

Case 4: Mexico City

Sustainable Buildings Certification Programme

Abstract

Mexico City's Sustainable Buildings Certification Programme (SBCP) offers the owners or tenants of commercial, residential and industrial buildings an opportunity to reduce and demonstrate the environmental impact of their properties across a broad range of categories. By requiring multiple actions covering energy, water, waste, transport and social and environmental responsibility, SBCP promotes a holistic view of sustainability in the building industry. Participation from owners and tenants is incentivised through tax reductions, reduced energy and water bills, access to project financing, expedited permitting procedures, and finally, prospects of increased rental yields from green premiums.



1. Programme context

Citywide reduction target(s)

Mexico City aims to reduce GHG emissions 50% by 2050 compared to 2000 levels.

Built environment context and programme background

Though Mexico City is fortunate to have a mild climate across the year, energy use in commercial and industrial buildings accounts for around 30% of citywide carbon emissions. Driven by a rapidly growing population across Mexico, the capital Mexico City is currently experiencing a rapid increase in construction, especially the residential sector. However, as more and more buildings are added to the capital each year, historical construction codes did not take into account energy efficiency. This has recently been tackled when Mexico City's Environmental Ministry recently unveiled in June 2016 updated building codes for both retrofitting and new construction. Targeting commercial, industrial and residential buildings, these lay out Complementary Technical Standards to provide guidance for energy efficiency performance of insulation, solar-powered water heaters, lighting, window glazing and building envelopes. They also address mechanical systems such as elevators, elevators and water pumps and water efficiency such as water saving faucets and showers.

This said, the existing building stock is today dominated by buildings with poor energy efficiency. Policymaker efforts to promote retrofitting of this existing building sector must contend with a host of challenges. In addition to high capital costs, long-term visions and investment strategies are generally lacking in the market place due to priorities in generating fast and high revenue at the lowest possible cost. There is also a lack of attractive local government incentives and financing options for private sector owners considering upgrading properties. Furthermore, there is a general lack of transparency in the market place regarding the energy efficiency of individual buildings. Although international building certifications such as LEED are present across Mexico, there is generally little financial incentive to encourage building owners to make the necessary investments for obtaining certification.

The Sustainable Buildings Certification Programme (SBCP), which grew out of Mexico City's First Climate Action Programme, is a first and major step towards tackling this set of challenges in the building sector.

2. Programme overview

Overall goals and start year

SBCP began operation in 2009. It aims to foster sustainable construction and building usage by awarding certifications that reflect various levels of sustainability performance. It targets both new and existing buildings in the commercial, industrial and residential (mostly multi-family) sector. Evaluation of building sustainability performance is holistic, taking into account a wide variety of categories and improvement actions. In addition to energy, it also assesses and awards varying levels of performance for water, mobility, solid waste, social and environmental responsibility and green roofs. Voluntary certifications issued through the programme are a first step towards the long-term goal of developing more stringent voluntary and mandatory building codes that integrate environmental performance and energy efficiency.

Programme target and scope

Both building owners and tenants may obtain certification through the programme. For commercial or industrial buildings, certifications can therefore be awarded to entire buildings or the portion of tenant occupied space. In the case of a multi-family building, in principle, certification and retrofitting actions apply to the entire property—both common and private areas. Since in reality this proves difficult due to financial restraints or lack of tenant cooperation, most multi-family certifications are confined to common areas such as entrances, outdoor spaces and corridors etc.

To date, 65 buildings or tenanted portions have been certified. These total 2.2 million m² of Gross Floor Area (GFA). Commercial properties account for 45 of these, with the remaining 20 being residential. A further 20 properties (predominantly multi-family residential) are in the process of obtaining certification. Of the 85 total buildings that are either certified or in the process, new construction makes up approximately 25%, with the remaining 75% consisting of existing buildings. The programme currently holds ambitions of expanding coverage to government buildings.

Programme structure and function

For existing buildings, enrolling in the programme firstly requires performing an audit. SBCP participants are responsible for costs associated with this step. Audits are carried out by third party organisations referred to as “implementing agents”. These have received training from Mexico City’s Ministry of the Environment. This ensures that techniques for measuring building sustainability are standardised. Since certification auditing addresses multiple sustainability areas in addition to energy efficiency, it can sometimes involve a team, with each member possessing differing expertise.

