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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF

US\$400 MILLION

TO THE

ARGENTINE REPUBLIC

FOR THE

CLEAN ENERGY FOR VULNERABLE HOUSEHOLDS AND COMMUNITIES PROJECT

June 5, 2023

Energy & Extractives Global Practice
Latin America and Caribbean Region

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CURRENCY EQUIVALENTS

Exchange Rate Effective: May 2, 2023

Currency Unit = Argentine Pesos (AR\$)

AR\$1 = US\$0.0044

US\$1 = AR\$224.65

FISCAL YEAR

January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

| | |
|----------|---|
| CERC | Contingent Emergency Response Component |
| DA | Designated Account |
| DGPyPSyE | General-Directorate for Sectorial and Special Programs and Projects (<i>Dirección General de Programas y Proyectos Sectoriales y Especiales</i>) |
| EIRR | Economic Internal Rate of Return |
| ESA | Environmental and Social Assessment |
| ESCP | Environmental and Social Commitment Plan |
| ESF | Environmental and Social Framework |
| ESMP | Environmental and Social Management Plans |
| FM | Financial Management |
| GCRF | World Bank Group's Global Crisis Response Framework |
| GDP | Gross Domestic Product |
| GHG | Greenhouse Gas |
| GWh | Gigawatt-hour |
| IBRD | International Bank for Reconstruction and Development |
| IMF | International Monetary Fund |
| INTI | National Institute for Industrial Technology (<i>Instituto Nacional de Tecnología Industrial</i>) |
| MECON | Ministry of the Economy (<i>Ministerio de Economía</i>) |
| M&E | Monitoring and Evaluation |
| MWh | Megawatt-hour |
| NDC | Nationally Determined Contribution |
| NPV | Net Present Value |
| PCU | Project Coordination Unit |
| PDO | Project Development Objective |
| PEU | Provincial Execution Unit |
| PERMER | Argentina Renewable Energy Markets Project (<i>Proyecto de Energías Renovables en Mercados Rurales</i>) |
| PEST | Seasonal Price (<i>Precio Estacional de Energía</i>) |
| POM | Project Operational Manual |
| PPSD | Project Procurement Strategy for Development |
| RASE | National Registry to Access Energy Subsidies (<i>Registro de Acceso a los Subsidios a la Energía</i>) |
| SE | Secretariat of Energy (<i>Secretaría de Energía</i>) |



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DATASHEET

BASIC INFORMATION

| | | |
|--------------|--|--|
| Country(ies) | Project Name | |
| Argentina | Clean Energy for Vulnerable Households and Communities Project | |
| Project ID | Financing Instrument | Environmental and Social Risk Classification |
| P178553 | Investment Project Financing | Moderate |

Financing & Implementation Modalities

| | |
|---|--|
| <input type="checkbox"/> Multiphase Programmatic Approach (MPA) | <input type="checkbox"/> Contingent Emergency Response Component (CERC) |
| <input type="checkbox"/> Series of Projects (SOP) | <input type="checkbox"/> Fragile State(s) |
| <input type="checkbox"/> Performance-Based Conditions (PBCs) | <input type="checkbox"/> Small State(s) |
| <input type="checkbox"/> Financial Intermediaries (FI) | <input type="checkbox"/> Fragile within a non-fragile Country |
| <input type="checkbox"/> Project-Based Guarantee | <input type="checkbox"/> Conflict |
| <input type="checkbox"/> Deferred Drawdown | <input type="checkbox"/> Responding to Natural or Man-made Disaster |
| <input type="checkbox"/> Alternate Procurement Arrangements (APA) | <input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS) |

| | |
|------------------------|-----------------------|
| Expected Approval Date | Expected Closing Date |
| 17-May-2023 | 30-Jun-2029 |
| Bank/IFC Collaboration | |
| No | |

Proposed Development Objective(s)

The objective of the Project is to increase energy access and energy efficiency in vulnerable households and communities and to respond promptly and effectively in case of an Eligible Crisis or Emergency.

**Components**

| Component Name | Cost (US\$, millions) |
|--|-----------------------|
| Component 1: Increase energy access in vulnerable households and communities | 223.00 |
| Component 2: Increase energy efficiency in vulnerable households and communities | 210.00 |
| Component 3: Project management and support for policymaking | 14.00 |
| Component 4: Contingent Emergency Response Component | 0.00 |

Organizations

| | |
|----------------------|-----------------------|
| Borrower: | Argentine Republic |
| Implementing Agency: | Secretariat of Energy |

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

| | |
|--------------------|--------|
| Total Project Cost | 448.00 |
| Total Financing | 448.00 |
| of which IBRD/IDA | 400.00 |
| Financing Gap | 0.00 |

DETAILS**World Bank Group Financing**

| | |
|--|--------|
| International Bank for Reconstruction and Development (IBRD) | 400.00 |
|--|--------|

Non-World Bank Group Financing

| | |
|---|-------|
| Counterpart Funding | 48.00 |
| Borrower/Recipient | 1.00 |
| Local Govts. (Prov., District, City) of Borrowing Country | 14.00 |
| Local Beneficiaries | 33.00 |

**Expected Disbursements (in US\$, Millions)**

| WB Fiscal Year | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|----------------|------|-------|-------|--------|--------|--------|--------|--------|
| Annual | 1.00 | 25.40 | 59.20 | 69.50 | 90.10 | 100.40 | 50.20 | 4.20 |
| Cumulative | 1.00 | 26.40 | 85.60 | 155.10 | 245.20 | 345.60 | 395.80 | 400.00 |

INSTITUTIONAL DATA**Practice Area (Lead)**

Energy & Extractives

Contributing Practice Areas**Climate Change and Disaster Screening**

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

| Risk Category | Rating |
|---|---------------|
| 1. Political and Governance | ● Substantial |
| 2. Macroeconomic | ● High |
| 3. Sector Strategies and Policies | ● Moderate |
| 4. Technical Design of Project or Program | ● Low |
| 5. Institutional Capacity for Implementation and Sustainability | ● Substantial |
| 6. Fiduciary | ● Moderate |
| 7. Environment and Social | ● Moderate |
| 8. Stakeholders | ● Moderate |
| 9. Other | |
| 10. Overall | ● Substantial |



COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

☐ Yes ☒ No

Does the project require any waivers of Bank policies?

☐ Yes ☒ No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

| E & S Standards | Relevance |
|---|------------------------|
| Assessment and Management of Environmental and Social Risks and Impacts | Relevant |
| Stakeholder Engagement and Information Disclosure | Relevant |
| Labor and Working Conditions | Relevant |
| Resource Efficiency and Pollution Prevention and Management | Relevant |
| Community Health and Safety | Relevant |
| Land Acquisition, Restrictions on Land Use and Involuntary Resettlement | Relevant |
| Biodiversity Conservation and Sustainable Management of Living Natural Resources | Relevant |
| Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities | Relevant |
| Cultural Heritage | Relevant |
| Financial Intermediaries | Not Currently Relevant |

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

Section I. A. Institutional Arrangements



The Borrower, through SE, shall vest the overall responsibility for the implementation, monitoring, and supervision of the Project, including the following points:

- (a) maintain, throughout Project implementation, a Project Coordination Unit (“PCU”) with structure, functions, and responsibilities acceptable to the Bank as set forth in the Project Operational Manual, including inter alia, the responsibility of the PCU to implement, monitor and supervise the carrying out of the Project;
- (b) ensure that the PCU is, throughout Project implementation: (i) headed by a Project coordinator and staffed with adequate professional, fiduciary, administrative, and technical personnel (including social and environmental specialists), all with qualifications, experience, and terms of reference acceptable to the Bank, as set forth in the Project Operational Manual; and (ii) supported by DGPyPSyE with the carrying out of the fiduciary activities under the Project, as set forth in the Project Operational Manual; and
- (c) cause the Participating Provinces, through the respective Participation Agreements, to operate and maintain throughout the execution of the Project, provincial implementation units (“PEUs”), with functions and responsibilities acceptable to both the Borrower, through SE, and the Bank and with staff in number and with qualifications and experience acceptable to both the Borrower, through SE, and the Bank.

Sections and Description

Section I. C. Participation Agreements

1. For purposes of carrying out any given Subproject under Part 1 of the Project, the Borrower, through SE, shall enter into an agreement (“Participation Agreement”) with the corresponding Participating Province (or, if applicable, amend the existing Participation Agreement with such Participating Province), all under terms and conditions acceptable to the Bank, which shall include, inter alia, the obligation of each Participating Province:
 - (a) to assist the Borrower, through SE, in the carrying out of the pertinent Subproject in accordance with the pertinent provisions of this Agreement, including technical, financial, administrative, environmental, and fiduciary standards acceptable to the Bank;
 - (b) to provide the counterpart funds, facilities, services, and other resources necessary or appropriate to carry out the corresponding Subproject;
 - (c) to comply with the provisions of the POM, the Anti-Corruption Guidelines, and the ESCP, as applicable;
 - (d) to take or permit to be taken all action to enable the Borrower, through SE, to comply with its obligations referred to in this Agreement, as applicable to the carrying out of the pertinent Subproject;
 - (e) immediately upon the installation of the corresponding goods or the completion of the corresponding works under a Subproject (as determined by the Borrower, through SE, and verified by the Participating Province and/or the Qualified Service Provider, as the case may be, in accordance with the provisions of the POM): (i) to operate and maintain (including, if applicable, replacement of the installed goods under such Subproject) the same in accordance with the pertinent provisions of this Agreement and the POM; or (ii) to enter into an agreement with a Qualified Service Provider (“Operation, Maintenance and Replacement Agreement”), or amend the existing Operation, Maintenance and Replacement Agreement, all under terms and conditions acceptable to the Bank, which shall include, inter alia: (A) the obligation of the Qualified Service Provider to immediately upon the



installation of the corresponding goods under a Subproject (as determined by the Borrower, through SE, and verified by the Qualified Service Provider in accordance with the provisions of the POM) operate and maintain (including, if applicable, replacement of the installed goods under a Subproject) the same in accordance with the provisions of the respective Participation Agreement, the ESCP and the POM all in a manner acceptable to the Bank; and (B) the right of the Participating Province to take remedial actions against the Qualified Service Provider in case such Qualified Service Provider shall have failed to comply with any of its obligations under the corresponding Operation, Maintenance and Replacement Agreement;

(f) to operate and maintain during Project implementation, the pertinent PEU, with functions and responsibilities acceptable to both the Borrower, through SE, and the Bank and with staff in number and with qualifications and experience acceptable to both the Borrower, through SE, and the Bank; and

(g) not to assign, amend, terminate, abrogate, repeal, waive, or fail to enforce the Participation Agreement or any provision thereof unless previously agreed by the Borrower, through SE, and the Bank.

2. The Borrower, through SE, shall exercise its rights and carry out its obligations under any Participation Agreement in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Loan. Except as the Bank shall otherwise agree, the Borrower, through SE, shall not assign, amend, terminate, abrogate, waive, or fail to enforce any Participation Agreement or any of its provisions.

Sections and Description

Section I.D. Retailer Agreements

For the purposes of implementing Part 2(a) of the Project, the Borrower, through SE, shall:

(a) identify, appraise, and select the Selected Beneficiaries in accordance with the provisions of the POM; and provide thereafter the Vouchers to the Selected Beneficiaries once such Selected Beneficiaries have complied with the requirements set forth in the POM; and

(b) identify, appraise, and select the Eligible Retailers in accordance with the provisions of the POM; and enter thereafter into an agreement with the selected Eligible Retailer, under terms and conditions set forth in the POM ("Retailer Agreement"), which shall include, inter alia:

(A) the right of the Borrower, through SE, to take remedial actions against the pertinent Eligible Retailer in the case such Eligible Retailer shall have failed to comply with any of its obligations under the pertinent Retailer Agreement;

(B) the obligation of the Eligible Retailers to:

(1) provide the information on the Eligible Appliances (and prices) to be offered to the Selected Beneficiaries under the Project, such Eligible Appliances to be determined in accordance with the provisions of the POM and the ESCP;

(2) establish the appropriate operating and logistic procedures for the delivery of the Eligible Appliances to the selected logistics operators, which in turn shall deliver the Eligible Appliances to the Selected Beneficiaries in accordance with the provisions of the POM and the ESCP;



(3) establish the appropriate procedures for monitoring, reporting, and evaluating the replacement activities to be carried out under this Agreement; and

(4) take or permit to be taken all action to enable the Borrower, through SE, to comply with its obligations referred to in this Agreement, including providing any information related to the replacement activities and allowing visits to the Eligible Retailer's stores.

Conditions

| | | |
|-----------------------|------------------------------|---|
| Type Effectiveness | Financing source IBRD/IDA | Description The Borrower, through SE, has adopted the Project Operational Manual (POM) in form and substance acceptable to the Bank. |
| Type Effectiveness | Financing source IBRD/IDA | Description The Borrower, through SE, has prepared, consulted, and adopted the Environmental and Social Instruments, all in form and substance acceptable to the Bank. |



I. STRATEGIC CONTEXT

A. Country Context

1. **With a gross domestic product (GDP) of US\$614 billion, Argentina was the third-largest economy in Latin America in 2022.** The country has 2.8 million square kilometers, and its population of about 46 million inhabitants¹ is highly urbanized, with 92 percent living in cities. The Buenos Aires Metropolitan Area alone constitutes 33 percent of the national population and generates more than 40 percent of Argentina's GDP. Argentina is a federal state. Hence, its 23 provinces and the Autonomous City of Buenos Aires preserve their autonomy under the national government.
2. **The middle class has historically been large and strong, with social indicators generally above the regional average; however, persistent social inequalities, economic volatility, and underinvestment have limited the country's development.** The rate of urban poverty reached 39.2 percent in the second semester of 2022, and 8.1 percent of Argentines live in extreme poverty. Childhood poverty, for those under 15 years old, is at 54.2 percent. The high frequency of economic crises in recent decades—the economy has been in recession during 21 of the past 50 years—has resulted in an average annual growth rate of 1.8 percent, well below the world average of 3.6 percent and the region average of 3.2 percent. Decades of underinvestment have led to sizeable gaps in capital stock relative to comparable countries, although capital spending as a percentage of GDP has improved in recent years. Such volatile macroeconomic environment has hindered the country's ability to reduce poverty rates and infrastructure deficit and increase incomes.
3. **The economy recovered from the Coronavirus Disease (COVID) crisis at a fast pace, reaching pre-pandemic activity levels by mid-2021.** Argentina's economy grew by 10.4 percent in 2021 and 5.2 percent in 2022, the largest increase in GDP since the 2010-2011 biennium, after the global financial crisis. Higher commodity prices and trading partners' growth, notably Brazil's, combined with public investment led to a robust growth recovery in 2021 and the beginning of 2022. However, since 2022 increasing macro imbalances and a more turbulent global context, started to slow down the pace of GDP growth. The Government of Argentina has concluded the process of restructuring its debt in foreign currency (both local and external) with private creditors, significantly improving the maturity profile for the next five to eight years.
4. **Climate change poses additional threats to Argentina's recovery and exacerbates existing climate vulnerabilities.** Average annual temperatures are expected to increase – by 1.5°C by mid-century – together with country-wide annual average precipitation and high variability. As the climate changes, weather-related disasters, such as floods, droughts, and heat waves, are likely to increase in frequency and intensity,² posing additional threats to vulnerable populations, reducing their ability to address them, and impacting the government's capacity to deliver public services. Climate change will particularly affect the Argentinian energy sector and its climate resilience, as higher temperatures and extreme weather events will impact power generation, especially clean energy sources such as hydro, solar and wind.³ Higher demand resulting from economic growth, industrial expansion, urbanization, and population growth, will also challenge existing power supply systems. Extreme temperatures and weather events will add further complexities due to an overload of demand and could lead to

¹ <https://www.censo.gob.ar>

² The World Bank Group, Climate Risk Profile: Argentina, 2021.

³ The World Bank Group; OLADE, *Evaluación del Impacto del Cambio Climático en la Generación Eléctrica en los Países del Cono Sur*, 2022.



service disruptions and failures to satisfy the energy demand of the most vulnerable populations. Key investments in both energy efficiency and supply for lower income households and communities will need to be scaled up to reduce and satisfy the growing demand and Argentina's development needs.

5. **In March 2022, Argentine authorities reached an agreement with the International Monetary Fund (IMF), on an Extended Fund Facility (EFF) program for a period of 30 months and an amount of US\$45 billion, to address the economy's macroeconomic imbalances and set the basis for sustainable growth.** This amount covers the remaining obligations under the 2018 SBA (US\$40.5 billion) and provided a small net financing support for reserves accumulation (US\$4.5 billion). The program sets a gradual fiscal consolidation path toward a zero primary deficit in 2025 (from 3 percent in 2021 to 2.5 percent of GDP in 2022, 1.9 percent in 2023, and 0.9 percent in 2024), a reduction of monetary financing of the deficit (eliminated by 2024), and the framework for monetary policy involving positive real interest rates, as part of a strategy to fight inflation. A staff-level agreement on the fourth review under Argentina's 30-month EFF arrangement was approved by the IMF Executive Board in March 2023, granting Argentina access to about US\$5.3 billion (SDR 4.0 billion).

6. **Despite meeting all the performance criteria under the IMF EFF by end-2022, Argentina's macro-fiscal situation remains challenging.** According to the IMF statement, prudent macroeconomic management in the second half of 2022 supported stability and helped secure program targets through end-2022 with some margin. Nevertheless, capital controls and deficit monetization continue to cause a large gap between the official and parallel exchange rates and limit foreign reserve accumulation. Inflation accelerated to historically high levels (102 percent year-over-year, as of February 2023), denting purchasing power. While fiscal targets have been met so far, a still sizable fiscal deficit continues to put pressure on monetary policy, given limited access to capital markets. A severe drought is expected to strongly affect agricultural production in 2023, reducing exports and fiscal revenues while limiting the capacity of the Central Bank to accumulate international reserves.

7. **In this context, the government is increasing efforts towards a gradual macroeconomic stabilization program that contains a broad set of economic policies.** To reduce the monetary financing of the fiscal deficit and the associated persistent and high inflation, the government has adopted measures to reduce the cost of subsidies and improve their targeting, especially in the costly energy sector. In addition, it is taking steps to improve the ability of the customs administration to supervise and control the over invoicing of trade and other related distortions. In addition to addressing the urgent need for reserve accumulation, these measures should help pave the way for the eventual easing of foreign exchange controls.

B. Sectoral and Institutional Context

8. **Despite being an upper middle-income economy⁴ with a developed electricity sector and power market, Argentina still has a significant share of vulnerable populations lacking access to modern energy services.** The country's total electricity demand is driven by the residential sector, which accounts for 46 percent of power consumption. Although increasing clean energy generation, fossil fuels still account for close to 60 percent of the total power supply. Considerable number of vulnerable households and communities still lack access to high-quality, clean, and modern energy services and would greatly benefit from increased energy access and energy efficiency. The lack of access to modern energy services impacts health, hygiene, education, and communications, as well as livelihoods and productivity. In the rural areas there are roughly 160 thousand households not yet connected to the grid, of which 100 thousand still lack access to electricity while the rest rely

⁴ <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>



on intermittent and unreliable power sources.⁵ Within this group, the indigenous population is particularly vulnerable as over a third lack access to the power grid and close to a fifth lives in rural areas. The rural population without connection to the electricity grid has a higher vulnerability index, and close to 40 percent of the households suffer Unsatisfied Basic Needs (NBI).⁶ At the same time, about four percent of all urban households are eligible for a highly subsidized wholesale electricity price and own an old and inefficient refrigerator.

9. **Lower-income households in Argentina devote over 10 percent of their income to energy expenditures.**⁷ Yet, high-income households consume roughly twice as much energy as vulnerable ones.⁸ Median energy expenditures represent over four percent of households total income in Argentina.⁹ Overall, electricity use is responsible for over 60 percent of energy expenditures in households. This reliance on electricity services is particularly pronounced in households led by women, headed by people below 25 or over 65 years of age, and led by individuals with low educational attainment.¹⁰

10. **Households led by women are disproportionately vulnerable and have less access to energy services.** Most households in the lower-income quintile are led by women and consume – on average – 10 percent less energy than those led by men.¹¹ Gender gaps in energy access and unpaid care work disproportionately affect women. According to studies commissioned by the World Bank, the provision of water, firewood, other energy sources, and animal care are most often the responsibility of women within the family. In Argentina, women spend an average of 6 hours and 7 minutes daily on unpaid domestic and care work, while men spend only 3 hours and 30 minutes. The presence of children under 6 years old increases this gap. Rural women work 14 more hours per week than men. COVID has exacerbated this disparity, as women's unpaid care tasks and agricultural work increased. At the same time, the lack of appropriate food preservation negatively affects family's food consumption and the potential diversification of productive activities and manufacturing. Lack of access to good quality electricity service also hampers educational and employment opportunities and participation in community affairs. Analyses also show that women value and acquire green products more and are more likely to change their behavior in favor of more efficient and sustainable solutions.¹²

11. **Argentina is close to achieving basic universal access to electricity, but dispersed rural, vulnerable households and communities still lack a high-quality energy provision.** The isolated and rural electricity sector has been reducing its reliance on fossil fuels thanks to, among others, initiatives such as the two successive Argentina Renewable Energy Projects for Rural Areas¹³ and the National Program for Electricity Inclusion (*Programa de Inclusión Eléctrica Nacional*, PROINEN). These initiatives reduce the use of diesel and emissions in

⁵ Cowan Ros & Alba, *Población sin cobertura eléctrica básica en Argentina – Principales características demográficas y socioeconómicas*, January 2023.

⁶ According to INDEC, households with Unsatisfied Basic Needs (IBN) are those that present at least one of the following deprivations: i. quality or sufficiency of housing; ii. sanitary conditions; iii. overcrowding; iv. school attendance; v. subsistence capacity (INDEC, 2012).

⁷ Bonfils & Reibel, *Estudio de los patrones de consumo energético de los hogares: Una alternativa para focalizar las medidas de eficiencia energética*, 2022, p. 118.

⁸ *Ibíd.*, p. 69.

⁹ *Ibíd.*, p. 116.

¹⁰ *Ibíd.*, p. 144.

¹¹ *Ibíd.*

¹² International Energy Agency, *Tracking gender and the clean energy transition*, 2018, available online at: <https://www.iea.org/articles/tracking-gender-and-the-clean-energy-transition>.

¹³ PERMER I: Proyecto de Energías Renovables en Mercados Rurales I (Argentina Renewable Energy Markets Project, P006043 and P045048 – grant); and PERMER II: Proyecto de Energías Renovables en Mercados Rurales II (Argentina Renewable Energy Project for Rural Areas, P133288).



isolated and vulnerable communities, and enhance the quality of services, inclusion, and gender-related improvements. Expanding these programs would contribute to the provision of clean energy to households in vulnerable and isolated communities or dispersed areas that still only have a partial, inadequate, and inefficient service.¹⁴

12. **Households with access to energy services have a sizable impact on Argentina's energy sector. In 2021, the residential sector represented over one-quarter of total final energy consumption, slightly below the transport and ahead of the industrial sectors.**¹⁵ Energy sources at the urban residential level vary by province and climate, but roughly 60 percent of total final energy consumption is fueled by gas distribution networks, followed by electricity (around 30 percent) and liquified gas (roughly 10 percent); wood, coal, and kerosene share the remaining 2 percent¹⁶. On average, urban energy consumption at the residential level is driven by space heating (48 percent of total energy consumption), water heating (21 percent), and cooking (15 percent). Food conservation represents another five percent and is the main electricity use (the previously categories rely mostly on gas).¹⁷ In the rural and dispersed and unserved or underserved context, households rely on wood combustion for cooking and heating, kerosene or diesel-fueled appliances, batteries for flashlights and radios, bottled gas and, to a lesser extent, solar heaters and cookers, candles, and combustion of dry guano.¹⁸ Energy consumption trends are greatly influenced by regional and climate characteristics, as roughly three-quarters of Argentina's households are in temperate climates, around a fifth in warm and the remaining in cold climates.¹⁹ Household's energy consumption in cooler climates can reach close to four tons of oil equivalent per year, but less than one in households in warm climates.²⁰

13. **Food conservation appliances (freezer refrigerators, refrigerators, and freezers) represent the largest share of electricity consumption in households across the country.** In lower income households, food conservation represents over a quarter of electricity use.²¹ Refrigerators are the most common appliance in households as over 98 percent in total and 80 percent own one in rural areas, and 86 percent own the most common freezer-refrigerators.²² Even at the lowest income quintile, over three-quarters of households own a refrigerator.²³ "A" labelled refrigerators consume around 330 kWh per year and "A+" labelled use roughly 250 kWh.²⁴ According to recent estimates, refrigerators between 11 and 20 years old can use 850 kWh per year on average and older equipment can consume 900 kWh per year on average. Only a quarter of food conservation appliances are less than five years old and close to a third of all food conservation equipment in Argentinian households are over 10 years of age.²⁵ About 75 percent of households either ignore the energy efficiency label

¹⁴ Romero, Ramos & Harari.

¹⁵ Secretaría de Energía, *Balance Energético Nacional de la República Argentina*, 2021, available online at: <https://www.argentina.gob.ar/economia/energia/hidrocarburos/balances-energeticos>.

¹⁶ Secretaría de Energía, *Balance Energético Nacional de la República Argentina*.

