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Report No: PAD4296

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF
US$ 70 MILLION EQUIVALENT

TO THE

REPUBLIC OF PERU

FOR A

TRANSMISSION INVESTMENT PLAN (PIT) TO SUPPORT POST-COVID-19 GREEN ECONOMIC RECOVERY IN PERU

August 18, 2021

Energy & Extractives Global Practice
Latin America And Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 30, 2021)

Currency Unit =	Peruvian Soles Nuevos (PEN)
3.75 =	US$1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Carlos Felipe Jaramillo
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ABBREVIATIONS AND ACRONYMS

COES	Committee for the Economic Operation of the System
CPF	Country Partnership Framework
CRSE	Multisectoral Commission for the Power Sector Reform
DFC	Directorate of Competitive Funds
DFIL	Disbursement and Financial Information Letter
DGER	General Directorate General of Rural Electrification
EDEs	Public Distribution Companies
E&S	Environmental and Social
EIRR	Economic Internal Rate of Return
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and social framework
ESMF	Environmental and Social Management Framework
ESS	Environmental and Social Standards
FIRR	Financial Internal Rate of Return
FM	Financial Management
FONAFE	National Fund for Financing of State Companies
GBV	Gender-Based Violence
GESTOR	Tailormade Financial Information System
GDP	Gross domestic product
GHG	Greenhouse gas
GRM	Grievance Redress Mechanism
IBRD	International Bank for Reconstruction and Development
IFR	Interim Financial Reports
Invierte.pe	National System Multi-year Programming Investment Management
LAC	Latin American and Caribbean
LMP	Labor Management Procedure
MEF	Ministry of Economy and Finance
MINEM	Ministry of Energy and Mines
MVA	Megavolt Amperes
MW	Megawatt
MWh	Megawatt Hour
NPV	Net Present Value
OGA	General Office Administration
OM	Operational Manual
OSINERGMIN	Supervisory Body of Investment in Energy and Mining
PDO	Project Development Objective
PITs	Transmission Investment Plans
PIU	Project Implementation Unit
PPSD	Project Procurement Strategy for Development
SAIFI	System Average Interruption Frequency Index
SE	Substation
SEP	Stakeholder Engagement Plan
SIAF	Governmental Integrated Financial Management System
STA	Single Treasury Account
T&D	Transmission and Distribution

VME	Vice Ministry of Electricity
WB	The World Bank
WTP	Willingness-To-Pay

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Peru	Transmission Investment Plan (PIT) to support Post-COVID-19 Green Economic Recovery in Peru	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P174812	Investment Project Financing	Moderate

Financing & Implementation Modalities

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

Expected Approval Date	Expected Closing Date
09-Sep-2021	30-Nov-2026

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To increase electricity availability and reliability in selected areas of Peru and support the modernization of the power sector regulatory framework.

Components

Component Name	Cost (US$, millions)
Strengthening and expansion substations and transmission lines	89.59
Technical assistance for regulatory strengthening	1.50
Project management and capacity building	4.00

Organizations

Borrower:	Ministry of Economy and Finance
Implementing Agency:	Ministry of Energy and Mines

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	95.10
Total Financing	95.10
of which IBRD/IDA	70.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	70.00

Non-World Bank Group Financing

Counterpart Funding	25.10
Borrower/Recipient	25.10

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027
Annual	13.88	24.50	21.27	9.61	0.74	0.00

Cumulative	13.88	38.39	59.66	69.27	70.00	70.00

INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change and Disaster Screening

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

COMPLIANCE

Policy

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

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

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

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

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

Legal Covenants

Sections and Description

Section I.A.1 (Project Implementation and Management)

(a) The Borrower, through MINEM/DGER, shall maintain, throughout Project implementation, a Project coordination unit within DFC ("PCU"), in number and with qualifications and responsibilities acceptable to the Bank, as set forth in the Operational Manual, with the responsibility for Project coordination and overall administrative and fiduciary matters, including financial management, social and environmental standards and monitoring and evaluation.

(b) No later than sixty (60) days after the Effective Date, the Borrower, through MINEM/DGER, shall ensure that a Project manager, a technical engineer, a procurement specialist, a legal specialist, a financial management, an environmental specialist and a social specialist are hired to work full time within the PCU, all under terms of reference acceptable to the Bank and as set forth in the Operational Manual and in the ESCP.

Sections and Description
Section I.B (Framework Agreements)

1. To facilitate the implementation of Part 1 of the Project, the Borrower, through MINEM/DGER, shall enter into an agreement with each of the EDEs (the Framework Agreement), which shall establish the responsibility of MINEM and the public distribution companies (EDEs) in the implementation of the Project and the responsibilities of the EDEs in the carrying out of their respective Sub-Projects in accordance with the provisions of this Agreement.

2. The Borrower, through MINEM/DGER, shall exercise its rights and carry out its obligations under each Framework Agreement in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Loan.

Sections and Description
Section I.C (Subtransmission Sub-Projects)

1. For the purposes of carrying out an Subtransmission Sub-Project under Part 1 of the Project, the Borrower, through MINEM/DGER, shall:
(a) deposit the Loan proceeds allocated to Category (1) in the table under SectionIII A. of Schedule 2 to the Legal Agreement, into an escrow account opened specifically for the purpose in a financial institution satisfactory to the Bank, to finance civil works and supervision under the Subtransmission Sub-Projects, pursuant to the relevant Sub-Project Agreement, on terms and conditions acceptable to the Bank and further detailed in the Operational Manual.

(b) after having selected a Subtransmission Sub-Project in accordance with the guidelines and procedures set forth in the Operational Manual and the ESCP, make available to the pertinent EDE a portion of the proceeds of the Loan (the “Subproject Funds”) according to the terms of an agreement (“Sub-Project Agreement”) to be entered into between the Borrower, through MINEM/DGER, and said EDE, under terms and conditions approved by the Bank and included in the Operational Manual.

(c) ensure that each Sub-Project Agreement is prepared based on the model form approved by the Bank and included in the Operational Manual, in which the Borrower, through MINEM/DGER shall:

(i) make available, promptly as needed, the Subproject Funds for the carrying out of the Subtransmission Sub-Projects;

(ii) obtain rights adequate to protect its interests and those of the Bank, including the right to suspend or terminate the right of the EDE to use the proceeds of the Subproject Funds, and/or obtain a refund of all or any part of the amount of the Subproject Funds then withdrawn, upon the EDE’s failure to perform any of its

obligations under the Sub-Project Agreement;

(iii) require each EDE to carry out its pertinent Subtransmission Sub-Project with due diligence and efficiency and in accordance with sound technical, economic, environmental and social standards and practices satisfactory to the Bank, including in accordance with the provisions of the Anti-Corruption Guidelines (applicable to recipients of Loan proceeds other than the Borrower), and the ESCP, including any environmental and social instruments referred to therein, as appropriate;

(iv) require each EDE to procure the works and consultants' services to be financed out of the Subproject Funds in accordance with the provisions of this Agreement;

(v) require each EDE to obtain the national permits and licenses required to implement the Subtransmission Sub-Projects;

(vi) maintain adequate records to reflect the operations, the resources and expenditures in respect of the Subtransmission Sub-Project and maintain adequate reporting in accordance with the standards specified in the Operational Manual;

(vii) assure the right of the PCU to inspect, by itself or jointly with DGER and the Bank, if the Bank shall so requests, the works, sites and constructions included in the activities financed by the Subtransmission Sub-Projects, the operations thereof and any relevant records and documents;

(d) exercise its rights and carry out its obligations under each Sub-Project Agreement in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Loan. Except as the Bank shall otherwise agree, the Borrower, through MINEM/DGER, shall not assign, amend, abrogate, waive, terminate or fail to enforce any Sub-Project Agreement or any provisions thereof.

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	(a) The Operational Manual has been finalized and, thereafter, adopted by MINEM/DGER, in a manner acceptable to the Bank.
Type	Financing source	Description
Effectiveness	IBRD/IDA	(b) The Terms of Reference for the PCU key staff pursuant to Section I.A.1(a) of Schedule 2 of the Legal Agreement and the Operational Manual have been finalized in a manner satisfactory to the Bank.
Type	Financing source	Description
Disbursement	IBRD/IDA	Notwithstanding the provisions of Part A of the Legal Agreement, no withdrawal shall be made: (i) for payments made prior to the Signature Date; and

		(ii) for Eligible Expenditures under Category (1) until the following condition has been met in respect of said expenditures, namely that the financial institution referred to in Section C 1 (a) in Schedule 2 to the Legal Agreement has been selected by the DGER and said selection has been approved by the Bank.
Type Effectiveness	Financing source IBRD/IDA	Description Each of the eight Framework Agreements as identified under the Operational Manual has been entered into between the Borrower, though MINEM/DGER, and each of the public distribution companies (EDEs) that is a party thereto.

I. STRATEGIC CONTEXT

A. Country Context

1. **Peru has been one of the fastest growing economies in the Latin American and Caribbean (LAC) region over the past few decades, but the current COVID-19 crisis has caused significant setbacks.** Gross domestic product (GDP) grew at an average annual rate of 5.1 percent from 2002 to 2019, enabling Peru to reach upper-middle-income status and more than double per capita income. Peru has also been one of the most macroeconomically stable countries in the LAC region. With a population of 32 million, much of the country's inhabitants and economic activities are concentrated in major cities such as the capital Lima,[1] but there are large development disparities across the country.[2] Peru experienced significant gains in poverty reduction from 2007 to 2019, with national poverty rates declining from 42.4 percent to 20.2 percent of the population. Despite this progress, the Peruvian economy is now being severely affected by the impacts of the COVID-19 pandemic. These setbacks could jeopardize the country's development gains achieved as well as post-pandemic economic recovery.

2. **The COVID-19 pandemic caused a deep economic recession during 2020, due to both the reduction in global demand and the impact of the lockdown measures.** Peru imposed a longer and more generalized lockdown than many countries from March-May 2020 and had to implement further lockdown measures in February 2021 to confront a second wave of COVID-19 cases, which has come at a high economic and social cost. Peru's GDP contracted by 11.6 percent in 2020 but is expected to return to growth of around 8.1 percent in 2021[3] provided there is effective containment of the second COVID-19 wave. Total employment fell by 40.1 percent (about 7.1 million workers) by June 2020 and earnings declined substantially for those who remained employed and are yet to return to 2019 levels.[4] To mitigate the adverse impact of the COVID-19 crisis on the poor and the economy, the Government introduced a strong economic policy package of monetary, fiscal, and financial measures, equivalent to about 20 percent of GDP. Public debt also increased to over 30 percent of GDP in 2020. Return to pre-crisis economic growth rates will take time given the scope of the impacts, continuation of the COVID-19 pandemic, economic recession, and the political uncertainty in Peru caused by past and current election events. Indeed, the economy is not expected to fully return to pre-COVID-19 output levels until 2023.[5]

3. **The power sector is essential to supporting both the COVID-19 response by providing reliable electricity supply to enable functioning of health facilities and the post-COVID-19 economic recovery by enabling productive activities needed for economic recovery and meeting the social needs of the population, especially in lagging regions.** Many of the COVID-19 sanitary prevention and protection measures require reliable and continuous electricity service, including for Intensive Care Units (ICUs), vaccine and medicine refrigeration, and water supply and sanitation facilities, as well as enabling distance education and work. Moreover, the electricity sector powers the country's productive activities, including the industrial and services sector,[6] which account for

[1] Lima accounts for an estimated 42 percent of the country' GDP *(source: Peru Systematic Country Diagnostic. WBG. 2017).*
[2] Peru - Systematic Country Diagnostic (English). Washington, D.C.: World Bank Group. 2017 (accessed at: *https://openknowledge.worldbank.org/handle/10986/26376?locale-attribute=en*).
[3] World Bank projections and estimates (February 2021).
[4] According to INEI, at the end of 2020, employment in Lima Metropolitana was around 1.13 million below the 2019 levels, while average monthly income was around 7.4 percent lower compared to 2019.
[5] Based on World Bank staff estimates from Equitable Growth, Finance and Institutions (EFI) unit analysis of Peruvian Economy in the midst of COVID-19.

the bulk of the country's GDP. At the national level, over half (55 percent) of businesses, including small and medium sized enterprises surveyed, indicated that electricity was a key constraint to doing business, including in the about 28 percent of businesses run by women. Many of these businesses suffer from electricity supply disruptions and insufficient power to meet their needs due to significant electricity system investment lags over the years. This situation has economic repercussions as it leads to service disruptions and suppressed (unmet) electricity demand that constrains firm productivity and output. Ensuring electricity service availability and reliability to power businesses and industries, especially in regions suffering from poor service quality and supply restrictions, is thus essential to economic recovery in the post COVID-19 context and more inclusive regional development and competitiveness in Peru.

4. **Improving the reliability and resilience of the power sector in lagging regions can also contribute to transitioning to a greener, more resilient, and inclusive post-COVID-19 recovery and to preventing potential setbacks due to Peru's vulnerability to climate and natural hazards.** Investment lags by public distribution companies have undermined the resiliency of many electricity systems to both meet electricity demand in a reliable manner and to withstand the risks of natural climate shocks. To cope with meeting demand, public distribution companies resort to using expensive, polluting, and inefficient self-generation typically from diesel generation sets, which increases greenhouse gas (GHG) emissions and operating costs. Polluting and costly diesel generation has been installed to avoid emergency situations and outages in various regions of the country and will need to be installed in many more areas of the country if urgent distribution system investments are not made by 2023. In addition, distribution networks are exposed to climate disaster risks (such as extreme precipitation, recurring flooding, landslides linked to the recurrent 'El Nino' phenomena, increasing temperature) which are likely to affect electricity service provision. Following a climate disaster, including as evidenced by the 1997-98 El Niño flooding, long outages of electricity services can severely affect relief and recovery activities that are critical to societal and economic wellbeing.[7] According to Peru's National Infrastructure Plan for Competitiveness (PNIC), the country's long-term basic energy infrastructure gap[8] amounts to US$ 2.1 billion and this gap will be higher if it included investments needed to maintain and retrofit existing infrastructure so they are better able to withstand and respond[9] to natural disasters and climate-induced shocks. Investments in electricity system infrastructure are needed to both strengthen the resilience of these systems and avoid installation of GHG-intensive emergency diesel generation, which will be key to ensuring green, low-carbon and climate resilient development as the country recovers from the COVID-19 pandemic.

B. Sectoral and Institutional Context

5. **The core of Peru's energy sector institutional and regulatory framework was established in 1992, creating much of the current electricity market structure and institutions.** The Ministry of Energy and Mines (MINEM) is the main policy institution in charge of energy sector policies, planning, and investment promotion. The Supervisory Body of Investment in Energy and Mining (OSINERGMIN) is the independent regulator responsible for tariff setting and supervising service quality, including information on systems interruptions and outage indicators throughout the country. The electricity sector is unbundled with separate generation, transmission, and distribution companies. There is substantial private sector participation in the generation and transmission segments. The distribution sector is operated by both private and public companies, with private companies

[7] These findings were evidenced in the recent "Energy Sector Resilience Diagnostic" and the "Energy Sector Risk Profile" prepared for the Peru Energy Sector Resilience ASA (P172702).
[8] The investment needed to close the existing gap between Peru and developed countries.
[9] https://www.mef.gob.pe/contenidos/inv_privada/planes/PNIC_2019.pdf

serving the nation's capital Lima and Ica, and the public companies serving the rest of the country.

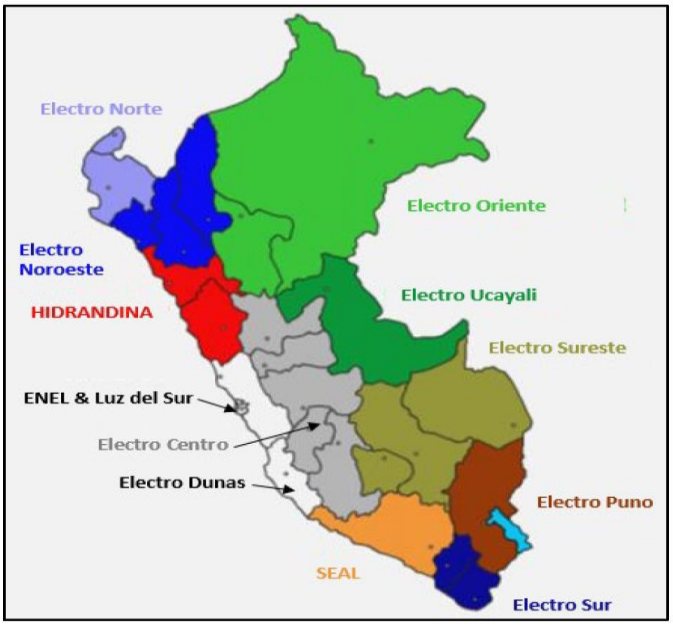
6. **Over the past few decades, the Peruvian energy sector has been showing an increasing need for modernization which could support a Green, Resilient, and Inclusive economic recovery.** The Peruvian electricity system's regulatory framework was established in 1992 and over the last twenty-seven years has been subject to numerous modifications and adjustments to address gaps that emerged. These adjustments were done in a piecemeal fashion and as a result the current framework is now a patchwork of different regulatory measures and this has begun to impair the long-term efficiency of the power sector. The MINEM established a Multisectoral Commission for Power Sector Reform (CRSE) to develop a comprehensive action plan to modernize the power sector's institutional and regulatory framework to: (i) enhance energy sector reliability and competitiveness; (ii) facilitate greater insertion of renewable energy technologies, including utility scale renewables interconnected to the grid and the need for ancillary services; (iii) spur the uptake of innovative technology such as decentralized renewable generation for industries, commercial and residential customers, and the use of smart meters and electric mobility; and (iv) consolidate transmission regulations to facilitate development of transmission investments and interconnection with neighboring countries. These measures are needed to modernize and green the energy matrix in Peru, while at the same time will serve to attract greater private investment in the energy sector.

7. **The CRSE established four priority reform areas that will enable development of a greener and more resilient energy matrix, and increased private sector participation and investment**. These priority areas include: (i) strengthening of the energy sector's institutional framework; (ii) wholesale power market transformation; (iii) distribution innovation and commercialization; and (iv) management and simplification of transmission regulation. As part of its energy sector engagement in Peru, the World Bank (WB) has been providing technical assistance to the MINEM and CRSE to support the energy sector reform program, including preparing conceptual frameworks with initial proposals and recommendations that will contribute towards greening of the energy matrix and increased private sector participation. Conceptual Framework proposals included adjustments to Peru's wholesale electricity markets regulation to increase competition to facilitate greater participation of renewable generators, including for providing ancillary services, and to allow greater participation by small scale private producers, unregulated consumers, and investors to enhance market competitiveness and spur investment. In terms of distribution, proposals also include the review of regulations to facilitate the development of decentralized renewables, including to allow smaller private actors to participate in retail and installation of renewables for households and businesses. To this end, proposals were made to adjust the tariff structure to enable recovering the costs of innovation projects, including for renewables, smart meters, among other technologies to provide investors greater certainty that the costs of these investment can be recovered to spur private investment. In terms of institutional strengthening the separation of supervisory and regulation functions was proposed, as well as improvements towards integrated planning for the energy sector to co-optimize the electricity and gas sectors. To support the strengthening of the public distribution companies, a proposal to separate ownership from management and operations of distribution assets was also made where performance contractors (concessionaires) will be required to meet quality of service standards (see Annex 6 for more details).

8. **The electricity distribution sector consists of twenty-two electricity distribution companies serving most of the territory and population of Peru.** Four private distribution companies (Luz del Sur, ENEL, Electro Dunas, and COELVISAC) service the Lima metropolitan area as well as Ica. Eleven (11) state-owned distribution companies are managed by the state holding corporation, the National Fund for Financing of State Companies (FONAFE) and can be classified as follows: (i) DISTRILUZ, an association of four (4) distribution companies (Electro Noroeste,

Electro Norte, HIDRANDINA and Electro Centro) which provides electricity service to 12 of the country's 24 departments; (ii) a second group of distribution companies that each operate independently in their concession areas, located in the southern and eastern areas of Peru (SEAL, Electro Sureste, Electro Sur, Electro Puno, Electro Oriente and Electro Ucayali); and (iii) ADINELSA which operates rural distribution systems. In addition to these main companies, smaller distribution companies, some private and some municipality-owned, serve other areas.

Figure 1. Geographic Areas of Main Distribution Companies



Source: Ministry of Energy and Mines

9. **The distribution sector shows significant disparities in electricity service quality provided to clients served by public utilities compared to those served by private utilities**. While the energy sector reforms of the early 1990s led to the privatization of many energy assets in Peru, the privatization effort stalled in the distribution sector. Attempts to privatize the country's regional distribution companies (those outside Lima and Ica regions) were unsuccessful due to strong regional public protests as well as underlying governance, operational, and market conditions that made them insufficiently attractive to the private sector. Although the private distribution companies operating in the Lima and Ica region provide service quality at the top of the benchmark across the LAC region, public distribution companies, which serve the majority of electricity consumers (62 percent of electricity clients), are ranked much lower in terms of service quality. These public utilities serve 75 percent of the country's *Fondo de Compensación Social Electrica* (FOSE) customers, a cross-subsidy program created to benefit the country's poorest electricity users. The public distribution companies' System Average Interruption Frequency Index (SAIFI) is between 2.5 to 6 times higher than the leading private distribution companies in Peru, and System Average Interruption Duration Index (SAIDI) is between 1.5 to 4 times higher than the private distribution companies. The number of annual complaints by customers of these public distribution companies also increased more than threefold over the 2013-2018 period (from 318 to 1,170).

10. **An important factor contributing to the electricity service deficiencies and inequity is the limited**

implementation of the public distribution companies' Transmission Investment Plans (PITs).[10] There are an estimated US$123 millions of delayed subtransmission investments in the PITs 2013-2017 and 2017-2021 that are approved by the regulator OSINERGMIN every four years and should be executed by the distribution companies. These investment delays are caused by various factors including: (i) public distribution companies do not have access to medium- and long-term financing due to restrictions on indebtedness and budgetary policies of the public sector; (ii) the investment needs from the PITs are greater than the investment budgets assigned annually by FONAFE given competing funding needs from other public entities and concerns regarding the ability of the public distribution companies to fully execute the public funding provided; and (iii) the relatively small size and fragmented nature of individual investments, which limit the interest of the private sector to finance these investments (through PPPs).[11]

11. **Accelerating the overdue PIT investments is critical to increase subtransmission system capacity, reduce transformer overloading and transmission line congestion, and offset the need to add costly and emission intensive emergency thermal generation.** Limitations on the availability and reliability of electricity are hindering the capacity to provide service to meet suppressed demand from existing customers, expand services to attend new customers, as well as respond to supply disruptions. To cope with this situation, public distribution companies resort to procuring costly and polluting on-site diesel generation which is not efficient, especially when the service supplied by the electricity matrix is intrinsically greener as it is based mostly in hydropower and renewables (65 percent) and natural gas (35 percent) all of which are more efficient and cleaner than diesel. As the COVID-19 economic reactivation proceeds it will be crucial to accelerate the execution of the delayed PITs investments to reduce the risks of supply disruptions and respond to suppressed and new demand with reliable and greener electricity supply, as explained below.

12. **Subtransmission system investment lags hinder the ability of the public distribution companies to meet both existing and new demand.** The new capacity that could be added just from financing priority transformer replacements in the 2013-17 and 2017-2021 PITs could increase power system capacity by 477 Megavolts amperes (MVA), equivalent to 6 percent -about 430 Megawatts (MW)- of the country's peak demand. Making the delayed PIT investments to increase subtransmission system capacity is thus critical to meeting the electricity needs of existing and new customers and avoiding potential supply disruptions. To compensate electricity customers for the supply restrictions, Peru's distribution companies are required to pay fines, which are additional to fines for the PIT investment delays; this increases the overall costs of service provision, while quality of service continues to deteriorate. Public distribution companies such as Electrosur, Electro Oriente, Hidrandina, and SEAL (companies with bulk of priority PIT investments) served about 42 percent of households and accounted for a third of these fines in recent years.