Table 1: Stages of the certification process

Step	Description
1. Registration	Building owner or tenant chooses an implementing agent to register their property with the Ministry of the Environment.
2. Audit	Implementing agent inspects buildings plans or conducts a physical assessment (audit) of existing building components. Documentation is reviewed to identify compliance with national and local energy efficiency standards. For existing buildings, energy and water invoices for the previous year are reviewed to establish baselines and for new buildings, energy and water consumption estimated.
3. Diagnostic report and implementation plan	If required, implementing agent creates an implementation plan to conduct any measures needed to solve any non-compliance issues or increase performance in the various sustainability categories.
4. Execute implementation plan	If required, building owner or tenant executes implementation plan under supervision of the implementing agent.
5. Evaluation assessment	Upon successful completion of implementation plan, the agent submits a certification request to the Ministry of the Environment.
6. Certification awarded	The Ministry of the Environment issues the Sustainable Building Certificate according to three levels for residential (compliance, efficiency and excellence) and two for commercial (compliance or excellence).
7. Follow up audit	Both new and existing buildings are subject to a follow-up audit every two years after certification to measure actual environmental performance and ensure continued compliance.



Credit: Enrique Abe / Courtesy: Mexico City Ministry of the Environment, 2016

An overview of the certification process is as follows, with further details provided in Table 1. First, a building owner or tenant selects an implementing agent from a list of certified organisations. The implementing agent then files a building registration report with the Mexico City’s Ministry of the Environment. The agent or agents then conduct an audit of the building, evaluating performance from six sustainability areas (each is elaborated further below): (1) energy, (2) water (3) mobility, (4) solid waste, (5) social and environmental responsibility and (6) green roofs. After initial evaluation, a diagnostic report is then lodged. Agents will identify for building owners or tenants opportunities to invest in building upgrades to gain a higher certification level. If adopted, building improvements are then carried out. Once a building has obtained its final evaluation from auditors, an appropriate level of certification is determined and awarded by the Ministry of the Environment. Follow up audits are then carried out each two years after the certification is issued to ensure continued compliance with environmental laws and verify actual energy and water savings achieved.

Commercial buildings may qualify for two levels of certification: compliance or excellence. In general, compliance requires meeting various federal and local laws regarding areas such as energy efficiency standards for lighting and

electromechanical systems, water and solid waste management. In addition, buildings are required to demonstrate performance in additional areas such as mobility and social and environmental responsibility. In addition to these basic prerequisites, if a building meets more stringent international standards (if taking the case of energy) such as LEED, Energy Star or FIDE (Mexican), it may qualify for an excellence level. In contrast, residential buildings (predominantly consisting of multi-family) may obtain three levels of certification: compliance, efficiency and excellence. These varying levels are determined using a points system. Points are accumulated by satisfying a higher number of requirements or actions across the six performance categories.

- Compliance 21 – 50 points
- Efficiency 51 – 80 points
- Excellence 81 – 100 points

The following paragraphs provide a more detailed overview of some key areas covered in each of the six sustainability categories, for both commercial and residential buildings. For reference, the total quantity of points that can be collected by residential buildings is included.

Energy (up to 25 total points)

Up to 25 points are awarded based on a building’s compliance with National Energy Efficiency Standards (Norma Oficial Mexicana - NOM). Buildings that meet the standards set forth in both NOM-14 “Energy efficiency in lighting systems” and NOM-8 “Energy efficiency in non-residential buildings” will be awarded the full 25 points. Two additional points may be obtained by installing photovoltaic cells, and a further seven for installation of solar water heating systems. Awarding of these additional points is based on the generation capacity of installed systems relative to the quantity of energy or grid electricity consumption that is substituted.

Water (up to 25 total points)

This category awards points for installation of rainwater collection systems, grey water treatment, water saving equipment in toilets and showers and treatment of plumbing leaks.

