Public Disclosure Authorized

Public Disclosure Authorized

Document of
The World Bank

Report No: PAD834

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$200 MILLION

TO THE

ARGENTINE REPUBLIC

FOR A

RENEWABLE ENERGY FOR RURAL AREAS PROJECT

March 9, 2015

Energy and Extractives Global Practice
Latin America and Caribbean

This document is being made publicly available prior to Board consideration. This does not imply a presumed outcome. This document may be updated following Board consideration and the updated document will be made publicly available in accordance with the Bank's policy on Access to Information.

CURRENCY EQUIVALENTS

(Exchange Rate Effective as of March 9, 2015)

Arg$8.76 = US$1

FISCAL YEAR
July 1 - June 30

ABBREVIATIONS AND ACRONYMS

BNA	Central Bank of Argentina (*Banco de la Nación Argentina*)
CDM	Clean Development Mechanism
CPS	Country Partnership Strategy
DGCAF	General Financial Management Directorate (*Dirección General de Cooperación y Asistencia Financiera*)
DIME	Development Impact Evaluation Initiative
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ERR	Economic rate of return
ESMF	Environmental and Social Management Framework
FCT	Rates Compensation Fund (*Fondo de Compensación Tarifaria*)
FEDEI	Special Fund for the Electric Development of the Interior (*Fondo Especial de Desarrollo Eléctrico del Interior*)
FNEE	National Electricity Fund (*Fondo Nacional de la Energía Eléctrica*)
GHG	Greenhouse gas
GoA	Government of Argentina
GRS	Grievance Redress Service
INDEC	National Institute of Statistics and Censuses (*Instituto Nacional de Estadística y Censos*)
IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Planning Framework
ITC	Fuel Transfer Tax (*Impuesto a la Transferencia de Combustibles*)
LAC	Latin America and Caribbean
M&E	Monitoring and evaluation
MINPLAN	Ministry of Federal Planning, Public Investments, and Services (*Ministerio de Planificación Federal, Inversión Pública y Servicios*)
NGO	Nongovernmental organization
NPV	Net present value
O&M&R	Operation, maintenance, and replacement
OM	Operational Manual
ONC	National Contracting Office (*Oficina Nacional de Contrataciones*)
PCU	Project Coordinating Unit
PERMER I	Argentina Renewable Energy Markets Project (*Proyecto de Energías Renovables en Mercados Rurales I*), P006043 and P045048 (grant)
PERMER II	Argentina Renewable Energy for Rural Areas Project (*Proyecto de Energías*

	Renovables en Mercados Rurales II), P133288
PEU	Provincial Executing Unit
PV	Photovoltaic
QSP	Qualified service provider
RPF	Resettlement Policy Framework
SE	Secretariat of Energy (*Secretaría de Energía*)
SEPA	Procurement Plans Execution System (*Sistema de Ejecución de Planes de Adquisiciones*)
SHS	Solar home systems
SIGEN	General Syndicate of the Nation (*Sindicatura General de la Nación*)
SSEE	Deputy Secretariat for Electricity (*Subsecretaría de Energía Eléctrica*)
UEPEX	Project Executing Units with External Financing (*Unidades Ejecutoras de Proyectos con Financiamiento Externo*)
UNDB	United Nations Development Business
WTP	Willingness-to-pay

Regional Vice President:	Jorge Familiar
Country Director:	Jesko S. Hentschel
Senior Global Practice Director:	Anita Marangoly George
Practice Manager:	Malcolm Cosgrove-Davies
Task Team Leader:	Lucía Spinelli

ARGENTINA
Argentina Renewable Energy for Rural Areas Project

TABLE OF CONTENTS

Page

PAD DATA SHEET

Argentina

Argentina Renewable Energy for Rural Areas Project (P133288)

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

ENERGY AND EXTRACTIVES GLOBAL PRACTICE

Report No.: PAD834

Basic Information			
Project ID	Environmental Assessment Category		Team Leader
P133288	B - Partial Assessment		Lucia Spinelli
Lending Instrument		Fragile and/or Capacity Constraints [ ]	
Investment Project Financing		Financial Intermediaries [ ]	
		Series of Projects [ ]	
Project Implementation Start Date		Project Implementation End Date	
01-May-2015		30-Apr-2020	
Expected Effectiveness Date		Expected Closing Date	
30-Apr-2015		31-Oct-2020	
Joint IFC			
No			
Practice Manager	Senior Global Practice Director	Country Director	Regional Vice President
Malcolm Cosgrove-Davies	Anita Marangoly George	Jesko S. Hentschel	Jorge Familiar

Borrower: Ministry of Economy and Public Finances (*Ministerio de Economía y Finanzas Públicas*)			
Responsible Agency: Secretariat of Energy (*Secretaría de Energía*)			
Contact:	Víctor Santiago Russo	Title:	Coordinador General del Proyecto
Telephone No.:	541150719690	Email:	vrusso@minplan.gob.ar

Project Financing Data(in US$, Millions)					
[X]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[ ]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	240.09	Total Bank Financing:	200.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	10.85
International Bank for Reconstruction and Development	200.00
Local Governments (Provincial, District, City) of Borrowing Country [*Provinces*]	5.74
Local Sources of Borrowing Country [*Private Sector*]	23.50
Total	240.09

Expected Disbursements (in US$, Millions)

Fiscal Year	2015	2016	2017	2018	2019	2020	2021
Annual	0.00	41.00	52.00	75.00	25.00	7.00	0.00
Cumulative	0.00	41.00	93.00	168.00	193.00	200.00	200.00

Institutional Data

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Cross Cutting Areas

[X]	Climate Change
[ ]	Fragile, Conflict & Violence
[ ]	Gender
[ ]	Jobs
[ ]	Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Energy and mining	Hydropower	5		100
Energy and mining	Other Renewable Energy	75		100
Energy and mining	Transmission and Distribution of Electricity	15		100
Energy and mining	General energy sector	5		100
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes		
Theme (Maximum 5 and total % must equal 100)		
Major theme	Theme	%
Social development/gender/inclusion	Social Inclusion	50
Rural development	Rural services and infrastructure	50
Total		100

Proposed Development Objective(s)

The project's development objective is to provide and enhance access to modern energy services in selected rural areas of Argentina.

Components

Component Name	Cost (US$, Millions)
1. Renewable electricity service provision	215.61
2. Solar thermal energy service provision	9.67
3. Project deployment support	6.71
4. Project management	8.10

Systematic Operations Risk-Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Moderate
7. Environment and Social	Low
8. Stakeholders	Moderate
OVERALL	Moderate

Compliance

Policy

Does the project depart from the Country Partnership Strategy in content or in other significant respects?	Yes	[ ]	No	[X]

Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10	**X**	
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50	**X**	
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Participation Agreements	**X**		

Description of Covenant
Loan Agreement, Article 3.01

Signing of a Participation Agreement between the Secretariat of Energy and each Participating Province.

Name	**Recurrent**	**Due Date**	**Frequency**
Operation, Maintenance, and Replacement Agreements	**X**		

Description of Covenant
Loan Agreement, Schedule 2. Section I.B.1.(f)

When applicable, the signing of Operation, Maintenance, and Replacement Agreements between a Participating Province and the respective qualified service provider.

Name	**Recurrent**	**Due Date**	**Frequency**
Specific Budget Line Entry	**X**		

Description of Covenant
Loan Agreement, Schedule 2.Section II.B.4

The borrower, through the Secretariat of Energy, shall, before the commencement of each calendar year during project implementation, create, and thereafter maintain throughout each said calendar year of project implementation, a specific budget line entry in the national annual budget starting in calendar year 2015.

Conditions		
Source Of Fund	**Name**	**Type**
IBRD	Participation Agreements	Effectiveness

Description of Condition

Loan Agreement, Article 5.01
At least two Participation Agreements have been executed on behalf of the borrower and each Participating Province.

Source Of Fund	**Name**	**Type**
IBRD	Retroactive Financing	Disbursement

Description of Condition

Loan Agreement, Schedule 2. Section IV.B.1
No withdrawal shall be made for payments made prior to the date of the Loan Agreement, except that withdrawals up to an aggregate amount not to exceed US$40 million of the total Loan amount may be made for payments made up to twelve months prior to the date of signature of the Loan Agreement, for eligible expenditures under the project.

Team Composition

Bank Staff

Name	Role	Title	Unit
Lucia Spinelli	Team Leader (ADM Responsible)	Senior Energy Specialist	GEEDR
Alvaro Larrea	Procurement Specialist	Senior Procurement Specialist	GGODR
Daniel Chalupowicz	Financial Management Specialist	Financial Management Specialist	GGODR
Cesar Adrian Arreola Croda	Team Member	Consultant	GEEDR
Elena Segura Labadia	Counsel	Senior Counsel	LEGLE
Enrique O. Crousillat	Team Member	Consultant	GEEDR
Fabiola Altimari Montiel	Counsel	Senior Counsel	LEGLE
Fernando J. Brunstein	Safeguards Specialist	Consultant	GENDR
Francisco Javier Obreque Arqueros	Team Member	Agricultural Spec.	GFADR
James Victor Pannett	Team Member	Energy Specialist	GEEDR
Lilian Pedersen	Safeguards Specialist	Consultant	GSURR
Maria Pia Cravero	Counsel	Junior Counsel	LEGLE
Noreen Beg	Safeguards Specialist	Senior Environmental Specialist	GENDR
Santiago Scialabba	Safeguards Specialist	Program Assistant	LCC7C
Vladimir Jadrijevic Cvitanic	Power Engineer	Consultant	GEEDR

Locations					
Country	**First Administrative Division**	**Location**	**Planned**	**Actual**	**Comments**
Argentina	Buenos Aires	Provincia de Buenos Aires	**X**		
Argentina	Catamarca	Provincia de Catamarca	**X**		
Argentina	Córdoba	Provincia de Córdoba	**X**		
Argentina	Corrientes	Provincia de Corrientes	**X**		
Argentina	Chaco	Provincia del Chaco	**X**		
Argentina	Chubut	Provincia del Chubut	**X**		
Argentina	Entre Ríos	Provincia de Entre Ríos	**X**		
Argentina	Formosa	Provincia de Formosa	**X**		
Argentina	Jujuy	Provincia de Jujuy	**X**		
Argentina	La Pampa	Provincia de La Pampa	**X**		
Argentina	La Rioja	Provincia de La Rioja	**X**		
Argentina	Mendoza	Provincia de Mendoza	**X**		
Argentina	Misiones	Provincia de Misiones	**X**		
Argentina	Neuquén	Provincia del Neuquén	**X**		
Argentina	Río Negro	Provincia de Río Negro	**X**		
Argentina	Salta	Provincia de Salta	**X**		
Argentina	San Juan	Provincia de San Juan	**X**		
Argentina	San Luis	Provincia de San Luis	**X**		
Argentina	Santa Cruz	Provincia de Santa Cruz	**X**		
Argentina	Santa Fe	Provincia de Santa Fe	**X**		
Argentina	Santiago del Estero	Provincia de Santiago del Estero	**X**		
Argentina	Tierra del Fuego	Provincia de Tierra del Fuego, Antártida e Islas del Atlántico Sur	**X**		
Argentina	Tucuman	Provincia de Tucuman	**X**		

I. STRATEGIC CONTEXT

A. Country Context

1. **After rebounding from the economic crisis of 2002, Argentina has been one of the top two performers in the Latin America and Caribbean (LAC) region in reducing poverty and sharing the gains of rising prosperity by expanding the middle class**. Total poverty (measured at US$4 per day) declined from 31 percent in 2004 to 10.8 percent in 2013, while extreme poverty (measured at US$2.50 per day) fell from 17 percent to 4.7 percent.[1] Income inequality fell from a Gini rating of 50.2 in 2004 to 42.5 in 2012. Argentina's poverty rate and Gini coefficient are among the lowest in Latin America and Caribbean. At the same time, the middle class in Argentina grew by 68 percent between 2004 and 2012, reaching 53.7 percent of the population.[2] According to the National Institute of Statistics and Censuses (*Instituto Nacional de Estadística y Censos* [INDEC]) census figures, the proportion of the population with at least one unsatisfied basic need fell from 17.7 percent in 2001 to 12.5 percent in 2010.

2. **The Government of Argentina (GoA) remains committed to promoting growth with equity and inclusion by striving to bridge the gap in basic services**. The GoA has set the goal of continued economic growth with social inclusion and improved competitiveness, a challenging objective in a large federal state, with pronounced inequalities between urban and rural areas. In addition, the country is attempting to advance recent social policies to the next level, ensuring that families who have escaped poverty can sustain better livelihoods, benefit from shared prosperity, and build better opportunities for their children. This requires sustained growth and a focused and efficient deployment of public resources geared to protect the most vulnerable. The proposed project in Argentina's rural areas is at the heart of this effort, bringing quality services to the poorest populations, thereby contributing to eliminating extreme poverty and boosting shared prosperity.

3. **Strong economic growth over the last decade was accompanied by rising macro imbalances**. Key macroeconomic challenges include the existence of inflationary pressures, deficits in fiscal and current accounts, and limited international reserves. Argentina has relatively modest fiscal and current account deficits, as well as low public sector debt to gross domestic product. Nonetheless, given the limited access to international capital markets, they create pressures on the economy. These imbalances need to be resolved in order to avoid unwanted effects on the medium-term sustainability of the gains in equity and development achieved during the last decade. In this regard, the GoA has recently implemented various public policy interventions aimed at resolving key macroeconomic imbalances. It must be noted, however, that continued and consolidated efforts are required for achieving the desired results.

[1] Poverty measured at US$1.25 per day declined from 6.3 percent in 2004 to 1.3 percent in 2012. Data from: Socio-Economic Database for Latin America and Caribbean, Centre for Labor and Social Distributive Studies (*Centro de Estudios Distributivos Laboralesy Sociales*) and World Bank.

[2] The World Bank Group's Country Partnership Strategy for Argentina (CPS) FY2015-2018 (Report No. 81361-AR), presented to the Board of Executive Directors on September 9, 2014.

B. Sectoral and Institutional Context

4. **Argentina's Electricity System (*Sistema Argentino de Interconexión*) is the third largest power market in LAC with 31,072 MW of installed capacity**. This fully unbundled system relies on thermal (60 percent of installed capacity) and hydropower (36 percent) facilities. Demand is highly concentrated in Greater Buenos Aires (39 percent), the Coastline (12 percent), Buenos Aires Province (12 percent), and Central Argentina (9 percent). The residential sector represents 34 percent of the demand, while the industrial sector accounts for 35 percent, commercial sector 26 percent, and lighting 4 percent. The system has 15 million customers, of which 13 million are residential and 1.5 million commercial, with the remainder divided between industry, government agencies, and other users.

5. **Private and public generators have been able to satisfy local demand mostly through thermal generation, which in part relies on subsidized imported fuels**. This has created challenges to the fiscal and current account balances of the country as imported fuels are being subsidized; therefore, only part of their cost is being transferred to the electricity generators and users. In addition, the impact of fuel imports on the current account balance is elevated and creates additional pressures on the Central Bank's reserves. To tackle these issues, the country needs to keep working on energy diversification and improving its subsidies policies to better target them toward poorest segments, as an essential way to reduce fiscal burdens and negative impacts on natural resources. In addition, these would allow the country to free up resources that could be used in poverty alleviation or boosting green energy generation, for example. Reducing Argentina's dependence on fossil fuels can also produce other positive outcomes, such as decreasing its vulnerability toward volatile hydrocarbons prices.

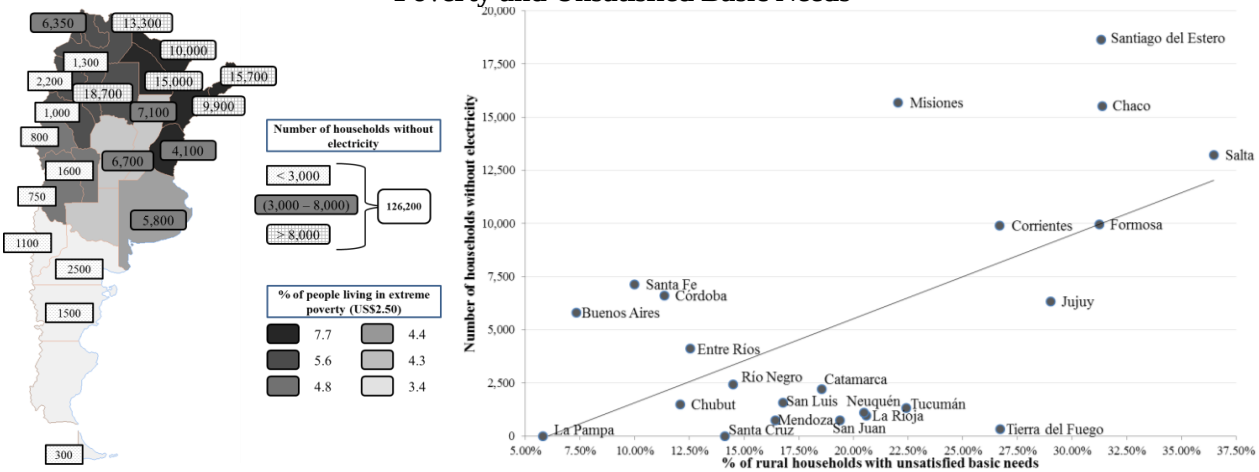
6. **In isolated and rural areas, the electricity sector's reliance on fossil fuels is minor** and—because of green initiatives such as the proposed Argentina Renewable Energy for Rural Areas Project[3]—will no longer contribute to or be affected by imbalances produced by these imports and subsidies. In fact, subsidies for rural electrification are negligible and mostly rely on existing transfer schemes and other sustainability mechanisms.[4] They also help accelerate the transition to green generation, increase energy security, reduce vulnerability, and benefit the poor.

7. **Universal access to modern energy services is one of the GoA's main sectoral priorities**. As in most middle-income countries, Argentina's level of electrification is high. However, the country's size, its topography, and the low rural population density remain as barriers to the universal supply of conventional on-grid electricity at reasonable costs. Even with a 98 percent electrification rate, many remain without access to modern energy services[5], while many others only have partial, inadequate, and inefficient access (few hours a day and dependent on the costly transportation of fossil fuels).

[3] This project, commonly referred to as PERMER II or *Proyecto de Energías Renovables en Mercados Rurales II*.
[4] Further details are presented in the Sustainability section of this document.
[5] Reliable and affordable energy, including electricity and additional energy-related services (such as potable water, cooking or heating).

8. **Roughly 145,000 households in mainly rural areas of Argentina—of which an important number belong to indigenous communities—still do not have access to modern energy services**, severely limiting their resilience to extreme poverty. As can be seen in figure 1, lack of access to this basic service is directly correlated to extreme poverty and predicts the presence of unsatisfied basic needs (further details in annex 5). Access to electricity and other modern energy options has a direct impact in alleviating poverty and boosting shared prosperity. For example, modern energy contributes to economic activity (for example, post farm processing); improved social services (health, education, government offices); and enhanced quality of life (for example, ease and safety of lighting compared to kerosene or candles; improved communication from cell phone charging). Electricity in general and renewable energy in particular reduces negative environmental impacts by limiting the use of biomass and fossil fuels. Moreover, household energy expenditures generally decrease with access to modern energy by replacing batteries, kerosene, candles, or wood. In turn, the provision of modern energy services reduces adverse health impacts and environmental risks while at the same time safeguarding precious resources.

Figure 1: The Location of Households without Electricity is Positively Correlated with Income Poverty and Unsatisfied Basic Needs[6]



9. **Improving access to modern energy services is especially beneficial for women**. Electricity allows them to participate in educational and employment opportunities or even community affairs, frees them from having to spend most of the day undertaking basic chores such as pumping water and carrying firewood, and reduces their exposure to indoor air pollution. In addition, public lighting reduces dangers that are unique to women.

10. **Under the leadership of the Secretariat of Energy (*Secretaría de Energía* [SE]), the GoA has implemented projects to increase access to energy services in rural areas**. Of these, the Bank-financed Argentina Renewable Energy Markets Project[7] has been the most successful. This project focused on providing rural areas with sustainable and reliable electric supply—using mostly renewable energy technologies and supporting thermal applications and water pumping in public buildings. The project was approved in March 1999, but the crisis of 2002 delayed its

[6] Own elaboration based on data from the 2010 census and CPS' poverty estimations.
[7] PERMER I or *Proyecto de Energías Renovables en Mercados Rurales I*.

implementation. The GoA was able to overcome the initial hurdles, successfully implement the original project, and obtain additional financing in 2008. The project remained active until December 2012. Overall, the project addressed the needs of more than thirty thousand customers (households, institutions and facilities, which represent over 150,000 people) in fifteen provinces. Given the use of renewable offgrid technologies and the implementation of a solid operation, maintenance, and replacement (O&M&R) scheme, PERMER I proved to be a valuable mechanism to increase electricity access in rural areas in a sustainable manner. It also helped create a rural electrification network that included federal and provincial institutions, bridging the divide between national and subnational entities.

11. **As an evolution to and an innovation from the GoA's previous efforts, the proposed project will focus on increased coordination between the Federal Government and provinces**. This is vital if Argentina is to achieve meaningful progress toward universal access to modern energy services. The Federal Government's regulatory control of generation and backbone transport of electricity (and distribution in the city of Buenos Aires), and the provinces' management of concessions' contracts (including zones, rates, quality of service, sanctions) and distribution oversight through provincial regulators, calls for a common approach toward rural electrification. In addition, energy provision is a vital input to many basic services (for example, health, water, education). This means the proposed project will need to continue building upon the relationships established with other stakeholders (for example, from the education sector) and incorporate new institutions (such as water utilities and the health sector) which were not part of the previous operation.

C. Higher-Level Objectives to which the Project Contributes

12. **PERMER II will be the main national instrument to move Argentina toward universal energy access**. The proposed operation will provide or enhance the availability of energy infrastructure for rural households, helping the isolated rural population to leave extreme poverty behind. The operation will also support the GoA's objectives to improve energy security, diversify the energy matrix, and reduce environmental impacts.

13. **The project is also fully aligned with the World Bank Group's Country Partnership Strategy (CPS) for Argentina**. The CPS focuses on promoting shared prosperity and reducing poverty by working on nine results areas set within three broader themes: (a) employment creation in firms and farms; (b) availability of assets for people and households; and (c) reducing environmental risks and safeguarding natural resources. The project will directly contribute to the second theme by expanding asset availability of households and people in an efficient and sustainable manner, for economic uses, improved social services, and enhanced quality of life. It will also support the other two themes as economic uses of electricity can enhance rural employment and utilizing renewable energy helps reduce environmental risks and safeguard natural resources. The operation will contribute to specific outcomes included in the CPS results framework, such as providing electricity for lighting, communications and other basic services.

14. **The operation similarly incorporates a set of cross-cutting initiatives—introduced by the CPS to gradually shift the Bank's engagement with Argentina—that will improve implementation**. These include focusing on providing knowledge services, supporting in-depth assessments for impact evaluation, increasing the involvement of low-income geographic areas, and improving governance by, for example, moving to the open procurement system.

15. **By focusing on offgrid solutions, PERMER II is complementary to activities financed by other international institutions**. These institutions are concentrated on grid-based services. The CAF Development Bank of Latin America is supporting the refurbishment of generation facilities and the Inter-American Development Bank is financing the Norte Grande and other grid extensions. PERMER II will also be linked to other Bank-financed operations—such as the Second Rural Education Improvement, Forest and Communities, and the Rural Corridors and Biodiversity projects—as it will provide electricity to schools, facilities in national parks and protected areas, and for the development of productive activities, including those by small forest producers.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

16. The project's development objective is to provide and enhance access to modern energy services in selected rural areas of Argentina.

Project Beneficiaries

17. **The main beneficiaries of the proposed operation will include some of the poorest members of the Argentine society**. Poverty rates are significantly higher in rural areas.[8] According to census data and estimates by the SE, roughly 145,000 households lack electricity service in Argentina (at least half a million people). It is expected that through the project, over 765,000 people will obtain access to modern energy services or benefit from an enhanced service (of which at least 40 percent would be women). Around 560,000 people will benefit from electricity service provision (for lighting, communication and other services, water pumping for human consumption and/or to support productive uses), of which roughly 319,000 currently lack the service and 241,000 have a limited access to it. The remaining 205,000 beneficiaries would gain access to modern thermal energy services (mostly in schools and including cooking, spatial heating and/or water heating). Finally, the capacity of institutions such as the SE, other instances within the Ministry of Federal Planning, Public Investments and Services (*Ministerio de Planificación Federal, Inversión Pública y Servicios* [MINPLAN]), and the Ministry of Education will be strengthened.