13. **The public distribution companies' electricity supply constraints exacerbate inequalities in poorer Peruvian regions and pose a constraint to achieving more inclusive growth and shared prosperity, particularly in the context of post-COVID-19 economic reactivation.** The regions served by the public distribution companies

[10] This is limited to the Transmission Investment Plan (PIT) investments of the public distribution companies that are part of the Secondary Transmission System (SST) and Complementary Transmission System (SCT) that are part of the concession areas of the distribution companies.

[11] Legally each public distribution company is responsible for the provision of their subtransmission asset and therefore the bundling can only take place within the investments of each of the distribution companies, which limits the size of the investment packages and limits the interest from the private sector. Proinversion has previously attempted to tender some subtransmission investments without successful results.

are among the poorer in Peru,[12] and concentrate 75 percent of FOSE customers. The main economic activities (e.g. services, commerce, manufacturing industries, agricultural activities and natural resources extraction) require reliable electricity service.[13] At the national level over half (55 percent) of businesses, including small and medium sized enterprises surveyed, indicated that electricity was a key constraint to doing business, including in the about 28 percent of businesses run by women. In the regions served by the public distribution companies, where urgent electricity system investments are needed, over 70 percent of businesses indicated that electricity was a key constraint to doing business.[14] The main electricity service issues indicated by businesses included: (i) non-programmed interruptions/cuts in electricity service; (ii) programmed interruptions/cuts in electricity service; and (iii) fluctuating voltage intensity.[15] The service interruptions and voltage fluctuations impact operations and can damage equipment, affecting the productivity of these enterprises, which in turn has a negative impact on local economies and further exacerbates economic inequality across subregions.

14. **Moreover, the lack of subtransmission investments by the public distribution companies has also resulted in emergency situations where polluting and costly diesel-based generation is required to prevent service disruptions.** Several emergency situations already occurred in 2019 and 2020, where diesel-based emergency generation had to be installed in Piura and commissioning of a thermal power plant had to be expedited in Pisco to reduce the risk of supply disruptions caused by delays in subtransmission system investments (see Annex 5). System reliability charges for the emergency measures in Piura alone in 2019 amounted to approximately US$4.4 million; these costs are borne by electricity consumers through a reliability surcharge on tariffs over a 12-month period. Although these measures helped alleviate the short-term emergency situations, they resulted in increased electricity supply costs and increased GHG emissions and local pollution given the additional thermal diesel on-site generation capacity. If priority subtransmission investments continue being delayed, then emergency situations are likely to increase, as many of the systems are already overloaded or will become so in the next two years (see Annex 4). The PIT investments will allow customers to be supplied by existing power plants connected to the national interconnected electricity system (SEIN), which is predominately supplied by cleaner energy resources such as hydropower (59.6 percent), natural gas (34.4 percent), and non-conventional renewables (5.25 percent) instead of more polluting, costly, and inefficient on-site diesel generation.[16] The avoided diesel generation obtained through making these priority PIT investment to be able to supply suppressed electricity demand during peak hours through the national grid instead of using installed on-site diesel power generation will be about 455,671 Megawatt Hour (MWh), resulting in lifetime estimated net GHG emission reductions of 309,704 tCo2.

15. **The COVID-19 pandemic has increased the urgency of executing the delayed PIT investments to ensure adequate and continuous electricity service to meet the fundamental social needs of the population, including the vulnerable population in many regions of the country.** Although the delayed PIT investments were carried over from past years, the pandemic aggravates the situation as many health facilities and information, communication and technology (ICT) services that are key to COVID-19 response and recovery require continuous

[12] In the regions of Amazonas, Ancash, Arequipa, Ayachuco, Cajamarca, Junín, La Libertad, Moquegua, Madre de Dios, Piura, Puno, San Martin, Tacna, and Ucayali.
[13] Instituto Nacional de Estadística e Informática. Sistema de Información Económica – PBI de los Departamentos, según actividades económicas (accessed at: *https://www.inei.gob.pe/estadisticas/indice-tematico/economia/*).
[14] Instituto Nacional de Estadística e Informática. Sistema de Información Económica – PBI de los Departamentos, según actividades económicas (accessed at: *https://www.inei.gob.pe/media/MenuRecursivo/publicaciones_digitales/Est/Lib1430/index.html*)
[15] Instituto Nacional de Estadística e Informática – Encuesta Nacional de Empresas 2015. (accessed at: https://www.inei.gob.pe/media/MenuRecursivo/publicaciones_digitales/Est/Lib1430/index.html)
[16] COES. "Estadistica de operacion 2020" (accessed at: *https://www.coes.org.pe/Portal/publicaciones/estadisticas/estadistica2020#*)

electricity supply to function. Adequate and reliable power is required for continuous functioning of health facilities, including for ICUs, vaccine and medicines refrigeration, and water supply and sanitation facilities. Furthermore, electricity service reliability is essential for providing internet service to enable home-based work and virtual education while schools remain closed due to COVID-19 risks. Twenty-two cities in Peru face serious electricity service availability and reliability issues, affecting the provision of electricity service to the 245 health facilities (with 5,108 hospital bed capacity) and 1,487 educational centers (446,150 students) as well as 3 million residents in these cities.

16. **Various systemic challenges underpin the lack of investments and suboptimal performance of the public distribution companies, which will require a comprehensive assessment to determine options for tackling governance, operational, and commercial issues**. Key challenges can be summarized as follows: (i) institutional governance limitations (for instance, frequent changes in senior management); (ii) limited business management capacity, including project management, planning, engineering, contracting, etc.; (iii) financial and investment management limitations due to long-term debt restrictions and limited internal generation of resources; (iv) legal restrictions on ownership that limit the amount of private shareholding; and (v) regulation and supervision limitations given uniform treatment of public and private companies despite different managerial and financing situation. In addition, the measures implemented to provide relief to consumers during the COVID-19,[17] such as reduced demand and lower collection rates, has negatively impacted the public distribution companies' finances and further delayed the investments needed to maintain electricity service supply and reliability and meet new demand.

17. **There is strong institutional support from key energy agencies for executing the delayed PIT investments and undergoing the needed regulatory reforms**. The MINEM, FONAFE, the public distribution companies, and OSINERGMIN all recognize the urgency to finance these delayed investments to avoid electricity supply disruptions, service quality issues and associated fines, and are also cognizant of the fact that these investments are even more urgent today given the COVID-19 response and recovery context. These entities therefore have a strong interest in finding ways to ensure long-term financing to execute these investments while at the same time ensuring a more sustainable mechanism to avoid delays in the upcoming 2021-2025 PIT program. There is also strong support at the Ministry of Economy and Finance (MEF) level given the urgent need for these PIT investments to close electricity infrastructure gaps in an efficient manner, ensure reliable electricity service to health facilities as well as the provision of essential basic services for the population and for businesses. Similarly, the electricity sector reform program is one of the top priorities of the MINEM, particularly given strong pressure from the private sector and other electricity sector stakeholders to address regulatory gaps and market inefficiencies. This includes strengthening of the public distribution companies and finding structural solutions for sustainable financing of the PIT investments going forward. The reform program is also supported by CRSE, which is comprised by representatives from the main electricity sector institutions in Peru as well as from the MEF, thereby helping ensure broad-based support for implementing reforms measures moving forward.

18. **The MINEM together with the public distribution companies identified 24 priority investments from their delayed PITs to support post-COVID-19 recovery in Peru, as well as technical assistance needed to support the Government's energy sector reform efforts, that will be financed under the proposed Project.** The subtransmission investments are comprised of transformer replacement and expansion, strengthening of existing

[17] The government implemented measures included: (i) mandatory electricity service provision without interruption during the entire national lockdown period from March to June 2020; (ii) deferring electricity payments during the lockdown for regulated electricity customers consuming up to 300 kWh/month and allowing for spreading repayments over a 24-month period.

substations and repowering of transmission lines, and new substations and transmission lines. The Project will also expand upon the ongoing energy sector reform technical assistance the WB has been providing to the MINEM to assist the Government in furthering its energy sector reform objectives, building from the conceptual frameworks developed for the four priority reform areas.[18] The expansion of the regulatory work will identify measures to facilitate the modernization of the sector, and to address systemic issues affecting the public distribution companies and their ability to access the necessary financing for the PITs.

C. Relevance to Higher Level Objectives

19. **The proposed Project is well aligned with the WB's FY17-FY21 Country Partnership Framework (CPF) for Peru[19] and the Performance and Learning Review of Peru (Report No. 135267-PE)[20].** The Project will contribute to meeting the objective under Pillar I 'Productivity and Growth' by enhancing the environment for sustainable private sector investments in 10 regions of the country.[21] The Project also contributes to address one of the key areas of the Peru Strategic Country Diagnostic,[22] 'Improving connecting infrastructure and public services' as it will help overcome gaps in electricity service availability and reliability, in particular at the regional level. The improved electricity service reliability will also contribute to the continuous functioning of health facilities and enable home-based work and virtual education that are critical to the COVID-19 response and mitigation efforts. The Project will also contribute to CPF's Pillar III 'Natural Resource and Climate Change Risk Management' as the electricity subtransmission system investments will offset the need to install emergency on-site diesel generation needed to prevent supply disruptions and meet existing and new electricity demand. The preparation of a Systematic Country Diagnostic Update is underway, although it has been slowed by the pandemic and will be delivered in Fiscal Year 2022, to be followed by a new CPF.

20. **The power sector regulatory and institutional reform support will also contribute to greening and mitigating GHG emissions from the electricity matrix as well as maximizing financing for development (MFD)** by enabling greater private sector participation in wholesale electricity markets (including renewable generators) and establishing the regulatory framework that will enable private investment in decentralized renewable energy provision, contributing to diversification of the energy mix in Peru. In addition, it is consistent with the Government's Strategic Priorities in the National Plan 2016-21 under the thematic area 'Jobs, Formalization & Economic Growth,' that aims to boost economic activity, including through: (i) accelerating the implementation of large investment projects to close infrastructure gaps; (ii) increasing public investment execution rates of the total allocated budget; and (iii) supporting regional development and competitiveness. Furthermore, it is aligned with the Government's PNIC, and the National Competitiveness and Productivity Plan[23] and PITs.

21. **The proposed Project is also fully aligned with the approach set out in the World Bank Group's paper 'Saving Lives, Scaling-up Impact and Getting Back on Track World Bank Group COVID-19 Crisis Response.'**[24] The

[18] The four priority reform areas include: (i) strengthening of the energy sector's institutional framework; (ii) wholesale market transformation; (iii) distribution innovation and commercialization; and (iv) management and simplification of transmission regulation.
[19] Report No. 135267-PE Discussed by the Executive Board of Directors on May 2, 2017.
[20] Report No. 135267-PE Discussed and approved by the Executive Board of Directors on April 25, 2019
[21] Ancash, Arequipa, Junin, La Libertad, Piura, Puno, San Martin, Tumbes, Tacna, Ucayali.
[22] Peru - Systematic Country Diagnostic (English) (Report No.112694-PE). Washington, D.C.: World Bank Group. 2017 (accessed at: https://openknowledge.worldbank.org/handle/10986/26376?locale-attribute=en).
[23] Plan Nacional de Competitividad y Productividad 2019-2030 (accessed at: https://www.mef.gob.pe/concdecompetitividad/Plan_Nacional_de_Competitividad_y_Productividad_PNCP.pdf)
[24] link

proposed Project is directly related to its Pillar 3, 'Ensuring Sustainable Business Growth and Job Creation', through enabling critical investments needed to ensure the continuity, resilience and sustainability of electricity services required to power the economy and, especially in lagging regions. Given the public distribution companies' financial constraints that have been compounded by the COVID-19 crisis, the Project is critical to increase capacity and reliability by financing priority investments, which is key to securing the economy by sustaining productive activities and business operations, that will also have a direct and positive impact on competitiveness, growth and job creation. The proposed Project is also aligned with Pillar 4 of the Approach Paper, 'Strengthening Policies, Institutions and Investments for Rebuilding Better', by identifying energy sector reform measures needed to increase the competitiveness of the power sector, improve the systemic issues related to service delivery from the public distribution companies – including those systemic issues affecting the PIT investment delays - to support the modernization of an efficient power sector.

22. **The proposed Project is aligned with the WB's priorities stated in 'Saving Lives and Livelihoods while Supporting Green, Resilient and Inclusive Development (GRID)'** as it supports: (i) the use of greener sources of energy by displacing on-site diesel generation which will be required to meet suppressed and future demand if no investments were made in the public subtransmission network; (ii) provision of continuous and resilient electricity service required to power the economic recovery and to address the large quality of service gap faced by households and businesses in the poorer regions; and (iii) sustained health services, and remote learning and work which can create inclusive development opportunities among the population served by the public utilities, especially those more vulnerable.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

23. The project development objectives are to increase electricity availability and reliability in selected areas in Peru and support the modernization of the power sector regulatory framework**.**

PDO Level Indicators

24. Progress towards the PDO will be monitored according to the following indicators: (i) electricity capacity (MVA); (ii) Transmission System Average Interruption Frequency Index (SAIFI; number); (iii) customers provided with new or improved electricity service (number); and (iv) submission of regulation for modernizing the energy sector regulatory framework for legislative or ministerial approval (text).

B. Project Components

25. **The proposed Project will finance priority electricity system investments needed to increase the availability, reliability, and climate resilience of the power system and ensure a greener, less GHG-intensive electricity supply in selected subtransmission segments. It will also provide technical assistance to support the Government's energy sector reform efforts to bolster post-COVID-19 recovery in Peru.** It will do so through the three components[25] described below.

[25] The term 'Components' is understood by the government as the term 'Parts' under the Legal Agreement.

26. **Component 1: Strengthening and expansion of substations and transmission lines (US$65 million IBRD, US$24.59 million public distribution companies).** This component will finance priority subtransmission investments of the FONAFE-managed public distribution companies included in the PITs (2013-2017 and 2017-2021), which are at high risk of reaching emergency alert status between now and 2023 due to overloaded transformers, electricity demand levels that exceed the capacity of these systems, and risks of disruptions due to flooding, mudslides and other climate-induced shocks, which are likely to result in service disruptions if no investments are made. These investments will reduce the need for installing more polluting and less efficient on-site emergency diesel generation that will otherwise be needed to meet electricity demand and prevent electricity service disruptions. The PIT investments will include: (i) expansion and strengthening resilience of existing power transformation substations; (ii) repowering of existing transmission lines within existing rights of way; (iii) construction of new substations; and (iv) installation of new transmission lines in urban, peri-urban, and rural areas. All investments will include siting and design specifications to improve resilience to flooding, mudslides, and other climate-induced shocks.[26] This component will also finance: (i) technical specifications development and bidding documentation preparation to enable the investments referenced above; and (ii) environmental and social documentation to comply with the WB's Environmental and Social Framework (ESF).

27. Twenty-four priority investments have been identified by MINEM and the public distribution companies that are part of the delayed PIT investments. The selection criteria used to choose the PIT subprojects are as follows: (i) public distribution company PIT investments approved by OSINERGMIN are justified through technical (market study and operational conditions) and financial evaluations; (ii) delayed investments within the PIT and confirmation that these are not yet executed; (iii) substation transformers that are overloaded or at high risk of becoming overloaded over the next 2 years thereby putting at risk electricity service provision and transmission lines that are congested; and (iv) compliance with established environmental, social and climate change[27] eligibility criteria. Priority was also given to projects that are more advanced in terms of meeting the necessary national technical and environmental, social, and climate resilience investment criteria. These priority PITs investments are located in 10 regions of Peru that include Ancash, Arequipa, Junín, La Libertad, Piura, Puno, San Martin, Tumbes, Tacna, Ucayali (see Annex 2 for more details),[28] regions where monetary poverty rates ranged

[26] Substation design studies will incorporate climate risks and vulnerabilities (including flooding, mudslides, higher temperatures) in the analyses and the engineering design will be factored in these risks when determining the optimal siting of substations, and technical design standards to ensure they are sufficiently robust to risks identified and ensure compliance with the country's service quality and reliability standards. Electricity system towers and lines will adhere to sound technical criteria to mitigate risks and will be located away from high-risk flood areas. In addition, the technical specifications of new substation and subtransmission investments included in the bidding documents will include design specifications and criteria to avoid or mitigate the climate risks identified. For instance, depending on the specific risks identified, the technical specifications included in the bidding documents for substation equipment and materials installation might require equipment with more rigorous design standards or higher installation heights for connectors, isolators, and transformer cells, capacitor banks, and controls or certain types of transmission poles or heights. The specific technical requirements will be determined based on the engineering design studies

[27] The climate resilience of the substations and investments under this component will be verified through these studies which will inform the final selection and design of the specific subprojects. A climate and disaster risk screening for the 24 investments will also be undertaken to determine their exposure to and likelihood of these risks occurring. The screening will characterize the exposure of these investments to hazards (including flooding, mass movements/mudslides, higher temperatures). This screening will allow for determining the relative risk of these investments to these hazards, and if additional resilience measures might be needed.

[28] Some regions where priority PIT investments were identified may be exposed to flooding and mass movement (mud/landslide) risks. For instance, coastal region of Peru is more exposed and likely to be impacted by flooding and mass movements caused by El Nino events. Thus, PIT investments in Tumbes, Piura, Tacna, and in coastal areas of Arequipa could be more vulnerable due to the risks to transmission systems posed by climate change. Likewise, certain districts in the department of Junín have high flood risks, therefore it will be important that PIT investments financed under the Project are not sited in high-risk locations.

from 18.6 to 42.6 percent in 2020.[29] A phased approach was agreed, where appraisal of the first 7 subprojects is undertaken during project preparation and all technical, fiduciary, environmental, climate resilience, and social requirements completed before the launch of the first bidding package.

28. **Component 2: Technical Assistance for Regulatory Strengthening (US$1 million IBRD, US$0.5 million MINEM).** This component will provide financing for technical assistance to support the modernization of the electricity market, including regulatory reforms to strengthen the public distribution companies. These studies will be carried out in coordination with the Vice Ministry of Electricity (VME) and the CRSE. This component will finance analytical and advisory support to assist the MINEM and CSRE with developing a comprehensive plan of reform measures needed to modernize the power sector's institutional and regulatory framework, including its resilience to climate change.[30] It will build upon the conceptual frameworks being prepared under the WB's ongoing advisory support to MINEM to support strengthening the institutional framework, wholesale market transformation, and modernization of the distribution sector.[31] This support will also assist in identifying systemic measures for overcoming the financial and institutional constraints facing the distribution companies – thereby supporting a sustainable solution to reduce risks of new PIT investment delays in the longer-term. This will include assessing alternatives and reform measures that go beyond the current public distribution company structure to also consider ways in which performance could be improved through options such as involving the private sector in management and operation of the public distribution companies or mechanisms to package subtransmission investments so they will be tendered out under PPP approach, among other. This component will also contribute to greening of the energy matrix and to MFD by furthering reform measures that will facilitate: (i) greater participation of private renewable energy generators in electricity wholesale markets; and (ii) private actors to invest in decentralized renewable energy generation or other innovative technologies such as smart meters, battery storage, and electric vehicles. The MINEM and CRSE will continue to be the technical focal points responsible for implementing the work, with guidance from WB and external local and international experts. Working sessions and stakeholder consultations will be held to build consensus with sector stakeholders on the recommended measures and gain support for sectoral reform.

29. **Component 3: Project management and capacity building (US$ 4 million IBRD).** This component will support the effective Project implementation and management, including: (i) project management unit; (ii) fiduciary oversight, including procurement and financial management, and monitoring of environmental and social aspects of the subprojects, including their resilience to climate change; and (iii) project monitoring and evaluation activities. Capacity building and training will also be provided to MINEM and public distribution companies on technical, fiduciary, and environmental and social aspects to ensure compliance with WB's requirements and support project implementation. This will include training and support provided by the WB team to the General Directorate of Rural Electrification (DGER) and its Directorate of Competitive Funds (DFC) as well as the public distribution companies, particularly during the first year of project implementation to ensure they have sufficient capacity to carry-out their financial management, procurement, and environmental and social management functions. Additional training will also be provided to works contractors and supervisors by the

[29] World Bank calculations based on National Survey Institute (INEI) figures for 2020.

[30] During FY20 work was undertaken through the "Peru Energy Sector Resilience ASA (P172702)" that identified gaps in energy sector policies and institutional capacity specifically related to climate disaster risk management (e.g. floods, landslides, earthquakes, tsunami). Future assessment work as part of the energy sector reform support will be undertaken to assess how the recommended energy sector resilience and adaptation measures can incorporated into national policies, plans, and commitments, which will be included as part of the White Book that will be prepared under this Component to guide the electricity sector reform program.

[31] Ongoing technical assistance activities on energy sector reform support being provided by the World Bank financed through ESMAP, PPIAF, and SFLAC trust-fund support.

DGER-DFC to ensure effective implementation of the Project's environmental and social instruments and compliance with the environmental and social standards applicable to the Project.

C. Project Beneficiaries

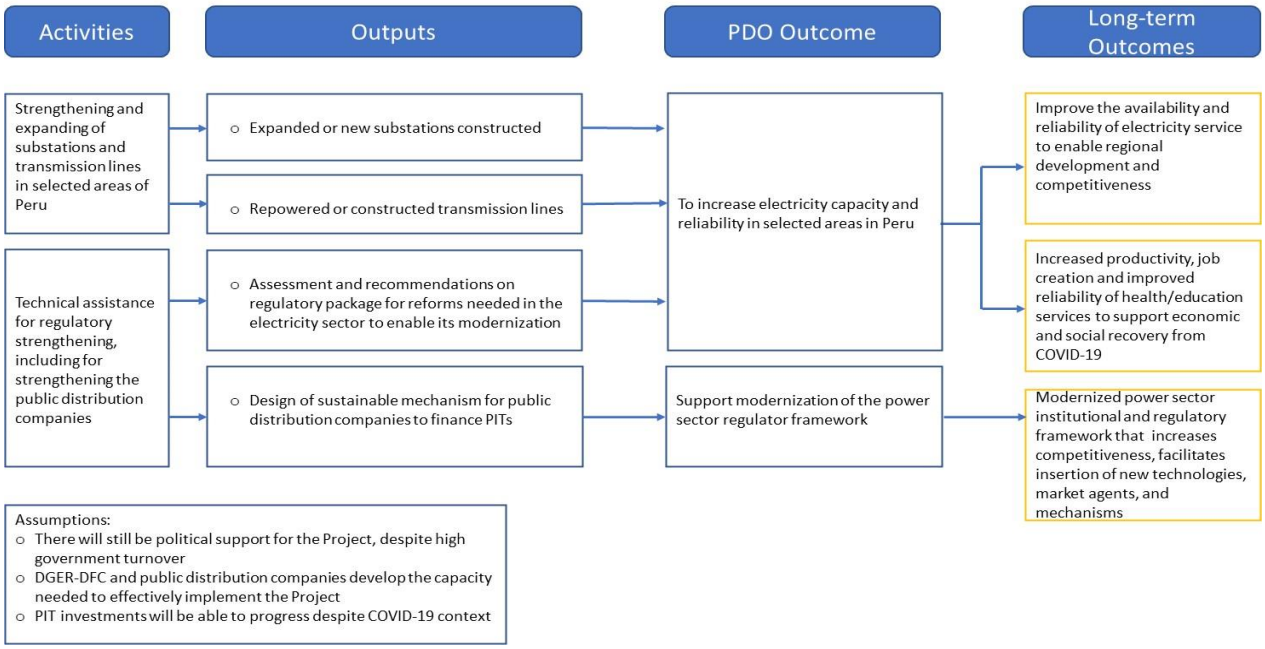
30. **The main beneficiaries of the proposed Project are the people provided with improved or new electricity service, including residential, commercial, and industrial customers, served by the public distribution companies in the 10 regions of Peru[32] where the subtransmission investments will be made**. These electricity users will benefit from improved electricity service for: (i) household energy uses such as lighting, appliances, telework, and virtual education; (ii) business and industrial energy uses to enable increased firm output and productivity and start-up of new economic activities; and (iii) health facilities, including those providing COVID-19 treatment through ICUs, oxygen plants, as well as refrigeration and cold chain equipment to preserve vaccines. The public distribution companies participating in the Project will also directly benefit from: (i) improved operations; (ii) reduced frequency cuts and operational costs; and (iii) increased revenues from being able to supply additional power to existing and new electricity users.