¹⁷ Bonfils & Reibel, p. 36.

¹⁸ Cowan Ros & Alba, *Población sin cobertura eléctrica básica en Argentina – Principales características demográficas y socioeconómicas*, January 2023.

¹⁹ *Ibíd.*, p. 64.

²⁰ *Ibíd.*, p. 65.

²¹ Instituto Nacional de Estadística y Censos, *Modelo de Demanda de Energía Residencial*, 2022.

²² Bonfils & Reibel, p. 91.

²³ *Ibíd.*, p. 94.

²⁴ GFA Consulting Group, *Informe Final: Propuesta del Plan Nacional de Eficiencia Energética Argentina*, 2021, available online at: https://eficienciaenergetica.net.ar/img_publicaciones/09011503_PropuestaPlaNEEAR.pdf.

²⁵ Bonfils & Reibel, p. 154.



of their equipment (50 percent) or these lack one (25 percent).²⁶ Only five percent of food conservation appliances are labelled “A+” and 13 percent “A”.²⁷ Roughly one-third of low-income households own equipment of 10 years or older,²⁸ and overall, vulnerable households are more likely to have older and less efficient equipment.²⁹

14. **Community centers, such as *clubes de barrio y pueblo*, community kitchens and playrooms, public libraries, play a key role across Argentina in supporting vulnerable population.** These community centers gather citizens of any gender and age and offer nourishment, shelter, and social or recreational activities, especially targeting socially vulnerable children and teenagers. Given their importance to vulnerable populations, the government assures lower tariffs, particularly for electricity.³⁰ As these centers frequently have inefficient electricity consumption, this exerts additional pressure on both their own and the government finances.

15. ***Clubes de barrio y pueblo* (sports-oriented community centers) in particular have an enormous potential to optimize energy use³¹ and reduce electricity consumption, as their tariffs are heavily subsidized.** In October 2022, the Government announced additional national-level subsidies for such institutions, with a target to reach over eight thousand *clubes*. So far, six thousand *clubes* are registered in a database of the Secretariat of Sports of the Ministry of Tourism and Sports some of which would obtain access to preferential rates for electricity and gas provision.³² These increased subsidies underline the need for more efficient use of energy at these facilities.³³ Half of the electricity costs arise from inefficient lighting fixtures and replacing them is key to reduce consumption and financial savings.³⁴

16. **In mid-2022, the government started revising tariff structures to better target subsidies to poor and vulnerable groups, reducing the number of beneficiaries and fiscal impact, and moving towards a more sustainable system.** Electricity subsidies cover the gap between electricity generation costs and the wholesale market operator’s – the Management Company of the Wholesale Electricity Market Limited Company (CAMMESA)³⁵ – seasonal price (PEST), which for the last few years, has consistently been set below the total cost of energy. In 2021, the average PEST only covered 37 percent of generation costs and resulted in a subsidy of US\$46 per megawatt-hour (MWh).³⁶ As tariffs for transmission and distribution are also set below economic costs, entities in these subsectors are cross-subsidizing consumers. By end of 2022, energy (mostly electricity) subsidies had reached 1.9 percent of GDP or over US\$11 billion. To reduce such subsidies, the Government announced in June 2022 a new segmentation of consumers into low, medium, and high-income categories, creating a national registry to access energy subsidies (*Registro de Acceso a los Subsidios a la Energía*, RASE), and stating their gradual reduction for high-income and commercial users. The overall strategy also seeks to increase energy supply and

²⁶ *Ibíd.*, p. 156.

²⁷ *Ibíd.*, p. 154.

²⁸ Instituto Nacional de Estadística y Censos, *Encuesta Nacional de Gastos de los Hogares*.

²⁹ Bonfils & Reibel, p. 150.

³⁰ Being classified as Level 2 in the electricity tariffs segmentation, as explained below.

³¹ Cohendoz, Informe Final Proyecto Clubes Sustentables, 2021.

³² Secretaría de Deportes, *Clubes Argentinos*, available online at: <https://clubesargentinos.deportes.gob.ar/>.

³³ Secretaría de Energía, *Subsidio a la energía para clubes de barrio en todo el país*, available online at: <https://www.argentina.gob.ar/noticias/subsidio-la-energia-para-clubes-de-barrio-en-todo-el-pais>

³⁴ Cohendoz.

³⁵ A public-private entity owned by the market agents (80 percent) and the State (20 percent).

³⁶ CAMMESA, *Informe Mensual Enero*. By the end of 2021, the seasonal price was US \$26.52 per MWh, and the monomic price US \$72.11 MWh.



investments to reduce prices, design new tariffs for residential users to further improve subsidy segmentation; and increase the seasonal price for residential and non-residential customers.

17. **As one of the early signatories of the Paris Climate Agreement, Argentina has committed to achieving ambitious emission reduction targets since its first Nationally Determined Contribution (NDC) back in 2016.** The country has continuously updated and upgraded the ambition of its NDCs and during the 2021 Leaders' Summit on Climate, the country announced its new goal of limiting emissions to 349 MtCOeq by 2030. The latter target represents an increase in ambition of roughly 28 percent since the first commitment announced in the 2016 NDC.³⁷ The energy sector alone represents over half of total Greenhouse Gas (GHG) emissions in the country;³⁸ power generation accounts for 13.1 percent of total emissions and the use of fuels at the residential level is another 7.4 percent; overall, energy use at the residential level representing close to 15 percent of total GHG emissions in the country.³⁹ The sector's share of total emissions – and its net emissions have consistently increased since 1990, driven mostly by an increase in emissions of power generation and residential fuel use.⁴⁰

18. **The country is also committed to expanding clean energy and distributed energy generation in the short and medium term.**⁴¹ Supported by the frameworks created by Laws 27.191⁴² and 27.424⁴³, Argentina has also set the goals of reaching 20 percent of power consumption from renewable sources by 2025 and 1,000 MW of distributed generation by 2030.⁴⁴ The country is also seeking to reduce energy demand by eight percent – compared to business as usual – by 2030.⁴⁵ To achieve this target, the government has developed or planned programs to replace high electricity-consumption household equipment such as solar heaters (CAFEST) and refrigerators and washing machines (RENOVATE),⁴⁶ by more energy efficient appliances through labelling programs^{47, 48} and minimum energy performance standards (MEPS)^{49,50}. Furthermore, the 2019 energy and climate change action plan (*Plan de Acción Nacional de Energía y Cambio Climático*, PANECC) also includes the

³⁷ Presidencia, *Actualización de la meta de emisiones netas de Argentina al 2030*, 2021, available online at: <https://unfccc.int/sites/default/files/NDC/2022-05/Actualizacio%CC%81n%20meta%20de%20emisiones%202030.pdf>

³⁸ Secretaría de Ambiente y Desarrollo Sustentable, *Inventario Nacional de Gases de Efecto Invernadero*, 2019, available online at: https://www.argentina.gob.ar/sites/default/files/inventario_de_gei_de_2019_de_la_republica_argentina.pdf.

³⁹ Secretaría de Ambiente y Desarrollo Sustentable.

⁴⁰ *Ibíd.*

⁴¹ Subsecretaría de Energías Renovables y Eficiencia Energética, *Principales programas y líneas de trabajo*, 2019, available online at: https://www.argentina.gob.ar/sites/default/files/oct2019_brochureseryee.esp_.pdf.

⁴² Información Legislativa, *Ley 27.191: Régimen de Fomento Nacional para el uso de Fuentes Renovables de Energía destinada a la Producción de Energía Eléctrica*, 2015, available online at: <http://servicios.infoleg.gob.ar/infolegInternet/verNorma.do?id=253626>.

⁴³ Información Legislativa, *Ley 27.424: Régimen de Fomento a la Generación Distribuida de Energía Renovable Integrada a la Red Eléctrica Pública*, 2017, available online at: <http://servicios.infoleg.gob.ar/infolegInternet/verNorma.do?id=305179>.

⁴⁴ As set by the Subsecretaría de Energías Renovables y Eficiencia Energética and Supported by the frameworks created by Laws 27.191 and 27.424.

⁴⁵ Subsecretaría de Energías Renovables y Eficiencia Energética, *Principales programas y líneas de trabajo*, 2019, available online at: https://www.argentina.gob.ar/sites/default/files/oct2019_brochureseryee.esp_.pdf.

⁴⁶ *Ibíd.*

⁴⁷ The energy efficiency labelling system includes seven levels developed with the national standards entity (Instituto Argentino de Normalización y Certificación, IRAM), identifiable by color bars and capital letters: from "A" and green to denote most efficient equipment, to red and "G" for the least efficient ones.

⁴⁸ Romero, Ramos & Harari.

⁴⁹ The so-called IRAM standards also include MEPS for refrigerators.

⁵⁰ Secretaría de Energía, *La Etiqueta*, available online at: <https://www.minem.gob.ar/www/835/26781/programa-de-etiquetado%20-%20~:text=La%20etiqueta&text=En%20Argentina%20tenemos%20hasta%20siete,G%20para%20los%20menos%20eficientes>.



objective to ensure that at least 70 percent of appliances are labelled “A+”⁵¹ or higher by 2030.^{52, 53} It is estimated that low-cost interventions such as labelling and MEPS can provide savings of up to 15 percent in total electricity consumption per year.⁵⁴ Furthermore, Argentina has been a leader in complying with the Montreal Protocol and over the last 20 years, including a number of successful World Bank operations, has reduced the use of Ozone-Depleting Substances and phased out their use in production processes, such as refrigerator manufacturing.⁵⁵

19. **Increasing access to energy services and mini-grids⁵⁶ and providing high-quality service have important economic and development impacts, and improve the quality of life of the most isolated and vulnerable Argentinians.** Implementing energy service and access measures in vulnerable and dispersed communities would result in multiple social and development benefits, such as improving the living conditions of the poorest, contributing to economic growth, improving the quality and access to social services, increasing resilience to climate change, and improving overall quality of life. Introducing mini-grids that provide high-quality and uninterrupted electricity services for the most underserved and remote households, as well as energy services for productive use will generate a strong development impact. Replacing diesel and other fossil fuels with clean energy sources will also reduce air pollution and associated environment and health impacts and increase energy security by reducing dependence on fossil fuels. Adapting dispersed energy infrastructure to extreme weather events to ensure a continuous service would also reduce poorest communities’ climate vulnerability and support the adaptation of drivers of economic growth to climate change.

20. **Replacing appliances with a relatively large impact on electricity consumption – particularly in vulnerable households – could have significant positive effects.** The replacement of refrigerations will improve the livelihoods of the poor, as these appliances account for the largest share of energy consumption in vulnerable households in Argentina. Beyond the energy and associated cost savings, the replacement will also provide additional environmental benefits as old refrigerators still using ozone depleting substances are taken out of use and properly scrapped. Interventions would also help reduce Argentina’s vulnerability to climate change by reducing the potential impact of extreme weather events on energy infrastructure. Furthermore, the interventions at centers such as *clubes* would also seek to be adapted to extreme weather events to increase their climate resilience and ensure these community centers adapt to and their operations are not imperiled by climate change. Overall, both activities would help Argentina mitigate and adapt to climate change.

21. **Energy investments can also help Argentina address a wide variety of social and development challenges.** In terms of job creation, studies show that energy efficiency interventions have the largest positive

⁵¹ The “A” label can also be subdivided (into A+, A++ or A+++ categories) as newer, more efficient appliances are introduced. The labels not only provide information about energy use but also include information on the size of the respective food conservation appliance.

⁵² Romero, Ramos & Harari.

⁵³ Romero, Ramos & Harari.

⁵⁴ International Energy Agency, Achievements of Energy Efficiency Appliance and Equipment Standards and Labelling Programmes: A global assessment, 2021, available online at: <https://www.iea.org/reports/achievements-of-energy-efficiency-appliance-and-equipment-standards-and-labelling-programmes>

⁵⁵ For further details, see the Montreal Protocol Hydrochlorofluorocarbons (HCFC) Phase-out Project (P129397), available online at : <https://documents1.worldbank.org/curated/en/138001546546424758/pdf/icr00004626-12282018-636818904078924831.pdf>.

⁵⁶ “Mini-grids are localized power networks without infrastructure to transmit electricity beyond their service area [...and...] tend to rely on modular generation technologies like solar PV, wind turbines, small-scale hydropower, and diesel generators,” while “stand-alone systems [...] are not connected to a grid and typically power single households. These and further details on levelized costs, technologies and other issues can be found at: International Energy Agency, Defining energy access, 2020, available online at: <https://www.iea.org/articles/defining-energy-access-2020-methodology>.



impact among energy sector activities.⁵⁷ As labor-intensive sectors, energy efficiency and solar PV interventions can be key to unlocking Argentina's sustainable recovery and growth while reducing the need for further capacity expansions, freeing-up additional financing. Investments in other clean energy-related areas, such as new and existing grids can further expand these positive outcomes.⁵⁸ Recent assessments of potential energy use measures in Argentina show that replacing inefficient refrigerators could create up to sixteen thousand jobs while distributed generation investments could result in twelve thousand new posts.⁵⁹

22. **Accompanying all these measures with improved capacities and enhanced knowledge would scale-up impact.** Detailed information and evidence for policymaking would further leverage the proposed Project's clean energy investments and ongoing technical assistance activities with Argentina. Working towards achieving the promises of a clean energy transition that helps deliver improved services, sustainability, and a path to further economic recovery calls for ad-hoc, just-in-time advice. And as the administration has acknowledged, the international context calls for enhancing energy security⁶⁰. The above-mentioned interventions align with such a government as improving energy use, reducing fossil fuels consumption, increasing security and reducing the negative impacts on the most vulnerable households and communities most exposed to inflation.

23. **Argentina is counting on the World Bank's support to increase energy access, efficiency, and advise policymakers to address the energy needs of the poorest Argentinians and climate change.** Overall, all Project activities will be oriented towards reducing GHG emissions and will help mitigate – or adapt to – climate change either through investments or by facilitating resources, capacities or knowledge through Project management and support to policymaking. The operation will also help enhance service, increase efficiency, and improve the use of energy by vulnerable populations, thus contributing to social and development goals and reducing the energy sector's negative impacts. The proposed operation will also help generate valuable information for policymaking and reduce energy bills of Argentina's poorest citizens, while also fostering economic activity and growth. Overall, these measures would be well aligned and supportive of Argentina's decarbonization, clean energy transition, energy efficiency and use and climate goals as well as complement Government's existing sustainable development agendas and ongoing collaboration and assistance efforts.

C. Relevance to Higher Level Objectives

24. **The proposed Project objectives are consistent with the World Bank Group's Country Partnership Framework (CPF) for the Argentine Republic (FY19-FY22) (Report No. 131971-AR)⁶¹ that was revised by the Performance and Learning Review (Report No. 170668-AR) on May 31, 2022.** The proposed operation will strengthen the capacity of Argentina to cope with climate shocks and maintain its position as a clean energy leader, in line with other past World Bank projects in the sector, and will contribute to the following CPF Focus Areas:

⁵⁷ International Energy Agency, Energy Efficiency, 2020, available online at: <https://www.iea.org/reports/energy-efficiency-2020/energy-efficiency-jobs-and-the-recovery>.

⁵⁸ Ibid.

⁵⁹ Romero, Ramos & Harari, Evaluación de Medidas de Eficiencia Energética en Argentina: un enfoque de insumo-producto, 2022, p. 31.

⁶⁰ Casa Rosada, *Palabras del presidente de la Nación, Alberto Fernández, en el Major Economies Forum Energy and Climate, por videoconferencia*, 2022, available online at: <https://www.casarosada.gob.ar/informacion/discursos/48879-palabras-del-presidente-de-la-nacion-alberto-fernandez-en-el-major-economies-forum-energy-and-climate-por-videoconferencia>.

⁶¹ The CPF was discussed by the Board of Executive Directors on April 25, 2019.



- a. *Focus Area 3: Supporting Argentina to implement its NDC:* The Project will promote the transition to a cleaner energy mix by reducing the use of fossil fuels, improving energy use, and increasing efficiency. The Project will also help citizens adopt better technologies for energy generation at the household level, especially in vulnerable households and communities. The Project will contribute to energy savings in the lowest-income deciles, and result in less GHG emissions.
- b. *Focus Area 2: Addressing Key institutional Constraints for Better Governance and Service Delivery:* The Project will help implement practices to increase energy access and efficiency as well as to improve overall energy use behavior at the household and community levels, thus furthering its impact. It will also support the crafting of key sector guidelines, enhancing knowledge and capacity for improving service provision.

25. **The Project also contributes to meeting the NDC goals.** The proposed operation contributes to the country's decarbonization and its NDC, in which the energy sector is to play a leading role as the main opportunity area for reducing emissions. The project will invest in activities to reduce emissions, but also identify and manage climate risks. Overall, the Project will help advance Argentina's sustainability through enhanced knowledge and reduced energy and fossil fuels use.

26. **The Project also supports Green, Resilient and Inclusive Development (GRID),⁶² focusing on Pillars 3 – Strengthening Resilience – and 4 – Strengthening Policies, Institutions and Investments for Rebuilding Better.** It will spur green and sustainable growth by investing in clean energies, supporting institutional strengthening and capacity building, while also enhancing the climate resilience of the sector. The Project also contributes to the World Bank's Climate Change Action Plan 2021-2025 (CCAP) which aims to advance the climate change aspects of the GRID approach. It also follows the directives of the LAC Roadmap for Climate Action 2021–25 as it guides the Bank's "response for scaled-up, transformational climate action in the region." The Project is also aligned with the recommendations of the Argentina Country Climate and Development Report (CCDR) that "Argentina could undertake a path towards net zero carbon dioxide emissions and smaller decreases in emissions from other pollutants by 2050, if it, among others, decarbonizes electricity production with increased capacity for renewable energy and increase energy efficiency."⁶³

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

27. The proposed PDO is to increase energy access and energy efficiency in vulnerable households and communities and to respond promptly and effectively in case of an Eligible Crisis or Emergency.

PDO Level Indicators

- a. **PDO 1: Increase energy access in vulnerable households and communities**
 - People provided with new or improved electricity service

⁶² The World Bank Group, *Green, Resilient, and Inclusive Development*, 2021, available online at: <https://openknowledge.worldbank.org/handle/10986/36322>.

⁶³ World Bank Group (2022). *Argentina Country Climate and Development Report. CCDR Series*; World Bank, Washington, DC. © World Bank Group. <https://openknowledge.worldbank.org/handle/10986/38252> License: CC BY-NC-ND, p. 6.



- Projected energy or fuel savings

b. PDO 2: Increase energy efficiency in vulnerable households and communities

- People provided with increased energy efficiency
- Projected energy or fuel savings

B. Project Components

28. **The proposed Investment Project Financing will be implemented over 6 years, focuses on the design, preparation, and implementation of clean energy interventions for vulnerable households and communities.** Total financing will amount to US\$448 million, including the US\$400 million from the IBRD loan, US\$33 million from beneficiaries and US\$15 million from other sources such as the national government (US\$1 million) and subnational entities (US\$14 million). Table 1 details project costs and financing sources.

Table 1: Project costs and financing sources (in US\$million)⁶⁴

| Project components | Total | IBRD | GoA ⁶⁵ | Others ⁶⁶ | Beneficiaries ⁶⁷ |
|---|--------------|--------------|-------------------|----------------------|-----------------------------|
| 1. Increase energy access in vulnerable households and communities | 223.0 | 193.0 | - | 13.0 | 17.0 |
| 1.a Mini-grids | 56.5 | 52.0 | - | 3.0 | 1.5 |
| 1.b Standalone solar PV systems | 131.0 | 114.0 | - | 8.0 | 9.0 |
| 1.c Thermal systems | 6.0 | 5.0 | - | 0.5 | 0.5 |
| 1.d Productive uses | 29.5 | 22.0 | - | 1.5 | 6.0 |
| 2. Increase energy efficiency in vulnerable households and communities | 210.0 | 193.0 | - | 1.0 | 16.0 |
| 2.a Households | 197.0 | 181.0 | - | - | 16.0 |
| 2.b Community centers | 13.0 | 12.0 | - | 1.0 | - |
| 3. Project management and support for policymaking | 14.0 | 13.0 | 1.0 | - | - |
| 3.a Project management | 9.5 | 9.0 | 0.5 | - | - |
| 3.b Support for policymaking | 4.5 | 4.0 | 0.5 | - | - |
| 4. Contingent Emergency Response Component (CERC) | - | - | - | - | - |
| <i>Front-end fee</i> | 1.0 | 1.0 | - | - | - |
| TOTAL | 448.0 | 400.0 | 1.0 | 14.0 | 33.0 |

⁶⁴ Including in-kind contributions from Government, others, and beneficiaries, which have been assessed by estimating the time and effort invested by relevant stakeholders.

⁶⁵ Therefore, Government's contributions would not imply any incremental monetary contribution.

⁶⁶ Such as subnational governments and entities, which would contribute both in-kind and pecuniary resources (through, for example, operation and maintenance arrangements),

⁶⁷ Beneficiaries would provide funding both through in-kind contributions as well as by partially funding certain activities (such as the replacement of appliances) or through tariffs to be paid for the new or improved service obtained.



29. **Component 1: Increase energy access in vulnerable households and communities (US\$223 million, of which US\$193 million IBRD, US\$17 million beneficiaries, and US\$13 million others).** This component supports interventions to improve access and quality of electricity services in dispersed rural communities and the most vulnerable populations in particular by targeting households and public institutions such as schools, health posts or provincial public services centers. Specific activities include, inter alia: (a) the construction of new or replacement or upgrade, of old mini-grids⁶⁸ in rural communities or isolated population clusters and for vulnerable households, communities or public institutions; (b) the acquisition and installation of standalone second or third-generation solar PV systems in rural communities or isolated population clusters for vulnerable households, communities or public institutions; (c) the provision of solar thermal energy systems through, among other things, the acquisition and installation of solar water heaters, in rural communities or isolated population clusters for vulnerable households, communities or public institutions; and (d) the acquisition and installation of solar-powered systems for productive uses such as water pumping, fencing, cooling and other uses in rural communities or isolated population clusters for vulnerable households, communities or public institutions. Overall, it is estimated the component could result in lifetime fuel savings of over 150 million liters of diesel and the generation of close to 2,000 Gigawatt-hour (GWh) of clean energy in investments lifespan.

30. **The component will seek to target potential households, communities and public institutions that could not be connected or supplied with modern and high-quality energy services through conventional grid extensions in the short to mid-term.** The specific configuration of clean energy generation systems (mostly solar) to be deployed will be adapted to local conditions and prioritizing local resources as well as resource use optimization and the maximization of the number of beneficiaries. It is expected that the component will help provide electricity services that meet not only households' energy needs, but can power other social and productive activities, thus improving the quality of life of rural inhabitants and local services and resulting in greater social inclusion and productivity. Activities will prioritize the sustainability of the service through concessionaires that can operate, maintain, and replace equipment through the collection of a fee, thus ensuring its sustainability over time.

Box 1: Sustainability Mechanisms for Energy Access Investments in Argentina

The sustainability of energy access operations in Argentina's rural and dispersed communities is tested and proven. Since the implementation of the Argentina Renewable Energy Markets Project (*Proyecto de Energías Renovables en Mercados Rurales I*, PERMER I, P006043 and P045048) and continuing with the Argentina Renewable Energy for Rural Areas Project (*Proyecto de Energías Renovables en Mercados Rurales II*, PERMER II, P133288) Argentina has deployed a series of rules and mechanisms to ensure appropriate operation, maintenance and replacement (O&M&R) mechanisms in access operations, typically through Qualified Service Providers (QSPs).

These (public or private) entities – typically concessionaires – are tasked by Argentinian Law to manage and administer energy provision infrastructure in their respective areas as well as to ensure appropriate O&M&R within their jurisdictions. They take over the assets financed by the access component, on behalf of the provinces and as mandated by Argentinean Law and incorporate them into their usual operation.

Provinces – through Provincial Executing Units – will ensure acceptable O&M&R mechanisms are in place and deployed through such QSPs during subprojects' lifecycles and that enough co-financing resources are

⁶⁸ This activity will not support the upgrade and/or construction of diesel-fueled mini-grids; all subcomponent resources are to be allocated specifically to renewable energy mini-grids that will either replace diesel-fueled systems or provide a new energy service.



available to guarantee their operation. Finally, beneficiaries also contribute to the subprojects through tariffs that cover – partially – such costs.

31. **The component will also benefit private actors beyond those acting as contractors or suppliers, as it will help incorporate new clients into Distribution Companies' areas of operation, fund investments in these zones to serve these new customers, generate expertise in the management of new technologies and overall expand their operations and eventual sales.** The component will also contribute to the GCRF, particularly to its Pillar 4 – Strengthening Policies, Institutions and Investments for Rebuilding Better –and its “green & sustainable growth” thematic area (while also being aligned to its Pillar 3 – Strengthening Resilience – and its “climate resilience” thematic area). Further component details are presented in Annex 2; planned subcomponents will include:

32. **Subcomponent 1.a: Mini-grids will support the deployment of renewable energy technologies, including installing new systems, upgrading old systems, or appropriately replacing existing diesel-powered systems** (US\$56.5 million, of which US\$52 million IBRD, US\$1.5 million beneficiaries, and US\$3 million others). These tasks will benefit vulnerable households, communities, and public institutions (such as schools, health posts or provincial public services centers), and help improve the electricity service by providing a stable and constant energy provision while reducing emissions. They will contribute to reducing rural women's time on domestic chores and expand income-generating opportunities. This activity will have positive climate change mitigation and adaptation impacts as it will support the “generation of renewable energy with low lifecycle GHG emissions to supply electricity”⁶⁹ and help reduce power outages at critical facilities due to extreme weather events from the provision of improved electricity by mini-grids. It is expected the subcomponent will help install roughly 38 mini-grids, with an average installed capacity of 230 kW and a cost of close to US\$1.4 million per system.

