

Sustainable Energy for All - Building Efficiency Accelerator Partnership

Accelerating Building Efficiency in Mexico City

19 March 2015

Workshop Summary

Tanya Müller García, Secretary of Environment for Mexico City, SEDEMA, and Adriana Lobo, Executive Director of CTS EMBARQ welcomed participants and thanked the workshop co-sponsors and participating Federal Ministries for participating in the first meeting of the Building Efficiency Accelerator in support of Mexico City's energy efficiency objectives. Secretary Müller expressed her hopes that the workshop will help shape how Mexico City can progress on energy efficiency. She also acknowledged that buildings offer an important opportunity for economic and environmental progress in both the short- and long-term.

Session 1: The Building Efficiency Opportunity

Santiago Creuheras, Director General for Energy Efficiency and Sustainability, Ministry of Energy (SENER), presented an overview of current energy efficiency activities in Mexico. He noted that the federal government is working to firm up its participation in the United Nation's Sustainable Energy for All (SE4All) Initiative by engaging with four of the SE4ALL Energy Efficiency Accelerators devoted to vehicles, lighting, appliances, and buildings. Mr. Creuheras expressed his confidence that this collaboration will bring good results both for the country and the city.

He summarized a number of Mexico's priority activities related to energy efficiency:

- Work with IPEEC on energy efficiency globally, including a leadership role as the chair of the policy committee
- Implementation of the regulatory framework related to energy efficiency, which is already in place in Mexico, and the role of CONUEE as a pioneering organization in strengthening it and sharing lessons with other countries in Latin America
- Consumer programs for replacing refrigerators, air conditioning, and fluorescent lights with efficient technologies
- Work with medium and small enterprises, including the National Business Ecocredit Program (35,000 pesos), to replace lighting, air-conditioning and/or pump systems
- Gender issues in collaboration with German and Danish bilateral aid agencies to focus on the role of women, children and people with disabilities in saving energy
- Behavior and creating energy saving culture, e.g. incorporating energy saving messages in soap operas, movies, MetroBus, etc.
- Cooperation with World Bank in 32 cities, one in each state, to analyze energy saving opportunities. 300 projects are planned in these cities on lighting, buildings, pumping, and transportation.
- Working with France, Mexico is leading the effort of the G20 and IPEEC to create an Energy Efficiency Finance Task Group supported by many international organizations to facilitate dialogue with the international finance community on how to address barriers to energy efficiency finance.

Thibaud Voita, Sustainable Energy for All, presented the overview of SE4ALL, focusing on the Energy Efficiency Accelerator Platform and the importance of actions in the building sector. Mr. Voita started by presenting the key

benefits of energy efficiency, including its role in stabilizing greenhouse gas emissions to keep global warming likely below 2°C above pre-industrial temperatures. He noted that two thirds of energy efficiency potential may remain untapped by 2035 with the largest share coming from the buildings sector.

The Sustainable Energy for All Initiative was established by the Secretary General of the United Nations, with its advisory board chaired by the President of the World Bank. It encompasses three objectives by 2030: to ensure a universal access to modern energy services, to double the rate of energy efficiency improvement, and to double the share of renewable energy in the global energy mix. It is a public-private partnership. A number of the companies are already supporting the initiative, including Danfoss, Johnson Controls, Saint Gobain and others. The Energy Efficiency Accelerator Platform is a public-private partnership with six Accelerators focusing on key sectors: buildings, transportation, lighting, industry, district energy, and appliances. Efforts are also being made to establish Accelerators for the power sector and energy efficiency finance. The Platform is targeting national and sub-national governments to introduce specific projects and actions on the ground.

Mr. Voita acknowledged that Mexico is an important country for SE4ALL and besides launching the work of Building Efficiency Accelerator in Mexico City, there is also cooperation on national projects with SENER and work in the city of Leon. He concluded by drawing attention to the importance of building energy efficiency and necessity of ambitious efforts in order to avoid “locking-in” high energy consumption and greenhouse gas emissions as the city grows.

Jennifer Layke, World Resources Institute, introduced the Building Efficiency Accelerator and its goal to bring together policymakers, businesses, financiers, and other stakeholders to take action. The partnership will identify barriers, opportunities, and report back on success and challenges in participating cities. The Building Efficiency Accelerator is preparing a menu of options, for which the actions can be chosen and tailored to a particular city. Mrs. Layke gave the examples of various interventions, which can be introduced in the cities: codes/norms for new or renovated buildings, energy efficiency targets, government leadership, benchmarking and disclosure, utility programs, etc. She also presented the sequence of steps the Accelerator will help cities go through to identify and implement actions to improve efficiency. The city will commit to providing regular progress reports, staying in communication with partners, and sharing information on activities underway. The cities need to commit to work with the partners on policy development, project execution and progress tracking. The Accelerator and its partners will provide the best in class technical support to the engaged cities.

Octavio García, ALENER, an industry group committed to energy efficiency in Mexico, challenged policymakers to continue to grow support for efficiency. ALENER is collaborating with a number of institutions, including international organizations, on energy efficiency and is providing training for various stakeholders on existing and new regulations to increase understanding and compliance. Mr. Garcia encouraged the incorporation of energy efficiency and energy savings into public policy and welfare programs, as they improve people’s health and productivity.