31. **The regulatory reform support will help improve the sector competitiveness and absorption of innovative technology that will benefit overall sector institutions, market participants and potentially new private investors**. The sector institutions, like the regulator (OSINERGMIN) and the system operator (*Comitee of Economic Operation of the National Interconnected System,* COES) can benefit from a strengthened institutional framework with improved oversight and public distribution companies from improved governance and a more efficient operation. Updating the existing legal and regulatory electricity framework can unlock opportunities for further private sector participation in clean energy investments in the wholesale market, decentralized renewable energy, increased energy efficiency and electromobility investments, which would contribute to the creation of local green employment and sustainable recovery.

[32] The 10 regions are Ancash, Arequipa, Junín, La Libertad, Piura, Puno, San Martin, Tumbes, Tacna, and Ucayali).

D. Results Chain

Figure 2. Theory of Change



E. Rationale for Bank Involvement and Role of Partners

32. **This operation builds upon the WB's longstanding partnership with the energy sector in Peru.** The WB has a long history of supporting the government of Peru to meet its energy goals through technical assistance and investment operations on a variety of priorities including bridging the rural electrification gap, energy sector resilience, energy sector reforms, renewable energy development, and natural gas market development. For more than a decade, from 2006-2017, the MINEM, through the DGER and its DFC, implemented the WB-financed Peru Rural Electrification Project (P090116) and the Second Rural Electrification Project (P117864), with similar implementation arrangements. Through these projects the WB built extensive working experience and a strong relationship with the public distribution companies as well as deep understanding of their processes, which can facilitate an agile implementation. In addition, Component 2 of the proposed Project will build upon the results from the ongoing technical assistance to develop the conceptual frameworks for the energy sector reform, including among other, a proposal for a sustainable approach to resolve the financing constraints to implement PIT investments by the public distribution companies.

33. **The WB has extensive experience in financing both transmission and distribution investment projects and supporting power sector reforms in countries in the region and globally**. The WB has recently concluded a flagship study on *Rethinking Power Sector Reform (P157376)*, which includes case studies from the region (e.g. Colombia, Dominican Republic, and Peru) as well as globally (e.g. India, Morocco, Philippines, Ukraine, and Vietnam). The WB has provided extensive support to the most recent power sector reforms in various countries including in the LAC region, such as supporting the *Misión de Transformación Energética* in Colombia. The WB can draw upon the lessons learned and findings from past projects and activities in Peru and its global experience from similar electricity network strengthening and rehabilitation projects and energy sector reform work, as well as including recent post-COVID-19 economic recovery projects.

34. **The WB's fiduciary systems and implementation support will also accelerate execution of the public distribution companies' PIT investments and enhance transparency in use of funds.** The public distribution companies have been unable to execute priority investments from their approved PITs due primarily to financing and implementation hurdles. WB support will assist in overcoming these constraints by enabling the MINEM and distribution companies to use the WB's procurement and financial management policies that will facilitate and accelerate implementation.[33] The use of WB fiduciary standards and processes, and rigorous oversight will also help increase the transparency in the use of public resources, which will instill greater confidence at the MEF and the Fund for Social Development Cooperation (*Fondo de Cooperación para el Desarrollo Social*, FONCODES) to allocate public resources for these investments moving forward.

F. Lessons Learned and Reflected in the Project Design

35. Various lessons learned from the past WB financed first and second rural electrification projects as well as similar subtransmission projects in other regions were considered in project design, in particular:

- **Strong government commitment is critical for creating an enabling environment for project implementation**. Strong government commitment has been expressed both by MINEM and the distribution companies as essential for successful implementation. The MINEM has demonstrated its commitment by designating the DGER as the executing Project Implementation Unit (PIU)[34] that will be supported by its DFC as the Project Coordination Unit (PCU) dedicated solely to the proposed Project. In addition, the public distribution companies have also expressed strong commitment to the Project and its design ensures that they will be engaged in the technical design, procurement of the works, and supervision of the works to ensure their continued participation.
- **Ongoing policy dialogue and targeted capacity building are critical to project sustainability**. Sustainability relies on engaging in policy dialogue and providing technical assistance to address fundamental power sector challenges that may influence project sustainability. Lessons learned from WB's flagship work on *Rethinking Power Sector Reform*s, highlights the need to assess electricity sector issues in a comprehensive manner and draw upon local and international experts to identify suitable solutions. These lessons have been incorporated into the design of Component 2, in which comprehensive assessment will be undertaken, and international and local experts will be mobilized to ensure that sound measures are proposed for enabling power sector modernization. Moreover, Component 1 will allow for contracting expert consultants to assist with preparing technical, environmental and social inputs needed in the procurement processes. Also, capacity building and training will be provided under Component 3 to the MINEM and public distribution companies on technical, fiduciary, and environmental and social aspects to facilitate compliance with WB's requirements and support project implementation.
- **Importance of accounting for COVID-19 restrictions in project design and supervision**. Given the current COVID-19 context, WB guidance related to public consultations and stakeholder engagement in operations will be followed. Furthermore, the WB's guidance on COVID-19 considerations in construction and civil works projects, national protocols and plans published by the MINEM and public distribution companies will be implemented. The Project will also roll out the Geo-Enabling initiative for Monitoring &

[33] According to MINEM estimates, the time period required to execute the PIT projects following the Government's complex invierte.pe system and public procurement and execution procedures could take between 42 to 61 months. Thus, the MINEM is interested in using World Bank fiduciary processes and support to assist in speeding up project implementation.
[34] Ministerial Resolution No. 156-2021 – MINEM/DM delegating the implementation of the proposed Project was issues on May 28, 2021.

Supervision (GEMS)[35] for remote supervision and subproject mapping, real-time risk and safeguards monitoring. COVID-19 considerations have also been reflected in the Labor Management Procedures (LMP) and Stakeholder Engagement Plan (SEP) prepared for the project, promoting the use of virtual consultations and communications as much as possible.

- **Including citizen engagement and gender activities enhance project sustainability.** The Project incorporates best practice from other energy operations into its design. In particular, it ensures that the stakeholder engagement and consultations and the Grievance Redress Mechanisms indicated in the Environmental and Social Management Framework (ESMF), SEP and LMP allow for feedback loops between citizens, workers, and governments, both during project preparation and implementation to ensure that citizen voices are taken into account, including disadvantaged and vulnerable people.
- **Challenges associated with implementing Right-of-Way (ROW) payments need to be addressed early in the project cycle**. Common obstacles regarding compliance of the RoW payments include incomplete documentation of land titles and difficulties in locating several dispersed landowners. These issues were incorporated into the Project's design as eligibility criteria. A Resettlement Framework (RF) has been prepared that will lay out the requirements for land acquisition and payments for subprojects (e.g. new substations or transmission lines) where compensation may be needed.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

36. **MINEM's DGER will assume overall responsibility for implementing the Project and serve as the implementing agency.**

37. DGER will be supported by the DFC as the PCU. The DGER will have the institutional responsibility for the project and will be responsible for approving payments and reimbursements as well as for monitoring and reporting project implementation to the WB. It will also be responsible for hiring the needed technical specialists with adequate qualifications to be part of DFC, including technical, legal, monitoring and evaluation, financial management, procurement, and environmental and social specialists to ensure a strong PCU. The DGER-DFC has successful experience executing WB financed projects that also involved a very similar implementation scheme with the public distribution companies. The DGER-DFC executed the Peru Rural Electrification Project (P090116) and the Second Rural Electrification Project (P117864) from 2006 to 2017, both which had strong implementation partnerships with the public distribution companies.

38. The DFC will include a project manager, a legal specialist, heads of the technical, financial and administrative, and environmental and social management units as well as expert staff in each of these areas. Technical staffing will include a project manager, a specialist in monitoring and control, a transmission lines specialist, a power substations specialist, a contracts management specialist, and a lawyer. A project fiduciary coordinator will also be hired as well as a financial specialist, procurement specialist, procurement assistant, and an accounting specialist. To ensure compliance with the WB's ESF, the DFC will include an environmental and social coordinator who will be supported by an environmental specialist and a social specialist. Although DGER has already hired a project manager and technical head to support project preparation, it will need to hire

[35] DFC staff and WB team participated in GEMS training and will develop the formats defining the use of the platform in July – August 2021.

additional personnel to fill the remaining positions at DFC and ensure adequate implementation of its responsibilities.

39. The DFC will be responsible for: (i) coordination with the public distribution companies; (ii) obtaining and reviewing the needed technical subproject information obtained from the public distribution companies and ensuring compliance with eligibility criteria; (iii) entering into agreements with the distribution companies on the responsibility of MINEM and the public distribution companies in the implementation of the Project, and the responsibilities of the public distribution companies in the carrying out of their respective subprojects in accordance with the provisions of the Legal Agreement; (iv) establishing an escrow account for the payments of investments to be financed under Component 1; (v) preparing the bidding documentation for works (Component 1) and consultancies (Component 1 and 2) in strict accordance with WB procurement regulation, fiduciary standards and the ESF; (vi) participating in the bid evaluation committee together with the distribution companies; (viii) inspecting works periodically to review physical progress and ensure compliance with WB technical, procurement and ESF requirements, as well as specific instruments prepared for the subprojects; (ix) overall environmental and social management oversight of the Project; (x) with DGER's approval, managing funds from the designated account; and (xi) preparing project implementation reports for DGER. If any gaps between national requirements and the WB are identified for specific project investments, especially in terms of ESF and related instruments required, the DFC will be responsible for undertaking or contracting supplemental studies to close these gaps prior to the bidding process for the PITs subprojects.

40. The public distribution companies will be responsible for: (i) obtaining the national permits and licenses required to implement subprojects (in conjunction with the subproject contractor); (ii) preparing all the subprojects technical design documentation, including technical specifications; (iii) reviewing the bidding documentation in compliance with WB requirements (including compliance with fiduciary and ESF requirements); (iv) carrying out the bidding process, leading the evaluation committee and awarding the bids; and (v) hiring, managing the works and supervision contracts, overseeing and paying the works and supervision.[36] The Project will include capacity building and technical assistance support to the public distribution companies and DGER-DFC on technical, fiduciary, and environmental and social aspects[37] to ensure compliance with WB's requirements and support project implementation. The contractors hired will be responsible for undertaking the PIT investments in accordance with established timeframes and in accordance with the specific environmental and social instruments prepared to comply with national regulation and the Bank's ESF.

41. As for the Project's technical assistance component to support the modernization of the electricity market, it will be carried out in coordination with the VME and the CRSE. The component will follow the same approach from the ongoing electricity reform support, where the MINEM and CRSE are the technical focal points responsible for implementing the work, with guidance from WB and support from external local and international experts that will be hired by DGER. Working sessions and stakeholder consultations will be held to build consensus with key sector stakeholders on the recommended measures to engender greater support for priority reform measures.

B. Results Monitoring and Evaluation Arrangements

[36] The supervisor contractors will monitor physical progress and compliance with WB technical, procurement and ESF requirements, including specific ESF instruments.
[37] Consultants may also be hired under the project to support preparing technical and environmental and social documentation required.

42. Project progress will be monitored based on completed procurement, disbursements and physical progress of works, and Project indicators. The PDO level and intermediate indicators, including annual targets will be monitored by the DGER-DFC and reported semi-annually and annually. The DGER-DFC will be responsible for coordinating with the public distribution companies to collect information to report on physical implementation of activities and progress on results indicators related to Component 1. The public distribution companies and the regulator (OSINERGMIN) regularly collect the necessary technical and commercial information as part of their normal operations for project development indicators and for those under Component 1 and the remaining indicator information will be collected through the supervision of the physical implementation of the works and consultancies. The DGER-DFC will monitor and collect results information regarding the energy sector regulatory assessment activities undertaken for Component 2. The MINEM/DGER will send the WB the Project Reports within forty-five days after the end of each calendar semester, covering the calendar semester.

C. Sustainability

43. The Project design and the strong commitment of key players in the power sector, including the MINEM, public distribution companies, FONAFE and OSINERGMIN, all enhance the likelihood of project sustainability, including support to the PIT investments and to the power sector regulatory reform. The Project will also provide technical assistance and implementation capacity strengthening assistance to the DGER-DFC and public distribution companies to facilitate executing the PIT priority investments to enhance project sustainability. Furthermore, the revenue generated from meeting additional electricity demand will allow the public distribution companies to operate and maintain these subtransmission investments in the future.

44. In addition, through Component 2 the Project will support the MINEM and CRSE with defining measures needed to modernize the country's electricity sector institutional and regulatory framework, as well as to address systematic issues affecting the financing and execution of the public distribution companies overall investment plans (including PIT investments), that could be executed as part of the country's comprehensive electricity sector reform program, contributing to longer-term sustainability of the sector, increase in the participation of clean energy and further private capital mobilization.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis (if applicable)

(a) Technical Analysis

45. The main investments will focus on strengthening and expansion of substations and transmission lines, all of which involve well established and known technologies. The WB has reviewed the list of 24 PIT selected subprojects that will be financed by the Project, which have already undergone a technical and economic evaluation and been approved by the regulator OSINERGMIN. Both the urgency and technical rationale for these investments was confirmed as such subprojects are needed to address transformer overloading risks, transmission line congestion issues, or to meet existing and new demand. The WB has reviewed OSINERGMIN's evaluation criteria and found it acceptable and has also reviewed the subproject information provided for the priority PITs. Nineteen of the subprojects have technical and economic viability provided by the National System Multi-year Programming Investment Management (Invierte.pe) with technical profiles already prepared for these subprojects and the remaining five subprojects will have a year to obtain Invierte.pe economic viability. In

addition, a first pipeline of seven PIT subprojects is under preparation which was selected based on their overload capacity and potential for emergency risk, investment readiness, as well as their compliance with the Project's established technical, financial, and environmental and social eligibility criteria. The DGER-DFC and public distribution companies will prepare the technical specifications, as part of the procurement documentation, for key equipment based on the detailed technical studies. At the subproject level, the potential investments do not pose significant technical risks, as they will use well-established technologies.

46. The technical assistance component to support the modernization of the electricity regulatory framework will build from the conceptual frameworks that have been developed under the WB's ongoing technical assistance in coordination with VME and CRSE. The regulatory reforms conceptual frameworks identified key bottlenecks related to supporting institutional strengthening and improved oversight, especially given the need for integration of new technology. It also assessed the wholesale market and how it could adapt to changing technology and market participants' behavior, the potential evolution of the short-term electricity market and whether to move from a short-term market based on costs to one based on offers, as well as the transition towards a day-ahead market and the joint optimization of energy and operating services to support absorption of clean energy. In the distribution segment barriers to entry and development of innovative technologies were identified. Recommendations included the separation of the distribution and retail activities, proposals to improve the distribution revenues to provide network companies with adequate incentives to make adequate investments in the network, use new distributed resources efficiently, support decarbonization, encourage innovation and provide value to current and future consumers. A diagnosis on how to streamline and improve transmission regulation to ensure investments are done in a timely manner was done. Recommendations included stronger and consolidated transmission planning at the national level and subnational level with a stronger coordination between the system operation and the distribution companies, improving regulation to include reinforcement investments, and institutional and coordination recommendations to facilitate international interconnections with neighboring countries. The conceptual frameworks provide adequate foundation to develop the specific regulatory support under the Project (see Annex 6 for more details).

(b) Economic and Financial Analysis

47. The proposed Project will support strengthening and expansion of substations and transmission lines (Component 1), technical assistance for regulatory strengthening (Component 2) and project management and capacity building (Component 3). The economic and financial analysis is focused on Components 1 and 3, which account for 98.2 percent of the IBRD loan. Given the analytical constraints associated with benefits that cannot be measured in monetary terms and/or where information is not available, Component 2 was not included in the economic and financial analysis.

48. While Component 2 is not included in the economic and financial analysis, the power sector regulatory and institutional reform support provided under such Component is anticipated to deliver economic benefits through enabling greater private sector participation in wholesale electricity, investments in centralized and decentralized renewable energy, and development of energy efficiency projects. This would contribute to the diversification of the energy mix and the reduction of GHG emissions in Peru. The increase in market competition is expected to result in a reduction in energy prices and tariffs to end users, thereby improving affordability and competitiveness. The reform is also expected to mobilize private capital to accelerate the implementation of energy projects, supporting local job creation and a green economic recovery.

49. For Components 1 and 3, an economic and financial analysis was conducted to compare a cost/benefit stream of the 'no project' case (i.e. no upgrade, expansion or construction of substations and transmission lines despite their being overloaded) with a cost/benefit stream of the 'with project' case.

50. The economic internal rate of return (EIRR) was calculated for the subprojects as a whole, based on the estimated cost benefit stream over a 30-year period, reflecting the useful life of the substations equipment and the transmission lines.[38] The net present value (NPV) of the cash flow was estimated using a discount rate of 8 percent, as per the Invierte.pe guidelines.[39] The main benefits are assumed to be: (i) the expected revenue increases associated with the growth of the electricity demand served; (ii) the cost reduction associated with the substitution of the on-site diesel generation for on-grid generation in overloaded substations during peak hours; and (iii) net GHG emissions reduction, which are presented in a separated scenario. Sensitivity analyses were carried out to assess the robustness of the results with respect to capital cost, demand, and willingness to pay. A switching value is estimated to indicate at what level the investment will cease to be economically viable.

51. The financial analysis assumed that the main benefits of the investments are: (i) the expected revenue increases associated with the growth of the electricity demand served; (ii) the cost reduction associated with the substitution of the on-site diesel generation for on-grid generation in overloaded substations during peak hours; and (iii) the avoided the payment of fines due to the delay or non-construction of the new expansion projects already approved by OSINERGMIN.[40] The subproject's financial costs are associated with capital investments, operation and maintenance and the cost of the energy provided. The financial internal rate of return (FIRR) was estimated and the financial cash flows were discounted with a rate of 12 percent[41] NPV. The analysis shows the project is economically and financially viable and robust, with an EIRR of 22.7 percent (NPV US$ 106.2 million) and an FIRR of 21.5 percent (NPV US$62.2 million). The results of the economic and financial analysis are presented in Table 3 and the full financial and economic analysis in Annex 3.

Table 3. Economic and Financial Analysis Results

	Economic Analysis		Financial Analysis		GHG
Indicator	EIRR (%)	NPV (US$ million)	FIRR (%)	NPV (US$ million)	Project Lifetime (tCO_2)
Subtransmission Investments and Project Management	22.7	106.2	21.5	62.2	2,518

52. **GHG emission Reduction.** GHG emissions reductions have been estimated following the WB Guidelines for transmission and distribution (T&D) projects,[42] where emissions from power generation are not considered

[38] As per the public distribution companies' standard assessment that follows OSINERGMIN regulation.
[39] The economic analysis is assuming the same discount rate set by Peru's Ministry of Finance in its "General Guidelines for the Identification, Formulation and Evaluation of Investment Projects. For infrastructure projects, the World Bank has recommended an economic discount rate in the range of 6.0–10.0 percent, or a general rule of thumb of two times the rate of GDP growth. The economic discount rate used in the analysis (8.0 percent) falls in the middle range of the Bank's recommendation and it is twice GDP growth for Peru for the period 2011-2019 (4.1%).
[40] This methodology is consistent with the National System Multi-year Programming Investment Management (Invierte.pe) to ensure aligned results.
[41] The financial analysis assumed the discount rate set by Peru's Electricity Concessions Law (No. 25844) to evaluate private investment in the sector.
[42] *https://worldbankgroup.sharepoint.com/sites/Climate/Knowledge%20Base/GHG-Guidance-Manual-GHG-Accounting-for-Energy-Investment-Options-Version2.pdf*

under T&D projects because "they are outside the project boundaries and because the operations of transmission infrastructure do not influence the emissions associated with generation." The only exception is "losses over which the project has control, and which are a natural consequence of the project."

53. Following WB Guidelines, net GHG emissions were estimated considering the reduction in technical losses of 0.9 percentage points in the subtransmission systems where interventions will occur with an estimated GHG emission reduction of 2,518 tCO2 during the project lifetime or an average of 84 tCO2 per year. Sensitivity analyses were done using the low case (increasing from US$40.90 per ton in 2021 to US$78 in 2050) and high case (increasing from US$81.80 per ton in 2021 to US$156 in 2050) for shadow prices of carbon (SPC). The environmental benefits add 0.11 percentage points to the return in the low case scenario, reaching a total EIRR of 22.8 percent (NPV US$106.5 million). In the high case scenario, the EIRR reaches 22.9 percent (NPV US$106.9 million). The estimated net emissions obtained during the project's lifetime do not reach the WB's minimum threshold of 20,000 tCO2e.

54. If, however, the methodology was expanded to account for the reduction of diesel consumption from on-site power generation, the Project's lifetime estimated net GHG emission reduction will be 309,704 tCo2. As electricity demand surpasses substation capacity in these electricity subtransmission systems, distribution companies will have to resort to costly and polluting emergency diesel-based generation to meet demand and avoid shortages since the national regulator OSINERGMIN requires the public distribution companies meet demand within their service territories. The Project's GHG reductions will be obtained from displacing diesel fuel consumption from onsite diesel generation that will need to be installed in the next two years in the overloaded substations to meet existing and growing demand if the PITs investments are not made. The Project PIT interventions will enable meeting this demand using greener on-grid generation[43] that is cleaner than onsite diesel-based generation, resulting in GHG emission reductions.[44] The Project PIT investments will enable avoiding the consumption of 37.9 million gallons of diesel during over the Project lifetime, which in the absence of the Project will be needed to generate 455,671 MWh of power to satisfy demand during peak hours in the substations that are part of the Project. The avoidance of this onsite diesel generation will result in 309,704 tCo2 of emission reductions.

B. Fiduciary

(a) Financial Management

55. **The Project's fiduciary aspects will fall under the responsibility of the DGER's General Office Administration (OGA) that will have support from DFC**. The financial management (FM) arrangements will be as follows. The preparation of the annual work program and budget will be in accordance with the procedures established by MEF through its General Public-Sector Budget Office (*Dirección General de Presupuesto Público*). The DGER-DFC will have to comply with Peruvian accounting and public financial management laws, including the use of the Governmental Integrated Financial Management System (SIAF for its acronym in Spanish) and its general chart of accounts. Moreover, considering the nature of project activities and financial information needs, the DGER-DFC will also use the tailormade financial information system (GESTOR) which will use information

[43] Peru's Emission Factor for Electricity consumption is assumed to be 167 kg/MWh, *Information provided by Perú Ministry of Environment – Directory of Greenhouse Emissions.*

[44] The GHG emissions reductions were estimated just for subprojects that have available information related to possible on-site diesel generation. The subproject analyzed are from Distriluz and only include expansion of SE, Annex 3 presents a list of these subprojects.

downloaded from SIAF. The DGER-DFC must comply with local requirements related to internal controls and internal procedures. In addition, the WB will agree with the entity on specific processes and procedures for project implementation, which will be reflected in the Project's Operational Manual (OM). The DGER will be the only responsible entity to manage the Project funds. The Project financial statements will be audited annually by an independent firm acceptable to the WB and selected through the oversight of the General Comptroller Office. The audit should be conducted under terms of reference approved by the WB and DGER-DFC should submit the annual audit reports by June 30th of each year.

