Document of
The World Bank

Report No: ICR 1336

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD Loans 4454 and 7617 and GEF TF 020548)

ON

TWO LOANS AND A GEF GRANT

IN THE AMOUNT OF IBRD LOANS US$30 MILLION
AND US$50 MILLION
AND
A GEF GRANT FOR SDR7.2 MILLION

TO

THE ARGENTINE REPUBLIC

FOR A

RENEWABLE ENERGY IN THE RURAL MARKET PROJECT

June 26, 2013

Sustainable Development Department
Argentina, Paraguay, and Uruguay Country Management Unit
Latin America and the Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 15, 2013)

Currency Unit = Argentine Peso (AR$)
AR$4.95 = US$1
US$1.53 = SDR1

FISCAL YEAR
January 1–December 31

Abbreviations and acronyms

AF	Additional Financing	MTR	Mid-term review
CAS	Country Assistance Strategy	NCB	National Competitive Bidding
CO_2	Carbon dioxide	NGO	Non-Government Organization
EE	Energy Efficiency	NPV	Net Present Value
EIA	Environmental Impact Assessment	O&M	Operation and Maintenance
EIRR	Economic Internal Rate of Return	PAD	Project Appraisal Report
FCT	Tariff Compensation Fund (*Fondo de Compensación Tarifaria*)	PCU	Project Coordinating Unit
FEDEI	Electricity Investment Development Fund *(Fondo Especial de Desarrollo Eléctrico del Interior)*	PDO	Project Development Objectives
FM	Financial Management	PEA	Provincial Executing Agency
GEF	Global Environmental Fund	PERMER	Renewable Energy in the Rural Market Project (*Proyecto de Energías Renovables en Mercados Rurales)*
GHG	Greenhouse Gas	PG(s)	Provincial Government(s)
GOA	Government of Argentina	PRA(s)	Provincial Regulatory Agency(ies)
IBRD	International Bank for Reconstruction and Development	PV	Photovoltaic
ICB	International Competitive Bidding	RES	Renewable Energy System
ICR	Implementation Completion Report	RET	Renewable Energy Technology
IP	Implementation Performance	SDR	Special Drawing Rights
IPPF	Indigenous Peoples Planning Framework	SE	Secretariat of Energy
ISR	Implementation Status and Results Report	SHS	Solar Home System
KPI	Key Performance Indicators	TA	Technical Assistance
kW	Kilowatt	WHS	Wind Home System
kWh	Kilo-Watt-hour	Wp	Watt-peak
M&E	Monitoring and Evaluation	WTP	Willingness to Pay

Vice President:	Hasan Tuluy
Country Director:	Penelope Brook
Sector Manager:	Malcolm Cosgrove-Davies
Project Team Leader:	Lucia Spinelli
ICR Team Leader	Enrique Crousillat

ARGENTINA
RENEWABLE ENERGY IN THE RURAL MARKET PROJECT

CONTENTS

A. Basic Information			
Country:	Argentina	Project Name:	AR RENEW.ENERGY R.MKTS
Project ID:	P006043,P045048	L/C/TF Number(s):	IBRD-44540,IBRD-76170,TF-20548
ICR Date:	06/26/2013	ICR Type:	Core ICR
Lending Instrument:	SIL,SIL	Borrower:	GOVT ARGENTINA
Original Total Commitment:	USD 30.00M,USD 10.00M	Disbursed Amount:	USD 79.90M,USD 9.48M
Environmental Category: B,B		**Focal Area**: C	
Implementing Agencies: Secretariat of Energy Secretariat of Energy			
Cofinanciers and Other External Partners:			

B. Key Dates				
AR RENEW.ENERGY R.MKTS - P006043				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	06/30/1997	Effectiveness:	12/09/1999	12/09/1999
Appraisal:	04/24/1998	Restructuring(s):		02/01/2001 11/20/2002 09/02/2003 12/20/2003 06/14/2006 05/08/2007
Approval:	03/30/1999	Mid-term Review:		
		Closing:	09/30/2005	12/31/2012

AR-RENEWABLE ENERGY IN RURAL MARKETS - P045048				
Process	**Date**	**Process**	**Original Date**	**Revised / Actual Date(s)**
Concept Review:	06/30/1997	Effectiveness:		12/09/1999
Appraisal:	04/24/1998	Restructuring(s):		11/20/2002 06/14/2006 05/08/2007
Approval:	03/30/1999	Mid-term Review:		12/14/2001
		Closing:	09/30/2005	12/31/2009

C. Ratings Summary

C.1 Performance Rating by ICR

Outcomes	Moderately Satisfactory
GEO Outcomes	Moderately Satisfactory
Risk to Development Outcome	Moderate
Risk to GEO Outcome	Moderate
Bank Performance	Moderately Satisfactory
Borrower Performance	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)

Bank	Ratings	Borrower	Ratings
Quality at Entry	Moderately Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance	Moderately Satisfactory	Overall Borrower Performance	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
AR RENEW.ENERGY R.MKTS - P006043			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Moderately Unsatisfactory		

AR-RENEWABLE ENERGY IN RURAL MARKETS - P045048			
Implementation Performance	**Indicators**	**QAG Assessments (if any)**	**Rating:**
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	None
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Satisfactory		

D. Sector and Theme Codes

AR RENEW.ENERGY R.MKTS - P006043		
	Original	**Actual**
Sector Code (as % of total Bank financing)		
Renewable energy	89	95
Sub-national government administration	11	5
Theme Code (as % of total Bank financing)		
Other financial and private sector development	20	10
Other urban development	40	
Rural services and infrastructure	40	90

AR-RENEWABLE ENERGY IN RURAL MARKETS - P045048		
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Sector Code (as % of total Bank financing)		
Renewable energy	89	95
Sub-national government administration	11	5

Theme Code (as % of total Bank financing)		
Other financial and private sector development	20	10
Other urban development	40	
Rural services and infrastructure	40	90

E. Bank Staff

AR RENEW.ENERGY R.MKTS - P006043		
Positions	**At ICR**	**At Approval**
Vice President:	Hasan A. Tuluy	Shahid Javed Burki
Country Director:	Penelope J. Brook	Myrna L. Alexander
Sector Manager:	Malcolm Cosgrove-Davies	Danny M. Leipziger
Project Team Leader:	Lucia Spinelli	Ricardo S. Klockner
ICR Team Leader:	Lucia Spinelli	
ICR Primary Author:	Enrique O. Crousillat	

AR-RENEWABLE ENERGY IN RURAL MARKETS - P045048		
Positions	**At ICR**	**At Approval**
Vice President:	Hasan A. Tuluy	Shahid Javed Burki
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F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)
a.Provide rural areas with reliable electric supply in a sustainable manner, using renewable energy technologies, when feasible;
b.Support the creation of sustainable business operations for rural energy;
c.Support the expansion of private sector participation in the provision of electricity in rural areas and the corresponding strengthening of provincial government capacities to regulate that participation; and
d.Advance the reform of the energy sector in particular critical areas.

Revised Project Development Objectives (as approved by original approving authority)

Global Environment Objectives (from Project Appraisal Document)
a.Remove market barriers to application, implementation and dissemination of renewable energy sources; and
b.Reduce greenhouse gas (GHG) emissions by replacing small-diesel electricity generation and the use of candles, kerosene and gas cylinders and in lighting and other domestic uses with RES.

Revised Global Environment Objectives (as approved by original approving authority)

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Total number of households served by the project (Original + AF)			
Value (quantitative or Qualitative)			9355 (original) 18227 (AF)	27482
Date achieved			10/09/2008	12/31/2012
Comments (incl. % achievement)	99,6%			
Indicator 2 :	Number of PERMER private concessionaires (Original + AF)			
Value (quantitative or Qualitative)		5	4 (AF)	8
Date achieved		12/09/1999	10/09/2008	12/31/2012
Comments (incl. % achievement)	200%			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Avoided CO2 emissions			
Value (quantitative or Qualitative)			1339 (AF)	2263 (Af) 4628 (total)
Date achieved			10/09/2008	12/31/2012
Comments (incl. % achievement)	169% (AF)			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1 :	Installed Solar Home Systems in households (Original + AF)			
Value (quantitative or Qualitative)		65000	6200 (Original) 15575 (AF)	23456 (total)
Date achieved		12/09/1999	10/09/2008	12/31/2012
Comments (incl. % achievement)				
Indicator 2 :	Installed Solar Home Systems in public buildings (Original + AF)			
Value (quantitative or Qualitative)		1100 (original)	630 (AF)	2255 (total)
Date achieved		12/09/1999	10/09/2008	12/31/2012
Comments (incl. % achievement)	183%			
Indicator 3 :	Households served by mini-grids (Original + AF)			
Value (quantitative or Qualitative)		3500 (Original)	2552 (AF)	2277 (Original) 130 (AF) 2407 (total)
Date achieved		12/09/1999	10/09/2008	12/31/2012
Comments (incl. % achievement)	In the original project there was no specific target for households by minigrids			
Indicator 4 :	Installed solar systems in public buildings for thermal applications (Original + AF)			
Value (quantitative or Qualitative)			138 (AF)	350
Date achieved			10/09/2008	12/31/2012
Comments (incl. % achievement)				
Indicator 5 :	Installed solar systems in public buildings for water pumping (Original + AF)			
Value (quantitative or Qualitative)		30 (AF)		188
Date achieved		10/09/2008		12/31/2012
Comments (incl. %	626%			

achievement)				
Indicator 6 :	Number of operators under PERMER			
Value (quantitative or Qualitative)		16 (AF)		14
Date achieved		10/09/2008		12/31/2012
Comments (incl. % achievement)	87.5%			
Indicator 7 :	Number of residential systems operated by private concessionaires (Original + AF)			
Value (quantitative or Qualitative)		12950 (AF)		11485 (AF) 15714 (TOTAL)
Date achieved		10/09/2008		12/31/2012
Comments (incl. % achievement)	88,6% for the AF.			
Indicator 8 :	Number of systems for public buildings operated by private concessionaires (Original + AF)			
Value (quantitative or Qualitative)		151 (AF)		234 (AF) 667 (TOTAL)
Date achieved		10/09/2008		12/31/2012
Comments (incl. % achievement)				
Indicator 9 :	Average tariff subsidy for residential systems (%)			
Value (quantitative or Qualitative)		70		79
Date achieved		12/09/1999		12/31/2012
Comments (incl. % achievement)	112,9%			
Indicator 10 :	Average retail tariff for households (pesos/month/consumer)			
Value (quantitative or Qualitative)		10		14.75
Date achieved		01/17/2007		12/31/2012
Comments (incl. % achievement)	147,5%			
Indicator 11 :	Total installed capacity of solar home systems (kW) (Original + AF)			
Value (quantitative or Qualitative)			1690 (Original) 2300 (AF)	3406 Kw
Date achieved			10/09/2008	12/31/2012