33. **Subcomponent 1.b: Standalone solar PV systems will finance the installation of second and third-generation standalone solar PV systems in rural communities or isolated population clusters** (US\$131 million, of which US\$114 million IBRD, US\$9 million beneficiaries, and US\$8 million others). It will target vulnerable households, communities, or public institutions such as security posts, national parks, health posts or schools. The systems will have positive climate change mitigation and adaptation effects as they will increase the “generation of renewable energy with low lifecycle GHG emissions to supply electricity”⁷⁰ and help reduce power outages at critical facilities due to extreme weather events from the provision of improved electricity by standalone systems. This subcomponent could help install 9,150 household and 1,390 public institution systems with an expected cost of US\$4,300 and US\$54,000 and installed capacities of 0.4 and 4 kW, respectively.

34. **Subcomponent 1.c: Thermal systems will fund the installation of renewable energy systems for thermal energy generation to provide water heating in rural communities or isolated population clusters for vulnerable communities or public institutions** (US\$6 million, of which US\$5 million IBRD, US\$0.5 million beneficiaries, and US\$0.5 million others). The subcomponent will contribute to climate change mitigation as it will finance the “generation of renewable energy with low lifecycle GHG emissions to supply [...] heating.”⁷¹ The subcomponent would finance the installation of roughly 300 systems with an average unitarian cost of US\$16,000.

35. **Subcomponent 1.d: Productive uses** (US\$29.5 million, of which US\$22 million IBRD, US\$6 million beneficiaries, and US\$1.5 million others). Will target the financing of solar-powered equipment in rural

⁶⁹ Common principles for Climate mitigation finance tracking, 2021, p. 11.

⁷⁰ Ibid.

⁷¹ Ibid.



communities or isolated population clusters for vulnerable households, communities, or public institutions. It will include: (i) solar-powered water pumping systems; (ii) solar fencing systems; (iii) cooling systems; and (iv) other productive uses. The interventions will contribute to climate change mitigation and adaptation as they will support the “generation of renewable energy with low lifecycle GHG emissions to supply electricity, heating, mechanical energy or cooling”⁷² and help increase the number of rural households engaged in diversified or less climate-dependent livelihood activities because of access to electricity from off-grid renewable energy systems. Solar fencing will also help rural women undertake grazing activities more efficiently, whilst training for men and women on using this technology will reinforce the economic benefits of adopting efficiency measures and the importance of sharing the burden of unpaid work between women and men. The subcomponent could support 3,000 households water pumping systems (with an average cost of US\$4,000 per system), 100 community water pumping systems (US\$10,000 each), 4,000 household fencing systems (US\$1,200), 244 household cooling systems (US\$6,000), and 250 community cooling systems (US\$10,000).

36. Component 2: Increase energy efficiency in vulnerable households and communities (estimated cost US\$210 million, of which US\$193 million IBRD, US\$16 million beneficiaries, and US\$1 million others). Component 2 will seek to increase energy efficiency across Argentina with a focus on vulnerable households, communities and their *community centers* (such as *clubes*, community kitchens, communal playrooms, popular libraries, and many others) through: (a) the replacement of old and inefficient food conservation appliances, as well as their scrapping, by financing and facilitating the provision of new and efficient refrigerators (class A and higher) using gases with low global warming potential, and associated logistics at the residential level⁷³; and (b) the acquisition and installation of efficient lighting fixtures, wiring and associated equipment and minor works as well as the scrapping of old lighting features at the community center level. Overall, it is estimated the component could result in lifetime electricity savings of close to 3,000 GWh.

37. Enhancing energy use interventions will be implemented in several phases at national scale and are expected to generate emission reductions as well as savings for final beneficiaries and the Government. As improved energy efficiency would result in decreased energy consumption and in the use of equipment relying on refrigerants with low global warming potential, activities will reduce GHG emissions associated to electricity generation as well as those that would arise from the use of highly pollutant gases⁷⁴. The component will also help lower energy bills, and it will particularly target highly subsidized beneficiaries (RASE segment 2 households and *community centers*), activities should help decrease resources devoted to energy subsidies. The component will also help improve the quality of energy services, particularly through better refrigeration equipment in households and enhanced lighting in *community centers*, thus improving beneficiaries’ quality of life and creating greater awareness on the positive and multiple impacts of energy efficiency.

⁷² Ibid.

⁷³ The country has twenty-six waste operators capable of handling old refrigerators and lighting equipment to be replaced, distributed in eight provinces: CABA, Buenos Aires, Catamarca, Córdoba, Chaco, Entre Ríos, Santa Fe and Tucumán.

⁷⁴ This reduction would be substantial as the Component is expected to reduce emissions by 1.46 MtCO₂ (58 ktCO₂/yr) and save 2,824 GWh (113 GWh/yr) and it would replace equipment still using ozone-depleting substances with highly efficient appliances using refrigerants with low global warming potential.



Box 2: Effective Replacement to Ensure Sustainability

Ensuring the sustainability of component 2 activities necessarily requires certifying an actual replacement.

Without an effective substitution of appliances and fixtures, the operation not only would not generate the expected and associated climate and financial benefits planned but would rather increase emissions and costs for families and Argentina.

Technology can help ensure the sustainability and actual replacement of refrigerators and lighting.

The Project will rely on cellphone-based apps to both allow beneficiaries to self-report the appliance to be substituted, as well as use such information to execute and monitor said replacement. Such mechanism would allow to track the appliances' replacement cycle and overall implementation progress. Furthermore, an app-based reporting (or similar) system would allow beneficiaries to also report satisfaction with either the household or *community centers* subcomponents and their implementation.

The reporting mechanisms would also be expanded to and required for waste management centers. True sustainability calls not only for the actual disposal of old equipment but also to the appropriate discarding of materials, particularly the high global warming potential gases to be found in old appliances and any substances within old lighting fixtures.

38. **The component will also benefit private actors acting as contractors or suppliers, as well as the overall industry, as it will support the recovery of the production of efficient refrigerators and lighting fixtures with the resulting positive impact on local economies and jobs.** Planned activities will also help enhance local supply chains and energy efficiency services markets as the Project will rely on these for implementing the replacement of old refrigerators at the household level and lighting fixtures in *community centers*. The component will also contribute to the GCRF, particularly to its Pillar 4 – Strengthening Policies, Institutions and Investments for Rebuilding Better –and its “green & sustainable growth” thematic area (while also being aligned to its Pillar 3 – Strengthening Resilience – and its “climate resilience” thematic area). Further component details are presented in Annex 2; planned subcomponents will include the following.

39. **Subcomponent 2.a: Households will seek to finance and facilitate the replacement of food conservation equipment with new and efficient (Class “A” or higher) refrigerators utilizing refrigerants with low global warming potential in vulnerable households across the country** (US\$197 million, of which US\$181 million IBRD, US\$16 million beneficiaries, and US\$1 million others). Scrapping and logistics will be also conducted and supported under the subcomponent; beneficiaries will contribute through direct payments to retailers taking part in the Project. The subcomponent will help mitigate climate change by supporting “new or replacement stand-alone energy efficient appliances”⁷⁵. It is expected the subcomponent could help replace roughly 222,000 refrigerators, with a cost of US\$568 each and energy savings potential of 499 kWh per appliance.

40. **Subcomponent 2.b: community centers, such as clubes, will fund the acquisition and installation of efficient lighting fixtures, wiring and associated equipment and minor works needed for appropriate implementation to upgrade and replace existing lighting infrastructure** (US\$13 million, of which US\$12 million IBRD, and US\$1 million others). The subcomponent will finance the design, acquisition and installation of new lighting, and the removal and scrapping of old lighting and all related logistics. The measures to be implemented will contribute to climate change mitigation as they will “reduce net energy consumption [...] in brownfield buildings and associated grounds”⁷⁶. The subcomponent could support improvements in around 2,500 of these

⁷⁵ Common principles for Climate mitigation finance tracking, 2021, p. 53.

⁷⁶ Ibid., p. 51.



community centers, with an average cost of US\$4,900 per *club* and an energy savings potential for each of nearly 12,300 kWh per year.

41. **Component 3: Project management and support for policymaking (US\$14 million, of which US\$13 million IBRD, and US\$1 million Government).** This component will focus on supporting and providing resources for the implementation of components 1 and 2, for the overall decarbonization of the energy sector, and for developing training and capacity building activities; performing assessments to inform energy sector guidelines; ensuring the incorporation of gender-related and citizen engagement aspects in the operation; develop appropriate and tailored communication strategies; and improve evidence for policymaking. The component will also benefit private actors acting as contractors or suppliers of key services. The component will contribute to the GCRF, particularly to its Pillar 4 – Strengthening Policies, Institutions and Investments for Rebuilding Better –and its “institutional strengthening and capacity building” thematic area (while also being aligned to its Pillar 3 – Strengthening Resilience – and its “climate resilience” thematic area). Further component details are presented in Annex 2; planned subcomponents will include:

42. **Subcomponent 3.a: Project management will focus on providing support and capabilities for overall Project management** (US\$9.5 million, of which US\$9 million IBRD, and US\$0.5 million Government). Activities under this subcomponent will include coordination, implementation, technical design, legal, procurement, financial management aspects and fulfillment of all fiduciary obligations; liaising and establishing relevant implementation agreements with key institutions collaborating with the Project, communication, environmental and social management (as per the Project Environmental and Social Commitment Plan, and its related instruments), monitoring, tracking mitigation and adaptation results and impacts, and evaluation; engagement and consultations with targeted populations and beneficiaries to foster behavioral change (including the implementation of the Project Stakeholder Engagement Plan, and its Grievance Redress Mechanisms), as well as developing, supporting and tracking implementation of the Project’s gender action plan and other gender-related activities to be designed to increase the impact of the operation, including developing methodologies to track the participation of women, assess gender gaps and implement relevant measures as well as deploy training activities and also support the Ministry of Economy (MECON) in its strategic evaluation of the Project.

43. **Subcomponent 3.b: Support for policymaking will seek to fund activities to increase local capacities, provide evidence and outputs for policymaking and develop communication strategies** (US\$4.5 million, of which US\$4 million IBRD and US\$0.5 million Government). Activities will include technical assistance for SE and other relevant entities – such as provincial or national regulatory entities aiming at enhancing capacities, knowledge and understanding of the energy sector’s decarbonization pathways, generation, distribution, or segmentation activities as well as help develop overall capacities for policy development. The subcomponent will also seek to support improving capacities to assess and address key drivers of the energy sector’s sustainability, tariffs, climate resilience and vulnerability issues, energy transition and decarbonization; change management, improved regulatory frameworks and human resources development; aligning incentives to increase energy efficiency, standards, and regulations; improvement of generation, distribution, and segmentation mechanisms, amongst others. In addition, subcomponent 3.b will support the production of outputs and evidence for policy making and the overall energy sector. Activities will seek to improve key stakeholders’ understanding of key energy sector issues, new technologies, or testing innovative approaches or methodologies for clean energy in Argentina. Finally, the subcomponent will also support the development of general and specific communication strategies to ensure a successful implementation.



44. **Component 4: Contingent Emergency Response Component (CERC) (with an initial zero-dollar allocation; if this component is activated, it will be financed by the Loan).** This component is a contingent financing mechanism available to have immediate access to World Bank financing to respond to “an event that has caused, or is likely to imminently cause, a major adverse economic and/or social impact associated with natural or man-made crises or disasters.” The mechanism to trigger the CERC will be established in the Contingency Emergency Response Manual (CERC Manual), detailing the applicable fiduciary, environmental and social, monitoring, reporting, and any other implementation arrangements necessary for the implementation of the proposed activities to be financed. In case the component is triggered, resources will be reallocated from other disbursement categories to fund the proposed activities to respond to the emergency. The implementation agency for this CERC will be determined in accordance with a CERC Manual.

Strategic Priorities

45. **Citizen engagement.** Throughout its three main components, the Project will develop a pro-active communication and citizen and stakeholders’ engagement strategy that incorporates the principles of using the feedback from beneficiaries (especially women) collected in community consultations in Project design and implementation and communicating those decisions and changes back to the beneficiaries. The strategy will focus on sensitizing the population on behavioral changes that could save energy in households as well as on developing an engagement strategy with the targeted populations and institutions to inform them about the benefits and implications of the planned interventions and to “close the loop” by including their feedback and preferences. Project monitoring will track the number of beneficiaries and their satisfaction, and their feedback will be included and reported upon during Project implementation.

46. **Gender.** There are gender inequalities related to the access and use of energy. In Argentina, rural women work 14 hours more per week than men when considering both paid and unpaid hours of care tasks.⁷⁷ The unavailability of clean energy sources for cooking or clean water in many places can cause women to develop obstructive lung disease and mean an even greater workload for them.⁷⁸ In addition to their caring roles, women in rural areas are also responsible for productive activities to contribute to the household economies such as grazing and raising of animals; making by-products; among others. The lack of energy access creates barriers for women to undertake family care activities or enter the workforce.⁷⁹ This can be tackled by actions to be undertaken as part of this operation. The installation of solar fencing systems and mini-grids, which are part of the project activities in component 1, will help reduce the time spent on domestic work and grazing, which in turn assists in making time to allow women to enter the workforce. Solar fencing helps women undertake grazing activities more efficiently, as it can be easily moved around and is not affected by power outages. This will allow women to have greater efficiency in the productivity of their day, allowing for their participation in paid work. Beneficiaries will receive training on the use of this technology, during which trainers will reinforce the economic benefits of adopting energy efficiency measures. The provision of mini-grids can also provide economic opportunities for women in their households, due to the newly acquired connection to the electricity network or an improvement in the quality of service. They may be able to expand their productive activities or seek to develop

⁷⁷ Alegre, Silvina, et. al. New generations of rural women as promoters of change. A quantitative-qualitative study of the situation of young rural women, their needs and opportunities in Argentina. 2015.

⁷⁸ Alegre, Silvina, et. al. New generations of rural women as promoters of change. A quantitative-qualitative study of the situation of young rural women, their needs and opportunities in Argentina. 2015.

⁷⁹ Alegre, Silvina, et. al. New generations of rural women as promoters of change. A quantitative-qualitative study of the situation of young rural women, their needs and opportunities in Argentina. 2015.



new microenterprises. The impact of such activities will be assessed by measuring the change in the time women spend on domestic/unpaid care work.

47. **Women are underrepresented in the energy sector.** The main barriers to their participation are social norms and traditional gender roles. The sector is seen as an industry that is not adequate for women and therefore females suffer discrimination and difficulty in advancing to managerial positions. Its traditionally male working environment can also pose a threat of various forms of harassment and exploitation. Given that data is critical to design policies aimed at addressing these barriers, a diagnosis on women's participation in employment in the renewable energy sector in rural areas will be carried as part of the project's technical studies. Gender Based Violence (GBV) risk will also be mitigated through measures set in the Environmental and Social Management Plans (ESMP) and Labor Management Plan (LMP) applicable to all Project activities. This Gender Action Plan is further described in Annex 4.

48. **Climate change.** All Project activities aimed at reducing GHG emissions and are clearly aligned with Argentina's green growth agenda as all components aim to support the development of energy efficiency measures that will help decarbonize Argentina's economy. In addition, investing in improved access infrastructure can help reduce the vulnerability of the sector – particularly in dispersed and rural communities and community centers to extreme weather events caused by climate change. Furthermore, enhancing consumption and use can also result in improved planning and reduced demand growth, helping free-up resources to adapt infrastructure and reducing reliance on fossil fuels and other resources. Conducting assessments on issues such as adaptation to climate change, energy connections safety and vulnerability to extreme weather events will also help improve Argentina's preparedness and climate resilience. Finally, the Project supports Argentina's decarbonization by investing in net zero GHG emissions activities and in the displacement of GHGs and as it identifies, assesses, addresses, manages, and considers climate risks.

49. **Private sector participation.** Finally, the Project supports interventions that will call for the participation and involvement of private actors. These activities include, for example, investments in renewable energy generation that will facilitate the inclusion of users and technologies into existing – mostly private – distribution companies' networks and thus improve these entities finances, services, and customer base. Furthermore, as the replacement of refrigerators includes existing producers, retailers and logistics companies, their bottom lines will improve while also creating further opportunities for the marketing of other efficient equipment – and showcasing the advantages of energy efficiency. Finally, the operation also creates further economic activity in the clean energy sector, spurring new investments and reactivating growth in the access technologies, appliances, and fixtures segments.

C. Project Beneficiaries

50. **The Project will seek to target vulnerable households, communities, public institutions and community centers whose electricity provision, service or use needs to be improved.** Vulnerable households, communities and public institutions or community centers will see better service, either through increased access or reduced electricity consumption, which would also result in lower electricity bills. These vulnerable populations will include distinct sets of households and communities. For component 1, vulnerable populations will be in rural and dispersed contexts as they lack access to electricity or have limited connection levels to off-grid solutions. For component 2, vulnerable population will be those electricity users included in the low-income segment of the RASE, as well as those served by or through targeted community centers. The project is expected to benefit



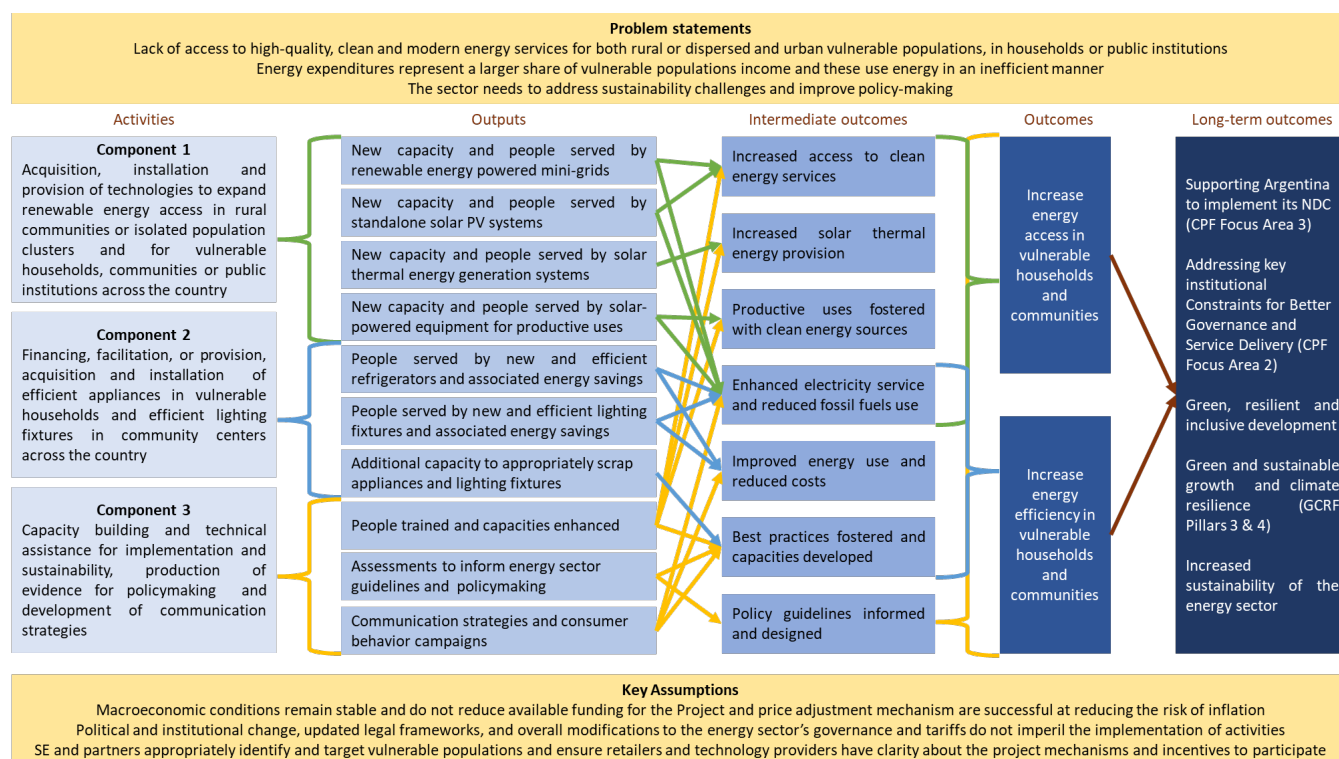
233,000 people with new or improved electricity services (component 1) and 1,25 million people with higher energy efficiency (component 2).

51. **Additional beneficiaries of the Project will include national and provincial entities, including the Ministries of Health, Tourism and Sport, the National Institute for Industrial Technology (INTI) and National Institute of Agricultural Technology (INTA), as well as subnational regulators, energy agencies and environmental departments.** The government will see fiscal benefits as the reduced energy consumption of households and community centers translates in the reduction of subsidies to these beneficiaries. Furthermore, the reduced use of fossil fuels will also decrease their import, further supporting Argentina's finances. Finally, the reduced energy consumption would also eventually reduce in the postponement of investments in generation and distribution capacity.

52. **Further indirect beneficiaries will also include relevant actors in the overall energy policy context.** As the Project will conduct assessments, training activities and capacity building activities, key actors will be better informed and policymaking in the country could be improved. Beneficiaries will also include individuals or institutions to benefit from assessments to be carried out under component 3. Finally, the Project as a whole will help address climate change mitigation and adaptation to extreme weather events. The operation will overall deliver global public goods emanating from the climatic, environmental, social, and overall development co-benefits of reduced emissions and increased energy efficiency.

D. Results Chain

Figure 1: Theory of Change of the Project





E. Rationale for Bank Involvement and Role of Partners

53. **The World Bank is well-positioned to support Argentina.** The Bank has considerable experience implementing these kinds of interventions and has collaborated extensively with the government, the SE and provincial entities as well as key players from the Argentinian power sector. The Project will also benefit from the World Bank's demonstrated experience in similar operations in the energy sector, especially those focusing on either the Argentinian power sector or similar energy efficiency interventions, such as:

- a. **Renewable Fund Guarantee Project for Argentina** (FODER, P159901) which has increased electricity generation capacity from renewable energy sources through private investment. The project consists of an IBRD guarantee to backstop the government's commitments to renewable energy independent power producers (IPPs), thus mitigating country risks and reducing financing costs.
- b. **Energy Efficiency Scale-up Program Project for India** (P162849) which seeks to increase energy savings in residential and public sectors, strengthen institutional capacity, and enhance access to commercial financing. The Program is scaling-up delivery in the residential sector, focusing on LED bulbs, tube lights and ceiling fans; delivering investments in public street lighting; supporting up-stream program development and incorporation of technical, environmental, and social sustainability elements into the design of the new initiatives, such as air-conditioning, agriculture demand side management and buildings; and strengthening and developing institutional capacity.
- c. **Renewable Energy for Rural Areas Project for Argentina** (PERMER II, P133288) which is providing and enhancing access to modern energy services in selected rural areas of Argentina. Amongst its four components – mostly focused on rural electrification and energy services – the project is also targeting solar thermal energy provision as well as conducting market studies to determine potential energy demand and technologies in the country, both of which could be of use to the proposed Project.
- d. **Efficient Lighting and Appliances Project in Mexico** (P106424) which promoted the efficient use of energy by increasing the use of energy efficient technologies at the residential level, including through the replacement and financing of incandescent light bulbs, refrigerators, and air conditioners.

54. **The World Bank will also continue supporting Argentina in the development of sector and tariffs reform, further options to reduce energy use and the sector's fiscal impact and to improve its overall sustainability.** The aid to Argentina includes both this and other financing operations – such as those highlighted above – as well as non-lending activities to be sought with Bank-executed resources. For example, the World Bank supported analytical efforts to improve the targeting of energy efficiency interventions, including the study assessing households' energy consumption patterns based on the ENGHO results (and extensively cited above), or to quantify the impact of energy efficiency measures on job creation, GHG emissions reduction and growth. Furthermore, the World Bank provided technical support to the government on energy issues relevant for the energy transition plan designed to fulfill the benchmarks agreed under the IMF-government agreement signed in mid-2022. Next steps could include additional support to Argentina to prepare the measures considered under all the components of the Project prior to approval as well as analysis relevant for the country to address key fiscal and environmental challenges.



