

TERMS OF REFERENCE

Sustainable Energy for Mexico City

Energy Efficiency and Distributed Generation in Public Buildings

1. Background and Justification

- 1.1 Mexico City (CDMX) has the sixth place in electricity use of all states in the country with 5.7% of the total national use.
- 1.2 In number of users in CDMX has the second place with 3.37 million. It is also the state household users with 2.95 million; in both cases around 7% of the total nationally.
- 1.3 Improvement in Energy Efficiency (EE); the use of solar energy, through Distributed Generation (DG); and the installation of solar water heaters (SWH) in buildings is a crucial strategy for the development of sustainable and low-carbon infrastructure, and a key action to promote a strong, green, and inclusive economic recovery.¹
- 1.4 Public buildings of CDMX, have significant potential for energy savings as well as DG.
- 1.5 What is established in the previous paragraph can be verified with the results of a study carried out by the Bank in 2019, at the request of the Ministry of Economic Development (SEDECO for its name in Spanish),² which determined that 48% of electricity use can be supplied by DG; while with the installation of SWH, 38% of the use of LP Gas in CDMX could be avoided.
- 1.6 The results of this study estimate that DG could generate around 8,000 jobs and an investment of \$1.5 billion USD, while the installation of SWH would generate 31,000 jobs and \$5.9 billion USD.
- 1.7 Regarding public buildings, in the most recent study conducted by SEDEMA and supported by the Bank, which includes 14 office buildings and the San Juan de Aragón Zoo, it is estimated that it is possible to achieve savings of between 25 % and 40% of the total electricity consumption of these buildings, through investments that are recovered between 2.8 and 7.1 years. In 2019, in the building of the Secretary of Economic Development of CDMX Government, 250 photovoltaic modules of 370 peak watts (Wp) were installed, which allows savings of 95% in electricity billing (30,000 US \$/year), with an investment of US\$175,000 that will be recovered in 6 years.
- 1.8 In the city of La Paz, in the state of Baja California Sur, in 2023, photovoltaic systems were installed in 9 public buildings, including office buildings, schools and the state congress. In total, 620.4 KWp were installed, with an investment of US\$577,210, which generates annual savings in electricity billing of US\$162,589, this is a recovery period of 6 years.

¹ 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.

² Source: BID, <https://blogs.iadb.org/energia/es/la-energia-solar-el-potencial-de-la-ciudad-de-mexico/#:~:text=El%20aprovechamiento%20de%20las%20energ%C3%ADas,a%20base%20de%20fuente%20solar>.

- 1.9 In the case of hospitals, an energy audit done to 10 public hospitals of the CDMX government concluded that it is possible to achieve savings of 3,653 MWh/yr, with an investment of \$49.6 million MX that would be recovered in 4.5 years.
- 1.10 According to the analysis carried out by the SEDECO in 98 public buildings, it is possible to install photovoltaic systems with a capacity, for the total of these buildings, of 4.96MWp, which require an investment of \$7.1 million USD with a recovery period of 5.6 years.
- 1.11 CDMX's Environmental and Climate Change Programme includes as one of its 7 pillars Solar City, which has objectives to promote the efficient use of energy and the use of renewables in the public and private sector.
- 1.12 The five strategic actions of Solar City are: training of certified technicians in the installation of GD and SWH; financial support to micro, small and medium enterprises (SMEs) for the installation of DG and SWH; the strengthening of the CDMX Solar Environmental Standard to use SWH in residential and commercial buildings; promote DG in CDMX Government buildings; and the installation of a vegetable oil transformation plant to produce biodiesel.
- 1.13 CDMX in its Local Climate Change Action Strategy 2021-2050, in the CDMX Climate Action Programme 2021-2030, and in its mitigation commitments and targets, plans to reduce its Greenhouse gas (GHG) emissions by 10% by 2024, 24% by 2030, and 36% by 2050 from a 2016 baseline. While in its conditional targets and commitments it hopes to reach net zero by 2050.
- 1.14 To meet these goals, one of its 8 pillars is the Ciudad Solar initiative, which includes EE and DG in public buildings.

2. Objective

- 2.1 The objective of this TC is to support the implementation of its Sustainable Energy Programme, as well as its Climate Action Strategy and Programme, particularly the Ciudad Solar initiative of the CDMX Government.
- 2.2 The specific objectives are: (i) develop a business model for the implementation of an EE and DG programme in public buildings in CDMX; (ii) define the scope of a national EE and DG programme in public buildings.