Comments (incl. % achievement)	85%			
Indicator 12 :	Total installed capacity of WHS (kW) (Original + AF)			
Value (quantitative or Qualitative)			1047	809
Date achieved			10/09/2008	12/31/2012
Comments (incl. % achievement)	77,2%			
Indicator 13 :	Total installed capacity of RET minigrids (kW) (Original + AF)			
Value (quantitative or Qualitative)		3000	4640 (AF)	58
Date achieved		12/09/1999	10/09/2008	12/31/2012
Comments (incl. % achievement)	during the AF, mini grids were not a cost effective solution. therefore funds were allocated to other components.			
Indicator 14 :	percent certifications of installed systems			
Value (quantitative or Qualitative)		95		95
Date achieved		12/09/1999		12/31/2012
Comments (incl. % achievement)				
Indicator 15 :	Percent of complaints attended withoutsubsequent complains			
Value (quantitative or Qualitative)		90		98
Date achieved		12/09/1999		12/31/2012
Comments (incl. % achievement)	108,9%			

G. Ratings of Project Performance in ISRs

-						
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	06/16/1999	S	S	S	0.00	0.00
2	11/30/1999	S	S	S	0.00	0.00
3	05/18/2000	S	S	S	0.80	0.25
4	10/12/2000	S	S	S	0.90	0.30
5	02/25/2001	S	S	S	0.90	0.30
6	11/30/2001	S	S	S	1.61	0.62
7	03/13/2002	S	S	U	1.61	0.62
8	10/11/2002	S	S	U	1.61	0.62
9	02/04/2003	S	S	U	1.96	0.81
10	05/07/2003	S	S	U	1.96	0.81
11	05/09/2003	S	S	U	1.96	0.81
12	07/15/2003	S	S	U	2.21	0.81
13	12/08/2003	S	S	U	2.84	0.96
14	05/07/2004	S	S	U	2.89	0.99
15	05/28/2004	S	S	U	2.89	0.99
16	11/29/2004	S	S	U	3.81	1.07
17	04/28/2005	MS	MS	MS	3.94	1.11
18	06/11/2005	MS	MS	MU	4.44	1.13
19	06/29/2005	MS	MS	MU	4.55	1.13
20	11/09/2005	MS	MS	MU	5.73	1.27
21	06/02/2006	MS	MS	MU	7.64	1.29
22	06/29/2006	MS	MS	MU	7.76	1.38
23	11/27/2006	MS	MS	MS	9.98	1.54
24	06/06/2007	MS	MS	MS	11.94	1.68
25	12/04/2007	S	S	S	15.75	1.81
26	06/25/2008	S	S	S	20.77	1.99

27	12/16/2008	S	S	S	24.14	3.29
28	06/11/2009	S	S	S	26.93	4.51
29	12/16/2009	S	S	S	27.84	7.99
30	06/25/2010	S	S	S	34.51	9.48
31	02/22/2011	S	S	MS	41.13	9.48
32	08/10/2011	S	S	S	47.77	9.48
33	04/14/2012	MU	S	MS	62.68	9.48
34	11/17/2012	MU	S	MS	76.30	9.48

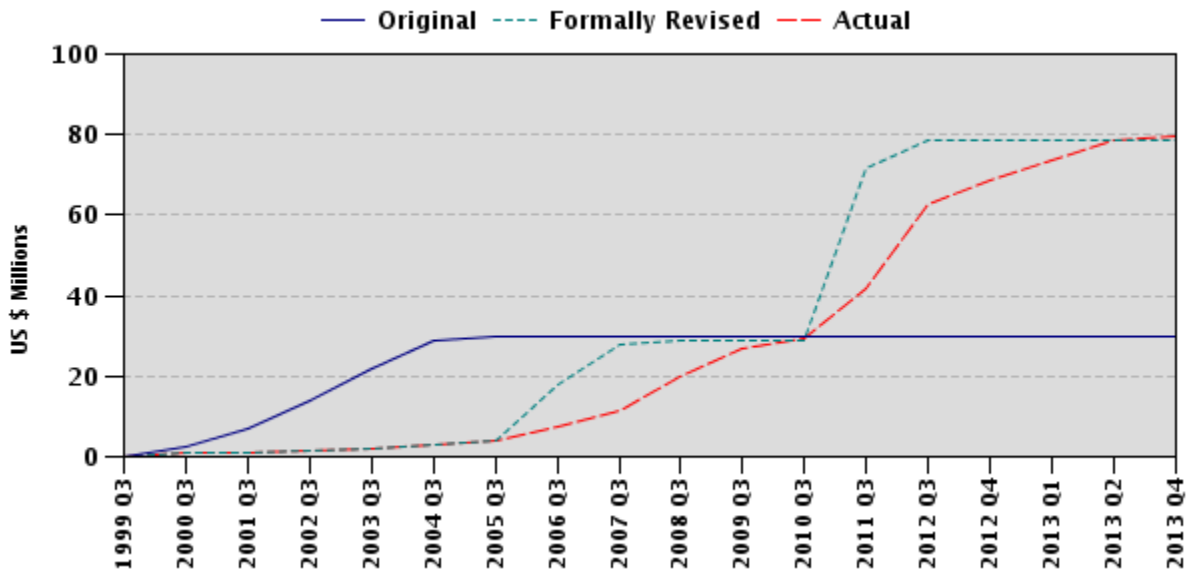
H. Restructuring (if any)

Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring			Amount Disbursed at Restructuring in USD millions		Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	
02/01/2001			S		S	0.90		Facilitate project implementation and involvement of concessionaries.
11/20/2002	N		S		U	1.61		Accelerate project execution and improve performance.
11/20/2002				MU			0.62	
09/02/2003			S		U	2.21		To increase project benefits to rural schools. Increased loan contribution to investment costs of soal systems in rural schools.
12/20/2003	N		S		U	2.84		
06/14/2006			MS		MU	7.76		
06/14/2006				MS	MU		1.38	
05/08/2007			MS		MS	11.41		(a) establish a new disbursement category and reallocate a portion of the proceeds of the GEF Trust Fund Grant assigned to Categories (1), (6) and (7) to said new disbursement category in order to finance with GEF Grand proceeds the acquisition and installation of wind systems connected to mini-grids under Parts A3 and A6 of te Project

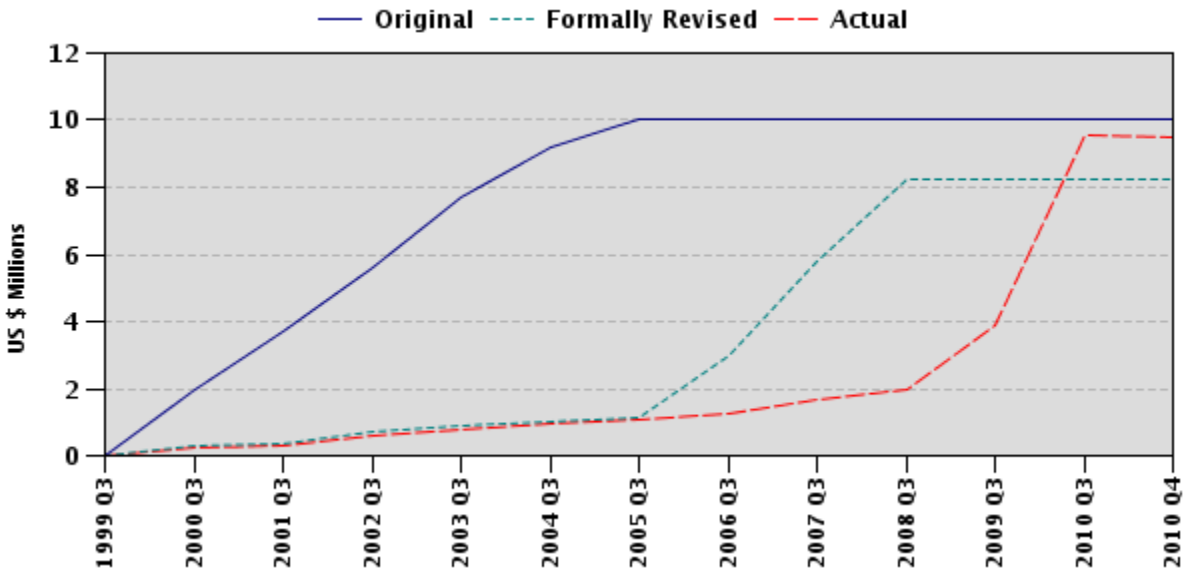
05/08/2007				MS	MS		1.68	(a) Establish a new disbursement category and reallocate a portion of the proceeds of the GEF Trust Fund Grant assigned to disbursement Categories (1) (a), (6) and (7) to said new disbursement category in order to finance with GEF Grant proceeds the acquisition and installation of wind systems connected to mini-grids under Parts A 3 and A 6 of the Project.

I. Disbursement Profile

P006043



P045048


Original
Formally Revised
Actual
US $ Millions
12
10
8
6
4
2
0
1999 Q3
2000 Q3
2001 Q3
2002 Q3
2003 Q3
2004 Q3
2005 Q3
2006 Q3
2007 Q3
2008 Q3
2009 Q3
2010 Q3
2010 Q4

1. Project context, development objectives, and design

1. The project, originally comprising an IBRD loan (4454) and a Global Environmental Fund (GEF) grant (TF 020548), was approved on March 1999 and became effective in December 1999. The original closing date—September 30, 2005—was extended twice before an Additional Financing (AF) loan (IBRD 7617) was approved in 2008. Subsequently, the closing date of the original loan was extended two more times, and the second loan was extended once. The economic crisis of 2001, which led to sustained fiscal austerity, reduced budget allocations for governments at all levels as well as for electricity subsidies in rural areas, delaying the implementation of the original project and making necessary a set of six amendments to the project's legal agreements in order to adapt it to the country's changing conditions and facilitate the implementation of the project.