Mobility (up to 14 total points)

Properties may obtain points for implementing actions to foster use of public transport, car sharing, private shuttles and bicycles, in addition to increasing accessibility for disabled people etc. In practice, this means providing shared transportation for employees and residents (i.e. privately contracted bus shuttles), bicycle parking facilities and measures to encourage carpooling. Also, entry bays allowing employees to board or alight from private vehicles or taxis (so as to avoid creating traffic jams) are also considered.

Solid waste (up to 17 total points)

Points are awarded for performing waste separation and recovery of recyclables, having adequate infrastructure for temporary storage of solid waste and for having whole property waste management planning.

Social and environmental responsibility (up to 25 total points)

Points are also given for effective management of noise pollution (such as installing double planed glass), encouraging social action (such as making or maintaining green areas and public gardens around the property), bioclimatic design (i.e. exploiting natural sunlight, warmth and vegetation for cooling/heating), periodical building maintenance practices, access to safe and convenient offsite parking structures and providing reasonable comfort to workers.

Green roofs (up to 8 total points)

A building may obtain points if converting a percentage of roof area into green space. A roof with 40% coverage will be given three points, 85% coverage six points and 100% coverage eight points. This percentage is calculated based only on those areas which can be feasibly turned into green space. This green roof option falls under the category of social and environmental responsibility.

The evaluation process can take anywhere from six months to two years, depending on the building size and number of building improvement measures implemented. Commercial building tenant participants are only responsible for meeting programme criteria within their rented space, with common areas excluded. However, tenants and building owners are encouraged to work together to obtain certification for the entire building. For existing buildings, environmental performance such as energy and water consumption is measured onsite by auditing key building components and inspecting utility invoices. For new properties, engineers and architects meet with programme representatives before construction begins. This allows construction plans to be created in alignment with the sustainability criteria developed for the programme.

When awarded, buildings have the option of publically displaying the certification on the property, as well as highlighting the achievement in advertisements and other promotional materials. The Ministry of the Environment requires no application fee for the certification process. City officials may also publicly disclose a building's certification after permission from the property owner. Importantly, in the event where a building requires significant investments to bring it up to a certifiable standard, owners or tenants have the option of spacing the certification process and compliance period over several years. This allows a building to address one criteria at a time and receive feedback throughout the process of certification.

Data collection and utilisation:

Data collection is limited to that used to determine a building's level of performance in each of the performance categories, and the accompanying audits conducted every two years thereafter. For existing buildings, baselines for energy efficiency and water consumption performance are created by auditing equipment and utility invoices. In the case of a new building, energy and water savings are projected based on comparisons with a traditional construction of the same characteristics. Actual performance is then measured in follow up audits. These are also required for existing buildings to demonstrate continued compliance with environmental regulations.

Innovative features

Engagement of owners and tenants

SBCP's innovation lies in its flexibility. As explained, it allows certification for both building owners (i.e. the whole building) and for tenants (i.e. leased portions of buildings). For commercial buildings, removing the need to obtain certification for a whole building allows tenants in poorly performing properties to improve the sustainability of their section, and then receive public recognition and financial benefits for this. On the other hand, for multi-family buildings, the programme encourages owners to pursue building-wide certification, inclusive of private living areas. Although this has only been achieved once for existing buildings, several new construction projects currently in the process of certification have invested in energy and water saving measures in tenant living quarters.

Holistic certification criteria

Creation of a custom-made sustainability certification scheme for buildings is an uncommon approach for a city government. Admittedly, other green building certification programmes such as LEED also score buildings on a holistic series of sustainability criteria. Yet the comprehensiveness of areas assessed by SBCP is nevertheless remarkable. As indicated above, performance categories and indicators range extend from building design and materials (i.e. building energy, water systems and green roofs) to building usage (i.e. waste) and sustainability measures impacting employees (i.e. sustainable transport options etc.) and improve the local community.

Incentive and support mechanisms

Reductions of property taxes and payroll taxes serve as an important factor incentivising building owners and commercial or industrial tenants to seek certification. Importantly, tax reductions are designed to incentivise higher levels of ambition. As shown in Table 2, they offer increasing discounts for higher levels of savings in energy and water consumption from baselines. To obtain the corresponding tax discount amount, buildings are only required to achieve the corresponding level of savings in either water or energy consumption, relative to baselines.