3. Key Activities

Under the supervision of the team leader, the activities related to the products of this consultancy include, among others, the following:

- 3.1. Conduct energy audits in public buildings of CDMX, to identify opportunities and calculate the EE and DG, identify, and evaluate the applicable measures, determine the necessary investments and their economic and financial evaluation.
- 3.2. Analyze the barriers faced by the implementation of EE and DG actions and programme, as well as the alternatives for their overcoming.

- 3.3. Identify and evaluate the different financing options for the implementation of an EE and GD program in public buildings in CDMX, as well as the challenges and opportunities of the identified alternatives.
- 3.4. For the most viable financial mechanisms, determine possible sources of financing, financial structure, mechanisms for payment of financing, including performance contracts and public-private partnerships.
- 3.5. Identify and evaluate the different options for the operational structure for the implementation of an EE and DG program in public buildings in CDMX, as well as the challenges and opportunities of the identified alternatives.
- 3.6. Confirm the feasibility of the evaluated financing mechanisms and operational structure options to implement an EE and DG program in public buildings in CDMX, in according to the applicable legal and regulatory framework.
- 3.7. Design the proposed method for monitoring and evaluating the program to be implemented, considering its energy, environmental, and economic benefits, as well as the co-benefits of the programme.
- 3.8. Based on existing studies and with the results of the evaluation for the case of CDMX, propose the opportunities, potentials, and EE and DG measures in public buildings at the national level, considering both federal, state, and municipal public buildings throughout the country.
- 3.9. Analyze and identify the basic elements to design a national program for EE and DG in public buildings, at federal, state, and municipal level, identifying sources and financing mechanisms, credit recovery, and operational structure of a program or programs at the subnational level.

4. Results and Expected Products

4.1. Product 1: Work plan and start-up workshop

4.1.1.**Work Plan.** The Work Plan is the document that must clearly and precisely describe the general and particular objective, the scope, the definition of the activities to be executed, the resources applied and the tasks of the consultancy, in addition to indicating the quality control mechanisms of the consultancy in general and of the products delivered, the instruments of communication between the parties. So, an exhaustive document is expected, which in addition to being a descriptive document must present a Gantt chart for the control of times and a mental map or conceptual diagram of the consultancy that defines the understanding of this for its better planning, programming, and execution.

4.1.2.**Start-up workshop.** A report of the activities, results, and agreements of the start-up workshop with the participation of the different key actors required in the project.

4.2. Product 2: Energy audits of CDMX public buildings.

4.2.1. **Information.** Inventory of energy consuming equipment, time of use, technological obsolescence, historical evolution of electricity consumption and billing, as well as the main electrical variables.

4.2.2. EE and DG potentials and measures. Calculation of potential savings in electricity consumption and billing for each type of EE measure and for DG, and registration in a database to be able to generate different implementation scenarios.

4.2.3. Investment estimation. Calculation of investments to implement the selected EE measures and for DG, as well as the feasibility analysis, including simple payback period, net present value and internal rate of return.

4.3. Product 3: Financial Mechanisms.

4.3.1. Mexico and international experiences. Report of experience with programs designed and/or implemented in Mexico or other countries on energy efficiency and/or distributed generation in public buildings, main expected/achieved results, lessons learned, and recommendations.

4.3.2. Financing alternatives. Report of the possible financing mechanisms, specifying sources of financing, guarantee, operational mechanics, revolving economic savings, terms and credit conditions.

4.3.3. Operational structure. Report on possible operational arrangements, including stakeholders, their functions and responsibilities, as well as governance and monitoring mechanisms.

4.3.4. Legal and regulatory framework. An analysis of the available technological options should be carried out, to integrate the best options and their related costs.

4.3.5. EE and DG Programme. Energy Efficiency and Distributed Generation Program in public buildings of CDMX, including goals, indicators, schedule, logistics and operational model, as well as a method for monitoring and evaluating results.

4.4. Product 4: EE and DG National Programme.

4.4.1 EE and DG potentials and measures. Analysis and estimation of energy efficiency and distributed generation potentials, and measures to be implemented at the federal, state, and municipal levels.

4.4.2 EE and DG National Programme, key elements. Report on the potential scope of a national Energy Efficiency and Distributed Generation program in public buildings, possible sources and financing mechanisms, stakeholders, scopes, and deadlines for implementing a pilot program and large-scale programs, with options for focusing on groups of facilities or energy efficiency technology and distributed generation.