56. **Main FM risks**. The financial management dimension of the project can be affected inter-alia by: (i) weak planning capacity and delays in budget allocation, mainly at the beginning of project implementation (this is a usual problem for projects in Peru) and low budgetary execution, as evidenced by the pervasive low execution experienced by the central government budget;[45] (ii) pending recruitment of the key staff that will support project implementation; (iii) pending completion of the OM that will include the process and procedures, roles and responsibilities for the financial management of the project; and (iv) pending implementation of GESTOR to produce the financial reports according to the project components/categories. These factors could affect the achievement of the Project objectives in the absence of adequate mitigating measures.

57. **Proposed mitigating measures for the Project's FM risks.** The proposed mitigating measures for managing the project's FM risks include: (i) the Project will benefit from the use of country systems and the public budget, and financial management legal framework, which are acceptable to the WB; (ii) strengthening the DGER-DFC with a financial management specialist with experience in managing WB projects, to be recruited no later than 60 days after Project effectiveness under terms of reference in form and substance satisfactory to the WB; (iii) completing the OM including necessary processes and procedures, roles and responsibilities to comply with WB requirements to manage the project funds and include the specific processes for payments requested by the public distribution companies; (iv) completing the implementation of GESTOR; and (v) defining terms of reference for the external audit, which will take in consideration the specific risks identified for this project. In addition, the WB will provide capacity building through periodic trainings and supervision to accompany the DGER-DFC with project implementation. The adoption of the OM by DGER-DFC will be a condition of effectiveness.

58. The WB loan proceeds will follow the WB's Disbursement Policies and Procedures, as described in the Disbursement and Financial Information Letter (DFIL). The Loan funds will be disbursed through a designated account in the Single Treasury Account (STA) of MEF in US Dollars. For processing payments to vendors under Category 1 of the table of loan proceeds, DGER will open an escrow (*fideicomiso)* bank account in a financial institution. A withdrawal condition for Category 1 will be in place until the financial institution for the *fideicomiso* account has been selected and approved by the WB.

59. The overall conclusion of the FM Assessment is that once the mitigating measures have been put in place, then the proposed FM arrangement will meet the WB's minimum fiduciary requirements.

(b) Procurement

[45] The Peru budget execution of the last three year has been in average 87% of the allocated budget / (*Source of information: Governmental financial management system SIAF).*

60. **DGER-DFC will be responsible for all procurement under the Project,** which will be implemented according to the WB's Procurement Regulations for IPF borrowers**,** issued in July 2016, and revised in November 2017 and August 2018, for the supply of works, goods, non-consulting and consulting services, and the provisions stipulated in the Loan Agreement. The Project will be subject to the Bank's Anticorruption Guidelines (ACG), dated October 15, 2006, revised in January 2011, and in force since July 1, 2016. The WB's Standard Procurement Documents will govern the procurement of WB-financed Open International Competitive Procurement. For procurement involving National Open Competitive Procurement, and other methods, the documents will be agreed with the WB.

61. **A Project Procurement Strategy for Development (PPSD), prepared by the Borrower**, describes how procurement in this operation will support the PDO and deliver value for money under a risk-based approach. Procurement for works, goods, consultant services and non-consulting services will be implemented based on Mandatory Procurement Prior Review Thresholds detailed in Annex I of the WB's Procurement Procedures. All procurement procedures, including roles and responsibilities of different participating entities and units, will be defined in the OM. A summary of PPSD, including recommended procurement approach for higher value contracts, is detailed in Table 4.

62. **A Procurement Plan was prepared based on the PPSD,** which provides adequate supporting market analysis for the selection methods detailed in the Plan. In accordance with Paragraph 5.9 of the Procurement Regulations, the WB's Systematic Tracking and Exchanges in Procurement (STEP) system will be used to prepare, clear, and update procurement plans and conduct all procurement transactions for the project.

63. **Civil works.** Component 1 will finance civil works for: (i) expansion and strengthening of existing power transformation substations; (ii) repowering of existing transmission lines within existing rights of way; (iii) construction of new substations; and (iv) installation of new transmission lines in urban, peri-urban, and rural areas. According to the PPSD, the open national competitive bidding approach will be applied as stipulated in the Procurement Plan. The national approach is supported by the availability of bidders in the local market.

64. **Consulting services** to be financed under the Project include supervision of civil works, environmental and social complementary studies for investments under Component 1, and analytical and advisory support activities under Component 2, external auditing, among others. Considering that these will be small contracts, the suitable market approach will be an open competition in the national market or direct market approach, while the Quality-Cost-Based Selection or the Consultant's Qualification Based Selection (considering the nature and scope of the services), or Direct Selection will be the selection methods.

65. **Goods and Non-consulting services.** The Project will finance the procurement of computers, equipment, printing services, publicity services, and other services.

66. **Operating Costs.** The Project will finance operating costs, such as office supplies, computers, and equipment maintenance, per diems for local and international staff, among others.

67. **A procurement capacity assessment was carried out to evaluate the adequacy of procurement arrangements of DGER-DFC.** The DGER-DFC has wide and satisfactory experience working with WB-financed Projects. However, for Project implementation it will need to hire a procurement specialist with experience in WB's procurement procedures that is fully dedicated to the Project. The public distribution companies will be

responsible for carrying out the bidding processes for the PIT investments under Component 1 of the Project. Therefore, continuous training by the DGER-DFC to them will be needed during Project implementation to ensure the adequate application of the Procurement Regulations. As DGER-DFC will be the entity ultimately responsible for the implementation of the Project, it will have active participation throughout the bidding processes. The arrangements between DGER-DFC and the public distribution electricity companies will be defined in the OM. The following table summarizes the mitigation actions proposed for the procurement-related risks:

Table 4. Mitigation Actions Proposed for the Procurement-Related Risks

Risks – Areas for Improvement	Mitigation Actions	Responsible	When
Responsibilities related to the procurement activities	The OM prepared by the borrower and deemed by satisfactory the Bank. The OM will establish clear definition of the procurement processes, the roles and responsibilities of staff related to the implementation of procurement activities, and the functions of the different institutions involved in the Project.	DGER-DFC	By Project effectiveness
Lack of staff with expertise in procurement processes with the Bank's Procurement Regulations	PIU will hire skilled staff.	DGER-DFC	60 days after Project effectiveness
Non-compliance of Bank's Procurement Regulations due to lack of experience of the public distribution companies	Active participation of the DGER-DFC to accompany the bidding processes. Training program on the application of the Regulations to be provided regularly to the public distribution companies.	DGER-DFC	During Project implementation

68. **Frequency of Procurement Supervision.** In addition to prior review supervision to be carried out by the WB office, annual supervision missions will be carried out to visit the field and conduct post review of procurement actions.

Table 5. Summary of PPSD (for higher value contracts)

Description	Est cost (US$)	Review	Market approach	Procurement method
CIVIL WORKS TRANSMISSION LINES AND ENERGY SUBSTATIONS PROJECTS Expansion and/or Reinforcement of Transformation Substations				
	76,851,486			
Group 1 - ELECTROCENTRO	4,629,071	Post	National Open	SDO
Group 1- ELECTRONOROESTE	2,127,448			
Group 1 - HIDRANDINA	3,370,820			
Group 2 - HIDRANDINA	5,632,386			

Group 2 - SEAL	13,806,646			
Group 3 – ELECTRO ORIENTE	10,275,546			
Group 3 - ELECTRONOROESTE	5,419,391			
Group 3 – ELECTRO PUNO	3,150,652			
Group 3 - ELECTROSUR	2,049,713			
Group 3 - SEAL	7,047,458			
Group 4 – ELECTRO UCAYALI	4,766,554			
Group 4 - ELECTRONOROESTE	7,334,264			
Group 4 - HIDRANDINA	6,083,229			
Group 4 - ELECTROCENTRO	1,158,308			

C. Legal Operational Policies

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

D. Environmental and Social

69. **The Project has an environmental and social risk classification of Moderate.** As the exact locations of the subprojects to be financed were unknown during preparation of this analysis, the project's risk classification of moderate is based on the scale and magnitude of subprojects' potential environmental and social impacts. The investments to be financed, including the construction of new infrastructure, both substations and transmission lines, correspond to routine construction activities that have been previously carried out by the distribution companies and have been determined not to cause significant risks and impacts on people or the environment, as they will be located outside legally sensitive areas, will not cause physical displacement and/or involuntary resettlement of affected people, and will not be located in areas where indigenous peoples are present who could be negatively affected by land acquisition or restrictions on its use.

70. **Environmental and Social Standards.** Peruvian standards will apply to environmental management, health and safety, and social management such as citizen participation, land acquisition and easements, etc. In addition, all Project activities to be financed will be required to comply with the requirements of WB Environmental and Social Standards (ESS). As a result of the environmental and social due diligence carried out by the WB, based on the nature and scale of the Project and the level of associated environmental and social risks, the following ESS were assessed to be relevant for the Project:

- ESS1: to address issues not fully covered under national legislation by carrying out a thorough risk assessment to identify and manage environmental and social (E&S) risks as well as impacts;
- ESS2: to address labor and working conditions for all the Project's workers beyond Health and Safety measures;
- ESS3: to address preliminary identified risks related to resource efficiency and pollution prevention;
- ESS4: to address proactively all risks the Project could pose to the community, such as gender-based violence (GBV), Sexual exploitation and abuse (SEA);
- ESS5: to address gaps regarding valuation of compensation and eligibility to receive compensation and what type of compensation; and
- ESS10: to address the requirement for a systematic, continuous, meaningful and inclusive stakeholders engagement through diverse means and channels including access to a Grievance Readiness Mechanism (GRM).

71. To comply with these relevant ESS, draft environmental and social instruments were prepared by DGER-DFC with the support of the WB's E&S team. A virtual Public Consultation on the draft E&S management instruments was held on June 10, 2021 that included diverse stakeholders, including from public and private institutions, local government, economic agents, services providers, and organized civil society.

72. **Environmental and Social Management Framework (ESMF).**[46] In view of the lack of knowledge regarding the specific locations where the proposed investments will be executed, during preparation of the Project the Borrower elaborated an ESMF to help screen activities once the locations and scope of works are known. This ESMF provides guidelines on: (i) subproject eligibility criteria; (ii) procedures for screening subprojects for E&S risks and impacts; (iii) proposed methodologies for carrying out the environmental and social risk assessment for the Project; and (iv) guidelines for developing a gap analysis between the national environmental and social instrument of each subproject and the Bank's environmental and social standards, which are among the main issues addressed in the ESMF.

73. **Stakeholder Engagement Plan (SEP).**[47] The SEP preliminarily identified different types of stakeholders, such as directly affected groups and other interested stakeholders that will not be directly affected by the civil works but could have an interest in the Project or benefit from it. These stakeholders include sector institutions such as MINEM, DGER-DFC, FONAFE, the public distribution companies, relevant non-governmental stakeholders, as well as the population that could be impacted by the investments and/or will benefit (Beneficiaries) from the improved electricity service where the Project investments will be made. Beneficiaries (end users) encompass different subgroups such as local governments and agencies that provide services to citizens including disadvantaged and vulnerable people and groups, economic agents (micro, small, medium and large enterprises, business, industries, etc.), health care and education facilities, among others. The SEP identifies the strategies, actions, and means by which the Project will engage its stakeholder in a systematic, continuous, meaningful, and

[46] The ESMF was disclosed by the WB on June 21, 2021 at http://documents.worldbank.org/curated/en/597161624318120172/Environmental-and-Social-Management-Framework-ESMF-Transmission-Investment-Plan-PIT-Program-to-support-Post-COVID-19-Economic-Recovery-in-Peru-P174812

[47] The SEP was disclosed by the WB on June 22, 2021 at http://documents.worldbank.org/curated/en/599031624325858864/Stakeholder-Engagement-Plan-SEP-Transmission-Investment-Plan-PIT-Program-to-support-Post-COVID-19-Economic-Recovery-in-Peru-P174812

inclusive manner. The SEP contains a timeline, roles, and responsibilities to implement the Project's engagement from the preparation phase of the Project all throughout construction and up to transfer of the assets to the public distribution companies. In addition, a GRM has been developed and will be adopted by the Project. Stakeholder engagement will be carried out both at Project level (macro) and subprojects level (local) and roles and responsibilities for each level are clearly outlined in the SEP.

74. **Labor Management Procedures (LMP).**[48] The Borrower prepared a draft LMP that will apply to all the Project's workers, including direct workers (consultants and staff working on the Project from the MINEM/DGER-DFC, the public distribution companies where project investments are made (eight public distribution companies), and Contracted Workers (contractors, and subcontractors). The LMP describes the working conditions and management of worker relationships, the terms and conditions of employment, provisions for non-discrimination and equal opportunity, worker's organizations and freedom of association, occupational health and safety for workers, provisions to protect the workforce, including child labor and minimum wage, and the prevention of forced labor. The LMP further ensures that the health and safety of workers are adequately addressed using World Bank Group General Environmental, Health, and Safety (EHS) Guidelines as pertinent to the Project. These labor and work conditions and requirements will be applied throughout the Project and will be included in bidding documentation and civil work and supervision contracts. Given the scope of the interventions to be financed, necessary workforces are not expected to be extensive, and no major issues associated with labor influx are anticipated.

75. **Resettlement Framework (RF).** While specific sites for the subprojects were not yet to be chosen during project preparation and given the characteristics of the Project, which currently includes the possibility of land acquisition or land use restrictions, the elaboration of a RF that establishes the general principles and procedures compatible with ESS 5 is justified. The RF prepared by DGER-DFC clarifies the resettlement principles, organizational arrangements and design criteria to be applied to subprojects, during project implementation when the need arises to acquire land, restrict land use and/or undertake resettlement (physical and/or economic). When subprojects are selected and the documentation required from public companies seeking financing is received, DGER-DFC will carry out a due diligence regarding the procedure followed by the public distribution companies when they acquire land and/or restrict land use to make sure that the process complies with WB requirements. If gaps are identified, DGER-DFC will prepare a resettlement plan commensurate with the gaps identified and implement appropriate and proportional corrective actions. It is worth mentioning that proposed subprojects will not be financed by the Project should they involve land acquisitions and/or land use restrictions which will cause physical displacement or will negatively impact indigenous peoples' territory.

76. **Environmental and Social Commitments Plan (ESCP)**. The DGER-DFC also prepared the ESCP which establishes the significant measures and actions and all specific documents or plans, as well as the timeframe and who is responsible for carrying out each of them in accordance with the Environmental and Social Standards (EAS). The draft ESCP was disclosed prior to appraisal and the final negotiated version was disclosed on August 9, 2021.

77. **Seven identified subprojects and environmental and social gap analysis.** The DGER-DFC identified during the Project preparation a group of seven subprojects to be part of the first financed bidding package under the Project once the loan agreement is signed. For these subprojects, DGER-DFC submitted to the WB the site-specific

[48] The LMP was disclosed by the WB on June 21, 2021 at http://documents.worldbank.org/curated/en/706121624318131023/Labor-Management-Procedures-Transmission-Investment-Plan-PIT-Program-to-support-Post-COVID-19-Economic-Recovery-in-Peru-P174812

environmental and social instruments prepared to comply with the national legislation. These instruments were reviewed against the WB's ESS and gaps were identified. Supplemental environmental and social studies to close these gaps will be needed to be prepared and finalized prior to the launch of the bidding process. No site-specific investment (civil works) will be carried out before the E&S instruments are finalized (compliant with national legislation and WB ESSs). This will be clearly set out in the ESCP.

78. **Site-specific Environmental and Social Instruments** for the interventions under Component 1 will be developed in compliance with national legislation, relevant ESSs, and the WB's General EHS Guidelines, following the processes and requirements laid out in the environmental and social instruments, specifically ESMF, SEP, LMP, and RF. The site-specific environmental and social instruments will be developed by DGER-DFC and will be part of the bidding documents for subproject implementation and subproject supervision.

Environmental and Social Risks and Impacts

79. **The proposed environmental risk classification for the Project is Moderate.** Classification responds to the scale of the activities, which relates to expansion and strengthening of existing power transformation substations, repowering of existing transmission lines within existing rights of way, new substations and new transmission lines, which correspond to routine and construction activities that have been previously carried out by the distribution companies. Potential preliminary risks and impacts are: (i) not likely to be significant, comprising mostly of small nuisances during construction and assembly works; (ii) not expected to be complex, with existing mitigation and management mechanisms in place that have been proven to be effective; (iii) predictable and expected to occur only during construction; (iv) site-specific, with Project activities taking place within fenced areas, and without the likelihood of impacts beyond the Project footprint; (v) low probability of serious adverse effects to human health and/or the environment, although hazardous materials containing Polychlorinated Biphenyls (PCBs) will be required to be managed as hazardous waste during parts replacements following local regulations and international agreements; (vi) routine safety precautions as related to civil works and assembly of electrical parts are sufficient to prevent accidents; and (vii) will be easily mitigated in a predictable manner.

80. **Climate and Disaster Risk Screening as Low.** The proposed Project has been screened for climate and disaster risks using the "Climate and Disaster Risk Screening Tool," and the main project risks identified relate to seismic, flooding, and mass movement (mudslide) risks. Substation design studies will consider these types of risks when defining the engineering design and determining the siting of substations. In addition, electricity system towers and lines adhere to sound technical criteria to mitigate risks identified and are located away from high-risk flood areas. This will be verified once selection of the specific subprojects is undertaken and when the E&S complementary studies are undertaken for the 7 subprojects already selected. In addition, the technical specifications of new substation and subtransmission investments included in the bidding documents will include design specifications to avoid and mitigate the climate risks identified. Thus, while only a high-level assessment is possible at this stage, climate and disaster risks will be further screened and actions updated during project implementation as needed.

81. **The proposed social risk classification for the Project is Moderate**. This rating responds to the scale and magnitude of the potential social impacts identified for the four types of subprojects to be financed. These potential social impacts are: (i) temporary access restrictions to businesses and houses; (ii) inconvenience to locals due to air pollution from dust and noise from construction works; (iii) increased traffic; (iv) community health and safety risks (communicable diseases, increased incidents of traffic accidents); (v) land acquisition and/or

temporary or permanent restrictions on land use which could affect vulnerable populations, such as squatters and small farmers, among others. In this regard, it is important to note that the Project will not finance investments that may generate physical displacement, but only those that in exceptional cases generate minor economic displacement. Likewise, the Project will not finance subprojects that may negatively affect indigenous peoples and/or potentially affect their collective rights. Investments in new substations and new transmission lines, especially in peri-urban and rural areas, will generate potential positive impacts, due to the infrastructure and services gap that limits the development of these areas, according to the National Rural Electricity Plan (MINEM, 2010). SEA and sexual harassment (SH) risk is currently considered as Low. This Project level risk will be further reassessed when specific information is available on subprojects.

E. Gender

82. **The proposed Project will contribute towards closing gender gaps in technical staff positions in the electricity sector in Peru.** Despite making up 48 percent of the global labor force, women only account for 22 percent of the traditional energy sector.[49] Women's participation in Science, Technology, Engineering and Mathematics (STEM) jobs in the renewable energy sector is lower, at 28 percent, while in administrative positions they reach 45 percent. Within the MINEM, women are significantly underrepresented in key units in charge of implementing investment projects in the electricity sector, as is the case of the DGER and in the DFC. There are currently only 26 percent of women hired in technical positions at DGER and limited women in technical positions at DFC. Findings of a recent gender assessment undertaken by the MINEM indicate that women are underrepresented within these units, mainly due to three reasons: (i) failures in institutional management; (ii) prevalent gender stereotypes and lack of organizational culture promoting equality and non-discrimination between women and men; and (iii) lack of incentives for women to enter technical positions. The MINEM has developed a Gender Activities Plan for 2021 (*Plan de Actividades para el Año 2021*), aligned with the country's national gender policy, to close gender gaps identified and promote equality between women and men in key technical units, including DFC.

83. **The Project will help address employment gaps between men and women by increasing the share of women in the DFC, a key technical unit within MINEM's organization structure, in charge of supporting the implementation of investment projects**. Actions to be implemented at DFC may focus on policies, guidelines and procedures related to attraction and recruitment of (female) talent, but also to retention and career advancement, with a gender lens. Topics may range from hiring processes, to promotions, and flexible work arrangements. For example, actions to attract women may include communication campaigns, workshops and open house events targeting women. Also, hiring processes may ensure that job adverts encourage women to apply and tap into women's networks to advertise job opportunities, as well as partner with universities. Gender workshops can be organized to help recognize and address gender discrimination. In terms of retention, activities may include setting guidelines for flexible working arrangements (which can benefit both men and women). DFC is an integral part of MINEM, hence, the impact of these activities in terms of female employment is expected to remain beyond the Project's duration. Progress will be monitored using the indicator '**share of women in technical positions in the DFC' (baseline 0 percent, target 36 percent).**

84. **A GBV screening for the project was completed to identify potential risks and mitigation measures that was incorporated into project design.** GBV in Peru is at one of the highest levels in Latin America and is present

[49] IRENA. 2019. Renewable Energy: A Gender Perspective. https://www.irena.org/publications/2019/Jan/Renewable-Energy-A-Gender-Perspective

in all regions and across all socioeconomic strata. Two out of three women in Peru (10.04 million women)[50] experience intimate partner violence. However, only 29 percent seek help from an institution, usually the police. In the specific context of the Project, possible situations of gender violence could appear on the payroll of the contractor and subcontractor, prejudging the women by their way of dressing or cheerful character. The LMP that has been developed for the Project to address issues related to labor conditions stipulates that it will not tolerate any act of physical or psychological violence exerted against any person based on their sexual orientation or gender identity that negatively impacts their emotional, physical, social or economic well-being at MINEM, public distribution companies, contractors and subcontractors, and also includes worker's GRM as well as the contact information for the local Peruvian entities that are responsible for handling GBV cases. In addition, the SEP will also address these issues for the local communities and population through the adoption, divulgation, and implementation of the Project's GRM. The social specialist at DFC will be responsible for responding any complaints received during the Project related to GBV and will develop the procedure to be followed by the MINEM and other entities involved in Project implementation related to how to properly handle GBV cases and protect victims. The Project will promote respect for its workers by providing information on gender diversity.

F. Citizen Engagement

85. **The proposed Project will use existing channels for engaging with citizens and receiving grievances.** The main project stakeholders include the MINEM, DGER-DFC, the public distribution companies, contractors and subcontractors, and beneficiary population in the electricity systems where the project investments are made. A GRM has been developed for the Project and will be made available to beneficiaries and project affected people, including online alternatives for collecting and processing citizen's suggestions and opinions and special channels including through email, text messages and Corporate WhatsApp and also through physical mail which will be managed by DGER-DFC. This Project GRM also includes a mechanism for complaints to be received and addressed by the contractors for the specific PIT subprojects by the contractors' community relations specialist and for these to be raised to DGER-DFC in cases where additional assistance is needed to respond. This GRM is described in both the SEP and ESMF for the Project. A specific GRM for the project workforce has also been prepared that is included in the LMP. All complaints and grievances received through the Project both by DGER-DFC, the contractors, and the project affected people will be registered by the social specialist at DGER-DFC and also included in specific reports and in the Progress Reports sent to the World Bank.