PDO Level Results Indicators

18. Progress toward achieving the PDO will be assessed through the following indicators:

(a) Direct project beneficiaries[9]
(b) People provided with access to electricity by household connections
(c) Community electricity connections constructed under the project
(d) People that obtain daily and constant electricity service (through minigrids)

[8] Cf. The Invisible Poor: A Portrait of Rural Poverty in Argentina. The World Bank. 2010.
[9] For this and every indicator, each benefit is counted separately (that is, if one individual obtains access to electricity at home and benefits from solar heating in public institutions, each benefit is counted separately).

III. PROJECT DESCRIPTION

A. Project Components

19. **The project constitutes an innovative approach to rural electrification**. The inclusion of tailored assistance, capacity-building activities and new technologies will provide a global example for countries poised to complete the access agenda. The tailored assistance will provide valuable knowledge to all provinces, clearing the way to achieve universal access to modern energy service in the near future. Capacity-building activities such as the creation of a PERMER II network—in which federal, provincial, and local institutions can share best practices and lessons learned—will allow the poorest and most marginalized provinces and communities to benefit from the national pool of resources and knowledge that decades of electrification projects have created. Finally, the use of new technologies for thermal energy provision and for remote subproject's monitoring will create new markets and areas of opportunity. The project comprises four components.

20. **Component 1: Renewable electricity service provision** (US$215.61 million, of which US$183.40 million IBRD). This component will focus on the provision of renewable electricity services through, among other things, (a) the acquisition and installation of standalone solar systems, standalone wind systems, Pico photovoltaic (PV)[10] for isolated individual households and public facilities[11] in rural areas of the participating provinces; (b) the construction and/or upgrade of minigrids[12] (including mini hydro, as applicable) for, among other things, rural and isolated population clusters and/or public institutions located in rural areas of the participating provinces; (c) the acquisition and installation of water pumping systems in isolated individual households, public facilities, and isolated communities, all located in rural areas of the participating provinces; (d) the acquisition and installation of equipment to micro-enterprises for the development of individual or collective productive uses activities; and (e) the provision of small works and goods as in-kind compensation under the relevant resettlement plans.

21. **Component 2: Solar thermal energy service provision** (US$9.67 million, of which US$7.90 million IBRD). This component will work on the provision of solar thermal energy services through, among other things, the acquisition and installation of solar water heaters, solar spatial heating systems, cookers, and ovens for (a) selected dispersed public facilities and (b) public buildings located in rural areas in the participating provinces.

22. **Component 3: Project deployment support** (US$6.71 million, of which US$5.70 million IBRD). This component will concentrate on the provision of support for the design, implementation, and execution of subprojects and the carrying out of activities to enhance renewable energy deployment in Argentina, including (a) the carrying out of market studies to determine potential energy demand and technologies at both urban and rural levels; (b) the carrying out of monitoring and evaluation (M&E) activities, including the deployment of new

[10] Pico PV means portable PV systems which offer basic electricity services such as lighting and communication, and usually with a capacity of less than 35 W.

[11] Targeted public facilities (either isolated or dispersed or located in isolated population clusters or communities) may already count with electricity or basic energy services which may be enhanced by the project.

[12] The project will not finance the acquisition or installation of diesel-powered units, although existing ones may be kept as backup, and the operation could finance their integration with renewable technologies.

technologies to remotely measure electricity consumption and use as well as subprojects performance; (c) the carrying out of communication strategies and outreach activities, including (i) the carrying out of studies to support the borrower's renewable energy goals; (ii) the dissemination of lessons learned, best practices, and relevant experiences; and (iii) provision of capacity building for the weakest stakeholders to ensure their participation in the project; and (d) provision of support for the development of pilot studies for technologies that have not been fully deployed in Argentina, such as solar spatial heating systems.

23. **Component 4: Project management** (US$8.10 million, of which US$3.00 million IBRD). This component will focus on carrying out project management activities, including (a) the strengthening of the operational capacity of (i) the Project Coordinating Unit (PCU) for the implementation, monitoring,[13] administration, and supervision of the project and (ii) the participating provinces and their respective Provincial Executing Units (PEUs) to carry out the project activities under their responsibility; (b) the carrying out of the project audits; (c) the carrying out of training; (d) the financing of travel costs for PCU and PEUs staff; and (e) the rental of vehicles for the carrying out of project supervision activities.

B. Project Financing

24. **The proposed lending instrument will be investment project financing in the amount of US$200 million**. Total project costs will be US$240.09 million, of which US$40.09 million will be provided as counterpart funding by Argentina, including US$5.74 million by the provinces, US$23.50 million by the private sector, and US$10.85 million by the GoA.

Project Cost and Financing

25. Table 1 details project costs and financing sources (in US$, million).

Table 1: Project Costs and Financing Sources

Project Components	Project cost	IBRD $	IBRD %	GoA $	GoA %	Provinces $	Provinces %	Private sector $	Private Sector %
1. Renewable electricity service provision	215.61	183.40	85.06	4.00	1.86	4.71	2.18	23.50	10.90
2. Solar thermal energy service provision	9.67	7.90	81.70	1.35	13.96	0.42	4.34	—	0.00
3. Project deployment support	6.71	5.70	84.95	0.40	5.96	0.61	9.09	—	0.00
4. Project management	8.10	3.00	37.04	5.10	62.96	—	0.00	—	0.00
Total costs	**240.09**	**200.00**	**83.30**	**10.85**	**4.52**	**5.74**	**2.39**	**23.50**	**9.79**

C. Lessons Learned and Reflected in the Project Design

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

[13] Equipment and surveys for M&E will be financed by Component 3, but M&E data will be prepared by the PCU.

(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.

(b) **Large-scale decentralized renewable energy operations face unique challenges** associated with market dispersion, the large number of stakeholders, limited knowledge of the terrain, and complex communications. A delivery model tailored to these circumstances is necessary. For example, PERMER I's experience shows that the decision to centralize procurement to overcome the weaknesses of some provinces proved to be the correct one and will continue.

(c) **Sustainability of the operation is more a logistical challenge than a technical task**. While PV and wind-power installations have a certain degree of technical complexity, 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. In these circumstances, building capacities at all levels becomes a necessity if an operation is to be successful.

(d) **Subsidies are a necessary component of rural electricity projects**, but these should be granted in a way that minimizes economic distortions. A sound tariff system should also rely—beyond subsidies—on secure sources to ensure sustainability as well as contributions (even if minor) from beneficiaries.

(e) **Enhanced dissemination of project objectives, components, and activities is recommended to ensure swift implementation**. Even though a project may be valuable in addressing the needs of dispersed rural populations, it may be hampered by poor communication between implementing agencies and beneficiaries. Special attention should also be paid to incorporating new stakeholders during design and implementation to ensure that changes in circumstances are adequately taken into account.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

27. **The project will be implemented over a five-year period; overall coordination and implementation will be the responsibility of the SE, through a PCU**. The PCU has a core of qualified staff to handle all procurement and financial management issues. Given the magnitude of the current operation, the PCU—located in the Deputy Secretariat for Electricity (*Subsecretaría de Energía Eléctrica* [SSEE])—will be further strengthened in order to have sufficient trained staff on technical issues (as it would define technical standards for technologies to be deployed), safeguards compliance, and monitoring. The centralized PCU will be responsible for most technical, fiduciary, management, and M&E tasks and will launch—on behalf of the provinces—most bidding processes[14] for the procurement and installation of goods, works, and services. As shown in Figure 3.2 (annex 3, page 44), loan funds will be centrally managed and payments will be made directly by the PCU to contractors, upon review of supporting documentation. For the activities under Components 1 and 2, once the works have been finalized and/or the goods have been installed, provinces will be in charge of their

[14] The only exception being potential bidding processes, mostly, related to small hydro systems.

O&M&R as these provincial entities[15] can guarantee it. The PCU will also monitor compliance with environmental and social safeguards (according to Argentine law, provinces are responsible for their fulfillment) and monitor implementation of the subprojects, compiling information from the various project implementation areas.

28. **Provinces will participate through PEUs typically located in the province's energy agencies** and they will be responsible for identifying demand, designing subprojects, ensuring safeguards compliance, and supervising implementation in their jurisdictions, as well as ensuring that an acceptable O&M&R mechanism (to be deployed through Qualified Service Providers [QSPs]) is in place during the subprojects' life cycle and that enough co-financing resources are available to guarantee their operation.[16] Provinces might also conduct bidding processes (for example, related to small hydro systems) if necessary and in consultation with the SE. As some of the poorest provinces will be included, the PCU will work with them to build their capacity to implement agreed activities (through Component 3). Provinces will also provide all necessary information to the PCU for M&E purposes. Provincial regulators will oversee and regulate QSPs (including concessionaires), supervising the appropriate provision of the electricity service, and reporting any breach of relevant agreements to the PCU.

29. **The province's roles and responsibilities will be defined through Participation Agreements** (the involvement of other stakeholders will be established under collaboration agreements, as needed). The Participation Agreements are already under preparation and a template (which includes all technical, economic, financial and environmental, and social aspects of the operation that parties need to take into account and implement) is part of the Operational Manual (OM). The project will rely on other agencies and relevant actors[17] to identify demand (in their respective sectors), propose subprojects, indicate requirements to assess electricity needs, and co-finance initial investments (when appropriate).

30. **It is expected that most of these institutions will provide counterpart funding to the project**. The GoA will provide counterpart funding to all components, while the provinces will focus on Components 1, 2, and 3, and the private sector's funds will mostly target Component 1. Counterpart funding from other institutions (including in-kind contributions) will focus on those activities in which their support is being sought.

B. Results Monitoring and Evaluation

31. **The project will build upon existing structures and capacities developed through PERMER I**. The operation's support to all M&E tasks—as well as to overall project implementation supervision and reporting—will be twofold: (a) the PCU will develop and deploy studies, systems, indicators, reports, remote monitoring technologies, and other instruments as necessary (b) relevant data and information will be gathered by the PCU and relevant stakeholders.

[15] These are QSPs, including concessionaires, which will be determined by the participating provinces and with which they will sign the O&M&R agreements.

[16] For further details on the O&M&R mechanism (to be partly subsidized) please see the Sustainability section below.

[17] A detailed description of relevant stakeholders is presented in annex 3.

32. **M&E and implementation supervision will be conducted through five main tasks**:[18] (a) PERMER II M&E, supervision, and monitoring system; (b) reporting of project development and intermediate indicators; (c) additional impact, results and performance indicators, and data to be developed during project implementation; (d) management system; and (e) baseline, mid-term, and implementation assessments to evaluate the operation's impact, including a planned impact evaluation study to be developed with support from the Development Impact Evaluation Initiative (DIME). This last task will be of increased importance as it can become an effective instrument for policy making. It will also be fully supported by the Bank as the CPS provides a special focus on impact evaluations, especially in the 'asset availability of households and people' theme.

C. Sustainability

33. **The GoA has strong ownership of rural energy projects**. The project is aligned with the GoA's main goals of reducing extreme poverty and fostering social inclusion. This provides a strong rationale for the GoA to continue its solid support for PERMER II.

34. **PERMER II includes robust institutional arrangements to guarantee adequate O&M&R of systems** by provinces and/or through O&M&R agreements between these subnational entities and QSPs. Beneficiaries will also contribute to the subprojects O&M&R through tariffs. These arrangements have proven to be successful. Two years after the closing of PERMER I, only 6 percent of the roughly 27,000 systems installed residential systems are no longer operational (mostly as a result of grid extensions) and batteries are being replaced as planned. This shows that under appropriate arrangements, O&M&R can be ensured with local funding.

35. **A financial architecture that can support the project's operation is available**. These include the National Electricity Fund (*Fondo Nacional de la Energía Eléctrica* [FNEE]), which consists of two different instruments: Special Fund for the Electric Development of the Interior (*Fondo Especial de Desarrollo Eléctrico del Interior* [FEDEI])[19] and Rates Compensation Fund (*Fondo de Compensación Tarifaria* [FCT]). However, resources from FNEE instruments per province are different and in some cases they may not be sufficient to cover O&M&R. The project will work to identify and ensure adequate funding through additional counterpart resources. Several provinces have already developed (or are designing) schemes to ensure that resources needed to co-finance O&M&R are available. Tucumán and Santa Fe, for instance, have created a surcharge (mostly to urban users) to adequately fund the dispersed market, and Salta and Jujuy have already started to work on the design of similar tools.

36. **Empowered beneficiaries will also be one of the major sources of sustainability**. Ensuring beneficiaries fully understand the technology, its benefits, and the implications of becoming public service users (including rights and obligations) is one of the priorities of PERMER II. This will be one emphasis of the outreach provided through Component 3.

[18] Further details can be found in annex 6.
[19] FEDEI also receives transfers from the Fuel Transfer Tax (*Impuesto a la Transferencia de Combustibles* [ITC]).

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

37. **The overall risk rating for the proposed project is Moderate**. Political and governance risk is rated Moderate as local political events and administration cycles could negatively impact project progress. While macroeconomic imbalances have increased over the past years and Argentina has been experiencing a mild contraction, the potential impact of macroeconomic risk on the achievements of the project's development objective is moderate. Limited counterpart financing is envisaged and no significant challenge for importing solar systems were experienced during the implementation of a previous project. Sector strategies and policies risk is rated Moderate as the electricity sector is facing several challenges associated to fiscal and current account imbalances, though PERMER II will not contribute to nor be affected by imbalances produced by fuel imports and subsidies. Technical design is also rated Moderate as the project builds upon a successful operation but now includes the deployment of new technologies. Institutional capacity for implementation and sustainability is Moderate; measures to manage this risk include tailored assistance to stakeholders, capacity building activities and strengthening the existing PCU. The PCU has the capacity to implement the project, though the envisioned scale-up (as compared to PERMER I) may stretch the supply chain and their capacity, slowing implementation and/or reducing quality, which may have a bearing on the achievement of the project's development objective. Fiduciary risks are rated Moderate as the PCU has sufficient capacity. Given the results of PERMER I, stakeholder risk is rated Moderate, given the participation of a larger number of provinces and federal institutions.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

38. **The project includes two investment components that aim to increase and improve the provision of electricity services and solar thermal energy in rural areas**. Important direct benefits that will accrue to rural households and public institutions include savings from the reduced use of traditional or less efficient energy sources (for example, kerosene, batteries, candles), as well as opportunities for productive activities and enhancing the quality of life and impact of services (education, health). Given the analytical constraints associated with indirect nonmonetary benefits, the economic analysis focuses on two main subcomponents that account for 71.4 percent of total project investments.[20] These subcomponents involve the provision of lighting and communications services (among others) to (a) isolated individual households and public facilities primarily through solar PV systems and (b) rural and isolated population clusters and/or public institutions through minigrids supplied by renewable energy technologies.

39. **The economic analysis uses cost estimates for investment and O&M&R based on the most recent experience in rural electrification in Argentina (PERMER I) and neighboring countries**. Costs are adjusted to reflect economic values, excluding taxes and duties and using border prices when relevant. Benefits are estimated on the basis of savings to users in traditional energy sources as well as on values of willingness-to-pay (WTP) obtained from market surveys carried out in most provinces through PERMER I. Details of the analysis are shown in annex 7.

[20] As a result, benefits will be by definition underestimated.

40. **Based on the above methodology the economic rate of return (ERR) of the aggregate project is estimated at 22.8 percent and its net present value (NPV) is US$76.9 million** (based on a 10 percent discount rate to reflect the economic opportunity cost of capital in Argentina). The project will generate an economic benefit of the said amount in providing and enhancing access to modern energy services in rural areas. There are uncertainties associated with the pace of expansion and the households' future consumption of electricity, as well as the difficulties in reaching remote places that may impact investment and O&M&R costs. A sensitivity analysis considering variations in costs and in electricity consumption indicated that the project economics are quite robust since in the worst scenario (higher cost and lower consumption) it would yield an ERR of 16.6 percent and a NPV of US$41.8 million.

41. **The project's objectives are, by nature, both social and economic and, given the high unit costs and limited capacity to pay of rural customers, public support is necessary**. Hence, a considerable subsidy is required and corresponding sources of funding need to be secured to ensure financial viability from the customers and QSPs perspectives. The financial sustainability of the operational phase will rely on the FNEE and other counterpart funds and fees/tariffs to be paid by customers. While current tariffs for the dispersed market vary from province to province (covering from 10 to 92 percent of total cost, depending on WTP), the relative size of the subsidy required is not uniform.

42. **Regarding GHG emissions, roughly 6,337 tCO_2e will be reduced per year**. This adds up to a total reduction of 38,023 tCO_2e per year by the end of the implementation period, leading to savings of 133,080 tCO_2e over the economic lifetime (estimated at 20 years) of the project. The GHG emission reductions assessment is in the project files. Emission reductions will be measured based on project results and utilizing the Clean Development Mechanism's (CDM) I.A small-scale methodology.

B. Technical

43. **The project relies on the utilization of simple, known, and proven technologies.** Subprojects will be implemented in accordance with internationally accepted technical standards with support from staff and other experts as needed. Technologies, technical parameters, key design features, and estimated costs for each component have been proposed by the SE and discussed with experienced officials with relevant experience. The SE already has relevant experience from the deployment of similar technologies. Preparation of technical specifications, evaluation of bidding processes, contractual negotiations, and supervision will be done by the PCU (and provinces when relevant) and supported as needed by the Bank.

44. **Other technologies considered under Component 2 include large solar thermal applications for spatial heating and cooking in public institutions**. The full deployment of the spatial heating systems will be delayed given the incipient experience (and market conditions in Argentina). Given their potential value (especially in terms of social inclusion and improving quality of life), the project will pilot technologies before financing their acquisition and installation. Component 3 will finance implementation support and technical expertise to capture the potential benefits of such alternatives.

45. **The project will also finance consulting services, training courses, capacity building, and feasibility studies (through Components 3 and 4)**. These tasks will be coordinated and

executed by the PCU. This approach was chosen as the PCU has the capacity to set national targets and policies and disseminate lessons learned and best practices to all stakeholders.

C. Financial Management

46. **A financial management assessment of the proposed project's arrangements has been performed in accordance with OP/BP 10.00 and in line with Bank specific guidelines.**[21] From a financial management perspective, the proposed operation will be executed by the PERMER II PCU. The SSEE—on which the PCU depends—and the General Financial Management Directorate (*Dirección General de Cooperación y Asistencia Financiera* [DGCAF]) in the SE will contribute with financial management and disbursements related activities, depending upon the internal organization of the SE. The PCU and the DGCAF have financial management arrangements in place that meet minimum Bank requirements. The PERMER PCU has qualified and experienced staff in Bank-financed activities and is capable of undertaking the financial management functions for the project.

47. **The PERMER PCU has presented to the Bank additional measures to strengthen financial management**, including: (a) Chart of Accounts for the proposed project; (b) draft format and contents of the annual financial statements and semiannual interim financial reports for M&E purposes; and (c) a project OM comprising a financial management section with administrative procedures and processes for project implementation, including definitions of responsibilities for annual and interim financial reporting, and managements of funds.

D. Procurement

48. **Procurement will be conducted according to the World Bank's guidelines**.[22] The structures responsible for carrying out procurement activities, monitoring, and supervising the fiduciary arrangements, as well as the final procurement risk rating, were defined as a result of the capacity assessment carried out on December 2013. The analysis concluded that the PCU has an overall installed capacity suitable to successfully carry out the procurement function. The PCU is solid enough to carry out processes with Bank's financing and has an experienced procurement specialist. However, it is necessary to strengthen the procurement staff in order to assist the procurement specialist with the increasing workload. The procurement activities under the proposed project would also seek to further the CPS objectives of supporting open procurement.

E. Social

49. **It is expected that the proposed operation will result in positive social outcomes,** enhancing welfare of isolated populations in Argentina's provinces through the provision of electric and thermal energy and safe and accessible water supply for families; the opportunity to undertake commercially productive activities; and the reliable and timely provision of social

[21] Financial Management Manual for World Bank-Financed Investment Operations; document issued by Operations Policy and Country Services-Financial Management on March 1, 2010.

[22] "Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" (issued in January 2011 and revised in July 2014) for the supply of goods, civil works and non-consulting services, and the "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" (issued in January 2011 and revised in July 2014).

services (for example, constant electricity supply for refrigeration of vaccines). Based on potential subprojects and also on the experience of PERMER I, the proposed project triggered the following social safeguard policies: OP/BP 4.10 (Indigenous Peoples) and OP/BP 4.12 (Involuntary Resettlement). Given that specific sites of each subproject are not known before approval, a framework approach has been adopted. Targeted project areas are primarily rural with indigenous people's communities, which are among the most vulnerable in Argentina. Based on a desk review of PERMER I's experience and relevant documents on indigenous peoples, the social assessment has been updated by the SE, and an Indigenous Peoples Planning Framework (IPPF) has been prepared. As the project is demand-driven, and key stakeholders change according to specific subprojects, diverse consultation mechanisms have been included in the operation's safeguard documents. A draft of the IPPF was made available and presented to organizations representative of indigenous peoples: the Indigenous Participative Council (*Consejo de Participación Indígena*) of the National Indigenous People Institute (*Instituto Nacional de Asuntos Indígenas*). The project counterpart updated the IPPF documents based upon the consultations to receive and incorporate their advice and gauge their level of support. The consultation was held on August 14, 2014, and only minor observations to the document were made. The IPPF was disclosed both in country and on the Bank's website on November 14, 2014.

50. **Subprojects to be financed by PERMER II (such as minigrids, hydropower, and small dams, among others) are likely to require land easements and/or acquisition,** including potential investments that might entail resettlement as defined by OP 4.12 (Involuntary Resettlement). The SE has prepared a Resettlement Policy Framework (RPF), based on the PERMER I experience, to ensure that analysis of alternatives and appropriate compensation and support to potentially affected persons are incorporated into the subproject design. Given that voluntary land donations may take place, the Environmental and Social Management Framework (ESMF) includes robust criteria to screen and document them. The RPF was disclosed both in country and on the Bank's website on November 14, 2014. The social safeguards documents also incorporate findings from the Gap Analysis of the Argentine Republic's ESMFs and the World Bank's Safeguard Policies, approved in 2013.

F. Environment

51. **The proposed project is classified as category B—partial assessment—as it is likely to have limited and reversible environmental impacts that can be readily mitigated**. The proposed project will have a largely positive impact on the environment, by improving the supply of energy in rural areas of Argentina's provinces, thereby reducing the use of fossil fuels and firewood. Physical interventions resulting from the implementation of investments in rural areas could have low to moderate negative impacts on the environment, depending on their locations. The most significant impacts will result from the construction of low-voltage distribution lines and related infrastructure, and appropriate mitigation measures will be followed to limit the impact on local fauna, avi-fauna and to protect indigenous plant and tree species and preserve riverine ecosystems in the case of pico/micro/mini-hydro schemes.

52. **Given that specific sites and potential environmental and social impacts of each subproject will not be definitively selected before approval, a framework approach has been adopted**. An ESMF has been prepared based on an update of the ESMF prepared for

PERMER I. This revised and updated version has benefited from an assessment of the previous ESMF through verification and accountability of previous subproject Environmental Impact Assessments (EIAs) prepared under PERMER I, and incorporates findings from the previously mentioned Gap Analysis. Based on the location and nature of potential subprojects and also on the experience of PERMER I, the proposed project triggered the following environmental safeguard policies: OP/BP 4.01 (Environmental Assessment); OP/BP 4.11 (Physical Cultural Resources); and OP/BP 4.04 (Natural Habitats). The SE conducted public consultations on the draft ESMF with local and provincial government officials; representatives of stakeholders in local communities; and local nongovernmental organizations (NGOs) on February 14 and July 14, 2014. Main issues discussed included the importance of consistent and early interaction with both individual and institutional end-users in rural communities, and the increased involvement of local NGOs; these issues have been built into project specific communication strategies. Minutes of stakeholder meetings, including measures proposed to address grievances, are included as an annex to the environmental safeguard instruments. The ESMF was disclosed in country on August 12, 2014, and on the Bank's website (and re-disclosed in Argentina) on October 29, 2014.