1.1 Context at appraisal

2. By the late 1990s, the Government of Argentina (GOA) had made substantial progress in developing a competitive and efficient electricity market. The sector had been unbundled at the federal level, a well-functioning regulatory system had been established, together with an ambitious privatization process, and the sector was achieving high outputs at low utility rate levels. Privatization at the provincial level was underway. These measures, however, were largely oriented to benefit the urban population, which had been traditionally served by federal and provincial public enterprises. There was much yet to be done to address the needs of the mostly poor rural population and to introduce renewable energy systems (RES). Four main issues associated with the rural sector were:

- There were 2.5 million people (8 percent of Argentina's population) living in dispersed rural areas with no access to electricity.
- Providing electricity in dispersed areas implied high investment costs.
- Provincial governments (PGs) had limited financial capability to address the rural electricity challenge; and
- Provincial regulatory agencies (PRAs) were particularly weak.

The GOA strategy to address these issues comprised:

- Creating a regulatory and policy environment to encourage private sector participation in providing electricity to rural areas;
- Improving the efficiency of energy services delivery; and
- Strengthening the institutional and technical capability of PRAs.

3. The project aimed at supporting the Government's rural energy strategy. It was part of the Bank's country assistance strategy (CAS – Report # 1605-AR, April 24, 1997) as it was designed to support the promotion of private sector investment in infrastructure as well as the development of an appropriate regulatory and policy framework for the power sector. At the same time, the project focused on the rural poor and promoted environmentally sustainable management of natural resources.

4. The project's GEF component was justified on the grounds of the GEF Climate Change Operational Program #6, "Promoting the adoption of renewable energy," since its goal was to remove barriers to the adoption of such technologies and reduce implementation costs. GEF support was aimed at reducing information barriers for both investors and customers, addressing high initial costs barriers to Renewable Energy Systems (RES), and training the regulatory agencies in the monitoring of renewable energy operations of concessionaires.

5. A second IBRD loan (AF, IBRD 7617) was appraised and approved in 2008, once the country had recovered from the crisis of the early 2000s. The original project had established a positive track record, and there was a high and growing demand for its rural access outputs.

1.2 Original Project Development Objectives (PDO) and key indicators (as approved)

6. The Project Development Objectives, as approved in 1999, were:
   a. Provide rural areas with reliable electric supply in a sustainable manner, using renewable energy technologies, when feasible;
   b. Support the creation of sustainable business operations for rural energy;
   c. Support the expansion of private sector participation in the provision of electricity in rural areas and the corresponding strengthening of provincial government capacities to regulate that participation; and
   d. Advance the reform of the energy sector in particular critical areas.

7. The Global GEF objectives were:
   a. Remove market barriers to application, implementation, and dissemination of renewable energy sources; and
   b. Reduce greenhouse gas (GHG) emissions by replacing small-diesel electricity generation; use candles, kerosene, and gas cylinders in lighting and other domestic uses with RES.

8. A set of thirty-eight performance indicators was originally agreed upon and incorporated into the Project Implementation Plan. These were subsequently aggregated (see section 2.3).

1.3 Revised PDO (as approved by original approving authority), key indicators, and reasons/justification

9. The crisis of 2001 made necessary several revisions to the project's design in order to adapt to the country's changing conditions and facilitate the implementation of the project. These revisions were reflected in a set of six amendments to the legal agreements. Whereas the original PDOs as well as most of the project's activities remained unchanged, greater emphasis was given to specific components (e.g., school electrification and residential solar home systems-SHS), and additional components were added (e.g., thermal applications and water pumping in public buildings), while the emphasis on a private oriented reform was reduced. Correspondingly, the objectives of

the AF were slightly modified[1], and new and more specific key performance indicators (KPI) were added.

1.4 Main beneficiaries

10. The beneficiaries of the project identified at the design stage were the thousands of low-income households located in the rural dispersed areas of at least eight Argentine provinces. The project was finally implemented in almost the whole country (19 provinces). It was also expected that the project would benefit the private sector in enabling the creation of sustainable business operations through concessions and the expansion of the market for renewable energy equipment, since part of this equipment is produced by local industries. Also, central and provincial governments were expected to benefit through the achievement of their rural electrification targets.

11. While on a relatively limited scale, the project was also expected to provide global benefits through the reduction of greenhouse gas (GHG) emissions.

1.5 Original components (as approved)

12. The project's components originally approved in 1999 were the following:

a. Installation and operation in about eight provinces by private concessionaries of: (i) solar home systems (SHS) in about 65,500 dispersed rural households; (ii) small off-grid electricity generating units (with output range of 3 kW to 10 kW each) based on RES, namely photovoltaics, small wind turbines and mini-hydro plants, and diesel units to supply about 3,500 households living in agglomerated villages; and (iii) about 1,100 RES to provide electricity to provincial public institutions (schools, medical centers, police stations);

b. Installation of pilot wind home systems in two communities; and

c. A capacity building program consisting of technical assistance to facilitate: (i) the implementation of the program; (ii) the consolidation of power sector reforms in the country; and (iii) the development of the technical and institutional capabilities required for broader adoption of RES, together with a training program to strengthen the capacity of the provincial regulatory agencies.

1.6 Revised components

13. Following the impact of the economic crisis of 2001 and arising needs for specific renewable energy uses, the project's components were revised on several occasions. These revisions made necessary the amendment of legal agreements and were reflected also in the components of the additional financing (AF) approved in 2008. Building on steady improvements in the implementation performance of the original loan, the AF operation was aimed at expanding significantly the scale and geographical scope of the project. It also included new renewable energy components, such as 140 solar-thermal systems and 30 solar powered water pumps.

[1] The original PCOs (c) and (d) were replaced by: "support the strengthening of private sector participation in the provision of electricity in rural areas of the participating provinces…" and "support studies by the borrower of critical energy sector issues," respectively.

1.7 Other significant changes

14. In response to the implementation problems encountered as a result of the crisis, the legal agreements were amended six times to achieve a more flexible and robust service model better aligned to the true capacity of public and private entities. Amendments focused mostly on allowing a broader set of concessionaires (incorporating public entities), incorporating renewable technology options, and increasing the contribution of the IBRD loan and GEF grant in the financing of the upfront costs of the systems. The following table presents a summary of the amendments:

#	Date proposed	Objective	Main changes
1	2/2001	To facilitate project implementation and the involvement of concessionaires	Allowed payment of IBRD/GEF subsidy upon SHS purchase by private concessionaires, instead of upon system installation.
2	11/2002	To accelerate project execution and improve its performance (addressing budget constraints of governments.	Increased the Bank pari pasu in the financing of solar home systems (SHS), technical assistance and least-cost decentralized electricity systems using renewable energy; increased the number and capacity of SHS from 100 to 1,500 households and output from 50W to 100-300W; allowed financing of equipment needed by the Provincial Implementation Units.
3	9/2003	To increase project benefits to rural schools.	Increased loan contribution (from 40 percent to 80 percent) to investment costs of solar systems in rural schools and other rural public installations and allowed the installation and operation & maintenance (O&M) of these systems by provincial governments.
4	4/2005	To overcome difficulties in attracting private concessionaires in rural areas and adapt to technology changes and new demand.	Allowed installations by electricity service providers other than private concessionaires; allowed financing of solar thermal systems; increased Bank contribution to decentralized system; a broader use of the GEF grant; and changed currency of GEF grant from SDR to US$.
5	6/2006	To accelerate project execution, addressing institutional obstacles and the availability of local funds	Increased loan contribution to SHS investment costs (to 100 percent); allowed central procurement when requested by concessionaires/local government; included community potable water pumping as an eligible public service for financing; and revised implementation plan and KPIs.
6	10/2007	To address demand for wind mini-grids.	Reallocated GEF grant proceeds to a new disbursement category in order to finance the acquisition and installation of wind turbines connected to mini-grids.

15. The crisis of 2001 had a major impact on the project's implementation progress during the early 2000s, causing severe budget cuts, delays, and the need to make significant revisions to the delivery model. Consequently, the closing date for the first IBRD loan and GEF grant was extended four times. The implementation period was extended considerably, from six years and five months to twelve years and nine months (including the AF) and ten years and nine months, respectively. The closing date of the AF operation was extended once, from December 2011 to December 2012. All extensions were justified in terms of the need to ensure the achievement of project development objectives.

2. Key factors affecting implementation and outcomes

2.1 Project preparation, design, and quality at entry

16. The project was prepared and designed during a period of thorough economic reform among most Latin American countries. In Argentina, the reform was characterized by the promotion of private sector investment in infrastructure and, in the power sector, the development of an appropriate regulatory framework supporting a competitive electricity market. Within this context, the project was conceptualized as one more step in consolidating the reform. The Government opted for a private-sector oriented approach that relied heavily—and exclusively—on private concessionaires that would contribute to the operation and also to the financing of the project.

17. As noted, the project was proposed as part of the Bank's Country Assistance Strategy (CAS – Report # 1605-AR, April 24, 1997), and consistent with the GEF objectives. It was designed to address the following issues:

- Lack of access of rural populations to energy supply at a cost and rate level that is affordable by the provincial governments and in particular by poor consumers;
- High up-front costs and lack of local information and experience in using renewable energy systems (RESs); limited capacity of provincial governments (PGs) and provincial regulatory agencies (PRAs); and
- Fine tuning of the electricity policy and strengthening of the institutional framework.

18. Along the lines of the trends of the late 1990s, the private concession approach for off-grid services was perceived to have many potential advantages, such as mobilizing fresh and additional human and financial resources while moving towards a more competitive and efficient energy service delivery. Accordingly, the financing plan of the project proposed the following contributions:

Players	Financing Contribution (%)
Private concessionaires	36
Governments, national and provincial	22
Customers	9
IBRD and GEF	33

19. The legal framework established for the implementation of the project included Implementation Agreements between the GOA and each province and a contractual agreement between the province and each concessionaire. These agreements established the conditions of GOA support to the provinces (e.g., financing, funding for subsidies) as well as the obligations of provinces and concessionaires, including compliance with agreements with the World Bank, requirements for quality of service, etc.

20. The Bank's participation was justified as a necessary complement to the financing plan, particularly in supporting capital investments. The Bank's expertise and international experience were equally important in pioneering a large-scale delivery mechanism for renewable energy services. It was also considered that the Bank's presence would help ensure transparency in awarding concessions and ensuring that the project was designed and implemented within the framework of the reformed electricity sector. Global Environmental Fund (GEF) involvement was considered necessary for a more rapid implementation and penetration of renewable energy technologies.

21. The three components of the original project (section 1.5) were designed to address the following market barriers: (i) need for substantial investment resources; (ii) insufficient information for prospective concessionaires; (iii) risks associated with the market acceptance of relatively new renewable energy technologies; and (iv) limited capacity of PGs and PRAs to supervise project progress and technical assistance. It was perceived that the project's success would depend on its capacity to overcome said barriers. No other risks were contemplated.