86. **Stakeholder engagement will take place throughout the project period—design, preparation, and implementation—to obtain feedback to minimize the adverse impacts of the project**. The DGER-DFC conducted a public consultation with stakeholders on the E&S framework instruments for the Project in June 10, 2021 before appraisal and an annex describing them has been included in the Project's SEP. Project beneficiaries will also be consulted at other key stages of subproject implementation as defined in the SEP on key project-related activities to provide opportunity for citizens to raise issues. The DGER-DFC will be responsible for responding to feedback provided by the different stakeholders through the consultations and through the Project GRMs along with the Project contractors for the PIT subprojects. The consultation frameworks and feedback mechanisms have been included in the Project's ESF instruments, including the SEP, that will guide consultation activities at various stages of implementation. The results of the consultations conducted will be documented and posted on the proposed Project's website and shared/discussed with beneficiaries in the subsequent consultation meetings. The DGER-DFC will ensure that all consultations are inclusive and accessible for vulnerable groups and the channels for

[50] National Statistics and Informatics Institute (Instituto Nacional de Estadística e Informática, INEI 2017) https://www.inei.gob.pe/estadisticas/indice-tematico/poblacion-y-vivienda/.

invitation and dissemination of results are suitable in the local context. During the works, the contractors will be requested to maintain billboards with information about the works, the GRM that will contain information regarding email, corporate WhatsApp, text, and a physical mailing address at the MINEM where any complaints can be received. The DGER-DFC and subproject contractor will be responsible for addressing registering complaints received and promptly addressing these. Under Component 2, consultations and workshops with key energy sector stakeholders on the proposed energy reform measures will also be undertaken. Through these consultations and workshops, participants will have the opportunity to provide feedback to the MINEM and the CRSE that they may consider before finalizing the inputs for the electricity sector White Book with the sector modernization reform plan for Peru.

V. GRIEVANCE REDRESS SERVICES

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

VI. KEY RISKS

88. **The overall risk to achievement of Project's development outcomes is rated as Moderate**, primarily owing to the political and governance risk and institutional and governance risk, with all other Project risks being considered moderate to low. Key mitigation measures have been proposed, including implementation of best practices observed from similar projects globally and from past energy project implementation experience in Peru. The section below presents the assessment and discussion of main residual risks.

89. **Political and Governance Risk.** In recent years Peru has experienced frequent turnover of high-level government officials at both the executive and Ministerial level, and a politicized environment in the context of a new incoming government by end of July 2021. These changes may lead to high level changes within the VME, including the DGER, which can slow down project implementation and achievement of PDO. Given the political uncertainty caused by past and current election events, in the absence of mitigation measures, **the inherent political and governance risk is rated Substantial**. The mitigation measures put in place for the project include: (i) Reestablishing support for the proposed Project at both the MINEM and MEF level immediately after high level changes occur; (ii) the DGER-DFC will maintain the same project preparation team (2 key staff) irrespective of higher-level ministerial changes; (ii) the DGER will hire key staff based on professional criteria in coordination with the WB team, all under the new government; (iii) training and capacity building for DGER-DFC staff will be provided at the outset and after any changes that occur to enable their compliance with WB requirements; (iv) involvement of the public distribution companies in the hiring of contractors that will carry-out the PIT investment and supervise them in the field, whom are not dependent on government entities to carry-out these functions; and

(v) close monitoring of potential political and governance risks related to the Project by the WB throughout implementation. Given the mitigation measures, the residual political and governance risk is lowered. Although the potential for political turnover may be substantial and cannot be foreseen or fully mitigated, given the proposed Project's importance to sustaining economic and social recovery, it is likely that the Project will continue to have broad political support going forward irrespective of the upcoming change in administration. The impact of these changes on achieving the project's development outcomes is moderate given the project design and mitigation measures adopted for the Project. Therefore, the **residual risk is rated as moderate.**

90. **Institutional Capacity for Implementation and Sustainability.** Since the DGER-DFC has yet to be fully staffed, and there is limited experience at the MINEM and public distribution companies with respect to the Bank's Procurement Regulations and the ESF, the capacity constraints, and the challenges of implementing a project with multiple entities involved, all pose a risk to achieving the PDO. Therefore, the **inherent risk is rated Substantial**. The risk is mitigated by the following measures: (i) a centralized implementation and coordination unit, DGER-DFC, will be responsible for overseeing the technical, fiduciary, and environmental and social aspects of the Project, which successfully implemented the WB-financed Rural Electrification and Second Rural Electrification Projects from 2006-2017 and has existing knowledge of the Bank's technical and fiduciary policies; (ii) the DGER-DFC will be staffed with dedicated technical personnel with expertise in subtransmission investments, fiduciary personnel, and environmental and social personnel, which will be financed through the IBRD loan, and will receive capacity building training at the outset to ensure compliance with WB requirements; (iii) working groups and joint evaluation committees comprised by DGER-DFC and public distribution companies' personnel will be formed for preparing subproject bidding documents and selecting contractors; (iv) the Project's OM, ESF instruments, and subproject financing agreements will clearly establish the roles and responsibilities of the DGER-DFC, public distribution companies, and subproject contractors; (v) the WB will monitor DFC's staffing to ensure that it includes the necessary professional skills and is fully staffed sixty days after Project effectiveness which will be stipulated as an effectiveness condition in the Legal Agreement; and (vi) capacity strengthening to all DGER-DFC staff with respect to the WB's fiduciary requirements and environmental and social standards will be provided once hired and for the public distribution companies whose PIT investments will be financed through the project. After the implementation of the mitigation measures, the Residual risk is reduced. The possibility of staffing and institutional capacity strengthening efforts being delayed or not fully effective, could happen. But the impact of such delay or shortcoming undermining the achievement of the DO is considered moderate and the likelihood of occurring given the risk mitigation measures is considered moderate. Thus, the **Residual risk is rated Moderate.**

91. **In this operation, other risks refer to risks related to COVID-19 pandemic.** The COVID-19 has brought multiple shocks to emerging economies. Triggered by the COVID-19 pandemic, the global economic landscape has deteriorated drastically, and it is still evolving. There is a high degree of uncertainty as to the duration of the pandemic and the effective roll-out of the vaccination program in Peru. Thus, the pandemic's economic, social, and health ramifications could slow down project implementation and achievement of the PDO. Therefore, the **inherent risk is rated Substantial**. The risk is mitigated by the following measures: (i) MINEM has established a COVID-19 protocol for its staff and guidance requiring that all energy sector companies also establish their own plans that have to be approved by the national health administration (MINSA); (ii) all public distribution companies have already developed and adopted COVID-19 protocols and have been conducting operations and maintenance activities and investments with contractors support even during the pandemic; (iii) the LMP for the Project establishes the COVID-19 guidelines that all contractors should follow which will be incorporated into their contracts; (iv) the SEP and ESMF also establishes procedures to using virtual and non-presential consultation and information sharing processes during the pandemic; and (iv) the project design includes use of GEMS methods to

assist the MINEM, public distribution companies, and WB with project supervision. Although the COVID-19 risk likelihood of continuing may be substantial and its duration cannot be foreseen or fully mitigated, the impact on achieving the project's development outcomes is Moderate given the project design and mitigation measures adopted for the Project. Therefore, **the residual risk is rated as Moderate.**

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Peru

Transmission Investment Plan (PIT) to support Post-COVID-19 Green Economic Recovery in Peru

Project Development Objectives(s)

To increase electricity availability and reliability in selected areas of Peru and support the modernization of the power sector regulatory framework.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
To increase electricity availability and reliability in selected areas and support power regulation								
Increased electricity capacity (MVA) in selected electricity systems (Text)		0.00	0.00	103.00	289.00	425.00	477.00	477.00
Transmission System Average Interruption Frequency Index (SAIFI) in selected electricity systems (Number)		4.30	4.30	4.41	4.32	415.00	3.94	3.94
Electricity customers provided with improved or new electricity service in selected electricity systems (Number)		0.00	0.00	460,000.00	1,020,000.00	1,200,000.00	1,300,000.00	1,300,000.00
Submission of regulation for legislative or ministerial approval for modernizing electricity sector regulatory		0.00	0.00	0.00	At least one regulation submitted for legislative or ministerial approval	At least one additional regulation submitted for legislative or	At least two regulation submitted for legislative or ministerial approval	At least two regulations submitted for legislative or

Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
framework (Text)					to support modernization of power sector regulatory framework	ministerial approval to support modernization of power sector regulatory framework	to support modernization of power sector regulatory framework	ministerial approval to support modernization of power sector regulatory framework

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Strengthening and expansion of substation and transmission lines								
Subprojects bidded out for selected electricity systems (Number)		0.00	12.00	19.00	24.00	24.00	24.00	24.00
Selected substations expanded or newly constructed (Number)		0.00	0.00	5.00	13.00	15.00	15.00	15.00
Selected transmission lines repowered or constructed (Kilometers)		0.00	0.00	6.00	31.00	63.00	77.00	77.00
Avoided diesel generation in selected existing substations (Megawatt hour(MWh))		0.00	0.00	233,300.00	398,000.00	455,600.00	455,600.00	455,600.00
Technical Assistance for Regulatory Strengthening								
Design and submission for legislative or ministerial		No sustainable mechanism in place to	Terms of Reference (ToR) agreed and	--	Sustainable Mechanism for	--	--	Sustainable Mechanism for

Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
approval of sustainable mechanism for the financing of subtransmission investments under the Transmission Investment Plans (PITs) (Text)		finance of PITs.	consultancy launched		financing of subtranmsission investements under the approved PITs presented for legislative or ministerial approval.			financing of PITs presented for legislative or ministerial approval.
Project management and capacity building								
Share of women in professional positions in the Directorate of Competitive Funds (DFC) (Percentage)		0.00	20.00	20.00	36.00	36.00	36.00	36.00
Participants in consultation activities during Project implementation (Number)		0.00	40.00	80.00	110.00	140.00	150.00	150.00
Percentage of stakeholders expressing satisfaction with consultation and engagement process done under the Project (Percentage)		0.00	25.00	30.00	35.00	40.00	50.00	50.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Increased electricity capacity (MVA) in selected electricity systems	Increased electricity capacity added in selected	Yearly	MINEM and Public	Public distribution companies'	MINEM, Public

	electricity systems.		distribution companies progress reports.	measurement following OSINERGMIN regulation and reporting to MINEM.	distribution companies
Transmission System Average Interruption Frequency Index (SAIFI) in selected electricity systems	Reduction in the average number of forced outages on weighted average per year based on those substations that have expanded capacity in the electricity systems under the Project. Baseline will be the average number of forced outages per substation as per the information provided by the regulator, OSINERGMIN.	Yearly	OSINERGMIN Technical Report: Monitoring the Electric Transmission Systems in Alert (SETA by its acronym in Spanish).	As per national regulations provided by OSINERGMIN. The weighted average will be calculated using the specific subproject SAIFI (provided by OSINERGMIN on SETA reports) over the total electricity demand of the subprojects.	MINEM
Electricity customers provided with improved or new electricity service in selected electricity systems	Number of electricity customers living in the area of influence of the selected subproject that benefit from improved or new electricity service. Electricity customers refer to residential, industrial, and commercial clients served by the public distribution companies that would obtain improved service through the Project investments in the selected	Yearly	MINEM and Public distribution companies progress reports	Public distribution companies measure it using their customer's data base and report to MINEM	MINEM and public distribution companies

	electricity systems.				
Submission of regulation for legislative or ministerial approval for modernizing electricity sector regulatory framework	The indicator will measure progress of submission of regulations needed for modernizing the energy sector regulatory framework for legislative or ministerial approval.	Biannual	MINEM progress reports.	CRSE reports progress to MINEM (DGER-DFC)	MINEM.

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Subprojects bidded out for selected electricity systems	Number of subprojects prepared and bided out for selected systems to be financed under the Project.	Biannually	MINEM and public distribution companies progress reports	Public distribution companies report to MINEM	MINEM, Public distribution companies.
Selected substations expanded or newly constructed	This indicator measures how many electricity substations are expanded or newly constructed in selected systems to be financed under the Project. The baseline is expected to be zero.	Yearly	MINEM and public distribution companies progress reports.	Public distribution companies report to MINEM	MINEM, public distribution companies.
Selected transmission lines repowered or constructed	This indicator aggregates the number of kilometers of	Yearly	MINEM and public	Public distribution companies report to	MINEM, public

	selected transmission lines repowered or constructed under the Project. The baseline is expected to be zero.		distribution companies progress reports.	MINEM.	distribution companies.
Avoided diesel generation in selected existing substations	The indicator will measure avoided diesel generation (in MWh) in selected existing substations to be financed under the Project.	Annual	MINEM and public distribution companies progress reports	Public distribution companies measure the avoided diesel by estimating the suppressed demand without the subproject investment (demand-supply capacity) in existing substations.	MINEM and public distribution companies.
Design and submission for legislative or ministerial approval of sustainable mechanism for the financing of subtransmission investments under the Transmission Investment Plans (PITs)	This indicator measures progress in the design and submission for approval of a sustainable mechanism for the sustainable financing of subtransmission investments under the approved PITs.	Biannually	MINEM progress reports.	CRSE reports to MINEM (DGER-DFC) and is included in progress reports.	MINEM
Share of women in professional positions in the Directorate of Competitive Funds (DFC)	This indicator measures the share of women hired in professional positions in the Directorate of Competitive Funds (DFC). Professional positions relates to women having a professional degree providing them a technical expertise in electricity,	Biannually	MINEM progress reports	MINEM/DGER reports based on human resources information.	MINEM

	fiduciary or environmental and social areas that would be hired at DFC.				
Participants in consultation activities during Project implementation	This indicator measures the number of participants in consultation activities during Project implementation.	Biannually	MINEM and public distribution companies' progress reports and consultation attendance lists.	Public distribution companies reports to MINEM	MINEM, public distribution companies.
Percentage of stakeholders expressing satisfaction with consultation and engagement process done under the Project	This indicator measures the percentage of stakeholder that report to be satisfied with the Project's consultation and engagement process.	Biannually	MINEM and public distribution companies' progress reports, and consultations ' participation lists.	Public distribution companies reports to MINEM	MINEM and public distribution companies.

ANNEX 1: Implementation Arrangements and Support Plan

Implementation Arrangements

1. The MINEM's DGER will be the Project Implementation Unit with the institutional responsibility within the Peruvian Government for implementing the Project. The DGER will be responsible for monitoring and oversight of overall project implementation. Within the DGER, DFC will be the PCU responsible for coordination and oversight of the technical, fiduciary, and environmental and social requirements of the project. The DFC will also closely coordinate with the public distribution companies (FONAFE managed) where the Project investments will be located to facilitate project implementation. The DGER-DFC together with the public distribution companies have successful experience executing WB financed projects, including the Peru Rural Electrification Project (P090116) and Second Rural Electrification Project (P117864).

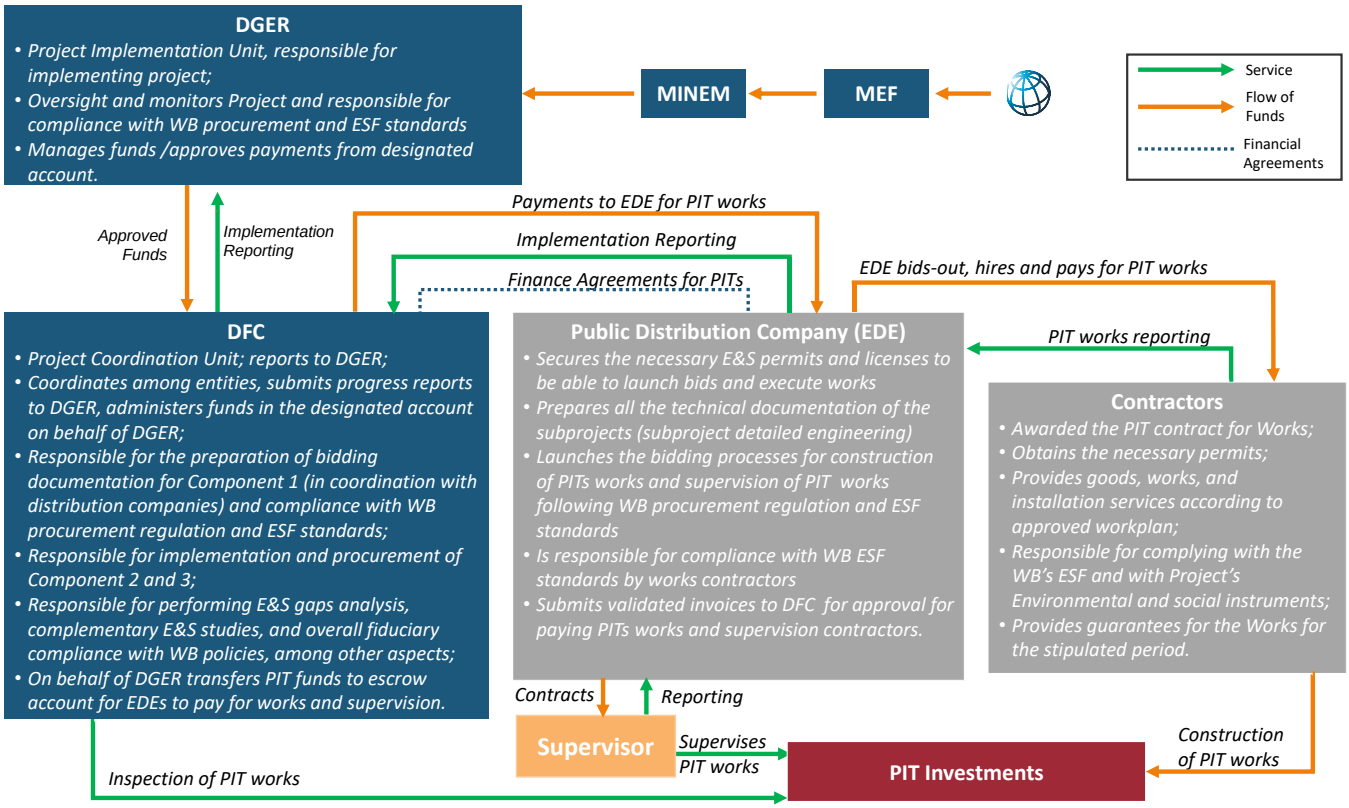
2. The DGER-DFC will be responsible for the Project's financial management, preparing the bidding documents and terms of reference for all project activities in strict accordance with the World Bank's procurement regulations and ESF, and for environmental and social oversight of the project. DGER will be responsible for requesting disbursement to the WB for the Project (advances, reimbursements and direct payments). The DFC will be responsible for all fiduciary aspects of the project, including managing the funds in the designated account, making all payments to contractors and consultants on behalf of DGER after reviewing the validated payment invoices provided by the public distribution companies, and preparing the necessary financial reports for the project. The DFC will be responsible for coordinating with the public distribution companies to obtain the necessary technical information required for the bidding documents and ensuring their compliance with both national and WB environmental and social requirements prior to the commencement of any physical works. The DFC will periodically inspect the project works to ensure physical progress and compliance with the WB's procurement and ESF requirements.

3. The public distribution companies will be responsible for obtaining the national permits and licenses required to implement the subprojects, in conjunction with the project contractors, and for preparing the necessary environmental and social documents and activities needed to comply with local requirements. This information will be provided to the DGER-DFC to ensure compliance with the project's ESF requirements and to facilitate the preparation of supplemental activities if needed. The public distribution companies will be responsible for conducting the detailed technical design studies for the specific subproject investments, which will be used by the DGER-DFC for the project's bidding documents. The public distribution companies will be responsible for carrying out the bidding processes for the PIT subproject investments under Component 1, following the WB's procurement regulations and ESF standards. The public distribution companies will be responsible for contracting independent supervision services to help oversee the physical implementation of the PIT subproject investments by the subproject contractors. They will also be responsible for validating the payment invoices provided by the contractors and sending these for approval of DGER-DFC. The contractors hired will be responsible for undertaking the PIT investments in accordance with established timeframes and in accordance with the WB's ESF.

4. The DGER has already hired several staff at DFC to support Project preparation and will be responsible for hiring and maintaining staff with adequate qualifications to implement the Project throughout its life. This will include hiring the project manager, heads of the technical, financial and administrative, and the environmental and social units of the DFC, as well as support staff in each of these areas. With respect to technical staffing, it will include a project manager, specialist in monitoring and control, transmission lines specialist, power substations

specialist, and a contracts management specialist. A project fiduciary coordinator will also be hired together with a financial specialist, procurement specialist, procurement assistant, an accounting specialist and also a legal specialist. To ensure compliance with the WB's ESF, the DFC will also have an environmental and social coordinator that will be supported by an environmental specialist, and a social specialist. While DGER has already hired a project manager and technical head to support project preparation, it will need to hire additional personal at DFC to fill the remaining positions and ensure adequate implementation of its responsibilities. The public distribution companies also already have technical and commercial personnel that are in place.

5. The Figure below depicts the project's implementation arrangements and the different roles and responsibilities:



Financial Management and Disbursements

6. **A Financial Management Assessment (FMA) was carried out in May 2021 to evaluate the adequacy of financial management arrangements for the implementation of the Project.** The FMA recommends a set of mitigating measures to address the main financial management challenges. Once the mitigation measures are in place, the proposed FM arrangements will meet the Bank's minimum fiduciary requirements.

7. **Summary of Financial Management and Accountability arrangements.** The FM residual risk for this project is **Moderate**. The Project will be implemented by the DGER which is a PIU adscript to the MINEM with an independent budgetary line. To implement the project the DGER will have the support of its DFC as coordination unit. The DGER-DFC has previous experience implementing projects financed through WB proceeds. However, the

DGER will need to recruit staff, including fiduciary staff for the DFC; as currently this directorate of the DGER has only been partially operating with two staff for Project preparation phase. The fiduciary aspects of the Project will fall under the responsibility of the OGA of the DGER. Although the DGER will be the only responsible entity to manage the Project funds; the public distribution companies will have the role of requesting payments for the PIT investment and supervision activities the project will finance under component 1. Considering the financial work that the Project will involve, the DGER-DFC will be strengthened with an additional financial management specialist and an accountant specialist with experience in working with WB financed projects. The FM arrangements for this Project will be straightforward. It is important to mention that Peru´s central government has sound public FM systems, and the DGER-DFC will benefit from the use of such country systems in the areas of budgeting, flow of funds, accounting, the use of financial information system SIAF for budgeting, accounting, and auditing.

8. **Main FM risks and mitigating measures.** The financial management dimension of the project may be affected inter-alia by: (i) weak planning capacity and delays in budget allocation, mainly at the beginning of project implementation (this is a usual problem for project's in Peru) and low budgetary execution, as evidenced by the pervasive low execution experienced by the central government budget;[51] (ii) pending recruitment of the key staff that will support project implementation; (iii) pending adoption of the OM that will include the process and procedures, roles and responsibilities for the financial management of the project*;* and (iii) potential delays in implementation of GESTOR to produce the financial reports according to the project components/categories. These factors may affect the achievement of the Project objectives in the absence of adequate mitigating measures.

9. The proposed mitigating measures for managing the Project's FM risks include: (i) the Project will benefit from the use of country systems and a public budget and financial management legal framework, which are acceptable to the WB; (ii) strengthen the DGER-DFC with a financial management specialist with experience in managing WB projects recruited under the terms of reference in form and substance satisfactory to the WB; (iii) complete the FM chapter of the OM including necessary processes and procedures, roles and responsibilities to comply with WB requirements to manage the project, including the specific processes for payments requested by the public distribution companies; and (iv) define terms of reference for the external audit, which will take in consideration the specific risks identified for the Project. In addition, the WB will provide capacity building through periodic trainings and supervision to accompany the PIU with project implementation.