G. Other Safeguards Policies Triggered

53. **While the exact location of subprojects is still being determined, Component 1 of the proposed project includes the construction and/or upgrade of minigrids for remote rural areas with renewable technologies**. These renewable technologies will include micro/mini/small-hydro run-of-river electricity generation facilities (ranging from 100 kW to 4 MW), some of which may require a small weir or pondage to provide water for the penstock.

54. **The Policy regarding Projects on International Waterways—OP/BP 7.50—has been triggered.** Several of these subprojects that are being considered for funding may use water from international waterways or their tributaries. In particular, activities may be implemented in rural areas that are served by the Paraná/Paraguay River system which originates in Brazil and flows into Bolivia and Paraguay (the Paraguay River) and Paraguay and Argentina (the Paraná River) or tributaries. The Paraguay discharges its water in the Paraná and further downstream it merges with the Uruguay River to form the La Plata River, a river that flows from Argentina to Uruguay. In addition, several of the subprojects to be considered for funding are located on waterways in rural areas of Argentina that share rivers with Chile, for example, the Negro, Colorado, Chico, and Deseado Rivers. The borrower requested the Bank to undertake the process of notifying other riparians on its behalf.[23] No responses were received from the governments of the Oriental Republic of Uruguay, the Republic of Paraguay, and the Republic of Chile. The Bank received requests for additional information from the governments of the Plurinational State of Bolivia and the Federative Republic of Brazil, and, on behalf of the GoA, it responded accordingly. There are no outstanding issues regarding the applicability of this policy to the proposed project.

[23] The five riparian states containing international waterways which flow into Argentina and on which subprojects may be located (Bolivia, Brazil, Chile, Paraguay and Uruguay) were notified in September, 2014. The deadline to respond or express any concerns was originally October 20, 2014 but was extended to November 5, 2014 at Brazil's request.

H. World Bank Grievance Redress

55. **Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS).** The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

ARGENTINA: Renewable Energy for Rural Areas Project

Results Framework

Project Development Objectives

PDO Statement

The project's development objective is to provide and enhance access to modern energy services in selected rural areas of Argentina.

These results are at	Project Level

Project Development Objective Indicators

Indicator Name	Baseline	Annual Target Values					
		YR1	YR2	YR3	YR4	YR5	End Target
Direct project beneficiaries (Number) - (Core)	0	0	205,400	203,300	191,250	165,050	765,000
Direct project beneficiaries that obtained enhanced access (daily hours and quality of service) to modern energy services (electricity, water pumping, productive uses, solar thermal applications) (Number - Subtype: Breakdown)	0	0	48,200	72,300	60,250	60,250	241,000
Direct project beneficiaries that obtained access to modern energy services (electricity, water pumping, productive uses, solar thermal applications) (Number - Subtype: Breakdown)	0	0	157,200	131,000	131,000	104,800	524,000
Female beneficiaries (Percentage - Subtype: Supplemental) - (Core)	—	—	40	40	40	40	40
People provided with access to electricity by household connections (Number) - (Core)	0	0	0	17,500	26,650	130,850	175,000
People provided with electricity by household connections—Offgrid/minigrid—Only renewable sources (Number - Subtype: Breakdown) - (Core)	0	0	0	17,300	25,950	129,750	173,000

Indicator Name	Baseline	Annual Target Values					
		YR1	YR2	YR3	YR4	YR5	End Target
People provided with electricity by household connections—Offgrid/minigrid—Any source except only renewable (Number - Subtype: Breakdown) - (Core)	0	0	0	200	700	1,100	2,000
Community electricity connections constructed under the project (Number) - (Core)	0	0	0	530	798	472	1,800
Community electricity connections constructed—Offgrid/minigrid—Only renewable sources (Number - Subtype: Breakdown) - (Core)	0	0	0	525	788	437	1,750
Community electricity connections constructed—Offgrid/minigrid—Any source except only renewable (Number - Subtype: Breakdown) - (Core)	0	0	0	5	10	35	50
People that obtain a daily and constant electricity service (through minigrids) (Number)	5,000	0	0	1,850	2,300	32,850	37,000
People that obtain a daily and constant electricity service and with prior access to the service (Number - Subtype: Breakdown)	5,000	0	0	1,400	1,400	25,200	28,000
People that obtain a daily and constant electricity service and without prior access to the service (Number - Subtype: Breakdown)	0	0	0	450	900	7,650	9,000

Intermediate Results Indicators							
		Annual Target Values					
Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Community electricity connections constructed under the project (schools) (Number)	0	0	540	420	180	60	1,200
Community electricity connections constructed under the project (other public facilities) (Number)	0	0	60	120	270	150	600
Generation capacity of hydropower constructed or rehabilitated under the project (MW) - (Core)	0	0	0	0.25	0.25	13.5	14
Generation capacity of hydropower constructed under the project (MW - Subtype: Breakdown) - (Core)	0	0	0	0.25	0.25	13.5	14
Generation capacity of renewable energy (other than hydropower) constructed (MW) - (Core)	0	0	2.25	3.25	3	1.5	10
Generation capacity of renewable energy constructed - Solar (MW- Subtype: Breakdown) - (Core)	0	0	2.25	2.25	2	1.5	8
Generation capacity of renewable energy constructed - Wind (MW- Subtype: Breakdown) - (Core)	0	0	0	1	1	0	2
People that obtained access to thermal energy provision (modern spatial heating, cooking, and water heating) in public institutions (Number)	0	0	71,250	41,000	61,500	31,250	205,000
People that obtained access to modern cooking appliances (Number - Subtype: Breakdown)	0	0	10,850	6,200	9,300	4,650	31,000
People that obtained access to modern water heating systems (Number - Subtype: Breakdown)	0	0	57,400	32,800	49,200	24,600	164,000
People that obtained access to modern spatial heating systems (Number - Subtype: Breakdown)	0	0	3,000	2,000	3,000	2,000	10,000

Indicator Name	Baseline	Annual Target Values					
		YR1	YR2	YR3	YR4	YR5	End Target
People that obtained access to an electricity service for water pumping only (Number)	0	0	46,250	46,250	55,500	37,000	185,000
Micro-enterprises that obtained an electricity service under the project (Number)	0	0	0	1,055	2,110	1,055	4,220
Collective micro-enterprises that obtained an electricity service under the project (Number - Subtype: Breakdown)	0	0	0	5	10	5	20
Individual micro-enterprises that obtained an electricity service under the project (Number - Subtype: Breakdown)	0	0	0	1,050	2,100	1,050	4,200
Micro-enterprises supported under the project that increase their production (Percentage - Subtype: Supplemental)	—	—	—	65	65	65	65
Capacity building, outreach, and training activities implemented under the project (Number)	0	20	20	15	10	5	70
Clean energy studies and strategies supported under the project (Number)	0	2	3	3	1	1	10
People that are satisfied with the benefits arising from obtaining access or an enhanced access to electricity through household connections (Percentage)	—	—	—	70	—	80	80
People that are satisfied with the benefits arising from obtaining access or an enhanced access to electricity through community connections (Percentage)	—	—	—	70	—	80	80

Indicator Description

Project Development Objective Indicators				
Indicator Name	**Description (indicator definition)**	**Frequency**	**Data Source / Methodology**	**Responsibility for Data Collection**
Direct project beneficiaries	Direct beneficiaries are people or groups who directly derive benefits from an intervention (that is, children who benefit from an immunization program; families that have a new piped water connection). Each benefit is counted separately (that is, if one individual could benefit from a more reliable electricity service at home and benefit from improved solar heating in public institutions, each action would be counted separately).	Biannual	PCU and PEUs	PCU and PEUs
Direct project beneficiaries that obtained enhanced access (daily hours and quality of service) to modern energy services (electricity, water pumping, productive uses, solar thermal applications)	Total number of beneficiaries that obtained access to an improved modern energy services (electricity, water pumping, productive uses, solar thermal applications).	Biannual	PCU and PEUs	PCU and PEUs
Direct project beneficiaries that obtained access to modern energy services (electricity, water pumping, productive uses, solar thermal applications)	Number of direct project beneficiaries that obtained access to modern energy services (electricity, water pumping, productive uses, solar thermal applications).	Biannual	PCU and PEUs	PCU and PEUs
Female beneficiaries	Based on the assessment and definition of direct project beneficiaries, specifies what percentage of the beneficiaries are female.	Biannual	PCU and PEUs	PCU and PEUs
People provided with access to electricity by household connections	This indicator measures the number of people that have received an electricity connection under the project via new connections aimed at connecting households. The baseline value for this indicator is expected to be zero. Excludes public buildings and only includes beneficiaries from households that obtained access (without prior electricity service).	Biannual	PCU and PEUs	PCU and PEUs

Indicator Name	Description (indicator definition)	Frequency	Data Source / Methodology	Responsibility for Data Collection
People provided with electricity by household connections—Offgrid/minigrid—Only renewable sources	This subindicator measures the number of people that have received an electricity connection under the project via new connections aimed at connecting households using renewable sources (solar, wind). The baseline value for this indicator is expected to be zero. Excludes public buildings and only includes beneficiaries from households that obtained access (without prior electricity service).	Biannual	PCU and PEUs	PCU and PEUs
People provided with electricity by household connections—Offgrid/minigrid—Any source except only renewable	This subindicator measures the number of people that have received an electricity connection under the project via new connections aimed at connecting households using nonrenewable sources (e.g.: hydro). The baseline value for this indicator is expected to be zero. Excludes public buildings and only includes beneficiaries from households that obtained access (without prior electricity service).	Biannual	PCU and PEUs	PCU and PEUs
Community electricity connections constructed under the project	This indicator measures the number of new community connections constructed under the project. 'Community connections' are electricity services provided to hospitals, schools, community centers, or other establishments that provide services to a larger pool of people in remote areas. The baseline value for this indicator is expected to be zero. Includes all connections financed by the project (for access provision and access enhancement).	Biannual	PCU and PEUs	PCU and PEUs
Community electricity connections constructed—Offgrid/minigrid—Only renewable sources	This subindicator measures the number of new community connections constructed under the project using renewable sources (solar, wind, etc.). 'Community connections' are electricity services provided to hospital, schools, community centers, or other establishments that provide services to a larger pool of people in remote areas. The baseline value for this indicator is expected to be zero. Includes all connections financed by the project (for access provision and access enhancement).	Biannual	PCU and PEUs	PCU and PEUs

Indicator Name	Description (indicator definition)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Community electricity connections constructed—Offgrid/minigrid—Any source except only renewable	This subindicator measures the number of new community connections constructed under the project using nonrenewable sources (e.g., hydro). 'Community connections' are electricity services provided to hospital, schools, community centers, or other establishments that provide services to a larger pool of people in remote areas. The baseline value for this indicator is expected to be zero. Includes all connections financed by the project (for access provision and access enhancement).	Biannual	PCU and PEUs	PCU and PEUs
People that obtain a daily and constant electricity service (through minigrids)	This indicator measures the number of people that has obtained—through the project and via connected households—a new or improved and daily and constant electricity service. That is, people that as a result of the project now count with an increased number of hours of electricity service (through minigrids only). The baseline is not 0, as some people already had a constant and daily service (which is being enhanced).	Biannual	PCU and PEUs	PCU and PEUs
People that obtain a daily and constant electricity service and with prior access to the service	This subindicator measures the number of people that has obtained—through the project and via connected households—an improved and daily and constant electricity service. That is, people that as a result of the project now count with an increased number of hours of electricity service (through minigrids only). The baseline is not 0, as beneficiaries already had a constant and daily service (which is being enhanced).	Biannual	PCU and PEUs	PCU and PEUs
People that obtain a daily and constant electricity service and without prior access to the service	This subindicator measures the number of people that has obtained—through the project—new and daily and constant electricity service. That is, people that as a result of the project now count with an increased number of hours of electricity service (through minigrids only). The baseline is 0.	Biannual	PCU and PEUs	PCU and PEUs

Intermediate Results Indicators				
Indicator Name	**Description (indicator definition etc.)**	**Frequency**	**Data Source / Methodology**	**Responsibility for Data Collection**
Community electricity connections constructed under the project (schools)	This indicator measures a number of new community connections constructed under the project. 'Community connections' to be measured by this indicator are electricity services provided to schools. The baseline value for this indicator is expected to be zero. Only includes schools.	Biannual	PCU and PEUs	PCU and PEUs
Community electricity connections constructed under the project (other public facilities)	This indicator measures a number of new community connections constructed under the project. 'Community connections' to be measured by this indicator are electricity services provided to health centers, community centers, or other establishments that provide services to a larger pool of people in remote areas. The baseline value for this indicator is expected to be zero. Only excludes schools.	Biannual	PCU and PEUs	PCU and PEUs
Generation capacity of hydropower constructed or rehabilitated under the project	This indicator measures the capacity of hydropower constructed or rehabilitated under the project. The baseline value is expected to be zero.	Biannual	PCU and PEUs	PCU and PEUs
Generation capacity of hydropower constructed under the project	This subindicator measures the capacity of hydropower constructed under the project. The baseline value is expected to be zero.	Biannual	PCU and PEUs	PCU and PEUs
Generation capacity of renewable energy (other than hydropower) constructed	This indicator measures the capacity of renewable energy (other than hydropower) constructed under the project. The baseline value for this indicator will be zero.	Biannual	PCU and PEUs	PCU and PEUs
Generation capacity of renewable energy constructed - Solar	This subindicator measures the capacity of solar PV systems under the project. The baseline value for this indicator will be zero.	Biannual	PCU and PEUs	PCU and PEUs
Generation capacity of renewable energy constructed - Wind	This subindicator measures the capacity of wind systems under the project. The baseline value for this indicator will be zero.	Biannual	PCU and PEUs	PCU and PEUs

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
People that obtained access to thermal energy provision (modern spatial heating, cooking, and water heating) in public institutions	This indicator measures the number of people that gained or obtained access to thermal energy provision (modern spatial heating, cooking and water heating) in public institutions.	Biannual	PCU and PEUs	PCU and PEUs
People that obtained access to modern cooking appliances	This indicator measures the number of people that gained or obtained access to modern cooking appliances in public institutions.	Biannual	PCU and PEUs	PCU and PEUs
People that obtained access to modern water heating systems	This indicator measures the number of people that gained or obtained access to modern water heating systems in public institutions.	Biannual	PCU and PEUs	PCU and PEUs
People that obtained access to modern spatial heating systems	This indicator measures the number of people that gained or obtained access to modern spatial heating systems in public institutions.	Biannual	PCU and PEUs	PCU and PEUs
People that obtained access to an electricity service for water pumping only	This indicator measures the number of people that gained or obtained access to an electricity service devoted to water pumping in isolated individual households, public facilities and isolated communities.	Biannual	PCU and PEUs	PCU and PEUs
Micro-enterprises that obtained an electricity service under the project	This indicator measures the number of micro-enterprises (individual or collective) that obtained a devoted electricity service for the development of their productive activities.	Biannual	PCU and PEUs	PCU and PEUs
Collective micro-enterprises that obtained an electricity service under the project	This subindicator measures the number of collective micro-enterprises that obtained a devoted electricity service for the development of their productive activities.	Biannual	PCU and PEUs	PCU and PEUs
Individual micro-enterprises that obtained an electricity service under the project	This subindicator measures the number of individual household micro-enterprises that obtained a devoted electricity service for the development of their productive activities.	Biannual	PCU and PEUs	PCU and PEUs

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Micro-enterprises supported under the project that increase their production	This indicator measures the number of micro-enterprises (individual or collective) that managed to achieve an increase in production after obtaining a devoted electricity service for the development of their productive activities.	Biannual	PCU and PEUs	PCU and PEUs
Capacity building, outreach and training activities implemented under the project	This indicator measures the number of capacity-building, outreach and training activities implemented and/or supported under the project, and targeting relevant stakeholders, including: PEUs, public and private sectors institutions and beneficiaries.	Biannual	PCU and PEUs	PCU and PEUs
Clean energy studies and strategies supported under the project	This indicator measures the number of studies, strategies, programs and other activities supported and/or financed under the project, and which focus on enhancing, promoting and fostering the development and deployment of clean energy sources in Argentina.	Biannual	PCU and PEUs	PCU and PEUs
People that are satisfied with the benefits arising from obtaining access or an enhanced access to electricity through household connections	This indicator measures the percentage of PERMER II beneficiaries that obtained a household connection through the project and that are satisfied with the benefits arising from the provision of electricity. These benefits include number of hours per day they have lighting and the availability of electricity to charge cellphones and utilize radios (according to their needs). This indicator includes beneficiaries that obtained access or an enhanced access to electricity for basic services (excludes water pumping and productive uses).	Years 3 and 5	PCU and PEUs	PCU and PEUs
People that are satisfied with the benefits arising from obtaining access or an enhanced access to electricity through community connections	This indicator measures the percentage of PERMER II beneficiaries that obtained a community connection through the project that are satisfied with the benefits arising from the provision of electricity. These benefits include number of hours per day they have lighting and the availability of electricity to charge cellphones and utilize radios (according to their needs). This indicator includes beneficiaries that obtained access or an enhanced access to electricity for basic services (excludes water pumping and productive uses).	Years 3 and 5	PCU and PEUs	PCU and PEUs

Annex 2: Detailed Project Description

ARGENTINA: Renewable Energy for Rural Areas Project

1. The proposed development objective of the Argentina Renewable Energy for Rural Areas Project is to provide and enhance access to modern energy services in selected rural areas of Argentina. PERMER II will be the main national instrument to move Argentina toward universal energy access. The proposed operation will provide or enhance the availability of energy infrastructure for rural households, helping the isolated rural population to leave extreme poverty behind. The operation will also support the GoA's objectives to improve energy security, diversify the energy matrix, and reduce environmental impacts. The operation will provide key support to Argentina's plans to achieve universal access to modern energy services and to improve the quality of life of the rural and isolated population. The project will also support capacity-building and strengthening activities at the national level. The operation builds upon the activities, lessons learned, best practices and experience obtained from the implementation of PERMER I, as well as from projects in other countries.

2. The main beneficiaries of the proposed operation will include some of the poorest members of the Argentine society as poverty rates are significantly higher in rural areas.[24] According to the latest census data and estimates by the SE, roughly 145,000 households[25] lack electricity service in Argentina. This means that at least half a million people still do not have access to this basic need, which could be partially met through PERMER II. Based on the needs and demands expressed so far by the country's provinces, it is expected that through the project, over 765,000 people will obtain or enhance their access to modern energy services, of which at least more than 40 percent will be women. Of this, around 560,000 people will benefit from electricity service provision (for lighting, communication and other services, water pumping for human consumption and/or to support productive uses); of which, roughly 319,000 currently lack the service and 241,000 have a limited access to it. The remaining 205,000 beneficiaries would gain access to modern thermal energy services (mostly in schools and including cooking, spatial heating and/or water heating). Finally, the capacity of institutions such as the SE, other instances within MINPLAN, and the Ministry of Education would be strengthened.[26]

3. The project will be implemented over a five-year period by the SE (in coordination with Provinces and other relevant stakeholders), through the existing PERMER PCU, created through PERMER I. As an evolution to and an innovation from the GoA's previous efforts, the proposed project will focus on increased coordination between the Federal Government and Provinces. As proven by PERMER I, this is vital if Argentina is to achieve meaningful progress toward universal access to modern energy services. The Federal Government's regulatory control of generation and backbone transport of electricity,[27] and the provinces' management of

[24] Cf. The Invisible Poor: A Portrait of Rural Poverty in Argentina. The World Bank, 2010.
[25] Based on national statistics and estimates, typically four people live in each household.
[26] These results summarize expected results, reflecting overall outcomes and encompassing several indicators. The outcomes included in the CPS (365,000 people receive electricity services) correspond to the people that will obtain access or an improved access to electricity for lighting, communication and other basic services in isolated individual households, rural and isolated population clusters or dispersed public facilities.
[27] As well as distribution in the city of Buenos Aires.

concessions' contracts (including zones, rates, quality of service, sanctions) and distribution oversight through provincial regulators, calls for a common approach toward rural electrification. In addition, energy provision has a direct impact on and is a vital input to almost all other basic services (for example, health, water, education). This means the project will need to continue building upon the relationships established with other stakeholders (for example, from the education sector) and incorporate new institutions (such as water utilities and the health sector) which were not part of the previous operation.

4. As stated earlier, the project constitutes an innovative approach to rural electrification as well as an evolution in the scale, scope and boundaries of PERMER I. The inclusion of tailored assistance, capacity-building activities and new technologies will provide a global example for countries poised to complete the access agenda. The tailored assistance will provide valuable knowledge to all provinces, clearing the way to achieve universal access to modern energy service in the near future. Capacity building activities such as the creation of a PERMER II network—in which federal, provincial and local institutions can share best practices and lessons learned—will allow the poorest and most marginalized provinces and communities to benefit from the national pool of resources and knowledge that decades of electrification projects have created. Finally, the use of new technologies for thermal energy provision and for remote subproject's monitoring will create new markets and areas of opportunity.

5. The project comprises four components, which support the acquisition and installation of goods and services to: (1) increase and improve the provision of renewable electricity services; (2) augment the provision of solar thermal energy services; (3) enhance the design, implementation and execution of subprojects as well as the development of activities to improve renewable energy deployment in the country; and (4) manage the project.

6. **Component 1: Renewable electricity service provision** (US$215.61 million, of which US$183.40 million IBRD). This component will focus on the provision of renewable electricity services through, among other things: (a) the acquisition and installation of stand-alone solar systems, stand-alone wind systems, Pico PV[28,29] for isolated individual households and public facilities in rural areas of the participating provinces; (b) the construction and/or upgrade of minigrids[30] (including mini hydro, as applicable) for, among other things, rural and isolated population clusters[31] and/or public institutions located in rural areas of the participating provinces; (c) the acquisition and installation of water pumping systems in isolated individual households, public facilities and isolated communities, all located in rural areas of the participating provinces; (d) the acquisition and installation of equipment to micro-enterprises for the development of individual or collective productive activities; and (e) the provision of small works and goods as in-kind compensation under the relevant resettlement plans. This component

[28] Pico PV means portable PV systems which offer basic electricity services such as lighting and communication, and usually with a capacity of less than 35 W.

[29] The World Bank's Energy Sector Management Assistance Program is currently supporting the analysis, testing, and homologation of Pico PV technology in Bolivia and Argentina.

[30] The project will not finance the acquisition or installation of diesel-powered units, although existing ones may be kept as backup, and the operation could finance their integration with renewable technologies.

[31] Targeted public facilities (either isolated or dispersed or located in isolated population clusters or communities) may already count with electricity or basic energy services which may be enhanced by the project.

will benefit nearly 560,000 people and government institutions; the GoA, provinces and the private sector will provide around US$32.21 million in counterpart funding. Sustainability will be sought by the establishment of O&M&R obligations in Participation Agreements and/or O&M&R Agreements between provinces and QSPs (including concessionaires).

7. Component 1 will consist of five different subcomponents that encompass a total of eight main activities:

(a) *Subcomponent 1.a*: Electricity service provision for lighting, communication, and other basic needs (such as food refrigeration and storage, but further refined in the project's OM) for isolated individual households and public facilities. The subcomponent's main planned activities will focus on:

(i) **1.a.i**: Electrification of isolated individual households through PV solar home systems (SHS) or wind systems, or Pico PV (details and criteria on when, where and how any of these technologies will be used—along with the expected installed capacity per system—are further defined in the project's OM). The PCU already counts with relevant experiences on these activities as they build upon subprojects financed by PERMER I. Based on lessons learned from that operation, the project will—from start—centralize procurement of these goods, and define a single set of technical specifications, to guarantee quality and reduce costs. The systems to be installed would consist of two main elements: generation equipment and internal household fixtures. Special attention will be given to the characteristics of batteries and lamps to be procured, so as to take advantage of newer technologies that have gone into the market since the implementation of PERMER I.