F. Lessons Learned and Reflected in the Project Design

55. **The proposed operation incorporates lessons learned from the implementation of projects in Argentina and elsewhere.** These include:

- a. **A large-scale access project is a medium- to long-term effort** that requires a design flexible enough to adapt to the changing conditions that may arise. As such, the Project will rely on the successive and successful PERMER I and PERMER II and the relationship between the Project Coordination Unit (PCU) and the Provincial Execution Units (PEUs) to gather enough information on local conditions and needs. The operation is also considering the lengthy implementation of these types of tasks in the overall Project implementation timeline.
- b. **Large-scale decentralized renewable energy operations face unique challenges** associated with market dispersion, the considerable number of stakeholders, limited knowledge of the terrain, and complex communications. To address these challenges the Project has produced a delivery model tailored to these circumstances and based on the experiences of past operations.
- c. **Sustainability of the operation is more a logistical challenge than a technical task.** The main challenge at the operational level is to provide effective maintenance and customer service in a market that is widely dispersed and often located in rugged terrain. The Project has relied on the proven mechanisms developed for over two decades to just deliver such services.
- d. **Direct government support for access is a necessary tool but should be granted in a way that minimizes economic distortions.** A sound tariff system for new energy access should also rely on secure sources to ensure sustainability as well as contributions (even if minor) from beneficiaries. The operation is seeking to incorporate such tariffs to also ensure beneficiaries buy-in and collaboration.
- e. **Enhanced dissemination of project objectives, components, and activities is recommended to ensure swift implementation.** Even though a project may be valuable, it may be hampered by poor communication between implementing agencies and beneficiaries and lack of guidance on how to appropriately use new equipment. As this is particularly relevant when relying on market actors and when consumers make decisions, the Project has planned citizen engagement activities to address these potential challenges.
- f. **Addressing consumer affordability barriers is necessary.** One of the key barriers to adopting energy-efficient technologies is the high initial investment cost of the new equipment, particularly for low-income consumers. For this reason, new and efficient appliances, and fixtures to be replaced will be subsidized and accompanied by campaigns to further increase the impact of such activities.
- g. **Relying on existing systems for financing increases the chances of success.** Households and retailers are more likely to participate and support a program if existing mechanisms – such as financing options, markets, or supply chains already in operation – are used. The refrigerators to be replaced will thus allow for the participation and involvement of existing financing mechanisms to allow beneficiaries to cover part of the cost of the new appliance.
- h. **Proper disposal of replaced products is necessary.** Experiences have demonstrated that if substituted equipment is not scrapped, there is a high risk that it will continue to be used together with the new



equipment, thereby offsetting the benefits of the program. The operation will use technological solution to seek and ensure the appropriate disposal and replacement of equipment.

- i. **Having proper warranties for energy efficient equipment helps ensure the sustainability of expected energy savings.** Such considerations will be included when designing the framework agreements defining the participation of eligible retailers and producers.
- j. **Creating synergies with policies can increase impact and leverage additional resources.** Accompanying increased access (through distributed generation) or efficiency (through newer and more efficient equipment) with policies and knowledge such as that expected to be developed under component 3, would support those interventions, help lock in the benefits of the investments and facilitate the introduction of further energy sector reforms.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

56. **The overall implementation of the Project will be the responsibility of the SE, through a PCU which will be responsible for coordinating all activities.** The Unit will perform most technical, management, reporting and monitoring and evaluation (M&E) tasks while the MECON's General-Directorate for Sectorial and Special Programs and Projects (DGPYPSyE) will be responsible for fiduciary activities. The Unit will coordinate bidding processes for the procurement and installation of goods, works, and services and design overall guidelines for participation in all components. Loan funds will be centrally managed, and payments will be made directly by the PCU to contractors or indirectly to beneficiaries – through appliance providers participating in component 2.a – upon review of supporting documentation. The PCU will ensure compliance with all environmental and social regulations and monitor the implementation of the subprojects and tasks, compiling information from the various implementation areas and activities. As the proposed operation will be the first implemented by SE under the new Environmental and Social Framework (ESF), measures to strengthen environmental and social management will be identified and reflected in the Environmental and Social Commitment Plan (ESCP). Further details are summarized and presented below as well as in Annex 1.

57. **Project implementation will start where local conditions are appropriate and activities are more likely to succeed.** As such, Component 1 will start in provinces that have sizable vulnerable populations and are prepared to sign participation agreements. For Component 2, the replacement of appliances and lighting fixtures will begin where appropriate removal and scrapping systems are in place. A Project Operational Manual (POM) will be finalized prior to Project effectiveness to define implementation arrangements, eligibility criteria, and management mechanisms. The POM will further detail interventions and overall Project management, legal, procurement, financial and environmental and social procedures. Energy provision and efficiency measures and processes to be supported as well as eligibility and prioritization criteria will be further defined based on capacities, cost-effectiveness, expected savings and subsidy levels, contributions to emissions reductions, environmental and social requirements, and technical standards.

58. **The SE, through the PCU will be responsible for executing, coordinating, monitoring, and reporting all Component 1 activities.** Provinces will have a significant role in the component and will participate through PEUs in Project implementation. These units –typically within the provincial energy agencies – will be responsible for



identifying and designing subprojects, ensuring coordination with SE, environmental and social compliance, and supervising implementation, as well as ensuring operation and maintenance. PEUs and provincial entities will benefit component 3 activities to provide additional capacity building and technical assistance activities. Province's roles and responsibilities will be defined through participation agreements to be agreed upon during implementation and including technical, economic, financial, environmental, and social roles and responsibilities. It is expected that most of these institutions will provide counterpart funding to the component.

59. **In addition to these key stakeholders, several other entities at the national and provincial levels will also have key roles in the implementation of component 1.** At the national level, these would include the Ministries of Education, Tourism, Environment or Agriculture as the component could target institutions (schools, primary health posts) or activities (agricultural productive uses) regulated, managed, operated, or supported by these agencies. At the subnational level, additional entities involved would include provincial regulators, as these are tasked with ensuring compliance of distribution companies with their concession contracts, supervising service quality, addressing complaints from users and certifying the incorporation of new users; distribution companies, as these are responsible for the operation and maintenance of the electricity supply in specific areas, collecting fees from beneficiaries and overall helping ensure the sustainability of planned activities; provincial environmental agencies, as these are tasked with enforcing relevant regulations; and municipalities, which could support the execution of component activities by engaging with Provincial authorities.

60. **The SE, through the PCU will be responsible for executing, coordinating, monitoring, and reporting on all Component 2 activities.** The SE will finance and implement activities under Component 2 and work on identifying potential beneficiaries which would include: i) households in the low-income segment of the RASE or successors or similar mechanisms and which own food conservation equipment of 15 years of age or older; or ii) community centers with a subsidized electricity tariff.

61. **Subcomponent 2.a activities will rely on existing markets and sales channels.** Collaboration and coordination with sector actors such as provincial authorities, distribution utilities and others players will help to better target potential beneficiaries and to improve the RASE database. Beneficiaries will receive a voucher – the item to be financed using IBRD loan proceeds – covering most of the cost of a new and efficient appliance – as well as all associated logistical and scrapping costs, which will be already contracted by the SE –by surrendering the old and inefficient equipment and after only paying the remaining costs (using any acceptable payment method, including financing programs offered by the store itself or current government programs such as *Ahora 12*). Participating retailers will sign framework (adhesion) agreements and coordinate with selected logistical services providers for the delivery of the new equipment, while the latter will also dispose of the replaced goods in waste management centers. Finally, those centers will present a scrapping certificate to the SE to receive the corresponding payment

62. **In the case of subcomponent 2.b activities, the lighting fixtures to be replaced – as well as wiring and associated equipment and minor works – will be fully financed by the SE.** When necessary and convenient, the SdE will seek to coordinate and discuss the interventions with relevant subnational authorities or – for example – distribution utilities to improve targeting of clients, appropriate communication strategies and potentially obtain feedback. The SE will establish framework agreements with potential energy efficiency service providers that would perform all relevant activities (specific assessments, replacement of lighting fixtures, appropriate waste disposal at established waste management centers) for a set of *community centers* to achieve economies of scale. The SE will also work on defining certification mechanisms and on signing a collaboration agreement with the INTI



to further engage with *community centers* and promote their adoption of new and efficient technologies and monitor the results of the implementation. Eligibility criteria for *community centers* will include: be registered in relevant databases (such as the Secretariat of Sports database for *clubes*), currently benefitting from the N2 electricity subsidy provided by the SE, and providing social services (such as community kitchens or similar).

63. **Component 3 will be implemented by the PCU and supported by DGPYPSyE, which will launch bidding processes for the procurement of relevant human resources, equipment, or activities, including training and capacity building activities and assessments as well as for any goods, works, or services linked to these analyses.** As activities under component 3 could also be carried-out with or for other entities beyond SE or the Federal Government and to test new methodologies and technologies, *ad-hoc* collaboration agreements could be sought, if needed.

B. Results Monitoring and Evaluation Arrangements

64. **The project builds upon existing structures and capacities developed through past and ongoing activities with SE.** The operation will support M&E tasks as well as overall project management, implementation, supervision, and reporting through component 3 and include support for: (a) the design and deployment of assessments, systems, indicators, reports, remote monitoring or data gathering technologies such as the Geo-Enabling initiative for Monitoring and Supervision (GEMS)⁸⁰, and other instruments as needed by SE and (b) data and information gathering by the SE and relevant stakeholders. Specific tasks to be conducted to fulfill all M&E obligations include:

- a. Design and deployment of a Project specific M&E, supervision, and monitoring system;
- b. Reporting of project development and intermediate indicators every 6 months;
- c. Generating additional impact, results, performance indicators, and data during project implementation;
- d. Implementation of an overall project management system; and
- e. Crafting of baseline, midterm, and implementation assessments to evaluate impact prior to approval.

C. Sustainability

65. **The government has strong ownership of access and energy efficiency interventions.** The Project is aligned with Argentina's development and climate goals as well as with other agreements with international organizations. This provides a strong rationale for the government to continue its support to increased energy access and efficiency measures.

66. **The proposed operation includes robust institutional arrangements to guarantee adequate implementation and flexibility to adapt to changing circumstances.** As shown in Box 1 above, arrangements under component 1 rely on an existing operation and have proven to be successful. For component 2, the SE will ensure a constant dialogue with key stakeholders to ensure implementation is adapted to the country's circumstances and built upon best practices and lessons learned. Furthermore, the environmental sustainability of replacement activities will be ensured as shown in Box 2 above.

67. **To ensure further buy-in and sustainability the Project will also work to identify and ensure adequate funding through additional counterpart resources when needed.** This will include the counterpart financing to

⁸⁰ Which has already been piloted by PERMER II.



be provided by Provincial level entities and the fees to be charged to beneficiaries under Component 1 as well as the counterpart funding that households would need to provide under Component 2.

68. **Empowered beneficiaries will also be one of the major sources of sustainability.** Ensuring beneficiaries fully understand the interventions and can realize how they benefit them is one of the priorities of the operation. As long as energy savings can be observed and felt by vulnerable households in their electricity bills and community centers users can see higher-quality services, the operation's sustainability should be safeguarded, and beneficiaries can become key to ensuring the Project's success.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

69. **The Project is expected to increase energy access and increase energy efficiency in vulnerable households and communities.** The operation will help improve energy provision and provide global and environmental benefits by reducing the use of electricity, refrigerants with high global warming potential and fossil fuels, increasing the security of supply, and resulting in climate change mitigation by achieving GHG emission reductions.

70. **The Project relies on commercially available technologies and does not present large technical complications.** The main technologies to be deployed (including mini-grids, solar PV and thermal systems, refrigerators, lighting fixtures) are well-known to relevant stakeholders and implementation agencies. The PCU and potential PEUs have already gained the necessary experience and technical expertise to implement all component 1 activities through PERMER I and II. The SE also has trained staff and experience in dealing with relevant component 2 technologies and will also further collaborate with other institutions with additional experience in these areas (such as the INTI).

71. **The economic and financial analyses focused on assessing most activities to be funded under component 1 and all of those included in component 2, representing roughly 90 percent of the IBRD loan and overall Project.** Given the analytical constraints associated with benefits that cannot be measured in monetary terms and/or where information is not available – or for which funding is negligible – small thermal energy and productive use systems under component 1, as well as component 3 – Project management and support for policymaking – (and 4) were not included in the economic and financial analyses.

72. **The Project's benefits were assessed by comparing "with" and "without" scenarios for five key types of interventions and investments (mini-grids, household PV systems, institution PV systems, refrigerators, and lighting fixtures) and their cost-effectiveness.** Technical assistance and other activities included under Component 3 are not directly assessed but will be fundamental for the development of the overall Project. The analysis estimated and presented the costs and benefits (displacement of fossil fuels use; increased energy use and sales) of interventions such as the: i) acquisition, installation, and operation of renewable energy generation equipment; ii) replacement and scrapping of old and inefficient refrigerators; and iii) improved and efficient lighting in community centers.⁸¹ Potential GHG emissions reductions are also being estimated following existing

⁸¹ For simplicity, the assessment focused on analyzing *clubes*; given the relative technical simplicity of replacing lighting fixture, the results should be also applicable to other types of community centers.



guidelines and frameworks. Emissions avoided were multiplied by a shadow price of carbon (SPC) for each year in the Project's lifetime. The SPC used for each year was calculated as the average between the low and the high case scenarios, starting in 2023 with a value of 76 US\$/tonCO₂eq.

73. **The economic and financial analyses used a set of general parameters across the five key types of interventions).** A discount rate of 4 percent⁸² was used for the assessments, and discount rates of 6 and 12 percent were used for the sensitivity analyses to test the robustness of the operation in diverse contexts. Different electricity costs and tariffs were used to quantify the benefits of project activities, including the economic value of the additional electricity service that would be achieved under component 1 or the benefits of energy savings and improved services under component 2, for example. The analyses also assumed the interventions would have a 20-year lifetime; as the installation would be done over 6 years, the overall lifespan of the assessed activities would be 25 years (See Annex 3 for details).

74. **The assessments above highlight the expected positive Project results,** to be driven by the social and environmental benefits each activity would result in. Even if the low – subsidized – tariffs to be paid by most beneficiaries mean the operation may not be financially profitable, the societal benefits of the operation justify planned activities. Expected results for the overall Project are summarized below.

Table 2: Aggregate Project results⁸³

| Concept | Unit | Results |
|-------------------------------|-------------------|---------|
| Fuel saved | M lts | 164 |
| Fuel savings | M US\$ | 242 |
| Electricity saved | GWh | 2,824 |
| Electricity savings | M US\$ | 273 |
| Additional electricity | GWh | 1,980 |
| Additional service | M US\$ | 529 |
| Net CO ₂ emissions | MtCO ₂ | (1.94) |
| Environmental benefits | M US\$ | 195 |

75. **The planned interventions would also result in a positive and robust economic Net Present Value (NPV) and Economic Internal Rate of Return (EIRR).** As shown below, Project results are highly sensitive to increased discount rates, yet still result in positive outcomes. The Project would not have the same positive financial results due to the low tariffs most beneficiaries will pay. If half the electricity generation and distribution costs were passed through to final users, the Project would be close to reaching financial viability.

⁸² As the World Bank forecasts a 2.1 percent real GDP growth rate for Argentina in 2023, a rounded 4 percent discount rate was applied; see the World Bank Group's "Discounting Costs and Benefits in Economic Analysis of World Bank Projects" guidance (2016) for further details.

⁸³ Overall, the Project would then result in net emissions (economic lifetime, tCO₂e) of -1,940,841.24, gross emissions (economic lifetime, tCO₂e) of 30,985.54, and net emissions (annual average, tCO₂e/year) of -77,633.65.



Table 3: Project sensitivity analysis scenarios (in US\$ million)

| Scenarios | Costs | Benefits | NPV | EIRR |
|--|-------|----------|------|-------|
| Economic analysis | | | | |
| Base case: w/ 4% discount rate | 483 | 753 | 270 | 12.2% |
| Case 1: w/ 6% discount rate | 433 | 603 | 169 | 12.2% |
| Case 2: w/ 12% discount rate | 335 | 339 | 4 | 12.2% |
| Case 3: base case w/ 10% lower energy savings | 480 | 712 | 232 | 11.3% |
| Case 4: base case w/ 10% higher investment & OM costs | 528 | 743 | 215 | 12.1% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 528 | 669 | 141 | 8.3% |
| Case 6: base case w/o GHG benefits | 480 | 625 | 145 | 8.7% |
| Financial analysis | | | | |
| Base case | 730 | 568 | -162 | -0.7% |
| Case 1: w/ lower discount rate | 643 | 448 | -195 | -0.7% |
| Case 2: w/ higher discount rate | 479 | 241 | -238 | -0.7% |
| Case 3: base case w/ 10% lower energy savings | 723 | 525 | -198 | -2.1% |
| Case 4: base case w/ 10% higher investment & OM costs | 796 | 560 | -236 | -2.8% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 796 | 504 | -292 | -5.3% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 723 | 684 | -39 | 3.0% |

B. Fiduciary

(i) Financial Management

76. **A Financial Management (FM) Assessment⁸⁴ was conducted to assess the adequacy of FM arrangements in place at the DGPyPSyE of the MECON.** The overall conclusion of the FM Assessment is that: (i) the FM arrangements for the proposed Project are considered adequate; (ii) the funds flow, disbursements, monitoring, auditing, and supervision arrangements have been designed in a way to respond to the Project's implementation arrangements; and (iii) the residual FM risk associated with the Project is rated as Moderate.

(ii) Procurement

77. **Procurement will follow the World Bank's 'Procurement Regulations for Investment Project Financing (IPF) Borrowers,' issued in July 2016 and updated in November 2020, for the supply of goods, works, non-consulting and consulting services.** The implementation will be the responsibility of SE. Technical inputs such as technical specifications and terms of reference will be provided by the SE technical departments. A procurement capacity assessment of the SE was carried out in December 2022 considering the existing systems, structure and staff that is currently implementing a World Bank project. The assessment concluded that existing staff have experience, but the team should be strengthened to manage the increasing workload that this and other multilateral projects under preparation will entail. Procurement arrangements for large-volume and higher risk activities were addressed in the Project Procurement Strategy for Development (PPSD) that has been prepared by the SE to identify fit-for-purpose approaches to implement them. The result of this analysis, capacity assessment and proposed actions to address the identified risks are detailed in Annex 1.

⁸⁴ The FM Assessment was conducted by Bank staff from November 2022-March 2023 in accordance with Bank Policy: Investment Project Financing and Bank Directive: Investment Project Financing and the Financial Management Manual for World Bank-Financed Investment Operations (effective March 1, 2010 and revised September 7, 2021).



C. Legal Operational Policies

| | Triggered? |
|---|------------|
| Projects on International Waterways OP 7.50 | No |
| Projects in Disputed Areas OP 7.60 | No |

D. Environmental and Social

78. **Project environmental and social risk classification is Moderate.** An Environmental and Social Assessment (ESA) was prepared before appraisal, to identify and characterize the main environmental and social risks and impacts related to all four project components throughout the project life cycle. Additionally, a Stakeholders Engagement Plan (SEP) and the Project Environmental and Social Commitment Plan (ESCP) were prepared. The SEP and ESA have been publicly disclosed and consulted⁸⁵. Specific subprojects have not been identified before appraisal and therefore the specific sites, environmental and social conditions, risks and impacts of each subproject are not known. The ESCP stipulates that an Environmental and Social Management Framework (ESMF) will be prepared, including a screening process for subprojects, guidelines to implement the mitigation hierarchy to manage risks and impacts. It will require the development of subproject-specific Environmental and Social Management Plans (ESMP, which shall be included in the bidding documents. The ESMF will also include a list describing activities and investments that will be ineligible under the Project. The ESMF will be prepared, disclosed and consulted before effectiveness. The ESCP also requires a specific CERC-ESMF addendum to be annexed to the ESMF, setting up the guidelines to assess and manage the environmental and social risks and impacts of component 4 investments, to be developed, disclosed, consulted and adopted before such component can be implemented. Additionally, the ESCP requires Project Labor Management Procedures to be adopted by the SE and relevant partners, including provisions on working conditions, management of workers relationships, occupational health and safety, and a specific grievance mechanism for Project workers. The negotiated version of the ESCP was published on April 17th, 2023.

79. **Based on the findings of the ESA, environmental risk is deemed Moderate.** The project will support the development of energy efficiency measures thus reducing reliance on fossil fuels and other resources. Enhancing energy use interventions are expected to generate emission reductions as well as savings for final beneficiaries and the Government. As improved energy efficiency would result in decreased energy consumption and in the use of equipment relying on refrigerants with low global warming potential, activities will reduce GHG emissions associated to electricity generation as well as those that would arise from the use of highly pollutant gases. The project will also help improve the quality of energy services, particularly through better refrigeration equipment in households and enhanced lighting in community centers such as *clubes*, thus creating greater awareness on the positive and multiple impacts of energy efficiency. Planned activities will also help enhance local supply chains and energy efficiency services markets as the Project will rely on these for implementing the replacement of old refrigerators at the household level and lighting fixtures in community centers. However, given the nature and scale of planned activities, low to moderate environmental, health and safety risks; and adverse impacts are expected under components 1 and 2.

⁸⁵ Final version of SEP and ESA were disclosed by the WB on April 1, 2023.



80. **Under component 1 such expected risks and impacts are related to investments in infrastructure and productive equipment** (mostly those for solar water pumping and electric fencing). Even though these interventions would be small-scale, low to moderate site-specific environmental, health and safety risks and adverse impacts could occur. These include, among others: increased risk of occupational incidents and accidents; nuisance on the neighboring areas and minor community health and safety issues during works; impact to physical assets (including cultural heritage) due to earth-movement and use of heavy equipment during works; punctual environmental pollution events (e.g., fuel and oil spills from machinery); and in some cases (e.g., pumping investments in very small and confined waterbodies) site-scale replacement or degradation of habitats, punctual impacts on biodiversity (at the level of individuals or small groups), water quality, or increased competition with other users of the natural resources might be induced. Most mitigation and management measures for such risks and impacts are readily available, and the SE has previous experience implementing them.

81. **Under component 2, key risks and potential impacts are related to the management of the residues from scrapped replaced appliances, particularly the handling of certain hazardous substances such as chlorofluorocarbons contained by old refrigerators and mercury in lighting fixtures.** In this context, environmental risks and potential impacts are predictable and expected to be site-specific, not complex, and not expected to cause serious adverse effects to human health or the environment. They can also be easily mitigated by applying routine and accessible measures and safety precautions including, as applicable, the adoption of Good International Industry Practice (GIIP) as defined in the World Bank Group Environmental, Health and Safety Guidelines (WBG EHSs). Downstream adverse environmental effects of the pre-identified technical assistance activities to be conducted under component 3, and of eventual investments under the contingency emergency response component 4 are, in principle, not deemed significant.

82. **Based on the findings of the ESA, social risk is deemed Moderate.** The Project seeks to generate positive social impacts through the improvement of households, communities, rural populations and different types of public spaces. Component 2 is expected to improve energy efficiency in the residential sector with a focus on lower-income population and women, through the replacement of inefficient appliances and lighting fixtures, including substituting over 20-year-old refrigerators with the latest, most efficient ("A" class) equipment in vulnerable households, as well as exchanging incandescent and fluorescent lamps with LEDs in community centers. This will be conducted on a voluntary basis and at reduced or no cost to the beneficiaries. Social risks under this component are associated with the potential exclusion of the most vulnerable populations if beneficiaries are not identified properly. A detailed Stakeholder Engagement Plan was prepared to mitigate this risk by properly identifying affected parties, including vulnerable population, and carrying out consultations to inform them and influence project design and implementation in an efficient manner. Labor Management Procedures will be developed to identify types of workers and address potential risks and impacts.

83. **Component 1 activities may involve total and/or partial acquisition of land and displacement of economic activities.** The risk of physical displacement of people at an individual or household level is low, while the possibility of displacing communities is not anticipated. To mitigate these risks, a Resettlement Policy Framework (RPF) and, when necessary, Resettlement Plans (RP) will be prepared. The RPF will detail voluntary land donation and willing buyer/willing seller processes, in accordance with ESS5, to structure and guide those cases where land transactions with or donations from private owners might occur. Finally, an Indigenous Peoples Planning Framework (IPPF) is being prepared to address potential risks on Indigenous Peoples that may be affected by Components 1 and 2. Regarding Component 1, in case that indigenous peoples are present in specific subproject areas of influence, a site-specific Indigenous Peoples Plan (IPP) will be developed. Economic or physical



displacement of indigenous communities is not anticipated, however, should it be required, the RPF will ensure requirements of ESS7 will be complied with, including obtaining FPIC. The design of specific subprojects will ensure that any project activities adversely affect Indigenous Peoples cultural heritage.

84. Regarding component 2, risks are mainly related to social communication and engagement, and can be easily mitigated by planning a robust participation plan and communication strategy aimed at including indigenous peoples in an efficient and culturally appropriate manner.

85. **Risks on sexual exploitation and abuse/sexual harassment (SEA/SH) are expected to be low** and mainly related to labor issues and workers for works under components 1 and 2, particularly construction works under the former. They will be mitigated through measures set in the ESMPs for both activities and LMP applicable to all Project activities, including the Code of Conduct that will be applicable to all Project workers.

86. **The borrower will take necessary measures to mitigate the risk of forced labor.** At global level, there are allegations of forced labor risks associated with the polysilicon (a key input for solar panels production) suppliers. The ESF prohibits the use of Forced Labor in any Bank-financed projects to which ESS2 Labor and Working Conditions apply. The borrower will require bidders to provide two declarations: a Forced Labor Performance Declaration (which covers past performance), and a Forced Labor Declaration (which covers future commitments to prevent, monitor and report on any forced labor, cascading the requirements to their own sub-contractors and suppliers). In addition, the borrower will include enhanced language on forced labor in the procurement contracts.