10. The WB loan proceeds will follow the WB's Disbursement Policies and Procedures, as described in the DFIL. The Loan funds will be disbursed through the STA of MEF in US Dollars. Funds of the loan will be identified in a segregated sub-account of the STA.

11. The overall conclusion of the FM Assessment is that once the mitigating measures have been put in place, then the proposed FM arrangement will meet the WB's minimum fiduciary requirements.

12. **Staffing and organizational arrangements.** The Project will be implemented by the DGER, which is a PIU

[51] The Peru budget execution of the last three year has been in average 87% of the allocated budget / (*Source of information: Governmental financial management system SIAF).*
- Emergency Covid-19 budget allocation and execution year 2020, Budget allocated: 20.5 million soles, budget executed as of September 2020: 9.7 million soles / (Source of information: https://emergenciasanitaria.contraloria.gob.pe/).of the STA

adscript to the MINEM with independent budgetary line. To implement the project the DGER will have the support of its DFC as the coordination unit. Financial management functions for the Project will be carried out by the OGA, and Budget and Planning Office of the DGER that include the following positions: Chief Administrator, Accountant, Treasurer, and Budget Officer. To manage the project, a FM specialist and an accountant specialist shall be hired, as part of the project team of the DFC, to support project implementation. These specialists will work in close coordination with the OGA of the DGER. The FM specialist shall be considered key staff and shall be hired no later than 60 days after the Project Effectiveness date.

13. **Planning and Budgeting**. The DGER has a budgetary independent line. The preparation of the annual work program and budget will be in accordance with the procedures established by MEF through its General Public-Sector Budget Office (*Dirección General de Presupuesto Público*). Such procedures will be complemented by specific processes and procedures established in the OM, such as the preparation of an annual operating plan with at least a semi-annual budget, including all sources of financing – IBRD and counterpart funds. Budget funds will be allocated into the PIU's budget. The budget will be partially funded with resources from the national budget and with resources from the loan. The PIU will operate independently and will be responsible for: (a) budget formulation and timely requesting of resources for each year in accordance with the annual operating plan; (b) ensuring the allocation of disbursement requests to the appropriate designated account for the execution of the activities agreed under the Project; (c) proper recording of the approved budget in their respective information systems, following a classification by project component/sub-component; and (d) timely recording of commitments, accruals, and payments, to allow adequate budget monitoring and the provision of accurate information on project commitments for programming purposes.

14. **Accounting and information systems.** The PIU will have to comply with Peruvian budget and public financial management laws, including the use of government SIAF and its general chart of accounts. Moreover, considering the nature of project activities and information needs, DFC will use a tailormade financial information system (GESTOR) which is pending to be implemented. GESTOR will use information downloaded from SIAF to issue the financial reports and the preparation of statements of expenditures in US Dollars according to the project components/categories.

15. **Financial reporting.** The PIU will prepare the interim financial reports (IFRs) using GESTOR with information downloaded from the SIAF. The reports will include loan proceeds and local counterpart funds. The IFRs will be prepared in local currency and in US Dollars and submitted to the WB by the PIU on a semi-annual basis no later than 45 days after the end of each calendar semester. The exact format and content of the IFRs will be agreed by negotiation.[52] On an annual basis, the PIU will also prepare project financial statements in accordance with International Public Sector Accounting Standards, which will include cumulative figures for the beginning and end of the year, along with notes to the statements. These financial statements will be audited in accordance with the WB's requirements and submitted to the WB within six months after the end of the Government's fiscal year (December 31). Working papers for the preparation of the semi-annual and annual financial statements should be kept by the PIUs and made easily accessible to WB supervision missions and to external auditors.

16. **Internal Controls.** The DGER-DFC must comply with local requirements related to financial management,

[52] These IFRs will include: (i) a statement of sources and uses of funds, including reconciling items (as needed) and cash balances, with expenditures classified by project component/subcomponent/categories; (ii) a statement of cumulative of funds, reporting the current semester and the accumulated operations against by component of ongoing plans and footnotes explaining the important variances.

including internal controls and internal procedures. In addition, the WB will agree with the entity on specific processes and procedures for project implementation, which will be reflected in the OM. Emphasis will be placed on establishing clear roles and a segregation of responsibilities among the OGA unit of the DGER and its DFC, along with the specific process for payments requested by the public distribution companies. The OM adopted by the DGER with WB's no-objection is considered an effectiveness condition.

17. **Internal Audit**. The PIU DGER is under the scope of the Organic Law of the National System of Control and the General Comptroller of the Republic (*Ley Orgánica del Sistema Nacional de Control y de la Contraloría General de la República*), and as such, their organizational structure includes an Internal Control Office (*Órgano de Control Institucional*, OCI) responsible for the oversight of all operations. In this capacity, these OCIs will play a role in safeguarding the Project's internal control, and whenever possible the team will use their reports as part of the regular project supervision and monitoring activities.

18. **Oversight and Supervision Arrangements.** On a preliminary basis, the FM team plans to perform at least two supervision missions per year, while also reviewing the annual audit reports and the semester IFRs.

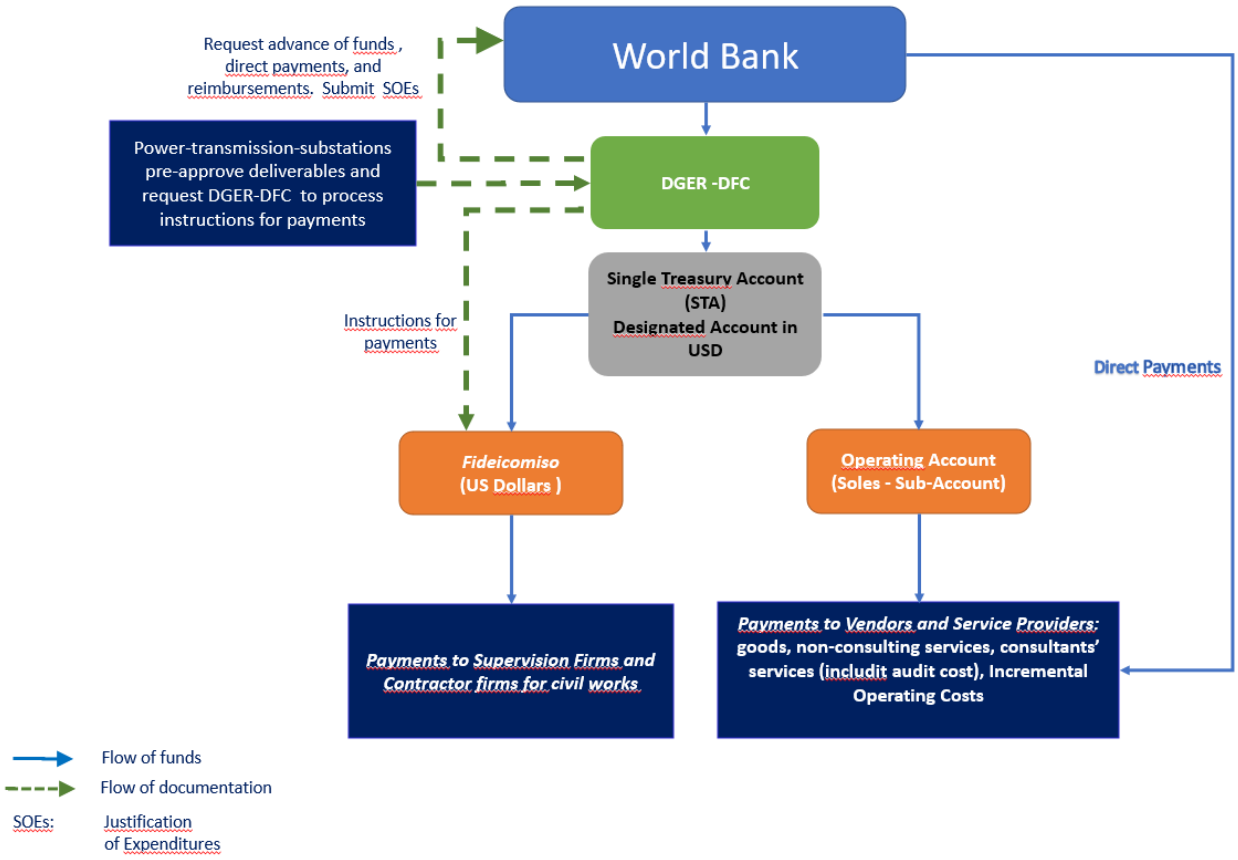
19. **External Audit.** Annual audit reports on project financial statements, including management letters, should be submitted to the WB within six months after the end of the Borrower's fiscal year (December 31). The audit will be conducted by an independent audit firm acceptable to the WB and using terms of reference approved by the WB. The selection of the audit firm will be performed through the General Comptroller of the Republic (CGR). The cost of the external audit can be financed out of loan proceeds. The scope of the audit will be defined by the PIUs in agreement with the WB based on project specific requirements and responding to identified risks as appropriate, including management letter and review of compliance with agreed processes and procedures. Audit requirements include:

Audit type	Due date
Project financial statements	June 30

20. **Funds Flow and Disbursement Arrangements.** WB loan proceeds will follow the WB`s disbursement policies and procedures as described in the DFIL. The WB and the Borrower have agreed to use the Single Treasury Account[53] (STA) as a disbursement mechanism for the project, and hence, advances to the designated account will be made to the STA. The STA for the use of loan resources is in place in Peru according to the Legislative Decree No 1441. Funds of the loan will be identified with a segregated code or sub-account of the STA. The OM will include specific procedures that will allow the project to operate the STA. The WB will disburse Loan proceeds using one of following three methods: (i) advance method: under the STA with a flexible ceiling based on semester forecast, (ii) direct payment: the minimum application size for direct payment requests will be US$500,000; and (iii) reimbursement: the minimum application size for reimbursement method will be US$500,000. For forecast purposes under the advance method, the format to be used will be annexed to the DFIL.

[53] Financial Institution for the Single Treasury Account: Banco Central de Reserva del Peru (BCR)

21. The project flow of funds is presented in the following flow chart:



22. **Designated Account**. Under the advance method a Designated Account (DA) in US Dollars in the STA will be operated by the DGER (PIU). For control purposes, the DGER (PIU) will be responsible for presenting justification of expenditures (through statements of expenditures). Funds deposited into the DA as advances, will follow the WB's disbursement policies and procedures, which will be described in the legal agreement and DFIL. For processing payments in local currency the following accounts will be used by the DGER (PIU): (i) an escrow bank account *(fideicomiso)* in US Dollars exclusively to pay the supervision service of civil-works and construction of civil works under Category 1 of the Table of Loan Proceeds; and (ii) local currency sub-account (operational account) assigned by MEF for processing payments to vendors. The specific protocols and applicable internal control arrangements for the payment processes and procedures will be reflected in the OM.

23. **Fideicomiso bank account.** A *fideicomiso* will be opened by the DGER (PIU) in a financial institution pending to be defined for payment financed under Category 1 of the table of loan proceeds. Payments made from the *fideicomiso* bank account will require specific instructions from the DGER (PIU). The DGER (PIU) will have the capacity to track the funds transferred from the designated account to the *fideicomiso* and will control and monitor payments made and prepare statement of expenditures to report the Bank. Detailed processes and procedures for controlling the *fideicomiso* account will be developed in the Project's OM. The financial institution where the *fideicomiso* will be opened shall be able to issue the account statement for verification and monitoring purpose. The *fideicomiso* account is subject to be reviewed by auditors and the WB.

24. **Withdrawal condition.** Until the financial institution for the *fideicomiso* account is selected by the DGER and approved by the WB, no expenditures under Category 1 will be accepted.

25. **Counterpart funds, retroactive financing, documentation requirements and disbursement deadline date**. Counterpart funds consist of resources from the National Treasury and public distribution companies which will be used in the percentages stipulated in the civil-work contracts following the procedures established in the OM. The DGER will manage the Treasury counterpart funds for the Project using the Single Treasury Account established by the Government. Funds for the Project will be identified with a specific project code and account in SIAF to process payments. No retroactive financing amount has been considered for the Project. Supporting documentation for project expenditures under the disbursement methods authorized for the Project should be in accordance with the provisions established under the DFIL. The Disbursement Deadline Date is four (4) months after the Closing Date specified in the Loan Agreement. Any changes to this date will be notified by the Bank.

Table A2a. Loan Proceeds

Category	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Works and Consulting Services under Part 1 of the Project (except Consulting Services financed under Part 1 (b) (i) and (ii) of the Project)	64,864,000	100%
(2) Goods, Non-Consulting Services, Training, Operation costs and Consulting Services	5,136,000	100%
Total Amount	70,000,000	

Procurement

26. **DGER-DFC will be responsible for undertaking and supervising any procurement under the Project,** which will be implemented according to the WB's Procurement Regulations for IPF borrowers, issued in July 2016, and revised in November 2017 and August 2018, for the supply of works, goods, non-consulting and consulting services, and the provisions stipulated in the Loan Agreement. The Project will be subject to the WB's ACG, dated October 15, 2006, revised in January 2011, and as of July 1, 2016. The WB's Standard Procurement Documents will govern the procurement of WB-financed Open International Competitive Procurement. For procurement involving National Open Competitive Procurement, and other methods, the documents will be agreed with the WB.

27. **A Project Procurement Strategy for Development (PPSD), prepared by the Borrower, will be finalized by negotiations.** The draft PPSD describes how procurement in this operation will support the PDO and deliver value for money under a risk-based approach. Procurement for works, goods, consultant services and non-consulting services will be implemented based on Mandatory Procurement Prior Review Thresholds detailed in Annex I of the WB's Procurement Procedures. All procurement procedures, including roles and responsibilities of different participating entities and units, will be defined in the OM. A summary of PPSD, including recommended

procurement approach for higher value contracts, is detailed in Table A2b.

28. **A Procurement Plan was prepared based on the PPSD,** which provides adequate supporting market analysis for the selection methods detailed in the Plan. In accordance with Paragraph 5.9 of the Procurement Regulations, the World Bank's STEP system will be used to prepare, clear, and update procurement plans and conduct all procurement transactions for the project.

29. **Civil works.** Component 1 will finance civil works for: (i) expansion and strengthening of existing power transformation substations; (ii) repowering of existing transmission lines within existing rights of way; (iii) new substations; and (iv) new transmission lines in urban, peri-urban, and rural areas. According to the draft PPSD, the open national competitive bidding approach will be applied as stipulated in the Procurement Plan. The national approach is supported by the availability of bidders in the local market.

30. **Consulting services to** be financed under the Project include supervision of civil works under Component 1, analytical and advisory support activities under Component 2, external auditing, among others. Considering that these will be small contracts, the suitable market approach will be an open competition in the national market or direct market approach, while the Quality-Cost-Based Selection or the Consultant's Qualification Based Selection (considering the nature and scope of the services), or Direct Selection will be the selection methods.

31. **Goods and Non-consulting services.** The Project will finance the procurement of computers, equipment, printing services, publicity services, and other services.

32. **Operating Costs.** The Project will finance operating costs, such as office supplies, computers and equipment maintenance, per diems for local and international staff, among others.

33. **A procurement capacity assessment was carried out to evaluate the adequacy of procurement arrangements of DGER-DFC.** The DGER-DFC has wide and satisfactory experience working with WB-financed Projects. However, for the implementation of the Project, they will need to hire a procurement specialist with experience in WB's procurement procedures and fully dedicated to the Project. The public distribution companies will be responsible for carrying out the bidding processes for the PIT investments under Component 1 of the Project. Therefore, continuous training by the DGER-DFC to them will be needed during Project implementation to ensure the adequate application of the Procurement Regulations. As DGER-DFC will be the final responsible for Project implementation, it will have active participation along the bidding processes. The arrangements between DGER-DFC and the Public Distribution Companies will be defined in the OM. The following table summarizes the mitigation actions proposed for the procurement-related risks:

Table A2b. Mitigation Actions Proposed for the Procurement-Related Risks

Risks – Areas for Improvement	Mitigation Actions	Responsible	When
Lack of clarity of responsibilities related to the procurement activities	The OM prepared by the borrower and deemed by satisfactory the WB. The OM should establish clear definition of the procurement processes, the roles and responsibilities of staff related to the implementation of procurement activities, and the	DGER-DFC	By Project effectiveness

	functions of the different institutions involved in the Project.		
Lack of staff with expertise in procurement processes with the WB's Procurement Regulations	PIUs should hire skilled staff.	DGER-DFC	60 days after effectiveness
Non-compliance of WB's Procurement Regulations due to lack of experience of the public distribution companies	Active participation of the DGER-DFC throughout the bidding processes. Training program on the application of the Regulations to be provided regularly by DGER-DFC to the public distribution companies.	DGER-DFC	During Project implementation

34. **Frequency of Procurement Supervision.** In addition to prior review supervision to be carried out by the WB office, annual supervision missions will be carried out to visit the field and conduct post review of procurement actions.

Table A2c. Summary of PPSD (for higher value contracts)

Description	Est cost (US$)	Review	Market approach	Procurement method
CIVIL WORKS TRANSMISSION LINES AND ENERGY SUBSTATIONS PROJECTS Expansion and/or Reinforcement of Transformation Substations				
	76,851,486			
Group 1 - ELECTROCENTRO	4,629,071	Post	National Open	SDO
Group 1- ELECTRONOROESTE	2,127,448			
Group 1 - HIDRANDINA	3,370,820			
Group 2 - HIDRANDINA	5,632,386			
Group 2 - SEAL	13,806,646			
Group 3 – ELECTRO ORIENTE	10,275,546			
Group 3 - ELECTRONOROESTE	5,419,391			
Group 3 – ELECTRO PUNO	3,150,652			
Group 3 - ELECTROSUR	2,049,713			
Group 3 - SEAL	7,047,458			
Group 4 – ELECTRO UCAYALI	4,766,554			
Group 4 - ELECTRONOROESTE	7,334,264			

Group 4 - HIDRANDINA	6,083,229			
Group 4 - ELECTROCENTRO	1,158,308			

Environmental and Social Aspects

35. The DGER-DFC, in collaboration with the World Bank environmental and social specialists, will be responsible for making sure all environmental and social documentation, activities undertaken to comply with national requirements, and specific instruments prepared for the project, meet the WB's ESF standards. If any gaps between national requirements and the WB's ESF standards are identified for specific subproject investments, the DGER-DFC will be responsible for undertaking or contracting the required E&S complementary study and supplemental activities needed to address these gaps. Within the DFC, an environmental and social coordinator will be hired that will be supported by an environmental specialist, and a social specialist to oversee environmental and social management of the ESMF, SEP, LMP and RF for the Project. The social specialist will also be responsible for the implementation of the GRM for both workers and population at the Project level (macro) as well as carry out oversight of the GRM that will be implemented by the Contractor at the subproject level.

36. The public distribution companies will be responsible for obtaining the necessary national environmental and social permits, licenses and authorizations required to implement the project, and for preparing the necessary environmental and social documents and activities needed to comply with local requirements. The public distribution companies will hire specialized technical and environmental and social consultants to facilitate undertaking the detailed technical design and environmental and social instruments for specific subprojects to meet national requirements. The public distribution companies will provide this information to the DFC to facilitate the preparation of environmental and social complementary studies (if needed) to ensure compliance with the project's ESF requirements.

Implementation Support Plan.

The WB will provide capacity building and training on fiduciary and on environmental and social aspects to ensure appropriate project implementation to MINEM's DGER-DFC and the public distribution companies participating in the Project. Procurement training would be provided to DGER-DFC as well as to the technical teams of the distribution companies on the WB Regulation policies to ensure appropriate preparation of the bidding documentation, evaluation committee evaluations and contract management according to WB policies. Similarly, FM training would be provided to the DGER-DFC, to the financial management specialist and accountant specialist working at DFC. Procurement training would be provided at the beginning of Project implementation and repeated as needed to ensure adequate understanding of the WB Regulations. WB's ESF trainings would also be provided on a regular basis both to DGER-DFC environmental and social specialists and to the environmental and social coordinator, which would be trained to provide training to public distribution companies' environmental/social experts, and to the works and supervision contractors. ESF trainings would take place at the start of Project implementation once the E&S team is hired at DFC and be repeated throughout each quarter during the first year, and is likely to take place on a semester basis thereafter. The WB ESF, procurement and FM teams would also be available on a just-in-time support to provide guidance and help solve any related issue that may arise during implementation.

Monitoring and Evaluation

37. **The DGER-DFC will be responsible for project results monitoring and evaluation arrangements and for Project reporting to DGER and the World Bank.** This will entail monitoring and collecting data on project implementation and status of the project results indicators. The DGER-DFC will be responsible for coordinating with the public distribution companies and project contractors and supervisors as needed to collect information to report on physical implementation of activities and progress on results indicators related to Component 1. The public distribution companies already regularly collect the necessary technical and commercial information as part of their normal operations on the main project indicators and the remaining indicator information will be collected through the supervision of the physical implementation of the works for the project, and through information that OSINERGMIN collects regularly. The DGER-DFC will monitor and collect results information regarding the energy sector regulatory assessment work undertaken for Component 2. The DFC will be responsible for results monitoring and reporting for the Project, and for sending the progress and results reports to the DGER and upon its approval, to the WB on an annual and biannual basis.

ANNEX 2: Detailed Project Description

1. The Project seeks to increase availability and reliability in select areas of Peru, which is essential to ensuring household welfare and securing the economy in the post COVID context. Adequate and reliable electricity service is critical for powering households, businesses, and industries and essential services needed to combat the COVID-19 pandemic such as hospitals, clinics, vaccine storage equipment, and oxygen plants in Peru. The Project will finance a portion of the FONAFE managed public distribution companies' priority subtransmission investments that are required to meet existing and new electricity demand and to avoid electricity service disruptions in various region of Peru. In addition, the Project will provide support to help further the Government's comprehensive electricity sector reform program. The MINEM's DGER will be the Project Implementation Unit, responsible for overall implementation of all Project components, supported by the DFC, as the PCU. The DGER-DFC, in coordination with the public electricity distribution companies, will be responsible for the implementation of the investment works and with the MINEM's VME and the CRSE for the technical assistance on regulatory work.

2. By assisting to overcome critical electricity distribution system investment delays that put at risk electricity service provision in Peru and supporting electricity sector reforms needed to modernize sector institutions and the regulatory framework, the Project will help tackle two of the most pressing energy sector challenges Peru faces today. The project consists of the three components described below.

3. **Overall Description: Component 1: Strengthening and expansion of substations and transmission lines (US$65 million IBRD, US$24.59 million public distribution companies).** This component will finance priority subtransmission investments of the FONAFE managed public distribution companies included in the PITs (2013-2017 and 2017-2021), which will include: (i) expansion and strengthening of existing power transformation substations; (ii) repowering of existing transmission lines within existing rights of way; (iii) construction of new substations; and (iv) installation of new transmission lines in urban, peri-urban, and rural areas. The physical works under this component will finance reinforcement and expansion of protection systems, connectors, isolators, and transformer cells, capacitor banks, and controls, transformer replacements and new transformers of 10, 23, 30, 33, 60 kilovolts (kV) in existing substations, the construction of new substations including the patios and installation of the aforementioned equipment, transmission line repowering and the installation of new transmission lines of 138 and 220 kV (poles and lines) that are expected to all be less than 20 kilometers in length, and the associated electromechanical and civil works related to these investments. When preparing the detailed technical assessment for these investments and their siting, potential climate and disaster risks will be considered (e.g. flooding, mass movements, earthquake, temperature) and the definitive engineering design will account for these risks. Depending on the risks identified, the technical specifications included in the bidding documents might require using, for instance, equipment with more rigorous design standards, or use of higher installation heights for connectors, isolators, and transformer cells, capacitor banks, and controls for a particular substations or require using specific types and heights for poles and cables. The specific technical requirements will be determined in the engineering design studies for each subproject financed by the public distribution companies, and the substation and transmission line investments that might incorporate resilient design measures will be financed by the Project.