4.5. Product 5: Workshops. Design a program of dissemination, coordination for implementation and training that includes the delivery of workshops with the key actors, at different levels, both managerial, operational and support, for the development and implementation of the program.

- 4.6. Reports must be in Spanish. Each must be submitted to the Bank in an electronic file. The report should include the cover page, the main document and all the annexes, as well as the data files that have been formed for the development of the corresponding analyses, which must clearly include the sources of information, sites from which they have been downloaded, dates of download, a description of the information or variables and any other information that provides a clear identification and understanding. (Zip files will not be accepted as final reports, due to Records Management Section regulations.)
- 4.7. All information, analysis, calculation files, databases, reports, etc. are part of this consultancy and property of the Bank, so the consulting firm must integrate and deliver complying with standards of structure and quality that allow its subsequent exploitation.

5. Monitoring and Coordination

- 5.1. The IDB will be responsible for coordinating the execution of this consultancy, as well as the approval of the products prepared by the consulting firm, prior approval and approval by the representatives of the CFE who participate, for this purpose recurring meetings must be scheduled in which the firm presents progress and critical activities. On behalf of the IDB, the technical coordination of this consultancy will be in charge of José Antonio Urteaga, Senior Specialist of the Energy Division (joseur@iadb.org)

6. Characteristics of the consultancy

- 6.1. Category and modality of consultancy: Hiring of Consulting Firm
- 6.2. Contract duration: 9 months
- 6.3. Workplace: Mexico City, Mexico

7. Ratings

- 7.1. The consultancy is expected to be carried out by a consulting firm or a consortium of national or international firms with specific expertise in:
- 7.1.1. Public policies on energy, in Mexico, 5 projects in the last 10 years.
 - 7.1.2. Analysis of the energy sector related to the project in Mexico at the local level (information, balances, modeling, tariffs)
 - 7.1.3. Mexico's electricity market and system, with emphasis on distribution, supply, sales, and demand
 - 7.1.4. Energy efficiency and energy efficiency projects
 - 7.1.5. Electric power generation, transmission, and distribution projects
 - 7.1.6. Planning of the national electricity sector
 - 7.1.7. Energy transition

8. Team must include at least:

- 8.1. a Project Leader who must have a minimum of 10 years of individual experience in management positions in the field of distributed generation, energy efficiency, planning or in the design and implementation of public policies on energy transition and / or energy efficiency.
- 8.2. an Energy Efficiency Expert, who must have a degree in science or engineering and a deep knowledge and experience of at least 5 years in energy efficiency policies and technology; in addition, must have experience working with public institutions.
- 8.3. an Expert in distributed generation, who must have a degree in science or engineering and a deep knowledge and experience of at least 5 years in distributed generation policies and technology; in addition, must have experience working with public institutions in Mexico.
- 8.4. a modeling expert, who must have a deep knowledge and experience of at least 5 years in the field of modeling of the energy sector.
- 8.5. an Energy Information Expert who must have a deep knowledge and experience of at least 5 years in the field of information in the energy sector.
- 8.6. a financial expert who must have a deep knowledge and experience of at least 5 years in economic and financial matters of energy projects.
- 8.7. a legal expert who must have a deep knowledge and experience of at least 5 years in the field of legislation in the energy sector and the education sector.
- 8.8. A support team on issues related to the activities and products described in these Terms of Reference to ensure the achievement of the objectives of the consultancy.

9. Payment Plan

Payment Plan	
Products	%
1. Product 1	20%
2. Product 2 and 3	50%
3. Product 4 and 5	30%
TOTAL	100%

10. Payment Method and Conditions of Employment

- 10.1. The method of payment will be determined according to the Bank's policies and procedures. For employment conditions, candidates should be citizens of an IDB member country.

Energy Efficiency, Distribute Generation and Solar Water Heating in Mexico City.

