

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

ARGENTINA

ENERGY EFFICIENCY AND RENEWABLE ENERGY IN LOW-INCOME HOUSING

(AR-G1002)

INVESTMENT GRANT PROPOSAL

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ELECTRONIC LINKS	
REQUIRED	
1. Annual work plan (AWP)	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37965801
2. Monitoring and evaluation plan	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37965802
3. Environmental and Social Management Report (ESMR)	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37965803
4. Procurement plan	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37965801
OPTIONAL	
1. Economic evaluation	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958947
2. Institutional analysis	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958948
3. Stakeholder mapping	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958949
4. Technical analysis of construction prototypes	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958951
5. Value chain analysis for the construction sector	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958952
6. Baseline analysis of energy consumption in the low-income residential housing sector	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958953
7. Analysis of the regulatory framework in the construction sector for introducing energy efficiency and renewable energy measures in low-income housing	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958955
8. Communication strategy (Component 5)	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37958954
9. Country strategy with Argentina 2012-2015	http://idbdocs.iadb.org/wsdocs/getdocument.aspx?DOCNUM=37271430
10. Climate Change Note for Argentina	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37204307
11. Urban Development and Sectoral Housing Services Note for Argentina	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37131247
12. Energy Sector Note for Argentina	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37113008
13. Endorsement of the project by the operational focal point of the Global Environment Facility in Argentina	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38010479
14. Survey on household energy use	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39524144
15. Annual energy consumption and GHG emissions in the housing sector in Argentina (2010)	http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39588235

16. Pilot locations and their characteristics

<http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39588231>

ABBREVIATIONS

AWP	Annual work plan
CO ₂	Carbon dioxide
ESMP	Environmental and Social Management Plan
GEF	Global Environment Facility
GHG	Greenhouse gas(es)
ICAS	Institutional Capacity Assessment System
ICB	International competitive bidding
INTI	Instituto Nacional de Tecnología Industrial [National Industrial Technology Institute]
IPVs	Institutos Provinciales de la Vivienda [Provincial Housing Institutes]
ISO	International Organization for Standardization
MINCyT	Ministry of Science, Technology, and Productive Innovation
MWh	Megawatt-hour
NCB	National competitive bidding
PCU	Project co-executing unit
PMR	Project monitoring report
PRM	Project risk management
PROMEBA	Barrio Improvement Program
SAyDS	Secretaría de Ambiente y Desarrollo Sustentable [Environment and Sustainable Development Department]
SSDUV	Subsecretaría de Desarrollo Urbano y Vivienda [Urban Development and Housing Division]

PROJECT SUMMARY

ARGENTINA ENERGY EFFICIENCY AND RENEWABLE ENERGY IN LOW-INCOME HOUSING (AR-G1002)

Financial Terms and Conditions				
Beneficiary: Argentine Republic				
Co-executing agencies: Secretaría de Ambiente y Desarrollo Sustentable [Environment and Sustainable Development Department] (SAyDS) and Subsecretaría de Desarrollo Urbano y Vivienda [Urban Development and Housing Division] (SSDUV)				
Source	Amount (US\$)	Disbursement period:		54 months
IDB/Global Environment Facility (IDB/GEF)	14,630,855			
Parallel financing*	71,780,224	Execution period:		48 months
Total	86,411,079	Approval currency: United States dollar		
Project at a Glance				
Project objective and description: The main objective of the project is to help reduce greenhouse gas (GHG) emissions in Argentina as the result of a reduction in energy consumption in low-income housing. The specific objective is to develop new minimum habitability standards incorporating energy efficiency and renewable energy measures in the construction of low-income housing based on the results of the low-income housing prototypes using energy efficiency and renewable energy that are built and monitored during the project. These standards would be incorporated into the new low-income housing projects financed using national funds from the SSDUV.				
Special contractual conditions precedent to the first disbursement: The first disbursement of resources from the Bank's contribution is contingent upon fulfillment of the following requirements to the Bank's satisfaction: (i) the entry into effect of the project Operating Regulations, including an Environmental and Social Management Plan (ESMP) and a detailed responsibilities matrix for all institutions involved, approved by the participating agencies in accordance with terms previously agreed upon with the Bank; and (ii) the delivery, to the Bank's satisfaction, of evidence that an interagency agreement has been signed between the SAyDS and SSDUV (paragraph 3.9).				
Special contractual conditions for execution: (a) As a condition precedent to the start of activities under Components 1, 2, and 3, the beneficiary, acting through the co-executing agencies, will present evidence to the Bank's satisfaction that execution agreements have been signed between: (i) the SSDUV and the corresponding Provincial Housing Institutes; (ii) each Provincial Housing Institute and the National Industrial Technology Institute (INTI); and (iii) the SSDUV and INTI; and (b) As a condition precedent to the start of activities under Components 2, 4, and 5, the beneficiary, acting through the co-executing agencies, will present evidence to the Bank's satisfaction that execution agreements have been signed between the SAyDS and the Ministry of Science, Technology, and Productive Innovation (MINCyT) and between the SAyDS and the Energy Department (paragraph 3.10).				
Exceptions to Bank policies: None.				
Project qualifies as:	SEQ [X]	PTI [X]	Sector [X]	Geographic [] Headcount []

* Parallel financing for the operation consists of US\$71,780,224 from the following sources: (i) US\$70,780,224 as local counterpart contribution, consisting of investments and in-kind contributions; and (ii) US\$1 million from the proceeds of an IDB technical cooperation operation (ATN/OC-14155-AR).

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problems addressed, and rationale

- 1.1 **Sectoral context and problems.** Argentina is one of the most urbanized countries in Latin America, with 91% of the population living in urban areas,¹ surpassing the regional percentage of 78%.² More than 70% of the population living in vulnerable conditions resides in urban areas. Consequently and to provide a better quality of life to this segment, it is estimated that Argentina must cover a deficit of 1.7 million low-income housing units and improve the habitability conditions of 2.1 million precariously constructed units.
- 1.2 In addition, residential use accounts for 26% of all energy consumption in Argentina. In the residential sector, natural gas is the most important source of energy, accounting for 60% of total energy consumed, followed by electricity³ with 36% (see optional electronic link 15).
- 1.3 Energy in the residential sector is primarily supplied by nonrenewable sources that account for 70% of the country's energy matrix. With stable annual growth in demand and under a business-as-usual scenario, it is estimated that greenhouse gas (GHG) emissions in the residential sector grow at an annual rate of 3.7%. In the case of low-income housing, dependence on natural gas is greater (78%), and GHG emissions are therefore higher in this subsector than in the residential sector as a whole.
- 1.4 With the exception of southern Patagonia, which is an extreme climate zone, energy use has not been considered as a parameter in the design of low-income housing, so there are no protocols in place to measure and monitor it. Furthermore, residential electricity and natural gas consumption is subsidized by the federal government. As a result, there are currently no incentives to take energy use into account in housing design. The overriding factor in low-income housing design has been construction costs, with no consideration given to energy efficiency measures that could lead to lower energy consumption, lower GHG emissions, lower household energy expenses, and increased savings for the country. If the latter were to be included in the analysis, the costs of the full life cycle of a home would be much lower.
- 1.5 Argentina has undertaken international commitments to curb GHG emissions. At the most recent Conference of the Parties to the United Nations Framework Convention on Climate Change (COP-20), Argentina joined the Lima Call for Climate Action, thereby agreeing to present GHG emissions mitigation and

¹ Inter-American Development Bank (2015) and Argentina's Urban Development and Housing Division (SSDUV).

² Higher than in Brazil (87%), Bolivia (79%), Uruguay (78%), and Chile (75%). (Latin American Energy Organization, 2010).

³ In 2012, more than 90% of the country's energy matrix was based on hydrocarbons. Natural gas accounted for 52%, and oil for 37%, of total demand. <http://www.iadb.org>. The production of electricity is also dependent on hydrocarbons: in 2012, 66% of electricity was produced from thermal energy, 28% from hydraulic energy, 5% from nuclear energy, and the remaining 1% from wind and solar energy. Meanwhile, renewable energy accounts for 11% of the primary energy supply on the national energy balance sheet. Biomass accounts for approximately 5%, which is considered relatively low compared with other Latin American countries (Source: Energy Department).

reduction actions that demonstrate a commitment to reduce national sources of GHG.⁴ This requires considering how sectoral actions can support or hinder these commitments. In the low-income housing subsector, energy efficiency measures can be paired with the use of renewable energy to curb GHG emissions.