4. This component will finance subproject preparation documentation, including additional technical, and ESF documentation needed (such as gaps analysis and the complementary studies needed to close gaps), bidding documentation, subproject financing agreements between MINEM and the public distribution companies. The component will also finance both the contractors hired to implement and supervise the subprojects.

5. **Component 1 Procedures:** The MINEM has identified 24 priority investments from the PITs (2013-2017 and 2017-2021) which will be financed by the Project. These priority investments are located in 10 of the 24 regions of Peru, specifically in the regions Ancash, Arequipa, Junín, La Libertad, Piura, Puno, San Martín, Tumbes, Tacna, Ucayali (see Table A1 below). Eligibility criteria for the investments selected and to be financed under the Project include: (i) public distribution company PIT investments approved by OSINERGMIN are justified through technical (market study and operational conditions) and financial evaluations; (ii) delayed investments within the PIT and confirmation that these are not yet executed; (iii) substation transformers that are overloaded or at high risk of becoming overloaded over the next 2 years thereby putting at risk electricity service provision and transmission lines that are congested; and (iv) compliance with established environmental, social and climate change[54] (subprojects cannot be located in environmentally sensitive areas nor in areas where indigenous peoples reside). All investments included are required to be part of the four types investments eligible for financing under Component 1 (e.g. strengthening/expansion of existing substations, repowering of existing transmission lines, new substations, and new transmission lines).

Table A1. Priority Investments by Type and Public Distribution Company

Installation Type	# of Projects
Substation (Transformers)	10
Substation (New)	4
Transmission Line (New)	3
Substation with Transmission Line	7

Company	# of Projects
Electrocentro	3
Electronoreste	4
Electro Oriente	2
Hidrandina	6
Seal	4
Electrosur	2
Electro Ucayali	2
Electropuno	1
Grand Total	**24**

6. During Project implementation, the PIT subproject investments will be screened by the DFC-DGER following the previously mentioned technical, financial, and environmental, climate, social eligibility criteria for the Project, especially for the last set of five subprojects that need to get economic viability from Invierte.PE. A phased approach will be used, where appraisal of the first 7 subprojects is undertaken during project preparation and all technical, fiduciary, and environmental and social requirements completed before the launch of the first bidding package. Afterwards, the remaining subprojects will be appraised, and all technical, fiduciary, and environmental and social requirements completed in a progressive manner for each subset of subprojects prior to tendering them out. The public distribution companies will first provide the DGER-DFC the subprojects' existing technical, financial, and environmental and social information. This documentation will include the definitive

[54] The climate resilience of the substations and investments under this component will be verified through these studies which will inform the final selection and design of the specific subprojects. A climate and disaster risk screening for the 24 investments will be undertaken to determine their exposure to and likelihood of these risks occurring. The screening will characterize the exposure of these investments to hazards (including flooding, mass movements/mudslides, higher temperatures). Data sources will include the Climate Change Knowledge Portal, and national/local level datasets obtained in consultation with the MINEM, public distribution, and other relevant national counterparts. This screening will allow for determining the relative risk of these investments to these hazards that will also help in determining if additional resilience measures might be needed to address these risks for the specific subproject investments to be eligible for financing under the Project.

detailed engineering design for the subprojects,[55] the economic viability of Invierte.PE, national environmental and social instruments (IGAS), certificate of the inexistence of archeological remains (CIRA), and the information on land acquisition and rights of way (where applicable) for the proposed subprojects. The DGER-DFC will then review the information provided for each subproject to make sure that the subproject meets the Project eligibility criteria before it enters into a subproject financing agreement with the public distribution companies to finance it. As part of the subproject review, an environmental and social gaps analysis will be undertaken by the social and environmental personnel in the DFC to ensure that the subprojects meet the WB's ESF standards applicable for the Project. If gaps are identified, the DFC will prepare, with the assistance of specialized consultants, complementary environmental and social studies/instruments to close the gaps, which will be completed prior to launching the bidding processes for all subprojects. Subsequently, the public distribution companies will hire both the contractors responsible for implementing the works and the contractor to supervise works using the bidding documents prepared jointly with DGER-DFC that are consistent with WB's fiduciary and environmental and social requirements for the Project. The DGER-DFC will be the primary entity responsible for supervising and monitoring implementation of the works and reporting to the WB.

7. As part of Project readiness, an initial set of seven subprojects were selected from the priority list in accordance with the technical, financial, and environmental and social eligibility criteria. The WB has reviewed the technical information for these subprojects and confirmed the technical need and urgency of these investments. These seven PIT subprojects are located in the Ancash, Junín, and Piura regions of Peru. This first subset of PIT subprojects comprises: (i) 6 subprojects of transformer replacements or additions within existing substations of Electronoroeste, Electrocentro, and Hidrandina (all Distriluz companies); and (ii) one subproject for a new substation for Electrocentro (see Table A2). This first pipeline of subprojects will be part of the first bidding process that will be tendered out during the first semester of project implementation.

Table A2. Selected Distriluz PIT subprojects by Type

Subproject	Company	Location	MVA	Decription
Ejidos	Electronoroeste	Castilla, Piura	30	Existing substation capacity expansion by changing existing transformer to a 30 MVA transformer
Chulucanas	Electronoroeste	Chulucanas, Piura	18	Existing substation capacity expansion by changing existing transformer to 18/18/7 MVA
Chupaca	Electrocentro	Chupaca, Junín	5	Existing substation capacity expansion by installing 5 MVA transformer and connector cells
Trapecio	Hidrandina	Chimbote, Ancash	40	Existing substation capacity expansion by installing a 40/20/30 MVA transformer and associated cells
Carhuaz	Hidrandina	Charhuaz, Ancash	9	Existing substation expansion by installing 9/5/7/3 MVA transformer
Caraz	Hidrandina	Caraz, Ancash	9	Existing substation capacity expansion by installing 15/15/15/5 MVA transformer, transformer cells, meter, and feeder
Pachachaca	Electrocentro	Yauli, Junín	5	New Substation, 5 MVA 50/10 kV and connector cells

Source: MINEM, 2020

8. An environmental and social gaps analysis was undertaken for these seven subprojects to review the existing environmental and social instruments to meet Peruvian national requirements and determine any gaps to comply with the WB's ESF standards applicable to Project. Terms of reference for the complementary

[55] Substation design studies will incorporate climate risks and vulnerabilities (including flooding, mudslides, higher temperatures) as key risk criteria included in the analyses and the engineering design has factored in these risks when determining the optimal siting of substations, and technical design standards to ensure they are sufficiently robust to any risks identified, to mitigate these risks and ensure compliance with the country's service quality and reliability standard. The public distribution companies will also assess these types of risks as one of the criteria when determining the optimal land to be used for siting the new substations. In addition, electricity system towers and lines will adhere to sound technical criteria to mitigate risks identified and are located away from high-risk flood areas. In addition, the technical specifications of new substation and subtransmission investments included in the bidding documents will include design specifications and criteria to avoid and mitigate the climate risks identified.

instruments to close the gaps identified will be prepared by September, prior to the tendering out of these seven subprojects so that all environmental and social management requirements that must be performed by the PIT subproject contractors hired are included in the bids and contracts. The DGER-DFC will be responsible for ensuring that the contractors adhere to these environmental and social requirements through periodic inspections and with the assistance of works supervisors hired to monitor on a continual basis the physical, financial and environmental and social progress of the different subprojects.

9. **Overall Description: Component 2: Technical Assistance for Regulatory Strengthening (US$ 1 million IBRD, US$0.5 million MINEM).** This component will provide financing for technical assistance to support the modernization of the electricity market, including regulatory reforms to strengthen the public distribution companies. These studies will be carried out in coordination with the VME and CRSE. This will include analytical and advisory support to assist the MINEM and CRSE with developing a comprehensive plan of reform measures needed to modernize the power sector's institutional and regulatory framework to facilitate the insertion of new market agents and mechanisms, and technologies to enhance reliability and competitiveness and enhance climate resilience and attract greater private investment and incorporation of innovative technology in the sector. This component will contribute to greening of the energy matrix and to MFD by furthering reform measures that will facilitate greater participation of private renewable energy generators in electricity wholesale markets and to establish the regulatory framework needed to permit private actors to invest in decentralized renewable energy generation and to unlock private investment in other innovative technologies like smart meters, battery storage, and electric vehicles. This component will also assist in identifying systemic measures for overcoming the financial and institutional constraints facing the distribution companies' contributing to the PIT delays to facilitate longer-term sustainability with respect to implementation of public distribution companies' investment plans, including corporate management, operational efficiency, and commercial and financial limitations. This will include assessing options and reform measures that go beyond the current public distribution company structure to also consider ways in which performance could be improved through options such as involving the private sector in management and operation of the public distribution companies or ways to package investments so they will be tendered out under PPP approach, among other potential options.

10. **Component 2 Procedures:** The component will support technical assistance and advisory support advancing the MINEM's energy sector reform program and institutional issues faced by the distribution companies, building upon the conceptual frameworks prepared under the WB's ongoing advisory support to MINEM on strengthening the institutional framework, wholesale market transformation, and modernization of the distribution sector.[56] The component will follow the same approach from the ongoing electricity reform support, whereas the MINEM and CRSE will continue to be the technical focal points responsible for implementing the work, with guidance from WB and support from external local and international experts that will be hired by DGER. Working sessions and stakeholder consultations will also be held to build consensus with the MINEM and OSINERGMIN and other sector stakeholders on the recommended measures to engender greater support for priority reform measures.

11. **Overall Description: Component 3: Project management and capacity building (US$ 4 million IBRD).** This component will support the effective implementation and management of the Project, including: (i) project management unit; (ii) fiduciary oversight, including procurement and financial management, and monitoring of environmental and social aspects of the subprojects; and (iii) project monitoring and evaluation activities. Capacity

[56] Ongoing technical assistance activities on energy sector reform support being provided by the World Bank financed through ESMAP, PPIAF, and SFLAC trust-fund support.

building and training will also be provided to MINEM and public distribution companies on technical, fiduciary, and environmental and social aspects to ensure compliance with WB's requirements and support project implementation.

12. **Component 3 Procedures:** The DGER as Project Implementing Unit will be responsible for preparing the terms of reference, selecting and hiring the technical, fiduciary and environmental and social specialists that will form part of DFC that will be responsible for project coordination, monitoring and report activities. The World Bank task team will provide guidance to the DGER to assist in preparing these initial terms of reference during project preparation and initial implementation. In addition, the World Bank team will provide additional training on fiduciary and environmental and social framework and procedures during early project implementation to the DFC staff, public distribution companies that are part of the Project, and the project contractors once hired so that they obtain the fiduciary and environmental and social management capacity needed to implement the project in compliance with the World Bank's standards.

ANNEX 3: Economic and Financial Assessment

1. This annex discusses the rationale for public financing of the Project, the valued added from the WB's support, and presents the analysis of the Project's development impact in terms of expected benefits and costs. The economic analysis covers the strengthening and expansion of existing substations and transmission lines financed by the Project. This economic analysis is consistent with the Guidelines for Economic Analysis of Power Sector Investments, 2017.

Project Background

2. Peru's electricity distribution sector consists of twenty-two distribution companies serving most of Peru's territory and population. Four (4) are privately-owned companies (Luz del Sur, ENEL, Electro Dunas, and COELVISAC) and eleven (11) are state-owned and managed by the state holding corporation, the FONAFE. The Project considers eight (8) state-owned distribution companies. The distribution sector has significant disparities in the quality of electricity services provided to clients served by public utilities compared to those served by private utilities.

3. An important factor contributing to electricity system constraints and service quality of public distribution companies is the limited implementation of their PITs. Based on the 2013-2017 and 2017-2021 PITs, the public distribution companies need to add an estimated 1,308 MVA in subtransmission system capacity to meet suppressed and new demand to service their concession areas. The subtransmission system's investment lags hinder the ability of the public distribution companies to meet both suppressed and new demand. Additional subtranmsision system capacity to meet suppressed and new demand provided by the Project will increase additional capacity to about 477 MVA.

4. The lack of investments by the public distribution companies over the years has resulted in: (i) electricity supply restrictions and emergency situations that has led to the need for diesel-based generation; (ii) the companies have been fined to compensate electricity users for unserved demand caused by service restrictions and for delays in making the PITs investments; and (iii) 37 electric transmission systems at the national level are classified as in alert status in 2018.

5. The proposed Project will finance 24 priority investments that have been identified by MINEM and the public distribution companies that are part of the delayed investments in the PITs that have been reviewed by the WB to confirm the technical need and urgency of these investments and that they comply with the subproject eligibility criteria established for the Project. The investments are comprised of transformer replacement and expansion, strengthening and expansion substations and transmission lines (Component 1), technical assistance for regulatory strengthening (Component 2) and project management and capacity building (Component 3). The economic and financial analysis is focused on Components 1 and 3, which account for 98.2 percent of the IBRD loan, and given that the analytical constraints associated with benefits that cannot be measured in monetary terms and/or where information is not already available (Component 2).

Economic and Financial Analysis

6. An economic and financial analysis is conducted by comparing the cost/benefit stream of the 'no project' case (i.e. no upgrade, expansion or construction of substations and transmission lines despite their being overloaded) with a cost/benefit stream of the 'with project' case. A range of scenarios and sensitivities that

meaningfully reflect the uncertainties of key input variables are evaluated. The analysis includes a consideration of the GHG emissions accounting.

Project costs

7. The economic costs of the Project comprise three parts: (i) the investment costs; (ii) the operating and maintenance (O&M) cost; and (iii) the cost of additional power supplied. The project information source was extracted from the PITs' profiles elaborated by the electricity distribution companies and approved by OSINERGMIN, the regulator, which followed the General Guidelines for the Identification, Formulation and Evaluation of Investment Project, set by MEF.

Investment Cost

8. The economic analysis considers all the investments needed to deliver the intended benefits to the end users. These include the assets (transformers, transmission lines, and associated equipment), transport, labor, engineering, construction services, complementary environmental and social instruments costs (ESG) and project management.

Table A3a – Investment Cost

Capital Cost	US$Million
Construction	**80.3**
Equipment	49.5
Transport	1.6
Electromecanic Assembly	7.5
Civil Works	12.3
General Expenses	9.3
Other Work Expenses	8.6
Consultancies ESG	0.8
Project management and capacity building	4.0
Total Capital Cost	93.6

Operating and Maintenance costs

9. The O&M costs are estimated as 3.59 percent of the project investment cost.

Cost of Additional Power Supply

10. The cost of the additional power supply is the average price of energy supplied to each substation, which is approved by the Supervisory Agency for Investment in Energy and Mining and it is available on the profile of the subprojects to be financed by the Project.

Project Benefits

Increased Capacity

11. The result of the Project's investment in substation and transmission line projects is the expansion of system capacity and the ability to serve the previously constrained and future demand, the economic value of which is measured by the willingness-to-pay (WTP); and the financial value of which is measured by the tariff charged by the distribution companies.

Reduced T&D Losses

12. This analysis assumes avoided transmission technical losses at the subtransmission level of 0.90 percent.

Avoided Fines

13. The avoided fines are estimated using the formula established by OSINERGMIN in Resolution No. 168-2014-OS/CD

$$m_{noc} = \sum_{i=1}^{n} 0{,}0003 \text{ UIT/ S/.} * f * CM_i \text{ S/.}$$

Where: m_{noc}: It is the value of the fine expressed in UIT (Peruvian Tax Unit). UIT is set annually by the Peruvian MET, in 2020 was equal to 4,300 soles.
S/: Peruvian Soles, national currency
f: delay factor. It is assumed equal to the maximum (0.084), for delays of more than 46 days.
CMi: Cost in Soles of the module delayed. It is assumed equal to the cost of the project equipment for this evaluation.

Reduced on-site Diesel Consumption

14. This analysis assumes that one of the project's economic and environmental benefit is the substitution of on-site diesel generation required to meet demand and avoid shortages in overloaded substationss, with on-grid (grid-connected) generation once the SEs expansion projects are completed.

15. Diesel consumption was estimated just for subprojects that have available information related to possible on-site diesel generation. The subprojects analyzed are from Distriluz, and only include the expansion of SEs (Chupaca, Ejidos, Chulucanas, Motil, Trapecio, Chao, Caraz and Carhuaz). Diesel consumption is estimated using a conservative scenario in which we assume that after a system becomes overloaded it will use on-site diesel generation to supply its demand during peak hours for the first ten years[57]. Diesel consumption avoided is estimated using the following formula:

Diesel Consumption: On-Site generation MWh ***** Diesel consumption factor[58]
On-site generation MWh: Energy Deficit x 4 hours x 365 days
Energy Deficit = Energy Demand MW – Maximum SE Capacity (supply)

Avoided global environmental damage costs

16. The Project's main impact on GHG emissions reductions comes from the expansion of substaions that are, or will soon become, over loaded. As electricity demand surpasses substation capacity in subtransmission systems, distribution companies are required to resort to costly and polluted emergency diesel-based generation to meet demand and avoid shortages. The Project interventions will allow for meeting the demand requirements with on-grid generation, which is cleaner than diesel-based generation.

GHG Emission Reduction =

[57] The company estimates that on average the on-site diesel generation plants will run for about 4 hours a day during peak demand. The companies could keep the on-site generation for more than 10 years, but also could adopt another alternative to meet the suppressed demand at any moment, therefore ten years sounds conservative, given the few options available in the interim.
[58] Information provided by Distriluz 12Kwh/gallon or 0.083 gallons/kwh

GHG Emissions Diesel On-Site Generation – GHG emissions generation on-grid (project scenario)

Where:
GHG Emissions Diesel On-Side Generation: Diesel Consumption * Diesel Emission factor (10.16 kg/gallon)[59]

GHG Emissions generation on-grid:
Electricity provided by the grid * Peru's Emission Factor for Electricity consumption
Electricity provided by the grid = On-site generation MWh, It is assume the project will displace all the onsite diesel generation.
Peru's Emission Factor for Electricity consumption = 167 kg/MWh[60]

17. However, the WB Guidelines for T&D projects state that emissions from power generation are not considered under T&D projects because "they are outside the project boundaries and because the operations of transmission infrastructure do not influence the emissions associated with generation". The only exception is "losses over which the project has control, and which are a natural consequence of the project". Therefore, although GHG emissions reductions were estimated for both for avoided diesel consumption and for technical losses, only reductions associated with technical losses can be officially reported under the WB's GHG accounting guidelines.

18. **Reduction in Technical Losses**. Investments in the subtransmission systems where the interventions will occur are expected to reduce technical losses by 0.9 percentage points, reducing the GHG emissions associated with this electricity consumption.

Following Bank Guidelines, GHG emissions reductions are estimated through these steps:

GHG Emission Reduction =
*Electricity Losses Reduction *Peru's Emission Factor for Electricity consumption*

Where:
Electricity Losses Reduction = Electricity Losses Non-Project – Electricity Losses with Project
Electricity Losses Non-Project Scenario = Electricity served no project for all years * losses factor (2.75%)
Electricity Losses Project Scenario = Elect. served project for all years * losses factor (1.85%)
Peru's Emission Factor for Electricity consumption = 167 kg/MWh

Key Assumptions
19. In addition to the costs and benefits noted in the previous section, the economic analysis rests on the following additional assumptions:

- The **period of analysis** is 30 years reflecting the equipment's useful life.

[59] Emission Factor taken from EIA. https://www.eia.gov/environment/emissions/co2_vol_mass.php
[60] *Information provided by Perú Ministry of Environment – Directory of Greenhouse Emissions.*

- **Discount rate for calculation of NPV**: 8 percent is the rate used, as set by Peru's Ministry of Finance in the "General Guidelines for the Identification, Formulation and Evaluation of Investment Projects"[61].

- All **project costs** are expressed in domestic currency and in constant 2021 prices, excluding financial charges, transfer payments and price contingencies, adjusted for various degrees of market distortions.

Table A3b. - Social Cost Multipliers for Economic Analysis

Social Cost multipliers		
Social Prices		
National Goods	[ ]	0.85
Imported Goods	[ ]	0.76
Skilled Labor	[ ]	1.00
Unskilled Labor		0.60
General Expenses	[ ]	0.85

- The detailed cost estimates were prepared originally between 2017 and 2020, and their costs have been updated to 2021.

- **Willingness-to-pay (WTP).** The economic value of the additional power served is valued at WTP conservatively assumed at Soles 0.343 per kWh (US$0.096 per kWh) in 2021, half of the cost of diesel-based generation (0.192) based on the following assumptions:

Table A3c. - WTP Estimation

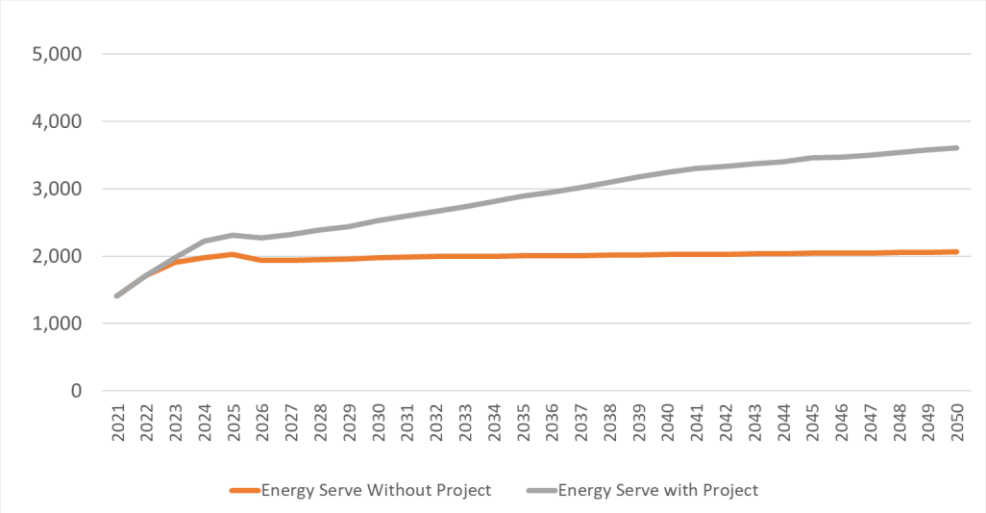
Willingness to pay: self-generation			
size		[kW]	50
Fuel			Diesel
capital cost		[US$/kW]	500
life		[years]	20
annual cost		[$/kW]	50.93
capacity factor		[ ]	0.7
generation		[hours/year]	6132
capital cost		[us$/kWh]	0.008
fuel consumption		[l/kWh]	0.2642
fuel cost		[S/l]	2.6072
fuel cost		[S/kWh]	0.689
total cost		[S/kWh]	0.720
total cost		[US$/kWh]	0.1920
WTP	*50%*	[S/kWh]	0.360
WTP	*50%*	[US$/kWh]	0.096

[61] For infrastructure projects, the World Bank has recommended an economic discount rate in the range of 6.0–10.0 percent, or a general rule of thumb of two times the rate of GDP growth. The economic discount rate used in the analysis is assumed at 8.0 percent, following Peru's Ministry of Finance guidelines, which fells in the middle rage of the Bank's recommendation and it is the double of Peru's GDP Growth in the period 2011-2019 (4.1%).