87. **The SEP describes the specific Grievance Mechanism (GM) for addressing project-related concerns and grievances during the project preparation and implementation.** The GM is based on existing channels (such as the 0800 telephone line from the Ministry of Economy, and WhatsApp from PERMER II - Renewable Energy for Rural Areas Project, P133288) and incorporates new channels to submit grievances and receive responses such as the Kobo ToolBox (online surveys). In line with ESS7, and especially for component 1, the GM seeks to be culturally appropriate and accessible for indigenous peoples, considering their customary dispute settlement mechanisms. Finally, the project GM also includes relevant SEA/SH considerations and protocols to properly respond and/or refer to the corresponding governmental service that could provide a proper response for the survivors.

V. GRIEVANCE REDRESS SERVICES

88. **Grievance Redress.** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, because of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit <https://accountability.worldbank.org>.



VI. KEY RISKS

89. **The overall residual risk rating associated with the proposed PDO is Substantial.** The section below presents the assessment and discussion of the key risks.

90. **Political and governance risk is assessed as Substantial.** The upcoming elections and changes in government could delay implementation and affect commitments regarding tariffs, subsidies, legal structure of the market, participation of the state in the sector, regulations for procurement or scrapping, among others, which could have an impact on Project outcomes. Government commitments with IMF and NDC play a relevant mitigation role as those commitments extend beyond a specific government mandate. Experience shows that in previous political and administration changes, GoA has provided continuous support to improving clean energy provision. In addition, the risk is mitigated by the work of the World Bank to strengthen and improve the operating environment and strengthen overall governance and transparency. It is likely this risk could delay the Project during implementation as mitigation measures cannot fully address political changes in Argentina.

91. **Macroeconomic risk is High.** The current macroeconomic conditions in Argentina include high foreign exchange volatility, low Central Bank reserves, and high inflation. The inherent risk is that these conditions might reduce the funding available for the Project and delay Project implementation directly and indirectly. Another risk is that price fluctuations could imperil implementation as – particularly in the case of energy efficiency measures – prices for appliances need to be pre-set between the SE and retailers and these may quickly become obsolete in a context of high inflation. Furthermore, Argentina's negotiations with the IMF could result in adjustments to Government's expenditures, structure, and programs and reduce the funding available for the Project. To mitigate the counterpart's budgetary risk, counterpart financing under the project draws largely from beneficiaries and other stakeholders involved. In addition, to mitigate the inflation risk, the Project will include price adjustment mechanisms in subproject contracts and agreements with retailers. This risk could likely delay the Project during implementation as mitigation measures would not be enough in a context of rampant inflation.

92. **The institutional capacity for implementation and sustainability risk is rated Substantial.** The inherent risk is the SE's limited capacity to deal with all the processes to successfully launch and craft Project activities in a timely manner as well as to coordinate the different and diverse set of activities under all the Project's components. Furthermore, this risk includes the complexities associated to Project implementation as this lie in the logistical coordination of all tasks and actors (and not in the technical design risk described above). These risks are mitigated by the fact that Argentina has well-staffed government officials familiar with programs like the ones to be implemented, the SE has overseen a wide range of projects with external multilateral financing – as well as bilateral donors and since the 1990s, the SE has been responsible for different Bank-financed operations and has received continuous support to expand and enhance its capacity including through the PCU. The PCU has a core cadre of qualified staff to manage most monitoring, evaluation, reporting, communication, environmental, social, procurement and monetary management activities. This unit is currently in charge of the implementation of the Renewable Energy for Rural Areas project (P133288), has a core of qualified staff and its capacity will be strengthened given the magnitude of the proposed operation. However, as this will be the first operation of the SE under the ESF, and several units in the Secretariat are to be involved, their capacity will be strengthened to have sufficient and trained staff. Finally, as large-scale decentralized renewable energy and energy efficiency operations face unique challenges associated with market dispersion, the considerable number of stakeholders, limited knowledge of the terrain, and complex communications, a delivery model tailored to these circumstances



is being developed. This risk could likely delay Project implementation given the logistical complexities associated to the Project.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Argentina

Clean Energy for Vulnerable Households and Communities Project

Project Development Objectives(s)

The objective of the Project is to increase energy access and energy efficiency in vulnerable households and communities and to respond promptly and effectively in case of an Eligible Crisis or Emergency.

Project Development Objective Indicators

| Indicator Name | PBC | Baseline | End Target |
|--|-----|----------|-------------------|
| Increase energy access in vulnerable households and communities | | | |
| People provided with new or improved electricity service (CRI, Number) | | 0.00 | 233,000.00 |
| Projected energy or fuel savings (CRI, Mega Joules (MJ)) | | 0.00 | 5,900,000,000.00 |
| Increase energy efficiency in vulnerable households and communities | | | |
| People provided with increased energy efficiency (Number) | | 0.00 | 1,250,000.00 |
| Projected energy or fuel savings (CRI, Mega Joules (MJ)) | | 0.00 | 10,170,000,000.00 |



Intermediate Results Indicators by Components

| Indicator Name | PBC | Baseline | End Target |
|--|-----|----------|------------|
| Component 1: Increase energy access in vulnerable households and communities | | | |
| Generation capacity of mini-grids (Megawatt) | | 0.00 | 9.00 |
| People provided with new or improved energy access through mini-grids (Number) | | 0.00 | 43,700.00 |
| Generation capacity of solar PV systems (Megawatt) | | 0.00 | 9.00 |
| People provided with new or improved energy access through solar PV systems (Number) | | 0.00 | 136,000.00 |
| People provided with new or improved energy access through solar thermal systems (Number) | | 0.00 | 24,300.00 |
| People provided with access to energy for productive uses (Number) | | 0.00 | 28,600.00 |
| Change in the time women spend on domestic/unpaid care work (Percentage) | | 0.00 | -10.00 |
| Net greenhouse gas (GHG) emissions (CRI, Metric tons/year) | | 0.00 | 19,400.00 |
| Component 2: Increase energy efficiency in vulnerable households and communities | | | |
| People provided with efficient refrigerators in households (Number) | | 0.00 | 576,000.00 |
| Lifetime energy savings from the deployment of efficient appliances (Gigawatt-hour (GWh)) | | 0.00 | 2,210.00 |
| Beneficiaries satisfied with the process to obtain a new and efficient refrigerator and resulting in improved energy efficiency (Percentage) | | 0.00 | 70.00 |
| People provided with efficient lighting in community centers (Number) | | 0.00 | 680,000.00 |
| Lifetime energy savings from the deployment of efficient lighting in community centers (Gigawatt-hour (GWh)) | | 0.00 | 630.00 |
| Beneficiaries satisfied with the process to obtain new and efficient lighting and resulting in improved energy efficiency | | 0.00 | 75.00 |



| Indicator Name | PBC | Baseline | End Target |
|--|-----|----------|--------------|
| (Percentage) | | | |
| Net greenhouse gas (GHG) emissions (CRI, Metric tons/year) | | 0.00 | 58,200.00 |
| Component 3: Project management and support for policymaking | | | |
| Development of an assessment of the participation of rural women in employment in the renewable energy sector (Text) | | No | Yes |
| Knowledge outputs and evidence produced to strengthen the energy sector's sustainability. (Number) | | 0.00 | 10.00 |
| Energy efficiency campaigns launched (Number) | | 0.00 | 3.00 |
| People trained on clean energy issues in connection with the Project (Number) | | 0.00 | 2,000,000.00 |
| of which females (Number) | | 0.00 | 1,000,000.00 |

Monitoring & Evaluation Plan: PDO Indicators

| Indicator Name | Definition/Description | Frequency | Datasource | Methodology for Data Collection | Responsibility for Data Collection |
|--|------------------------|-----------|-----------------------|---|------------------------------------|
| People provided with new or improved electricity service | | Annual | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |



| | | | | | |
|--|---|--------|-----------------------|---|-----------------------|
| Projected energy or fuel savings | | Annual | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| People provided with increased energy efficiency | The indicator measures the number of people that benefit from enhanced energy efficiency measures at the households and Clubes level. | Annual | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Projected energy or fuel savings | | Annual | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |



Monitoring & Evaluation Plan: Intermediate Results Indicators

| Indicator Name | Definition/Description | Frequency | Datasource | Methodology for Data Collection | Responsibility for Data Collection |
|---|---|-----------|-----------------------|---|------------------------------------|
| Generation capacity of mini-grids | This indicator measures the installed capacity of mini-grids constructed or rehabilitated under the Project. The baseline value is expected to be zero. | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| People provided with new or improved energy access through mini-grids | This indicator measures the number of people that have received an electricity connection under the Project via new or enhanced connections through mini-grids aimed at connecting households and public buildings using renewable sources (solar, wind, etc.). The baseline value for this indicator is expected to be zero. | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Generation capacity of solar PV systems | This indicator measures the capacity of generation through standalone solar PV systems for households or institutions and installed under the Project. The baseline value is expected to | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project | Secretariat of Energy |



| | | | | | |
|--|---|----------|-----------------------|---|-----------------------|
| | be zero. | | | reports. | |
| People provided with new or improved energy access through solar PV systems | This indicator measures the number of people that have received access to electricity under the Project via new or enhanced connections using standalone solar PV systems aimed at connecting households or public buildings. The baseline value for this indicator is expected to be zero. | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| People provided with new or improved energy access through solar thermal systems | This indicator measures the number of people that gain or obtain access to thermal energy provision (modern spatial heating, cooking or water heating) in public institutions. | 6 months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| People provided with access to energy for productive uses | This indicator measures the number of people that gained or obtained access to an electricity service devoted to productive uses. The baseline is expected to be zero. | 6 months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Change in the time women spend on domestic/unpaid care work | This indicator will measure how much time women | Annual | The questions | Ex-ante vs. ex-post comparison of the | Secretariat of Energy |



| | | | | | |
|--|--|--|---|--|--|
| | spend on domestic and/or unpaid work prior to Project activities and compare it with the time devoted for the same activities after rural electrification or improved service efforts have been undertaken, as these should help reduce the time for such tasks. | | will be incorporated in the form already implemented for productive uses (Argentina Renewable Energy for Rural Areas Project - P133288) for stages of delivery and monitoring (ex-ante vs. ex-post comparison) of the equipment. A questionnaire for mini-grids will be formulated from the list of users that the UEPS must provide for the evaluation of the specific | results of a socioeconomic survey conducted among a sample of beneficiary women with questions on the hours spent per week on unpaid tasks and the time spent on tasks that seek present or future remuneration. | |
|--|--|--|---|--|--|



| | | | | | |
|---|---|----------|-----------------------|---|-----------------------|
| | | | project. | | |
| Net greenhouse gas (GHG) emissions | Project net greenhouse gas (GHG) emissions are calculated as an annual average of the difference between project gross (absolute) emissions aggregated over the economic lifetime of the project and the emissions of a baseline (counterfactual) scenario aggregated over the same time horizon. They are reported in metric tons of carbon dioxide equivalent per year. | Annual | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| People provided with efficient refrigerators in households | This indicator measures the number of people that benefit from new and efficient appliances in households. | 6 months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Lifetime energy savings from the deployment of efficient appliances | This indicator measures energy savings achieved from the deployment of efficient appliances. | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project | Secretariat of Energy |



| | | | | | |
|---|--|----------|-----------------------|---|-----------------------|
| | | | | reports. | |
| Beneficiaries satisfied with the process to obtain a new and efficient refrigerator and resulting in improved energy efficiency | This component seeks to measure the percentage of people that are targeted by and benefit from the overall activities, results, impacts and implementation arrangements of Component 2 and which are satisfied with the overall participation process. | Annual | Secretariat of Energy | The PCU will track and monitor satisfaction levels through surveys with beneficiaries and report results annually. | Secretariat of Energy |
| People provided with efficient lighting in community centers | This indicator measures the number of people that benefit from efficient lighting in community centers. | 6 months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Lifetime energy savings from the deployment of efficient lighting in community centers | This indicator measures achieved energy savings from the deployment of efficient lighting in community centers. | 6 months | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Beneficiaries satisfied with the process to obtain new and efficient lighting and resulting in improved energy efficiency | This component seeks to measure the percentage of people that are targeted by | Annual | Secretariat of Energy | The PCU will track and monitor satisfaction levels through surveys | Secretariat of Energy |



| | | | | | |
|---|---|----------|-----------------------|---|-----------------------------|
| | and benefit from the overall activities, results, impacts and implementation arrangements of Component 2 and which are satisfied with the overall participation process. | | | with beneficiaries and report results annually. | |
| Net greenhouse gas (GHG) emissions | Project net greenhouse gas (GHG) emissions are calculated as an annual average of the difference between project gross (absolute) emissions aggregated over the economic lifetime of the project and the emissions of a baseline (counterfactual) scenario aggregated over the same time horizon. They are reported in metric tons of carbon dioxide equivalent per year. | Annual | Secretariat of Energy | The PCU at the SE will gather information on the performance of subprojects and activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| Development of an assessment of the participation of rural women in employment in the renewable energy sector | This indicator seeks to assess the current situation of rural women employment in the renewable energy sector. | Annual | Secretariat of Energy | Quantitative and qualitative data collection on a representative sample in coordination with regional institutional organizations. | Secretariat of Energy |
| Knowledge outputs and evidence produced to strengthen the energy sector's sustainability. | This indicator measures the number of studies, assessments, and any other | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the relevant activities | Secretariat of Energy - PIU |



| | | | | | |
|--|--|----------|-----------------------|---|-----------------------|
| | knowledge outputs and/or evidence financed under the project and to support the design of public policies to strengthen the overall energy sector's sustainability. | | | and present it through the monitoring systems and Project reports. | |
| Energy efficiency campaigns launched | This indicator measures the number of energy efficiency or energy savings campaigns launched in connection to the Project targeting beneficiaries or other energy users across Argentina. | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the relevant activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| People trained on clean energy issues in connection with the Project | This indicator measures the number of people and beneficiaries that are trained in clean energy issues under the Project. It includes relevant stakeholders, including the PCU, PEUs, public and private sector institutions, and direct Project beneficiaries as well as government officials, university students, entrepreneurs, local technicians, and others. | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on the relevant activities and present it through the monitoring systems and Project reports. | Secretariat of Energy |
| of which females | This subindicator measures the number of women trained in clean energy | 6 Months | Secretariat of Energy | The PCU at the SE will gather information on activities performed | Secretariat of Energy |



| | | | | | |
|--|---|--|--|--|--|
| | issues under the Project and including relevant stakeholders, including the PCU, PEUs, public and private sector institutions, and beneficiaries, amongst others. | | | and present it through the monitoring systems and Project reports. | |
|--|---|--|--|--|--|



ANNEX 1: Implementation Arrangements and Support Plan

1. Specific and additional implementation details for each Component – as relevant – are presented below, complementing the information presented in section *III.A Institutional and Implementation Arrangements* above. These will be further elaborated, defined, and potentially amended through the POM.

Component 1

2. Implementation will be kick-started by provinces, which, through the PEUs – and with the advice of the PCU – will prepare and submit subprojects to the PCU for approval. The PCU will then assess, prioritize, and define subprojects feasibility and carry-out relevant procurement processes, which will be coordinated with the PEUs. Once completed, it will be responsibility of the PEU's to report any performance issue and ensure their appropriate functioning and servicing. Component 1 participation requirements will include:

- a. Province's adherence through a Participation Agreement
- b. Existence or creation of a Provincial Executing Unit (PEU)
- c. Presence of a distribution company in the concession area to be targeted and of a regulator or agency that would fulfill such functions, or – in the case of subcomponent 1.c – existence of an entity to be responsible for the operation and maintenance of solar thermal equipment
- d. Allocation of Provincial resources mainly for operation and maintenance.
- e. When systems have already been installed, these should be in good conditions (thus demonstrating relevant entities compliance with service provision regulations)

3. The sustainability of energy access activities will rely on a series of rules and mechanisms to ensure appropriate operation, maintenance, and replacement mechanisms in access operations, typically through Qualified Service Providers (QSPs). These (public or private) entities – typically concessionaries – are tasked by Argentinian Law to manage and administer energy provision infrastructure in their areas as well as to ensure appropriate operation, maintenance and replacement (O&M&R) within their jurisdictions. These entities will take over the assets financed by access component, on behalf of the provinces and as mandated by Argentine Law. Provinces – through Provincial Executing Units – will ensure acceptable O&M&R mechanisms are in place and deployed through such QSPs during subprojects' lifecycles and that enough co-financing resources are available to guarantee their operation. Finally, beneficiaries also contribute to the subprojects through tariffs that cover – partially – O&M&R costs.

Component 2

4. Overall processes, roles, and responsibilities for subcomponent 2.a will be as follows:
- a. The SE will identify potential beneficiaries⁸⁶, define and announce participation guidelines, bidding processes (when applicable) and framework agreements for relevant retailers, logistics operators and waste management centers to join the replacement scheme.

⁸⁶ In collaboration with provincial authorities or distribution entities as needed.



- b. Beneficiaries will request their inclusion in the program through an App to be developed and include a picture of the current electricity bill and equipment to be replaced; interested retailers, logistical operators and waste management centers will submit expressions of interest or bid (when applicable) to join the scheme and or participate and adhere to established participation agreements or framework contracts.
 - c. The SE will send a voucher to complying beneficiaries to partially cover the new and efficient eligible refrigerator and scrapping and logistics.
 - d. Beneficiaries will use the voucher at the selected participating retailers and cover any remaining costs.
 - e. Selected logistics operators will retrieve the new appliance, deliver it to the beneficiary, confirm conditions match the information provided by the beneficiary, and collect the old and inefficient equipment and deliver it to a selected waste management center.
 - f. The waste management center will receive the replaced equipment and appropriately dispose it.
 - g. All parties (retailers, logistics operators, waste management centers) will appropriately report and document all their activities and be reimbursed as per the existing participation agreements or framework contracts.
5. In the case of subcomponent 2.b activities, the overall process will be as follows:
- a. The SE will identify potential beneficiaries⁸⁷, further define and announce participation guidelines and framework agreements for relevant energy efficiency services providers and other relevant stakeholders as well as collaboration agreements with entities such as the INTI.
 - b. The SE will select community centers to benefit from the program and to be bundled together to achieve economies of scale, based on eligibility and prioritization criteria to be further established in the POM.
 - c. The SE will procure the energy efficiency services for sets of community centers and monitor implementation progress and pay based on the resulting contracts.
 - d. The SE will evaluate program impact and overall adoption of energy efficient practices and technologies.

Component 3

6. Component 3 will be implemented by the PCU and supported by DGPYPSyE, which will launch bidding processes for the procurement of relevant human resources, equipment, or tasks, including training and capacity building activities and assessments as well as for any goods, works, or services linked to these analyses. As activities under component 3 could also be carried-out with or for other entities beyond SE or the Federal Government and to test new methodologies and technologies, *ad-hoc* collaboration agreements could be sought, if needed.

Implementation Support Plan

7. The World Bank will provide capacity building and training as needed to the SE on fiduciary and on environmental and social aspects to ensure appropriate project implementation. As mentioned before, other stakeholders – such as PEUs and provincial entities – will also be targeted including under component 3 activities.

⁸⁷ In collaboration with provincial authorities or distribution entities, as needed.



Training on fiduciary matters (such as procurement or financial management) would be provided to SE and DGPpPSyE as well as to other technical teams and stakeholders if necessary to ensure compliance with relevant policies. As the proposed operation will be the first one for the SE to be implemented under the World Bank's Environmental and Social Framework (ESF), training on relevant processes and policies will be provided to the SE. Furthermore, capacity strengthening measures on environmental and social management have already been identified and reflected in the Environmental and Social Commitment Plan (ESCP). Overall, the World Bank technical, ESF, procurement and FM teams will be available on a just-in-time basis to support and provide guidance as well as help resolve any related issues that may arise during Project implementation. Further details on the overall approach for implementation support on FM, procurement and ESF issues are detailed in the respective sections below.

Financial Management

8. A FM Assessment was carried out to assess the adequacy of FM arrangements in place DGPpPSyE.

9. In general terms, the Argentine national-level public FM system is reasonably well aligned with international good practices and standards as they are schematized by the PEFA⁸⁸ framework. The Project will make extensive use of country's systems in terms of budgeting, accounting, internal controls, and internal and external audit.

10. The FM Assessment identified the following risk to the achievement of the Project Development Objective: subcomponent 2.a's complexity. The main mitigating measures include: (i) preparation of a POM (including a section with FM arrangements acceptable to the Bank), which is reflected as a Project effectiveness condition; (ii) annual audit of project's financial statements following auditing standards and terms of reference acceptable to the Bank; (iii) specific flow of funds and disbursement arrangements will be used under the component 2.a (iv) continued close Bank support and supervision. The overall FM residual risk after mitigating measures is assessed as Moderate. The Project risk rating will be reviewed regularly in the course during Project implementation support.

11. The overall conclusion of the FM Assessment is that: (i) the FM arrangements for the proposed Project are considered adequate; (ii) the funds flow, disbursements, monitoring, auditing, and supervision arrangements have been designed in a way to respond to the Project's implementation arrangements; and (iii) the residual FM risk associated with the Project is rated as Moderate.

12. The FM pending step to be completed by Effectiveness is as follows: preparation of a POM (which is reflected as a Project effectiveness condition), including administrative procedures, the vouchers use mechanism, the Project's chart of accounts, flow of funds, IFR format agreed with the Bank, TOR of financial external audit, and format of annual financial statements.

Institutional Arrangements for FM

13. DGPpPSyE of the MECON will be responsible for overall FM aspects comprising; overseeing budget formulation and execution; treasury operations including payments of eligible expenditures; managing the Designated Account (DA) and submission of withdrawal applications to the Bank; maintaining the Project's accounting records and preparing the requisite Project financial reports; and complying with the Project's external

⁸⁸ Argentina - Public Expenditure and Financial Accountability (PEFA): Performance Assessment Report, Report No: AUS0001244, December 2019.



auditing arrangements. DGPyPSyE is currently responsible for fiduciary functions of the Argentina Renewable Energy for Rural Areas (PERMER II) Project in Argentina Project. There are no outstanding or unsatisfactory audit reports for the active Bank project (managed by DGPyPSyE) under implementation.

External Auditing

14. The Project's annual financial statements will be audited under Terms of Reference (TORs) prepared according to Bank guidelines and performed by an independent auditor following standards acceptable to the Bank. TORs will be agreed with DGPyPSyE and incorporated in the POM. Audited financial statements will be furnished to the Bank no later than six months after the end of each fiscal year—or another period agreed upon with the Bank (not exceeding 18 months) if due to project circumstances, it is more cost-effective to join periods to be audited. In accordance with the Bank's Access to Information Policy, upon receipt of the annual audited financial statements of the Project, they will be made available to the public by the Bank. It is expected that the financial audit will be conducted by the AGN. If AGN will not be capable of conducting the external audit, a private auditor acceptable to the Bank will be hired to conduct the audit.

Organization and Staffing

15. According to the last implementation support mission of the active project carried out in October 2022, DGPyPSyE has qualified and FM experienced staff. DGPyPSyE's FM team will continue supporting the implementation and closing of the current project as well as the implementation of the new proposed Project.

Budgeting

16. National budget formulation and implementation are guided by rules established by the National Constitution and the Financial Administration Law. The preparation of the annual budget, which integrates current and capital expenditures, is coordinated by MECON, and follows a clearly defined calendar that is generally adhered to. The Federal Government's Integrated Financial Management Information System (*Sistema Integrado de Información Financiera*, or e-SIDIF) will be used for fulfilling project budget accounting needs. The Project will rely on the MECON own procedures for budget formulation and execution.

Accounting and Financial Reporting

17. The UEPEX⁸⁹ system which is the Federal Government system for accounting and financial reporting of donor-financed operations will be used to generate the annual financial statements and Interim Financial Reports (IFRs) for reporting purposes. These reports will be generated on the basis of budget execution reporting in the e-SIDIF system and will consolidate results of all the Project's components. DGPyPSyE will be responsible for: (i) maintaining the Project's accounts with the chart of accounts reflecting the Project categories, components, and source of funding; and (ii) producing the requisite annual financial statements following International Accounting Standards. The cash basis accounting will be used to maintain the Project's records. Project financial reports will consist of annual financial statements and semiannual IFRs. The Chart of accounts, format, and content of annual financial statements and IFRs will be incorporated in the POM.

18. The following table shows the financial reports as scheduled to be submitted to the Bank:

⁸⁹ UEPEX: Argentina budget execution and recording software for multilateral financed operations.



Table A1 1: Reports' Schedule

| Report | Due date |
|--|---|
| Semi-annual unaudited IFRs reflecting the sources and uses of funds for each semester and cumulative uses by category, including beginning and ending cash balances. | Within 45 days after the end of each calendar semester |
| Annual audit report on project financial statements | Within six months after the end of each calendar year (or other period agreed with the Bank). |
| Special opinions on SOEs and Designated Account | |
| Management letter identifying any internal control weaknesses and areas for improvement | |

Internal Control and Internal Auditing

19. The internal control environment to be used for the Project is anchored in Argentina's legal and institutional framework and the Secretariat of Energy's operational processes and procedures. These allow for the establishment of roles and responsibilities for FM, and the proper segregation of duties. The internal controls relevant to the Project include arrangements to ensure that: (a) operations are conducted effectively, efficiently, and in accordance with relevant financing agreements; (b) financial and operational reporting is reliable; (c) applicable laws and regulations are complied with; and (d) assets and records are safeguarded. The use of the national e-SIDIF system, with its inbuilt controls that ensure proper authorization of transactions, contributes to the observance of these controls. Besides, the MECON is under the scope of the General Syndicate of the Nation or SIGEN, which is the Federal Government's internal audit office under the Executive branch. SIGEN supervises and coordinates the actions of the Internal Audit Units in all government agencies, approves their audit plans, and conducts independent audit.