- 1.6 **The institutional framework—entities and primary functions.** Argentina's housing policy makes the national government responsible for allocating resources and establishing minimum standards of habitability in low-income housing through the Federal Housing Plan. This project, which seeks to reduce the housing deficit, has delivered an average of 39,000 completed housing units per year since 2003 and expects to deliver 54,000 housing units per year after 2015. The provinces execute the projects through the Provincial Housing Institutes (IPVs), which are decentralized agencies constituted under public law. The IPVs are responsible for site development, final design, tender processes for construction contracts, inspection, and approval of results, under the supervision of Argentina's Urban Development and Housing Division (SSDUV). The Environment and Sustainable Development Department (SAyDS) has been in charge of issues relating to climate change since 2002 as the authority responsible for implementation of the United Nations Framework Convention on Climate Change. These two institutions—the SSDUV and the SAyDS—are the project co-executing units.
- 1.7 Under the direction of the Energy Department, the Energy Savings and Efficiency Program was launched in 2003, with activities that included lighting, mandatory labeling of domestic appliances, and the promotion of energy efficiency in public buildings. Since 2007, the Energy Department has been developing and implementing the National Program for Rational and Efficient Energy Use, which focuses on energy efficiency in industry, energy efficiency labeling on products, and public lighting.
- 1.8 **Project strategy.** To reduce the deficit in low-income housing while at the same time reducing energy consumption in Argentina's low-income residential sector and its impact on GHG emissions, energy efficiency and renewable energy measures must be incorporated into design and construction standards. The design and construction of low-income housing do not currently include energy efficiency and renewable energy measures due to obstacles such as: (i) the fact that existing minimum habitability standards do not specifically include energy efficiency and renewable energy elements or provide for differentiated applicability in the country's various climate zones; (ii) the lack of a protocol for monitoring the energy performance of buildings that would standardize energy use measurement and evaluation criteria in order to develop national standards; (iii) limited demand for energy efficiency and renewable energy technologies in the construction of urban housing; and (iv) use of a minimum construction cost criterion for housing designs instead of a dwelling life cycle cost criterion.
- 1.9 This project includes the design and construction of pilot low-income housing units that incorporate cost-effective energy efficiency and renewable energy measures. This involves strategies and resources to be monitored and evaluated during project execution, such as direct solar gain and sunrooms, cross ventilation, greenhouses, enclosed entryways, thermal bellows, exterior insulation, interior wall

⁴ <http://unfccc.int/resource/docs/2014>.

insulation, solar orientation of the housing complex and the unit, solar systems with accumulator walls, conventional solar collectors and evacuated tube collectors, air conditioning with buried pipes, and higher quality carpentry to reduce leaks, which should result in energy savings of close to 32%. The long-term objective is to bring about a change in the methodology for defining the minimum design criteria for low-income housing construction, shifting from a minimum investment cost criterion to a minimum product life-cycle cost criterion. This shift will lead to additional savings during the life cycle of the home based on improvements in the initial design, which would include several of the measures described above. It is expected that this change in criterion will generate savings in energy consumption on the order of 30%, lowering the total cost associated with low-income housing. Adoption of these minimum design criteria as well as additional new criteria will ensure the sustainability of the proposed interventions.

- 1.10 **Bank support in the sector—complementarity and lessons learned.** The Bank has supported the establishment of energy efficiency and renewable energy programs in Argentina through nonreimbursable technical cooperation operations (ATN/OC-11500-AR, ATN/KK-11892-AR, and ATN/OC-11899-AR). This has yielded lessons on the design and implementation of energy efficiency and renewable energy measures, even though the standards were developed for educational facilities, small isolated communities, and bioenergy production. One of the principal lessons learned from these operations is the need to work jointly with the Energy Department and the SAYDS in order to ensure that policies are aligned across sectors. Another lesson learned and taken into account in the design of this operation is the need to include the provincial agencies that implement the measures in order to ensure that these measures are properly disseminated. These lessons have been incorporated into the project structure. As described in Section II, the Bank has participated actively in the urban development of marginal areas. This participation has strengthened the targeted communities, improving the quality of life of their inhabitants and mitigating potential adverse environmental and social impacts (paragraph 2.3).
- 1.11 Project outcomes will be potentiated with the support of technical cooperation operation ATN/OC-14155-AR, currently in execution. The aforementioned operation includes various analyses of the life cycle of construction materials, feasibility of water savings systems, end uses of energy in the residential sector, environmental, economic, and social valuation of low-income housing, performance of photovoltaic solar systems, and analyses of grid connection obstacles, project dissemination, and institutional strengthening of the project executing agency. Project preparation costs are being assumed by technical cooperation operation ATN/FM-13516-AR.
- 1.12 **Strategic alignment with the Bank.** The project will contribute to the lending priorities under the Ninth General Increase in the Resources of the IDB (document AB-2764) of: (i) poverty reduction and equity enhancement; and (ii) support for climate change initiatives, sustainable energy (including renewable energy), and environmental sustainability through an increase in the number of families living in new or improved dwellings, by supporting: (a) access to housing; and (b) better performance in terms of energy efficiency for the underserved segments of the population. In addition, the project will contribute to the regional

goals of: (i) percentage of households with electricity; (ii) proportion of urban population living in dwellings with hard floor; (iii) GHG emissions; and (iv) countries with planning capacity in climate change mitigation and adaptation. It will also contribute to the following outputs: (i) individuals benefited by an anti-poverty program; (ii) number of households with new or upgraded dwellings; (iii) percentage of power generation capacity from low-carbon sources over total generation capacity funded by the IDB; and (iv) climate change pilot projects in agriculture, energy, health, water and sanitation, transport, and housing, as set forth in the Results Matrix. In the energy infrastructure dimension, the foregoing indicators are consistent with those in the Sustainable Infrastructure Strategy for Competitiveness and Inclusive Growth. Similarly, the project supports the Bank's country strategy with Argentina (2012-2015) (document GN-2687) by: (i) reducing the carbon footprint of Argentina's economy; (ii) reducing the energy consumption growth rate by implementing energy efficiency measures and expanding the use of renewable energy; and (iii) improving the quality of life of the population with unmet housing needs.

B. Objective, components, and costs

- 1.13 **Objective.** The main objective of the project is to help reduce GHG emissions in Argentina as the result of a reduction in energy consumption in low-income housing. The specific objective is to develop new minimum habitability standards⁵ incorporating energy efficiency and renewable energy measures in the construction of low-income housing based on the results of the low-income housing prototypes using energy efficiency and renewable energy that are built and monitored during the project. These standards would be incorporated into the new low-income housing projects financed using national funds from the SSDUV.
- 1.14 **Component 1. Low-carbon, low-income housing prototypes (US\$10.5 million).** This component will finance the design and construction of 128 low-income housing prototypes with a low carbon footprint under the following criteria: (i) representative location in different climate zones of Argentina; and (ii) location in urban areas. The design and construction of the homes will make it possible to: (i) identify the effects of the home's orientation; (ii) measure the effects of a home's utilization (i.e., uninhabited or inhabited) on its thermal behavior; and (iii) evaluate the impact of the progressive incorporation of energy efficiency and renewable energy. Construction of these prototypes will make it possible to monitor performance and evaluate energy efficiency and renewable energy measures and technologies incorporated into the homes, giving priority to locally available resources. The component includes training for the occupants of the prototypes on how to use them correctly and good practices related to energy efficiency. It also includes training for IPV staff on housing design and supervision and monitoring of construction.

⁵ The minimum habitability standards currently in place are the technical standards for which compliance will be mandatory in the construction of all low-income housing units financed by the Argentine government. Said standards will be disseminated extensively through the activities under Component 5, both for materials and equipment manufacturers and chambers, builder associations, and final users. They are expected to be adopted both by decentralized government agencies with local financing and by the private sector due to the expected benefits to be obtained.

- 1.15 Reference homes will be defined for each climate zone according to the design and construction practices currently used by each IPV pursuant to habitability standards presently in place (without energy efficiency and renewable energy). Using the reference homes as the base, four design categories will be established with four homes in each category, for a total of 16 housing prototypes per climate zone and a total of 128 prototype homes for the eight climate zones.
- 1.16 The categories are as follows: (i) categories 1 and 2 use the same reference housing design but with better insulation in walls (along with windows and doors), roofing, and floors to meet the minimum required comfort level.⁶ The housing prototypes in categories 1 and 2 are exactly the same except that the 32 homes in category 1 are occupied and the 32 homes in category 2 are not. This makes it possible to compare the effects of occupancy on the thermal behavior of these homes; (ii) category 3 applies a new design in terms of structure and area, incorporating bioclimatic strategies and passive solar energy systems; and (iii) category 4, based on category 3, includes measures and technologies needed to provide locally available active renewable energy solutions.
- 1.17 **Component 2. Monitoring and evaluation of low-income housing prototypes (US\$1.97 million).** Using the funds allocated to this component, the National Industrial Technology Institute (INTI) will develop a uniform monitoring protocol at the national level and together with the IPV's will conduct monitoring for a year. INTI will conduct inspections during the various phases of construction and use of the homes. Special instruments will be used to monitor a total of 128 homes—96 inhabited prototype homes and 32 uninhabited control homes. Monitoring includes measurements of: (i) climate in each of the project locations; (ii) relevant physical variables such as temperature, radiation, wind speed, and humidity; (iii) hygrothermal conditions; and (iv) occupancy level and other parameters inside the home, such as consumption of gas, electricity, and water.
- 1.18 In addition, a survey of periodic natural gas and electricity consumption during the monitoring year will be conducted for the 640 reference units using the bills from the utility companies. Technical cooperation operation ATN/OC-14155-AR will provide support in the form of studies analyzing life cycle and assessing social impacts. A diagnostic study will also be done on water and energy use (electricity and gas) using household surveys, and socioeconomic variables will be measured. Monitoring involves the use of eight toolkits for taking measurements in each of the localities and training for local actors to do the monitoring. Since the design is specific to each zone, the toolkit will be adapted to each of the eight localities.
- 1.19 Families will be assigned to prototype homes on a random basis from the universe of persons qualified according to the IPV eligibility criteria (see the [monitoring and evaluation plan](#)). The data gathered during monitoring will be used to establish the technical guidelines developed in Component 3.
- 1.20 **Component 3. Development and adoption of energy efficiency and renewable energy standards (US\$65,982).** This component consists of the

⁶ Standard 11,605, issued by Instituto Argentino de Normalización y Certificación [Argentine Institute of Standardization and Certification], establishes maximum thermal transmission values for walls and roofs of dwellings in six bioenvironmental zones, ensuring minimum habitability conditions. The project makes it possible to transition from level C (minimum) to level B (medium).

development of new minimum habitability standards to incorporate energy efficiency and renewable energy measures into low-income housing built with domestic funds. These standards, designed by the SSDUV with recommendations from the project committee, will be approved by resolution of the SSDUV. They will be based on the results from the monitoring and evaluation of the prototype homes in each of the eight climate zones and will be defined for each climate zone. In addition, energy consumption savings and other energy savings will be estimated based on a cost-benefit analysis that will consider the additional costs of incorporating energy efficiency measures (categories 1 and 2), bioclimatic design and passive (category 3) and active (category 4) renewable energy systems and the benefits of reducing GHG emissions. This component will also involve dissemination of the new standards to public officials at the national, provincial, and municipal levels.