Secretary Müller described the Government of Mexico City’s existing efforts to improve energy efficiency, including:

- An administrative program to systematize actions to reduce waste, water and energy impacts to the environment, one of 73 programs implemented through the city’s Climate Action Plan published in 2008 and updated in 2014;
- Promoting rational and efficient use of utilities and lighting in the city;
- Substituting existing lighting with LED, installing light sensors as well as programmable, efficient air-conditioners and electric engines; and
- Supporting solar hot water heating and other equipment upgrades in hospitals, which has reduced energy use by 20% and to date avoided 34 tCO₂ and saved more than 300,000 pesos a year.

Together, these programs and policies have avoided 1494 tCO₂ between 2010 and 2014. Mexico City wants to apply the lessons from these successes to additional actions in the short-term. Secretary Müller believes these actions should include regulations for new housing and commercial building construction that incorporate energy efficiency requirements.

ReSession 2: Financing Energy Efficiency in Mexico City

Adrian Fernández, Latin American Regional Climate Initiative, emphasized the importance of the building sector in Mexico City and the fact that many buildings are constructed without consideration for energy efficiency. One of the biggest tasks is to improve efficiency in existing buildings and one of the most significant barriers is access to financing. Energy efficiency projects have attractive financial returns and produce multiple benefits beyond energy savings.

A finance panel—consisting of **Leticia Riquelme, IADB; Gisela Martínez, UNDP Mexico; Ulla Blatt, Danish-Mexican Energy and Climate Program; Ernesto Hanhausen, Emerging Energy & Environment; Anahi Ramirez, GIZ, and Ernesto Infante, SHF**—discussed the types of financial vehicles and programs that are already supporting Mexico’s efficiency improvements. They considered two key questions.

What are the financial instruments and international financial models, which can benefit building efficiency in Mexico?

Leticia Riquelme pointed out that funding for energy efficiency needs the support from public policies, as it does not work by itself. Mrs. Riquelme advocated for creation of a comprehensive program, which would include both financial and technical components. Some of the elements of a broader suite of finance programs discussed include:

Climate funding: **Anahi Ramirez** talked about the experience of GIZ in implementing a “Nationally Appropriate Mitigation Action (NAMA)” approach for housing in Mexico under the United Nations Framework Convention on Climate Change (UNFCCC). GIZ supported the national housing committee and successfully funded efforts to construct new housing and rehabilitate existing houses using bilateral and multilateral climate finance.

Ernesto Infante noted that the Federal Mortgage Society (SHF), the National Housing Commission (CONAVI) and the Secretariat of the Environment and Natural Resources (SEMARNAT) are leading the development of a Nationally Appropriate Mitigation Action (NAMA) of Sustainable Housing in Mexico. This initiative seeks to mitigate emissions through the use of eco-technologies, improvements in architectural design and the use of efficient building materials. In this context, Ernesto said that the SHF is developing the Financial Component for NAMA New Housing jointly with the German Development Bank KfW, complementing the SHF EcoCasa Program. He also stressed that the NAMA Sustainable Housing is the public policy framework for the development of low-carbon housing and that the EcoCasa program is the pilot program in Mexico as a financial scheme for its implementation.

ESCO-style programs:

- **Ernesto Hanhausen** mentioned that FIDE efforts were successful several years ago and that his organization has been managing different funds and created a framework for energy efficiency funding at a large scale.
- **Ulla Blatt** advocated for ESCO to be a potential solution for addressing the barriers of high upfront costs and lack of knowledge. This industry today is not well-developed in Mexico. The Danish government is supporting a new energy saving insurance scheme, which was tested by the

InterAmerican Development Bank in hospitals and other buildings in Columbia and is now being tested in Mexico by the Agricultural Development Bank.

Targeted design or equipment deployment incentives: **Gisela Martinez** suggested looking at the finance problem differently for existing and new buildings. For new buildings it is critical to find resources to instruct builders and support the selection of efficient buildings materials. In this case, the functions or use of the building, climate conditions and other local features should be taken into account. For existing buildings, substitution of energy efficient equipment to replace inefficient technology is very successful. She noted the existing campaign on solar heating buildings and the new program on solar heating in hotels in Yucatan as good local examples. Internationally, Bangladesh used innovative small scale finance to increase access for rural communities to solar energy.

Low-carbon Housing Building Programs:

- **Leticia Riquelme** mentioned working with the Federal Mortgage Society (SHF) to promote energy efficiency in housing and the initiative of the national bank to create a new product that is a license for development that will encourage investors to enter the energy efficiency market.
- **Ernesto Infante** focused on financing from the Federal Mortgage Society for the construction of low-carbon housing. Within this context, Ernesto Infante stated that the SHF is running the EcoCasa Program, with support from the German Development Bank (KfW) and the Inter-American Development Bank (IDB). This program channels concessional resources to housing developers to compensate for the difference in the cost of energy efficiency measures and eco-technologies required to achieve a 20% reduction in CO2 compared to a baseline home. Nevertheless, he noted that even more efforts and business models are needed to make the investment in sustainable housing profitable. Infante said that SHF has boosted funding for housing construction through syndicated first floor plans, as many development companies are unable to obtain financing through commercial banks. He concluded that SHF will continue with its efforts to provide innovative financial products for building low-carbon housing and that they will be accessible to people with lower incomes.

What kind of funding schemes can be applied in commercial and public buildings in Mexico City?

Energy Savings Performance Contracting: **Ernesto Hanhausen** advocated for considering ESCO types of projects for public buildings. He elaborated on the importance of guaranteeing savings for investors through a shared savings approach, especially in case of long-term contracts. CONUEE can potentially serve the role of a “super-ESCO” to help organize and aggregate the industry for the government. Mr. Hanhausen identified three problems related to ESCO projects:

- 1) Energy diagnosis: energy audit is voluntary in Mexico City, but is very much needed in order to identify the energy saving opportunities and the investment needs.
- 2) Communication/education: the city’s finance department should allow long term ESCO contracts recognizing that ESCOS are paid back for efficiency upgrades over time and the city is not paying upfront.
- 3) Budgeting issues: Administrators should not cut operational budgets when energy savings are achieved.