Disbursement Arrangements

20. The following disbursement methods may be used under the loan: (i) Advance; (ii) Reimbursement; and (iii) Direct Payment.

Flow of Funds and Disbursement Arrangements for Eligible Expenditures

21. The Project will finance the procurement of works, goods, consultant and non-consultant services, operating costs, training, and workshops, for which regular IPF disbursement mechanisms will be used. To finance expenditures to local providers, a specific segregated Designated Account (DA) managed by DGPYPSyE and denominated in the loan currency (US\$), will be opened at the state-owned bank, Banco de la Nación Argentina (BNA) (acceptable to the Bank). This account will receive advances from the Loan account and will be replenished by the Bank as execution progresses. The DA will have a Fixed Ceiling of US\$40 million. The frequency for reporting eligible expenditures paid from the DA will be at least once every three (3) months. Proceeds from the DA will be transferred to an Operating Account managed by DGPYPSyE and denominated in AR\$ to handle payments of eligible expenditures to local providers. These transfers will take place based on quarterly forecasted expenditures. Under this modality, DGPYPSyE will document eligible expenditures to the Bank using Statements of Expenditures (SOEs). At the request of the government, the Bank will make Direct Payments to vendors based on requests for payments and supporting documentation. Reimbursement of eligible expenditures will also be permitted. The Project's Minimum Application Size for Direct Payments and Reimbursement will be US\$500,000 equivalent. The Project will have a four (4) month Grace Period after the closing date.



22. While most of the disbursements under the Project's components will follow the regular disbursement mechanisms by which DGPYPSyE will make payments for the procurement of goods, works, consulting services, non-consulting services, operating costs and training, a portion of disbursements under subcomponent 2.a will follow specific flow of funds disbursement arrangements as described further below.

23. With the purpose of supporting the provision of enhanced energy use to vulnerable households across the country under the subcomponent 2.a⁹⁰, the Project will finance the replacement of old and inefficient food conservation appliances with new and efficient refrigerators (class A and higher) using gases with low global warming potential through the provision of Vouchers⁹¹. The amount of the Vouchers to be delivered to the Selected Beneficiaries will be documented to the Bank as eligible expenditures under the Category 2 through a customized SOE which format is included in the DFIL. Detailed internal controls procedures over the subcomponent 2.a will be clearly defined in the POM.

24. The table below shows the overall arrangements for disbursements.

Table A1 2: Disbursement Arrangements

| | |
|--|--|
| Retroactive expenditures | <p>Eligible expenditures:</p> <ul style="list-style-type: none"> Are paid up to 12 months prior to the date of loan signing (the authorized retroactive period will be defined in the Loan Agreement); and Do not exceed 20 percent of the loan amount. |
| Reimbursement of eligible expenditures pre financed by the government after the date of loan signing | <ul style="list-style-type: none"> Reimbursement of eligible expenditures. |
| Other Disbursement Methods | <ul style="list-style-type: none"> Advance to a segregated DA in US\$ managed by DGPYPSyE with a proposed ceiling of US\$40 million (TBC). Direct Payments to suppliers. The Minimum Application Size for Direct Payment requests will be defined in the Disbursement and Financial Information Letter (DFIL). |
| Frequency of reporting expenditures paid from the DA | <ul style="list-style-type: none"> Quarterly or more often is needed. |
| Supporting documentation | <ul style="list-style-type: none"> Statement of Expenditures (SOEs). Records (supplier contracts, invoices, and receipts) for Direct Payments. |

⁹⁰ It is expected that SE will identify potential beneficiaries, define and announce participation guidelines, bidding processes (when applicable) and framework agreements for relevant retailers, logistics operators and waste management centers to join the replacement scheme. Beneficiaries will request their inclusion in the program through an app to be developed and include a picture of the current electricity bill and equipment to be replaced; interested retailers, logistical operators and waste management centers will submit expressions of interest or bid (when applicable) to join the scheme and or participate and adhere to established participation agreements or framework contracts. The SE will send a Voucher to Selected Beneficiaries to partially cover the new and efficient eligible refrigerator. Beneficiaries will use the Voucher at the selected participating retailers and cover any remaining costs. Selected logistics operators will retrieve the new appliance, deliver it to the beneficiary, confirm conditions match the information provided by the beneficiary, and collect the old and inefficient equipment and deliver it to a selected waste management center. The waste management center will receive the replaced equipment and appropriately dispose it. All parties (retailer, logistics operators, waste management centers) will appropriately report and document all their activities and be reimbursed as per the existing participation agreements or framework contracts.

⁹¹ According to the provisions of the Loan Agreement, Voucher means the non-refundable, adjustable financial support provided by the Borrower, through SE, in favor of a selected vulnerable household, for use by said selected vulnerable household as partial payment to an Eligible Retailer in connection with the purchase of a new appliance (covering a portion of the cost of said appliance), in accordance with the POM.



Table A1 3: Category of expenditures and financing percentages

| Category Description | Amount of the Loan Allocated (US\$) | Percentage of Expenditures to be Financed (inclusive of Taxes except for fee leveled from financial transactions) |
|---|-------------------------------------|---|
| (1) Goods, works, consulting services, non-consulting services, Training Costs, and Operating Costs for Parts 1, (2)(ii) and 3 of the Project | 286,000,000 | 100% |
| (2) Vouchers under Part 2(a)(i) of the Project | 113,000,000 | 100% |
| (3) Emergency Expenditures under Part 4 of the Project | 0 | 100% |
| (4) Front-End Fee | 1,000,000 | |
| Total IBRD Project Costs | 400,000,000 | 100% |

Contingency Emergency Response Component

25. This component will finance eligible expenditures required for Argentina to respond to an eligible crisis or emergency, defined as “an event that has caused, or is likely to imminently cause, a major adverse economic and/or social impact associated with natural or man-made crises or disasters”. The list of eligible expenditures, the funds flow arrangements and the Implementation Agency will be defined in the CERC Manual that will be adopted and will be included as part of the in the POM once a disaster is declared in accordance with the conditions established in the financing agreement. The expenditures will be documented through Statements of Expenditures. If an entity other than DGPYPSyE leads the emergency response, we would need to conduct a FM assessment of said entity, prior to funds under this component being disbursed.

Retroactive Financing

26. The Bank will reimburse the expenditures for payments made up to one year prior to the expected date of the Loan Agreement. These expenditures will not exceed US\$80 million equivalent (20 percent of the loan amount). Such funds will be deposited in a separate bank account informed by the government, other than the DA.

27. The following figures present the proposed flow of funds:

Figure A1 1: General Flow of Funds (Category 1)

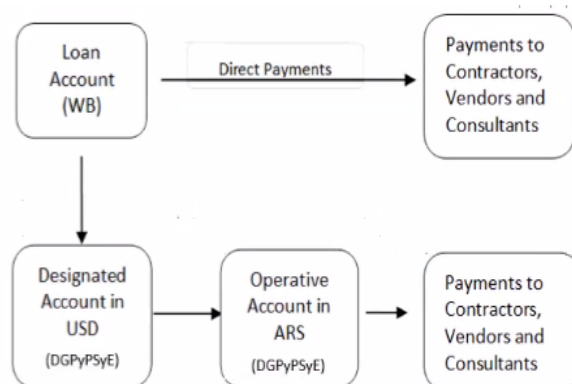
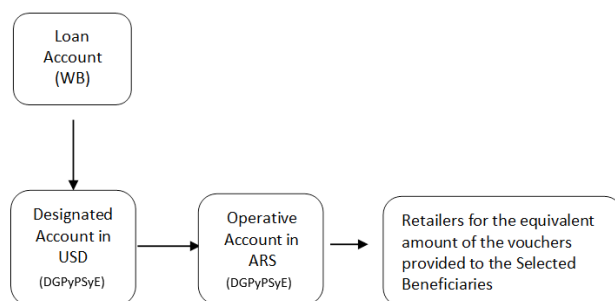


Figure A1 2: Specific Flow of Funds (Category 2)



FM Risk

28. The overall FM residual risk after mitigating measures is assessed as Moderate. The following mitigating measures will be implemented to cope with the identified Project's risks: (i) preparation of a POM (including a section with FM arrangements acceptable to the Bank), which is reflected as a Project effectiveness condition; (ii) annual audit of project's financial statements following auditing standards and terms of reference acceptable to the Bank; (iii) specific flow of funds and disbursement arrangements will be used under the subcomponent 2.a (iv) continued close Bank support and supervision. The overall FM residual risk after mitigating measures is assessed as Moderate. The Project risk rating will be reviewed regularly in the course during Project implementation support.

FM Implementation Support Plan

29. The FM supervision plan and the resources to be allocated thereto have been determined in accordance with the risks identified. During the Project's implementation, FM staff will assess the continuing adequacy of the FM arrangements for the Project. In addition to monitoring the timeliness of receipt of the IFRs and annual audited financial statements, FM staff will review these reports. The Project's FM Specialist (FMS) will participate in at least one supervision mission every year and will provide ad hoc support through emails and phone calls as



needed. The FM supervision plan will be adjusted by the assigned FMS according to Project's fiduciary performance and updated risk.

Table A1 4: FM Pending Steps

| Action | Responsible Entity | Completion Date |
|---|--------------------|------------------|
| Preparation and review of the FM section of the POM which will include inter alia: <ul style="list-style-type: none">- Administrative procedures.- Vouchers use mechanism.- Chart of accounts.- Flow of funds.- IFR format for reporting and disbursement purposes agreed with the Bank.- Format of the Annual Financial Statements; and- TOR for the financial external audit. | DGPyPSyE | By effectiveness |

Procurement

30. The overall project risk for procurement after the proposed mitigating measures is assessed as Moderate. Procurement will be conducted using the World Bank's 'Procurement Regulations for IPF Borrowers', issued in July 2016 and updated in November 2020, for the supply of goods, works, and non-consulting and consulting services. The World Bank's Standard Procurement Documents will govern the procurement of World Bank-financed Open International Competitive Procurement. For procurement involving National Open Competitive Procurement, the borrower may use documents agreed with the World Bank.

31. The World Bank has conducted a capacity assessment in December 2022 of the PCU to review the organizational structure for carrying out procurement under the project and the experience of the existing procurement staff. The assessment concludes that the current staff has adequate experience implementing World Bank-financed projects and particularly on the type of procurement that this operation includes. Nonetheless, the assessment identified risks arising from the increasing workload and additional coordination complexity of subcomponent 2.a that this operation will entail.

32. The Borrower has prepared a PPSD to define a fit-for-purpose procurement approach for the high value and/or high-risk activities particularly under components 1 and 2. As a result of this analysis, it is concluded that the best alternative for most activities for the procurement of works, goods and non-consultant services under components 1, 2 and 3 is an approach via requests for bids in an open competitive process, applying the current country thresholds to define the market approach. Additionally, for specific cases, and given the number of interventions, the PCU will implement approaches that could benefit from economies of scale centralizing demand through arrangements such as framework agreements when applicable. The PPSD also describes a fit-for-purpose implementation arrangements for the transfers to beneficiaries for the replacement of refrigerators program under subcomponent 1.a. Based on project's design, refrigerators will be partially financed by a transfer to selected beneficiaries provided through a voucher to purchase the appliance and beneficiaries will finance the remaining cost, and consequently this part of the project is not considered procurable. Beneficiaries can use such vouchers within the retailers participating in the program. The PCU will ensure a screening process to select the retailers with established technical and commercial conditions to identify the capacity to provide the refrigerators



under the established conditions. The PCU will carry out an open national advertisement with the conditions of the program and sign framework agreements with interested retailers where the vouchers can be applied. The procurement of the services for logistics and disposal to be carried out by the PCU will follow regular procurement methods as described in the previous paragraph.

33. For the procurement of solar panels, prior to beginning the procurement process, the borrower will undertake market analysis to identify the possible sellers of solar panels to the project. The bidding documents will emphasize forced labor risks in solar panels and components and will require that sellers of solar panels to the project will not engage or employ any forced labor among their work force. Bidders will be required to provide two declarations: a Forced Labor Performance Declaration (which covers past performance), and a Forced Labor Declaration (which covers future commitments to prevent, monitor and report on any forced labor, cascading the requirements to their own sub-contractors and suppliers). In addition, enhanced language on forced labor will be included in the procurement contracts. The Bank will prior review procurements of solar panels and components to ensure that enhanced provisions are used by the borrower.

34. For the CERC component (component 4), the procurement procedures will be defined in the appropriate CERC Manual to be implemented if such component was triggered, following emergency arrangements as of stated in the World Bank's Procurement Regulations.

35. Based on the capacity assessment and the risks identified in the PPSD, the following actions are recommended to mitigate procurement risks and facilitate project implementation: a) strengthen the procurement team with additional support to address the increasing workload that the operation will require; b) for subcomponent 1.a, specific procedures, logistics, coordination and implementation team should be defined in the POM with the detail of roles and responsibilities to enhance a coordinated implementation, c) support and assistance from the World Bank procurement team to the PCU during project implementation, in particular for more complex activities such as the implementation of consolidated procurement.

36. Procurement activities expected to be carried out during the first 18 months of project implementation are detailed in the Procurement Plan. The rest of the activities will be added to the Procurement Plan once they are defined by the technical areas and any updates on the PPSD will be reflected during project implementation.

Environmental and Social

37. SE, through the PCU will be the ultimate responsible for the compliance of the applicable environmental and social requirements and regulations. It will supervise, monitor implementation and report on the subprojects and project activities, even when implemented or supported by third parties. SdE will further support such partner entities to ensure they are trained in relevant environmental and social standards and perform all tasks in accordance with the ESF. Partner's roles and responsibilities will be formalized through participation agreements to be developed during project implementation and including technical, economic, financial, environmental, and social roles and responsibilities.

38. SE has overseen a wide range of projects with external multilateral financing – as well as bilateral donors – for a long time. Since the 1990s, SE has been responsible for different Bank-financed operations and has received continuous support to expand and enhance its capacity including through the Project Coordination Unit. In the recent past, it implemented the FODER – Argentina Renewable Fund Guarantee Project (P159901), and it is currently completing the implementation of the PERMER II – Renewable Energy for Rural Areas Project (P133288). which is being implemented under the former environmental and social safeguard operational policies. The



performance of PERMER II has experienced challenges in the environmental and social management that justifies the need to strengthen the institutional capacities of the Project.

39. The PCU for the proposed new project is integrating the environmental and social management teams from the FODER and PERMER II, aiming at consolidating a core cadre of qualified staff to handle environmental and social management issues. The integrated E&S team is composed of two social and gender specialists, an environmental specialist, an environmental and social specialist, and a lawyer. Aiming at better coordinating both teams in the preparation of the E&S instruments, the PCU has hired an external consultant with experience working with multilateral development banks, conducting E&S evaluations, and implementing E&S safeguards/standards.

40. However, the proposed operation will be the first one for the SE to be implemented under the World Bank ESF. Despite its previous exposure to World Bank requirements, SE lacks the required know-how to manage certain E&S aspects required under the ESF that are relevant to the appraised project, such as the management of hazardous and nonhazardous wastes and water use efficiency. As such, capacity strengthening measures on environmental and social management have been identified and accordingly reflected in the ESCP.



ANNEX 2: Detailed Project Description

1. The operation will target vulnerable households and communities, which can be found in rural and isolated areas as well as in urban centers. Regardless of key differences, these populations tend to lack access to high-quality, clean, and modern energy services, are in a state of energy poverty and could greatly benefit from increased energy access and (or) energy efficiency. In Argentina, northern provinces tend to have a higher share of both rural and urban vulnerable populations, even if in absolute terms the latter may be concentrated in the Buenos Aires City and Province as well as in the Pampa region.
2. Additional Project context data and details for each Component are presented below, complementing the information presented in section *II.B Project Components* above. These further elaborate on key characteristics of the targeted populations and activities to be implemented by the operation. Further definitions and potential changes will be processed or included through the POM.

Targeted populations

Table A2 1.: Share of vulnerable households per province⁹²

| Region | Share of vulnerable households (%) |
|--------------|------------------------------------|
| CABA | 31.7 |
| GBA | 54.6 |
| Pampa | 50.9 |
| Northwest | 66.1 |
| Northeast | 77.2 |
| Cuyo | 51.5 |
| Patagonia | 33.9 |
| Total | 52.5 |

3. Households across Argentina tend to devote on average 4.4 percent of their income to energy expenditures, with electricity representing close to two thirds of such expenditures. This share is higher amongst lower-income households as these devote over 10 percent of their income to energy expenditures.⁹³

⁹² Bonfils & Reibel, p. 142.

⁹³ Bonfils & Reibel, *Estudio de los patrones de consumo energético de los hogares: Una alternativa para focalizar las medidas de eficiencia energética*, 2022, p. 118.



Table A2 2: Energy expenditures as a share of income per province⁹⁴

| Regions | Median energy expenditures relative to income | Median electricity expenditures relative to energy expenditures | Energy expenditures (in US\$) | Electricity expenditures (in US\$) |
|--------------|---|---|-------------------------------|------------------------------------|
| Northwest | 4.8% | 70.0% | 1,285 | 923 |
| Northeast | 4.8% | 69.5% | 1,043 | 811 |
| GBA | 4.8% | 59.6% | 1,720 | 1,073 |
| Pampa | 4.8% | 57.6% | 1,502 | 853 |
| Cuyo | 4.4% | 58.7% | 1,380 | 807 |
| Patagonia | 3.5% | 69.2% | 1,447 | 959 |
| CABA | 2.0% | 58.1% | 977 | 583 |
| Total | 4.4% | 61.5% | 1,451 | 898 |

4. As regards coverage, rural households without access to electricity also tend to concentrate in northern Argentina.

5. Based on the recently created RASE, low-income populations (segment 2) tend to own a greater share of old and inefficient refrigerators and would be well served by their replacement.

Table A2 3: Refrigerators age and ownership per income segment⁹⁵

| Refrigerators age | Segment | | | | | | Total | |
|----------------------|---------|------|-----------|------|-----------|------|------------|------|
| | 1 | | 2 | | 3 | | | |
| | # | % | # | % | # | % | # | % |
| <5 years | 184,726 | 31% | 1,123,857 | 20% | 1,561,457 | 25% | 2,870,040 | 23% |
| 5-10 years | 226,414 | 38% | 2,035,497 | 37% | 2,391,518 | 38% | 4,653,429 | 37% |
| 11-20 years | 125,848 | 21% | 1,486,353 | 27% | 1,419,349 | 23% | 3,031,550 | 24% |
| >20 years | 24,974 | 4% | 480,835 | 9% | 391,328 | 6% | 897,137 | 7% |
| No data | 38,308 | 6% | 407,636 | 7% | 528,655 | 8% | 974,599 | 8% |
| Total | 600,270 | 100% | 5,534,178 | 100% | 6,292,307 | 100% | 12,426,755 | 100% |

6. Vulnerable populations also benefit from *community centers* (such as *clubes de barrio y pueblo*, community kitchens, communal playrooms, popular libraries, and many others) services across Argentina. These spaces represent a key social service that allows for a healthy development of young and old Argentinians.

⁹⁴ Ibid., pp. 115-116.

⁹⁵ Bonfils & Reibel.



Improvements in the quality of their services and reduced expenditure could have a great positive impact that would be felt across the country.

Components and activities

7. All components will be oriented towards reducing GHG emissions and helping mitigate – or adapt to – climate change either through investments or by facilitating resources, capacities or knowledge through Project management and support to policymaking. The section below presents additional details to complement the information already presented in section *II.b Project components*.

Component 1: Increase energy access in vulnerable households and communities

8. This component seeks to support interventions that help supply energy and improve suboptimal electricity services in dispersed rural communities in general, and the most vulnerable populations within these communities by targeting both households and public institutions such as schools, health posts or provincial public services centers).

Subcomponent 1.a: Mini-grids

9. Targeted communities could include isolated populations that lack electricity services or are only served by small diesel generation plants that provide a discontinuous (only during certain seasons) or limited (only for a reduced number of hours per day) electricity service (due to challenges associated with transporting and storing fuel). The subcomponent would cover both the installation of the renewable energy generation plant as well as medium and low voltage distribution networks, as needed.

Subcomponent 1.b: Standalone solar PV systems

10. The subcomponent would target both households and public institutions. In the case of individual households, the PV systems would be adapted to the needs of the targeted beneficiaries and local conditions. The Project would finance second-generation equipment (including, *inter alia*, the PV panels and base, charge controller, battery and its container, interconnection conductors and grounding system), its installation (including – *inter alia* – board, pipes, conductors, lamps, power outlets and a continuous-continuous converter), and AC converter (for larger systems). In the case of third-generation systems, the subcomponent would fund – *inter alia* – the PV module, LED lighting fixtures (including a flashlight), battery with built-in regulator, connection conductors and cell phone charger.

11. The subcomponent would also target public institutions, such as schools, health care centers and other public facilities. Activities would benefit both unserved as well as underserved establishments and, in all cases, the Project would seek to provide both the renewable energy generation equipment as well as the electrical installation (in AC). In the case of schools, it is expected the Project would extensively support the installation of systems in schools that already have a basic electricity service to allow for use of computers. Regarding health care centers, the Project will finance all relevant power generation equipment and fixtures as well as an efficient refrigerator for the conservation of sanitary supplies in small health establishments that require it. In the case of any other public facility, the renewable energy generation system, internal installation, and fixtures will be provided.

Subcomponent 1.c: Thermal systems

12. This activity would replace existing equipment or infrastructure that relies on wood and fossil fuels and could include the procurement and installation of equipment for drying, hot water supply (solar water heaters) or spatial heating systems (solar heating).



Subcomponent 1.d: Productive uses

13. The subcomponent will target individual household-level and existing productive uses, or collective productive initiatives already developed by associations or producers' cooperatives. The subcomponent could also finance the installation of PV systems for water pumping in isolated households, communities or public institutions. In all cases, the water would be extracted from existing wells, solely PV systems would be used (for new water pumping services or for replacing diesel-powered equipment), no batteries would be necessary (but water storage could be used) and water quality would need to be independently assessed when pumping water for larger uses or users or community systems.

Component 2: Increase energy efficiency in vulnerable households and communities

14. Component 2 will seek to increase energy efficiency across Argentina with a focus on vulnerable households, communities and their *community centers* (such as *clubes*, community kitchens, communal playrooms, popular libraries, and many others) through: (a) the replacement of old and inefficient food conservation appliances, as well as their scrapping, by financing and facilitating the provision of new and efficient refrigerators (class A and higher) using gases with low global warming potential, and associated logistics at the residential level⁹⁶; and (b) the acquisition and installation of efficient lighting fixtures, wiring and associated equipment and minor works as well as the scrapping of old lighting features at the community center level.

15. The Project will rely on cellphone-based apps to both allow beneficiaries to self-report the appliance to be substituted, as well as use such information to execute and monitor said replacement. Such mechanism would allow to track the appliances' replacement cycle and overall implementation progress. Furthermore, an app-based reporting (or similar) system would allow beneficiaries to also report satisfaction with either the household or *community centers* subcomponent and its implementation. The reporting mechanisms would also be expanded to and required for waste management centers. True sustainability calls not only for the actual disposal of old equipment but also to the appropriate discarding of materials, particularly the high global warming potential gases to be found in old appliances and any substances within old lighting fixtures. Additional details of the subcomponents are described below.

Subcomponent 2.a: Households

16. The Project will target the replacement of 20 percent of 15-year-old – or older – refrigerators in the low-income segment as defined by the new tariffs and RASE, or 5 percent of all refrigerators in this same segment, this is roughly 200 thousand refrigerators. The subcomponent will finance also the logistical costs associated with such replacements as well as the scrapping. While it is expected a refrigerator could cost around US\$568 each, the logistical costs per appliance would on average amount to US\$250 and the scrapping would cost US\$54 per refrigerator.

17. The amount of appliances to replace would be similar to the refrigerators produced in 3 months in Argentina (roughly 80 thousand per month) and slightly higher than the sales for such same time period (45 thousand per month). The Project thus would not represent a challenge for the sector and would indirectly benefit economic activities across the country as the seven key manufacturing companies (responsible for roughly 84 percent of total refrigerators production in Argentina) are based in Santa Fe, Buenos Aires, San Luis and Catamarca.

18. The program would also seek the appropriate scrapping of the refrigerators. Existing waste management centers (15) are located in the Buenos Aires Province and City, Córdoba, Mendoza and Santa Fe. Additional centers

⁹⁶ The country has twenty-six waste operators capable of handling old refrigerators and lighting equipment to be replaced, distributed in eight provinces: CABA, Buenos Aires, Catamarca, Córdoba, Chaco, Entre Ríos, Santa Fe and Tucumán.



that could be potentially used (11) have also been further located in the Buenos Aires Province as well as in Neuquén, Chaco, Córdoba and San Juan.

Subcomponent 2.b: Community centers

19. The subcomponent would target community centers registered in the relevant databases (such as that for *clubes* kept by the Ministry of Tourism and Sports). Activities to be performed will vary per center and include the specific assessments, lighting fixtures replacement, support from an electrician during installation, logistics and scrapping.

Component 3: Project management and support for policymaking

20. This component will support Project management and institutional capacity building for implementation and sustainability and improved knowledge, leveraging the Government's existing resources and institutional structures. Further details on specific activities under this component are presented below.