(ii) **1.a.ii: Isolated public facilities**. The activity will provide electricity from renewable energy sources to dispersed public buildings or facilities that provide basic services (health, education, security posts, national parks and/or provincial institutions—targeted institutions as well as criteria for their selection are further defined in the project's OM) and currently lack or are in need of an improved service. To facilitate implementation of these activities, MINPLAN has already signed collaboration agreements with the Ministry of Education and the National Parks Administration. Details and characteristics of the equipment to be provided and installed are defined in the OM. Specific tasks to be performed under this activity include:

- **1.a.ii.1: Schools**. Will target those currently lacking or in need of greater power, as the GoA is currently launching programs to install new equipment—computers and others—in these facilities.

- **1.a.ii.2: Other public facilities**. Will target national parks, security posts, health centers and other provincial institutions. It is further defined in the OM, based on demand, needs, and dialogue with responsible agencies. In the case of health centers, it is expected two main types of facilities will be targeted: small buildings or facilities with basic energy needs, in which

installations and a freezer would be fully funded by the project; and larger facilities in which additional counterpart funding would be sought. These details are also established and defined in the OM.

(b) *Subcomponent 1.b*: Electricity service provision for lighting, communication, and other basic needs (such as food refrigeration and storage, but further refined in the project's OM) for rural and isolated population clusters and/or public institutions through minigrids. Targeted clusters would include those lacking the service or in need of improvement (in terms of hours of service availability or quality—which currently depends on the availability of fossil fuels for electricity generation). In the first case (no electricity service) the project would develop the renewable generation facility, medium- and low-voltage distribution grids and install fixtures in households and public services buildings to connect to the grids. For those communities where the service is provided but is in need of improvement, the project would focus on the installation of the generation equipment and the construction of distribution grids as needed. Existing diesel-fueled equipment could be kept as backup (the project may also fund necessary arrangements to integrate or switch between technologies). In, mostly, mid-sized localities where hydraulic resources are available, the project will focus on the installation of mini-hydro technologies (as long as the subproject can comply with safeguard policies requirements), as well as medium-voltage distribution lines. Expected size, capacity, and usage of different technology options (solar, wind and/or hydro), as well as criteria to define these and other relevant features are established in the project's OM.

(c) *Subcomponent 1.c*: Electricity service for potable water pumping for isolated individual households, public facilities (including firefighting facilities) and isolated communities. In addition, it could also finance the acquisition and installation of new and efficient water purification technologies (although the financing of these and other related activities is defined through the OM). Specific activities to be supported include:

(i) **1.c.i: Isolated individual households**. PERMER II will finance the installation of solar and autonomous water pumping systems (water would be extracted from existing wells). It is expected these systems would consist of a PV system, a submersible pump and a controller (no batteries would be needed, as the system would rely on existing water storage tanks); specific details are established under the project's OM.

(ii) **1.c.ii: Isolated public facilities**. Building on PERMER I (which supported the installation of 188 of these systems in Santiago del Estero) and other experiences, the operation will finance the installation of autonomous systems which could consist of PV panels, submersible pump and controller (details are further specified in the OM, together with criteria to select targeted institutions). It is expected that the project will establish that beneficiaries should already count with a well, storage tank and internal plumbing to benefit from this activity. Relevant provincial agencies should also conduct analyses to

prove that the water to be pumped meets quality regulations. In the case of firefighting facilities and public baths (among others) water sources, storage tanks and other necessary facilities should already be available.

(iii) **1.c.iii: Isolated communities**. The proposed operation will support the deployment of renewable energy technologies for water service provision in localities currently lacking water distribution services or in which these are powered by diesel-fired units. Specific requirements are included in the project's OM.

(d) *Subcomponent 1.d*: Electricity service provision to micro-enterprises[32] for the development of individual or collective productive uses activities. Provincial economic promotion agencies (and microcredit institutions) are currently working on the identification of potential subprojects. Main features of the specific activities to be developed include:

(i) **1.d.i: Individual**.[33] Will support ongoing productive activities that are in need of an improved electricity service (the size of the equipment is established in the project's OM, and it is expected these would be of 200 watt-peak (Wp) per user, on average). The application for support under this activity will be presented through the relevant provincial agency; requirements to request support are set in the project's OM.

(ii) **1.d.ii: Collective**.[34] Will target existing or new productive subprojects implemented by associations or collectives (only in provinces that count with QSPs that could provide the service). Subprojects to be supported shall be submitted by the competent provincial authority, providing the information requirements as established in the project's OM.

(e) *Subcomponent 1.e*: Small works and goods as in-kind compensation under the relevant resettlement plans.

8. **Component 2: Solar thermal energy service provision** (US$9.67 million, of which US$7.90 million IBRD). This component will work on the provision of solar thermal energy services through, among other things, the acquisition and installation of, mostly, solar water heaters (it is expected these would represent roughly 70 percent of the component's costs), solar spatial heating systems, cookers, and ovens for (a) selected dispersed public facilities and (b) public buildings located in rural areas in the participating provinces. The component will only

[32] The definition of micro-enterprise can vary from country to country. In Argentina, national decree 675/97—which created the Social Capital Fund—defines micro-enterprises as any economic activity that could be characterized as "informal, small-scale, and family-owned, with self-employment, labor-intensive, with a poor organization and division of labor, low productivity, low-tech, with a low supply of fixed assets and with no regular access to credit."".

[33] Subsistence activity led by a single family. The electricity service would help enhance their efficiency and modernization.

[34] Small existing, or new, enterprises. Activities are usually led by a small producers association or cooperative.

target public buildings and facilities[35] even if they currently count with a basic energy service or are already connected to the grid. It is expected that this component could benefit almost 205,000 people and that roughly it will be co-financed by the provinces and other relevant stakeholders, including the Ministry of Education (for schools, which will represent the largest share of targeted institutions, although this is further elaborated in the project's OM).

9. Argentina already has valuable practical experiences in the deployment of these technologies. PERMER I financed the installation of cookers, solar ovens and solar water heating technologies in three provinces. Building upon these experiences, PERMER II would continue these but also finance the procurement and installation of spatial heating devices. Support for these latter technologies will rely on the implementation first, of a pilot that would ensure technical standards and approaches applicable to all targeted facilitates are developed (to be financed under Component 3).

10. For any chosen technology, provinces will establish (as needed) an operational contract or O&M&R Agreement with relevant local agencies and/or QSPs. This legal document should set the operation, maintenance and equipment replacement conditions as well as any fees or tariffs to be paid by beneficiary institutions. It is expected that roughly 70 percent of the component's resources would be utilized to procure and install water heating devices, while the remaining 30 percent would be utilized for the development of any other targeted technologies.

11. Component 2 will consist of two different subcomponents.

(a) *Subcomponent 2.a*: Solar thermal energy provision in dispersed public facilities

(b) *Subcomponent 2.b*: Solar thermal energy provision for public buildings in rural areas

12. **Component 3: Project deployment support** (US$6.71 million, of which US$5.70 million IBRD). This component will concentrate on the provision of support for the design, implementation and execution of subprojects, including environmental and social aspects, as well as activities to enhance renewable energy deployment in Argentina including, among other things: (a) market studies to determine potential energy demand and technologies at both urban and rural levels; (b) M&E activities, including the deployment of new technologies to remotely measure electricity consumption and use as well as subprojects performance; (c) communication strategies and outreach activities, including (i) studies to support the borrower's renewable energy goals; (ii) the dissemination of lessons learned, best practices and relevant experiences; and (iii) provision of capacity building for the weakest stakeholders to ensure their participation in the project; and (d) provision of support for the development of pilot studies for technologies that have not been fully deployed in Argentina, such as solar spatial heating systems. All tasks will be fully executed by the SE (in coordination, as needed, with provincial and national stakeholders) and funded by the IBRD loan resources.

[35] Public buildings and facilities are being targeted so as to benefit the largest number of users. The presence of other 'community centers' other than those that are public is negligible.

13. Specific activities to be funded include, but are not limited to:[36]

(a) Support in the implementation of subprojects from Components 1 and 2:

(i) Measurement campaign for monitoring use of installed systems;

(ii) Development of a geographic information system and data collection to monitor PERMER II subprojects and activities;

(iii) Pilot project for the installation of solar spatial heating in schools;

(iv) Complementary studies and tasks aimed at facilitating the implementation of mini-hydro technologies (activity 1.a.3);

(v) Market size and potential beneficiaries studies and rates determination studies;

(vi) Communication, dissemination and training programs, including:

- Dissemination and communication activities with PEUs;
- Preparation of multimedia items for user training (activity 1.a.i);
- Media materials for public facilities (activity 1.a.ii);
- Development of items and training for minigrids beneficiaries (activity 1.b).

(vii) Capacity-building activities for the weakest stakeholders;

(viii) Other studies, as needed.

(b) Support the development and expansion of renewable energy generation technologies in the Argentine markets:

(i) Studies to determine the feasibility and potential to develop and implement solar thermal technologies in urban areas;

(ii) Analyses on energy-efficient equipment (including new and existing technologies, capabilities, and technical specifications) for their use in rural markets and supplier development activities;

(iii) Other studies, as needed.

(c) Impact evaluation:

(i) Baseline generation for impact assessment and analysis of project progress;

[36] Activities are further defined, refined, and explained under the project's OM.

(ii) Mid-term evaluation study;

(iii) Others, as needed.

14. **Component 4: Project management** (US$8.10 million, of which US$3.00 million IBRD). This component will focus on carrying out project management activities, including, among other things: (a) the strengthening of the operational capacity of (i) the PCU for the implementation, monitoring[37] (which could take into account the methodologies being developed by the Bank and the International Energy Agency (IEA) under the Sustainable Energy for All Global Tracking Framework), administration and supervision of the project; and (ii) the participating provinces and their respective PEUs to carry out the project activities under their responsibility; (b) project audits; (c) training; (d) financing of travel costs for PCU and PEUs staff; and (e) rental of vehicles for project supervision activities. The GoA and provinces are co-financing this component through a variety of means, including in-kind contributions.

[37] Although the equipment and surveys would be financed under Component 3, actual M&E data will be prepared and presented by the PCU.

Annex 3: Implementation Arrangements

ARGENTINA: Renewable Energy for Rural Areas Project

Project Institutional and Implementation Arrangements

1. The project will be implemented over a five-year period; the proposed lending instrument will be Investment Project Financing in the amount of US$200 million. Total project costs will be US$240.09 million, of which US$40.09 million will be provided as counterpart funding by Argentina, including: US$5.74 million by the provinces, US$23.50 million by the private sector and US$10.85 million by the GoA.

Project administration mechanisms

2. The proposed operation will continue relying on the implementation arrangements developed under PERMER I. This means that overall coordination and implementation will be the responsibility of the SE, through the PCU, located in the SSEE. The SE will have a vital role in implementing and supervising to ensure that the operation is implemented as agreed (including tasks to be developed by other stakeholders, mainly provinces), and that the project achieves its objectives.

3. The PCU—being tasked with overall project implementation in coordination with provinces and other stakeholders—also led the implementation of PERMER I and has proven to be effective and adequate for the activities being envisioned under the proposed project. Through PERMER I, the PCU—after experiencing budget and staff constraints during the 2002 crisis period and afterwards—managed to build a core of qualified staff to handle all procurement and financial management issues. Given the magnitude of the current operation, the PCU will be strengthened in order to have sufficient and trained staff on technical issues (as it would define technical standards for technologies to be deployed), safeguards compliance and monitoring.

4. Overall institutional and implementation arrangements will consist of a centralized PCU which will be responsible for most technical, fiduciary, management and M&E tasks. The PCU will launch most bidding processes[38] for the acquisition and installation of all goods, works and services. For the activities under Components 1 and 2, once the works have been finalized and/or the goods have been installed, provinces will be in charge of their O&M&R as these provincial entities[39] can guarantee it (Components 3 and 4 will be implemented directly by the PCU, with only in-kind support from other stakeholders). The PCU will also monitor compliance with Bank environmental and social safeguards (as per Argentine law, provinces will be responsible for their fulfillment) and monitor implementation of subprojects, compiling information from the various project implementation areas.

5. The PCU's specific responsibilities are detailed in the project's OM and include the following:

[38] The only exception being the bidding processes, mostly, related to small hydro systems.
[39] These entities are QSPs (including concessionaires) which will be determined by participating provinces and with whom they will sign O&M&R Agreements.

(a) Manage and implement the project;

(b) Prepare and adapt relevant agreements to local circumstances;

(c) Conduct outreach and information campaigns;

(d) Develop technical and economic feasibility studies for increasing renewable energy generation and its supply to the Argentine dispersed markets;

(e) Carry out the studies to be developed as part of Component 3 and, in general, for the appropriate implementation of the operation;

(f) Prepare and launch the bidding processes for the centralized procurement of goods and works; and oversee those to be conducted by the provinces;

(g) Organize and lead training activities as needed (in particular, those related to the strengthening of provincial stakeholders, including PEUs), to ensure proper implementation and training of beneficiaries;

(h) Prepare and manage all relevant information related to project implementation;

(i) Manage data collection databases and follow up project indicators.

6. Provinces will participate through PEUs, typically located in the province's energy agencies, and they will be responsible for identifying demand, designing subprojects, ensuring safeguards compliance and supervising implementation in their jurisdictions, as well as ensuring that an acceptable O&M&R mechanism (to be deployed through QSPs) is in place during the subprojects' life cycle and that enough co-financing resources are available to guarantee their operation.[40] Provinces might also conduct bidding processes (e.g. related to small hydro systems) if necessary and in consultation with the SE. As some of the poorest provinces (which did not participate in PERMER I) will now be included, the PCU will work with them to build their capacity to implement agreed activities (through Component 3). Provinces will also provide all necessary information to the PCU for M&E purposes.

7. The PEU's specific responsibilities are also detailed in the project's OM and include the following:

(a) Propose laws, decrees or provincial regulations to facilitate and/or accelerate project implementation;

(b) Ensure the signing, at the provincial level, of relevant agreements;

(c) Assess the technical and economic feasibility studies for increasing renewable energy generation and its supply to the Argentine markets;

[40] For further details on the O&M&R mechanism (to be partly subsidized) please see the Sustainability section above.

(d) Evaluate subprojects and technologies chosen for project implementation;

(e) Ensure the availability of the FNEE provincial funds or any other local resources, as well as their inclusion in the relevant budgetary procedures (both for initial investment costs as well as and for operation and maintenance);

(f) Conduct and supervise the bidding processes relevant to the implementation of PERMER II;

(g) Coordinate and manage all information concerning project progress in the province;

(h) Monitor the implementation of the project at the provincial level in every aspect, including physical, technical, legal, economic, financial, and environmental and social;

(i) Liaise with other relevant provincial agencies whose intervention is required to fulfill the objectives of the project.

8. Provincial regulators will be responsible for the following activities (detailed also in the OM):

(a) Oversee and regulate participating QSPs (including concessionaires);

(b) Supervise the appropriate provision of the electric service (in regards to technical and commercial aspects of the operation) as specified in contracts with the QSPs;

(c) Communicate to the PCU any breach in the compliance of relevant agreements (as it is their obligation per Argentine law).

9. The province's roles and responsibilities will be defined through Participation Agreements. These are already under preparation and a template (which includes all technical, economic, financial and environmental and social aspects of the operation that parties need to take into account and implement) is part of the OM.

10. The project will also rely (as needed) on other agencies and relevant actors to identify demand (in their respective sectors), propose subprojects, indicate requirements to assess electricity needs and co-finance initial investments (when appropriate). Their involvement and participation will be established under collaboration agreements, as necessary. These stakeholders may include:

(a) Ministry of Education (*Ministerio de Educación*): Will be involved in the execution of activities linked to rural schools (under Components 1 and 2). MINPLAN has already signed a collaboration agreement with the ministry.

(b) Ministry of Tourism, National Parks Administration (*Ministerio de Turismo, Administración de Parques Nacionales*): Will participate in activities to be developed in public facilities located in national parks and those related to the

fostering of rural tourism (under Components 1 and 2). MINPLAN and the National Parks Administration have already signed a collaboration agreement.

(c) Ministry of Health (*Ministerio de Salud*): Will be involved in those activities linked to rural health centers (under Components 1 and 2).

11. Additional stakeholders include:

(d) *Municipalities*: These will collaborate with provinces, as needed, to provide relevant information regarding energy needs in their jurisdictions.

(e) *QSPs*: These (public or private) entities will provide operation, maintenance and replacement services, and/or electricity distribution services and/or solar thermal energy services within their jurisdictions. Based on the different agreements to be signed, these entities would take over the assets financed by the project, on behalf of the provinces and as mandated by Argentine Law.

(f) *Private sector:* Will participate as QSPs (concessionaires) of subprojects (where applicable) and as potential co-financiers of hydro-powered minigrids.

12. Other provincial agencies whose participation will be sought (and is defined in the OM) include:

(g) *Provincial environmental agency*: Will enforce any environmental policies and regulations (all permits are granted at this subnational level).

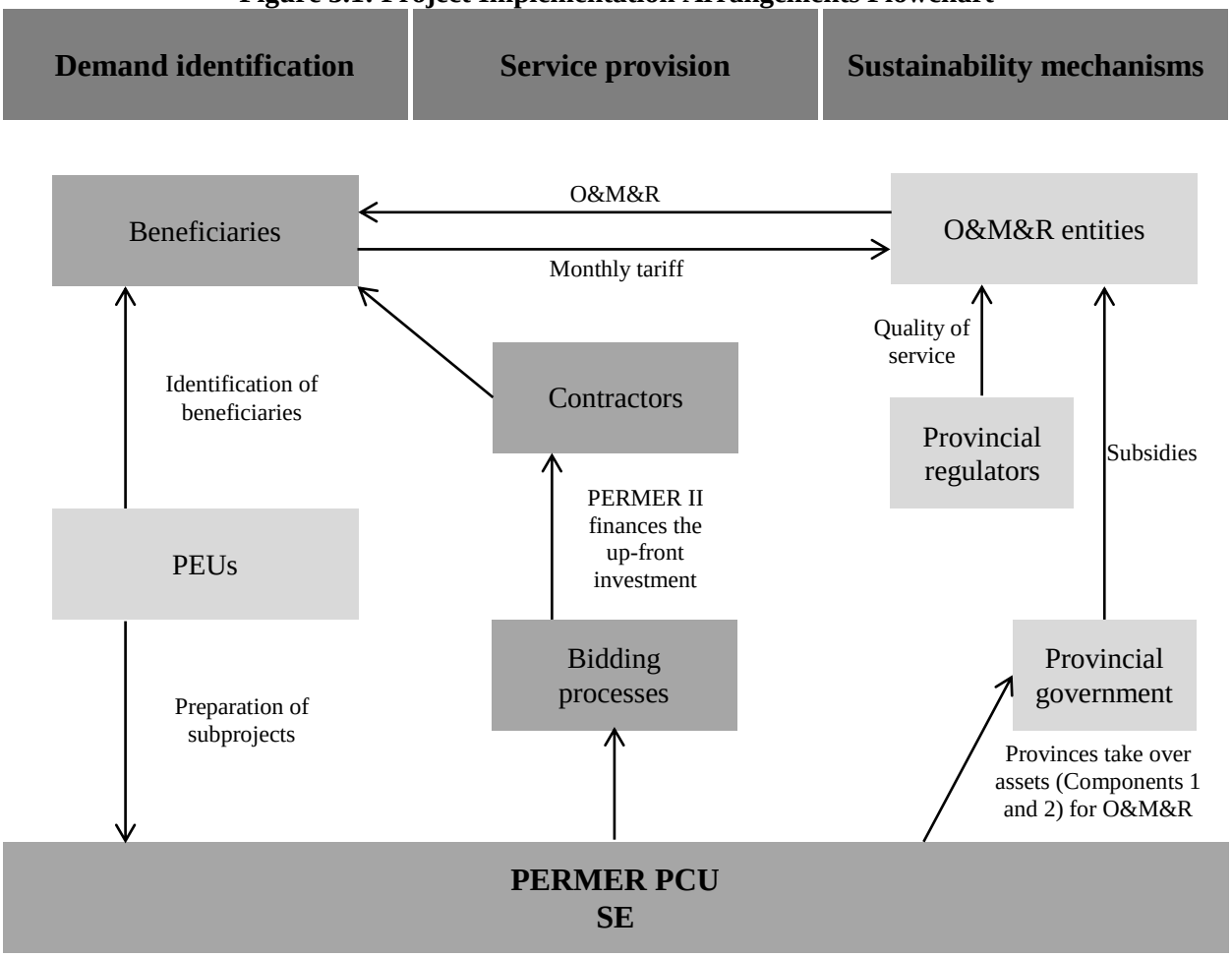
(h) *Provincial water authorities*: Could support the development of activities focusing on providing access to potable water, as agencies tasked with ensuring water provision and enforcing local quality regulations and guidelines.

(i) *Agencies and institutions focused on the promotion of productive uses in rural areas*: These public sector agencies or microcredit institutions will provide technical and/or financial support to the micro-enterprises developing productive activities and which are obtaining an electricity service under Component 1. They will help filter the demand for support by assessing subproject proposals according to guidelines to be provided by the PCU (and established in the project's OM).

(j) *Water utilities*: Will oversee the operation and maintenance of water supply and sanitation activities, as defined by local laws and regulations.

13. Figure 3.1 summarizes the project implementation arrangements.

Figure 3.1: Project Implementation Arrangements Flowchart



14. It is expected that most of these institutions will provide counterpart funding to the project. The GoA will provide counterpart funding to all components, while the provinces will focus on Components 1, 2 and 3, and the private sector's funds would mostly target Component 1. Counterpart funding from other institutions (including in-kind contributions) will focus on those activities in which their support is being sought. Table 3.1 showcases expected IBRD and counterpart funding per activity.

Table 3.1: IBRD and Counterpart Funding per Activity

Component	Objectives	Subcomponent	Targets	Technologies	IBRD loan funding
1. Renewable electricity service provision	Lighting, communication and other services	1.a. Isolated individual households and public facilities	1.a.i. Isolated individual households	Renewable energy technologies: solar (PV) or wind systems	100%
			1.a.ii. Isolated public facilities	Renewable energy technologies	80% for new or improved for schools 100% for small health centers 80% for other health centers 80% for new or improved access for other public facilities
		1.b Rural and isolated population clusters and/or public institutions through minigrids	Rural and isolated population clusters and/or public institutions	Minigrids: mini-hydro, renewable energy technologies	100% for electricity generation for minigrids powered by renewable energy 75% for electricity distribution for minigrids powered by renewable energy Leverage for minigrids powered by hydro technologies
	Water pumping for human consumption	1.c. Isolated individual households, public facilities and isolated communities	1.c.i. Isolated individual households	Solar (PV)	100% for water pumping with solar systems from existing wells and facilities
			1.c.ii. Isolated public facilities	Solar (PV)	80% for water pumping with solar systems from existing wells and facilities
			1.c.iii. Isolated communities	Renewable energy technologies	100% for water pumping from existing facilities
	Productive uses	1.d. Micro-enterprises for the development of individual or collective productive uses activities	1.d.i. Individual	Solar (PV)	100% for solar systems
			1.d.ii. Collective	Renewable energy technologies	100% for renewable energy technology systems
	Resettlement	1.e. Small works and goods as in-kind compensation under the relevant resettlement plans	Affected persons	—	In-kind counterpart funding
2. Solar thermal energy service provision	Water heating, cooking and spatial heating	2.a. Dispersed public facilities	Dispersed public facilities	Solar water heaters, solar spatial heating systems, cookers and ovens	80%
		2.b. Public buildings	Public buildings in rural areas		80%
3. Project deployment support					100%
4. Project management					100%

Financial Management, Disbursements, and Procurement

Financial Management Arrangements

Executive Summary and Conclusion

15. A financial management assessment of the proposed project's arrangements has been performed in accordance with OP/BP 10.00 and in line with Bank specific guidelines.[41] From a financial management perspective, and in line with the implementation arrangements previously discussed, the proposed operation will be executed by the PERMER II PCU. The SSEE, on which the PCU depends, and the DGCAF in the SE will contribute with financial management and disbursements related-activities, depending upon the internal organization of the SE.