Insurance and Risk Mitigation Programs that could complement projects or ESCOs:

- **Leticia Riquelme** explained that it is difficult to fund public buildings and buildings that the government rents and emphasized the need for risk mitigation programs. She gave the example of a new program that has a third party provide a guarantee to the bank that the energy savings will be

achieved. IDB and the Danish Government are using this insurance program for approved ESCO providers and projects developed in Colombia. After completion, if the project is not delivering the energy savings expected, the supplemental insurance will pay the difference between the expected energy performance and the performance after the project is implemented. She explained that this program was implemented for the agricultural industry in Mexico, but the model can be replicated in other sectors.

- **Ulla Blatt** proposed that Mexico City can look at the application of this insurance model to hospitals and hotels. She also mentioned that Denmark has designated additional bilateral aid funds for energy efficiency projects, for which Mexico is eligible.

Code Implementation and Enforcement: **Ms. Blatt** pointed out the importance of building codes implementation especially for new construction, referring to it as a low-hanging fruit and a cost-effective opportunity. She believes it would be important to implement building codes in Mexico City, especially taking into account that good regulations exist at the national level.

Benchmarking and Assessment **Gisela Martinez** noted the importance of life cycle approach and its incorporation into the governmental projects. Ms. Martinez also advocated for the necessity to solve budgeting issues, referring to budget cuts due to energy savings in the previous year playing the role of a penalty instead of a reward.

Ernesto Infante indicated that SHF does not have non-residential projects at the moment, but is looking for collaboration with companies that are experts in non-residential buildings to implement a new scheme on the construction of low-carbon multi-story or high-rise low-income housing with the integration of eco-technologies and renewable energy. According to Mr. Infante, there are builders in Mexico who want to invest in sustainable buildings. Organizations such as IADB, KfW and various “green” funds could be approached to provide financing.

Anahi Ramirez advocated for the benchmarking, which should be based on a very specific assessment systems, which can help support the access to the funding and can be applied to different building types in Mexico.

Ingrid Hahn, Kfw, an audience participant, pointed out that Kfw has a lot of experience in housing and about a half the housing improvement in Germany is done with Kfw support. In Mexico, Kfw has a small office and approximately 600 million Euros available for funding two programs: one for new efficient equipment and the other is ECO CASA¹. Kfw has already invested about 200 million in these programs. Ingrid also mentioned the collaboration between Kfw and the UK government, as well as the EU to promote the development of passive housing. She also pointed out their support for a large-scale program in India on public buildings focused on energy efficiency in schools.

Adrián Fernández provided a brief summary of the session emphasizing the several essential points (‘needs’):

- Resources to scale different efforts
- Addressing budget problems as a key barriers
- Changing institutions and procedures to provide preferential treatment for and enable the implementation of energy efficiency
- coordinating among different institutions and goals on energy efficiency actions, such as a new focus on trying not to construct houses in places that are far from the city

¹ The Ecocasa Program supports the construction of 27,000 efficient homes that will help to reduce emissions of greenhouse gases in the country, while improving the quality of life of the low-income families who live in them.

According to Dr. Fernández, the conditions have been set through the pilots for further implementation of energy efficiency, but now there is need to take into consideration financial opportunities and the technical aspects.

Session 3: Activity Scoping: Building Energy Codes

The third session of the day focused on one of the two key areas of activity identified as a priority activity by Secretary Muller: implementing a local building energy code. To begin the session, Architect ***Evangelina Hirata, CASEDI/ONNCCE***, presented a comprehensive overview of the situation of building codes development in Mexico. She advocated for the necessity of promoting norms and codes to ensure safety and health of buildings, while reducing impact on the environment. CASEDI was founded four years ago and has conducted a study of the codes in different countries, including Canada, U.S., and Great Britain. A model code, which largely relies on the US system, has been developed for Mexico. It is a voluntary model that creates a baseline for efficiency. The code has been developed since 2004 by CONUEE. There are two different types of norms: NMX are voluntary, NOM are mandatory. The federal government adopted the code and each jurisdiction can decide whether to implement this model on a mandatory or voluntary basis. It is important to have an analysis of what will happen with the energy code.

She highlighted some successes on developing and implementing codes:

- There are now efforts to train people outside the regulatory system. But nationally, the practice has been to not pay attention to the regulations. For 2015, there is hope to have a formal document to help integrate and achieve consensus. Next, there will be an effort to start an adoption project with the national government.
- A housing building code was developed by CONAVI in 2007 and 2009 for the federal level. Chapter 27 is devoted to energy issues.
- A housing energy baseline was developed through the NAMA projects
- There is an effort to normalize climate zones in Mexico.
- National Energy strategy for 2013-2017 is being updated to include efficiency.

She identified the need for a strategy to accelerate code activity and highlighted several opportunities for progress:

- Normalization is a very important topic and should be a priority for energy policy. There are many energy initiatives in Mexico, but the energy conservation code needs to be the baseline.
- Legal adaptation and implementation of the federal code at the local level is needed. Both adaptation (technical) and adoption (legal) are needed once a local jurisdiction decides to adopt the code.
- There is a need to establish a requirement for regular updates of the codes and regulations. The U.S. updates codes every three years, every 4 years in Japan and Europe. Some Mexican regulations are 40 years old.