Subcomponent 3.a: Project management

21. This subcomponent will focus on providing support and capabilities for overall Project management, including coordination, implementation, technical design, legal, procurement, financial management and fulfillment of all fiduciary obligations; liaising and establishing relevant implementation agreements with key institutions collaborating with the Project, communication, environmental and social management (as per the Project Environmental and Social Commitment Plan, and its related instruments), monitoring, tracking mitigation and adaptation results and impacts, and evaluation; engagement and consultations with targeted populations and beneficiaries to foster behavioral change (including the implementation of the Project Stakeholder Engagement Plan, and its Grievance Redress Mechanisms), as well as developing, supporting and tracking implementation of the Project's gender action plan and other gender-related activities to be designed to increase the impact of the operation, including developing methodologies to track the participation of women, assess gender gaps and implement relevant measures as well as deploy training activities and also support MECON in its strategic evaluation of the Project.

Subcomponent 3.b: Support for policymaking

22. The subcomponent will seek to fund activities to increase local capacities, provide evidence and outputs for policymaking and develop communication strategies. Activities will include the following activities.

- a. Technical assistance activities for SE and other relevant entities – such as provincial or national regulatory entities. Activities will aim to enhance capacities, knowledge and understanding of generation, distribution, or segmentation activities as well as help develop overall capacities for policy development. The subcomponent will also seek to support improving capacities to assess and address key drivers of the energy sector's sustainability, tariffs, climate resilience and vulnerability issues, energy transition and decarbonization; change management, improved regulatory frameworks and human resources development; aligning incentives to increase energy efficiency, standards, and regulations; improvement of generation, distribution and segmentation mechanisms, amongst others.
- b. Production of outputs and evidence for policy making and overall the energy sector. Activities will seek to improve key stakeholders' understanding of the energy sector's decarbonization pathways, key energy sector issues, new technologies, or testing innovative approaches or methodologies for clean energy in Argentina. Specific assessments to be produced will be defined throughout Project implementation and could include, inter alia:



- i. Impact assessment of energy access and efficiency policies and activities;
 - ii. Assessments to determine cost competitiveness of energy access strategies, including grid extensions and distributed generation (Least Cost planning estimation);
 - iii. Development of systematic ways to collect, present and update provincial tariffs and related information;
 - iv. Overall Project monitoring system, including capability to detect Project implementation anomalies;
 - v. Surveys and assessments to identify gender gaps in targeted populations as well as to track impact of the operation on women;
 - vi. Development of tailored support and approaches to support and test water pumping systems for human consumption in rural areas;
- c. Development of general and specific communication strategies to ensure successful implementation. Activities will include preparing outputs such as:
- i. Overall communications plan, to ensure appropriate dissemination of Project activities and prevent any potential negative impact associated with the operation's implementation. The plan will also seek to involve beneficiaries and implement participation strategies as per the identified vulnerable actors and including the universal design principles as set out in Article 2 of the Convention on the Rights of Persons with Disabilities.
 - ii. Awareness campaigns on energy use and efficiency for beneficiaries of both components 1 and 2. Dissemination strategies will be also adapted to visually impaired persons (as per Article 2 of the Convention on the Rights of Persons with Disabilities), illiterate people, and to indigenous peoples, as needed.
 - iii. Training procurement staff on the inclusion and proper weighting of environmental sustainability issues in relevant processes.
 - iv. Develop component 1 focused strategies to improve the channels and means of communication between relevant stakeholders (SE, Provincial authorities, etc.); implement information collection systems to allow for improved monitoring and response to specific queries or complaints and strengthen capacities by training relevant SdE and Provincial staff on data processing and Project monitoring systems.
 - v. Perform component 2 focused activities such as providing technical training to the INTI for the implementation of the community centers subcomponent, including on energy efficiency awareness and on lighting fixtures auditing; facilitating the preparation, design and dissemination of information for the community centers subcomponent with the participation of the INTI; training and capacity strengthening for waste management centers to better include sustainability issues into their operations and allow their incorporation in circular economy circuits; and raising awareness among targeted and overall low-income populations on the multiple benefits of energy efficiency measures, including developing educational resources to increase awareness on energy consumption and its impact on household, institutions and



community centers finances⁹⁷, health and the environment, itinerant education programs and courses in schools and other behavior change-related activities.

Component 4: Contingent Emergency Response Component

23. **Component 4: Contingent Emergency Response Component (CERC) (with an initial zero-dollar allocation; if this component is activated, it will be financed by the Loan).** This component is a contingent financing mechanism available to Argentina to have immediate access to World Bank financing to respond to an eligible crisis or emergency, defined as “an event that has caused, or is likely to imminently cause, a major adverse economic and/or social impact associated with natural or man-made crises or disasters.”

⁹⁷ It is estimated that awareness-raising activities with community center users alone could help reduce *Clubes* energy consumption by 2 to 5 percent.



ANNEX 3: Economic and Financial Analyses

Introduction

1. The Project is expected to increase energy access and energy efficiency in vulnerable households and communities. The operation will also help increase renewable energy generation and energy savings. The Project will also provide global and environmental benefits by reducing the use of electricity and fossil fuels, increasing security of supply, and mitigating climate change by achieving GHG emission reductions and the appropriate disposal and reduced use of refrigerants with high global warming potential (GWP).
2. The economic and financial analyses focused on assessing most activities to be funded under component 1 and all of those included in component 2, which have been allocated roughly 90 percent of the IBRD loan and overall Project funding. Given the analytical constraints associated with benefits that cannot be measured in monetary terms and/or where information is not available – or for which funding is negligible – small thermal energy and productive uses systems under component 1, as well as component 3 – Project management and support for policymaking – (and 4) were not included in the economic and financial analyses.
3. The assessments analyzed the Project's benefits by comparing “with” and “without” scenarios for the five key types of interventions and investments and their cost-effectiveness. Technical assistance and other enabling activities included under component 3 are not directly assessed but will be fundamental for the development of the overall Project. The analysis assessed and presented the costs and benefits (displacement of fossil fuels use; increased energy use and sales) of interventions such as the: i) acquisition, installation, and operation of renewable energy generation equipment; ii) replacement of old and inefficient refrigerators; and iii) improved and efficient lighting in community centers.⁹⁸
4. Activities per component may vary but the expected costs and benefits of the five types of interventions presented below are expected to be quite similar. In the case of component 1, the specific size and cost of each intervention (mini-grids, photovoltaic systems for households, and for institutions) will vary according to local demand needs and available resources, but typical interventions have been delimited and assessed using the previous PERMER II experiences as a basis. In the case of component 2, a large share of activities will consist of a standard intervention without much variation (refrigerators replacement, in which only logistics and scrapping may vary but standard values and costs have been used based on discussions with relevant stakeholders). For community centers, a standard type of intervention was modeled using key values obtained from recent assessments of these kinds of interventions (*clubes* in this instance). All interventions rely on commercially available technologies and do not present large technical complications. Further details, values and assumptions for each subproject type are presented below.

Project activities

5. The Project activities included in the analyses were:
 - a. Mini-grids: Deployment of renewable energy technologies, including installing new systems, upgrading old systems, or appropriately replacing existing diesel-powered systems. The expected characteristics of a typical intervention are shown below:

⁹⁸ For simplicity, the assessment focused on analyzing *clubes*; given the relative technical simplicity of replacing lighting fixture, the results should be also applicable to other types of community centers.



- Installed capacity: 230 kW
 - Target number: 38 mini-grids
 - Current emissions factor: 0.8 tCO₂/MWh
- b. Household solar PV systems: Installation of second and third-generation standalone solar PV systems in rural communities or isolated population clusters in low-density areas, targeting vulnerable households
- Installed capacity: 0.4 kW
 - Target number: 9,150 households
 - Current emissions factor: 0.8 tCO₂/MWh
- c. Institutions solar PV systems: Installation of standalone solar PV systems in rural communities or isolated population clusters, targeting public institutions such as security posts, national parks, primary health care centers or schools.
- Installed capacity: 4 kW
 - Target number: 1,391 institutions
 - Current emissions factor: 0.8 tCO₂/MWh
- d. Refrigerators: Finance and facilitate the replacement of food conservation equipment with new and efficient (Class “A” or higher) refrigerators in vulnerable households across the country. Scrapping and logistics will be also conducted and supported under the subcomponent.
- Old appliance energy consumption: 899 kWh/yr
 - Target number: 222,000 refrigerators
 - Grid emissions factor: 0.39 tCO₂/MWh
- e. Community centers: Funding the acquisition and installation of efficient lighting fixtures, wiring and associated equipment and minor works needed for appropriate implementation to upgrade and replace existing lighting infrastructure. The subcomponent will also include the tailored design of interventions for sets of centers.
- Typical electricity consumption: 40,800 kWh/yr
 - Target number: 2,500 clubes
 - Grid emissions factor: 0.39 tCO₂/MWh

Assumptions

General assumptions

6. A discount rate of 4 percent⁹⁹ was used for the assessments; discount rates of 6 and 12 percent were utilized for the sensitivity analyses to test the robustness of the operation in diverse contexts.. A VAT of 21 percent and annual inflation of five percent (in the first year and decreasing towards two percent by the end of the interventions’ lifetime) were also included. Different electricity costs and tariffs were used to quantify the benefits of project activities, including the economic value of the additional electricity service that would be achieved

⁹⁹ As the World Bank forecasts a 2.1 percent real GDP growth rate for Argentina in 2023, a rounded 4 percent discount rate was applied; see the World Bank Group’s “Discounting Costs and Benefits in Economic Analysis of World Bank Projects” guidance (2016) for further details.



under component 1 or the benefits of energy savings and improved services under component 2, for example. Key values and variables are summarized below.

Table A3 1: Key assumptions

| Concept | Unit | Amount |
|------------------------------------|-----------|--------|
| Discount rate | % | 4% |
| <i>Sensitivity discount rate 1</i> | % | 6% |
| <i>Sensitivity discount rate 2</i> | % | 12% |
| VAT | % | 21% |
| Exchange rate (as of May 2, 2023) | AR\$/US\$ | 224 |

Emissions

7. As per climate corporate commitment, GHG emissions are being assessed for this operation. Net Project emissions were estimated following existing guidelines and frameworks, including the:

- a. Common principles for Climate mitigation finance tracking, which establish:
 - i. For component 1: The “generation of renewable energy with low lifecycle GHG emissions to supply electricity” as an eligible activity whose emissions shall be “substantially lower than corresponding GHG emissions from fossil fuel generation” and under which “examination of GHG emissions is not necessary for forms of energy that are widely recognized to have very low lifecycle emissions, such as solar”.
 - ii. For component 2: “Measures that reduce net energy consumption” such as “energy efficiency improvement in assets in existing buildings”, including “indoor and exterior lighting” (activity 9.1), as well as “New or replacement standalone energy efficient appliances or equipment”, including the “installation of highly efficient refrigerators with refrigerants with low global warming potential” as eligible activities which shall “demonstrate a substantial reduction in net energy consumption, resource consumption, or CO2e emissions”.
- b. Guidance manual on Greenhouse Gas Accounting Methodology for Energy Access Investment Operations: As per the methodology, “direct project GHG emissions are zero if the new individual system or new/rehabilitated mini-grid is renewable” which is the case of component 1 activities. Other key values and assumptions were obtained from similar activities performed in Argentina (through PERMER II).
- c. Guidance manual on Greenhouse Gas Accounting for Energy Investment Operations: Section “6.2 Energy Efficiency in Residential and Public Lighting and Appliances” was used to assess component 2 activities. Emissions were estimated as follows:
 - i. $\text{Net emissions reduction} = \text{loss factor (LF)} \times \text{grid emissions factor} \times (\text{energy consumption without the project} - \text{energy consumption with the project})$
- d. Interim guidance on demonstrating substantial net greenhouse gas (GHG) emissions reduction in line with the revised Joint MDB Mitigation Methodology: As per this note, the substantiality of Project activities is demonstrated as these would reduce GHG emissions by at least 25 thousand tCO₂/yr or save energy by at least 50 GWh/yr.



8. Activities will either consist of renewable electricity generation (from sources considered to have no associated emissions), or interventions encompassing the use and replacement of existing appliances with new equipment that relies on refrigerants with low global warming potential s or inefficient lighting fixtures for LEDs (all of which, in the absence of the Project would continue to being used). As stated in the guidance documents cited above, no emissions would be attributable to component 1 (mini-grids, solar energy generation). In the case of component 2, related construction or leakage Project emissions would be negligible and emissions related to the manufacturing of equipment, its transportation and utilization should be equal to a “without Project” scenario (as it would be expected that all old and inefficient refrigerators and lighting fixtures would have been replaced by the end of interventions’ lifespan in year 2048, and as the Project’s emission reductions are achieved by bringing forward those replacements). However, to have a more robust and conservative analysis, a “logistics” emissions factor has been included for component 2 interventions and encompassing the delivery and disposal of new and old equipment. Other environmental benefits such as the appropriate disposal of refrigerant gases with high global warming potential have been estimated (considering an average of 250 grams of refrigerant with a global warming potential of 3,400 per old refrigerator). Waste management centers will be required to report on these gases disposal, which will be tracked through the Project’s monitoring and reporting systems.

9. Finally, emissions avoided were multiplied by a shadow price of carbon for each year in the Project's lifetime. The SPC used for each year was calculated as the average between the low and the high case scenarios, starting in 2023 with a value of 76 US\$/tonCO₂eq.

Component 1

10. Activities under this component will result in increased energy access in households, communities, and public institutions in isolated, dispersed, or rural areas. The economic and financial analyses assumed the interventions would have a 20-year lifetime; as implementation would be done over 6 years, the overall lifespan of the component activities would be 25 years. The installation and deployment paces are presented below:

Table A3 2: Component 1 implementation timeline

| Year | | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------|---|----|----|-----|-----|-----|-----|-----|
| Mini-grids | % | | | | | | | |
| Households | | 0% | 5% | 10% | 15% | 25% | 30% | 15% |
| Institutions | | | | | | | | |

11. The main costs included in the analysis were: the investment costs of the generation equipment; the associated operation and maintenance (O&M) costs, which was estimated as a percentage of equipment investment costs, based on local experiences and data; and the replacement costs associated to certain equipment (batteries, inverters) every six years (households) or ten years (mini-grids, institutions).

12. The benefits of the interventions considered in the analyses were: the displacement of existing fossil-fueled energy sources and the subsequent savings, the additional clean energy generation and the economic value of the improved service and energy availability (the cost of generation was used for the analysis), the financial value of additional sales (expected tariff to be used in rural and dispersed contexts) and, in the case of the economic analysis, the environmental benefits associated to these activities. Key values and assumptions are presented below:



Table A3 3: Key variables used for component 1 analyses

| Concept | Unit | Mini-grids | Households | Institutions |
|----------------------------------|-----------------------|------------|------------|--------------|
| Target | # | 38 | 9,150 | 1,391 |
| Investment cost | US\$ | 1,368,184 | 4,300 | 53,990 |
| O&M cost | % | 3.45% | 3.45% | 3.45% |
| Replacement costs | % | 30% | 30% | 30% |
| Installed capacity | kW | 230 | 0.4 | 4 |
| New electricity generation | kWh/yr | 2,014,800 | 1,752 | 23,360 |
| Previous electricity generation | kWh/yr | 419,750 | 219 | 5,840 |
| Previous generation fuel savings | lts/kWh | 0.27 | 0.27 | 0.27 |
| Previous generation savings | US\$/lts | 1.48 | 1.48 | 1.48 |
| New access provided | % | 30% | 60% | 0% |
| New access previous fuel use | lts/mo | 60 | 60 | - |
| Average previous fuel use | lts/yr | 21,600 | 36 | - |
| Diesel emissions factor | tCO ₂ /MWh | 0.80 | 0.80 | 0.80 |
| Electricity cost | US\$/kWh | 0.13 | 0.54 | 0.45 |
| Electricity tariff | US\$/kWh | 0.04 | 0.29 | 0.29 |

Component 2

13. Activities under component 2 will increase energy efficiency in vulnerable households and community centers in mostly urban areas. The economic and financial analyses assumed the interventions would have a 20-year lifetime. As the deployment and installation of technologies (refrigerators and lighting fixtures) would be done over 6 years, the overall lifespan of the component would be 25 years. The installation and deployment paces are presented below:

Table A3 4: Component 2 implementation timeline

| Year | | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------|---|----|-----|-----|-----|-----|-----|-----|
| Refrigerators | % | 0% | 10% | 20% | 20% | 20% | 20% | 10% |
| Community centers | | | | | | | | |

14. The main costs included in the analysis were: the investment costs and last mile logistics and scrapping of the refrigerators and lighting fixtures (and the associated emissions); the assessment of measures to implement as well as the procurement of lighting fixtures and their installation; and – in the case of community centers– the associated operation and maintenance (O&M) costs, estimated as a percentage of equipment investment costs.

15. The assessed benefits of the interventions included: the reduced energy use resulting from more energy efficient equipment and the retirement of old appliances and fixtures; the resulting savings arising from lower energy consumption (generation costs and typical tariffs for households and *clubes* were used for the economic and financial analyses, respectively), and, in the case of the economic analysis, the environmental benefits associated to these activities (including from the retirement of refrigerants with high global warming potentials and minus the associated logistics emissions). Key values and assumptions are presented below:



Table A3 5: Key variables used for component 2 analyses

| Concept | Unit | Refrigerators | Community centers |
|----------------------------------|-----------------------|---------------|-------------------|
| Target | # | 221,541 | 2,500 |
| Investment cost | US\$ | 568 | 4,960 |
| O&M cost ¹⁰⁰ | % | 54% | 2.50% |
| Electricity cost | US\$/kWh | 0.10 | 0.10 |
| Electricity tariff | US\$/kWh | 0.03 | 0.03 |
| Electricity savings | kWh/yr | 499 | 12,264 |
| Previous electricity consumption | kWh/yr | 899 | 40,800 |
| New electricity consumption | kWh/yr | 400 | 28,536 |
| Logistics | km | 180 | 400 |
| Logistics emissions | gCO ₂ /km | 770 | 280 |
| Technical T&D losses | % | 16% | 16% |
| Grid emissions factor | tCO ₂ /MWh | 0.39 | 0.39 |

Results

Introduction

16. The assessment first focused on analyzing individual interventions and their expected results (at the household or community level), then assessed overall results of fully deploying each type of Project activity and finally assessed all key Project activities together. Key findings per type of intervention (at the individual and aggregate level) as well as overall Project results are presented below. The analyses estimated the economic and financial internal rates of return (EIRR and FIRR) as well as the net present values (NPVs) at the different levels mentioned above.

Component 1

Mini-grids

17. Key results of the economic analysis demonstrate the robustness of the mini-grids subcomponent. Both the deployment of an individual mini-grid and the construction of all planned mini-grids would have a positive NPV and EIRR – including environmental benefits. The financial analysis also shows positive and robust results, as both the individual and all Project interventions together would have positive NPVs and FIRRs, even if the results would be slightly less positive given the low tariffs to be collected.

Table A3 6: Key results from mini-grids assessments (in US\$ million)

| Concept | Costs | Benefits | NPV | EIRR |
|---------------------------|-------|----------|------|-------|
| Economic analysis | | | | |
| Individual mini-grid | 2.47 | 6.07 | 3.60 | 27.9% |
| All Project mini-grids | 83 | 206 | 122 | 28.1% |
| Financial analysis | | | | |
| Individual mini-grid | 3.60 | 5.58 | 1.99 | 15.4% |
| All Project mini-grids | 133 | 201 | 68 | 14.6% |

¹⁰⁰ Logistics in the case of refrigerators.



18. A sensitivity analysis was also produced considering several scenarios. The economic assessment continues to confirm the robustness of planned activities and approach. However, the financial analysis is not as positive given the need to provide low tariffs for rural households and institutions.

Table A3 7: Mini-grids sensitivity analyses (in US\$ million)

| Economic analysis: Individual mini-grid | Costs | Benefits | NPV | EIRR |
|--|--------------|-----------------|------------|-------------|
| Case 1: w/ 6% discount rate | 2.27 | 5.12 | 2.85 | 27.9% |
| Case 2: w/ 12% discount rate | 1.90 | 3.32 | 1.43 | 27.9% |
| Case 3: base case w/ 10% lower energy savings | 2.47 | 5.80 | 3.33 | 26.4% |
| Case 4: base case w/ 10% higher investment & OM costs | 2.72 | 6.07 | 3.35 | 24.8% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 2.72 | 5.46 | 2.74 | 21.6% |
| Case 6: base case w/o GHG benefits | 2.47 | 5.56 | 3.09 | 25.3% |
| Economic analysis: All mini-grids | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 72 | 164 | 92 | 28.1% |
| Case 2: w/ 12% discount rate | 51 | 90 | 39 | 28.1% |
| Case 3: base case w/ 10% lower energy savings | 81 | 194 | 112 | 26.5% |
| Case 4: base case w/ 10% higher investment & OM costs | 89 | 203 | 113 | 24.9% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 89 | 182 | 93 | 21.7% |
| Case 6: base case w/o GHG benefits | 81 | 185 | 103 | 25.3% |
| Financial analysis: Individual mini-grid | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 3.21 | 4.64 | 1.43 | 15.4% |
| Case 2: w/ 12% discount rate | 2.53 | 2.89 | 0.36 | 15.4% |
| Case 3: base case w/ 10% lower energy savings | 3.60 | 5.13 | 1.53 | 13.2% |
| Case 4: base case w/ 10% higher investment & OM costs | 3.96 | 5.58 | 1.63 | 13.0% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 3.96 | 5.03 | 1.07 | 10.3% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 3.60 | 6.93 | 3.34 | 21.2% |
| Financial analysis: All mini-grids | Costs | Benefits | NPV | FIRR |
| Case 1: w/ 6% discount rate | 113 | 158 | 46 | 14.6% |
| Case 2: w/ 12% discount rate | 76 | 85 | 8 | 14.6% |
| Case 3: base case w/ 10% lower energy savings | 129 | 182 | 53 | 12.5% |
| Case 4: base case w/ 10% higher investment & OM costs | 142 | 198 | 56 | 12.3% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 142 | 178 | 36 | 9.7% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 129 | 246 | 117 | 20.4% |

Households

19. The economic analysis results also demonstrate that the installation, O&M and replacement of key equipment for PV systems at the household level would be viable, due to the high costs of fossil-fueled energy in



dispersed and rural areas (and the associated emissions) to be replaced, as well as the positive effect of additional energy provision. The financial analysis does not show similarly positive results, given the low tariffs to be applied.

Table A3 8: Key results from households' assessments

| Concept | Costs | Benefits | NPV | EIRR |
|--|--------|----------|--------|-------|
| Economic analysis | | | | |
| Individual household (in US\$) | 8,778 | 13,583 | 4,805 | 15.5% |
| All Project households (in US\$ million) | 72 | 110 | \$39 | 15.5% |
| Financial analysis | | | | |
| Individual household (US\$) | 12,926 | 10,852 | -2,074 | -1.7% |
| All Project households (in US\$ million) | 116 | 94 | -22 | -3.8% |

20. The sensitivity analysis suggests the economic robustness of the planned activities and approach. However, also suggests the operation's sensitivity to the worst-case scenario with higher costs and lower benefits. The financial analysis is not positive due to the subsidies necessary for access operations.

Table A3 9: Households sensitivity analyses

| Economic analysis: Individual household (in US\$) | Costs | Benefits | NPV | EIRR |
|--|--------------|-----------------|------------|-------------|
| Case 1: w/ 6% discount rate | 8,004 | 11,460 | 3,456 | 15.5% |
| Case 2: w/ 12% discount rate | 6,561 | 7,456 | 895 | 15.5% |
| Case 3: base case w/ 10% lower energy savings | 8,778 | 13,392 | 4,614 | 15.1% |
| Case 4: base case w/ 10% higher investment & OM costs | 9,656 | 13,583 | 3,927 | 12.9% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 9,656 | 12,225 | 2,569 | 10.1% |
| Case 6: base case w/o GHG benefits | 8,778 | 13,224 | 4,446 | 14.8% |
| Economic analysis: All households (in US\$ million) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 62 | 88 | 26 | 15.5% |
| Case 2: w/ 12% discount rate | 43 | 49 | 6 | 15.5% |
| Case 3: base case w/ 10% lower energy savings | 71 | 107 | 36 | 15.0% |
| Case 4: base case w/ 10% higher investment & OM costs | 79 | 109 | 30 | 12.8% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 79 | 98 | 19 | 9.9% |
| Case 6: base case w/o GHG benefits | 71 | 106 | 34 | 14.7% |
| Financial analysis: Individual household (in US\$) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 11,510 | 9,017 | -2,493 | -1.7% |
| Case 2: w/ 12% discount rate | 8,916 | 5,623 | -3,293 | -1.7% |
| Case 3: base case w/ 10% lower energy savings | 12,926 | 10,531 | -2,395 | -2.9% |
| Case 4: base case w/ 10% higher investment & OM costs | 14,219 | 10,852 | -3,367 | -5.9% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 14,219 | 9,767 | -4,452 | -14.2% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 12,926 | 12,681 | -245 | 3.4% |
| Financial analysis: All households (in US\$ million) | Costs | Benefits | NPV | EIRR |



| | | | | |
|--|-----|-----|-----|-------|
| Case 1: w/ 6% discount rate | 98 | 74 | -24 | -3.8% |
| Case 2: w/ 12% discount rate | 65 | 40 | -25 | -3.8% |
| Case 3: base case w/ 10% lower energy savings | 115 | 90 | -26 | -6.4% |
| Case 4: base case w/ 10% higher investment & OM costs | 127 | 93 | -34 | NA |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 127 | 83 | -44 | NA |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 115 | 108 | -7 | 1.9% |

Institutions

21. The assessments suggest that the installation, O&M and replacement of key equipment for PV systems at public institutions would be positive. Both individual interventions and aggregate activities would be viable and beneficial and have a positive NPV and EIRR – including environmental benefits – due to the elevated costs of polluting energy sources at larger facilities in dispersed and rural areas. However, the financial analysis does not shows similarly positive results.