16. The objective of this assessment is to determine whether the financial management arrangements for the proposed operation are acceptable to the Bank. The entity's arrangements are considered acceptable if its budgeting, accounting, internal control, funds flow, financial reporting, and auditing arrangements: (a) are capable of correctly and completely recording all transactions and balances relating to the project; (b) facilitate the preparation of regular, timely and reliable financial statements; (c) safeguard the project's assets; and (d) are subject to auditing arrangements acceptable to the Bank. The assessment conclusion is that the PCU and the DGCAF have adequate financial management arrangements in place that meet minimum Bank requirements. The PERMER PCU has qualified and experienced staff in Bank-financed activities, and is capable of undertaking the financial management functions for the project. There is a moderate element of risk involved in project implementation. However, proposed mitigating measures will adequately cope with the identified risks.

17. The following financial management actions have been satisfactorily prepared by the PERMER PCU and presented to the Bank, prior to approval:

(a) Chart of Accounts for the project.

(b) Draft format and contents of the annual financial statements and semiannual interim financial reports for M&E purposes.

(c) A project OM comprising an financial management section with administrative procedures and processes for project implementation, including definitions of responsibilities for annual and interim financial reporting, and managements of funds.

Risk Assessment and Mitigation

18. There were no major financial management issues identified during previous/ongoing projects and proposed mitigating measures will adequately cope with the identified risks. financial management risk at entry is deemed Moderate.

[41] Financial Management Manual for World Bank-Financed Investment Operations; document issued by Operations Policy and Country Services-Financial Management on March 1, 2010.

Implementing Entity

19. The proposed operation will be implemented though the PERMER II PCU in line with the proposed implementation arrangements previously discussed. The DGCAF in the SE under MINPLAN will contribute with financial management and disbursement-related activities, depending upon the internal organization of the SE. Subsidiary Participation Agreements will be signed between the SE and all participating subnational jurisdictions. Implementation and overall project coordination will be the responsibility of the PCU and the SE assisted (as needed and based on project implementation financial management requirements and SE's internal organization) by the DGCAF.

20. The PERMER PCU is widely experienced in implementing Bank-financed projects[42] as evidenced by previous project financial management performance, which has been consistently assessed satisfactory. By utilizing established human capacity, systems, and procedures, these arrangements will greatly reduce the initial training and costs required to correctly implement the project and will assure a much higher quality administration and management.

Budgeting and Accounting

21. Budget execution in Argentina is recorded in the national government's Integrated Budget and Accounting System (*Sistema Integrado de Información Financiera*) and subject to control over the budgetary execution process. It is required that a separate budgetary line in the SE annual budget be set to allocate budgetary resources and keep track of project implementation specifying the sources of funds.

22. The PCU and the DGCAF have skilled and experienced financial management staff capable of fulfilling the project budgetary execution and accounting needs.

23. The Project Executing Units with External Financing (*Unidades Ejecutoras de Proyectos con Financiamiento Externo* [UEPEX]) system will be used to maintain the project accounting records at the national and subnational levels. The project Chart of Accounts will reflect disbursement categories, project components, and sources of financing. The cash basis of accounting will be used for recording project transactions.

Internal Control and Internal Auditing

24. The government entities in Argentina are subject to internal audit of the General Syndicate of the Nation (*Sindicatura General de la Nación* [SIGEN]) which is the Federal Government's internal audit agency under the jurisdiction of the executive branch. If necessary, the internal audit reports on the project performance will be reviewed during project supervision.

25. The project is subject to internal audit of SIGEN working along with provincial court of accounts. Should there be Participation Agreements signed between the SE participating

[42] The PERMER PCU managed: PERMER I, loan 4454-AR, US$30 million, closed on December 31, 2011, and additional financing loan 7617-AR, US$50 million, closed on December 31, 2012; and Global Environment Facility grant, trust fund 20548-AR, US$10 million, closed on December 31, 2009.

provinces in PERMER II, they should define the extent and timing of the intervention of the provincial court of accounts. Interventions should be ex post in most cases, and very limited intervention should take place within the processes during implementation.

Flow of Funds and Disbursements Arrangements

26. The main disbursement method will be advances to the designated account. The following disbursement methods will continue to be used under the loan:

(a) Reimbursement

(b) Advance

(c) Direct payment

27. To facilitate project implementation the PERMER PCU will operate a separate Designated Account in United States dollars (US$). As it is the normal procedure in Argentina, the Designated Account will be opened in the Central Bank (*Banco de la Nación Argentina* [BNA]). The PERMER PCU will manage the Designated Account and will be also responsible for preparing the bank account reconciliation on a monthly basis. Funds deposited into the Designated Account as advances will follow the Bank's disbursement operating policies and procedures described in the Disbursement Letter. Withdrawals from the Designated Account will be solely made for payments of eligible expenditures. As eligible expenditures arise, funds will be converted to local currency and deposited into a dedicated payment account open in BNA in Argentine pesos (Arg$) from which payments will be made for contracts of goods and services, including vendors and consultants, as incurred. The proposed ceilings for advances and supporting documentation that should be provided to the Bank for reporting on the use of advances are described in the paragraph following this.

28. The proposed ceiling for advances to be on deposit to the Designated Account is US$40,000,000.

29. Also, there will be an option to retroactive payments for expenditures, as follows: up to US$40,000,000 equivalent of the loan amount for payments made on or after one year before the signature date of the loan for eligible expenditures in accordance with the applicable Bank procedures.

Eligible payments

30. Shall be paid between January 1, 2015, and the date of the loan signing; or within a period comprising the last 12 months prior to the loan signing but in any case shall not exceed 12 months.

31. Shall not exceed 20 percent of the loan amount; and for items procured in accordance with applicable Bank procurement procedures.

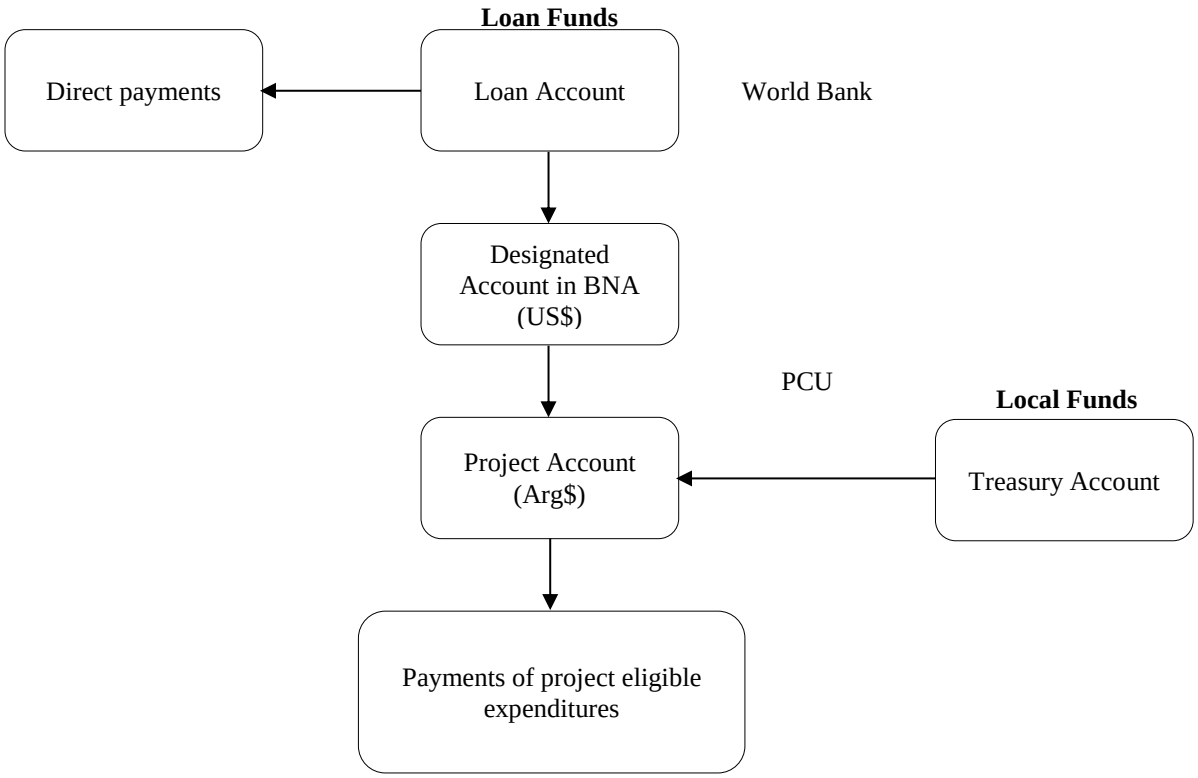
32. Any provinces or institutions proposed to receive advances during project implementation shall be subject to financial management arrangements acceptable to the Bank and included in the OM.

Table 3.2: Eligible Payments

Retroactive expenditures	Eligible payments: – Are paid up to one year before the date of loan signing; – Do not exceed 20 percent of the loan amount; and – Are for items procured in accordance with applicable Bank procurement procedures.
Reimbursement of eligible expenditures pre-financed by the GoA after the date of loan signing	– Reimbursement of eligible expenditures into a bank account controlled by the SE. The minimum application size for reimbursement requests would be US$8,000,000.
Other disbursement methods	– Direct payments to suppliers. The minimum application size for direct payment requests would be US$100,000; – Advance to a segregated DA in US$ managed by the SE, in BNA, with a ceiling of US$40,000,000.
Supporting documentation	– Statement of Expenditures; – Records (supplier contracts, invoices, and receipts).

33. Funds will be centrally managed and payment will be made by the PCU directly to the contractor, upon review of all the supporting documentation. Figure 3.2 presents the flow of funds from the loan account to the project Designated and Operative Accounts, as follows:

Figure 3.2: Flow of Funds



34. The project's OM has incorporated specific arrangements to ensure the adequacy of the PCU control to monitor over the use of funds. The procedures prepared by the PERMER PCU have been reviewed and found acceptable to the Bank.

Financial Reporting

35. Given existing capacity and features of the project, PERMER PCU will be in charge of preparation of the annual and interim financial statements for the project in line with Bank requirements.

36. The UEPEX system will be used by the PCU to produce the requisite financial statements following public sector accounting standards in Argentina. These are comprehensive and consistent with international public sector accounting standards in particular with the International Public Sector Accounting Standards #1 Presentation of Financial Statements. Such standards are set by the Accountant General Office (*Contaduría General de la Nación*).

37. A draft format of the annual financial statements has been prepared by the PCU. It has been reviewed and it is acceptable to the Bank. In addition, the PCU shall also prepare semiannual interim financial reports for M&E purposes that will be part of the project progress reports.

External Auditing Arrangements

38. The annual financial statements of the project will be audited by an acceptable auditor, following terms of reference and conducted in accordance with auditing standards acceptable to the Bank as well. It is proposed that Argentina's Supreme Audit Institution (*Auditoría General de la Nación*) be the external auditor for the project. The annual audit will cover all funding and expenditures reported in the project financial statements, and will be submitted to the Bank within six months after the end of the reported period. For audit purposes the fiscal year will be the calendar year.

Procurement Arrangements

39. Procurement will be conducted according to the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" (issued in January 2011 and revised in July 2014) for the supply of goods, civil works, and non-consulting services, and the "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" (issued in January 2011 and revised in July 2014) for technical assistance and other consultant assignments. The procurement activities under the project will also seek to further the CPS objectives of supporting open procurement.

40. For each contract which will be financed by the loan, the applicable procurement methods or consultant selection methods, the need for pre-qualification, when necessary, estimated costs, prior review requirements, and time frame will be agreed between the borrower and the Bank in the Procurement Plan.

41. The structures responsible for carrying out procurement activities, monitoring and supervising the fiduciary arrangements as well as the final procurement risk rating, were defined as a result of the capacity assessment carried out on December 2013. The assessment reviewed the organizational structure, the staff responsible for procurement, the relationship between the procurement, technical, administrative, and financial offices, the operating manuals, and the systems used for supervising and controlling.

42. The analysis concluded that the PCU has an overall installed capacity suitable to successfully carry out the procurement function. The PCU is solid enough to carry out processes with Bank's financing and has an experienced procurement specialist. However, it is necessary to strengthen the procurement staff in order to assist the procurement specialist with the increasing workload. The overall project risk for procurement is Medium-I (High Impact—Low Likelihood).

43. The option for some provinces to carry out procurement functions remains open as in the previous operation financed with Bank's proceeds, however, the PCU will remain completely responsible for the due compliance of the agreed policies and procedures, therefore, any process carried out in any province, will be subject to PCU's review and formal prior approval. Implementation details are explicit on the OM approved by the Bank.

44. Procurement activities under this project are aligned to the CPS objective related to supporting open procurement: first, all invitations to bid, bidding documents, minutes of bid openings, requests for expressions of interest and the pertinent summary of the evaluation reports of bids and proposals of all Goods, Works, Non-Consultant Services and Consultants' Services procured by the borrower, through the SE, will be published in the web page of the borrower's National Contracting Office (*Oficina Nacional de Contrataciones* [ONC]). Second, the Procurement Plan, including execution data, will be managed through the Bank's Procurement Plans Execution System (*Sistema de Ejecución de Planes de Adquisiciones* [SEPA]), which is of public access once the plan is approved by the Bank.

General

45. The Procurement Plan will be updated at least annually or as required to reflect the actual project's implementation needs and improvements in institutional capacity. The Bank's standard bidding documents and standard requests for proposals would govern the procurement of goods and civil works through International Competitive Bidding and the selection of consulting firms, respectively. All other standard bidding documents to be used for each procurement method different to International Competitive Bidding, as well as model contracts for the procurement of works, goods and consultants, are included in the OM.

Goods and Works and Non-consulting Services

46. **Procurement of Goods**: Goods to be procured will be mostly equipment and networks.

47. **Procurement of Works**: Civil works procured under this project will include work contracts for the installation of solar or wind systems.

48. **Advertisement**: All procurement notices shall be advertised in the ONC web page or in at least one local newspaper of national circulation. In addition, the International Competitive Bidding procurement notices and contract award information shall be advertised in the United Nations Development Business (UNDB) online. The ONC shall also be used to publish information on awarded contracts in accordance with provisions of paragraphs 2.60 of the Procurement Guidelines and as mandated by local legislation.

Selection of Consultants

49. **Firms**: It is planned to use direct contracting to hire a consultant to assist in the pilot process with choosing the best technology to use in solar heating of environments. The consultancy will also include the construction of technology identified in existing public building, in order to perform tests and measurements and the preparation of technical specifications to be included in future bidding processes.

50. **Individual Consultants**: Most of the consulting services to be contracted will be related to supervision, training, and technical assistance. The consulting services mentioned above may be provided by individual consultants selected by comparison of qualifications of at least three candidates and hired in accordance with the provisions of Section V of the Consultant Guidelines.

51. Individual consultants for services with an expected duration of six months or more would be selected as a result of a request of expressions of interest advertised in a national newspaper and/or ONC.

52. **Advertisement**: The ONC or a national newspaper shall also be used to advertise a request of expression of interest for consulting firms or individuals, and to publish information on awarded contracts in accordance with provisions of paragraphs 2.31 of the Consultant Guidelines and as mandated by local legislation. Contracts expected to cost more than US$300,000 shall be advertised in UNDB online.

53. **Operating Costs**: Operating costs refer to reasonable recurrent expenditures that would not have been incurred by the implementing agency in the absence of the project. They may include but are not limited to operation and maintenance of office equipment purchased under the project, as well as nondurable/consumable office materials, as needed for the implementation of the project. All these activities would be procured using the implementation agencies' administrative procedures, which were reviewed and found acceptable to the Bank.

Details of the Procurement Arrangements Involving Methods and Review

54. Thresholds for the use the different procurement methods and recommended thresholds for Bank prior review are given in table 3.3 below:

Table 3.3: Thresholds for Procurement Methods and for Recommended Bank Review[43]

Estimated Value Contract Threshold	Procurement Method	Bank Prior Review
Works:		
≥US$15,000,000	ICB	All
<US$15,000,000 and ≥US$350,000	NCB	First two
<US$350,000	Shopping	First two
Any estimated cost	Direct contracting	All
Goods and Non-consulting Services:		
≥US$500,000	ICB	All
<US$500,000 and ≥US$100,000	NCB	First two
<US$100,000	Shopping	First two
Any estimated cost	Direct contracting	All
Consulting Firms:		
Any estimated cost	SS	All
≥US$300,000	QCBS, QBS, FBS, LCS, CQS	All
<US$300,000	QCBS, QBS, FBS, LCS, CQS	First two
Individual Consultants:		
Any estimated cost	SS	All
≥US$50,000	IC	All
<US$50,000	IC	First two

55. The Procurement Plan will define the contracts that are subject to Bank prior review based on the recommended thresholds given in table 3.3. Such recommended thresholds could be revised at every update of the Procurement Plan.

56. **Procurement post-review arrangements**: The Bank would carry out ex post reviews through an annual supervision mission on procurement. The PCU and the Bank, including procurement and financial management staff, would meet annually to review their procurement and to carry out the ex post review. One out of every ten contracts should be post reviewed when applicable. The Bank's project supervision would review procurement reports and would carry out procurement reviews in the participating provinces.

57. **Procurement records**: Detailed procurement records, reflecting the project's supply of goods, civil works construction/rehabilitation and consultant services, including records of time taken to complete key steps in the process and procurement activities related to supervision, review, and audits, would be maintained by the PCU. These records will be maintained for at least two years after the project's closing date. The records for civil works and goods would include public notices, bidding documents and addenda, bid opening information, bid evaluation reports, formal appeals by bidders and outcomes, signed contracts with related addenda and amendments, records on claims and dispute resolutions, and any other useful information. The

[43] Abbreviations in the table include: Selection Based on the Consultant's Qualifications (CQS), Selection under Fixed Budget (FBS), International Competitive Bidding (ICB), Individual Consultant (IC), Least-Cost Selection (LCS), National Competitive Bidding (NCB), Quality-Based Selection (QBS), Quality- and Cost-Based Selection (QCBS), and Sole Source (SS).

records for consultant services would include public notices for expression of interest, request for proposals and addenda, technical and financial reports, formal appeals by consultants and outcomes, signed contracts, addenda and amendments, records on claims and dispute resolution and any other useful information. The participating provinces, when applicable, will retain all invoices, price comparisons, bids received, bid evaluation reports, and all of the documentation required under the law and ensure that it is readily available. The filing, record keeping, auditing, reporting, post-review, and monitoring of the smaller procurement activities are crucial for the successful application of the funds for ensuring economy, efficiency, and transparency.

Special Procurement Conditions

58. The following shall apply to procurement under the project:

(a) Procurement of goods, works, non-consultant services, and consultants' services (in respect of firms) shall be carried out using (i) (A) standard bidding documents (which bidding documents in respect of works shall include, if applicable, a provision whereby the pertinent contractor must comply with the pertinent provisions of: (I) the ESMF; and (II) the corresponding Environmental Management Plan (EMP) and/or Indigenous Peoples Plan (IPP),including the provisions of any updated/adjusted version, or similar safeguards instrument referred to in Sections E of Schedule 2 to the Loan Agreement); and (B) standard requests for quotations/proposals (as the case may be), all acceptable to the Bank, which shall all include, among other things, a settlement of dispute provision and the pertinent provisions of the Anti-Corruption Guidelines; (ii) model bid evaluation forms, and model quotations/proposals evaluation forms (as the case may be); and (iii) model contract forms, all acceptable to the Bank;

(b) All contracts for works to be procured under the project shall contain a methodology, acceptable to the Bank, whereby the price of each said contracts shall be adjusted through the use of price adjustment formulas, in a manner acceptable to the Bank;

(c) A two-envelope bidding procedure shall not be allowed in the procurement of goods, works and non-consultant services;

(d) After the public opening of bids for goods, works and non-consultant services, information relating to the examination, clarification, and evaluation of bids, and recommendations concerning awards shall not be disclosed to bidders or other persons not officially concerned with this process until the publication of contract award. In addition, bidders and/or other persons not officially concerned with said process shall not be allowed to review or make copies of other bidders' bids;

(e) After the public opening of consultants' proposals, information relating to the examination, clarification, and evaluation of proposals and recommendations concerning awards shall not be disclosed to consultants or other persons not officially concerned with this process until the publication of contract award (except as provided in paragraphs 2.23 and 2.30 of the Consultant Guidelines). In addition,

consultants and/or other persons not officially concerned with said process shall not be allowed to review or make copies of other consultants' proposals;

(f) Foreign bidders or foreign consultants shall not, as a condition for submitting bids or proposals and/or for contract award: (i) be required to be registered in Argentina (except as provided in the standard bidding documents referred to in paragraph 4 (a) (i) (A) above); (ii) be required to have a representative in Argentina; and (iii) be required to be associated or subcontract with Argentine suppliers, contractors or consultants;

(g) The invitations to bid, bidding documents, minutes of bid openings, requests for expressions of interest and the pertinent summary of the evaluation reports of bids and proposals of all goods, works, non-consultant services and consultants' services procured by the borrower, through PCU, shall be published in the web page of the borrower's ONC, and in a manner acceptable to the Bank. The bidding period shall be counted from the date of publication of the invitation to bid or the date of the availability of the bidding documents, whichever is later, to the date of bid opening;

(h) The provisions set forth in paragraphs 2.49, 2.50, 2.52, 2.53, 2.54, and 2.59 of the Procurement Guidelines shall also be applicable to contracts for goods, works and non-consultant services to be procured under National Competitive Bidding;

(i) References to bidders in one or more specialized magazines shall not be used by the borrower, through the PCU, in determining if the bidder in respect of goods whose bid has been determined to be the lowest evaluated bid has the capability and resources to effectively carry out the contract as offered in the bid, as referred to in the provision set forth in paragraph 2.58 of the Procurement Guidelines. The provision set forth in paragraph 2.58 of the Procurement Guidelines (including the limitation set forth herein) shall also be applicable to contracts for goods to be procured under National Competitive Bidding procedures;

(j) Witness prices shall not be used as a parameter for bid evaluation, bid rejection or contract award;

(k) The borrower, through the PCU, shall (i) supply the SEPA with the information contained in the initial Procurement Plan within 30 days after the project has been approved by the Bank and (ii) update the Procurement Plan at least every three months, or as required by the Bank, to reflect the actual project implementation needs and progress and shall supply the SEPA with the information contained in the updated Procurement Plan immediately thereafter;

(l) The provisions of paragraphs 2.55 and 2.56 of the Procurement Guidelines providing for domestic preference in the evaluation of bids shall apply to goods manufactured in the territory of the borrower in respect of contracts for goods to be procured under International Competitive Bidding procedures;

(m) Compliance by bidders with the norms issued by the International Organization for Standardization with respect to any given good procured under the project shall not be used as parameter for contract award;

(n) Consultants shall not be required to submit bid or performance securities;

(o) Contracts of goods, works and non-consultant services shall not be awarded to the 'most convenient' bid, but rather to the bidder whose bid has been determined (i) to be substantially responsive and (ii) to offer the lowest evaluated bid, provided that said bidder has demonstrated to the borrower, through the PCU, to be qualified to perform the contract satisfactorily; and

(p) The types of contracts described in Section IV of the Consultant Guidelines shall be the only types of contracts to be used by the borrower, through the PCU, in connection with the contracting of consultants' services provided by a firm and to be financed with the proceeds of the loan.

Environmental and Social

59. Table 3.4 summarizes the safeguard policies triggered by the project:

Table 3.4: Safeguard Policies Triggered by the Project

Safeguard Policy	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[ ]
Natural Habitats (OP/BP 4.04)	[X]	[ ]
Pest Management (OP 4.09)	[ ]	[ ]
Indigenous Peoples (OP/BP 4.10)	[X]	[ ]
Physical Cultural Resources (OP/BP 4.11)	[X]	[ ]
Involuntary Resettlement (OP/BP 4.12)	[X]	[ ]
Forests (OP/BP 4.36)	[ ]	[X]
Safety of Dams (OP/BP 4.37)	[ ]	[X]
Projects on International Waterways (OP/BP 7.50)	[X]	[ ]
Projects in Disputed Areas (OP/BP 7.60)[44]	[ ]	[X]

Social

Summary

60. It is expected the proposed operation would result in positive social outcomes, enhancing welfare of isolated populations in Argentina's provinces through the provision of electric and thermal energy and safe water supply for families; the opportunity to undertake commercially productive activities; and the reliable and timely provision of social services (for example, constant electricity supply for refrigeration of vaccines).

[44] By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas.

