentage of water not account for, i.e., supplied to the user but not reported for collection purposes. This occurs worldwide, ranging from 10 to 20 percent (in the United States, up to 30 percent). In Mexico, however, unreported water use was 42 percent in 2005.<sup>13</sup>

<sup>12</sup> Guide to Efficient Water Use in Residential Developments with 2004 Conagua Data (*Guía Conafovi uso eficiente del agua en desarrollos habitacionales con datos de la Conagua 2004*), Conafovi, Mexico 2005.

<sup>13</sup> “Drinking Water, Sewer and Sanitation Subsector” (*Situación del subsector agua potable, alcantarillado y saneamiento*), Conagua, Mexico 2006.



For the control and study of water, Mexico is divided into 13 different basins, three of which are located at the US border.

## Financial implications of green building

Passing along the differential in infrastructure cost or investment for water supply and management in user fees may have a considerable impact on economic activity and the overall cost of living.

Clearly, promoting green rules and measures in real estate construction—whether for commercial, residential or institutional use—not only ensures water availability to residents but also enables major savings in extraction, transportation and infrastructure, which are not passed on to the end user.

### Sidebar 2

#### Fiscal Incentives for Promoting the Use of Energy from Renewable Sources

Among the financial policies adopted by the Mexican government to contribute toward reducing carbon emissions and protecting the environment are regulations for fiscal incentives and deductions associated with the generation and use of energy from renewable sources. For example, Article 32, section XXVI LISR of the Income Tax Law (*Ley del Impuesto sobre la Renta*) establishes the following:

##### *Promotion of the use of energy from renewable sources*

Income taxpayers who invest in machinery and equipment for generating energy from renewable sources will be able to deduct 100 percent of the investment in a single fiscal year, and will be contributing toward protecting the environment by diminishing the use of fossil fuels.

In order to understand the scope of “renewable sources,” a description of such sources is included, as follows: those which, due to their nature or through adequate use, are considered to be inexhaustible, such as solar energy in all of its forms; wind energy; hydraulic energy, both kinetic and potential, from any natural or artificial water body; ocean energy in its various forms; geothermal energy; and energy originating from biomass or wastes. Also, “generation” is considered to be the successive conversion of energy from renewable sources into other forms of energy.

In order to avoid these investments being made for the exclusive purpose of reducing one’s tax base, it is considered obligatory to maintain acquired machinery and equipment in operation for a minimum period of five years after the year in which the purchase was deducted.