Table A3 10: Key results from institutions' assessments

| Concept | Unit | Costs | Benefits | NPV | EIRR |
|-------------------------------|--------|-----------|-----------|-----------|-------|
| Economic analysis | | | | | |
| Individual institution (US\$) | US\$ | \$97,638 | \$144,108 | \$46,470 | 13.4% |
| All Project institutions | M US\$ | \$137 | \$178 | \$41 | 10.9% |
| Financial analysis | | | | | |
| Individual institution | US\$ | \$141,910 | \$123,288 | -\$18,622 | -0.8% |
| All Project institutions | M US\$ | \$222 | \$185 | -\$37 | -2.3% |

22. The sensitivity analyses also suggest the robustness of the planned activities and approach in most scenarios.

Table A3 11: Institutions sensitivity analyses

| Economic analysis: Individual institution (in US\$) | Costs | Benefits | NPV | EIRR |
|--|--------------|-----------------|------------|-------------|
| Case 1: w/ 6% discount rate | 89,449 | 121,555 | 32,106 | 13.4% |
| Case 2: w/ 12% discount rate | 74,797 | 79,043 | 4,246 | 13.4% |
| Case 3: base case w/ 10% lower energy savings | 97,638 | 140,937 | 43,299 | 12.8% |
| Case 4: base case w/ 10% higher investment & OM costs | 107,402 | 144,108 | 36,706 | 11.0% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 107,402 | 129,697 | 22,295 | 8.5% |
| Case 6: base case w/o GHG benefits | 97,638 | 138,148 | 40,510 | 12.4% |
| Economic analysis: All institutions (in US\$ million) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 118 | 142 | 24 | 10.9% |
| Case 2: w/ 12% discount rate | 82 | 79 | -3 | 10.9% |
| Case 3: base case w/ 10% lower energy savings | 136 | 172 | 35 | 10.2% |
| Case 4: base case w/ 10% higher investment & OM costs | 150 | 176 | 26 | 8.2% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 150 | 158 | 8 | 5.4% |



| Financial analysis: Individual institution (in US\$) | Costs | Benefits | NPV | EIRR |
|--|--------------|-----------------|------------|-------------|
| Case 1: w/ 6% discount rate | 126,671 | 102,445 | -24,226 | -0.8% |
| Case 2: w/ 12% discount rate | 99,860 | 63,879 | -35,981 | -0.8% |
| Case 3: base case w/ 10% lower energy savings | 141,910 | 119,698 | -22,212 | -2.2% |
| Case 4: base case w/ 10% higher investment & OM costs | 156,101 | 123,288 | -32,813 | NA |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 156,101 | 110,959 | -45,142 | NA |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 141,910 | 125,065 | -16,845 | -0.2% |
| Financial analysis: All institutions (in US\$ million) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 187 | 146 | -41 | -2.3% |
| Case 2: w/ 12% discount rate | 124 | 78 | -46 | -2.3% |
| Case 3: base case w/ 10% lower energy savings | 220 | 175 | -45 | -4.9% |
| Case 4: base case w/ 10% higher investment & OM costs | 242 | 182 | -60 | -9.6% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 242 | 164 | -78 | NA |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 220 | 184 | -36 | -2.4% |

Component 2

Refrigerators

23. Key results of the economic analysis show the replacement of an individual refrigerator (or that of close to a quarter of a million appliances) and the related last-mile logistics and scrapping could result in a positive NPV and EIRR due to the resulting environmental benefits. The financial analysis would not show a similarly positive result.

Table A3 12: Key results from refrigerators assessments

| | Unit | Costs | Benefits | NPV | EIRR |
|---------------------------|-------------|--------------|-----------------|------------|-------------|
| Economic analysis | | | | | |
| Individual refrigerator | US\$ | \$872 | \$1,002 | \$130 | 5.7% |
| All Project refrigerators | M US\$ | \$175 | \$206 | \$30 | 5.9% |
| Financial analysis | | | | | |
| Individual refrigerator | US\$ | \$1,055 | \$325 | -\$730 | -6.0% |
| All Project refrigerators | M US\$ | \$237 | \$69 | -\$168 | -6.6% |

24. The sensitivity analysis shows the need to ensure cost-effectiveness as the subcomponent may be susceptible to worsening scenarios. However, the analysis also shows that the environmental benefits and improved service would justify these activities, particularly in an improved electricity tariffs context.



Table A3 13: Refrigerators sensitivity analyses

| Economic analysis: Individual refrigerator (in US\$) | Costs | Benefits | NPV | EIRR |
|--|--------------|-----------------|------------|-------------|
| Case 1: w/ 6% discount rate | 872 | 850 | -22 | 5.7% |
| Case 2: w/ 12% discount rate | 872 | 567 | -305 | 5.7% |
| Case 3: base case w/ 10% lower energy savings | 872 | 936 | 64 | 4.8% |
| Case 4: base case w/ 10% higher investment & OM costs | 959 | 1,002 | 42 | 4.5% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 959 | 901 | -58 | 3.3% |
| Case 6: base case w/o GHG benefits | 872 | 655 | -217 | 1.0% |
| Economic analysis: All refrigerators (in US\$ million) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 168 | 167 | -1 | 5.9% |
| Case 2: w/ 12% discount rate | 148 | 98 | -50 | 5.9% |
| Case 3: base case w/ 10% lower energy savings | 175 | 191 | 15 | 5.0% |
| Case 4: base case w/ 10% higher investment & OM costs | 193 | 204 | 11 | 4.6% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 193 | 183 | -10 | 3.4% |
| Case 6: base case w/o GHG benefits | 175 | 130 | -45 | 0.8% |
| Financial analysis: Individual refrigerator (in US\$) | Costs | Benefits | NPV | FIRR |
| Case 1: w/ 6% discount rate | 1,055 | 270 | -785 | -6.0% |
| Case 2: w/ 12% discount rate | 1,055 | 168 | -887 | -7.6% |
| Case 3: base case w/ 10% lower energy savings | 1,055 | 292 | -763 | -6.8% |
| Case 4: base case w/ 10% higher investment & OM costs | 1,161 | 325 | -836 | -6.7% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 1,161 | 292 | -868 | -7.4% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 1,055 | 548 | -507 | -2.0% |
| Financial analysis: All refrigerators (in US\$ million) | Costs | Benefits | NPV | FIRR |
| Case 1: w/ 6% discount rate | 226 | 55 | -171 | -6.6% |
| Case 2: w/ 12% discount rate | 198 | 30 | -168 | -6.6% |
| Case 3: base case w/ 10% lower energy savings | 237 | 61 | -176 | -7.6% |
| Case 4: base case w/ 10% higher investment & OM costs | 261 | 68 | -193 | -7.5% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 261 | 61 | -199 | -8.3% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 237 | 115 | -122 | -2.8% |

Community centers

25. Interventions in community centers would be positive and viable, both at the individual and aggregate level, according to the economic analysis. The replacement of lighting fixtures (and related assessments and other operational costs) would result in a positive NPV and EIRR. The financial analysis does not show similar positive results, mostly due to the low electricity tariffs community centers pay.



Table A3 14: Key results from community centers assessments

| | Costs | Benefits | NPV | EIRR |
|---------------------------------------|-------|----------|--------|-------|
| Economic analysis | | | | |
| Individual center (in US\$) | 6,645 | 23,274 | 16,629 | 30.7% |
| All Project centers (in US\$ million) | 15 | 54 | 39 | 31.1% |
| Financial analysis | | | | |
| Individual center (in US\$) | 8,825 | 7,979 | -846 | 2.5% |
| All Project centers (in US\$ million) | 22 | 19 | -3 | 1.9% |

26. The sensitivity analysis confirms the previous assessments and shows the impact of low tariffs in the financial analysis even under changing circumstances.

Table A3 15: Community centers sensitivity analyses

| | | | | |
|--|--------------|-----------------|------------|-------------|
| Economic analysis: Individual center (in US\$) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 6,382 | 19,559 | 13,177 | 30.7% |
| Case 2: w/ 12% discount rate | 5,886 | 12,594 | 6,708 | 30.7% |
| Case 3: base case w/ 10% lower energy savings | 6,645 | 21,665 | 15,020 | 28.3% |
| Case 4: base case w/ 10% higher investment & OM costs | 7,310 | 23,274 | 15,965 | 27.6% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 7,310 | 20,947 | 13,637 | 24.6% |
| Case 6: base case w/o GHG benefits | 6,645 | 16,091 | 9,446 | 20.9% |
| Economic analysis: All centers (in US\$ million) | Costs | Benefits | NPV | EIRR |
| Case 1: w/ 6% discount rate | 14 | 43 | 29 | 31.1% |
| Case 2: w/ 12% discount rate | 11 | 24 | 13 | 31.1% |
| Case 3: base case w/ 10% lower energy savings | 15 | 50 | 35 | 28.7% |
| Case 4: base case w/ 10% higher investment & OM costs | 17 | 53 | 37 | 28.0% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 17 | 48 | 31 | 24.9% |
| Case 6: base case w/o GHG benefits | 15 | 36 | 21 | 20.9% |
| Financial analysis: Individual center (in US\$) | Costs | Benefits | NPV | FIRR |
| Case 1: w/ 6% discount rate | 8,348 | 6,630 | -1,718 | 2.5% |
| Case 2: w/ 12% discount rate | 7,465 | 4,134 | -3,331 | 2.5% |
| Case 3: base case w/ 10% lower energy savings | 8,825 | 7,181 | -1,644 | 0.9% |
| Case 4: base case w/ 10% higher investment & OM costs | 9,708 | 7,979 | -1,729 | 1.0% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 9,708 | 7,181 | -2,527 | -0.6% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 8,825 | 13,480 | 4,655 | 10.8% |
| Financial analysis: All centers (in US\$ million) | Costs | Benefits | NPV | FIRR |



| | | | | |
|--|----|----|----|-------|
| Case 1: w/ 6% discount rate | 20 | 15 | -5 | 1.9% |
| Case 2: w/ 12% discount rate | 16 | 8 | -7 | 1.9% |
| Case 3: base case w/ 10% lower energy savings | 22 | 17 | -5 | 0.1% |
| Case 4: base case w/ 10% higher investment & OM costs | 24 | 19 | -5 | 0.3% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 24 | 17 | -7 | -1.3% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 22 | 31 | 9 | 9.8% |

Aggregate Project results

27. The assessments above highlight the expected positive Project results, to be driven by the social and environmental benefits each activity would result in. Even if the low – subsidized – tariffs to be paid by most beneficiaries mean the operation may not be financially profitable, the societal benefits of the operation justify planned activities. Expected results for the overall Project are summarized below.

Table A3 16: Aggregate Project results¹⁰¹

| Concept | Unit | Results |
|------------------------|--------|---------|
| Fuel saved | M lts | 164 |
| Fuel savings | M US\$ | 242 |
| Electricity saved | GWh | 2,824 |
| Electricity savings | M US\$ | 273 |
| Additional electricity | GWh | 1,980 |
| Additional service | M US\$ | 529 |
| Net CO2 emissions | MtCO2 | (1.94) |
| Environmental benefits | M US\$ | 195 |

28. The planned interventions would also result in a positive and robust economic NPV and EIRR. As shown below, Project results are highly sensitive to increased discount rates, yet still produce positive outcomes. The Project would not have similarly positive financial results due to the low tariffs most beneficiaries will pay. If half the electricity generation and distribution costs were passed through to final users, the Project would be close to achieve financial viability.

¹⁰¹ Overall, the Project would then result in net emissions (economic lifetime, tCO2e) of -3,053,865.76, gross emissions (economic lifetime, tCO2e) of 30,367.74, and net emissions (annual average, tCO2e/year) of -122,154.63.



Table A3 17: Project sensitivity analyses

| Scenarios | Costs | Benefits | NPV | EIRR |
|--|-------|----------|------|-------|
| Economic analysis (in US\$ million) | | | | |
| Base case: w/ 4% discount rate | 483 | 753 | 270 | 12.2% |
| Case 1: w/ 6% discount rate | 433 | 603 | 169 | 12.2% |
| Case 2: w/ 12% discount rate | 335 | 339 | 4 | 12.2% |
| Case 3: base case w/ 10% lower energy savings | 480 | 712 | 232 | 11.3% |
| Case 4: base case w/ 10% higher investment & OM costs | 528 | 743 | 215 | 12.1% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 528 | 669 | 141 | 8.3% |
| Case 6: base case w/o GHG benefits | 480 | 625 | 145 | 8.7% |
| Financial analysis (in US\$ million) | | | | |
| Base case | 730 | 568 | -162 | -0.7% |
| Case 1: w/ lower discount rate | 643 | 448 | -195 | -0.7% |
| Case 2: w/ higher discount rate | 479 | 241 | -238 | -0.7% |
| Case 3: base case w/ 10% lower energy savings | 723 | 525 | -198 | -2.1% |
| Case 4: base case w/ 10% higher investment & OM costs | 796 | 560 | -236 | -2.8% |
| Case 5: base case w/ 10% higher costs & 10% lower benefits | 796 | 504 | -292 | -5.3% |
| Case 6: base case w/ 50% passthrough of electricity costs to tariffs | 723 | 684 | -39 | 3.0% |



ANNEX 4: Gender Action Plan

Introduction

1. This annex summarizes the gender gaps identified and the Gender Action Plan designed for this Project. Measures for the empowerment of women and reduction of gender disparities are mostly concentrated under component 1, aimed at increasing and improving energy supply in dispersed areas. Below is an account of the gender gaps found, how the Project will address them, and how the Project's contribution to reducing each gap will be measured.
2. Argentina has increasingly demonstrated a commitment to Gender Equality. The Ministry of Women, Gender and Diversity (MMGyD, for its Spanish acronym) was created in 2019, and is responsible for the design, implementation and evaluation of national public policies related to gender, equality, and diversity, and for preventing, eradicate, and repair gender-based violence and fully assist victims. It supports a variety of initiatives across the country and coordinates actions with other ministries, provincial and municipal governments to ensure gender equality across mainstreamed territories. The ministry's National Plan for Equality in Diversity (2021-2023), the main planning instrument, includes actions targeted for the rural population, where greater gender gaps exist.
3. A gender perspective has also been incorporated in the Guidelines for an Energy Transition Plan to 2030 (Annex 1 of Resolution 1036), approved by the Secretariat of Energy in 2021. These guidelines establish that universal access to modern and quality energy services must be ensured, especially for the most vulnerable. It incorporates a gender lens not only with regard to access, but also highlights gender equality in the development of knowledge for the energy transition. This agenda has also been recently brought forward with the presentation of the report by the Inter-American Development Bank (IDB) on "Gender and Energy in Argentina: the participation of women in the electricity generation market".

Gender gaps in rural areas

4. There are gender inequalities related to the use and access of energy. Women devote more time to unpaid daily care work, such as caring for children, the sick and the elderly at home, and as well as attending to household chores. Therefore, the lack of access to energy disproportionately affects women compared to men, as it implies greater effort and time spent on these activities.¹⁰²
5. In Argentina, women spend an average of 6:07 hours a day on unpaid domestic and care work, while men only spend an average of 3:30 hours a day. The presence of children under 6 years of age at home widens the gap in the distribution of unpaid work: 4.5 hours for men and 9.3 hours for women.¹⁰³ Rural women work 14 hours more per week than men when considering both paid and unpaid hours of care tasks. This gap has intensified during the pandemic, because women's unpaid care tasks increased by an estimated four hours while agricultural work increased, placing double pressure on rural women.¹⁰⁴
6. As part of their housework, rural and indigenous women are also historically responsible for managing energy for food preparation and heating, which - in addition to taking up much of their time- creates a higher physical and health risk. The unavailability of clean energy sources for cooking in many places, for example, implies they must collect firewood. Women exposed to smoke from solid fuels are, on average, twice as likely as other

¹⁰² UN Environment Program, 2021

¹⁰³ INDEC. Annual Survey of Urban Households. 2021.

¹⁰⁴ Secretariat of Family, Rural and Indigenous Agriculture. Plan for Women of Family, Rural and Indigenous Agriculture "Plan En Nuestras Manos". 2020.



women to develop obstructive lung disease. Given that women are usually responsible for vulnerable people who require special care in the home, the health problems derived from the lack of clean water or energy mean an even greater workload.¹⁰⁵

7. In addition to their household and caring roles, women in rural areas have a double workload, as they are also responsible for productive activities to contribute to the household economies. These activities include grazing and raising of animals; making by-products such as cheese and leather goods, honey and crafts; harvesting and maintenance of vegetable gardens; and food production. Therefore, women are less likely to participate in the labor market due to time unavailability, limiting their opportunities for career development and economic independence. This inequitable allocation of workload is referred to as time poverty.

Gender gap in women's participation in the renewable energy sector

8. Women have unequal access to participation in social organizations and decision-making bodies, as well as access, use and control of productive resources, which impacts their economic autonomy. These differences are also evidenced in certain fields, such as the energy sector, in which significant disparities are observed between men and women's knowledge and technical know-how.¹⁰⁶ The main barriers to their participation are social norms and traditional gender roles, as the energy sector is usually seen as an industry that is not adequate for women and therefore women are underrepresented, suffer discrimination and have difficulty in advancing to managerial positions. Women's participation may also be hindered by labor conditions. The energy sector's traditionally male working environment can pose a threat of various forms of harassment and exploitation. Furthermore, as previously indicated, women have limited time available to spend on paid labor activities or to receive training for these roles.¹⁰⁷ In order to design policies aimed at addressing these barriers, the gathering of local disaggregated data on women's participation in the sector and its characteristics is critical.

9. Data on female participation in the renewable energy sector in Argentina is scarce. The first study on Gender and Energy in Argentina was carried out in 2022 to have a diagnosis on the participation of women in the sector, with a focus on the sub-segment of electric power generation. The study found that only 26,5 percent of all workers are female¹⁰⁸. Nonetheless, this study did not differentiate the urban and rural workforce market, which is relevant provided the disparities faced by rural women in opportunities and essential to develop programs that can assist in their increased participation in the sector.

Gender Action Plan

10. Project-specific Gender Action Plan was developed to help reduce women's time poverty, as well as address a data gap on rural women's participation in employment in the renewable energy sector. The plan will involve association between different project stakeholders. Moreover, the Project's Monitoring and Evaluation efforts will include gender-specific disaggregation to verify improvements in the gaps. Indicators and desagregations for each gap are described in detail in Table A4.1

11. A change in time allocation of women's daily activities is expected to occur as a result of different project actions. The installation of solar fencing systems and mini-grids, which are part of the project activities in

¹⁰⁵ Economic Commission for Latin America and the Caribbean. Implications of gender roles in natural resource governance in Latin America and the Caribbean. 2021. <https://www.cepal.org/en/insights/implications-gender-roles-natural-resource-governance-latin-america-and-caribbean>

¹⁰⁶ Vaca Trigo. Opportunities and challenges for women's autonomy in the future work scenario. Gender issues series, No. 154 (LC/TS.2019/3), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2019.

¹⁰⁷ Economic Commission for Latin America and the Caribbean (ECLAC), Women and Energy (LC/MEX/TS.2020/7), Mexico City, 2020.

¹⁰⁸ IDB, Gender and Energy in Argentina: the participation of women in the electricity generation market, 2022. This figure includes women's participation in electricity, gas and water.



component 1, will help reduce the time spent on domestic work and grazing. Solar fencing will help women undertake grazing activities more efficiently because, unlike traditional fencing, it can be easily moved around and, as it is not affected by power outages, is it highly reliable. Access to electric power by mini-grids will provide time savings for domestic activities, as well as the ability to carry out these in the evening. This will allow women to have greater efficiency in the productivity of their day, allowing for their participation in paid work. Furthermore, beneficiaries will receive training on the use of this technology, during which trainers will reinforce the economic benefits of adopting energy efficiency measures, which in turn assists in making time to allow women to enter the workforce. Induction workshops for women and men will strengthen this message, as well as introduce gender gaps and the overall benefits for the family of sharing the burden of unpaid work. On the other hand, the provision of mini-grids can also provide economic opportunities for women in their households, due to the newly acquired connection to the electricity network or an improvement in the quality of service. They may be able to expand their productive activities or seek to develop new microenterprises.

12. The collection of data of the participation of rural women in employment in the renewable energy sector will be critical to identifying barriers and opportunities in the sector. This will be carried out as part of the technical studies to be developed under component 3 and will lead to the development of targeted actions focused on women's needs and conditions in the sector. This data can also serve as a baseline against which to assess the activities undertaken.

13. Although Gender Based Violence (GBV) risk for this project has been assessed as low, traditionally male working environment can still pose a threat for women. These are mainly related to labor issues and workers under components 1 and 2, particularly construction works under the former. They will be mitigated through measures set in the ESMP and Labor Management Plan (LMP) applicable to all Project activities, including the Code of Conduct that will be applicable to all Project workers. Training for project stakeholders will be carried out to make gender gaps visible and disseminate GBV reporting tools. Particularly, these will aim to strengthen capabilities of local offices to provide support to victims of GBV. The use of technology, such as an app to map characteristics and location of cases of rural GBV, will also assist in this regard.

Table A4.1- Summary of Gender Gaps, Actions and Indicators

| USE OF TIME | | |
|---|--|---|
| Gap | Actions | Governmentl and Indicator |
| <p>Baseline gap: Rural women work 14 hours more per week than men in care tasks.</p> <p>Evidence: Secretariat of Family, Rural and Indigenous Agriculture. Plan for Women of Family, Rural and Indigenous Agriculture “Plan En Nuestras Manos”. 2020.</p> <p>National Directorate of Economy, Equality and Gender, Secretariat of Economic Policy and Ministry</p> | <p>The provision of solar fencing systems (component 1) will benefit beneficiary women by reducing the time required for unpaid and subsistence activities for the family.</p> <p>The provision of mini-grids (component 1) can reduce time dedicated to housework and provide economic opportunities for women in their households, due to the connection of their house to the electricity network or improvement in the quality of service.</p> | <p>Indicator: Change in the time women spend on domestic/unpaid care work (%). Baseline: 0 Target: -10</p> <p>Target to be achieved: Reduction of at least 10 percent compared to the baseline.</p> <p>Methodology: Ex-ante vs. ex-post comparison of the results of a socioeconomic survey conducted among a sample of beneficiary women with questions on the hours spent per week on unpaid tasks and the time spent on tasks that seek present or future remuneration.</p> |



| <p>of Economy. 2020. Care: a strategic economic sector. Measurement of the contribution of unpaid domestic care work to the GDP).</p> | <p>In the trainings that will be conducted on productive uses and energy efficiency as part of the project, the economic benefits of adopting these measures to allow time for women to work and share the burden of unpaid work will be reinforced.</p> <p>Induction workshops for men and women will also be undertaken to promote this message as part of the three trainings that are proposed for mini-grid work, to be included in the bidding documents. The project's technical for component 1 will assist in the development of the content for these workshops.</p> | <p>These questions will be incorporated in a survey, that in the case of productive uses is already implemented in the Argentina Renewable Energy for Rural Areas Project (P133288). UEPS will be the source of information to identify the beneficiaries.</p> <p>Ex-ante: The survey will be carried out to beneficiaries either when solar fencing systems are delivered or prior to the completion of the mini-grid works.</p> <p>Ex-post: The survey will be carried out again six months after the delivery of the system or the completion of the mini-grid.</p> |
|---|---|---|
| <p>WOMEN'S PARTICIPATION IN EMPLOYMENT IN THE RENEWABLE ENERGY SECTOR</p> | | |
| Gap | Actions | Governmentl and Indicator |
| <p>Baseline gap: No assessment of the participation of rural female in the renewable energy (RE) sector.</p> <p>Evidence: IDB, Gender and Energy in Argentina: the participation of women in the electricity generation market, 2022.</p> | <p>Generate a diagnosis on women's participation in employment in the renewable energy sector in rural areas</p> <p>Develop targeted actions that can assist in increasing women's participation in employment in renewable energy such as:</p> <ul style="list-style-type: none"> - creation of trainings aimed at women to develop specific know-how in the renewable energy sector in association with sector institutes and universities. -and job fairs and women's associative initiatives. <p>These actions would be advertised in the trainings to be carried out as part of the project (and could potentially be developed in the same places).</p> | <p>Indicator: Development of an assessment of the participation of rural women in employment in the renewable energy sector</p> <p>Baseline: No</p> <p>Target: Yes</p> <p>Target to be achieved: Assessment of the current situation with regards to participation of rural women in RE sector employment</p> <p>Methodology: Quantitative and qualitative data collection on a representative sample in coordination with regional institutional organizations. Data sources will include information collected by UEPS, companies, universities, as well as the development of interviews and focus groups with rural women.</p> |