61. Given that specific sites, social conditions, and impacts of each subproject are not known before approval, a framework approach has been adopted. However, based on potential subprojects and also on the experience of PERMER I, the project has triggered the following social safeguard policies: OP/BP 4.10 (Indigenous Peoples) and OP/BP 4.12 (Involuntary Resettlement).

62. The social safeguards documents incorporate findings from the Gap Analysis of the Argentine Republic's ESMF and the World Bank's Safeguard Policies, approved in 2013.[45]

Anticipated Social Aspects and Corresponding Social Assessment

63. Based on the PERMER I experience and considering targeted areas are primarily rural areas, it is possible that members of one or more of Argentina's indigenous peoples could be present within the project's geographical influence area. In order to guarantee the inclusion of such groups in project benefits, or otherwise to avoid that project activities affecting them in an adverse way, the project triggered OP/BP 4.10. The borrower has prepared an IPPF, based on the IPPF prepared for PERMER I, to strengthen and coordinate overall attention to indigenous peoples' participation. The IPPF was disclosed both in country and on the Bank's website on November 14, 2014.

64. The IPPF includes an analysis of the lessons learned from the participation of indigenous peoples in PERMER I. Through that operation, more than 13,000 indigenous peoples benefited from individual SHS systems in Salta (over 5,000 members of the Diaguitas Calchaquíes, Tupi Guaranties and Kollas groups), Tucumán (over 1,700 Diaguitas Calchaquíes), Chaco (roughly 2,000 Wichi and Tobas), Mendoza (approximately 1,000 Mapuches and Huarpes), Neuquén (1,200 Mapuches), and Jujuy (1,700 Quechuas, Kollas, Atacama, Ocloyas and Omaguaca).

65. The PERMER I team conducted an identification and consultation process of indigenous populations in different provinces. These included both inhabitants of indigenous communities as well as those that identify themselves as indigenous but are integrated into non-indigenous communities. The communication and organizational factors of the different communities and different peoples was a key factor to consider when designing communication activities and determining beneficiaries. Given the nature of the operation (which provided individual solar systems), the project was very well received since it is considered by the community as an improvement in the living conditions and opportunities for development.

66. Finally, the specific subproject EMPs to be developed under the project would include pre-screening. In the case that indigenous peoples are present by a specific subproject, a site-

[45] Although the gap analysis focused on a comparison of legal frameworks with Bank OPs, rather than EMP implementation capacity in sectors, it noted that the electricity sector regulations were largely consistent with Bank OPs. It did, however, note that (a) while there is a single opportunity for consultation once the EIA studies have been completed, normally in the form of a public hearing, in several cases it is optional (at the discretion of the enforcement authority) and (b) that as not all critical habitats receive full recognition, the regulations do not always require the identification of alternatives to habitat conversion, and do not always require that mitigation measures be adopted.

specific IPP would be developed based on the IPPF guidelines. IPPF would submit to indigenous people organization consulting process.

67. Based on the nature of the project, it is anticipated that its implementation will achieve mostly positive social development outcomes and impacts. These include (a) increased access to social opportunities for the indigenous people as well as non-indigenous people living in remote areas, by improvements to living conditions and productive activities through the availability of energy; (b) helping dampen rural migration to urban areas; (c) strengthening indigenous peoples recognition and inclusion by promoting respect for their cosmic vision, and by working through legitimate representatives; (d) improving diets and health of beneficiaries by supporting the development of potable water provision for human consumption and productive activities; and (e) improving environmental conditions in public services facilities through renewable energy-powered heating systems while also enhancing sanitary conditions in health and education institutions.

68. Regarding Involuntary Resettlement, subprojects financed by PERMER II (such as minigrids, hydropower, small dams, or farming activities) are likely to require land easement and/or acquisition, including potential investment that might entail resettlement as defined by OP 4.12 (loss of assets, physical displacement, or livelihood losses). The borrower has prepared an RPF, based on the PERMER I experience, to ensure that analysis of alternatives and appropriate compensation and support to potentially affected persons are incorporated into the subproject design. Given the nature of the subprojects, potential cases of voluntary land donations might take place, and the ESMF includes robust criteria to clearly document these. The RPF was disclosed both in country and on the Bank's website on November 14, 2014.

Environmental

Summary

69. The project is classified as Category B (Partial Assessment) assigned to projects that are likely to have limited and reversible environmental impacts, that can be readily mitigated. The project will have a largely positive impact on the environment, by improving the supply of energy in rural areas of Argentina's provinces, thereby reducing the use of fossil fuels for domestic consumption, and the use of firewood (in the case of institutional buildings, that is, schools and hospitals).

70. Physical interventions resulting from the implementation of investments in rural areas could have low to moderate negative impacts on the environment, depending on their locations. The most significant impacts will result from the construction of low-voltage distribution lines and construction of related infrastructure, and appropriate mitigation measures will be followed to limit the impact on local fauna, avi-fauna and to protect indigenous plant and tree species, and preserve riverine ecosystems in the case of pico/micro/mini-hydro schemes.

Alternatives (Scenario without the Project)

71. Without a program of rural connections to the grid or appropriate offgrid solutions, the government would not be able to advance its program to bring the benefits of electricity to lower income, rural consumers.

72. Civil works will lead to relatively minor air and water pollution during the construction phases and, once the works are completed, limited loss of non-critical animal and plant habitats. These impacts will be assessed through a screening process and appropriate mitigation measures will be proposed. Battery disposal plans, including consumer training and monitoring of disposal, will be incorporated into the solar PV investment component.

73. The project is national in scope; therefore all Argentine provinces constitute the target area for investment subprojects. The natural environment of these provinces is very varied, as it includes ecosystems ranging from forests to desert and from the Andes Mountains to the large rivers of the Rio de la Plata valley. The project would focus on two types of rural zones: (a) those with small populations located in extremely isolated locales, for which standalone generation will be provided and (b) small concentrated communities in isolated locales that are of sufficient size to warrant provision of minigrids. Although specific subprojects are unlikely to be definitively selected prior to approval, an indicative list of potential subprojects indicates that many will be located in or close to natural habitats, and—in the case of retrofitting existing diesel generation facilities to hybrid solar/diesel back-up systems—will be located within national parks and reserves, at government offices, and lodges located within the parks or reserves.

74. Given that specific sites, environmental and social conditions, and impacts of each subproject are not likely to be definitively selected prior to approval, a framework approach will be adopted. An ESMF has been prepared based on an update of the ESMF prepared for PERMER I. This builds on an assessment of the adequacy of the previous ESMF through verification and accountability of previous subproject EIAs prepared under PERMER I, and incorporates findings from the previously mentioned Gap Analysis.

75. The ESMF includes a screening process for subprojects and EIAs/EMPs will be consulted upon and disclosed prior to the commencement of civil works. While the project will not support or lead to the conversion of natural habitats, and the ESMF explicitly forbids any project activities inducing significant conversion or degradation of critical natural habitats, EMPs for all civil works will contain guidelines for the protection of biodiversity and water resources.

76. Based on the location and nature of potential subprojects and also on the experience of PERMER I, the project triggered OP/BP 4.01 (Environmental Assessment); OP/BP 4.11 (Physical Cultural Resources); and OP/BP 4.04 (Natural Habitats). While some mini-hydro schemes may be located within forests, the ESMF will explicitly forbid any project activities that would lead to the significant degradation and conversion of critical forest areas and forest ecosystems. The ESMF will address the potential impact of the project on forests and/or the rights and welfare of local communities, and suggest appropriate mitigation measures

77. During PERMER I, it was verified that many subprojects were located on the sites of ancient indigenous settlements, and numerous utensils and tools of historical and archaeological importance were found during the progress of works. A chance finds procedure will be inserted into construction contracts and included in the ESMF, and the local and national Cultural Patrimony, Archeology Departments, and/or Museums authorities will be notified when chance finds are made. The ESMF includes specific screening provisions for evaluating potential impacts on cultural resources and will provide specific guidance on the chance finds procedures.

78. The pico/micro/mini-hydro electricity generation facilities (ranging from 100 kW to 4 MW) will be run-of-river, and for those that require a small weir or pondage to provide water for the penstock, the dam height would not exceed 10 meters. As such, OP 4.37 (Safety of Dams) is not triggered. The task team will agree on appropriate safety measures with the borrower, and will ensure the involvement of qualified dam/civil engineers in project design. The ESMF for the project will include a screening procedure to ensure that there would be either no or negligible risk of significant adverse impacts to communities and their assets due to potential failure of the dam structure.

Consultations

79. The SE, as the borrower, has conducted public consultations on the draft ESMF with local and provincial government representatives; representatives of stakeholders in local communities; and local NGOs. Two sets of consultations were held: on February 14, 2014 and on July 14th, 2014. Minutes of stakeholder meetings, including measures proposed to address grievances, have been included as an Annex to the ESMF. Participants to the consultations stressed the importance of consistent and early interaction with both individual and institutional end-users in rural communities, to ensure that the renewable energy technologies are effectively used and maintained. The increased involvement of local NGOs to educate local cultures about the benefits of clean and renewable energy sources as opposed to the traditional use of firewood was also a theme in the consultations. Communication strategies have been built into the project design, and in Component C, which focuses on project deployment support, and the involvement of local NGOs and civil society will be sought.

Borrower capacity in implementing safeguards

80. The implementation arrangements under the project will be the same as those for PERMER I. The implementation of the operation will be carried out through existing management structures, at both the national and provincial level. The implementing agency will be the SE through the PERMER PCU. The PCU will be responsible for coordinating the various activities of the project with other provincial stakeholders, including PEUs. The social and environmental team (SET) of the PCU will be responsible for identifying and disseminating guidelines for the implementation of actions to ensure safeguard compliance by the provinces (as per Argentine law, these are in charge of such issues).

81. The project will comply with Bank operational policies related to safeguards, while also ensuring compliance with the GoA rules and regulations. This will be based upon the application of the updated ESMF. The same team will be responsible for monitoring the application of the IPPF as well the RPF, the good practices guide, and the communication strategy. There is

currently one officer in the SE responsible for environmental and social safeguard compliance monitoring. It is recommended that this capacity be enhanced and reinforced through the hiring of at least two additional staff members, supplemented by training.

82. The borrower's performance can be assessed analyzing the experiences from the implementation of PERMER I. The implementation completion and results report of PERMER I (Report No. 1336, June 26, 2013, pp. 10-11) states that, "Environmental safeguard compliance was rated satisfactory throughout the whole implementation of PERMER I. However, an assessment undertaken by the Bank in early 2011 concluded that some subprojects, particularly minigrids, could have environmental and social impacts broader than what was foreseen at the design stage. Consequently, the supervision of ongoing subprojects was strengthened, including a more rigorous review of EIAs, and data was systematized. No significant negative environmental impacts were detected."

83. At the provincial level, the institutional capacity is variable. The findings of the aforementioned Argentina Safeguards gap analysis will be used to identify those provinces that will need more support from the central PCU. Most EIAs/EMPs are outsourced by the provinces to consultants, so it will be important to undertake regular quality control assessments.

84. **Disclosure**. The ESMF was disclosed to the public on August 12, 2014. Consultations were held on February 14 and July 14, 2014. The ESMF is also available in country at the offices of the SE in Buenos Aires, on its website, and was disclosed on the Bank's website and re-disclosed in Argentina on October 29, 2014.

Table 3.5: Potential Negative Impacts and Proposed Mitigation Measures

Impacts	Mitigation Measures
Loss of vegetation and related loss of habitat due to clearing of indigenous vegetation arising from opening up of access roads (in rural areas) and construction activities.	Clearing of vegetation and trees will be strictly controlled. Affected areas will be re-vegetated with indigenous grasses, shrubs, trees, and flora to limit impact to local flora and fauna.
Losses of soil cover due to excavations, and the potential use of quarries and borrow pits—e.g., for construction of engine houses at the hydro facilities.	Use soils excavated for construction areas to refill areas where removed and avoid exposing loose, dry, bare soil to wind or water for long periods.
Water pollution increase as a result of siltation during construction, or as a result of mini-hydro operations.	Minimize clearing and disruption to riparian vegetation. Avoid using machinery in the vicinity of watercourses. Observe manufacturer machinery and equipment guidelines, procedures with regard to oil spill prevention.
Soil and water pollution due to unsafe disposal of creosote-treated poles.	Ensure that all construction materials are stored and ultimately disposed of in an appropriate manner.
Health damage resulting from respiratory infections that may arise from dust and cement.	Provide workers with face masks and goggles. Ensure water spraying of construction area regularly. Ensure that construction workers have facemasks and eye protection during clearance work, and that local residents are advised to avoid the area during clearing of vegetation.
Solid waste pollution resulting from disposal of solid waste during construction.	Ensure that construction sites follow appropriate waste management measures. Rehabilitate quarry sites and borrow pits.

Noise pollution (resulting from construction and operation activities).	Provide construction workers with adequate noise-protection headgear.

Impacts	Mitigation Measures
Potential destruction or damage to resources of archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance.	Implement 'Chance Find Procedures' to be specified in construction contracts in case of an archeological or culturally important discovery during construction. According to this procedure, work will cease on the site upon discovery of the resource. The local Environmental Officer, after inspecting and securing the site, will contact cultural heritage authorities for advice and arrange for survey or safeguard work as appropriate.
Potential degradation or loss of habitat (due to the construction of the remote grids with renewable energy facilities) The loss is expected to be minimal.	Liaise with national parks and wildlife authorities to assess if the installations are in the vicinity of important wildlife (breeding) habitats or wildlife corridors, and to propose mitigation measures if so. Should they indicate a significant impact, the borrower may provide some natural barriers to enable wildlife to freely and safely bypass the construction area.
Adverse impacts on avi-fauna due to presence of wind turbines.	Minimize bird collisions by reducing height of turbines as feasible, and not placing them in the migration routes of important bird species or in important bird areas.
Visual impacts of substations in national parks	Address project's visual impact through enhanced landscaping (such as planting of ornamental plants on the road frontage, raising the height of perimeter walls, etc.).
Solar battery disposal	A battery disposal plan will be prepared, including consumer training, and periodic monitoring of removal and final safe disposal of batteries.
Safety and security issues of substations near residences or offices; and in dry/forested areas that may result in forest fires	All substations in residential or commercial areas should have adequate fire and blast resistant walls. Capacitor banks, circuit breakers, lightning arrestors, and battery rooms should be adequately protected. Fire safety plans (taking into consideration the residential nature of the site) should be prepared and tested with drills. Enhanced security measures should be employed to prevent the theft of conductors, earthing equipment, and oil contained in pole-mounted transformers (which can cause transformer fires).

Other Safeguards Policies Triggered

85. While the exact location of subprojects is still being determined, it is likely that Component 1 of the project (Electricity Service Provision) will include the construction and/or upgrade of minigrids for remote rural areas with renewable technologies. These renewable technologies will include micro/mini/small-hydro run-of-river electricity generation facilities (ranging from 100 kW to 4 MW), some of which may require a small weir or pondage to provide water for the penstock. Several of these subprojects that are being considered for funding may use water from international waterways or their tributaries. In particular, activities may be implemented in rural areas that are served by the Paraná/Paraguay River system which originates in Brazil and flows into Bolivia and Paraguay (the Paraguay River) and Paraguay and Argentina (the Paraná River) or tributaries. The Paraguay discharges its water in the Paraná and further downstream it merges with the Uruguay River to form the La Plata River, a river that flows from Argentina to Uruguay. In the case of Chile, several of the subprojects to be considered for funding are located on waterways in rural areas of Argentina that share rivers with Chile—for example the Negro, Colorado, Chico and Deseado rivers. These river systems comprise international waterways as defined under the World Bank's OP/BP 7.50 (Projects on

International Waterways), paragraph 1.[46] Therefore, the Policy regarding Projects on International Waterways—OP/BP 7.50—has been triggered.

86. The borrower requested the Bank to undertake the process of notifying other riparians on its behalf. The notifications were issued on September 5, 2014 to the five riparian states containing international waterways which flow into Argentina and on which subprojects may be located (date of reception is indicated between parentheses): Bolivia (September 12, 2014), Brazil (September 19, 2014), Chile (September 12, 2014), Paraguay (September 9, 2014), and Uruguay (September 10, 2014). The deadline to respond or express any concerns was originally October 20, 2014 but was extended to November 5, 2014 at Brazil's request.

87. No responses were received from the governments of the Oriental Republic of Uruguay, the Republic of Paraguay, and the Republic of Chile. The Bank received requests for additional information from the governments of the Plurinational State of Bolivia, and the Federative Republic of Brazil, and, on behalf of the government of the Argentine Republic, it responded accordingly:

(a) To restate that, in the Bank's assessment, the project and/or subprojects are unlikely to lead to any appreciable harm to the interests of other riparians;

(b) To reiterate that, as mentioned in the notification letter, site-specific Environmental and Social Management Plans will indeed be prepared before the implementation of any subproject, if applicable;

(c) To commit to provide any subproject-specific information upon request; and

(d) To confirm that the Bank will continue to process the project for approval.

88. There are no outstanding issues regarding the applicability of this policy to the project.

[46] International waterways are defined under OP 7.50 as (a) any river, canal, lake, or similar body of water that forms a boundary between, or any river or body of surface water that flows through, two or more states, whether Bank members or not; (b) any tributary or other body of surface water that is a component of any waterway described in (a) above; and (c) any bay, gulf, strait, or channel bounded by two or more states or, if within one state, recognized as a necessary channel of communication between the open sea and other states—and any river flowing into such waters.

Annex 4: Implementation Support Plan

ARGENTINA: Renewable Energy for Rural Areas Project

Strategy and Approach for Implementation Support

1. The Implementation Support Plan describes the support Argentina will require to implement key mitigation measures identified in the PAD. The Plan will seek to ensure that major risks are addressed and the project can be implemented in a swift and expeditious manner. The project design already takes these issues into account and provides mitigation options to be backed by the World Bank. The Plan will be implemented by the Bank team involved in the operation taking into account country level risks, legal framework, and local context. The Implementation Support Plan is indicative and flexible, and will be revisited during project implementation based on progress made on the ground.

2. The plan relies on several lessons learned from PERMER I:

(a) Project implementation should reflect the conceptual reality of its times, but mitigate chances of dramatic changes by maintaining a flexible design.

(b) It is strongly recommended to continue incorporating the most recent experiences in developing renewable energy resources in rural areas.

(c) Closely monitor applicable safeguards and update any associated mechanisms and instruments as needed.

(d) Constant screening of country risks is necessary to maintain a healthy operation.

(e) Slow implementation is an embedded characteristic of rural access operations that must also be acknowledged.

(f) Maintain required flexibility to deal successfully with changing economic and political conditions.

Overall Project Implementation

3. The World Bank strategy to support implementation will rely on continuous monitoring and constant interaction and advice to the PCU. Even though the PCU will count with proven, capable, and experienced staff, hands-on and constant collaboration and advice will be necessary to overcome the challenges associated to a dramatic increase in project scope and boundaries (compared to the activities financed under PERMER I).

4. Satisfactory implementation from start will require the preparation of critical tasks in the following areas:

(a) Legal

(i) The Bank team will work closely with the PCU to help expedite:

- The effectiveness due diligence; and
- The signature of all relevant agreements between the SE, provinces, line agencies, QSPs, and other relevant stakeholders (as needed).

(b) Procurement

(i) A PP for the first 18 months and a procurement chapter for the OM have been prepared with full support of the Bank team;

(ii) Provide training to the PCU;

(iii) Review procurement documents and deliver timely feedback to the PCU; and

(iv) Monitor procurement progress against the PP.

(c) Financial management

(i) Provide training to the PCU;

(ii) Closely supervise the project's FM; and

(iii) Review any audits or FM reports in a timely manner.

(d) Safeguards

(i) Support the development of specific studies and terms of reference needed at subproject level, under a framework approach;

(ii) Provide training to the PCU's environmental and social teams and to PEUs and other provincial authorities and stakeholders (as needed); and

(iii) Closely supervise the implementation of safeguards documents, taking into account experiences and lessons learned from PERMER I.

(e) M&E

(i) Support the drafting of terms of reference to prepare activities needed to count with a successful M&E framework; and

(ii) Provide advice on new and innovative activities related to impact evaluation (to be funded under Component 3).

5. Particular key issues to be addressed also include:

(a) Implementation capacity

(i) The use of more complex technologies, new to the PCU, may slow down the implementation of the operation. The team would support the preparation of

specific procurement, technical and safeguard guidelines and training activities with the SE through knowledge exchanges and sharing lessons learned elsewhere.

(ii) The magnitude of the envisioned scale-up (as compared to PERMER I) may over-extend supply chain and implementation capacity. This situation could slow down implementation and/or reduce quality and delivery. To mitigate this risk, the team would support the training and enlargement of the PCU as well as support knowledge transfer between relevant stakeholders (mainly PEUs).

(b) Implementation arrangements

(i) **Signing of agreements.** Could take a long time (especially with new participating provinces) and delay the whole project. The Bank team will support (from design stages) the drafting of agreements that can be generally agreeable to all parties. The Bank team will also ensure the presence of sufficient legal expertise on the relevant teams.

(ii) **Insufficient counterpart funds.** New players could also lack adequate counterpart funding to ensure O&M&R of subprojects. Even though the FNEE funds are an important source of funding, these may not be available in all provinces at all times. Mitigation options include helping provinces identify new funding sources, taking into account the mechanism already implemented by some (Jujuy and Salta).

(iii) **O&M&R is not satisfactory.** The lack of adequate O&M&R may jeopardize the success of the operation. To address this, the Bank team will ensure O&M&R requirements are part of the institutional arrangements to be signed between the provinces and the SE. The team will also rely on the definition of appropriate mechanisms through Component 3.

(c) Stakeholder involvement

(i) Dissemination of information for project beneficiaries and relevant stakeholders. Improved dissemination and incorporation of new stakeholders during implementation will be sought. The team will make sure it can recollect and take into account beneficiaries opinion's, with special emphasis to the needs of vulnerable people, women, the young and indigenous populations; and taking into account the varying conditions across each province.

(ii) Expansion to new provinces may be problematic due to lower capacity or lack of experience. The team will support participating provinces (which include some that may lack all the necessary capacities for a quick implementation). The team will help address each province's particularities by supporting the preparation of specific manuals and ensuring the PCU works closely work with new participating provinces, to lead them through the process and to assure a fast catch-up.

Implementation Support Plan

6. The Bank team will undertake field visits on a regular basis and have discussions with the PCU and all PEUs, other stakeholders as well as project beneficiaries. During project implementation, it will also maintain a constant presence in the field with at least two supervision missions per year (and even more during the first year of implementation). The team will also support the strengthening of the PCU and will develop capacity-building activities and support training workshops for PEUs.

7. The team will also undertake regular and comprehensive fiduciary review, including thorough reviews of financial management reports and findings of procurement reviews and audits. As needed, the team will work together with the implementing agency to maintain a viable delivery model, allocate adequate human resources—in quantity and quality—for and throughout the implementation period and continuously provide valuable guidance through local staff.

8. Implementation support will be carried out at the following levels:

(a) **Technical:** Technical staff will be located in the Buenos Aires and Washington offices. Additional technical experts will also be used, especially for the development of technical specifications for new technologies deployment.

(b) **Fiduciary:** Bank staff will provide advice and support to the PCU and PEUs (as needed). As usual, staff will be readily available in the Argentina Country Office.

(c) **Governance and capacity building:** Support will be coordinated from Buenos Aires, with strong involvement of Washington-based staff.

(d) **Safeguards:** The Bank will support the PCU and PEUs with Washington-based senior staff as well as local experts and consultants.