In Mexico City, construction regulation has been adopted which is the most comprehensive code. What is missing is referencing the energy codes. If needed there can be subsidies for adoption. The benefits are that the code will be the new baseline for all new projects.

The moderator of the session, ***Rodrigo Gallegos, IMCO***, invited the discussants to respond to Ms. Hirata's presentation and share their perspectives on the importance of building energy codes for Mexico City.

Norma Morales, CONUEE, indicated that CONUEE has expertise on developing the standards, both for residential and non-residential buildings. Mrs. Morales stated that in addition to energy efficiency standards, a framework,

which would integrate all these standards, is needed. She also noted that CONUEE conducted training for stakeholders from the construction industry on utilization and compliance with the standards, but the results were not very good. In Mrs. Morales' view the first step is to ensure compliance with the existing codes, after that the experiences from other countries can be taken into account.

Ana Lepure, a consultant for the International Energy Agency at the Ministry of Energy, pointed out the need for regulation that would cover all existing standards. She also encouraged updating the codes every 3 years - in Mexico the update of municipal regulation takes place only every 15 years. Ms. Lepure emphasized the importance of the adoption of the codes by local governments, which should take into account difference in climate conditions and policy priorities.

Richard Shackleton, UK Foreign and Commonwealth Office in Mexico, noted that his agency has a 1.7 million British Pound fund for project work including on climate change and sustainability issues. One of the key success criteria for the building codes in the UK is their orientation towards identifying the results they would like to see, rather than specifying materials. In his view, the codes should reflect the goal: ie if the goal is reducing greenhouse gas emissions an outcome oriented code to help achieve that goal. He referred to BRE – a research center in the UK, which supports contractors and local governments on how to economically improve building construction. BRE has an internationally recognized building certification programme called BREEAM. He agreed that implementation of the codes is very important, but emphasized that the codes should be developed in a way so that they work for those who will use them, to ensure they deliver the desired results.

Salvador Rodríguez, GIZ, differentiated between building standards at the federal and at the local levels, calling them different 'universes'. There is an understanding that there needs to be a continuous process for updating. He pointed out that adoption of the national model at the local level will require local consultations to understand different needs and barriers. Mr. Rodriguez also recommended providing training to local authorities, which can be difficult with administration and staff changes. He noted that there have been a lot of improvements in the field of sustainable buildings in Mexico, but not all authorities are aware of these processes. It is important to take 'baby steps' in order to increase compliance with the regulations. In Germany, where the development of the regulations was catalyzed by the oil crisis, and the UK, where first efforts to regulate the quality of construction were taken in order to mitigate the risk of fire. He concluded by saying there should be a certain 'trigger' in Mexico City, which would accelerate development of the regulations.

Mr. Gallegos posed two further questions to the panel:

- **At the local level, what would you encourage Mexico City to implement?**
- **What solution for verification based on results would you suggest?**

Ms. Hirata emphasized the importance of the verification and compliance at the local level and pointed out that the federal regulations should be well understood in order to design an effective training and start the implementation process. Verification of compliance is the responsibility of government, but in some countries the office responsible for building licenses also gives certification of compliance. The implementation process has a lot of steps and will require certain competencies, which have to be developed.

Ms. Morales indicated that CONUEE is interested in implementation of the Mexican regulations and take actions on improving energy efficiency. But local governments, like Mexico City, have not supported this effort. She noted that norms are not retroactive. Ms. Morales also emphasized the importance of assessments of building energy performance in terms of kWh per square meter, as well as the relevant training of the local government staff to increase the understanding of the code. CONUEE will provide training at the request of local governments.

Ms. Lepure elaborated on the importance of all implementation steps: design, implementation, and assessment are all important. She also spoke about strong electricity subsidies, which create a barrier to energy efficiency

improvements and undermine consumers' motivation to save energy. Ms. Lepure concluded that the benefits of energy efficiency and sustainable building operations should be clearly explained to end-users in Mexico City. Implementation of energy regulations should be communicated to the stakeholders in the construction industry.

Mr. Shackleton called for considering not only the efficiency of a building, but also the sustainability of its surroundings. The building should be understood as a part of the community, which has specific needs and priorities, to which the local codes should be adapted. He also pointed out that energy efficient buildings are beneficial for businesses, as building certification can demonstrate corporate social responsibility and increase the attractiveness of the property for buyers or renters. Therefore, the new regulation should be presented as a business opportunity and not as another law; not something for litigation but as a way to strengthen competitiveness.

Mr. Rodriguez spoke about the experience in Veracruz where there was a problem identifying the competencies and responsibilities for issuing building permits and ensuring compliance. The state provided the licenses for construction, but the municipality could not influence the process. There were only a couple of people who could do the assessment of buildings making local enforcement impossible. It is important to be very clear about expectations. If they are clear it is difficult to break the law or have corruption.

A participant asked about how to treat and encourage actions that are beyond the minimum established by the code. **Ms. Hirata** replied that certifications need to be recognized by the market. It is helpful to have a standard because it will prevent doubt about the baseline. **Mr. Shackleton** noted that codes can encourage competition: if codes set the baseline, businesses could do more to demonstrate they are going beyond just simple compliance in order to increase the sales value of such properties.

Another question was about how to improve communication and establish a vision for sustained competencies and authorities from the federal, state and local government. **Ms. Lepure** noted there is need for better vertical communication between levels of government. Specifically, there is a need for teams at different levels of government to develop recommendations on how to adapt codes to different cities. There is some experience with this in Toluca. Citizen participation is also important. **Ms. Hirata** replied that the government is interested in compliance with national regulation. Even with the three different levels of government, the federal law needs to be recognized. She identified the need to analyze the current status of implementation by every municipality.