22. The design process took into account alternative courses of action regarding delivery mechanisms, technical, and financial aspects, as well as incorporating lessons derived from Bank studies and ongoing projects.[2] It was acknowledged at the outset that there was a need for subsidies and it was agreed to finance them through the Electricity Investment Development Fund (FEDEI)[3], the IBRD loan (through the Government of Argentina) and the GEF grant. A 50 percent subsidy was proposed for the initial investment and it was agreed that any gap that may arise in the financing of subsidies to

[2] Lessons learned include the Bank's recent experience in financing SHSs, the implementation of small power purchase agreements, economic and financial analysis of rural electrification projects, demonstration efforts in renewable energy technologies, and incentives systems (taxes, duties and subsidies) consistent with long-term objectives.

[3] FEDEI for its Spanish name: Fondo Especial de Desarrollo Eléctrico del Interior. This fund covered investment costs. Operating and management (O&M) costs were subsidized partially through utility rates by the Tariff Compensation Fund (FCT).

consumers, excluding operating and maintenance costs, would be closed by the provincial governments using FEDEI funds.

23. At the time of project preparation, the GOA had almost completed the reform of the national power sector and had initiated the implementation of an Electric Supply Program for the Rural Dispersed Population. These two factors were considered to be clear indications of the GOA's commitment and ownership of the project. Furthermore, eight provinces had become participating provinces by signing letters of intent, and market studies were underway in four of them. Also, an international workshop with about 60 private investors, Provincial Rating Agencies, and NGOs was held.

24. While it could be argued that the design of the project incorporated the most recent experience in developing renewable energy resources in rural areas and certainly reflected the conceptual reality of its times, it also had a few shortcomings that became major obstacles during implementation. The project's delivery model assumed the continuation of the ongoing reform and provided very little room for flexibility in case conditions changed. This lack of flexibility was reflected in the fact that the model relied fully and exclusively on the role of private concessionaires and on acceptance of a rigid list of technology options. While it is fair to say that the preparation of a sector project was not the most effective channel to foresee the eventual collapse of the country's economic and political model—nor it is expected that it should have done it— country risk was absent from the design process, as well as the possible demand for other renewable energy technologies.

25. Another shortcoming in the design of the project was the absence of clearly defined eligibility criteria to choose or establish priorities/amounts to be assigned among the beneficiary populations and provinces. While this lack of definition introduced into the project's design a degree of flexibility that allowed an early start in some provinces, it led also to a first come first serve process, wherein the institutionally stronger regions could benefit more in spite of the policy orientation of the project.

2.2 Implementation

26. The economic crisis that impacted Argentina between 2001 and 2003 led to sustained fiscal austerity that resulted in reduced budget allocations to the project as well as diminished subsidy support from the FEDEI and the Tariffs Compensation Fund (FCT). It also meant a shift in the Government of Argentina's economic policy, moving away from a private sector-oriented strategy. The austerity measures also weakened the organizational structure of the Secretariat of Energy (SE) and the Project Coordinating Unit (PCU), reducing the number of employees in key functions and causing serious delays in the project's implementation. Other factors contributing to a slow implementation were a complicated approval process at the provincial level and a considerable increase in the cost of photovoltaic systems.

27. A Bank supervision mission held in the midst of the crisis (November 2002) provided the following snapshot in its Implementation Status and Results Report (ISR #8), that illustrates the gravity of the situation: (i) absence of a local budget which caused

major delays in procurement and debilitated implementation capacity; (ii) cancellation of contracts because of the lack of funds to support the necessary subsidies and the impact of the local currency devaluation on the financial viability of the agreements; (iii) postponement of agreements with concessionaires due to uncertainties associated with rates; (iv) frozen distribution rates. Overall, the most important impact of the crisis was the fact that the business environment deteriorated drastically and, hence, the delivery model based on private concessionaires was no longer viable nor did it have political support. This was aggravated by a set of inflexible characteristics of the project design, requiring a departure from such an approach, restructuring the project, and moving toward a more pragmatic and flexible model that allowed the participation of cooperatives and public entities as concessionaires, a greater contribution of the Bank in the financing plan (see Annex 1), and a broader set of technology options.

28. While the project faced a crisis of large magnitude and exogenous nature, the fact that it went through six amendments, instead of two or three, casts doubts on whether the Bank did a comprehensive assessment of the situation and suggests that it was following a trial and error approach.

29. As events played out, the first IBRD loan had an implementation period of 12 years and 5 months, an unusually long period that meant an overall extension of almost 100 percent. The magnitude of the delay was such that by April 2005 (i.e., six months before the original closing date) project disbursements had reached only 12.6 percent. This extremely long implementation period brought considerable costs such as the late delivery of the project's benefits and the economic burden that this entailed, and much higher supervision costs for government agencies and the Bank itself. . As the mid-term review (MTR) was carried out in December 2001, i.e., at the moment when the country plunged into a devastating economic crisis and the project had not really taken off, such an early review yielded limited benefits.4 It is important to consider, however, that rural access is, by nature, a medium- to long-term effort due to the multiplicity of actors involved, the isolated areas to be covered, and the need to assure a behavioral change in rural populations.

30. The delay, however, also brought some benefits. Thanks to the successive extensions, the project had time to revamp its delivery model, rebuild its implementing capacity and, most important, as early results—particularly in the province of Jujuy—made evident the potential benefits of the project, Government of Argentina ownership was regained and other provinces became seriously interested. This is a common trend in rural access operations. That is, the longer than usual implementation period gave room for the dissemination of early results and the subsequent growth of demand for renewable energy services through a model better adapted to the capacity (technical and financial) of concessionaires, local governments, and customers. While by 2003 only the province of Jujuy had shown some tangible progress, fifteen provinces became actively engaged

[4] While the MTR of December 2001 identified a set of constraints associated with the crisis, such as the provinces' need for greater support from the GOA and the need for some amendments to the legal agreements, it failed to acknowledge that the PDOs could not be achieved on time. Also, serious budget problems surfaced in mid-July, after the MTR was held.

during the last years of the project as they were encouraged—and drew lessons—from Jujuy's success.

31. An important and very successful component not foreseen in its full magnitude at the design stage was the provision of solar home systems (SHS) and thermo-solar systems for more than 2,000 schools and public services in 13 provinces. This component required an investment of US$25.5 million, of which US$20.4 million were funded by the two IBRD loans, US$4.6 million by a new participant, the Ministry of Education, and US$0.5 million by provincial governments. The provision of renewable energy systems (RES) in schools is enhancing the quality of education services and operations, as well as constituting an effective dissemination of SHS and hot water benefits.

32. Given the steady improvements in the project's performance and disbursement rates following the project restructuring and a recovering economy, the project's Implementation Performance (IP) was upgraded to "moderately satisfactory" in November 2006, and to "satisfactory" in December 2007. The project established a solid track record that, together with a growing demand for its outputs, justified the scaling-up of the operation. Consequently, a second IBRD loan (AF) for US$50 million was approved in December 2008. Since then, the project maintained a good performance—though with some temporary exceptions—in almost all aspects, moving on track towards achieving its development objectives. In fact, the AF doubled the project's benefits within a short time frame that contrasted with the implementation record of the original loan. An AF was opted for, instead of a new free-standing operation, in order to minimize the disruption that a more abrupt transition could have had on a project that had built the required institutional capacity and was already performing well.

33. Annex 1 presents the originally planned (at appraisal) and actual figures for the project's costs and financing. These figures make evident the consequences of the project restructuring, i.e., a considerable increase in the Bank's participation (IBRD and GEF, from 33 percent to 95 percent) in the financing plan and a drastic reduction in the local contribution, including an almost negligible contribution of private concessionaires. It also shows a significant demand-driven shift in the use of the GEF grant for wind systems in contrast to its original plan to support solar home systems (SHS). Overall, the project addressed the needs of more than 30,000 customers in fifteen provinces according to the following distribution: 25,071 residential SHS; 1,894 SHS in schools; 361 public services; 2,407 in mini networks (solar, wind power, micro-hydro but mostly diesel units); 350 solar thermal (mostly in schools) and 188 solar pumping.

34. A technical assistance component comprising a large number of studies was implemented in support of the project (market and feasibility studies for provinces, project dissemination programs, surveys, energy productive uses) and to address specific energy policy needs of the Secretariat of Energy—SE (e.g., daylight savings time policy, promotion of hydroelectricity, energy efficiency, regulation and utility rates studies).

2.3 Monitoring and Evaluation (M&E) design, implementation and utilization

35. At negotiations, a set of Key Performance Indicators (KPI) were agreed upon and incorporated into the Project Implementation Plan. These KPI addressed eleven specific objectives that were consistent with the PDO but did not match their structure. The original 38 KPIs were not fully quantifiable nor did they always include precise target values for their proper monitoring. As project implementation advanced and amendments were made, the PCU proceeded to focus on the indicators that were quantifiable. To this end, data were submitted to the provincial governments by the concessionaires, cooperatives, and/or public utilities responsible for the implementation of the project in each province, and were subsequently submitted to the PCU. These data were included in the quarterly reports received by the World Bank and incorporated into the implementation status and result reports (ISRs).

36. The fifth amendment of the legal documents in 2006 included a revised set of KPIs. This adjustment implied a considerable improvement that involved a fine-tuning of the indicators with a better alignment to the PDO, and established clear quantifiable targets. The approval of the AF operation in 2008 implied the incorporation of a new set of indicators within the same structure (presented in Annex 2). It should be noted, however, that KPIs did not seem to fully keep pace with revisions to the project design, as evidenced by the fact that at project-end, some indicators for areas where there was no demand, or which had proven ineffective, remained unchanged.[5]

2.4 Safeguard and fiduciary compliance.

37. **Environment**. While the project is expected to yield environmental benefits associated with the reduction of GHG emissions, it was recognized at appraisal that the provision of RES could have minor negative environmental impacts related to the installation of specific technologies and the management of wastes generated by the maintenance and repair of equipment. Hence, the project was assigned an Environmental Category B in accordance with OP 4.01, triggering the environmental assessment safeguard. It was agreed at negotiations that all environmental concerns would be dealt with in the concessionaires' contract, which would include: (i) procedures for the recycling or proper disposal of batteries used in SHS and WHS; (ii) procedures for the disposal of solar cells; (iii) environmental siting criteria for micro-hydro schemes; and (iv) procedures for storage, handling, and disposal of diesel fuel. These procedures were also included in community information programs for the rural population. The actual implementation of the project did not include a micro-hydro system, thus reducing considerably the complexity of its environmental impact.

