

## TC Document

### I. Basic Information for TC

▪ Country/Region:	MEXICO
▪ TC Name:	Sustainable Energy for Mexico City
▪ TC Number:	ME-T1496
▪ Team Leader/Members:	Urteaga Dufour, Jose Antonio (INE/ENE) Team Leader; Barrios Nunez, Uriel (CID/CME); De Dobrzynski, Esteban (LEG/SGO); Irigoyen, Jose Luis (INE/ENE); Jose Luis Enriquez (CID/CME); Juan Herrera (INE/ENE); Juan Tulande Lopez (INE/ENE); Mauricio Castaneda (VPC/FMP); Miranda Monroy, Edna (CID/CME); Sanchez Alvarez, Lourdes Felicidad (VPC/FMP)
▪ Taxonomy:	Client Support
▪ Operation Supported by the TC:	NA.
▪ Date of TC Abstract authorization:	06 Jan 2023.
▪ Beneficiary:	Mexico City Government
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	United Kingdom Sustainable Infrastructure Program(SIP)
▪ IDB Funding Requested:	US\$405,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	24 months
▪ Required start date:	23 Apr 2023
▪ Types of consultants:	Individuals Firms
▪ Prepared by Unit:	INE/ENE-Energy
▪ Unit of Disbursement Responsibility:	CID/CME-Country Office Mexico
▪ TC included in Country Strategy (y/n):	y
▪ TC included in CPD (y/n):	y
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Productivity and innovation; Institutional capacity and rule of law; Environmental sustainability; Gender equality; Diversity

### II. Objectives and Justification of the TC

- 2.1 Mexico City (CDMX) uses 5.7% of the country's total electricity, ranking sixth among states. It has 3.37 million users, ranking second in number of users and households (2.95 million) nationally.
- 2.2 Improvement in Energy Efficiency (EE)<sup>1</sup>; Solar energy, through Distributed Generation (DG)<sup>2</sup>, and the installation of solar water heaters (SWH)<sup>3</sup> in buildings are crucial for

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<sup>1</sup> Energy efficiency refers to the ability of a system, device, or process to use energy efficiently and effectively to achieve its intended purpose. In other words, it is the practice of using less energy to perform the same function, without compromising quality or productivity. Energy efficiency can be achieved through various measures, such as the use of energy-efficient technologies, improved building insulation, and more efficient transportation systems. It is a critical component of efforts to reduce energy consumption, lower greenhouse gas emissions, and promote sustainable development.

sustainable and low carbon infrastructure and promote economic recovery<sup>4</sup>. It is also a critical matter to address diversity and gender inequalities, by providing tangible benefits, especially for low- and middle-income strata children and women.

- 2.3 CDMX's public buildings have significant potential for energy savings through DG and SWH. A study carried out by the Bank in 2019 and the Ministry of Economic Development (SEDECO)<sup>5</sup> found that 48% of electricity use can be supplied by DG, and SWH could avoid 38% of LP Gas use. DG could generate 8,000 jobs and US\$1.5 billion in investment, while SWH could create 31,000 jobs and US\$5.9 billion.
- 2.4 Regarding the replacement of refrigerators for domestic use, according to the studies carried out with the support of the Bank to CDMX's Ministry of the Environment (SEDEMA), estimate that 1.3 million refrigerators in CDMX need replacing with high-efficiency models.
- 2.5 In 2022, the Bank supported SEDEMA with a study that found that only 6% of residential homes in CDMX use SWH, but they can be installed in about 1.6 million homes and pay for themselves in 15.5 months through LP Gas savings.
- 2.6 Regarding public buildings, a study made by SEDEMA with the Bank support found that investing in energy efficiency in 14 public buildings and the San Juan de Aragón Zoo could save 25-40% of electricity consumption, with a 2.8 to 7.1 years recovery period. Installing photovoltaic modules in SEDECO building generated 95% electricity savings (US\$30,000/year) with a US\$175,000 investment that will be recovered in 6 years.
- 2.7 Photovoltaic systems installed in 9 public buildings in La Paz, Baja California Sur, generated annual electricity savings of US\$162,589 with a recovery period of 6 years.
- 2.8 In the case of hospitals, an energy audit showed that 10 public hospitals in CDMX could save 3,653 MWh/yr with an investment of MX\$49.6 million that would be recovered in 4.5 years.
- 2.9 Installing photovoltaic systems in 98 public buildings in CDMX could generate 4.96MWp with a US\$7.1 million investment and a 5.6 years recovery period.