- 1.21 **Component 4. Strengthening of the local energy efficiency and renewable energy market (US\$421,385).** The objective of this component is to help strengthen the market for the development of local/regional technology in energy efficiency and renewable energy, through the future incorporation of the new minimum standards (technical specifications) in the IPV bidding documents prepared under Component 3. Market analysis studies will be carried out to identify capacity needs, gaps in research, and content suggestions for technical and professional training related to energy efficiency and renewable energy in the construction sector. Local and regional dissemination and training programs will be developed on lessons learned from the prototypes evaluated, including best practices for incorporating energy efficiency and renewable energy in housing construction. These initiatives are expected to reach at least 120 actors in the private sector (builders, developers, chambers of construction, related professionals, energy suppliers, etc.) and the public sector (municipalities). The Ministry of Science, Technology, and Productive Innovation (MINCyT) will provide information on its currently available instruments for the execution of projects in those areas. Technical cooperation operation ATN/OC-14155-AR will provide support through an analysis of the obstacles to connecting renewable energy to the grid.
- 1.22 **Component 5. Dissemination of results (US\$806,644).** This component will finance activities related to the disclosure and dissemination of results and lessons learned from the project, targeting both the general public and relevant stakeholders. These activities will develop: (i) an online platform; (ii) a national dissemination campaign on construction with energy efficiency and renewable energy in the residential sector; (iii) promotional materials designed for different audiences; and (iv) dissemination and training workshops, in partnership with environmental authorities and other local actors. Technical cooperation operation ATN/OC-14155-AR will support the development of these activities. Based on analysis of the control-group housing units through surveys (Component 2) and taking socioeconomic factors into account, training programs will be designed to meet the needs and influence the behavior patterns of end users. Particular emphasis will be placed on the gender gap.
- 1.23 The project's cost structure and sources of parallel financing are shown in Table 1.

Table 1. Project costs and parallel financing (US\$)

Components	IDB/GEF	Parallel financing		Total
		Local ^a	IDB technical cooperation ^b	
1. Design and construction of prototypes	10,554,269	60,629,690		71,183,959
2. Monitoring and evaluation	1,979,094	3,951,515	400,000	6,330,609
3. Standards and regulatory framework	65,982	938,693		1,004,675
4. Strengthening of local capacities	421,385	1,080,986	200,000	1,702,371
5. Dissemination of results	806,644	963,676	400,000	2,170,320
Administration/Audit	803,481	3,215,664		4,019,145
Total	14,630,855	70,780,224	1,000,000	86,411,079

^a The local contribution will consist of investments and in-kind contributions.

^b ATN/OC-14155-AR.

C. Key results indicators

- 1.24 The results framework sets forth the indicators and means for verifying achievement of the project's objectives.
- 1.25 The general outcome of the project is the incorporation of minimum energy efficiency and renewable energy standards in low-income housing units in Argentina. The specific outcomes include: (i) reduction of CO2 emissions and energy consumption in low-income households; (ii) increase in knowledge of energy efficiency and renewable energy technologies; (iii) monitoring and evaluation of low-carbon, low-income housing prototypes; (iv) adoption of minimum energy efficiency and renewable energy standards in low-income housing built with national funds; (v) increase in local capacity to produce and apply energy efficiency and renewable energy technology in low-income housing; and (vi) increase in knowledge on experiences in incorporating energy efficiency and renewable energy measures into low-income housing.
- 1.26 **Economic analysis.** The focus is on identifying the economic feasibility of building the 128 pilot homes (Component 1) through a cost-benefit analysis in which the benefits considered include a reduction in CO2 emissions, energy and natural gas consumption savings, and improvements in the quality of life of the inhabitants. The results indicate that the project is feasible, with an economic internal rate of return of 16.73% and a net present value of US\$1.9 million using a discount rate of 12%. This feasibility holds up even in the case of considerable changes in terms of cost increases or fewer benefits. For more details, see [optional electronic link 1](#).

II. FINANCING STRUCTURE AND MAIN RISKS

- 2.1 The project primarily involves the investment to build prototype homes over a four-year execution period. The funds come from three sources: (i) the contribution from the Global Environment Facility (GEF); and (ii) parallel financing consisting of (a) the Bank contribution (ATN/OC-14155-AR); and (b) the local counterpart contribution. The GEF is a United Nations fund that provides grants to address

environmental problems relating to biodiversity, climate change, international waters, land degradation, chemical products, and waste. For the GEF, this project falls within the area of climate change. The GEF requirements for access to the fund were met, including approval of the project document as well as the approval needed to proceed with the Bank's procedure.

A. Environmental and social safeguard risks

2.2 In accordance with the Bank's Environment and Safeguards Compliance Policy (OP-703), this project has been classified as a category "C" operation. This means that the project will have a minimum impact based on the Bank's environmental and social policy filters. However, the construction of houses in each of the eight localities could produce minor local impacts and short-term environmental, social, health, and safety impacts. These adverse impacts may include (i) increased noise, dust, and potential contamination of soil, water, and groundwater if solid waste, hazardous materials (fuels, paint, etc.), and wastewater discharges are not properly treated; and (ii) health- and safety-related impacts due to incorrect construction practices such as the improper use of personal protective gear, inadequate procedures for working at heights and in confined spaces and for working with electrical equipment, etc. To ensure control of these impacts, suitable mitigation measures have been developed and are described in the Environmental and Social Management Plan (ESMP) that is part of the project Operating Regulations, the entry into effect of which is a contractual condition precedent to the first disbursement (paragraph 3.9). It should be noted that the project will not result in any relocations.

2.3 **Environmental and Social Management Plan (ESMP).** As required under operational policy OP-703, Directive B.3, the project will incorporate effective mitigation measures for the construction of 128 housing units. These measures are already available and may be implemented under the effective management of environmental, social, health, and safety systems consistent with the principles of the ISO 14001 and OSHA 1801 standards. These mitigation measures will be consolidated under an ESMP based on the experience of the Barrio Improvement Program (PROMEBA) (loan 2662/OC-AR). For that purpose and similarly to the mechanisms established under PROMEBA, the ESMP will be included in the bidding documents, and each contractor will be required to submit a specific and detailed ESMP for each site before breaking ground on any construction work. Implementation of the ESMPs will be verified by the IPV field teams. Annual visits to the pilot sites by the Bank's safeguards team are also planned, under the project supervision budget.

B. Fiduciary risks

2.4 The greatest fiduciary risk, as identified in the risk matrix, is related to potential delays in the disbursement of counterpart funds. This risk will be mitigated by setting milestones and deadlines as part of an execution schedule periodically updated to ensure execution. In addition, the Bank's project team will conduct very close supervision of the fulfillment of project activities and indicators.

2.5 Another fiduciary risk has to do with the complexity of the bidding documents. Given the high level of innovation in which new energy efficiency and renewable energy technologies will be tested, establishing the technical specifications for the

bidding documents could be complicated, contractors might find it difficult to formulate their bids, and there may also be construction delays in cases in which contractors do not have adequate experience to build the prototype houses or the technologies defined are not implemented correctly. Accordingly, a single standardized bidding document will be designed for all project locations to facilitate the evaluation of bids. Deadlines for bid submission will be extended. The execution units will provide support for bidders. The specifications will be more detailed so as to limit the possibility of deviations by contractors and make it easier to supervise the works. Inspections during construction will be more rigorous and more frequent, with additional measurements. Upon delivery of the homes, INTI will conduct final inspections for certification of the prototype housing units according to the standards established for each of the construction categories.