Session 4: Case Studies on Experiences with Energy Efficiency in Buildings

Jorge Luis Hagg, Schneider Electric & past president of the Mexican Institute of the Intelligent Building (IMEI), urged that energy efficiency needs to be a priority for the future taking into account the growth in energy demand and related GHG emissions. He suggested that buildings are citizens and we give them life. Mr. Hagg drew attention to the need to optimize energy use and the fact that building operation plays the crucial role for energy efficiency, citing that the operation of a building is half of its energy costs. If a building is not operated in the efficient way, energy saving potential will not be realized. It is important to develop or use a system for benchmarking to determine building efficiency. Mr. Hagg gave the example of a project in Polanco, where the lighting systems were improved and energy consumption was measured after the intervention. However, it was difficult to determine how much energy efficiency was improved due to the lack of a benchmarking system. Mr. Hagg also gave the example of an office building project that generates its own energy. He also noted there are already 300 projects with LEED certification, including ones in Polanco and Santa Fe, and mentioned two of such buildings: Torre Mayor and Reforma 222.

Liliana Rodriguez, THREE Environmental Consulting, presented case studies of LEED certification in Mexico. She stated that Leadership in Energy Efficient Design (LEED) is a global and well-known certification approach and tool,

which has been used in 35 countries in the world, and had a big impact on Mexico. Currently there are 129 certified projects in Mexico and 445 registered, with 139 registered projects in Mexico City alone. Mrs. Rodriguez presented a case study of a 7-11 convenience store in Monterrey which received basic LEED certification in 2011-2012. Sustainability measures implemented in this project included preferential parking spaces for efficient vehicles and/or cars with two or more passengers, as well as electric vehicle charging stations. Modeling software was used to determine what measures could be beneficial with no additional costs. The store design also preserved a 50 year old tree which was incorporated into the store's interior. The tree's canopy helps shade the store and creates a pleasant atmosphere. This LEED certified store reported that it is consuming 20% less energy per square meter, while the sales per unit of energy use increased by 22%. The staff has also described a more pleasant work environment. Mrs. Rodriguez also mentioned another 7-11 store inside the University of Monterrey campus, for construction of which reusable materials were used. With two-thirds of buildings for 2050 yet to be built, LEED and other certifications represent an opportunity to reduce carbon dioxide emissions and create buildings with a lot of other benefits without adding a lot of costs.

Pablo Álvarez Romo, ECOCIHAC, pointed out that buildings are responsible for 40% of the global energy consumption and related GHG emissions. We need to change how buildings are seen. This is a historic moment because we know we need to be constructing sustainably. Companies that are efficient are sustainable and they generate jobs and growth. Renovated, efficient buildings have lots of benefits for productivity and competitiveness. The Expo CIHAC building, which is 40 years old and was renovated and achieved LEED Platinum certification is considered by some to be the best building in Latin America. The project cost USD \$1 million with a payback in the value of the building within three months. Mr. Álvarez pointed out that during renovation only simple solutions were used, including nontoxic materials and a system for tracking renewable energy generation. This building has been operating for 4 years and demonstrated 40% energy savings.

During the question and discussion portion of the session, the audience asked the presenters about:

How to apply the lessons learnt from the case studies to Mexico City? Including: how to improve rented buildings? How to finance in a revolving way? How do you buy down initial risk?

Mr. Álvarez Romo noted that "money is key, but the return on sustainability is the best business." Energy efficiency should create revenues. Subsidies will not be needed if the city can provide help and non-financial incentives for the investment. **Mr. Hagg** pointed out the necessity of improved standards for new buildings and making old existing buildings more efficient.

What organizational changes were needed to get leaders to go ahead with the projects? What was effective at bringing people with you?

Mr. Hagg stated that in the private sector, there is concern about recovering investments, but impact on productivity of people is important and valued. 20% of an investment can make a building sustainable. **Ms. Rodríguez** explained that the inadequate knowledge and/or lack of knowledge could cause unsustainable decisions. Lack of knowledge forces decisions to be made out of fear. It changes when people working in the building are involved in the project. They have knowledge and can experience the value. **Mr. Álvarez Romo** advocated for the need to change the culture of organizations after they understand the value of investing in building energy efficiency. The monetary benefits of energy efficiency should be communicated to the organizations in order to encourage investments and transform the culture.

A participant noted that Mexico City government plans to soon announce its intention to have the world's oldest LEED certified building. This is in part so that actions by the government will be examples for citizens.

Ken Mentzer, the moderator for the session, concluded by noting that as codes are adopted and enforced there is a big opportunity and a need to think about developing a financing pipeline that can soon become self-financed.

Session 5: Activity Scoping: Public Building Renovation and Efficiency Improvements

Antonio Ibarra, SEDEMA, shared an opening presentation on the experiences from sustainable environmental audits conducted in Mexico City, in which 560 companies have participated over 10 months. He explained that Programa de Auditoría Ambiental Sustentable (PAAS), administered by the Mexico City government, is a comprehensive sustainable environmental audit program, which is the only one in the country. This program includes indicators on water, energy, CO2 emissions, and waste, and is designed to provide information on sustainable actions and encourage sustainable business services. It also includes a certification program, which is twofold: one is for sustainable business certification and the other one is for sustainable buildings certification. The certified organizations receive an incentive of 40% reduction on water tax or payroll. The audit program has a separate part on energy, under which the opportunities of the organization to improve energy efficiency are identified. Another part is on waste reduction, and one of the solutions identified for waste generated during construction is for it to be recycled or reused in other construction processes. He also noted that one of the parts of the program is regarding voluntary actions businesses are taking themselves to improve their image, and gave an example of vertical gardens.