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<sup>2</sup> Distributed generation refers to the generation of electricity from multiple small-scale power sources that are located close to the point of consumption, rather than from a centralized power plant. Examples of distributed generation sources include solar panels, wind turbines, and small-scale natural gas generators. The electricity generated from these sources can be used on-site or fed into the grid, providing an alternative to traditional, centralized power generation.

<sup>3</sup> Solar water heaters (SWH) are systems that use solar energy to heat water for domestic, commercial or industrial use. They typically consist of a solar collector, which absorbs sunlight and converts it into heat, and a storage tank, which stores the heated water until it is needed. The collector is usually mounted on the roof of a building, facing towards the sun, and can be either flat plate or evacuated tube type. The heated water can be used for a variety of purposes, including bathing, washing clothes and dishes, and space heating. Solar water heaters can be an effective and environmentally friendly alternative to traditional water heating systems, as they can significantly reduce energy consumption and greenhouse gas emissions.

<sup>4</sup> According to Sustainable Recovery, World Energy Special Report, from the International Energy Agency, <https://www.iea.org/reports/sustainable-recovery>, for every million USD invested in photovoltaic investment and EE in buildings, 12.1 and 14.5 jobs are created respectively.

<sup>5</sup> Source: BID. [La energía solar, el potencial de la Ciudad de México.](#)

- 2.10 CDMX's Environmental and Climate Change Program includes Solar City, which promotes efficient energy use and renewable energy in the public and private sector. Solar City's strategic actions include training technicians in DG and SWH installation, financial support for SMEs, strengthening environmental standards, promoting DG in government buildings, and installing a plant to produce biodiesel.
- 2.11 CDMX Local Climate Change Action Strategy 2021-2050, plans to reduce its GHG emissions by 10% in 2024, 24% in 2030, and 36% in 2050, with a goal of net zero emissions by 2050. To meet these goals, one of its 8 pillars, includes DG and SWH, as well as EE in public buildings and MSMEs.
- 2.12 The objective of this TC is to support the implementation of its Sustainable Energy Program, as well as its Climate Action Strategy and Program, particularly the *Ciudad Solar* initiative of the CDMX Government.
- 2.13 The specific objectives are: (i) develop a business model for the implementation of an EE and DG program in public buildings in CDMX; (ii) define the scope of a national EE and DG program in public buildings; and (iii) design an EE, DG and SWH program for the residential sector in Mexico City, and a proposal for its implementation at the national level.
- 2.14 In the case of public buildings, the main lessons learned are: (i) in EE, carry out third-level energy audits, in order to specify the necessary investments, considering both the price of the high-efficiency equipment to be installed, and the conditions of the electrical installation and the costs that its adequacy implies, as well as the costs for the waste management such as mercury, in the case of lighting, and refrigerants in the case of air conditioning; (ii) in DG, review the structural conditions of the buildings in order to determine if it is necessary to carry out conditioning actions, identify shadows, replace the waterproofing with the one that contains reflective paint; (iii) for both measures, analyze the main risks that may generate less than expected savings, and actions to overcome them.
- 2.15 Results. As a result of the implementation of this TC, it is expected: (i) to have a bankable model to implement EE and DG projects in public buildings in CDMX, including the calculation of investments and their profitability, as well as the financial and logistical mechanism for its implementation, in accordance with the applicable legal and budgetary frameworks; (ii) prepare a proposal for the implementation of an EE and DG program at the national level, considering the scope, potential for energy savings, investments, and profitability for the country's states; (iii) propose an EE, DG, and SWH program in CDMX homes, which will include the estimated scope of the required investment as well as the profitability for each of the participating agencies, identification of financing sources, and scheme with greater feasibility, from the

technical, logistical, budgetary and legal point of view; and (iv) prepare a proposal for an EE, DG, and SWH program for homes nationwide<sup>6</sup>.