C. Other key issues and risks

- 2.6 Another significant risk is a possible delay in the project due to a lack of measurement equipment. The project co-executing unit (PCU) at the SSDUV will be responsible for procuring this equipment, while INTI is in charge of technical supervision, with the support of the IPVs, which in turn report to this PCU. The level of coordination required is high. To mitigate this risk, efforts to procure equipment will begin in the initial phases of the project, in order to provide flexibility in delivery periods and in training IPV staff in the management, monitoring, early installation, and testing of the equipment. INTI will coordinate with the IPVs on the protocols for data measurement and delivery, equipment replacement, etc., and will be responsible for insurance payments, payment of registration fees, and safekeeping of the equipment. Another risk is that statistically significant differences might not be found between the prototype housing units and the control housing units due to the limited size of the sample.
- 2.7 In addition, public management and governance risks were identified due to the involvement of multiple actors physically located in different areas of the country. These risks will be mitigated by creating a responsibilities matrix for the project co-executing units (PCUs) (see paragraphs 2.2 and 2.3 in Annex III). Furthermore, lack of coordination between the PCUs could lead to execution delays. Should the Bank determine that delays are occurring, it will call upon SAYDS and SSDUV authorities to agree on the actions needed to reestablish the normal development of the project. With regard to the difficulties that might arise due to political circumstances at the national, provincial, or municipal level, the project will seek to obtain an institutional commitment from the relevant actors. Agreements and schedules will be drawn up. Monitoring will be strict.
- 2.8 Lastly, regarding the risk of noncompliance with the new regulations, training and dissemination campaigns will be conducted to establish adoption of the new regulations. Technical cooperation operation [ATN/OC-14155-AR](#) has a dissemination component aimed at ensuring that the project results are widely publicized.
- 2.9 The sustainability of the proposed interventions is assured through: (i) the training to be provided to the various actors, both national and provincial, in the standards and rules to be developed as a result of this project, as well as the broad dissemination of project results, called for under Components 4 and 5 as well as

operation ATN/OC-14155-AR; and (ii) the adoption of the new minimum habitability standards, which will be mandatory in the construction of low-income housing financed with federal funds, including the energy efficiency and renewable energy measures emerging from Component 3 of this project.

III. IMPLEMENTATION AND MANAGEMENT PLAN

- 3.1 **Execution structure and technical coordination.** Due to the cross-sector nature of the proposed intervention, an institutional plan has been developed for implementation, consisting of two levels: (i) execution; and (ii) technical operational; (see Figure 1 in Annex III). At the execution level, there will be two PCUs, each performing the specialized activities for which it is responsible (see Table 2 in Annex III). The National Coordinating Unit for the Barrio Improvement Program (NCU-PROMEBA), under the SSDUV, will be one PCU (PCU-SSDUV) and will be responsible for executing Components 1, 2 (with respect to procurement of goods), and 3, the housing prototypes, and the development of minimum standards. In turn, the IPVs in the provinces participating in the project will be the sub-execution units for Component 1. The PCU-SSDUV will define the general technical specifications of the bidding documents. All housing prototypes will be tendered in accordance with Bank policies. The standard procedures applied in PROMEBA will be used. The IPVs will handle the design, bidding, contracting, and inspection of the prototype and control homes, and in conjunction with INTI will monitor the variables for the development of bioclimatic standards. At the project level, bidding documents and construction contracts will be reviewed by the PCU-SSDUV.
- 3.2 The activities of this operation are consistent with those of PROMEBA (loan 2662/OC-AR), which complements Argentina's federal housing programs run by the SSDUV. The operation preceding PROMEBA (loan 1842/OC-AR) benefited 83,000 low-income families living in informal shantytowns and settlements. PROMEBA is providing water, sewer, and drainage infrastructure, access roads, public lighting, community facilities, and public spaces, as well as measures for granting title to land and strengthening community organization. The new PROMEBA operation (loan 2662/OC-AR) was approved for US\$400 million in 2011 and will likely benefit another 50,000 low-income households in informal settlements and contribute to the urban and social inclusion of the poorest segments of Argentina's population.
- 3.3 The second PCU will be set up within the structure of the SAyDS (PCU-SAyDS) for the execution of Component 2 (with respect to the contracting of individual consultants, consulting firms, and nonconsulting services) and Components 4 and 5. The PCU-SAyDS will rely on technical assistance from the SAyDS Climate Change Division.
- 3.4 The role of the Project Committee is to provide technical assistance to the PCUs. The Project Committee will consist of a group of technical representatives from the SAyDS, SSDUV, Energy Department, INTI, and MINCyT, all of which will be formally committed to participate in the project. At the technical level, some of the institutions will have responsibilities as technical coordinators of components and/or activities in addition to participating in the Project Committee. All members

will be appointed officially by authorities of each of the participating agencies. The PCUs will meet every six months, and the Project Committee will meet when convened by any of them. Minutes will be drawn up regarding agreements reached in each meeting.

- 3.5 MINCyT establishes policies and coordinates actions to build the country's scientific, technological, and innovation capacity, making the productive sector more competitive, rooted in the development of a new pattern of production based on more technologically dense goods and services. INTI is a decentralized agency of MINCyT that promotes the creation of technological innovation and its transfer to industry, certifies standards and technical specifications, and ensures that the quality of processes, goods, and services produced in the country is consistent with global standards and trends. It has 45 research and development centers, including for construction and energy, which are directly linked to the project through monitoring and evaluation of the prototypes. INTI develops, reproduces, and maintains national standards of measurement and disseminates their accuracy as the national metrology institute, helping to ensure the quality of measurements related to care of the environment. The primary function of the Energy Department is to develop, propose, and execute national energy policy, within a broad framework of federal coordination with provincial jurisdictions, supervising their compliance and proposing a regulatory framework that facilitates their performance. It is responsible for the National Program for Rational and Efficient Energy Use.
- 3.6 At the technical operational level, the role of the institutions is summarized as follows: (i) the SAyDS will monitor the project's GHG emissions; (ii) the SSDUV, assisting the IPVs, will coordinate design of the low-income housing prototypes and will develop the new habitability standards for low-income housing with energy efficiency and renewable energy; (iii) INTI will provide technical coordination for monitoring of the prototype and control housing units, training and supervising each of the IPVs involved and evaluating the outcomes that will serve as a basis for Component 3; (iv) the Energy Department will provide professional knowledge related to energy efficiency and renewable energy, coordinate the survey for the assessment of energy use (electricity, natural gas, and water in control housing units), assist in analyzing the project's national and regional impact on the energy system in terms of GHG emissions, and collaborate in the design of user training plans; (v) MINCyT and the SAyDS will provide technical coordination of Component 4, conducting the market analysis and assessing related capacity-building and research needs, participate in training workshops, and identify future lines of research for developing energy efficiency and renewable energy technologies and content gaps for technical and professional training related to energy efficiency and renewable energy in construction; and (vi) the IPVs will design, tender, supervise, and inspect construction of the prototype housing units and will collaborate on monitoring and other local activities. All these interactions will be reflected in the interinstitutional agreements between the PCU-SAyDS and the PCU-SSDUV, the PCU-SSDUV and the IPVs, the IPVs and INTI, the PCU-SSDUV and INTI, the PCU-SAyDS and MINCyT, and the PCU-SAyDS and the Energy Department.

A. Summary of implementation arrangements

- 3.7 Bank supervision of the procurement of goods by the PCU-SSDUV will be in accordance with the table of thresholds, type of procedures, and supervision method established for PROMEBA. When the procurement method is international competitive bidding, the provisions of Appendix 2 to the Bank's Procurement Policies (document GN-2349-9) on the domestic margin of preference in comparing bids for the procurement of goods manufactured in the country may be applied, as indicated in the respective bidding document. Meanwhile, Bank supervision of the procurement of goods by the PCU-SAYDS will be on an ex ante basis for national competitive bidding and international competitive bidding procedures for the procurement of goods and nonconsulting services and consulting firms for amounts equal to or above US\$200,000. Supervision of procurements for amounts below US\$200,000 may be performed on an ex post basis. When 12 months have elapsed from the date of the first procurement or contract, the Bank may opt to revise these terms.
- 3.8 Measuring, evaluating, and monitoring the energy performance of housing units creates a need for interagency coordination at the operational level. Bidding on all equipment will be handled by the PCU-SSDUV; equipment will be installed by INTI in coordination with the IPVs. The PCUs will have the fundamental responsibility of ensuring that this coordination is handled effectively, and they will be under the obligation to inform the Bank of any substantial delay in the previously established timeframes.
- 3.9 **The first disbursement of proceeds from the grant is contingent upon fulfillment of the following requirements to the Bank's satisfaction: (i) the entry into effect of the project Operating Regulations, including an Environmental and Social Management Plan (ESMP) and a detailed responsibilities matrix for all institutions involved, approved by the participating agencies in accordance with terms previously agreed upon with the Bank; and (ii) the delivery, to the Bank's satisfaction, of evidence that an interagency agreement has been signed between the SAYDS and SSDUV.**
- 3.10 As a condition precedent to the start of activities under Components 1, 2, and 3, the beneficiary, acting through the co-executing agencies, will present evidence to the Bank's satisfaction that execution agreements have been signed between: (i) the SSDUV and the corresponding IPVs; (ii) each IPV and INTI; and (iii) the SSDUV and INTI. As a condition precedent to the start of activities under Components 2, 4, and 5, the beneficiary, acting through the co-executing agencies, will present evidence to the Bank's satisfaction that execution agreements have been signed between the SAYDS and MINCyT and between the SAYDS and the Energy Department.