38. Environmental safeguard compliance was rated satisfactory throughout the whole implementation of the project. However, an assessment undertaken by the Bank in early 2011 concluded that some sub-projects, particularly mini-grids, could have environmental and social impacts broader than what was foreseen at the design stage. Given the advanced stage of implementation it was decided not to restructure the project

[5] Such as RET-based mini-grids and wind home systems.

in this respect. Instead, the supervision of ongoing sub-projects was strengthened— including a more rigorous review of Environmental Impact Assessment (EIA)— and data was systematized. No negative impacts were detected.

39. **Social.** Project preparation included extensive consultations with the public and private sectors. A framework for a disseminating and consultation strategy was agreed upon at this stage. Such a strategy, which was targeted to various rural customers, covered the dissemination of project characteristics as well as mechanisms for customers' participation in O&M and the monitoring of the sub-projects.

40. As noted, originally the project did not trigger any social safeguards. However, Bank supervision missions concluded that the project was likely to have a broader impact than originally expected and should have triggered additional safeguards (i.e., indigenous people, involuntary resettlement). Consequently, the Additional Financing triggered OP 4.10 on Indigenous Peoples, and the Bank proceeded to intensify its supervision and dialogue on these subjects with the support of local specialists. Considering that in several provinces some beneficiaries belong to indigenous peoples, a framework for the management of indigenous populations was developed in order to guarantee an open consultation process tailored to the characteristics of their culture.

41. **Procurement**. Procurement activities were carried out in accordance with World Bank guidelines. The original plan considered that the physical components of the project would be implemented by the private sector in a decentralized manner. It was contemplated that for concessions procured under the project, the concessionaire would follow its own procurement rules, while concessions procured before 1999 would have to follow the Bank's guidelines. In practice, the second case applied since no new private concessions were procured during the project. Procurement methods applied for goods and their installation were International Competitive Bidding (ICB, for the selection of new concessionaries and goods above a specified threshold), National Competitive Bidding (NCB, for goods and installation) and prudent shopping for smaller packages. Drawing lessons from early experience, a set of Special Procurement Provisions were agreed upon for the AF. These focused mostly on improved procurement planning, disseminating, and monitoring.

42. While the procurement performance of the project is regarded as moderately satisfactory, it was not free of problems. Like the rest of the project, procurement activities had a slow start aggravated by the cancellation of one contract and major delays caused by the lack of counterpart funds associated with the 2001 crisis. Also, institutional weaknesses in several provinces caused delays in the procurement of goods. Consequently, centralized procurement of goods was approved in mid-2006 (Fifth Amendment to legal documents) in order to address capacity constraints and to seek the benefits of economies of scale. Procurement performance ratings were downgraded to moderately unsatisfactory on two occasions after post-review exercises revealed the persistence of staff/resource weaknesses. However, these weaknesses were overcome as teams were strengthened. The process benefited also from the local support of Bank procurement specialists.

43. **Financial management**. The financial management (FM) arrangements for the project were assessed during appraisal and found satisfactory. FM arrangements were implemented in an adequate manner and maintained in similar fashion throughout the life of the project, thus guaranteeing the proper use of the loans and grant proceeds. Annual consolidated financial reports were submitted to the Bank in a timely manner in compliance with the World Bank's accounting policies and internal control procedures.

44. External audits of the project financial statements were submitted on a regular basis although with some delays during the initial years. The audits were satisfactory. While in some exceptional cases audits were qualified (due to the temporary use of the special account to cover local counterpart costs), no weaknesses were found in internal controls.

45. The provision of counterpart financing was satisfactory with the exception of the crisis period, when it became one of the many obstacles to procurement activities and contributed to delays.

2.5 Post-completion operation/next phase

46. The project has succeeded in installing renewable energy systems to provide electricity to more than 25,000 households, using SHS, WHS, mini-grids and a variety of public services. The sustainability of these installations will rely on two main factors: (i) a regulatory framework that provides a set of adequate incentives through electricity rates that cover fully the operational costs and subsidies funded by secure sources; and (ii) an effective operation and maintenance (O&M), and customer service, to guarantee an appropriate quality of service.

47. The project will be operated within a stable institutional framework defined by the Participation Agreements signed by each province and the Concessions Contracts that establish the responsibilities of various parties in guaranteeing the necessary funding as well as in providing satisfactory operations and management. The project has helped in establishing said regulatory system at the provincial level. Cost-based rates have been set and subsidies established, taking into account the capacity to pay of rural customers in each of the provinces involved.[6] Provincial regulatory agencies have strengthened their capacity and subsidies are being funded through the FEDEI and FCT. Hence, the post-completion sustainability will rely mostly on the second factor: an adequate operation, maintenance and commercial service of the existing installations. In this respect, the clear definition of a responsible operator has proven to be a key factor for satisfactory service. The experience of provinces that reached the operational stage earlier, as well as the role of the PCU in disseminating this knowledge, will be of utmost importance. However, it should be noted that the model or models being used have yet to be tested in most provinces. Saving the institutional differences of the delivery models adopted from

[6] Each province sets its subsidy levels, which range from around 20 percent to 80 percent of the operating and maintenance costs, depending on their policies and specific rural socio-economic conditions. The sustainability of this scheme depends on a well-established regulatory framework (strengthened by the project) and its reliable funding sources.

province to province, the early and successful experience of Jujuy and other provinces in addressing the logistical challenge of O&M is being used by others in designing their operations. Further dissemination of good practices may be needed to help ensure the project's sustainability.

48. It is important to mention that, as a result of the positive development outcomes of the project and the increased demand that this has generated, the Government of Argentina has requested a follow-up operation. Preparatory work is underway. This new operation would guarantee institutional continuity and further strengthening of implementing and operating capacity.

3. Assessment of outcomes

3.1 Relevance of objectives, design and implementation

49. The project's outcomes continue to be relevant, particularly given current country priorities and the high demand for renewable energy systems revealed in most provinces during the last stages of project implementation. There are still isolated rural populations that lack electricity. Within this context, the project has proven to be a valuable option in responding to electricity access in rural areas. Multiple expressions of interest—from provincial governments, concessionaires, utilities and customers—for the continuation/expansion of the project confirm this relevance.

50 The project's design reflected an ambitious effort to develop renewable energy in rural areas with a strong emphasis on private sector development. This approach proved to be unworkable when the impact of the 2001 crisis was felt. However, the viability and relevance of the delivery model was restored through the restructuring measures noted above, de-emphasizing the private development component when there was no existing concessionaire while maintaining the essence of its objective: achieving an efficient and sustainable delivery model for renewable energy services in dispersed markets.

51. The project's focus and progress in implementing renewable energy technologies, and its technical support to facilitate this progress remain fully consistent with GEF's medium- to long-term objectives of reducing greenhouse gas (GHG) emissions.

3.2 Achievement of project development objectives

52. As noted above, the project's amendments and additions were reflected in an adjusted set of KPI presented in Annex 2. Overall, the project satisfactorily met most of the targets with the exception of the renewable energy technology (RET)-based mini-grid component, where its cost effectiveness was overvalued at the design stage and, subsequently, funds were allocated to other components (namely, solar home systems). Overall, the shortfall in achieving the original targets—particularly with respect to the total number of households reached and solar home systems installed—is explained by the reduced resources allocated, which dropped from the US$120 million to US$100 million, in spite of the AF, as the local contribution was significantly reduced. A quantitative estimate[7] of the project's achievements provides the following figures:

[7] ESIN Consultora S.A.–Trama TecnoAmbiental S.L. 2013. Consultoría Evaluación Final del PERMER.

Project output[8]	Compliance with KPI (weighted average)[9]
1. Increase access to electricity services and quality of associated uses for rural population	77.7 percent
2. Increase private sector participation in off-grid rural electricity market	73.9 percent
3. Improve subsidy allocation in off-grid rural electricity initiative	96.5 percent
4. Increase renewable energy use and reduce CO_2 emissions (Global Environmental Objective Indicators)	61.2 percent
5. Strengthen regulatory framework associated with off-grid electricity service	94.8 percent

3.3 Efficiency

53. An ex-post economic evaluation of the project, using actual data on costs, early benefits, and the most recent market studies, yielded the following results (details in Annex 3): an economic internal rate of return (EIRR) of 11.2 percent and a net present value (NPV, at 10 percent discount rate) of US$1.14 million. These results are based on a conservative forecast for future energy consumption (14.5 kWh per month per household). In the case that such consumption should reach 24 kWh/month, as some surveys suggest, the EIRR would reach 21.2 percent; and the NPV, US$11.1 million, indicating the high sensitivity of the project's economics to the future consumption of solar energy. The results obtained are similar to the estimates at appraisal, which gave an EIRR of 12.1 percent and NPV of US$5.1 million. It should be noted, however, that the major delays experienced by the project—caused mainly by an inflexible design that hampered the project's capacity to react upon a crisis—had a negative impact on its efficiency as benefits were delayed considerably.

54. There was no similar evaluation at the design stage regarding mini-grids, renewable energy services to public buildings, or wind home systems (the latter, proposed as a pilot project). Regarding the financial evaluation, given that the provision of energy to dispersed areas relies heavily on subsidies, the financial cash flow is not expected to yield a financial rate of return with acceptable values. In particular, the financial analysis for SHS would only yield cash benefits from replacing artisanal lighting and the purchase of batteries, which do not capture the benefits of improved and additional electricity source.

3.4 Justification of overall outcome rating

Rating: moderately satisfactory

[8] In should be noted that the outputs and corresponding indicators that were actually monitored are, overall, consistent with the PDOs, including the global GEF objectives (linked to output 4). The exceptions are PDO (d) (advance the reform of the energy sector in particular critical areas) that was de-emphasized. Instead, output 3 was incorporated as an indicator of operational sustainability.

[9] Averages assigned equal weights to all performance indicators except for Development Objective 1, where weights were assigned proportional to scale of each component (e.g., residential SHS, public services SHS, WHS).

55. Taking into account the confirmed relevance of the project's objectives, the progress made in achieving most of these objectives, and the positive results to date in accomplishing a sustainable delivery model, the overall outcome rating is considered moderately satisfactory.