1. Background and Justification

- 1.1. THE IDB. Established in 1959, the Inter-American Development Bank is the main source of financing for economic, social and institutional development in Latin America and the Caribbean. It provides loans, grants, guarantees, policy advice and technical assistance to the public and private sectors of its borrowing countries.
- 1.1 Mexico City (CDMX) has the sixth place in electricity use of all states in the country with 5.7% of the total national use.
- 1.2 In number of users in CDMX has the second place with 3.37 million. It is also the state household users with 2.95 million; in both cases around 7% of the total nationally.
- 1.3 Improvement in Energy Efficiency (EE); the use of solar energy, through Distributed Generation (DG); and the installation of solar water heaters (SWH) in buildings is a crucial strategy for the development of sustainable and low-carbon infrastructure, and a key action to promote a strong, green, and inclusive economic recovery.³
- 1.4 Public buildings of CDMX, have significant potential for energy savings as well as DG.
- 1.5 What is established in the previous paragraph can be verified with the results of a study carried out by the Bank in 2019, at the request of the Ministry of Economic Development (SEDECO for its name in Spanish),⁴ which determined that 48% of electricity use can be supplied by DG; while with the installation of SWH, 38% of the use of LP Gas in CDMX could be avoided.
- 1.6 The results of this study estimate that DG could generate around 8,000 jobs and an investment of \$1.5 billion USD, while the installation of SWH would generate 31,000 jobs and \$5.9 billion USD.
- 1.7 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 for its name in Spanish), it is estimated that the replacement potential amounts to 1.3 million, which are the ones that register an age that justifies their replacement by high-efficiency one.
- 1.8 In 2022, the Bank supported SEDEMA, with a study to calculate the SWH potential in its residential sector. The results made it possible to identify the CDMX lag in their use in the residential sector, since it only reaches 6%, while, at the national level, it is 10%. The investment per household for its installation is recovered in 15.5 months considering the savings in expenses for LP Gas consumption.

³ 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.

⁴ Source: BID, <https://blogs.iadb.org/energia/es/la-energia-solar-el-potencial-de-la-ciudad-de-mexico/#:~:text=EI%20aprovechamiento%20de%20las%20energ%C3%ADas,a%20base%20de%20fuente%20solar.>

- 1.9 Based on the total number of homes in CDMX, considering only single-family homes, with piped water, and tile roofs, it is estimated that SWH can be installed in approximately 1.6 million homes.
- 1.10 CDMX's Environmental and Climate Change Programme includes as one of its 7 pillars Solar City, which has objectives to promote the efficient use of energy and the use of renewables in the public and private sector.
- 1.11 The five strategic actions of Solar City are: training of certified technicians in the installation of GD and SWH; financial support to micro, small and medium enterprises (SMEs) for the installation of DG and SWH; the strengthening of the CDMX Solar Environmental Standard to use SWH in residential and commercial buildings; promote DG in CDMX Government buildings; and the installation of a vegetable oil transformation plant to produce biodiesel.
- 1.12 CDMX in its Local Climate Change Action Strategy 2021-2050, in the CDMX Climate Action Programme 2021-2030, and in its mitigation commitments and targets, plans to reduce its Greenhouse gas (GHG) emissions by 10% by 2024, 24% by 2030, and 36% by 2050 from a 2016 baseline. While in its conditional targets and commitments it hopes to reach net zero by 2050.
- 1.13 To meet these goals, one of its 8 pillars is the Ciudad Solar initiative, which includes DG and SWH, as well as EE in public buildings, MSMEs, and the residential sector, by replacing inefficient refrigerators with high efficiency one.
- 1.14 The objective of this TC is to support the implementation of its Sustainable Energy Programme, as well as its Climate Action Strategy and Programme, particularly the Ciudad Solar initiative of the CDMX Government.
- 1.15 The specific objectives are: (i) develop a business model for the implementation of an EE and DG programme in public buildings in CDMX; (ii) define the scope of a national EE and DG programme in public buildings; and (iii) design an EE, DG and SWH programme for the residential sector in Mexico City, and a proposal for its implementation at the national level.

2. Objective

- 2.1 The objective of this TC is to support the implementation of its Sustainable Energy Programme, as well as its Climate Action Strategy and Programme, particularly the Ciudad Solar initiative of the CDMX Government, by designing an EE program, DG and SWH in residential sector of CDMX.
- 2.2 The specific objectives are: (i) calculate the potentials of EE, DG and SWH in the residential sector; (ii) evaluate and propose different financing mechanisms; (iii) propose the operational and logistic structure models for the implementation of the program; and (iv) propose the method for monitoring and evaluation of the results and indicators of the program.