B. Summary of arrangements for monitoring results

- 3.11 Results will be measured for the individual housing unit and for the project as a whole. In each housing unit, whether a prototype or a control unit, multiple variables will be measured to determine the minimum habitability standards. At the project level, the bidding documents and contracts for building the houses and executing other components will be reviewed in advance by the PCUs. Project disbursements will be audited in accordance with the Bank's policies.

- 3.12 Monitoring will be conducted on an ongoing basis to verify fulfillment of project objectives and activities, with the focus on the outcome and output indicators presented in the Results Matrix. Annual monitoring reports have been planned for the execution period (midterm and final reports, respectively). The midterm report will provide information on changes that may be necessary in the implementation strategy.
- 3.13 The PCUs will be jointly responsible for presenting combined semiannual technical and financial reports in accordance with the Bank's policies. The project monitoring report will be updated every six months to monitor the results indicated in the Results Matrix. Additional supervision by the Bank includes missions to the eight pilot sites and meetings with federal and provincial project partners and other interested parties. However, the two co-executing agencies (SAyDS and SSDUV) will inform the Bank of problems or delays in the project, so that timely support can be provided and appropriate measures adopted.
- 3.14 The co-executing agencies will develop an annual work plan and submit it to the Bank for review and approval. Progress made on the project will be examined at least once a year by all parties involved in execution and implementation. Project execution reports will be submitted in accordance with GEF requirements and will be prepared on the basis of the GEF's annual monitoring guidelines. Those reports will be prepared and consolidated by the co-executing agencies and reviewed by the Bank before delivery to the GEF. The PCUs will coordinate the delivery of a consolidated audited financial statement on all allocations of project funds, within 120 days after the end of the corresponding year. See [monitoring and evaluation plan](#).

Development Effectiveness Matrix				
Summary				
I. Strategic Alignment				
1. IDB Strategic Development Objectives		Aligned		
Lending Program	-Lending for poverty reduction and equity enhancement -Lending to support climate change initiatives, renewable energy and environmental sustainability			
Regional Development Goals	-Proportion of urban population living in dwellings with hard floor -CO2 emissions (kilograms) per \$1 GDP (PPP)			
Bank Output Contribution (as defined in Results Framework of IDB-9)	-Number of households with new or upgraded dwellings -Climate change pilot projects in agriculture, energy, health, water and sanitation, transport, and housing			
2. Country Strategy Development Objectives		Aligned		
Country Strategy Results Matrix	GN-2687	Promotion of Energy Efficiency.		
Country Program Results Matrix		The intervention is not included in the 2015 Country Program Document.		
Relevance of this project to country development challenges (If not aligned to country strategy or country program)				
II. Development Outcomes - Evaluability		Evaluable	Weight	Maximum Score
		7.7		10
3. Evidence-based Assessment & Solution		8.4	33.33%	10
3.1 Program Diagnosis		3.0		
3.2 Proposed Interventions or Solutions		2.4		
3.3 Results Matrix Quality		3.0		
4. Ex ante Economic Analysis		7.0	33.33%	10
4.1 The program has an ERR/NPV, a Cost-Effectiveness Analysis or a General Economic Analysis		4.0		
4.2 Identified and Quantified Benefits		1.5		
4.3 Identified and Quantified Costs		0.0		
4.4 Reasonable Assumptions		0.0		
4.5 Sensitivity Analysis		1.5		
5. Monitoring and Evaluation		7.7	33.33%	10
5.1 Monitoring Mechanisms		1.5		
5.2 Evaluation Plan		6.2		
III. Risks & Mitigation Monitoring Matrix				
Overall risks rate = magnitude of risks*likelihood		Medium		
Identified risks have been rated for magnitude and likelihood		Yes		
Mitigation measures have been identified for major risks		Yes		
Mitigation measures have indicators for tracking their implementation		Yes		
Environmental & social risk classification		C		
IV. IDB's Role - Additionality				
The project relies on the use of country systems				
Fiduciary (VPC/FMP Criteria)	Yes	Financial Management: Budget, Treasury, Accounting and Reporting, External control, Internal Audit.		
Non-Fiduciary				
The IDB's involvement promotes additional improvements of the intended beneficiaries and/or public sector entity in the following dimensions:				
Gender Equality	Yes	There will be an analysis of the gender implications of the social housing programs. As part of component 5, and based on the information collected under the program, capacity building programs will be designed to modify the behaviour of households, with a focus on gender (see paragraph 1.22 of the POD).		
Labor				
Environment				
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project	Yes	GEF provided Project Preparation Grant (AR-T1107), under which studies for project preparation were developed. Additionally, TC AR-T1120 has been approved, which will support the execution of the project. Under one of the components of this TC, there will be support in strengthening the Execution Unit in the Secretariat of Environment.		
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan	Yes	The knowledge gaps that the evaluation will fill is the performance on-site of pilot houses with energy efficiency (EE) and renewable energy (RE). The evaluation, under component 2, will monitor and evaluate results of the intervention to develop EE and RE standards for the construction of social housing in Argentina.		

The objective of the project is to define minimum housing standards that incorporate EE and RE measures in the construction of social housing, to contribute to a reduction in CO2 emissions in Argentina by reducing energy consumption. To define these standards the project will construct and monitor 128 prototype social housing units with EE and RE measures.

The POD presents the problems to be addressed by the project as well as the factors causing them. The magnitudes of the problems are provided and the proposed interventions are linked to the problems identified in the diagnosis. The results matrix has vertical logic. All impact, outcome and output indicators are SMART and have baselines, targets and sources of information.

The project was analyzed using a cost-benefit analysis. Only one rate of return for the housing construction component was calculated, which means that the costs and benefits were aggregated independent of the type of RE and EE housing solutions or location. This does not allow to know what is the rate of return by RE and EE housing type and by location. This is important given the pilot nature of this operation. In addition, aggregation could be covering housing solutions that are not economically viable. The economic benefits are clearly specified and calculated. With respect to the costs it is not clear whether transfer payments such as taxes have been excluded. The costs were not adjusted using the shadow price of foreign exchange, which is of particular importance in Argentina. The assumptions used were presented and a sensitivity analysis was undertaken.

The project has a monitoring and evaluation plan. The plan does not follow the DEM guidelines. In the monitoring plan, the output indicators are not identical to those presented in the results matrix, some output indicators are not included and the work plan does not indicate when each of the output indicators will be collected. With respect to the evaluation plan, the outcome indicators are not the same as those in the results matrix. The operation will be evaluated using an ex post economic analysis. Given that this is a pilot program, an impact evaluation will also be undertaken. According to the evaluation plan the impact evaluation will be experimental and will gather information on the specific indicators that are required to measure the difference in energy consumption between the homes with and without the RE and EE measures.

RESULTS MATRIX

Project objective	To help reduce greenhouse gas (GHG) emissions in Argentina as the result of a reduction in energy consumption in low-income housing. The specific objective is to develop new minimum habitability standards incorporating energy efficiency and renewable energy measures in the construction of low-income housing based on the results of the low-income housing prototypes using energy efficiency and renewable energy that are built and monitored during the project. These standards would be incorporated into the new low-income housing projects financed using national funds from the Urban Development and Housing Division (SSDUV).					
General project outcomes/ Impact indicator	Unit	Baseline	Year 1	Year 2	Target	Comments
General outcome 1 (GO.1). Percentage of low-income housing units built annually in Argentina using minimum energy efficiency and renewable energy standards	Percentage (%)	0	0%	10%	10%	The specification of minimum energy efficiency and renewable energy standards will be made as part of the project activities. Source of information: INTI

Results indicators	Unit	Baseline	Year 1	Year 2	Target	Comments
Component 1: Low-carbon, low-income housing prototypes						
Outcome Component 1.1 (O.C.1.1)						
<i>Reduction in CO₂ emissions and energy in the project's low-income housing units</i>						
Outcome indicator Component 1.1 (O.I.C.1.1) Cumulative annual CO ₂ emissions from houses built as part of the project with energy efficiency and renewable energy measures / Annual CO ₂ emissions from low-income houses built as part of the project without energy efficiency and renewable energy measures	Percentage (%)	0	32%	32%	32%	<ul style="list-style-type: none"> Reductions achieved in the 128 prototype houses that incorporate energy efficiency and renewable energy measures compared with emissions from the control units (i.e., built without energy efficiency and renewable energy measures): GHG emissions for 128 houses: <ol style="list-style-type: none"> Reference houses (without energy efficiency or renewable energy): 806.2 tons CO₂/year <u>Assumptions:</u> <ul style="list-style-type: none"> Calculations based on the results from project preparation and calculations using GEF CO₂ calculator spreadsheet. Source of information: INTI
Outcome indicator Component 1.2 (O.I.C.1.2) Megawatt-hours (MWh) of annual consumption in housing units built as part of the project with energy efficiency and renewable energy measures / MWh of annual consumption in housing units built as part of the project without energy efficiency and renewable energy measures	Percentage (%)	0	32%	32%	32%	<ul style="list-style-type: none"> Measurement of average 32% reduction in total natural gas consumption for prototype houses throughout the eight climate zones, with reference to current construction standards in all zones. Total current energy consumption for 128 houses: <ol style="list-style-type: none"> Reference houses (without energy efficiency or renewable energy): 3,990.7 MWh/year Source of information: INTI
Output indicators						
Output indicator 1.1.1 Drawings with designs of low-income housing categories that incorporate energy efficiency and renewable energy measures prepared	Drawings	0	3	0	3	<ul style="list-style-type: none"> These low-income housing categories incorporate energy efficiency and renewable energy measures consistent with the climate zones considered in the project. A description of these categories is provided in the grant proposal (paragraph 1.16). Source of information: SSDUV
Output indicator 1.1.2 Housing units built	Housing units	0	128	0	128	<ul style="list-style-type: none"> Each of the low-income housing categories will be constructed in eight climate zones. Depending on the construction schedule in each of the provinces, it is possible that a percentage of the prototype houses will be built in year 2. Source of information: SSDUV