Table 4.1: Implementation Support Plan

Time	Focus	Skills Needed	Resource Estimate (annual)
First 18 months	Legal	Legal counsel	8 staff weeks per specialist
	Procurement	Procurement specialist	6 staff weeks per specialist
	Financial management	Financial management specialist	
	Safeguards	Social and environmental specialists	
	M&E	Task team leader and information technology specialist	12 staff weeks per specialist
	Implementation capacity	Task team leader and rest of the team	
	Implementation arrangements	Task team leader, legal counsel and rest of the team	

Time	Focus	Skills Needed	Resource Estimate (annual)
	Stakeholder involvement	Task team leader, social specialist and rest of the team	3 staff weeks per specialist
18-84 months	Technical	Power engineer	6 staff weeks per specialist
	Fiduciary	Financial management and procurement specialists	24 staff weeks per specialist
	Safeguards	Social and environmental specialists	12 staff weeks per specialist

Table 4.2: Skills Mix Required

Skills Needed	Number of Staff Weeks per year	Number of Trips per year	Comments
Procurement specialist	6	—	Based in Buenos Aires
Financial management specialist	6	—	Based in Buenos Aires
Social specialists	15	—	Support from local consultants
Environmental specialists	12	2	Based in Washington, supported by local consultants
Information technology specialist	12	2	Non-local; for the first 2 years only
Legal counsel	8	1	Partially based in Buenos Aires
Power engineer	6	2	Non-local; for the first 2 years only
Task team leader and rest of the team	39	—	Task team leader based in Buenos Aires

Annex 5: Unserved Population and Targeted Beneficiaries

ARGENTINA: Renewable Energy for Rural Areas Project

1. Argentina has a population of roughly 40 million people, distributed across 23 provinces and the Autonomous City of Buenos Aires. Population density varies across the country, from 1 inhabitant per km^2 in Santa Cruz to 64 people per km^2 in Tucumán (and 4,950 people per km^2 in the city of Buenos Aires). Even though the country has a very high electrification rate, focusing on achieving universal access is still necessary as still over half a million people lack access to this basic service.

2. The fact that 1.2 percent of the population cannot benefit from the fruits of modern energy services does not mean the access agenda should not be relevant or that international partnerships and support should not be sought. On the contrary, in countries such as Argentina (large, with dispersed populations, and highly electrified), all help that can be obtained is needed as the targeted population will obviously be composed by the poorest members of the Argentine society. In addition, providing energy services to the highly dispersed population that lacks these services is the most complicated and expensive task in the electrification agenda, especially considering the long distances between dwellings and the grid. These characteristics also call for the adoption of particular non-traditional technologies.

3. As access to electricity has a direct impact in alleviating poverty and boosting shared prosperity, the dire need to increase it becomes even clearer. Access to this service enhances social inclusion by improving the lives of the mostly rural poor and reduces negative environmental impacts by limiting the use of biomass and partially foreign fossil fuels, also safeguarding the country's precious natural resources. Sustainable access to this basic service can foster equity and sustained poverty reduction and can also help sustain employment creation by promoting productive uses of electricity.

4. On the other hand, lack of access to electricity and other energy services results in a low quality of life, poor medical care and education, and limited opportunities for economic development. Schools have limited access to modern educational resources and students have less time available to read or do homework at home. Health clinics do not have adequate access to light, water pumps, refrigeration for drugs and vaccines, medical instruments or fans, and sterilizers. Without electricity, people in the rural environment have limited hours to complete their work or undertake employment possibilities, limiting entrepreneurship. Mobile phone coverage, if available, cannot be leveraged as it is difficult to recharge mobile phone batteries and overall, investments and productivity cannot be raised. Finally, when families do not have electricity services, they usually cover their energy needs with batteries (for flashlights and radios), kerosene burners and candles, and wood (for cooking and heating), which have high relative costs for the low-income segment but also contribute to respiratory illnesses, and degrades available natural resources.

5. Limited or no access to modern energy services is especially burdensome for women. Lack of electricity forces them to spend most of the day undertaking basic chores and collecting firewood. Obtaining fuels for lighting, cooking and heating, as well as drinking water are just some of the laborious activities that women are usually tasked with in rural areas. These not only are hard but also time-consuming responsibilities—compromising their opportunities to

participate in educational and employment opportunities or even community affairs—that also add to the overexploitation of forest resources (already scarce in areas such as the Puna and Patagonia, increasing the difficulty to find these resources). The optimization of cooking and heating devices—and the provision of these services through public institutions—enhances hygiene, reduces health risks associated to indoor air pollution, improves the sustainable use of resources, and also help women to free up time to apply for better job opportunities and education and improve their quality of life. Electricity also fosters the provision of communication services, which women can leverage to learn and understand, for example, their rights and benefits they are entitled to. Handicraft production is also a characteristic activity of rural women in Argentina, and electricity can significantly ease up production, resulting in increased incomes, contributing to a better quality of life. In addition, lighting fosters safety, uniquely benefitting women.

6. The inability to access modern energy services thus creates perverse incentives and vicious circles: as the extremely poor (which includes an important female dimension) lack a basic service needed to improve their labor, or their health or their education, they cannot—on their own—finance or support the activities that are needed to pull themselves out of poverty. In addition, lack of access forces them to invest their limited resources in less productive activities and unsustainable energy. With this in mind, the project will mostly target beneficiaries that have been:

(a) Historically excluded from basic services provision;

(b) Located far away from urban centers and dispersed across vast areas;

(c) Dependent on primary economic activities;

(d) Mostly located in arid climatic zones; and

(e) Rely on fuel wood as main energy source.

The Unserved Population

7. According to studies conducted in Catamarca by the PCU after the implementation of PERMER I, average households to be targeted by PERMER II will consist of 3.6 to 4.2 individuals, above the national average (as previously mentioned, outcomes will be estimated using an average of 4 persons per household). The dispersed rural population's main economic activity is subsistence agriculture and livestock. In 53 percent of analyzed cases, the main household income is obtained through public employment or pensions (showcasing the high number of people over 60 years that live in isolated areas); while roughly 13 percent comes from permanent social assistance schemes. Another PERMER I study in the Entre Ríos Province has shown that most families do not have an appropriate water supply, and in the La Pampa Province roughly 90 percent of the analyzed population is engaged in basic agricultural and livestock activities. These examples provide only a quick overview of the general situation. The targeted population under PERMER II is shown in table 5.1 (based on 2010 census data produced by INDEC).

Table 5.1: Household Access to Electricity Rate

Service	Households	Rate (%)
Grid	11,898,143	97.70
Offgrid[47]	128,802	1.10
No access	147,124	1.20
Total	**12,174,069**	**100**

8. Table 5.2 shows the number of households that lack access to electricity by province, using the 2010 data—but excluding the Greater Buenos Aires—under two scenarios: INDEC 2010 data and INDEC 2010 data excluding the number households served under PERMER I (however, it should be noted that in La Pampa and Santa Cruz census sampling errors mean the actual size of the unserved population cannot be determined). In order to better illustrate some characteristics of this unserved population, the table also presents INDEC 2010 data on unsatisfied basic needs rates per province.

Table 5.2: More Households in Poor Provinces lack to Electricity

Province	2010 INDEC census	2010 INDEC census + PERMER I subprojects
Buenos Aires	5,798	5,798
Catamarca	2,207	2,207
Córdoba	6,615	6,615
Corrientes	11,201	9,901
Chaco	17,512	15,512
Chubut	1,490	1,490
Entre Ríos	5,077	4,100
Formosa	9,951	9,951
Jujuy	6,930	6,330
La Pampa	384	—
La Rioja	1,515	962
Mendoza	2,291	730
Misiones	15,683	15,683
Neuquén	2,487	1,108
Río Negro	2,437	2,437
Salta	18,215	13,214
San Juan	944	747
San Luis	1,555	1,555
Santa Cruz	321	—
Santa Fe	7,121	7,121
Santiago del Estero	18,657	18,657
Tierra del Fuego	322	322
Tucumán	3,671	1,317
TOTAL	**142,384**	**125,757**

9. Based on these statistics, it is estimated that roughly half a million people currently lack access to electricity in Argentina. Figures 5.1 and 5.2 highlight the positive correlation between lack of access to energy services and extreme poverty and unsatisfied basic needs in the rural environment.

[47] There is no disaggregated information on urban or rural conditions for these households (most recent data was included in the 2001 census, and is no longer considered useful).

Figure 5.1: The Location of Households without Electricity is Positively Correlated with Income Poverty[48]

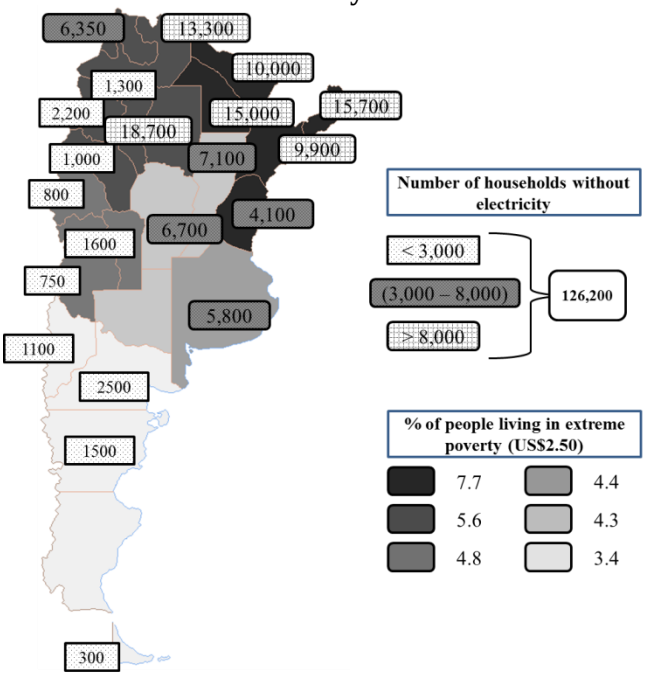
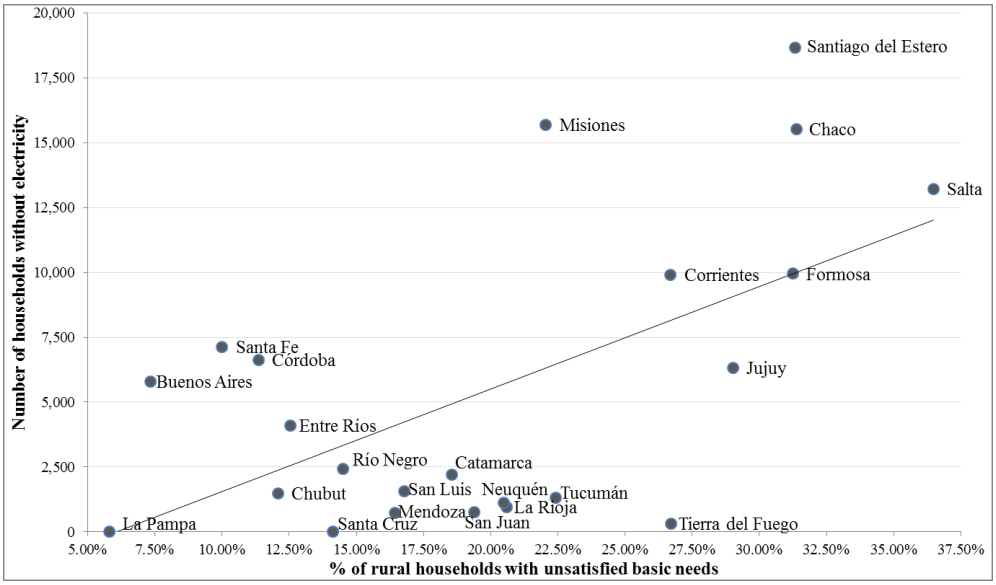


Figure 5.2: The Location of Households without Electricity is also Positively Correlated with Unsatisfied Basic Needs[49]



[48] Own elaboration based on data from the 2010 census and CPS' poverty estimations.

[49] Ibid. Figure 5.2 only intends to showcase the axiomatic correlation between lack of access to electricity and poverty. The number of households without electricity variable is highly influenced by population size in each province, but it is still believed the trend line clearly showcases the above-mentioned correlation.

10. It is also important to notice that structural poverty, as measured through the unsatisfied basic needs indicators, is directly linked to the rural environment, and—as previously mentioned—particularly affects women. According to the 2001 census, 36 percent of women in rural areas had unsatisfied basic needs, while in towns of 2,000 to 5,000 inhabitants, only 22 percent of the female population had unsatisfied basic needs. Even though these shortcomings do not significantly differ between men and women, the lack of services and primitive living conditions of households are crucial factors contributing to the depopulation of rural areas. In these circumstances, women and children are migrating to larger population centers. Because of this, the number of males usually exceeds that of women in all age groups, and in the 45 to 64 age group, the proportion of males is markedly higher than that of women.[50]

Overall performance of PERMER I

11. Through PERMER I, Argentina successfully supplied electricity to households, schools, health centers and other public facilities, as well as thermal energy for cooking and water heating in schools and public buildings in 19 provinces, as shown in table 5.3. The operation, maintenance and replacement of all these systems, is being ensured by provincial entities through QSPs (government agencies and/or private concessionaires). Similar to what will be done through PERMER II, these institutions charge a fee to users, which—together with provincial subsidies—guarantees the sustainability of the service over time.

12. In general, the operation and maintenance, as well as the fee collection, have been successful and appropriate. The replacement of batteries has been done every three/four years on average. Only in Chubut (for residential users) and Río Negro (schools) did some issues, which are currently being resolved, arise. According to customer evaluation surveys, roughly 80 percent of all claims related to quality of the service have being resolved satisfactorily. The current default rate is around 20 percent.

[50] Biaggi, C, C y Tasso Alberto Canevari. *Mujeres que trabajan la tierra. Un estudio sobre las mujeres rurales en Argentina*. *Proyecto de Desarrollo para Pequeños Productores Agropecuarios* (Small Farmer Development Project). Secretariat of Agriculture, Livestock and Fisheries (*Secretaría de Agricultura, Ganadería y Pesca*). 2007.

Table 5.3: PERMER I Beneficiaries per Activity by December 2012 (thousands)

Province	Electricity service provision																*Solar thermal energy provision: Beneficiaries*	Total beneficiaries[51]
	Households						Public buildings						*Results*					
	Individual systems			Minigrids[52]			Schools			Other buildings								
	Beneficiaries	Installed capacity (kW)	Generation (MWh)	Beneficiaries	Installed capacity (kW)	Generation (MWh)	Beneficiaries	Installed capacity (kW)	Generation (MWh)	Beneficiaries	Installed capacity (kW)	Generation (MWh)	Connections	Beneficiaries	Installed capacity (kW)	Generation (MWh)		
Buenos Aires	—	—	—	—	—	—	6.39	0.12	0.21	—	—	—	0.21	6.39	0.12	0.21	—	6.39
Catamarca	—	—	—	0.22	0.05	0.09	1.08	0.03	0.04	—	—	—	0.08	1.30	0.08	0.13	—	1.30
Córdoba	—	—	—	—	—	—	2.58	0.06	0.11	—	—	—	0.09	2.58	0.06	0.11	—	2.58
Corrientes	5.20	0.16	0.28	—	—	—	2.55	0.06	0.11	—	—	—	1.47	10.30	0.22	0.39	2.55	10.30
Chaco	14.72	0.29	0.52	—	—	—	6.24	0.08	0.14	—	—	—	3.89	20.96	0.37	0.66	—	20.96
Chubut[53]	6.46	0.81	1.95	—	—	—	—	—	—	—	—	—	1.62	6.46	0.81	1.95	—	6.46
Entre Ríos	3.91	0.12	0.21	—	—	—	—	—	—	—	—	—	0.98	3.91	0.12	0.21	—	3.91
Jujuy	16.80	0.42	0.76	1.88	0.19	0.84	1.32	—	—	—	—	—	4.77	25.61	0.61	1.60	5.61	25.61
La Pampa	3.45	0.10	0.19	—	—	—	—	—	—	—	—	—	0.86	3.45	0.10	0.19	—	3.45
La Rioja	2.21	0.07	0.12	—	—	—	1.80	0.02	0.04	—	—	—	0.61	4.01	0.09	0.16	—	4.01
Mendoza	6.24	0.19	0.34	—	—	—	—	—	—	—	—	—	1.56	6.24	0.19	0.34	—	6.24
Misiones	—	—	—	—	—	—	0.72	0.01	0.02	8.40	0.02	0.03	0.07	9.12	0.03	0.05	—	9.12
Neuquén	7.64	0.26	0.46	1.83	1.45	2.61	1.53	0.05	0.10	10.20	0.04	0.08	2.45	21.20	1.80	3.24	—	21.20
Río Negro	—	—	—	—	—	—	0.78	0.04	0.07	—	—	—	0.03	0.78	0.04	0.07	—	0.78
Salta	20.15	0.81	1.45	9.36	1.64	7.09	9.48	0.16	0.28	35.80	0.07	0.13	7.07	74.79	2.67	8.95	—	74.79
San Juan	0.79	0.06	0.11	—	—	—	0.48	0.01	0.02	8.80	0.02	0.03	0.26	10.07	0.09	0.16	—	10.07
Santa Cruz	2.30	0.07	0.12	—	—	—	—	—	—	—	—	—	0.58	2.30	0.07	0.12	—	2.30
Santiago del Estero	—	—	—	—	—	—	20.70	0.40	0.72	—	—	—	0.69	20.70	0.40	0.72	—	20.70
Tucumán	10.42	0.28	0.51	—	—	—	1.17	0.01	0.03	9.00	0.00	0.01	2.72	21.64	0.30	0.54	1.05	21.64
TOTAL	**100.28**	**3.62**	**7.01**	**13.30**	**3.33**	**10.62**	**56.82**	**1.05**	**1.88**	**72.20**	**0.15**	**0.28**	**29.98**	**251.81**	**8.15**	**19.79**	**9.21**	**251.81**

[51] For beneficiaries, the following estimates were used: 4 inhabitants per household, 30 people per school, and 200 people per public facility.

[52] For minigrids, only residential users are included, even though these also typically include schools and health posts. Minigrids in Jujuy, Salta, and Neuquén are fossil-fuel powered; in Catamarca different technologies were used (hydro: 43 kW, wind: 4 kW; diesel: 4 kW).

[53] In Chubut, only wind generators were installed, in all other provinces only solar PV was used for electricity generation.

The challenge ahead

13. The project has also assumed, based on experiences from Argentina and elsewhere, that the population that lacks access to energy services represents the poorest members of Argentine society. To ensure project resources are actually focusing on the most impoverished Argentines, the project is including in its OM clear criteria to identify targeted beneficiaries.

14. It is expected that the project will be implemented in all of the 23 provinces of Argentina. Beneficiaries are likely to include an important number of citizens in the northwest and northeast, most of the unserved citizens of the Pampas, and all of the unserved citizens in regions such as Cuyo and Patagonia. Table 5.4 summarizes the characteristics of all five of Argentina's regions, the results of PERMER I, the size of the unserved population, and expected outcomes of PERMER II.[54] It is expected it can illustrate the types of renewable energy technologies that could be used and to provide a general perspective on some of the main productive uses activities that will be promoted by provincial agencies in coordination with the project.

Table 5.4: Argentina's Provinces Main Features

Region and Provinces	Features and Overall Results	
Noroeste 1. Catamarca 2. Jujuy 3. La Rioja 4. Salta 5. Santiago del Estero 6. Tucumán	*Geography:* Highlands, mountains and high plateau. *Economic activities:* Agriculture and mining. Subsistence farming in the *Puna* grasslands. In the fertile and more densely populated valleys of the *Cordillera Oriental* sugar cane, citrus and tobacco are grown. Forestry and timber are also important economic activities. The touristic industry has also been developed. The region also produces oil and gas. *Demographic and social:* Great proportion of rural population and high demographic dependency rate. High population growth and high birth and mortality rates. Poor results in social development indicators and important infrastructure and social assets deficiencies. Increased presence of indigenous communities.	
	Household connections installed by PERMER I	14,311
	Households with no access after PERMER I	42,700
	Expected households connections to be installed by PERMER II	17,700
	Households (%) with no access to be connected by PERMER II	41.45%
Noreste 7. Corrientes 8. Chaco 9. Entre Ríos 10. Formosa 11. Misiones	*Geography:* Plains, estuaries (Corrientes) and plateau (Misiones). Has a subtropical climate and the landscape includes forests, subtropical jungle and savannah. Most rivers are part of the *La Plata* basin. *Economic activities:* Mostly focused in the primary sector, with a specialization on subtropical crops such as cotton, rice, and fruits. More recently, corn and soy are being grown. Most livestock is composed of cattle and zebu. Industry is predominantly linked to agriculture and forestry sectors. *Demographic and social:* Great proportion of rural population and high demographic dependency rate. High population growth and high birth and mortality rates. Poor results in social development indicators and important infrastructure and social assets deficiencies. Numerous indigenous communities in the region.	
	Household connections installed by PERMER I	5,957
	Households with no access after PERMER I	55,100
	Expected households connections to be installed by PERMER II	13,000
	Households (%) with no access to be connected by PERMER II	23.59%

[54] Overall results focus only on access to electricity service provision in households for basic needs (lighting, communication, etc.).

Region and Provinces	Features and Overall Results	
Pampeana 12. Buenos Aires 13. Córdoba 14. La Pampa 15. Santa Fe	*Geography:* Mostly composed of lowlands with a temperate and oceanic climate. *Economic activities:* Agriculture (cereals, oilseed, and forage), livestock (cattle), and fishing (*Mar del Plata*). Industry is very diverse and includes food, steel, metallurgy, cars, textiles, chemical, pharmaceutical, paper, garments, and petrochemicals, among others. Demographic and social: Most satisfactory *situation in Argentina.* Low population growth and mortality rates; high proportion of urban population. Positive results in terms of social development indicators and good access to infrastructure and social facilities. Predominantly urban; includes Buenos Aires, Córdoba and Rosario.	
	Household connections installed by PERMER I	862
	Households with no access after PERMER I	19,500
	Expected households connections to be installed by PERMER II	16,000
	Households (%) with no access to be connected by PERMER II	23.59%
Patagonia 16. Chubut 17. Neuquén 18. Río Negro 19. Santa Cruz 20. Tierra del Fuego	*Geography:* The *Patagonia Andina* is composed by mountain ranges separated by valleys and glaciers, while the *Patagonia extra Andina* is characterized by terraces and plateaus that reach the Atlantic Ocean. Climate is mostly arid and/or semiarid. *Economic activities:* Oil exploration and production; agriculture (valleys), industry (including household appliances manufacturing in large cities) and fishing (Atlantic coast). *Demographic and social:* In Northern Patagonia, great proportion of rural population and high demographic dependency rate. Low population growth and density rates; high birth and mortality rates. Poor results in social development indicators and important infrastructure and social assets deficiencies. Southern Patagonia has positive results in terms of social development indicators. However it has a very small population, very low density rate and most population growth is because of immigration. Has historically lacked social infrastructure, equipment, and facilities, due to the long distances between villages. Significant presence of indigenous communities, especially in northern Patagonia.	
	Household connections installed by PERMER I	4,534
	Households with no access after PERMER I	5,400
	Expected households connections to be installed by PERMER II	5,400
	Households (%) with no access to be connected by PERMER II	100%
Total	**Household connections installed by PERMER I**	**27,422**
	Households with no access after PERMER I	**125,700**
	Expected households connections to be installed by PERMER II	**55,100**
	Households (%) with no access to be connected by PERMER II	**43.83%**

PERMER II expected results

15. As previously mentioned, PERMER II could help provide access to modern electricity services to between a third and half of the currently unserved population. In addition, it would support Argentina's efforts to provide access to thermal energy, as well as test, pilot, and develop new and emerging technologies, and build capacities at the national and subnational levels. Table 5.5 summarizes expected results from the project, as well as costs and financing sources.