56. It spite of having recovered from the negative impact of the 2001 crisis, the rating is not satisfactory because the project did not achieve its development objectives fully, particularly with respect to its private development component and its shortcoming in developing the proposed RET-based mini-grids component. Also, it took an excessively long implementation period that delayed benefits and increased supervision costs, and procurement delays jeopardized temporarily the achievement of the project's development objectives.[10]

3.5 Overarching themes, other outcomes and impacts

(a) Poverty impacts, gender aspects, and social development

57. The project provided access to electricity to more than 25,000 rural households (around 100,000 people). The market studies undertaken among these beneficiaries reveal the potential for considerable improvement in their quality of life associated with the benefits of better and more reliable lighting and communications. This potential was confirmed by the early assessment carried out by the PCU.[11] Also, the provision of hot water to schools and thermal stoves has proven to be particularly beneficial. The provision of electricity has meant considerable savings stemming from the substitution of renewables for traditional energy sources, which amount on average to around US$200 per year per household. Considering that the rural customers reached by the project are mostly poor, said benefits are expected to have a significant impact on reducing poverty.

(b) Institutional change/strengthening

58. All parties recognize that, overall, the effort in implementing the project during a difficult period, including the adoption of international standards in procurement and financial management, as well as a rigorous monitoring and evaluation and treatment of social and environmental safeguards, have contributed considerably to strengthening the capacity of the implementing agencies for dealing with investment projects in rural areas, both at the centralized level and in the provinces.

(c) Other unintended outcomes and impacts (positive or negative)

59. None were detected

10 In fact, the project was rated MU for DO during its last year due to alarming procurement delays. This low DO rating was kept until real outputs were achieved.
11 ESIN Consultora S.A. – Trama TecnoAmbiental S.L. 2013. Consultoría Evaluación Final del PERMER.

3.6 Summary of findings of beneficiary survey and/or stakeholder workshops

60. Annex 6 summarizes the conclusions and recommendations of a workshop held in November 2012 with the participation of the provinces involved in the project plus the PCU.

4. Assessment of risk to development outcome and global environment outcome

Overall rating: moderate.

61. As noted above (section 2.5), the sustainability of the project's outcome (the benefits from providing renewable energy services in rural areas) will depend on an adequate regulatory framework that provides the right incentives through electricity rates and securely funded subsidies, and an effective operations and management and customer services. The project will operate within a stable institutional environment characterized by strengthened provincial regulatory agencies and generally well-established concessionaires. Hence, risks to the development outcome will depend mostly on the provincial operating entities and concessionaires' capacity to address the technical and logistical complexities of providing a satisfactory O&M service. While the effectiveness of models adopted for these purposes has not been fully demonstrated, considering the success of early implementation experiences, particularly in Jujuy, and the diversity of institutional and logistical models being adopted, the risks of a decline in project benefits is deemed to range from low to moderate.

GEF rating: moderate

62. Same as above. Also, the Government of Argentina's commitment to continued development of renewable energy systems in rural areas is reflected in its interest in a follow-up operation.

5. Assessment of Bank and borrower performance

5.1 Bank performance

(a) Bank performance in ensuring quality at entry

Rating: moderately satisfactory

63. The project design incorporated the most recent experience in developing large-scale renewable energy resources in rural areas. The design process took into account alternative courses of action for delivery mechanisms and the lessons derived from Bank studies and ongoing projects. The project concept was consistent with the ongoing reform in the Argentine power sector, using a delivery model based on the dominant role of the private sector. That is, the design reflected the conceptual reality of its times. Evaluations of the borrower's capacity were done objectively; and the implementation measures, designed accordingly. Applicable safeguards were identified consistent with the practices of the late 1990s.

64. However, the project design did not take into account country risks and the slow implementation typical of rural access operations, nor did it incorporate the required

flexibility to deal successfully with changing economic and political conditions. In hindsight, the project design could be seen as a candid effort to support an ongoing reform without acknowledging associated risks.

(b) Quality of supervision

Rating: moderately satisfactory

65. During project implementation, the Bank maintained a constant presence in the field with two or more supervision missions per year. Faced with the major and largely unexpected challenge of the 2001 crisis, the Bank proceeded to restructure the project a number of times—though after a brief period of surprise—to gradually adjust to changing conditions, working together with the implementing agency in restoring a viable delivery model.

66. Fiduciary and safeguard aspects were dealt with diligently, although with some delays in procurement. Adequate resources were allocated—in quantity and quality—throughout the implementation period and the continued provision of valuable guidance through local staff. Overall, the Bank demonstrated the capacity and flexibility to react positively to unforeseen adverse events, take corrective measures and move toward the achievement of PDOs. However, the fact that the project required an excessive number of amendments suggests that the Bank was unable to assess the situation comprehensively and anticipate problems. Also, the performance indicators did not seem to keep pace fully with revisions to the project design.

(c) Justification of rating for overall Bank performance

Rating: moderately satisfactory.

67. This rating combines the ratings for project preparation and supervision.

5.2 Borrower performance

(a) Government performance

Rating: moderately satisfactory

68 The Government supported the project throughout most of its execution. It revealed a commitment to the provision of electricity in remote rural areas and the development of renewable energy, and it took the necessary measures in restoring the viability of the project. However, during a relatively long period, starting with the crisis of 2001, budgets allocated to the project were insufficient, bringing about significant delays in its implementation as well as visible weaknesses in the staffing of the implementing agency. These weaknesses caused an irregular performance in procurement and monitoring activities. Also, temporary uncertainties on rates policies discouraged concessionaires and delayed their procurement initiatives.

(b) Performance of implementing agency or agencies

Rating: satisfactory

69. Although the PCU experienced budget and staff constraints during the crisis period and a few more years, it managed to build a core of qualified staff that managed procurement and financial management issues well. This continuity helped maintain satisfactory management and supervision. The decision to centralize procurement as a measure to overcome the weaknesses of some provinces proved to be the correct one. Also, decentralizing part of the PCU functions through two units working in the provinces of the northwest and northeast improved the management and supervision of that region. The management of safeguards and monitoring revealed a learning process adapted to the changing standards of the times.

(c) Justification of rating for overall borrower performance

Rating: moderately satisfactory

70. Combines the ratings for Government and for the Implementing Agency.

6. Lessons learned

71. **A large-scale renewable energy system project is a medium- to long-term effort that requires a design flexible enough to adapt to the changing conditions that may arise.** Failure to do so may require cumbersome and costly restructuring efforts. Projects designed in a rigid manner and without much room for flexibility are likely to face greater obstacles as external (e.g., country risk) or internal conditions change, and experience considerable delays and additional costs in their efforts to adjust. The project's experience also casts doubts on the effectiveness of short-term instruments in addressing long-term rural development challenges.

72. **Subsidies are a necessary component of rural electricity projects, being necessary to establish a sound system of rates and subsidies that minimizes economic distortions; they are also funded by secure sources.** Dispersed rural markets are characterized by high costs and low income customers, requiring a significant subsidy to ensure the installation and operation of renewable energy systems. These subsides should be clearly defined in order to minimize uncertainties that could hamper bidding processes as well as the operational phase of rural projects.

73. **The eligibility criteria for populations and/or regions to be provided with rural electrification projects should be clearly established at an early stage in keeping with the government's policy orientation.** The absence of such criteria can result in a first-come, first-served situation that would tend to favor the regions/provinces that are institutionally stronger and may deviate from the government's social and economic objectives (e.g., poverty reduction). While the flexibility gained by the lack of an eligibility criterion could be useful in starting a rural access effort, it is essential to avoid such deviations once a project has gained momentum.

74. **Safeguard issues need to be addressed thoroughly at an early stage and incorporated into the project design in order to minimize negative and/or irreversible impacts.** The effective identification of social and environmental impacts, and the pertinent safeguards, should be matter for an early and thorough assessment and

incorporated into the design of bids (when mitigation or management measures entail a cost borne by contractor). A late acknowledgment of such impacts implies higher mitigation costs and often faces institutional inertia impeding its solution.

75. **Large-scale decentralized renewable energy operations face unique challenges associated with the dispersion of their market, the large number of players involved, limited knowledge of the terrain, and difficult communication that requires a delivery model tailored to these needs**. Specific lessons made evident by the project are:

- **Importance of dissemination:** it is essential to disseminate among interested parties experiences of best practices and the benefits of renewable energy systems in order to develop effectively a renewable energy system (RES) market and achieve sustainable operation. A centralized executing agency should assume this responsibility in a proactive manner aiming to engage all possible participants working in the field, including provincial entities, NGOs and the private sector.
- **Promote use of local resources:** Local resources, when technically qualified, offer the advantage of a better knowledge of the region and often have stronger incentives to perform well. Bidding processes should take this potential into account and minimize obstacles for local contractors to participate (i.e., adapt bid requirements, such as guarantees, to the reality of the region).
- **Sustainability of the operation is more a logistical challenge than a technical task:** while photovoltaic (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 times located in rugged terrain. Innovative approaches tailored to each case—but often relying on local resources—are necessary to provide an effective and low-cost service.

7. Comments on issues raised by borrower/implementing agencies/partners

(a) Borrower/implementing agencies

76. The project coordinating unit (PCU) submitted a set of minor comments and suggestions aimed at more precise representation of specific issues. These comments, which did not contain any disagreements, have been incorporated into the text. The conclusions of the completion report issued by the borrower are presented in Annex 7.