Results indicators	Unit	Baseline	Year 1	Year 2	Target	Comments
Outcome Component 1.2 (O.C.1.2)						
<i>Increase in knowledge about energy efficiency and renewable energy technologies</i>						
Outcome indicator Component 1.2 (O.I.C.1.2) Number of individuals trained in energy efficiency and renewable energy technologies focused on: (i) design and monitoring strategies; or (ii) use and maintenance	Number of individuals	0	0	50	50	<ul style="list-style-type: none"> • Training (i) for IPV employees on the benefits, costs, strategies, and technologies for incorporating energy efficiency and renewable energy measures into low-income housing financed through federal programs. The training will cover the basics relating to the current standards and the new standards to be developed under the program. • Training (ii) for users of low-income housing on energy savings techniques, how to use the equipment provided, monitoring of the instruments installed at the home during the measurement stage and precautions when handling them, and how to report equipment operation failures. Source of information: SSDUV and IPV
Output indicator 1.2.1 Training workshop for IPV employees on energy efficiency and renewable energy design strategies and construction monitoring	Workshops	0	1	0	1	<ul style="list-style-type: none"> • Training for IPV employees on the benefits, costs, strategies, and technologies for incorporating energy efficiency and renewable energy measures into low-income housing financed through federal programs. The training will cover the basics relating to the current standards and the new standards to be developed under the program. Source of information: SSDUV and IPV
Output indicator 1.2.2 Training workshops for residents of low-income homes built as part of the project on the use and maintenance of energy efficiency and renewable energy technologies	Workshops	0	1	1	2	<ul style="list-style-type: none"> • Training for users of low-income housing on energy savings techniques, how to use the equipment provided, monitoring of the instruments installed at the home during the measurement stage and precautions when handling them, and how to report equipment operation failures. Source of information: SSDUV

Results indicators	Unit	Baseline	Year 1	Year 2	Target	Comments
Component 2: Monitoring and evaluation of low-carbon, low-income housing prototypes						
Outcome Component 2 (O.C.2)						
<i>Monitoring and evaluation of low-carbon, low-income housing prototypes</i>						
Outcome indicator Component 2 (O.I.C.2) Report containing an evaluation of the implementation of energy efficiency and renewable energy measures in low-income housing, including at least: (i) methodology for data collection and analysis; and (ii) information analysis using two points in time (baseline and year 2).	Report	0	0	1	1	<ul style="list-style-type: none"> Report prepared on the basis of the information provided by outputs 2.1 and 2.2. <p>Source of information: INTI and IPV</p>
Output indicators						
Output indicator 2.1 Measurements taken for the prototype and control units built as part of the project (climate, consumption of natural gas, electricity, and water, and other variables)	Measurements	0	0	768	768	<ul style="list-style-type: none"> The frequency of data collection is described in the monitoring and evaluation plan, paragraphs 3.14 to 3.17. <p>Source of information: INTI and SSDUV</p>
Output indicator 2.2 Baseline analysis studies prepared for each region compiling information on energy use and socioeconomic variables for the prototype and control housing units built as part of the project	Studies	0		8	8	<ul style="list-style-type: none"> These studies include household energy use and an assessment of the environmental, economic, and social performance of low-income housing. Outputs of ATN/OC-14155-AR. <p>Source: IDB (INE/CCS)</p>

Results indicators	Unit	Baseline	Year 1	Year 2	Target	Comments
Component 3: Development and adoption of energy efficiency and renewable energy standards						
Outcome Component 3 (O.C.3)						
<i>Adoption of minimum energy efficiency and renewable energy standards in low-income housing built with federal funds</i>						
Outcome indicator Component 3 (O.I.C.3) Percentage of bidding documents for construction of low-income housing that incorporate technical guidelines on energy efficiency and renewable energy	Percentage (%)	0	0	100	100	<ul style="list-style-type: none"> • Technical specifications and minimum performance standards will be incorporated into all bidding documents for low-income housing financed with federal funds, differentiated by bioclimatic zones. • Minimum habitability standards for integrating energy efficiency and renewable energy measures into low-income housing developed by the SSDUV in consultation with the Project Committee. • Minimum standards incorporated into the bidding documents of the SSDUV and the IPV's. These standards will be based on the results of the monitoring and evaluation of prototype houses in each of the eight climate zones and will be defined for each climate zone. Source of information: SSDUV
Output indicators						
Output indicator 3.1 Studies with technical guidelines on energy efficiency and renewable energy for low-income housing prepared	Number of studies	0	0	8	8	<ul style="list-style-type: none"> • The technical specifications and minimum performance standards that will be incorporated into all bidding documents for low-income housing financed with federal funds, differentiated by bioclimatic zones, will be defined. Source of information: SSDUV
Output indicator 3.2 Training workshop for IPV employees at the local, provincial, and national levels held to promote and strengthen the new technical guidelines on energy efficiency and renewable energy	Workshop	0	0	1	1	<ul style="list-style-type: none"> • The workshop expands the training of IPV employees in the benefits, costs, strategies, and technologies for incorporating energy efficiency and renewable energy measures into low-income housing financed by federal programs. It will include training in the use of the new standards resulting from the program. Source of information: SAYDS

Results indicators	Unit	Baseline	Year 1	Year 2	Target	Comments
Component 4: Strengthening of the local energy efficiency and renewable energy market						
Outcome Component 4 (O.C.4)						
<i>Increase in local capacity to produce and apply energy efficiency and renewable energy technologies to low-income housing</i>						
Outcome indicator Component 4 (O.I.C.4) Number of individuals in the private and public sectors at the local level trained in the production/ application of energy efficiency and renewable energy technologies	Number of individuals	0	0	120	120	<ul style="list-style-type: none"> Individuals trained in the energy efficiency and renewable energy value chain in the private sector (builders, developers, members of the chamber of construction, related professionals, energy providers, etc.) and in the public sector (municipalities). Source of information: SAyDS
Output indicators						
Output indicator 4.1 Training workshops conducted for the private and public sectors at the local level on the production/ application of energy efficiency and renewable energy technologies	Workshops	0	0	2	2	<ul style="list-style-type: none"> The workshops train public sector officials in the benefits, costs, strategies, and technologies for incorporating energy efficiency and renewable energy into the results of the low-income housing program and how they can be applied to other types of facilities, such as schools, hospitals, and government offices. With regard to the private sector, the workshops train business owners in the benefits, costs, needs, opportunities, and support via public programs for the development and application of energy efficiency and renewable energy technologies in traditional housing. Source of information: SAyDS

Results indicators	Unit	Baseline	Year 1	Year 2	Target	Comments
Output indicator 4.2 Diagnostic studies of obstacles for connecting renewable energy to the grid, water use, and life cycle analyses prepared	Studies	0	0	2	2	<ul style="list-style-type: none"> Studies will include the following: <ul style="list-style-type: none"> Development of regulatory, legal, and technical rules to allow electric power to be fed into the distribution network and pilot test. Design of water saving equipment and pilot test. Life cycle evaluation of the performance of the innovative construction products, materials, and systems to be developed and incorporated into the pilot housing units built as part of the program. Outputs of ATN/OC-14155-AR Source of information: IDB (INE/CCS)
Component 5: Dissemination of results						
Outcome Component 5 (O.C.5)						
<i>Increase in knowledge about experiences in incorporating energy efficiency and renewable energy into low-income housing</i>						
Outcome indicator Component 5 (O.I.C.4) Monthly visits to the project's online platform	Visits	0	0	500	500	<ul style="list-style-type: none"> Measurement begins one month after the platform becomes operational. Source of information: SAYS
Output indicators						
Output indicator 5.1 Project showroom set up	Number of showrooms	0	0	1	1	<ul style="list-style-type: none"> The showroom consists in presenting the program's findings at a permanent exhibition site (Tecnópolis) in order to disseminate the results and encourage their adoption by the general public. This will include talks, visits, and distribution of informational material. Output of ATN/OC-14155-AR included in this matrix. Source of information: SAYS
Output indicator 5.2 Project's online platform in operation	Platform	0	0	1	1	<ul style="list-style-type: none"> Platform with project data including database of materials and technologies. Source of information: SAYS

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Argentina
Project number:	AR-G1002
Name:	Energy Efficiency and Renewable Energy in Low-income Housing
Co-executing agencies:	Secretaría de Ambiente y Desarrollo Sustentable [Environment and Sustainable Development Department] (SAyDS) reporting to the Chief of the Cabinet of Ministers, and Subsecretaría de Desarrollo Urbano y Vivienda [Urban Development and Housing Division] (SSDUV)
Fiduciary team:	Brenda Álvarez (FMP/CAR), Natalia Perez Fontela (FMP/CAR), and Teodoro Noel (FMP/CAR)

I. EXECUTIVE SUMMARY

- 1.1 The Project Risk Management (PRM) methodologies for sovereign guaranteed operations were used for risk analysis, and the Institutional Capacity Assessment System (ICAS) was used for the institutional analysis. The co-executing agencies will be the SAyDS and the SSDUV.
- 1.2 Some weaknesses and fiduciary risks were identified and indicated in the Risk Mitigation Matrix. The fiduciary management systems of the co-executing agencies were evaluated using the procedures mentioned in section I.1 above, and it was concluded that they are adequate but should be strengthened.
- 1.3 The program does not include financing from any other organization.