- 2.16 **Strategic alignment.** This TC is consistent with the Update of the Institutional Strategy of the Inter-American Development Bank Group (AB-3190-2), and is aligned with attention to development challenges: (i) productivity and innovation, since it will allow for a proposal to support the implementation of the Environmental and Climate Change Program, the Local Climate Action Strategy 2021-2050 and the CDMX Climate Action Program 2021-2030, which will make it possible to reduce costs through transformational mechanisms based on the use of renewable energy and greater energy efficiency in public buildings and homes; (ii) institutional capacity and rule of law, since the results of the TC will be sought to establish public policies in properties of the Government of CDMX that strengthen the knowledge of the opportunities and benefits of the optimal use of energy, as well as the adoption of operational, maintenance and acquisition practices that contribute to the use of renewable energy and improvement in the energy efficiency of its facilities; (iii) climate change and environmental sustainability, by focusing on improving the efficiency of electricity consumption and the use of renewable energy through DG and SWH, thereby contributing to the reduction of CO<sub>2</sub> emissions; and (iv) gender equality and diversity by improving EE, DG Solar energy and SWH in households as a critical matter to address diversity inequalities, by providing tangible benefits, especially for low- and middle-income strata children and women. The TC is also aligned with the IDB Group Country Strategy with Mexico 2019-2024 (GN-2982), with the strategic objective of contributing to equitable and sustainable access to social services. Additionally, this TC is aligned with the objective of the Sustainable Infrastructure Program (SIP), which consists of supporting the countries of Latin America and the Caribbean (Brazil, Colombia, Mexico, and Peru) to present and comply with their Nationally Determined Contributions (NDC) of the Paris Agreement, through the following indicators of the SIP log-frame: number of policies related to low carbon emissions reflected in planning and procurement processes and/or investments in infrastructure; number of low carbon infrastructure projects reaching financial close that have benefited from SIP Technical Assistance (TA); policies or regulations of sustainable infrastructure of low carbon emissions adopted that have received support from the technical assistance activity of the SIP; number of relevant public sector institutions that have adopted methodologies, tools and approaches to promote sustainable low carbon infrastructure as a result of SIP TA.

### III. Description of activities/components and budget

To achieve these objectives, the TC will have three components.

- 3.1 **Component I: Business model for the implementation of an EE and DM program in public buildings in CDMX (US\$220,000).** Design of a project for the implementation of EE and DG actions in buildings owned by the Government of CDMX, such as office buildings, hospitals, schools, and buildings for other facilities such as zoos: (i) preparation of a diagnosis of CDMX public buildings, for which the

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<sup>6</sup> To date, comprehensive EE and DG programs have not been implemented in public buildings, while in the case of the residential sector, only EE programs have been carried out through the replacement of refrigerators and air conditioning equipment at the national level, however in CDMX were not implemented, because the energy distribution company, in CDMX, could not use electricity billing as a means of collecting loans for the acquisition of new equipment, which was a condition for this project.

studies already carried out will be updated and complemented, in order to determine the energy and economic savings and other benefits from the implementation of EE and DG actions, as well as the necessary investments and their profitability; (ii) use of the Information Platform for Energy Efficiency in Buildings in the Government of CDMX; (iii) proposal of the business model, in accordance with the criteria defined by the Government of CDMX, as well as the corresponding legal and budgetary frameworks; (iv) identification of financing sources and basic elements for agreements between the different participants; and (v) development of a training program for building operation and maintenance personnel, as well as purchases of CDMX government agencies.

- 3.2 **Component II: Scope of a national EE and DG program in public buildings (US\$70,000).** Preparation of a proposal for the implementation of EE and DG actions in public buildings at the country's state level: (i) estimate of electrical energy consumption by state, considering office buildings, hospitals, and schools, as well as other types of real estate owned by state governments; (ii) estimation of ranges of energy savings and photovoltaic generation by type of property at the state level; (iii) range of investments and profitability; (iv) general implementation and financing mechanism; and (v) identification of financing sources.
- 3.3 **Component III: EE, DG and SWH program for the CDMX residential sector, and a proposal for its implementation at the national level (US\$115,000).** Design of a large-scale program for CDMX and a general proposal at the national level to implement EE, DG, and SWH actions in housing, which will include: (i) development and implementation of a model to determine the potential of EE, DG and SWH in households in CDMX, the necessary investments and their profitability; (ii) design of a program for CDMX, detailing the financial mechanism, funding sources, scope, implementation schedule, the agencies involved, their roles and responsibilities; (iii) method for monitoring, reporting, and verification of the program's energy and economic savings, as well as other benefits; and (iv) preparation of a proposal of the scope for a national EE, DG, and SWH program in the residential sector.
- 3.4 **Indicative Budget.** The total budget from UKSIP fund for this TC is US\$405,000 to achieve the expected results and its breakdown by main component is as indicated below.