Table 5.5: Expected Results per Activity

Component	Objectives	Subcomponent	Targets	Technologies	Connections			Beneficiaries		
					Total	Access provision	Access enhancement	Total	Access provision	Access enhancement
1. Renewable electricity service provision	Lighting, communication and other services	1.a. Isolated individual households and public facilities	1.a.i. Isolated individual households	Renewable energy technologies: solar (PV) or wind systems	46,000	41,500	4,500	183,500	165,000	18,500
			1.a.ii. Isolated public facilities	Renewable energy technologies	1,500	1,000	500	94,000	56,500	37,500
		1.b Rural and isolated population clusters and/or public institutions through minigrids	Rural and isolated population clusters and/or public institutions	Minigrids: mini-hydro, renewable energy technologies	9,500	2,500	7,000	80,000	20,000	60,000
	Water pumping for human consumption	1.c. Isolated individual households, public facilities and isolated communities	1.c.i. Isolated individual households	Solar (PV)	13,500	4,000	9,500	55,000	16,500	38,500
			1.c.ii. Isolated public facilities	Solar (PV)	1,500	750	750	87,000	43,500	43,500
			1.c.iii. Isolated communities	Renewable energy technologies	5,000	0	5,000	43,000	0	43,000
	Productive uses	1.d. Micro-enterprises for the development of individual or collective productive uses activities	1.d.i. Individual	Solar (PV)	4,200	4,200	0	17,000	17,000	0
			1.d.ii. Collective	Renewable energy technologies	20	20	0	500	500	0

Component	Objectives	Subcomponent	Targets	Technologies	Connections			Beneficiaries		
					Total	**Access provision**	**Access enhancement**	**Total**	**Access provision**	**Access enhancement**
1. Renewable electricity service provision	Resettlement	1.e. Small works and goods as in-kind compensation under the relevant resettlement plans	Affected persons	—	—	—	—	—	—	—
	Subtotal 1—Renewable electricity service provision				***81,220***	***53,970***	***27,250***	***560,000***	***319,000***	***241,000***
2. Solar thermal energy service provision	Water heating, cooking and spatial heating	2.a. Dispersed public facilities	Dispersed public facilities	Solar water heaters, solar spatial heating systems, cookers and ovens	3,200	3,200	0	195,000	195,000	0
		2.b. Public buildings	Public buildings in rural areas		200	200	0	10,000	10,000	0
	Subtotal 2—Solar thermal energy service provision				***3,400***	***3,400***	***0***	***205,000***	***205,000***	***0***
3. Project deployment support										
4. Project management										
Total					**84,620**	**57,370**	**27,250**	**765,000**	**524,000**	**241,000**

Annex 6: Monitoring and Evaluation, Supervision and Reporting

ARGENTINA: Renewable Energy for Rural Areas Project

General Overview

1. M&E, supervision, and reporting tasks are essential to analyze progress, provide necessary corrective measures during implementation, and assess the operation's impact. In the case of the proposed project, M&E will build upon the existing information flows and dynamics developed through PERMER I.

2. The operation's support to all M&E tasks—as well as to overall project implementation supervision and reporting—will be twofold: (a) the PCU will develop and deploy studies, systems, indicators, reports, remote monitoring technologies, and other instruments as necessary (and as established in the project's OM) with funding from Component 3 and (b) relevant data and information will be gathered by the PCU and relevant stakeholders with support from Component 4 as needed and as established in the same OM, relevant agreements, and other legal documents.

3. Results M&E and implementation supervision will be conducted through five main instruments (further detailed in the project's OM): (a) PERMER II M&E, supervision and monitoring system; (b) indicators reporting; (c) additional impact, results and performance indicators and data; (d) management system; and (e) baseline, mid-term and implementation assessments to evaluate the operation's impact, including a planned impact evaluation study to be developed with support from DIME. This last task will be of an increased importance, as it can become an effective instrument for policy making.

Main Instruments

4. The five tasks will seek to incorporate as many subprojects supported by PERMER I as possible. The text below provides further information on how these five main tasks will be developed.

PERMER II M&E, Supervision and Monitoring System

5. With financing from Component 3, the PCU will develop a PERMER II M&E, supervision and monitoring system (the 'PERMER II System'). Taking into account any reporting obligations included in the project's Loan Agreement, this instrument will rely on the project's implementation network. It will provide access to project progress information to, amongst others, national authorities, provincial stakeholders, interested firms, contractors and service providers, beneficiaries, and the World Bank.

6. The system will consist of tailor-made software through which the PCU will be able to compile information, request, and gather data from relevant stakeholders and produce reports as needed and committed. In particular, the system will manage to produce all monthly, biannual, mid-term and completion reports as well as satisfy any additional information needs. The use of innovative and remotely managed technologies will be sought, and incorporated into such

software. The project's OM includes further information on the system's design, tasks, inputs needed, and methodologies.

Indicators Reporting

7. The project will rely on the previously described task to request, compile, gather, and present results per indicator (for further details on these, please see annex 1). Overall responsibility for these activities will reside within the PCU. Other specific responsibilities will be detailed through (a) relevant agreements with other key players; (b) the OM; and (c) terms of reference of the earlier-mentioned PERMER II System. When needed, financing to perform this task will be provided through Component 4.

8. This task will—through the OM—provide further details on indicators composition, construction, results, definitions, key players, roles, responsibilities and process for data collection, sources of information, timelines, methodologies and others (also included in the OM).

Additional Impact, Results and Performance Indicators

9. In order to properly measuring impact, results and performance, the project will define additional information needs. These additional data will help not only assess performance and compliance with higher-level project development and intermediate objectives, but also provide a deeper understanding of the rural energy sector.

10. With funding from Component 3, the PCU—in collaboration with relevant stakeholders such as provinces, contractors and beneficiaries—will seek to better understand how subprojects are being designed, implemented, sustained, and maintained; what are the actual roles being played by all relevant actors; what are the beneficiaries opinions, complaints, and perceived impacts of the project; how is the operation achieving its broader objectives and how is it managing to help reduce poverty and increase shared prosperity in Argentina. The task will also compile aggregate information at the national and provincial level, aiming at also analyzing the operational model, sustainability mechanisms, and capacities created. At the very least, specific subprojects, beneficiaries, QSPs, concessionaires, provinces and federal-related variables will be recollected.

11. In addition, data to be compiled will also help construct the results needed to report project development and intermediate outcome indicators and other studies, such as baseline and impact assessments. Specific details are included in the project's OM and the PERMER II System terms of reference, as the system will also incorporate this task.

Management System

12. In order to appropriately manage all internal roles, responsibilities, functions, and activities, the project will also support—with financing from Component 3—the design and deployment of a PCU management system. Such software will also be part of the PERMER II System, and will help follow up on day-to-day activities such as: implementation, processes, biddings, contracts, payments, staffing, safeguards, and any other deemed appropriate. Access to such a system will be limited to PCU staff and potentially to other relevant stakeholders (such as

contractors or concessionaires and other QSPs) on a case-by-case basis. As the use of such a system will be part of the operation's management, its application will—directly or indirectly—be funded by Component 4.

Baseline, Mid-term and Implementation Completion Impact Assessment Studies

13. Finally, the operation will also finance (mostly through Component 3) the preparation of specific reports. This task will consist of the preparation of, at least, the following reports (although this is detailed and can be modified through the project's OM):

(a) Baselines on energy service provision, prior to project implementation;

(b) Mid-term review report;

(c) Impact assessment and evaluation, to be produced after implementation and to be done with support from DIME; and

(d) Implementation completion and results report and associated documents.

Annex 7: Economic and Financial Analyses

ARGENTINA: Renewable Energy for Rural Areas Project

1. The project is expected to achieve its proposed PDO through the financing of different activities and relevant outcomes, such as: providing electricity, or enhancing service, to: 55,150 households, or up to 220,600 inhabitants, through PV or wind systems or minigrids (that is, a range of mature renewable energy technologies that have been tested worldwide and have proven to be technically reliable), and 1,777 public services institutions (schools, rural health, and security posts, among others). The project is expected also to provide access to solar thermal applications in 3,418 public services facilities as well as water pumping to 18,650 households and 1,566 public services and electricity for 4,238 productive uses.

2. There is strong global evidence that rural electrification projects can generate sufficient benefits for the investment to be warranted from an economic standpoint. The absence of an electricity service not only deprives people of basic necessities, such as lighting and communications, and constrains their access to social services (health, education, security) but also hampers productivity and economic development. Investments in rural electrification reduce inequality and improve the quality of life and income of poor rural households. This experience was confirmed at the country level with the implementation of PERMER I as the ICR of the project estimates (for its largest component—SHS) ERR was 11.2 percent, in spite of the major delays. However, while the benefits associated with the provision of electricity services in rural areas tend to be high compared to the long-term supply cost of a power system, it is worth noting that part of these benefits are not realized in monetary terms and, hence, cannot be used as a measure of the consumer's ability to pay. There are many non-monetary benefits associated to rural electrification. Some of the benefits expected in this project include the additional income associated with the productive uses of electricity at both the household and public institutions levels, the value of time saved in charging batteries of mobile phones and collecting water, the enhancement in the quality of life of households due to the availability of hot water, and improvements in the quality and quantity of medical and education services.

3. *Rationale for public sector provision/financing*. A feature common to all successful electrification efforts is the government's sustained commitment to electrification as a priority development agenda. This commitment—that is often motivated by the poverty reduction and inequality dimensions of electricity access—entails an effective planning effort which, by nature, is a public role: setting up a suitable system of tariffs and subsidies, establishing clear rules for the selection and prioritization of electrification projects, and helping mobilize the resources required for such an investment effort.

4. As PERMER I and other Bank operations in Latin America and Caribbean have demonstrated, the high cost of providing electricity to dispersed rural households, the limited demand of the mostly poor households and the fact that part of the benefits stemming from the electricity service are not received in monetary terms (such as the enhanced quality of life and improved public services), a significant subsidy is a necessary component of rural electricity projects. Hence, a public initiative is necessary in ensuring the required financing and establishing a system of tariffs and subsidies that ensures sustainable cost recovery while minimizing price distortions.

5. *Value added of Bank's support*. The Bank's involvement in the project is justified by the value it can add to the proposed operation. The Bank is quite active in supporting rural electrification in most regions and, hence, is in a privileged position to transfer to the current administration experiences and lessons learned not only for PERMER I, but from other rural energy projects currently being developed in the region (for example, Bolivia, Peru, Mexico, and Haiti) and elsewhere.

Economic Analysis

6. The project includes two investment components that are aimed to increase and improve the provision of electricity services in rural areas and to augment the provision of solar thermal energy. These components will provide benefits to rural households and public institutions which are associated with savings in the use of traditional or less-efficient energy sources (for example, kerosene, batteries, candles) as well as opportunities for productive activities and enhancing the quality of life and services (improved conditions for education, health services, quality of leisure time). Given the analytical constraints associated with benefits that cannot be measured in monetary terms and/or where information is not readily available, the economic analysis focuses on two main subcomponents that account for 71.4 percent of total investments.[55] These subcomponents involve the provision of lighting and communications services (among others) to (a) isolated individual households and public facilities primarily through solar PV systems and (b) rural and isolated population clusters and/or public institutions through minigrids supplied by renewable energy technologies.

7. The aggregate ERR of the project is 22.8 percent and its NPV is US$76.9 million (based on a 10 percent discount rate and similar investments in the SHS and isolated clusters subcomponents). That is, the project will generate such economic benefit by increasing and improving access to sustainable modern energy services in rural areas of Argentina. There are uncertainties associated to the pace of expansion and the households' future consumption of electricity, as well as on the difficulties in reaching remote places that may have an impact on investment and O&M&R costs. A sensitivity analysis considering variations ±10 percent in costs and ±15 percent in electricity consumption indicated that the project economics are quite robust since in the worst scenario (higher cost and lower consumption) it would yield an ERR of 16.6 percent and an NPV of US$41.8 million. Table 7.1 presents results of this analysis.

Table 7.1: EER (%) Sensitivity Analysis

Costs Variation	Electricity Consumption		
	+15%	Base Case	-15%
-10%	30.00	26.20	22.20
Base Case	26.30	22.80	19.20
+10%	23.20	20.00	16.60

Isolated Individual Households - PV subcomponent

8. This subcomponent involves the installation of 45,880 SHS for isolated rural households for a total investment of US$80.3 million. The economic evaluation is undertaken for a single

[55] As a result, benefits will be by definition underestimated.

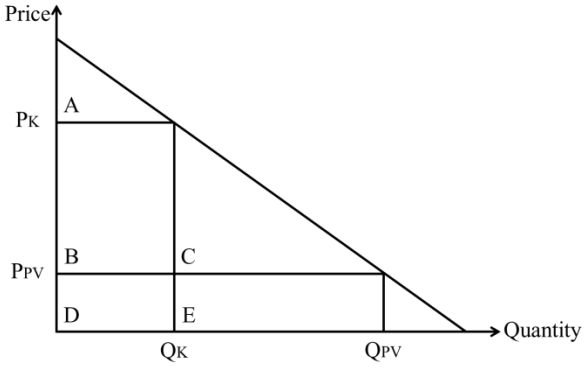
household using economic costs (that is, excluding import duties and other taxes) and considering estimates for energy savings and future electricity consumption based on surveys carried out in different provinces. The ERR for the individual households solar component is 28.8 percent.

9. *Costs:* The analysis includes an investment and installation economic cost of US$989 for a 100-Wp SHS. It includes also economic costs of US$221 per battery, to be replaced every four years, annual O&M&R costs of US$5.70 per household and an economic life of 20 years.

10. *Benefits:* SHS have two types of benefits: On one hand, they substitute the expense associated with traditional energy sources, that is, lighting and communications devices, such as kerosene lamps, candles, gas, and batteries, by solar panels whose running costs are practically negligible (replacement of parts and batteries are considered as maintenance costs and are taken into account in the analysis). Surveys on rural households in the province of Catamarca, and subsequently checked with other provinces for uniformity, indicate that an average household consumes per month five packs of candles, ten AA batteries and around five liters of kerosene. It is expected that candles and batteries will be fully substituted while households would still use some kerosene for cooking. In addition to the savings over traditional lighting and communications devices, PV systems make more energy available —and of better quality—and, therefore, they bring additional welfare benefits to the beneficiaries. Benefits are explained in figure 7.1 that represents schematically the rural household demand for energy. The monthly WTP of rural households is derived from their savings in traditional energy and expressed in US$ per kWh based on the equivalent electrical energy required to replace the former consumption.

11. When using traditional energy, users consume Q_K at price P_K and the value of saved traditional energy resources is given by areas B+D. Once the consumer adopts a PV system, demand increases to Q_{PV} at price P_{PV}, and the additional benefits associated with the extra energy are given by areas C+E. A straight line approximation to the demand curve is used given the lack of quantifiable information regarding consumers' preferences.

Figure 7.1: Benefits Generated by Subprojects



12. The analysis considers the case of a typical household with the following characteristics based on the findings of market surveys undertaken in most provinces by the PCU during the implementation of PERMER I:

Q_K: 86 kWh per year
P_K: US$2.44 per kWh, WTP based on surveys on households recently served by PERMER I; that is, average savings in traditional energy (B+D): US$210 per year and estimated consumption Q_K
Q_{PV}: 175 kWh per year
P_{PV}: US$0.0 per kWh (that is, running costs are only fixed maintenance costs)

13. Table 7.2 presents the flow of costs and benefits for a single SHS representative of average conditions to be found in different provinces.

Table 7.2: Residential PV Subcomponent - Costs and Benefits (US$)

Year	Capital cost	Batteries replacement	O&M& R	Total cost	Avoided cost	WTP[56]	Total benefits	Net benefits
1	989	0	0	989	0	0	0	-989
2	0	0	6	6	210	109	318	313
3	0	0	6	6	212	110	322	316
4	0	0	6	6	214	111	325	319
5	0	221	6	227	216	112	328	101
6	0	0	6	6	218	113	331	326
7	0	0	6	6	221	114	335	329
8	0	0	6	6	223	115	338	332
9	0	221	6	227	225	116	341	115
10	0	0	6	6	227	118	345	339
11	0	0	6	6	229	119	348	343
12	0	0	6	6	232	120	352	346
13	0	221	6	227	234	121	355	129
14	0	0	6	6	236	122	359	353
15	0	0	6	6	239	124	362	357
16	0	0	6	6	241	125	366	360
17	0	221	6	227	244	126	370	143
18	0	0	6	6	246	127	373	368
19	0	0	6	6	249	129	377	371
20	0	0	6	6	251	130	381	375
			NPV:		**US$1,300**			
			ERR:		**28.80%**			

Rural Isolated Clusters Subcomponent

14. This subcomponent considers the installation of renewable energy generating capacity in isolated clusters or minigrids, primarily through solar plants in small locations with no prior electricity service or served by isolated diesel units. The estimated cost is US$80.60 million. The analysis is done for a typical solar PV installation to serve 100 households through a 50 kW solar plant. As opposed to the SHS case, a solar plant of such scale does not impose a significant physical constraint to consumption, hence, households are expected to consume about 55 kWh per month as evidenced in several provinces under similar conditions. The ERR for the individual households solar component is 16.8 percent. If average consumption would be in the order of 70 kWh, as actually happens in regions where refrigeration is needed (for example, Chaco) the ERR would increase to 23.3 percent.

[56] Additional benefits associated to increased and improved quality of energy.

15. *Costs:* The analysis includes an investment and installation economic cost of US$377,000 for a 50W solar plant, including distribution investments, and excluding taxes and duties. It assumes also a unit O&M&R cost of US$53 per kW/month and an economic life of 20 years.

16. *Benefits:* The estimation of benefits follows an approach analogous to the one presented above for SHS, considering two types of benefits: savings in the expenses associated with traditional energy sources—that is, lighting and communications devices, such as kerosene lamps, candles, gas, and batteries—and additional welfare benefits associated to a better quality and quantity of energy, which in this case would be higher given the dimensions of the solar plant compared to the number of households.

17. The analysis considers the case of a typical household with the following characteristics based on the findings of surveys undertaken by the PCU (refer to figure 7.1):

Q_K: 86 kWh per year
P_K: US$2.44 per kWh, WTP based on surveys on households recently served by the project; that is, savings in traditional energy (B+D): US$175 per year and estimated consumption Q_K.
Q_{PV}: 660 kWh per year (based on consumption of newly connected households in previous rural electrification projects)
P_{PV}: US$0.10 per kWh, unit price resulting from an average monthly payment of US$5.50 and the said consumption level.

18. Table 7.3 presents the flow of costs and benefits for the 50 kW solar plant investment.

Table 7.3: Rural Isolated Clusters Subcomponent - Costs and Benefits (US$)

Year	Number of customers	Capital cost	O&M&R	Total cost	Avoided cost	WTP[57]	Total benefits	Net benefits
1	100	377,000	0	377,000	0	0	0	-377,000
2	0	0	31,800	31,800	20,984	72,898	93,882	62,082
3	0	0	31,800	31,800	21,194	73,627	94,821	63,021
4	0	0	31,800	31,800	21,406	74,363	95,769	63,969
5	0	0	31,800	31,800	21,620	75,107	96,727	64,927
6	0	0	31,800	31,800	21,836	75,858	97,694	65,894
7	0	0	31,800	31,800	22,054	76,617	98,671	66,871
8	0	0	31,800	31,800	22,275	77,383	99,658	67,858
9	0	0	31,800	31,800	22,498	78,157	100,654	68,854
10	0	0	31,800	31,800	22,723	78,938	101,661	69,861
11	0	0	31,800	31,800	22,950	79,727	102,677	70,877
12	0	0	31,800	31,800	23,179	80,525	103,704	71,904
13	0	0	31,800	31,800	23,411	81,330	104,741	72,941
14	0	0	31,800	31,800	23,645	82,143	105,789	73,989
15	0	0	31,800	31,800	23,882	82,965	106,846	75,046
16	0	0	31,800	31,800	24,121	83,794	107,915	76,115
17	0	0	31,800	31,800	24,362	84,632	108,994	77,194
18	0	0	31,800	31,800	24,605	85,479	110,084	78,284
19	0	0	31,800	31,800	24,851	86,333	111,185	79,385
20	0	0	31,800	31,800	25,100	87,197	112,297	80,497

[57] Additional benefits associated to increased and improved quality of energy.

Year	Number of customers	Capital cost	O&M&R	Total cost	Avoided cost	WTP[57]	Total benefits	Net benefits
				NPV:	**US$176,430**			
				ERR:	**16.8%**			

GHG Emissions

19. Regarding GHG emissions, the project followed the Bank's guidelines on calculating the lifetime savings in GHG emissions. Based on the assumptions used in this economic analysis, such as reduction in the use of kerosene lamps, candles and gas, and utilizing the CDM's I.A small-scale methodology, a savings of 6,337 tCO_2e would be saved per year. This adds up to a total savings of 38,023 tCO_2e per year by the end of the implementation of this project, and leads to a savings of 133,080 tCO_2e over the economic lifetime (est. 20 years) of the project. The GHG emission reductions assessment is in the project file.

20. Tables 7.4 and 7.5 show the GHG calculation assumptions and timeline summary.

Table 7.4: GHG Assumptions Used for Calculating Emissions

	Assumptions	Baseline	Gross GHG emissions
1	Enter details regarding **upstream** GHG emissions (i.e. scope 3), what is being included/excluded and why.	—	—
2	Enter details regarding **construction** GHG emissions (i.e. scope 3), duration, and estimated amount.	—	—
3	Enter details regarding **operational** GHG emissions (scope 1 and/or 2), emissions sources, amounts, and any changes over time.	Current power consumption, using traditional energy sources - i.e. lighting and communication devices, such as kerosene lamps, candles, gas and batteries, has an estimate energy consumption of 86 kWh/year	Project emissions calculated for 6 years. 1. Project is installing 44,430 SHS, each 100 W, for isolated rural households (est. US$78.8 million); With new system, consumption is expected to increase to 175 kWh/year. 2. Project is installing 76 solar plant minigrids, serving 100 households through 50 kW solar plants. Expected household consumption after installation is 660 kWh/year.
4	Enter details regarding any **leakage** GHG emissions (i.e. scope 3) beyond the project boundary.	—	—
5	If applicable, enter details on any **downstream** GHG emissions (i.e. scope 3) from transport, installation, operation, disposal, or other activities and explain why/if exclusions are made.	—	—

Table 7.5: Emissions Timeline during Project Implementation (tCO2e)

	FY1	FY2	FY3	FY4	FY5	FY6
Baseline emissions	—	—	—	—	—	—
Upstream (scope 3)	—	—	—	—	—	—
Construction (scope 3)	—	—	—	—	—	—
Operational emissions (scope 1 and/or 2)	6,337	12,674	19,011	25,349	31,686	38,023
Leakage (scope 3)	—	—	—	—	—	—
Downstream emissions (scope 3)	—	—	—	—	—	—
Total baseline emissions	—	—	—	—	—	—
Total gross project emissions	—	—	—	—	—	—
Upstream (scope 3)	—	—	—	—	—	—
Construction (scope 3)	—	—	—	—	—	—
Operational emissions (scope 1 and/or 2)	0	0	0	0	0	0
Leakage (scope 3)	—	—	—	—	—	—
Downstream emissions (scope 3)	—	—	—	—	—	—
Total gross project emissions	—	—	—	—	—	—
Net GHG emissions reduced	—	—	—	—	—	—
GHG reduction at full capacity for representative year:				**38,023**		
GHG reduction over economic lifetime:				**133,080**		

Financial Analysis

21. The project's objectives are, by nature, economic and social. It is acknowledged that due to the high costs associated to extending electricity services in remote areas, the low level of consumption and limited capacity to pay of newly connected customers, the project would not be financially viable unless some sort of support is provided. Hence, a considerable subsidy is required and corresponding sources of funding need to be secured to ensure the operation's financial viability from the customers and QSPs' perspective.

22. While the project's capital investment will be funded by World Bank loan proceeds, GoA's provincial and private financing, the financial viability of the operational phase is a critical issue that requires special attention. The provinces will be responsible for the operation and maintenance of the facilities installed through the different project components. To such end, the roles and responsibilities of provinces, provincial regulators, QSPs and other stakeholders will be defined through relevant agreements. The financial sustainability of the operational phase will rely on the following funding:

(a) The FNEE, which consists of two different instruments: FEDEI[58] and FCT;

(b) Other counterpart resources. Several provinces have developed (or are designing) schemes to ensure that resources needed to co-finance O&M&R are available (for example, Tucumán and Santa Fé, have created a surcharge to mostly urban users to be used to fund the dispersed market; Salta and Jujuy have started to work on a similar scheme);

(c) Fees/tariffs paid by users will also contribute to finance O&M&R costs.

[58] FEDEI also receives transfers from the ITC.

23. The mechanism to distribute FNEE funds among all provinces is sound; it is established by law and has been operative for several years. While current tariffs for the dispersed market vary from province to province (covering from 10 percent—in San Juan, Tucumán—to 92 percent—Chaco—of total cost) and, hence, the relative size of the subsidy required is not uniform, the funding available for these purposes exceeds the requirement. For example, in 2012, only 14.2 percent of FCT funds were being used. The remaining 85.8 percent would allow the service of around 400,000 additional households, a figure that exceeds by far the expansion associated with the project.