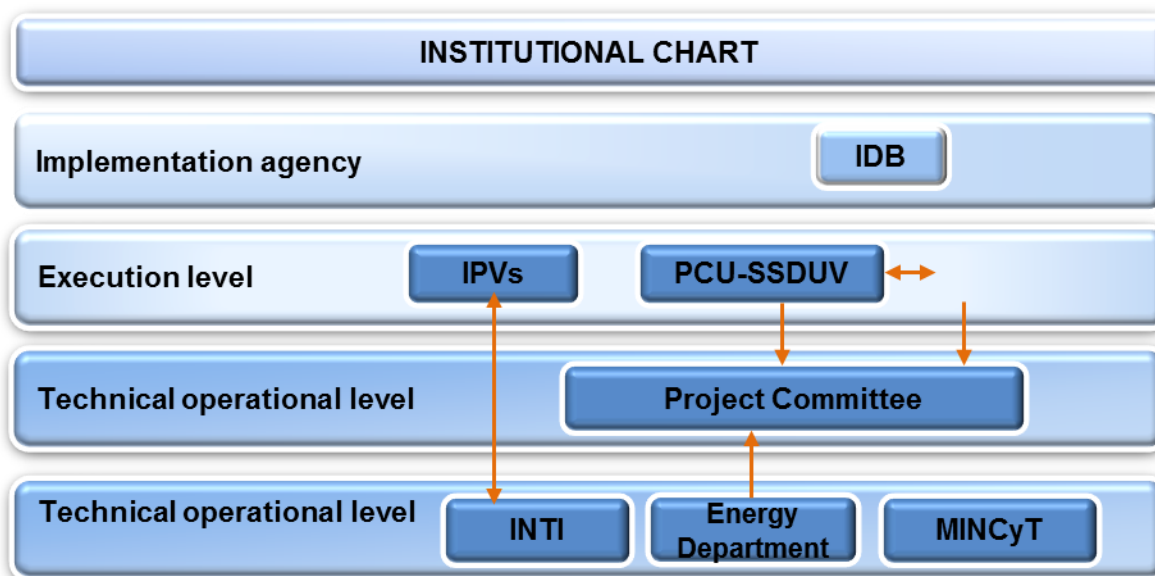
II. FIDUCIARY CONTEXT OF THE CO-EXECUTING AGENCIES

- 2.1 The fiduciary systems of the co-executing agencies are considered satisfactory, although there are some weaknesses that will require certain strengthening measures. These were included in the Risk Mitigation Matrix.
- 2.2 To mitigate these risks, a responsibilities matrix was drawn up for the two project co-executing units (PCU) (Table 1) and will be fine-tuned prior to the first disbursement. The matrix shows the operational execution arrangements between the two PCUs (Figure 1).

Table 1.
Distribution of responsibilities between the two PCUs for project AR-G1002

Instrument	Responsible PCU	Comment
Procurement plan	PCU-SAyDS	The PCU-SAyDS will present a consolidated AWP to the IDB with the support of the PCU-SSDUV.
Financial statements	PCU-SAyDS	Each PCU is responsible for its own financial statements, and the PCU-SAyDS consolidates them for delivery to the IDB.
Semiannual project monitoring reports (PMR)	PCU-SAyDS	The PCU-SAyDS will be responsible for consolidating the PMRs, with support from the PCU-SSDUV for delivery to the IDB.
Disbursement requests	PCU-SAyDS	The PCUs will coordinate their disbursement requests and submit consolidated requests to the Bank.
Reports to GEF	PCU-SAyDS	The PCU-SAyDS will be responsible for consolidating reports to the GEF, with the collaboration of PCU-SSDUV.
Midterm evaluation	PCU-SAyDS PCU-SSDUV	The midterm evaluations will be comprehensive, performed by a team designated or contracted for such purpose, and will be approved by both PCUs.
Final evaluation	PCU-SAyDS PCU-SSDUV	There will be a single final evaluation, performed by a team designated for such purpose and approved by both PCUs.
Auditing firm	PCU-SAyDS	If the project is not audited by the Office of the Auditor General, the PCU-SAyDS will contract a single firm to audit the entire project.

Figure 1. Responsibilities for financial and technical execution of AR-G1002



2.3 The responsibilities of the two PCUs regarding each project component are shown in Table 2.

Table 2. Responsibilities of the PCUs, by Component

Project component	Responsible PCU	Coordinating technical institution	Participating institutions
1. Design and construction of prototypes	SSDUV Sub-executing IPVs	SSDUV and IPVs	Energy Department
2. Monitoring	SAyDS	INTI	SSDUV, Energy Department
3.1. Development of minimum habitability standards	SSDUV	SSDUV	SAyDS, Energy Department, INTI, MINCyT
3.2. Dissemination and training in standards	SAyDS	SAyDS	
4. Strengthening of the local/regional energy efficiency and renewable energy market	SAyDS	SAyDS, MINCyT	Energy Department, SSDUV
5. Dissemination and training	SAyDS	SAyDS	Energy Department, SSDUV, INTI

III. FIDUCIARY RISK EVALUATION AND MITIGATION MEASURES

- 3.1 Fiduciary capacity was analyzed as part of the ICAS analysis, and the risks (including fiduciary risks) were identified using the PRM methodology. The greatest fiduciary risk lies in potential delays in disbursements due to delays in the tendering and execution of works. Given that this operation involves many actors physically located in different areas of the country, achieving homogeneous execution will require significant efforts on the part of the PCU-SSDUV. To mitigate these risks, execution agreements will be signed between the SSDUV and the corresponding IPVs, similar to those established under the Barrio Improvement Program (PROMEBA). A Bank team from Headquarters and the Country Office is participating and will continue to participate in project execution.
- 3.2 Another fiduciary risk has to do with the complexity of the bidding documents. Given the high level of innovation in which new energy efficiency and renewable energy technologies will be tested, establishing the technical specifications for the bidding documents could be complicated. As a result, contractors might find it difficult to formulate their bids, and there may also be construction delays in cases in which contractors do not have adequate experience to build the prototype houses or the technologies defined are not implemented correctly. Accordingly, following the parameters established under PROMEBA, a single standardized bidding document will be designed for all project locations to facilitate the evaluation of bids. Deadlines for bid submission will be extended. The execution units will provide support for bidders. The specifications will be more detailed so as to limit the possibility of deviations by contractors and make it easier to supervise the works. Inspections during construction will be more rigorous and more frequent, with additional measurements. Upon delivery of the homes, INTI will conduct final inspections for certification of the prototype

housing units according to the standards established for each of the construction categories.

IV. CONSIDERATIONS FOR THE SPECIAL PROVISIONS OF THE CONTRACTS

- 4.1 **Conditions precedent to the first disbursement.** The first disbursement of proceeds from the grant is contingent upon fulfillment of the following requirements to the Bank's satisfaction: (i) the entry into effect of the project Operating Regulations, including an Environmental and Social Management Plan (ESMP) and a detailed responsibilities matrix for all institutions involved, approved by the participating agencies in accordance with terms previously agreed upon with the Bank; and (ii) the delivery, to the Bank's satisfaction, of evidence that an interagency agreement has been signed between the SAYDS and SSDUV.
- 4.2 **Special conditions for execution.** As a condition precedent to the start of activities under Components 1, 2, and 3, the beneficiary, acting through the co-executing agencies, will present evidence to the Bank's satisfaction that execution agreements have been signed between: (i) the SSDUV and the corresponding IPV; (ii) each IPV and INTI; and (iii) the SSDUV and INTI. As a condition precedent to the start of activities under Components 2, 4, and 5, the beneficiary, acting through the co-executing agencies, will present evidence to the Bank's satisfaction that execution agreements have been signed between the SAYDS and MINCyT and between the SAYDS and the Energy Department.
- 4.3 **Consolidated financial statements.** The co-executing agencies will submit a consolidated set of annual financial statements for the project, audited by an independent auditing firm acceptable to the Bank based on terms of reference previously agreed upon with the Bank.

V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

A. Procurement execution

- 5.1 The Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-9) will apply. In addition, the co-executing agencies have agreed to use the Procurement Plan Execution System for the administration and management of procurement planning for the program.
- a. **Procurement of works, goods, and nonconsulting services (Components 1 and 2).** Contracts for works, goods, and nonconsulting services¹ generated under the program and subject to international competitive bidding (ICB) will use the standard bidding documents issued by the Bank. Contracts subject to national competitive bidding (NCB) will use national bidding documents agreed

¹ Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document GN-2349-9), paragraph 1.1: Nonconsulting services are treated similarly to goods.

upon with the Bank. The program sector specialist will be responsible for reviewing the technical specifications of the procurements during preparation of selection processes.