Table 2: Corresponding tax reductions for energy or water savings

Discount amount	Savings level
Property tax reduction	
10%	30 to 39%
15%	40 to 49%
20%	50 to 100%
Payroll tax reduction	
20%	30 to 44%
30%	45 to 59%
40%	60 to 100%

Building owners are also financially incentivised to participate by the prospect of receiving a green premium on rental prices. As a further coaxing measure, participants are entered into a list made available to international or domestic corporations looking for office space or industrial facilities in Mexico City (this list is not disclosed publicly and is available upon request). Often, these companies are searching for space in green buildings to align with their sustainability policies. Certification in the programme thereby allows participants to access these potential new tenants, some of whom are willing to pay a premium for green building rental.

Other benefits too ensure program participation. Certified participants may gain assistance in applying to financial schemes with attractive interest rates to cover the costs of building upgrades from local and international development institutions. This is a particularly important driver amongst capital-intensive and extensive retrofitting and upgrade projects for larger buildings. Although this funding programme is open to non-SBCP buildings, certified buildings enjoy expedited processing of applications when applying. Finally, both new construction and existing participants can benefit from expedited processing of construction permitting and environmental impact assessment phases during building planning.



Credit: Enrique Abe / Courtesy: Mexico City Ministry of the Environment, 2016

Links to other city policies or programmes

SBCP was designed as part of Mexico City’s first Climate Action Programme. This was developed in 2008 and mostly concerned itself with short-term climate goals reaching through the year 2012. The programme exceeded its initial emissions reduction goals by 10%, resulted in a 7.7 million-tonne reduction in CO₂ equivalent (henceforth CO₂e) emissions for 2008-2012. After this initial success, in 2014 the Climate Action Programme was updated to produce Mexico City’s second Climate Action Plan. This laid out goals for the 2014-2020 period. Although SBCP has continually operated independently of the Climate Action Programme, it can be thought of as promoting the voluntary climate leadership portion of city climate goals. The SBCP’s sustainability criteria are also designed to align with current national construction and energy efficiency standards, as well as environmental impact assessment requirements for new construction. These standards are created by the Federal Ministry of Economy.

3. Design and implementation

Design phase

Inputs

Certification criteria and methods were created through collaboration between city officials and technical experts from universities, government and the building industry. These experts possessed experience in the various performance areas covered by the certification criteria. The city devoted two full-time staff members to the design of the programme. An additional ten other staff members also offered support in convening stakeholders and planning. The design of the programme was included in the programme budget of the Mexico City Environmental Ministry.

Timeline

Design of SBCP took place during the period 2008-2009.

Implementation phase

Inputs

Two full-time staff members are charged with implementation. Given that actual auditing of participating buildings is conducted by third party technicians, this small number of staff suffices for implementation. In addition to outreach, staff duties include training and certification of third-party certifying auditors. There is no dedicated budget for marketing or communications.

Early in the programme, staff needed to recruit participants. This was accomplished by screening building permit applications for new construction and retrofitting of commercial and residential properties and industrial facilities in Mexico City. As judged from the engineering plans, programme officials reached out to those projects demonstrating the highest potential for energy savings and sustainability improvements. Since the programme has no devoted budget for marketing, recruitment relies heavily on word of mouth, with technical experts involved in the certification process speaking directly to prospective new participants. City officials are invited to speak about SBCP at conferences, universities and key building industry bodies such as the Mexican Chamber of Construction Industry. As awareness of the programme and its incentives has spread, participants now mostly seek to enroll on their own, nullifying the need for recruiting.

Timeline

Implementation of the program began in 2009 and is scheduled to continue indefinitely.

Key collaborations

SBCP forms an important relationship with the companies of Mexico City that offer technical expertise relating to environmental sustainability in building construction and operations. As mentioned, programme implementation relies heavily on third-party technicians. These implementing agent audit buildings, appraise sustainability performance, identify improvement opportunities and supervise the overall certification process. The city provides training resources for these professionals to earn a credential as an official implementing agent, thus allowing them to perform energy audits for the programme. This credential then provides the auditors with a new opportunity to win contracts.