### Indicative Budget

Component	Description	IDB/SIP Fund Funding
Component I	Diagnosis of potential and investment required for an EE and DG program in public buildings in CDMX and development of the business model for its implementation	US\$180,000
	Training program for personnel responsible for the operation and maintenance of buildings, and for those responsible for acquisitions in the CDMX Government, considering a minimum percentage of women participation.	US\$40,000
Component II	Estimation of EE and DG potentials and necessary investment, and proposal for the implementation of a national program	US\$70,000
Component III	Design of an EE, DG and CSA program for the residential sector of CDMX, based on the estimation of the existing potential, identification of real benefits for target population including children and woman, the necessary investments and the identified sources of financing.	US\$90,000

	Estimation of savings and investment ranges for the implementation of a national EE, DG and CSA program in the residential sector and program proposal	US\$25,000
<b>Total</b>		<b>US\$405,000</b>

#### **IV. Executing agency and execution structure**

- 4.1 **Executing Agency.** The Ministry of Finance and Public Credit (SHCP for its name in Spanish) of Mexico has agreed that the IADB execute the TCs in the country, in this case the executing agency will be the Energy Division (INE/ENE), to facilitate institutional coordination, as well as the adequate development of the studies to be carried out, in accordance with the guidelines of the TC Operational Guide (GN-2629-1). Execution will include: (i) hiring consulting firms and/or individual consultants; (ii) recurring meetings with each beneficiary government agency to achieve their participation and involvement in all stages of the activities, from the preparation and feedback of the terms of reference, to the review and follow-up of the deliverables; and (iii) administrative and technical monitoring of all contracts made by the IADB.
- 4.2 A Program Committee will be formed that will be made up of representatives of the Embassy of the United Kingdom in Mexico and UKSIP, SEDEMA, SEDECO and IDB, and other CDMX Government dependencies that are considered necessary. The Committee will oversee: (i) confirm the objectives, scope and expected results of the program; (ii) validate the Terms of Reference for each of the scheduled studies, considering, in the case of consulting firms, gender equality in the integration of specialist teams; and (iii) validate the results of the studies carried out.
- 4.3 Procurement. All activities to be executed under this TC have been included in the Procurement Plan (Annex IV) and will be contracted in accordance with Bank policies as follows: (a) AM-650 for Individual consultants; (b) GN-2765-4 and Guidelines OP-1155-4 for Consulting Firms for services of an intellectual nature and; (c) GN-2303-28 for logistics and other related services-

#### **V. Major issues**

- 5.1 No relevant risks are identified in the execution of the TC, with the sole exception of coordination between government institutions. As a mitigation measure, the IADB and UKSIP will continue their current dialogue with the different institutions to ensure their collaboration, through the work of the Program Coordination Committee, and follow-up meetings with the necessary periodicity to ensure the correct participation of the institutions.
- 5.2 As mentioned in section II of this document, the Government of Mexico City has shown a strong interest in renewable energies development and reducing greenhouse gas emissions. However, there are budgetary and institutional capacity constraints that could pose a risk to the successful implementation of the technical assistance provided. As part of the efforts of this Technical Cooperation, special emphasis will be placed on promoting feasible and sustainable implementation of the results obtained.

#### **VI. Exceptions to Bank policy**

- 6.1 There are no exceptions to Bank Policy in the execution of the TC.

## **VII. Environmental and Social Strategy**

- 7.1 This TC will not finance feasibility or pre-feasibility studies of investment projects with associated environmental and social studies; therefore, it falls outside the scope of the Bank's Environmental and Social Policy Framework (ESPF).

### **Required Annexes:**

[Request from the Client - ME-T1496](#)

[Results Matrix - ME-T1496](#)

[Terms of Reference - ME-T1496](#)

[Procurement Plan - ME-T1496](#)