Mr. Ibarra also noted that compliance with regulation and legal framework, including the federal laws, is a program priority. If the audit shows that the compliance is weak, the building or business does not get the certification. But he also noted that voluntary compliance is sometimes better than mandatory and often can be better quantified. The measures implemented by the companies give them the opportunity to reduce their operation costs. However, if the taxes applied to the business are low, the program provides less fiscal incentive to improve energy efficiency.

In 2014, 461 companies participated in the audit program. For this year the city set a participation goal of engaging 750 new businesses, of which currently 15% has been achieved. Focusing on the opportunities related to energy, Mr. Ibarra mentioned lighting, motors, and improvements in culture. He gave an example of the Microsoft building, which has taken a number of actions. Other well-known buildings participating in the program include Nestle, ANTARA, INFONAVIT, Dos Patios Federal Corporation – “these businesses have a big impact and big opportunities.”

He noted that he and other city staff are taking lots of notes and thinking about what else they may want to do based on the discussions at the workshop.

José Antonio Urteaga, FIDE, suggested that many public buildings in Mexico City are currently bad examples in terms of energy efficiency, including the one where the event was taking place, noting that the T12 lighting fixtures in the room are no longer available. Being the moderator, he introduced the discussants who were asked to respond to the presentation and discuss what else the city could do related to public buildings.

Rafael Ramos Villegas, C40 Cities Climate Leadership Group (C40), spoke about the support that C40 provides globally to improve energy efficiency in public and private buildings. He also described an energy retrofit conducted on the buildings of Universidad Iberoamericana in Mexico City, when he served as the contact between the University and the ESCOs. He spoke about three difficulties facing with renovation of public buildings:

- 1) Many governmental buildings are very old and were designed for a different way of life, without considering energy efficiency. Therefore, it is difficult to improve energy efficiency in such buildings.
- 2) Mexico City has building stock that is rented and some that is owned by the government. Renovating rentals must be done in agreement with the building owners.

- 3) Metering and billing may present a significant obstacle: the Mexico City government has a unified account for electricity for all properties; an individual energy bill for each building would create higher motivation for energy savings.

Edgar Villaseñor Franco, ICLEI, contributed to the discussion with the experience from ICLEI, which works with 1300 local governments worldwide. He noted that ICLEI has been working on improving energy efficiency in many cities. Mexico City is one of the oldest ICLEI partners; however, on the energy efficiency side there has not been much engagement or action. Mr. Villaseñor advocated for better analysis of buildings and a better billing system. He also noted that training and leadership are very important for municipalities and that elected officials should step up. Mr. Villaseñor explained that municipalities are all different and gave the example of Puebla, where public lighting systems have already been renovated. They also worked with businesses to renovate old buildings. They presented different saving devices and trained the people who purchased. When they needed equipment, ICLEI helped them bundle the procurement and purchase these together to secure better equipment at reasonable prices.

Dario Ibarüengoitia, SUMe, an affiliate of the World Green Building Council, pointed out that the term 'audit' might have a negative connotation, as it might be perceived in a way that it is about finding the things that are wrong. Therefore, he suggested that the term certification might be more appropriate. He also referred to a study about the increase of productivity in green certified buildings and pointed out that it is important to set the example, which can be done in governmental buildings. Mr. Ibarüengoitia also emphasized the importance of the knowledge on how the building is operating, as many improvements can be achieved through the changes in operations. In this regard manuals for operation are important. He indicated that the improvements in operations should be the priority and should be done before renovation. If the operations are not optimized, the effectiveness of the best energy efficiency measures during retrofit will be undermined.

Mr. Urteaga next led the panelists through a few discussion questions.

What are the best practices in building operations?

Mr. Ibarüengoitia noted that there are already standards for building commissioning and that retro-commissioning for existing buildings is a big opportunity. If the way the building is operating is known, it will be easier to measure its energy use and how to improve energy efficiency.

How to improve the value of efficiency for owners of rental buildings?

Mr. Ramos pointed out that it is important to communicate what market value of the property the owner will have after the energy efficiency improvements, that the renter will be more comfortable and have lower cost in energy, and that the costs for municipal government will be reduced. He gave an example of the retrofit of Empire State Building in New York, with which C40 was involved. It is a private building with many tenants. This project clearly demonstrated that it is possible to achieve agreement between owners and tenants on energy efficiency investments.

What does the Mexico City government know about its buildings?

Odón de Buen of CONUEE offered a few thoughts on this critical question: he explained that CONUEE has the history of energy consumption for 2500 facilities and there is a good understanding of how much the whole city consumes. There are also benchmarks based on ENERGY STAR, which give a good picture.

Mr. Ibarüengoitia asked how different building sectors (office buildings, stadiums, etc.) are treated in the city audit program?

Mr. Ibarra explained that the methodology for the environmental audit is standardized, but the application of the methodology to different buildings is supposed to be customized, but it depends on the

competencies of the auditor. For more complex buildings there are superstar auditors, there are also auditors specializing on green and sustainable buildings. The auditors need to figure out how to apply the methodology to different building types.