Annex 1. Project costs and financing

(a) First IBRD loan-4454 and GEF grant

PAD COSTS (US$ millions)

			Government				
	IBRD	**GEF**	**GOA**	**Prov.**	**Conces.**	**Custom.**	**Total**
SHS Residential	10.9	5.5	9.1	0.0	20.5	5.1	51.1
SHS Schools	7.2	0.0	6.8	0.0	11.2	2.8	28.0
Mini-grids	0.6	0.0	0.6	0.0	1.0	0.2	2.4
Wind Systems	0.0	0.4	0.1	0.0	0.0	0.1	0.6
Public Services (solar)	1.4	0.0	1.8	0.0	2.2	0.0	5.4
Thermosolar	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EE pilot	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Investment Total	**20.1**	**5.9**	**18.4**	**0.0**	**34.9**	**8.2**	**87.5**
Admin.,TA and Fee	5.1	3.8	1.1	1.9	0.0	0.0	11.9
Contingencies	4.8	0.3	5.1	0.0	8.3	2.6	21.1
TOTAL	**30.0**	**10.0**	**24.6**	**1.9**	**43.2**	**10.8**	**120.5**

ACTUAL COSTS (US$ million)

			Government					percent of PAD
	IBRD	**GEF**	**GOA**	**Educ.**	**Prov.**	**Conces.**	**Total**	**est.**
SHS Residential	5.92	0.46	0.00	0.00	1.01	0.46	7.85	15.4
SHS Schools	11.73	0.00	0.00	2.37	0.53	0.00	14.63	52.3
Mini-grids	6.48	0.00	0.00	0.00	1.92	0.10	8.50	354.2
Wind Systems	0.00	7.49	0.00	0.00	2.54	0.00	10.03	1671.7
Public Services (solar)	2.36	0.00	0.00	0.00	0.37	0.05	2.78	51.5
Thermosolar	0.64	0.21	0.00	0.00	0.22	0.00	1.07	
EE pilot	0.05	0.00	0.00	0.00	0.01	0.00	0.06	
Investment Total	**27.18**	**8.16**	**0.00**	**2.37**	**6.60**	**0.61**	**44.92**	**51.3**
Admin.,TA and Fee	2.82	1.34	0.15	0.00	0.00	0.00	4.31	36.2
Contingencies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOTAL	**30.00**	**9.50**	**0.15**	**2.37**	**6.60**	**0.61**	**49.23**	

(b) Additional Financing (Second IBRD Loan-7617)

PAD COSTS (US$ million)

		Government			
	IBRD	**GOA**	**Educ.**	**Prov.**	**Total**
SHS Residential	27.5	0.0	0.0	0.0	27.5
SHS Schools	8.7	0.0	2.2	0.0	10.9
Mini-grids	7.0	0.0	0.0	2.3	9.3
Wind Systems	0.5	0.0	0.0	0.0	0.5
Public Services (solar)	0.3	0.0	0.0	0.1	0.4
Thermosolar	0.7	0.0	0.0	0.2	0.9
Investment Total	**44.7**	**0.0**	**2.2**	**2.6**	**49.5**
Admin.,TA and Fee	5.3	0.1	0.0	0.2	5.5
Contingencies	0.0	0.0	0.0		0.0
TOTAL	**50.0**	**0.1**	**2.2**	**2.7**	**55.0**

ACTUAL COSTS (US$ million)

		Government				**percent of**
	IBRD	**GOA**	**Educ.**	**Prov.**	**Total**	**PAD est.**
SHS Residential	42.50	0.00	0.00	0.00	42.50	154.5
SHS Schools	5.43	0.00	1.36	0.00	6.79	62.3
Mini-grids	0.13	0.00	0.00	0.04	0.17	1.8
Wind Systems	0.00	0.00	0.00	0.00	0.00	0.0
Public Services (solar)	0.70	0.00	0.00	0.18	0.88	234.7
Thermosolar	0.48	0.00	0.00	0.12	0.60	68.6
Investment Total	**49.24**	**0.00**	**1.36**	**0.34**	**50.94**	**102.9**
Admin.,TA and Fee	0.73	0.00	0.00	0.00	0.73	13.3
Contingencies						
TOTAL	**49.97**	**0.00**	**1.36**	**0.34**	**51.67**	**94.0**

Annex 2. Outputs by component

The project scale-up (Additional Financing) did not change its activities or the originally expected outcomes. However, considering the various amendments to the legal agreements and drawing on lessons from the initial experience of the project, the set of indicators originally proposed was modified. The table below presents the project's outputs by the closing date.[12]

Objective/Output	Indicator	Baseline	Target	Actual (% accomplished)	Actual (Original + AF)
1. Increase access to electricity services and quality of associated uses for rural population	**1. PERMER original**				
	Total number of households served by PERMER	0	9,355	9,952 (106.4 %)	**27,478**
	Intermediate results indicators				
	Installed SHS in households	0	N/A	6,060	23,456
	Installed SHS in public buildings	0	N/A	1,603	2,255
	2. PERMER AF				
	Total number of households served by PERMER	0	18,227	17,526 (96.1 %)	**27,478**
	Intermediate results indicators				
	Installed SHS in households	0	15,575	17,396 (111.7%)	23,456
	Installed SHS in public buildings	0	630	652 (100.3%)	2,255
	Households served by mini-grids	0	2,552	130 (0.05%)	2,407
	Installed solar systems in public buildings for thermal applications	0	138	78 (56%)	350
	Installed solar systems in public buildings for water pumping	0	30	188 (626%)	188
2. Increase private sector participation in	**3. PERMER original**				
	Number of PERMER private concessionaires	0	5	5 (100%)	

12 Source: ISRs complemented by completion reports of the PCU.

Objective/Output	Indicator	Baseline	Target	Actual (% accomplished)	Actual (Original + AF)
off-grid rural electricity market	**4. PERMER AF**				
	Number of PERMER private concessionaires	0	4	8 (200%)	
	Intermediate results indicators				
	Number of operators under PERMER	0	16	14 (87.5%)	14
	Number of residential systems operated by private concessionaries	0	12,950	11,485 (88.6%)	15,714
	Number of systems for public service operated by private concessionaires	0	151	234 (154%)	667
3. Improve subsidy allocation in off-grid rural electricity initiative	**5. PERMER original**				
	Intermediate results indicators				
	Average tariff subsidy for residential systems (percent)	0	70	76 (108.6%)	
	Average retail tariff for households (pesos/month/customer)	0	10	12.3 (123%)	
	6. PERMER AF				
	Intermediate results indicators				
	Average tariff subsidy for residential systems (percent)	0	70	79 (112.9%)	
	Average retail tariff for households (pesos/month/customer)	0	10	14.73 (147.3%) Current value affected by inflation	
4. Increase renewable energy use and reduce CO_2 emissions (Global Environmental Objective Indicators)	**7. PERMER original**				
	Avoided CO_2 emissions (ton CO_2 eq.)			2,346	4,628
	Intermediate results indicators				
	Total installed capacity of SHS (kW)	0	1,690	1,327 (78.5%)	
	Total installed capacity of WHS (kW)	0	957	809 (84.5%)	
	Total installed capacity of RET based mini-grids (kW)		3,000	47 (1.6%)	
	8. PERMER AF				

Objective/Output	Indicator	Baseline	Target	Actual (% accomplished)	Actual (Original + AF)
	Avoided CO_2 emissions (ton CO_2 eq.)		1,339	2,263 (169%)	4,628
	Intermediate results indicators				
	Total installed capacity of SHS (kW)	0	2,300	2,079 (90.4%)	
	Total installed capacity of WHS (kW)	0	90	0 (0%) There was no demand for WHS	
	Total installed capacity of RET based mini-grids (kW)	0	4,640	11 (0.2%) Mini-grids were not cost effective, therefore funds were allocated to other components	
5. Strengthen regulatory framework associated with off-grid electricity service	**9. PERMER original**				
	Intermediate results indicators				
	Percent certifications of installed systems	0	95	100 (105.3%)	
	Percent of complaints attended without subsequent complaints	0	90	90 (100%)	
	10. PERMER AF				
	Intermediate results indicators				
	Percent certifications of public systems	0	95	90 (94.7%)	
	Percent of complaints attended without subsequent complaints	0	90	98 (108.9%)	

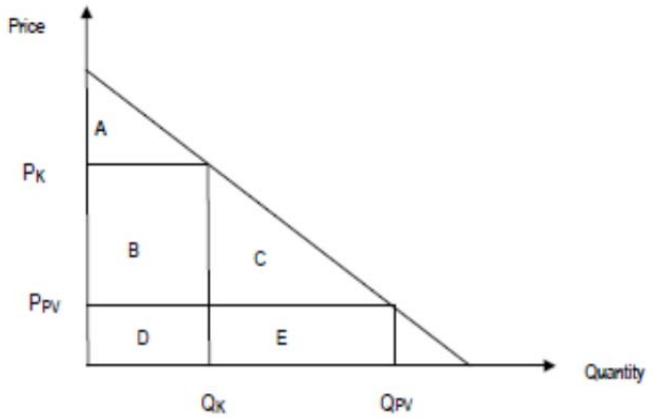
Annex 3. Economic analysis

Following the appraisal's approach, the economic analysis focuses on the residential photovoltaic component, i.e., the Solar Home Systems (SHS) that were installed by the PERMER in 13 provinces, accounting for 53 percent of the project's total investment during its two phases (original IBRD loan and GEF grant plus the IBRD additional financing).

The economic internal rate of return for the residential solar component is 11.2 percent and its net present value (NPV) is estimated to be US$1.14 million, based on a 10 percent discount rate that, as at appraisal, is considered to be the economic opportunity cost of capital in Argentina. These results are based on a conservative forecast for future energy consumption (14.5 kWh per month per household). In case consumption should reach 24kWh/month, as surveys suggest, the rate of return would reach 21.2 percent and the NPV US$11.1 million, thus indicating the high sensitivity of the project's economics to the future consumption of solar energy. These results compare to a rate of return of 12.1 percent estimated at appraisal (9.5 percent excluding the benefits of the GEF grant) and a NPV 0f US$5.1 million (negative US$1.44 million without GEF).

Costs. The analysis includes the actual investment cost of US$50.3 million for 23,419 Solar Home Systems installed by the project. It also includes a cost of US$65 per unit for the replacement of batteries every four years, annual operating and maintenance costs, and an economic life of fifteen years.

Benefits. Solar Home Systems have two types of benefits: on the one hand, they replace the expense associated with traditional energy sources, i.e., lighting and communications devices such as kerosene lamps, candles, gas, and batteries, by using 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). In addition to the savings over traditional lighting and communications devices, photovoltaic systems make available more energy—and of better quality—and therefore they bring additional welfare benefits to the beneficiaries. Benefits are explained in the following figure that represents schematically the rural household demand for energy:



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. The analysis considers the case of a single PV customer using a 100Wp panel (by a wide margin the most used panel in the project) with the following characteristics based on the findings of surveys undertaken in various provinces:

Q_K: 86 kWh per year
Savings in traditional energy (B+D): US$210 per year, which yields a unit cost of US$2.44/kWh
Q_{PV}: 175 kWh per year (with a sensitivity for 296 kWh per year, based on market study forecasts)
P_{PV}: US$0.0 per kWh (i.e., running costs are sole fixed maintenance costs)

The table below presents the flow of costs and benefits for the project's SHS component in thirteen provinces.