3. Key Activities

- 3.1 Under the supervision of the team leader, the activities related to the products of this consultancy include, among others, the following:
- 3.2 Based on statistical information, studies conducted by the IDB, the Government of Mexico City, other Mexican institutions, as well as multilateral organizations and cooperation agencies, estimate the potential for improving energy efficiency (EE), distributed generation (DG), and solar water heating (SWH) in Mexico's residential sector, as well as the necessary investments and their profitability.
- 3.3 Based on the estimated investments, identify and conduct a comparative analysis of available financing mechanisms, indicating sources and financing conditions, including public-private partnership schemes.
- 3.4 Evaluate, comparatively, different operational and logistical models for the implementation of a large-scale program, which includes different packages of EE actions and measures.
- 3.5 For the operational structure, analyze the feasibility of implementing the program at the national or regional level, through existing institutions such as the Trust for Electrical Energy Saving, FIPATERM, as well as State Energy Agencies and Commissions.
- 3.6 Conduct a survey to confirm or adjust the values of savings potentials and investments, generated from statistical information, as well as measure the interest of residential users in participating in the program and the actions and measures of greatest interest. As part of the survey, the interest in different credit options will also be measured according to the identified financing mechanisms.
- 3.7 Design a pilot program to validate and make adjustments to the financial, operational, and logistical mechanisms, in order to have inputs for the formulation of a large-scale program.
- 3.8 Design and test a monitoring and evaluation method for the program's progress and results, as well as its co-benefits.
- 3.9 Evaluate EE potentials and measures, as well as the expected results of a national program for the installation of SWH and distributed generation systems in the residential sector.
- 3.10 Calculate the necessary investment to implement a national program, its profitability, sources of financing and financing mechanisms, operations and the program's costs.

4. Results and Expected Products

4.1. Output 1: Work plan and start-up workshop

- 4.1.1. **Work Plan.** The Work Plan is the document that must clearly and precisely describe the general and particular objective, the scope, the definition of the activities to be executed, the resources applied and the tasks of the consultancy, in addition to indicating the quality control mechanisms of the consultancy in general and of the products delivered, the instruments of communication between the parties. So, an exhaustive document is

expected, which in addition to being a descriptive document must present a Gantt chart for the control of times and a mental map or conceptual diagram of the consultancy that defines the understanding of this for its better planning, programming and execution.

4.1.2.Start-up workshop. A report of the activities, results and agreements of the start-up workshop with the participation of the different key actors required in the project.

4.2. Product 2: EE, DG and SWH for residential sector in CDMX. Design a sustainable energy programme for residential sector in CDMX.

4.3. Output 3: Establish the main components of EE, DG and SWH for residential sector. Define the scope and main components for a large-scale program at the national level.

4.4. Reports must be in Spanish. Each must be submitted to the Bank in an electronic file. The report should include the cover page, the main document and all the annexes, as well as the data files that have been formed for the development of the corresponding analyses, which must clearly include the sources of information, sites from which they have been downloaded, dates of download, a description of the information or variables and any other information that provides a clear identification and understanding. (Zip files will not be accepted as final reports, due to Records Management Section regulations.)

4.5. All information, analysis, calculation files, databases, reports, code, etc. are part of this consultancy so the consulting firm must integrate and deliver complying with structure and quality standards that allow its subsequent exploitation.

5. Monitoring and Coordination

5.1. The IDB will be responsible for coordinating the execution of this consultancy, as well as the approval of the products prepared by the consulting firm, prior approval and approval by the representatives of the CFE who participate, for this purpose recurring meetings must be scheduled in which the firm presents progress and critical activities. On behalf of the IDB, the technical coordination of this consultancy will be in charge of José Antonio Urteaga, Senior Specialist of the Energy Division (joseur@iadb.org)

6. Characteristics of the consultancy

6.1. Category and modality of consultancy: Hiring of Consulting Firm

6.2. Contract duration: 12 months

6.3. Workplace: Mexico City, Mexico

7. Ratings

7.1. The consultancy is expected to be carried out by a consulting firm or a consortium of national or international firms with specific expertise of at least 15 years of experience in the formulation,

programming, implementation, and implementation of computer platforms related to energy issues.

8. Team must include at least:

- 8.1.** a Project Leader who must have a minimum of 10 years of individual experience in in the formulation, programming, implementation, and implementation of computer platforms related to energy issues.

9. Payment Plan

Payment Plan	
Products	%
1. Product 1	20%
2. Products 2 and 3	60%
3. Products 4 and 5	20%
TOTAL	100%

10. Payment Method and Conditions of Employment

- 10.1.** The method of payment will be determined according to the Bank's policies and procedures. For employment conditions, candidates should be considered to be citizens of an IDB member country.