- (i) The IPV and SSDUV will participate in the procurement processes for Component 1. The IPV initiates the process using the standardized works bidding documents (approved by the IDB for loan 2662/OC-AR) to which it adds technical specifications specific to each of the seven provinces (eight locations). The PCU-SSDUV approves and the Bank gives its no objection to the bid file, the bidding documents, a model contract, and a model notice. Once the Bank's no objection has been obtained, the IPVs in each province solicit bids and prepare a report evaluating the bids submitted. Each IPV publishes the call for bids in national media outlets, consistent with IDB procurement procedures. The IPV assembles a file containing the results of the bid process. Following approval by the PCU-SSDUV and receipt of the Bank's no objection, the works contract is awarded. The IPV prepares a draft contract to be sent to the PCU-SSDUV and to the Bank for a statement of no objection, prior to signing. Once a copy of the contract is forwarded to the PCU-SSDUV, a work startup document is signed. The IPV is responsible for issuing a work certificate recommending payment, which is made by the PCU-SSDUV through an account created for the IPVs. Once the work is completed, the IPV signs the provisional work acceptance document and, when appropriate, the final work acceptance document. A similar process will be followed for the procurement of measurement instruments and equipment under Component 2.
- b. **Selection and contracting of consultants.** Contracts for consulting services generated under the program will use the request for proposals issued by the Bank. The procurement plan will list the selection processes.
 - (i) **Selection of individual consultants.** In the cases indicated in the approved procurement plans, the contracting of individual consultants may be advertised locally or internationally to create a short list of qualified individuals, pursuant to document GN-2350-9, Section V, paragraphs 5.1 to 5.4. In the cases of services put out to contract, consultants will submit midterm or final reports to the co-executing agencies, as requested. For the renewal of contracts, approval by the responsible authority of the performance evaluation as at least satisfactory will be sufficient. Evaluations will be performed once a year to facilitate approval by the corresponding authorities.
 - (ii) **Training.** The procurement plan lists the procurements that apply to the program components that include training activities and that are contracted as consulting and nonconsulting services.
- c. **Recurring expenses.** The recurring expenses or operating and maintenance expenses required during the program will be: tickets (the national regulations set out in Decree 1191/2012 stipulate that tickets must be purchased from Aerolíneas Argentinas and Austral for travel within Argentina and even abroad), per diems, transport, leases and utilities, maintenance, expenses, stationery,

messaging, and mail, cleaning services, IT inputs, insurance, telephones, and petty cash needed for operation of the co-executing agencies, which will be financed by the program and procured following the administrative procedures of the aforementioned agencies, which have been reviewed and accepted by the Bank. Operating costs do not include the salaries of government employees.

- d. **Advance procurement/ Retroactive financing:** No retroactive financing is planned for this operation.

Table 3a. Thresholds ^a (US\$)

Works			Goods			Consulting services	
International competitive bidding	National competitive bidding	Shopping	International competitive bidding	National competitive bidding	Shopping	International notice	Short list 100% national
≥5,000,000	<5,000,000 ≥350,000	<350,000	≥500,000	<500,000 ≥100,000	<100,000	≥200,000	<200,000

Table 3b. Thresholds (US\$)

Thresholds for ex post review Consulting services		
Consulting firms	Individual consultants	Shopping
<200,000	<50,000	<50,000

^a The threshold amounts established for ex post review are applied, starting 12 months after the first disbursement, on the basis of the co-executing agencies' fiduciary execution capacity and may be modified by the Bank to the extent that this capacity changes.

B. Procurement supervision

- 5.2 Bank supervision of the procurement of goods by the PCU-SSDUV will be in accordance with the table of thresholds, type of procedures, and supervision method established for PROMESA. Meanwhile, Bank supervision of the procurements by the PCU-SAYDS will be on an ex ante basis for NCB and ICB procedures involving the procurement of goods and nonconsulting services and consulting firms for amounts equal to or above US\$200,000. Supervision of procurements for amounts below US\$200,000 may be performed on an ex post basis. When 12 months have elapsed from the date of the first procurement or contract, the Bank may opt to revise these terms. This determination will be based on periodic reviews, the external audit reports on the accounting and financial statements of the two PCUs, and inspection visits.

C. Records and files

- 5.3 The co-executing agencies will maintain a standardized central filing system with its respective procedures and original documentation. The forms or procedures agreed upon and described in the program Operating Regulations will be used to prepare and file program reports. Originals are filed by the SAYDS, which will handle the bidding for Components 4 and 5, and by the SSDUV for Components 1, 2, and 3.

VI. FINANCIAL MANAGEMENT

A. Accounting and information systems

- 6.1 The co-executing agencies will use the executing units of external loans (UEPEX) system as its financial administration system. Accounting records will be kept on a cash basis and in line with the International Financial Reporting Standards, when applicable in accordance with national criteria. The following financial reports will be required: (i) financial execution plan for up to 180 days following the request for an advance; (ii) annual audited financial statements; and (iii) other reports as requested by the fiduciary specialists.

B. Disbursements and cash flow

- 6.2 **Cash flow.** The Financial Management Policy for IDB-financed Projects (OP-273-1) and the Financial Management Operational Guidelines for IDB-financed Projects (OP-274-2) will apply. Grant funds requested from the Bank in the form of advances will be deposited in accounts in dollars held by each PCU and converted into Argentine pesos according to operational requirements. Project expenses and investments will be paid out of these accounts according to plan. The co-executing agencies will maintain strict and effective control over the use of advance funds, using mechanisms that allow them to verify and reconcile the balances in their records with the corresponding balances in the Bank's records (LMS1 report). The e-disbursements modality will be used. This is the Bank's online system that allows the co-executing agencies to prepare and send disbursements requests electronically to the Bank, which lowers transaction costs and allows the Bank to review and process requests remotely.

C. Internal control and internal audit

- 6.3 The national internal control agency is the Sindicatura General de la Nación [Receiver General of Argentina], which carries out its activities in conjunction with the Internal Audit Unit of the SAyDS. All procurements under the program will be supervised on an ex ante basis. When 12 months have elapsed from the initial procurement date, the Bank may opt for ex post review of procurement processes for consulting services, provided the contract amounts are below US\$200,000. For permitted items, ex post control will be based on a sampling of payments from the local contribution as well as payments from Bank funds.

D. External control and reports

- 6.4 The Office of the Auditor General is the senior technical agency for external control of the national public sector. It has a department to oversee borrowing from international financial organizations that conducts financial audits of government projects financed by the IDB-GEF, based on requests submitted annually by the borrower (Ministry of Economy and Public Finances, Division of Projects with International Donor Organizations) and audit agreements signed with co-executing agencies for externally financed programs. The Office of the Auditor General is expected to audit the project. In the event that this proves impossible, in view of the complexity of this operation, a firm included on the Bank's list of eligible auditing firms will be hired through a national competitive bidding process using the model bidding documents and terms of reference

prepared for such purpose by the financial fiduciary unit, as provided in Manual AF-200.

E. Financial supervision plan

- 6.5 The initial financial supervision plan was based on the risk and fiduciary capacity assessments carried out in accordance with the on-site and desk reviews planned for the project. It includes the scope of operational, financial, and accounting actions, compliance and legality, frequency, and responsible parties.

F. Execution arrangements

- 6.6 As described above in Section II of this annex, the project will have two PCUs responsible for administrative and financial processes. One will be set up within the structure of the SAYDS (PCU-SAYDS) for execution of Components 4 and 5. The other will be set up within the SSDUV (JPEU-SSDUV) for execution of Components 1, 2, and 3. Component 1 will be executed on a decentralized basis in the IPVs of the provinces participating in the project, in their capacity as sub-executing agencies.

**ADOPTION OF ENERGY EFFICIENCY AND RENEWABLE ENERGY IN SOCIAL
HOUSING**

AR-G1002

CERTIFICATION

The Grants and Cofinancing Management Unit (ORP/GCM) certifies receipt of the commitment letter dated on April 8, 2014 and sent by the World Bank as trustee to the IADB/Global Environment Facility Fund – GEF (FMM), for project Adoption of Energy Efficiency and Renewable Energy in Social Housing for US\$14,630,855, chargeable against the FMM.

[Original Signed]

05/23/2014

Sonia M. Rivera
Chief

Date

Grants and Cofinancing Management Unit
ORP/GCM

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-____/15

Argentina. GRT/FM-____-AR. Nonreimbursable Investment Financing of the Global Environment Facility (GEF). Energy Efficiency and Renewable Energy in Argentina's Low-Income Housing

The Board of Executive Directors

RESOLVES:

1. That the President of the Inter-American Development Bank, or such representative as he shall designate, is authorized in the name and on behalf of the Bank, as Administrator of the IADB/GEF Fund, to enter into such agreement or agreements as may be necessary with the Argentine Republic, and to adopt such other measures as may be pertinent for the execution of the project proposal contained in document PR-____ with respect to a nonreimbursable investment financing financed with the resources of the Global Environment Facility (GEF) for energy efficiency and renewable energy in Argentina's low-income housing.

2. That up to the sum of US\$14,630,855 is authorized for the purposes of this resolution chargeable to the resources of the IADB/GEF Fund.

3. That the above-mentioned sum is to be provided on a nonreimbursable basis.

(Adopted on ____ 2015)