Programme changes and adaptations

Since its inception, SBCP has expanded the scope of sustainability criteria considered in the certification process. When the program was first launched in 2009, performance criteria was limited to energy and water use and solid waste disposal. These criteria were expanded in 2013 to include mobility, green roofs and social responsibility. Particularly those criteria associated with energy efficiency, were designed to drive continued improvements in certified buildings in accord with new technology developments. The addition of mobility and green roofs was added to encourage facilities with sustainable transport, reduce air pollution and to mitigate the urban heat island.

4. Outcomes and impacts

Environmental impacts

Compared to the base year 2009, for the 40 buildings certified as of 2015, the programme has achieved a total reduction of 20.1 million kWh of electricity and 66,120 tonnes of CO₂e. For existing buildings with baselines, these represent actual savings. For new buildings with no baseline, these figures represent estimate savings from a business as usual building design. As mentioned earlier, Mexico City's initial Climate Action Programme—from which SBCP was originally derived—achieved a 7.7 million tonne reduction in CO₂e for 2008-2012. A total of 834,529 tonnes of this came from energy efficiency improvements in the building stock and other sectors such as transport. Although this achievement cannot be singularly attributed to the SBCP, nevertheless, the programme carried out an important contribution to this amount. On top of energy savings impacts, the 40 certified buildings in 2015 have also achieved a savings of 205,690 m³ of potable water. This is an important outcome in water scarce Mexico City.

Market impacts

Based on anecdotal evidence, officials report that owners of certified buildings can expect a green premium of around 20% for office rentals. These premiums, along with substantial property and payroll tax credit incentives, are generating important economic benefits for participants. These benefits work in concert to reduce financial risks for building owners when carrying out sustainability improvement measures. Certification also adds a degree of predictability to building operational costs. This is because quantifying efficiency performance allows for more accurate calculation of expenditures on energy and water. Additionally, through training and hiring technicians to oversee the auditing and certifying of participating buildings, SBCP has directly created 68 new jobs. As a further market impact, it is anticipated that certification would lead to increases in property values. Such impacts are not measured directly however.

Social impacts

Social outcomes of SBCP are significant. Firstly, since private sector building codes in Mexico City have not previously addressed energy efficiency and environmental performance, the programme fills a regulatory void. It brings owners, engineers and tenants in new construction projects or existing buildings to voluntarily integrate sustainability principles and environmental performance into building design and maintenance. Secondly, certifications (showing grades of either Compliance, Efficiency or Excellence) supply the market and public with a clear indication of the sustainability performance of a building or tenanted section. These are based on diverse, objective and quantitative information that was previously non-existent. This newly created information allows both potential building buyers and tenants to scrutinize and choose properties based on their environmental performance. Thirdly, SBCP has also contributed to increased awareness regarding building sustainability in both key stakeholders in the building industry as well as the general public. This is by the process of certification and ensuing certifications serving as an educational opportunity for both building users and management. Finally, by allowing tenanted sections to pursue certification, SBCP is fostering improved cooperation between building owners and tenants. These improved relations lead to sustainability performance gains for both building components and management, which can then create good publicity for the firm and building.

5. Lessons learned for replication

Strengths and drivers

Ability to foster retrofitting and improved building design

A major strength of SBCP’s certification approach is its ability to foster physical improvements in building shells, equipment and systems that improve environmental sustainability and reduce fossil fuel consumption. For existing buildings, this occurs through retrofitting and upgrading building systems to more efficient technologies, or additionally, by installing additional components such as green roofs and solar PV systems. For new buildings, project developers consult the criteria of the certification during the design phase to bring the building into alignment with sustainability goals. A further driver of environmental impacts comes from various levels of certification. The prospect of receiving a higher certification level can incite building owners and engineers to invest further in raising sustainability performance. As already explained, higher certification levels generate higher property tax and payroll tax reductions.

Promotion of renewable energy and targeted technologies

Another programme strength lies in the role that certifications play in diffusing specific, sustainable building and renewable energy technologies. As explained, the energy efficiency component of the certification highlights the installation of photovoltaic electricity generation and hot water systems as a means of gaining extra points. This is serving to directly promote increased renewable energy capacity in Mexico City. Additional technologies promoted include high performance lighting, window glazing and water pumps, water saving devices in toilets, water taps and showers and electric power control sensors. For building shells, certification encourages use of natural ventilation and measures to mitigate urban heat island effects such as white or green roofs, and white interiors and exteriors.