PERMER residential SHS component–cost and benefits (thousands of US$)

Year	# SHS units	Capital cost	Replace battery	O&M	Total cost	Avoided cost	WTP[1]	Total benefits	Net benefits
2001	580	669.6	0.0	3.3	672.9	0.0	0.0	0.0	-672.9
2002	0	0.0	0.0	3.3	3.3	121.8	63.2	185.0	181.7
2003	419	483.9	0.0	5.8	489.7	121.8	63.2	185.0	-304.6
2004	13	14.7	37.7	5.8	58.2	209.8	108.9	318.8	260.5
2005	319	536.5	0.0	8.5	545.0	212.5	110.3	322.8	-222.2
2006	475	954.2	27.2	13.3	994.7	279.6	145.1	424.7	-570.0
2007	228	591.6	38.5	16.3	646.4	379.2	196.8	576.1	-70.3
2008	840	1,614.2	20.8	24.3	1,659.3	427.2	221.7	648.9	-1,010.4
2009	724	1,024.8	58.1	29.4	1,112.3	603.5	313.3	916.8	-195.6
2010	2,319	3,351.5	53.4	46.2	3,451.1	755.5	392.1	1,147.6	-2,303.5
2011	9,938	23,621.9	75.3	164.3	23,861.6	1,242.5	644.9	1,887.5	-21,974.1
2012	6,704	15,859.0	105.1	243.6	16,207.8	3,329.5	1,728.1	5,057.6	-11,150.2
2013	861	1,624.1	204.1	251.7	2,080.0	4,737.2	2,458.9	7,196.1	5,116.1
2014	0	0.0	721.3	251.7	973.0	4,918.0	2,552.7	7,470.7	6,497.6
2015	0	0.0	540.9	251.7	792.6	4,918.0	2,552.	7,470.7	6,678.1

Year	# SHS units	Capital cost	Replace battery	O&M	Total cost	Avoided cost	WTP[1]	Total benefits	Net benefits
							7		
2016	0	0.0	222.4	251.7	474.1	4,918.0	2,552.7	7,470.7	6,996.6
2017	0	0.0	721.3	248.4	969.7	4,796.2	2,489.4	7,285.6	6,316.0
2018	0	0.0	513.6	248.4	762.0	4,796.2	2,489.4	7,285.6	6,523.6
2019	0	0.0	221.5	246.0	467.5	4,708.2	2,443.8	7,151.9	6,684.4
2020	0	0.0	700.5	245.9	946.4	4,705.5	2,442.4	7,147.8	6,201.4
2021	0	0.0	482.8	243.2	726.0	4,638.4	2,407.6	7,046.0	6,320.0
2022	0	0.0	206.7	238.4	445.1	4,538.8	2,355.8	6,894.6	6,449.4
2023	0	0.0	646.0	235.5	881.4	4,490.8	2,330.9	6,821.7	5,940.3
2024	0	0.0	435.7	227.4	663.2	4,314.5	2,239.4	6,553.9	5,890.7
2025	0	0.0	55.9	222.3	278.2	4,162.5	2,160.5	6,323.0	6,044.8
2026	0	0.0	0.0	205.5	205.5	3,675.5	1,907.7	5,583.2	5,377.7
2027	0	0.0	0.0	87.4	87.4	1,588.5	824.5	2,413.1	2,325.7
									$1,141
								IERR:	**11.2 %**
	[1]Additional benefits associated with more and better quality of energy source								

Annex 4. Bank lending and implementation support/supervision processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Ricardo Klockner		LCSFP	TTL
Ernesto Terrado	Principal Energy Planner	IENPD	
Estanislao Gacitua-Mario	Social Scientist	LCSES	
Juan Quintero	Environment Specialist	LCSES	
Ferenc Molnar	Legal Counsel	LEGLA	
Reynaldo Pastor	Legal Counsel	LEGLA	
Nelson de Franco	Principal Power Engineer	LCSFP	
Asif Faiz	Sector Leader	LCC7	
Supervision/ICR			
Lucia Spinelli	Senior Energy Specialist	LCSEG	TTL
Xiaoping Wang	Senior Energy Specialist	SEGES	former TTL
Gabriela Elizondo	Senior Energy Specialist		former TTL
Philippe Durand	Lead Energy Specialist		former TTL
Todd m. Johnson	Lead Energy Specialist		former TTL
Alvaro Larrea	Sr. Procurement Specialist		
Daniel Chalupowicz	Financial Management Specialist		
María Pia Cravero	Legal Counsel		
Elba Gaggero	Environment Specialist		
Fernando Brunstein	Environment Specialist		
Enrique Crousillat	Consultant	LCSEG	ICR
Luis Vaca-Soto	Consultant		Energy
Alfredo Idiarte	Energy Specialist		
Lilian Pedersen	Social Specialist		
Luis Garcia	Energy Specialist		
Ruth Tiffer-Sotomayor	Consultant		Environment
Keisgner Alfaro	Sr. Procurement Specialist		
Isabel Tomadin	Social Specialist		
Almudena Mateos	Energy Specialist		
Andres Mac Gaul	Sr. Procurement Specialist		

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY99	0.00	55,333.80
FY 01	0.00	0.00
FY02	0.00	226.79
Supervision/ICR		
FY99	0.00	21,056.54
FY00	11.14	68,535.08
FY01	8.78	67,051.93
FY02	6.16	73,915.01
FY03	6.51	66,285.85
FY04	9.20	71,503.82
FY05	10.93	61,630.66
FY06	26.63	143,142.82
FY07	25.19	138,568.69
FY08	17.73	84,540.18
FY09	31.50	90,122.73
FY10	30.65	134,974.02
FY11	28.02	147,108.60
FY12	20.94	92,656.82
FY13	12.70	66,398.91
Total:	**246.08**	**1,327,491.66**

Annex 5. Beneficiary Survey Results

Not Applicable

Annex 6. Stakeholder workshop report and results

A three-day workshop with the participation of the fifteen provincial governments involved in the project plus the PCU was held in November 2012 to discuss the performance and impact of the project and propose recommendations for an eventual follow-up operation. The workshop was characterized mostly by technical presentations that did not focus much on social aspects. It arrived to the following conclusions:

1. The project was perceived as a highly valuable effort in addressing the needs of dispersed rural populations, improving their quality of life through the provision of electricity services;
2. Implementation conditions differ greatly from province to province, depending on timing issues, the number of customers and the nature of the problems encountered;
3. Most provinces coincided on the presence of a considerable demand for renewably energy systems that would justify a follow-up operation;
4. A follow-up operation would benefit from a better coordination among current players, improved dissemination and the incorporation of new stakeholders in its design and implementation;
5. Installation and operation costs vary significantly across provinces. Also, there was the perception that there is room for a more efficient implementation to improve the project's economic viability;
6. More emphasis should be given to the needs of vulnerable people; women, the young and indigenous populations.

Annex 7. Summary of borrower's ICR

The Borrower issued a draft ICR in March 2013. This report presented a brief history of the project, including its background and context under which it was design and justified. It includes also the difficulties faced during the implementation period, the restructuring effort, results and an assessment of outcomes. A summary of the report's chapter 9: Lessons Learned is included below:

1. **Technical aspects**: the project was executed following the technological options and selection criteria originally established, prioritizing those that would guarantee a good performance from a technical, economic, social and environmental viewpoint. Technical specifications were prepared by the PCU with the support of some PEAs. These specifications were modified and broadened with the support of the Ministry of Education.
2. **Procurement issues**: the most important adjustment in this regard was the centralization of procurement for equipment and the inspection and certification of works and installations. The integral financing of the project, permanent control and supervision, financial support to provincial inspectors, quick response to amendment needs proved to be instrumental for the satisfactory completion of the project.
3. **Works and systems installations**: a more agile and appropriate process was achieved in those provinces where bidding was carried out by distribution utilities upon the request of the provincial government. Conversely, legal restrictions — sometimes requiring the approval through decrees— caused delays in the execution of works due to the lack of resources for the inspection of works. Experience shows the need to continuously update a list of future customers.
4. **Operation and Maintenance**: participation agreements signed by each province establish the need for an entity responsible for the O&M of the equipment installed. It coincides that the most satisfactory results are being achieved in those provinces where the responsible entity has been clearly identified; hence, sanctions are being considered for those provinces that do not comply with this condition.
5. **Social and Environmental issues**: acknowledging that in some provinces a large percentage of the project beneficiaries are indigenous people, an IPPF has been prepared in these provinces. Regarding the environmental impact of the project, no adverse impacts have been found during implementation; however, a framework to address such impacts, particularly in mini-grids, was elaborated for the AF.

The report assessed the performance of the provincial implementing agencies and the World Bank in the following manner:

1. Provincial Executing Agencies: in general, their performance is considered acceptable.
2. World Bank: acceptable performance. While the implementation of the project extended through a long period, it is perceived that the performance of the Bank varied with time and there were periods when the Bank's response to the PCU

requests—particularly on procurement and its reaction to the crisis—were excessively long.

Annex 8. Comments of co-financiers and other partners/stakeholders

Not applicable

Annex 9. List of supporting documents

Aide Memoire for the Project's Supervision Missions.

ESIN Consultora S.A. – Trama TecnoAmbiental S.L. 2013. Consultoría Evaluación Final del PERMER.

Fundación Compromiso, 2012. Proyecto de Energías Renovables en Mercados Rurales (PERMER). Relatoría Taller PERMER (21,22 y 23 de noviembre de 2012). 2 volúmenes.

IT Power, 2011. Proyecto PERMER, Estudios de factibilidad del abastecimiento eléctrico de la población rural dispersa con energías renovables en la provincia de Mendoza. Informe Final, for Ministerio de Planificación Federal, Secretaría de Energía.

L/F & Asociados S.A., 2004. Análisis de Energías Renovables en Mercados Rurales Dispersos, Provincia de Chaco. Informe Final.

Unidad Ejecutora del proyecto PERMER. Proyecto de Energías Renovables en Mercados Rurales, Informe de Cierre GEF.

Unidad Ejecutora del proyecto PERMER, 2013. Proyecto PERMER. Informe Final (versión preliminar).

World Bank. Project Implementation Status Reports (ISRs)

World Bank, 1999. Project Appraisal Document on a Proposed Loan and GEF Grant in the Amount of IBRD Loan US$30 Million and GEF Grant SDR 7.2 Million (US$10 Million Equivalent) to the Argentine Republic for the Renewable Energy in the Rural Market Project. Report Nº 17495-AR, March 4, 1999.

World Bank, 2008. Project Paper on a Proposed Additional Financing Loan in the Amount of US50 Million to the Argentine Republic for the Renewable Energy in the Rural Market Project. Report Nº 43941-AR, October 9, 2008.

IBRD 33362R

AUGUST 2008