Session 6: Action Plan and Project Roadmap

Representatives of companies and NGOs that are partners to the Building Efficiency Accelerator described what their organization can contribute to improving building efficiency in Mexico City and their recommendations to the city for the partnership. **Jorge Vélez Guerrero, Centro Mario Molina**, substituting for Francisco Barnés, Executive Director, acted as the moderator for this session.

Clay Nesler, Johnson Controls, shared a success story of the energy service company (ESCO) and energy performance contracting (EPC) model. He described it as “a model, but not **the** model.” Using energy performance contracting infrastructure or energy improvements are paid for through energy bill savings. These projects are therefore cost neutral and can generate positive cash flow. Mr. Nesler pointed out that ESCO markets are particularly large in US (where it is a U.S. \$7 billion market), Europe and China. EPC is important to accelerating energy efficiency because 1) it expands the scope of projects, 2) it can help scale projects, and 3) it keeps score of savings. Most ESCO projects cover several technologies and multiple buildings, and often include measures on both energy efficiency and renewable energy. Johnson Controls’ is currently implementing a project for 12 airports and many public buildings in the Hawaiian Islands. The project involves upgrading of 75,000 lights and other technologies, and avoids 43,000 tonnes of carbon dioxide emissions each year. The project saves 49% of energy use over 20 years and US\$ 518,000 in reduced energy cost. Mexico City should find a model for EPC that can work locally.

Mr. Nesler noted that having worked on energy efficiency and conducted market research his “lessons learned” included 1) the importance for the government to set performance-based goals (makes them twice as likely to succeed); 2) use analytical tools, take a programmatic approach (like how an EPC has one supply that coordinates all activities, enabling standard solutions to standard problems); and 3) address barriers related to procurement and budgeting. Mr. Nesler also emphasized importance of the government to show its leadership through demonstration projects. Finally he noted that partnerships are the only way to achieve these goals at scale. Partnerships need to be public-private and involve service providers, technology provides, NGOs and others.

Rafael Ramos, C40, mentioned that C40 works with both large cities and smaller cities, including in China and India. He noted that C40 has 7 relevant networks of cities from around the world, including related to district energy, energy efficiency in public buildings, energy efficiency in private buildings, etc. These are a venue for knowledge and experiences to be shared.

Adrián Baez, Danfoss, shared the Danfoss’ experiences in collaborating with governments in different countries. Mr. Baez’s believes the government should take an active role in improving energy efficiency through managing standards and forcing manufactures to improve energy efficiency. He explained that in Mexico there is no demand for energy efficiency and consumers just by the cheapest option, because there is no standard enforced. Progress is needed on standards in the short and long term. Mr. Baez gave the example of a company which has achieved 35% of energy savings through energy efficiency measures. He also mentioned that the government could provide certain benefits for the industry to make investments in energy efficiency more attractive. Mr. Baez explained that it can be very difficult for buildings to comply with energy efficiency requirements, due to conflicts between different standards, and therefore both the government and industry should play an active role in development of standards.

Javier Gallegos, Saint-Gobain, pointed out that he and Saint-Gobain are happy to be part of this group, as it is a rare opportunity to have such an enriched audience to talk about the topic of energy efficiency. He explained that

Saint-Gobain's mission/vision is to raise the awareness in other organizations. It has had 350 years of experience as an industrial group and established a development group with 200 million euro in investment every year. Their mission is to be a resource for the environment; they want to apply their knowledge in to support of the activities in Mexico City.

Edgar Villaseñor Franco, ICLEI, pointed out that one of the barriers for energy efficiency improvements in Mexico City is the capabilities of local authorities to change the course of policy development. He explained that ICLEI develops campaigns, trainings and information materials which can set examples for different parts of society. Mr. Villaseñor emphasized training for authorities and other leaders, including religious leaders, to reach people with simpler messages. Energy efficiency can be profitable in Mexico and many businesses would like to make such investments.

Dario Ibargüengoitia, SUMe, talked about experience with communication and education. He emphasized the need to change the way that buildings operate and the importance of cooperation across different organizations. Mr. Ibargüengoitia pointed out that this workshop is important, as it gives the opportunity to share information, discuss experiences and determine further actions.

Asier Maztegi, TECNALIA, talked about the work of TECNALIA, which is a private organization that works internationally to fight against climate change through technology advancements and has experience of over 45 years. TECNALIA has a number of activities related to energy efficiency in Europe. He explained that TECNALIA has a common business culture, which can be applied to the situation in Mexico. Mr. Maztegi explained that when the rules and regulations are being established, they should be necessary for the market. It is important to establish the framework for measuring energy use and establishing the baseline. He also noted that in construction, unlike industry where consumption can become intensive, the difficulties for ESCOs to operate are much higher due to the fragmented market and because the minimum energy consumption hinders the profitability of investment operations. As an example, he cited the rehabilitation of the windows on the exterior of an average building. Building right the first time is important because implementing changes in many buildings after they are constructed is not profitable. Changes to the outside of a small house can cost 7,000-8,000 Euros, but they save only 50-90 Euros because the windows are only a small part of the total surface of the exterior of the building. Mr. Maztegi pointed out the need to conduct pilot projects to demonstrate the importance of social innovation on energy efficiency. Wind energy can also be beneficial, however, sometimes this opportunity is rejected by the society. The need for social participation so that technologies are adopted and have an opportunity to generate a real market must be demonstrated.

In summary, **Mr. Vélez** noted that analysis from Centro Mario Molina shows that there are economic opportunities to improve buildings. Studies also show that managers are interested in improving their buildings.