Holistic approach to building sustainability

Giving buildings different options for accumulating points allows the programme to attract more participants, and thereby contributes to greater impacts. Furthermore, the extremely broad and comprehensive scope of sustainability categories covered incentivises buildings to give attention to wider sustainability concerns besides energy efficiency. This drives action to reduce environmental impacts from employee mobility, to adopt green roofing measures and to use more sustainable building materials and designs. Since the financial return on investing in such measures may not be evident, tax break incentives provided by SBCP play a crucial role in motivating building owners, designers and tenants to consider such areas.

Explicit and attractive incentives

SBCP is an incentive driven initiative where clear fiscal and financial incentives from Mexico City are driving programme uptake. These offset some of the risks and costs associated with retrofitting or investing in high performing sustainability building technologies. As mentioned, these include tax credits, green premiums associated with certified properties, special project financing opportunities, expedited permitting processes and optional placement on a list solicited by international corporations looking for space in Mexico City. Lastly, for buildings that may lack the capital necessary to pursue a certification, the process can be extended over a number of years to allow for gradual compliance. In contrast, other non-government green building certification schemes such as LEED are unable to provide the same level of government-backed fiscal incentives to spur market uptake.

Standardisation

Implementation of SBCP requires that third party auditors carry out vital roles such as auditing and allocating sustainability scores to buildings, recommending performance improvements and then conducting follow up monitoring. The programme ensures that auditors maintain similar standards and work ethics by mandating trained and certification through Mexico City’s Ministry of the Environment. Additionally, auditors will typically specialise in one certification category (e.g. energy). On one hand, this allows building owners, designers and tenants to draw upon the expertise and capacities of multiple companies and certifying certification agents. On the other hand, each agent undertakes the same training and certification from the city. This standardisation of the auditing processes ensures adherence to a common set of practices and principles by various technicians with contrasting expertise.

Challenges, limitations and countermeasures

Engagement of existing commercial buildings and small businesses

Whilst certification of new construction is progressing well, engaging existing commercial buildings—and especially small businesses—is proving a major hurdle. For small businesses, the principle hurdle to securing participation can be explained by the extra upfront costs required for auditing and retrofitting. For existing buildings, relative to a new building where construction plans can be designed to reflect technical requirements in performance categories, certification can prove lengthy and expensive. The principle countermeasure to overcome cost hurdles for existing buildings and smaller businesses is the aforementioned strategy of allowing gradual certification over several years. In this way, a building may for example earn points for energy in one year, waste the next, and then transport in the next and so on.

Difficulty engaging rental properties

There has so far been limited success in enticing owners of multi-family properties to invest in retrofitting the entire property, inclusive of common and tenant areas. There are several reasons for this. Firstly, performing audits and carrying out installation of energy efficient lighting, water efficient toilets and shower heads etc. in tenant living quarters is difficult for privacy, organisational and financial reasons. The main coping strategy to navigate this hurdle is to allow certification of uniquely common areas. However even for common areas, certification can prove costly and difficult. One reason for this is that environmental regulations for multi-family buildings are generally less stringent than those for commercial or industrial properties. As a result, bringing multi-family building systems up to required levels of performance can prove costly.

Lack of legal structure

Programme representatives have underlined that SBCP would find more traction in the building industry if backed by a more clearly defined legal structure. This would occur, for example, by incorporating the programme into the Mexico City Environmental Law and its regulation into the Self-Regulation and Environmental Audits chapters. Additionally, the development of additional supporting and regulatory measures for promoting energy efficiency and environmental considerations is required. The already mentioned unveiling of updated construction regulations in Mexico City that cover energy efficiency and environmental sustainability will likely address this problem and serve as a key driver of programme participation in the future. It is anticipated that many new, future buildings meeting the new building code will be able to fulfil many requirements for certification under SBCP.

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Credit: Enrique Abe / Courtesy: Mexico City Ministry of the Environment, 2016