Summary and Conclusion

Jennifer Layke provided the summary of the discussions during the day and asked the audience for the reflections on the key takeaways. Mrs. Layke pointed out the following topics and themes, which were discussed during the workshop:

- Opportunities for energy efficiency improvements in Mexico City
 - Mexico City can connect with other leadership and experiences around the world
 - Investments in energy efficiency can have important results
 - Energy efficiency efforts in the field of appliances, small businesses, and housing, already underway in Mexico, can inform other actions

- Low-cost options to improve efficiency are already available, but capacities and skills need to be developed
- Topics discussed included design, construction, operations, and behavior.
- Multiple benefits of energy efficiency
 - Better experience and comfort in buildings, improving productivity
 - Using efficiency to help hospitals, schools and others institutions to achieve their goals
 - The case studies showed the importance of “Viewing buildings as citizens”: as people spend most of their time in buildings, benefits for buildings are benefits for citizens as well
- Various financial mechanisms for investing into energy efficiency
 - Guarantees for risk mitigation
 - Energy performance contracting
 - Budgetary and procurements challenges in changing the incentives for decision-makers on capital and operating decisions
- Actions that can change the playing field for energy efficiency
 - Importance of strong building codes to set a minimum standard and baseline. The existing norms need to be implemented taking into account different local conditions, and requirements for more regular updates to the codes need to be incorporated
 - Efforts to improve the operations of buildings, like retro-commissioning, can have significant energy saving with little effort or cost
 - Rental programs as an opportunity to improve energy efficiency in buildings
 - Actions in public buildings, starting with understanding the baseline of energy use
 - Importance of setting the goals and tracking progress
 - Reform is needed in public procurement rules, public budgeting, and the building development process.
- Several partners shared experiences and willingness to apply them to Mexico City’s objectives, including ICLEI, C40, WBGC, and businesses from Spain, France, Denmark, and US.
 - To have a bigger impact Mexico City’s efforts need partnerships to expand scale, expand scope, and keep score
 - Setting measurable goals are essential. Baselines are needed to measure progress. Essential elements in creating a standardized approach.
 - Growing markets thoughtfully and developing technical skills that will benefit the economy of the city.

Julia Martínez, CTS EMBARQ, expressed high interest in working with the private partners to develop a roadmap and encourage new organizations to join this platform. Mrs. Martínez shared her hopes for further fruitful collaboration with all organizations present at the workshop on development of an energy efficiency roadmap in April. She expressed certainty in the ability to establishing strong public private partnerships. Mrs. Martínez thanked C40 for offering its experience, as well as TECNALIA, ICLEI and pointed out importance of the experience of the partners on training and standards. A lot was learned through throughout the day. She promised to present the roadmap and to be in touch to discuss ways for different organizations to join.

Odón de Buen, CONUEE, provided concluding remarks on the current challenges related to energy efficiency in Mexico City, and Mexico more broadly. He provided the example of Norm 008 for non-residential buildings, which took 7.5 years from its original blueprint until it became NOM in 2002; however, there is still a problem with compliance, regardless of the hard work to promote this norm. Mr. de Buen emphasized the need for political will from the city government for compliance with NOM-008, which has the legal and conformity assessment conditions to be required as soon as possible if it is integrated into the building permit processes. He also mentioned federal NOM-020, whose compliance is being worked on with CONAVI. Mr. de Buen pointed out that energy efficiency in buildings should be a big concern for the city government. The city needs buildings which are

efficient, comfortable, have a small carbon footprint and contribute to the competitiveness of the urban space. The fact is that in the majority of new buildings, a lot of glass is used on the exterior, which increases their energy use on cooling and affects the comfort of those who work there. He mentioned that there is a benchmark system, reviewed by ENERGY STAR, and it is possible to apply it in Mexico City. However, a problem is that the principal characteristics of buildings in Mexico City, especially the parameters used in these evaluations, are unknown.

Another challenge Mr. de Buen talked about was related to the ESCOs and energy performance contracting. This has been discussed in Mexico since the mid-90s and is still a priority. Administrative contracts need to be developed to advance this approach. Although there is a big interest in ESCOs, the size of the potential market is uncertain and it is not clear whether this model will work for public buildings, where it is very much needed. He stated that if there was interest in helping to take this issue to the treasury department, there are many people who could work together. Mr. de Buen emphasized the need for the business model on energy efficiency with the benefits for multiple stakeholders that supports the governmental program. He thanked the Building Efficiency Accelerator for the opportunity to attend the event and receive valuable information, as there is not much experience in cities in improving energy efficiency in the building sector. He also noted that currently very little is being done for buildings in comparison to the size of the opportunity and that action in the building sector can have a very big impact, particularly in a city like Mexico City that wants to be competitive worldwide. Mr. de Buen concluded by saying that energy needs should become the center of economic development policy, asked Tanya Müller to adopt the Norm 008 and congratulated WRI and CTS EMBARQ on the event.

Adriana Lobo concluded by saying that this event is just the beginning of a new and fruitful partnership. She noted that the momentum from event was demonstrated by the statistics of attendance: around 100 participants joined the workshop including 31 presenters. There was considerable diversity across stakeholder types, backgrounds and skills:

- 19 from the government of Mexico City
- 2 from other municipal governments
- 8 from the federal government
- 24 from NGOs or consultancies
- 18 from the private sector
- 5 from financial organizations
- 9 other participants
- 15 organizing staff

Ms. Lobo promised that this conversation will be continued and the materials will be made available. She thanked Ms. Layke and her team and concluded the workshop by saying that this effort will not be considered as a success until there is a successful workplan in place to support Mexico City's goals for the Building Efficiency Accelerator under Sustainable Energy for All.