Energy Balance

20. The Project will finance reinforcement and expansion of protection systems, connectors, isolators, and transformer cells, capacitor banks, control houses, transmission line replacement and expansion, and transformer replacement for 10, 23, 30, 33, 60, 138, and 220 kilovolts (kV). As a result of the investments, additional power will be transmitted through the grid. To ensure the reliability of supply, it is assumed that after the project investment the peak load will not exceed 80 percent. The figure below shows the demand served by the project with and without project scenarios.

Figure A3a. - Demand served with and without the project



Results

21. The economic analysis shows that the selected subprojects to be financed by the Project are economically viable after consideration of the environmental benefits. The EIRR is estimated as 22.7 percent (ENPV US$106.2 million) (Table A3d) for the project. The returns, including the environmental benefits, add 0.11 percent points, reaching a total EIRR of 22.8 percent (ENPV US$106.5 million)[62].

22. The economic evaluation takes a conservative approach to estimate the project benefits, including a number of benefits which are either uncertain or difficult to quantify such as: (i) energy security; (ii) employment generation; and (iii) increased quality of life. These benefits have not been included in this economic analysis. It is therefore likely that the ERR of the proposed Project will be higher than estimated results of this analysis.

23. Table A3d shows the summary of the calculations of the economic returns for an 8 percent discount rate.

[62] The results of an Economic Evaluation following Invierte.PE guidelines show an EIRR of 14.16 percent and an ENPV of US$59.8 million. The main difference in methodology is associated with the willingness to pay for electricity, which in Invierte.PE methodology is equal to the electricity tariff. Also, Invierte.PE doesn't consider benefits associated with GHG emissions reductions.

Table A3d – Summary of Economic Analysis

			net
[1]	Discount rate	[ ]	8.0%
[2]	**Economic rate of return**		
[3]	ERR	[ ]	22.7%
[4]	ERR+GHG@BankGuidanceValues	[ ]	22.9%
[5]	**Composition of NPV**		
[6]	Project capital cost	[$USm]	-60.3
[7]	Project O&M	[$USm]	15.7
[8]	Energy Cost	[$USm]	-343.1
[10]	**total costs**	[$USm]	**-388**
[11]	***Benefits***	[$USm]	
[12]	Conusmer benefits	[$USm]	493.9
[13]	**total benefits**	[$USm]	**493.9**
[14]	**NPV (before environmental benefits)**	**[$USm]**	**106.2**
[15]	NPV (incl. Local environmental benefits)	[$USm]	**106.2**
[16]	GHG Reduction Benefits	[$USm]	0.7
[17]	**NPV (including environment)**	**[$USm]**	**106.9**

24. Net GHG reduction is estimated to be around 2,518 tons of CO2 during the Project lifetime or 84 tons of CO2 on average per year. Sensitivity analysis using the low case (increasing from US$40.9per ton in 2021 to US$78 in 2050) and high case (increasing from US$81.8 per ton in 2020 to 156 in 2050) shows that SPC, have little impact on the Project's returns. There is a 0.11 percentage point difference between the EIRRs for the low and high case SPC (Table A3e).

Table A3e – Sensitivity on Social Value of Carbon

Shadow Prices of Carbon	NPV (US$M)	EIRR
Low Case	106.5	22.8%
High Case	106.8	22.9%

25. Based on the WB's current GHG accounting methodology the Project has a low loss reduction potential and therefore the project's lifetime emission reduction does not reach the WB's minimum threshold of 20,000 tCO2e.

26. **Diesel Consumption Avoided.** It is estimated that Project completion will avoid the consumption of 37.9 million gallons of diesel, that will otherwise be required to generate 455,671 MWh to satisfy the suppressed demand in the SE expansion subprojects analyzed for this Project. If the reduction of diesel consumption for on-site power generation could be considered in the GHG emission accounting, net GHG emissions during the Project's lifetime are estimated to be 309,704 tCo2.

Sensitivity Analysis

27. Sensibility analysis were run on the economic return and NPV by modulating three key parameters: capital investment, electricity demand and the beneficiary's willingness to pay for electricity. Four scenarios were tested:

(i) Capital investment cost increases by 12.5 percent
(ii) Electricity demand falls by 12.5 percent
(iii) The willingness to pay falls by 12.5 percent
(iv) Scenarios i, ii, iii simultaneously

Table A3f – Scenario Analysis

Scenario	EIRR	EIRR + GHG Emission Benefits
Baseline	22.7%	22.8%
Capital investment cost increases by 12.5 percent	20.3%	20.5%
Electricity demand falls by 12.5 percent	16.9%	17.2%
The willingness to pay falls by 12.5 percent	17.1%	17.3%
Scenarios i, ii, iii simultaneously	12.2%	12.5%

28. The results show the project return/NPVs are robust to the three scenarios, as well as a scenario with all three simultaneously (scenario iv).

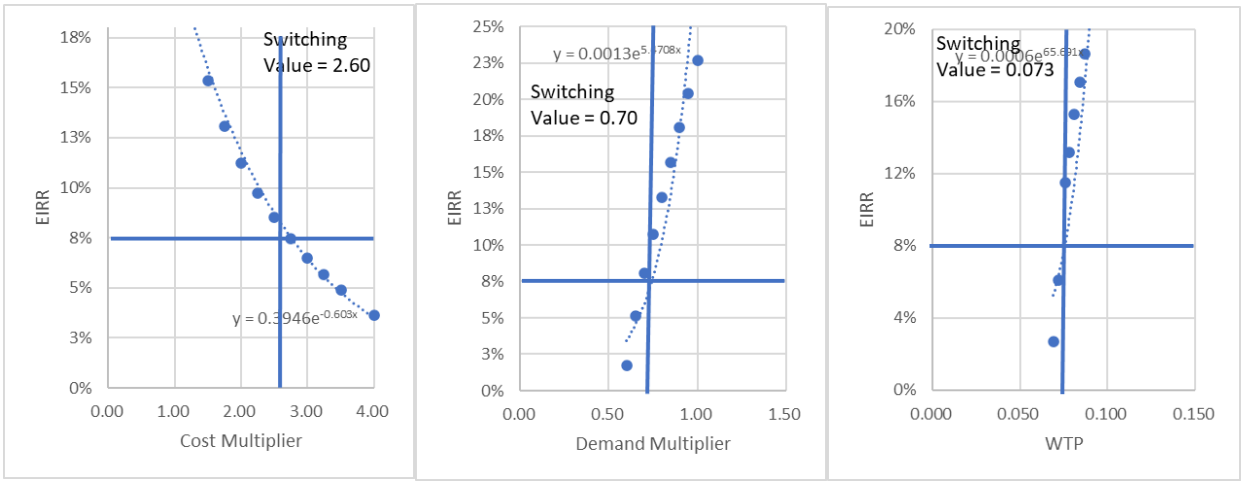
Switching Values

29. The switching values analysis for the key parameters were also calculated to identify the threshold value between the project's viability and unviability.

Table A3g – Switching Values

Input	Unit	Baseline Value	Switching Value
Capital Cost Multiplier	Ratio	1	2.602
Annual Demand Multiplier	Ratio	1	0.70
Clients Willingness to Pay	US$/kWh	0.096	0.073

Figure A3b – Switching Values & Sensitivity Analysis



Financial analysis

30. The financial analysis assumed that the main benefits of the investments are: (i) the revenue increase associated with the growth of demand served, (ii) the cost reduction associated with the substitution of the on-site diesel generation for on-grid generation in overloaded substations during peak hours, and (iii) the non-payment of fines due to the delay or non-construction of the new expansion projects already approved. The subproject's financial costs are associated with capital investments, operations and maintenance and the cost of the energy served. The financial analysis used a discount rate of 12 percent.[63]

The financial analysis shows that the representative sample of selected subprojects to be financed by the Project are viable. The FIRR of 21.5% and the Project's net financial benefits are estimated at US$62.2 million. Similar to the economic analysis, sensibility analyses were run on the financial return and NPV by modulating two key parameters: capital investment, and electricity demand. The results show the project financial return/NPVs are robust in both scenarios, as well as in a scenario where scenarios i and ii happen simultaneously (scenario iii).

Table A3h – Scenarios Financial Analysis

Scenario	FIRR
Baseline	21.5%
i. Capital investment cost increases by 12.5 percent	19.8%
ii. Electricity demand falls by 12.5 percent	17.4%
iii. Scenarios i, and ii simultaneously	16.2%

[63] The financial analysis assumed the discount rate set by Peru's Electricity Concessions Law (No. 25844) to evaluate private investment in the sector.

ANNEX 4: Priority PITs Subprojects to be financed by the Project

Proy	EMPRESA	Nombre del Proyecto	Tipo de Instalaciones	kV	km	kVp/kVs	MVA	Tipo de Proyecto (R, A, N)	Ubicación Geográfica			Invesión (US$)
1	Electrocentro	Transformador 50/10 kV — 5 MVA y celdas conexas, SET Pachachaca	SE	60	-	60/13.2	5	N		Tarma	Junín	**2,960,858.68**
2	Electrocentro	Segundo Transformador 33/10 kV — 5 MVA y celdas conexas, SET Chupaca	SE	33	-	33/13.2	5	A		Chupaca	Junín	**1,958,432.44**
3	Electronoroeste	Ampliación de la Capacidad de Transformación en SET Los Ejidos, Provincia y Departamento de Piura	SE	60	-	60	30	A	Castilla	Piura	Piura	**1,517,908.38**
4	Electronoroeste	Ampliación de la capacidad de transformación en SET Chulucanas, provincia de Morropón, departamento de Piura	SE	60	-	60/23	18	A	Chulucanas	Morropon	Piura	**742,928.67**
5	Hidrandina	Instalacion del nuevo transformador en SET Motil 138/33/22.9 kV - 25 MVA	SE	138	-	138/33/23	25	A	Agallpampa	Otuzco	La Libertad	**3,602,412.83**
6	Hidrandina	Instalacion del nuevo transformador en SET Trapecio 138/22.9/13.8 kV , 40 MVA y celdas asociadas	SE	138	-	138/22.9/13.8	40	A	Chimbote	Santa	Ancash	**871,772.99**
7	Hidrandina	Ampliacion de la SET Carhuaz	SE	66	-	66/22.9/13.8	9	A	Carhuaz	Carhuaz	Ancash	**1,125,196.12**
8	Hidrandina	Ampliacion de la SET Caraz 12-15 MVA (ONAN-ONAF); 66/22,9/13,2 KV	SE	66	-	66/22.9/13.8	9	A	Caraz	Huaylas	Ancash	**1,585,198.73**
9	Hidrandina	Ampliacion mediante el suministro e instalacion del transformador 60/23/10 kV - 15 MVA en SET Chao	SE	60	-	60/22.9/10	15	A	Chao	Viru	La Libertad	**2,383,119.13**
10	Seal	Mejoramiento del sistema de protección y maniobras 33 kV de la Subestación Convertidor	SE	--	--	--	--	R	Arequipa	Arequipa	Arequipa	**2,830,861.54**
11	Seal	Creación de la línea en 33 kV Cono Norte - Ciudad de Dios y SET Asociadas.	LT y SE	33	6.4	33/22.9/10	25	N	Cerro Colorado y Yura	Arequipa	Arequipa	**5,255,031.30**
12	Seal	Creación de la línea en 33 kV Challapampa - El Cural y SET Asociadas	LT y SE	33	6.5	33/22.9/10	25	N	rro Colorado y Uchuma	Arequipa	Arequipa	**6,586,419.10**
13	Electro Oriente	Ampliación de Potencia de la Subestación de Transmisión de Moyobamba, distrito y provincia de Moyobamba, región San Martin	SE	138	-	138/60/22.9	50	A	MOYOBAMBA	MOYOBAMBA	SAN MARTIN	**5,277,700.47**
14	Electro Oriente	Creación de la Subestación Picota en el tramo LT 138 kV Bellavista-Picota - distrito Picota - provincia Picota - región San Martin	LT y SE	138	0.1	138/22.9	20	N	PICOTA	PICOTA	SAN MARTIN	**5,642,115.43**
15	Electronoroeste	Creacion de Linea 60 KV Zorritos - Tumbes y SET Asociadas distrito de Zorritos - provincia de Contralmirante Villar - Departamento de Tumbes	LT	60	24	0	0	N	De la Cruz y Tumbes	bes y Contralmirante V	Tumbes	**5,759,182.72**
16	Electropuno	AMPLIACIÓN DE LA SET BELLAVISTA - TRANSFORMADOR 60/10 KV - 25 MVA Y CELDAS CONEXAS, DISTRITO, PROVINCIA Y DEPARTAMENTO DE PUNO	SE	60	0	60/10	25	A	PUNO	PUNO	PUNO	**3,348,196.24**
17	Electrosur	Mejoramiento y ampliación de la SE Tomasiri 66/22.9/10kV, Distrito de Sama - Provincia de 2013-2017 Tacna - Departamento de Tacna	SE	66	-	66/22.9/10	6	A	Sama	Tacna	Tacna	**1,016,523.94**
18	Electrosur	Recuperación de la capacidad de la S.E.T. Tacna mediante transformador de reserva, Distrito de Tacna, Provincia de Tacna- Departamento de Tacna	SE	66	-	66/10.5/10	25	N	Tacna	Tacna	Tacna	**1,161,704.74**
19	Seal	Creación Línea en 138 kV Base Islay - Matarani y SET Matarani	LT y SE	138	12.1	138/22.9/10	40	N	Islay y Mollendo	Islay	Arequipa	**7,489,328.66**
20	Electro Ucayali	LT 60 kV, Der Manantay – Manantay, 1,7 km y Nueva SET Manantay 60/23/10 kV, 30 MVA; incluye dos (02) celdas de línea, celdas de transformador conexas y celdas en MT.	LT	60	1.7	60/23/10	30	N	MANANTAY	CORONEL PORTILLO	UCAYALI	**2,156,813.52**
21	Electro Ucayali	Nueva SET Campo Verde 138/23 kV, 20 MVA; incluye dos (02) celdas de línea y celdas de transformador conexas.	LT y SE	138	0.3	138/23	20	N	CAMPOVERDE	CORONEL PORTILLO	UCAYALI	**2,908,600.19**
22	Electronoroeste	LT SEPO – SET Grau y Nueva SET Grau I Etapa (Considera montaje de solo uno de los 2 transf.)	LT y SE	60	9.8	60/22.9/10	30	N	26 de Octubre y Piura	Piura	Piura	**7,794,117.65**
23	Hidrandina	Nueva SET Huarmey 25/30 MVA, 220/60/10 kV, incluye celdas de línea y transformación 60 KV, celdas de transformación y de alimentadores de 23 KV y 10 KV	LT y SE	220 60	0.5 3	220/60	25	N	Huarmey	Huarmey	Ancash	**6,464,642.78**
24	Electrocentro	LT 60 kV Orcotuna — Parque industrial y celdas conexas	LT	60	16	60	0	N	Chupaca	Huancayo	Junin	**1,230,933.77**

Nro	Nombre del Proyecto	Factor de Utilización		Ciudad Principal Afectada	Población Afectada	Centros Educativos	N° de Estudiantes	Centros de Salud	N° de Camas
		2019	2023						
1	Transformador 50/10 kV — 5 MVA y celdas conexas, SET Pachachaca	85%	138%	Tarma	91,849	22	6,600	13	147
2	Segundo Transformador 33/10 kV — 5 MVA y celdas conexas, SET Chupaca	82%	110%	Chupaca	57,604	20	6,000	6	92
3	Ampliación de la Capacidad de Transformación en SET Los Ejidos, Provincia y Departamento de Piura	92%	149%	Castilla	183,759	20	6,000	18	294
4	Ampliación de la capacidad de transformación en SET Chulucanas, provincia de Morropón, departamento de Piura	103%	116%	Morropon	173,193	20	6,000	7	277
5	Instalacion del nuevo transformador en SET Motil 138/33/22.9 kV - 25 MVA	83%	111%	Otuzco	85,091	20	6,000	7	136
6	Instalacion del nuevo transformador en SET Trapecio 138/22.9/13.8 kV , 40 MVA y celdas asociadas	74%	103%	Santa	474,053	21	6,300	21	758
7	Ampliacion de la SET Carhuaz	80%	103%	Carhuaz	50,007	19	5,700	21	80
8	Ampliacion de la SET Caraz 12-15 MVA (ONAN-ONAF); 66/22,9/13,2 KV	77%	121%	Huaylas	56,557	16	4,800	5	90
9	Ampliacion mediante el suministro e instalacion del transformador 60/23/10 kV - 15 MVA en SET Chao	69%	112%	Chao	39,125	17	5,100	6	63
10	Mejoramiento del sistema de protección y maniobras 33 kV de la Subestación Convertidor	79%	116%	Arequipa	293,941	367	109,950	28	470
11	Creación de la línea en 33 kV Cono Norte - Ciudad de Dios y SET Asociadas.	71%	113%						
12	Creación de la línea en 33 kV Challapampa - El Cural y SET Asociadas	74%	111%						
13	Ampliación de Potencia de la Subestación de Transmisión de Moyobamba, distrito y provincia de Moyobamba, región San Martin	97%	147%	Moyobamba	133,631	25	7,500	23	214
14	Creación de la Subestación Picota en el tramo LT 138 kV Bellavista-Picota - distrito Picota - provincia Picota - región San Martin	71%	155%	Picota	44,039	21	6,300	5	70
15	Creacion de Linea 60 KV Zorritos - Tumbes y SET Asociadas distrito de Zorritos - provincia de Contralmirante Villar - Departamento de Tumbes	69%	102%	Tumbes y Contralmirante Villar	24,127	12	3,600	5	39
16	Ampliación de la SET Bellavista - Transformador 60/10 KV - 25 MVA y celdas conexas, distrito, provincia y departamento de Puno	107%	113%	Puno	76,740	326	97,900	7	123
17	Mejoramiento y ampliación de la SE Tomasiri 66/22.9/10kV, Distrito de Sama - Provincia de 2013-2017 Tacna - Departamento de Tacna	76%	116%	Sama	3,686	7	2,100	3	6
18	Recuperación de la capacidad de la S.E.T. Tacna mediante transformador de reserva, Distrito de Tacna, Provincia de Tacna-Departamento de Tacna	68%	101%	Tacna	346,192	476	142,800	19	554
19	Creación Línea en 138 kV Base Islay - Matarani y SET Matarani	87%	152%	Matarani	5,485	12	3,600	5	9
20	LT 60 kV, Der Manantay – Manantay, 1,7 km y Nueva SET Manantay 60/23/10 kV, 30 MVA; induye dos (02) celdas de línea, celdas de transformador conexas y celdas en MT. 04 celdas de alimentador en 10 kV			Manantay	107,364	13	4,000	9	172
21	Nueva SET Campo Verde 138/23 kV, 20 MVA; incluye dos (02) celdas de línea y celdas de transformador conexas. 01 celda de alimentador adicional en 22.9 kV en Campo Verde 04 celdas de alimentador en 10 kV			Campoverde	19,598	0	0	3	31
22	LT SEPO – SET Grau y Nueva SET Grau I Etapa (Considera montaje de solo uno de los 2 transf.)			Piura	298,282	20	6,000	18	477
23	Nueva SET Huarmey 25/30 MVA, 220/60/10 kV, incluye celdas de línea y transformación 60 KV, celdas de transformación y de alimentadores de 23 KV y 10 KV			Huarmey	33,066	16	4,800	8	53
24	LT 60 kV Orcotuna — Parque industrial y celdas conexas			Huancayo	595,183	17	5,100	8	952

ANNEX 5: Examples of Emergency Situations in the Electricity Systems of Public Distribution Companies

1. In Peru, the delays in completing the PIT (2013-2017 and 2017-2021) investments have already begun creating deficiencies at the regional level (outside Lima metropolitan and Ica) that if not addressed in the short-term could lead to disruptions in electricity supply to important secondary cities and peri-urban areas of the country. During 2019, several electricity systems had to be declared in an emergency situation by the MINEM to be able to adopt temporary measures to address the problems caused by the delayed PIT investments and prevent electricity supply restrictions. However, the emergency measures taken were suboptimal, requiring adding additional diesel capacity and speeding up commissioning of thermal plants. The cost of these measures is borne by all electricity users, who are required to pay for them through a reliability charge on electricity transmission tolls. The investments also cause increased GHG emissions and local pollution given the additional diesel-capacity added. There are various additional electricity systems already at risk of being declared in an emergency state given the PIT investment lags, including for major cities like Cuzco, as described below.

A. Emergency Status of Electric Systems during 2019

Emergency Status of the Paita – Sullana Electric System (Piura)

2. The Paita - Sullana electric system, which is located in the Piura Region of northern Peru, has a 60 kV ring subtransmission system, which in 2019 had operational problems due to the presence of voltage levels below the tolerances allowed in the Technical Standard for the Quality of Electrical Services (NTCSE for its acronym in Spanish). This situation compromised service provision and if appropriate measures were not adopted, restriction of electricity supply to customers in the entire area was anticipated.

3. Given the delay in the execution of the distribution companies' investment plans, the MINEM declared the emergency status of the Paita – Sullana electric system, due to a lack of transport capacity. The Investment Plan 2017-2021 included the entry into operation of Valle del Chira Substation, however, its commissioning is delayed and it is now scheduled to start operation until April 2023. The situation in the electric system deteriorated and to avoid power cuts MINEM authorized 16 MW of additional diesel-based emergency generation until November 2022, when the Tallanca thermal plant (18 MW) is expected to become operational, until the Valle del Chira substation comes into operation in 2023.

Emergency Status of the Independence Electric System Substation (Ica)

4. The Pisco Thermal Power Plant (TPP Pisco), which is located on the south-middle coast of Peru, stopped operating in April 2019, generating the risk of supply restrictions in the electrical system associated with the Independencia Substation. The risk was temporarily mitigated with the commissioning of the El Pedregal TTP (18 MW), however the long-term solution is the commissioning of the New Chincha Substation that was approved in the PIT 2013-2017, and is expected to be operational during the first semester of 2023. Given this delay and the supply risk, MINEM declared an emergency situation for the Independence Substation Electrical System in September 2019 to enable implementation of temporary measures to overcome it until the New Chincha Substation is put into service.

B. Electric Systems at risk of emergency status being declared

At risk Quencoro Electrical System Substation (Cuzco)

5. The Quencoro Substation is located in the southern part of the city of Cuzco and has two transformers (10.5 kV and 34.5 kV) to meet demand. However, the transformation capacity at the 34.5 kV level was exceeded in August 2019 and at the 10.5 kV level it is at 88 percent of its capacity. According to the maximum demand growth projections, the transformation capacity limit will be reached by mid-2021.

6. To deal with this situation, part of the load of Quencoro substation (approximately 2 MVA) has been transferred to the Dolorespata Substation (which also serves the urban area of Cuzco), which has increased technical energy losses and maneuverability limits due to the contingencies that require load transfer between feeders. In this scenario, there is no possibility of meeting the vegetative demand growth projected for the regulated market, and there could be non-compliance with the NTCSE standards. Investments needed to solve the transformation capacity at 34.5 kV level are being proposed for the PIT 2021-2025 through a new substation in the Urcos area. To solve the transformation capacity at 10.5 kV level the public disco (Electro Sureste) proposed the expansion of the Industrial Park Substation that was approved in the PIT 2017-2021, however, it will only be operational in 2023.

7. Considering this scenario, the public disco has submitted a request to the system operator (Committee for the Economic Operation of the System, COES) to declare an electrical emergency for the Electrical System associated with the Quencoro Substation, in order to implement temporary measures to prevent restrictions to electricity supply in the city of Cusco, until the definite solutions are implemented.

At risk Juliaca Electrical System Substation (Puno)

8. Currently, energy supply in the Juliaca Electric System is carried out through the Juliaca Substation, which has two transformers, one 12 MVA and the other 50 MVA. In June 2019, the 50 MVA transformer presented a load level of 94.3 percent on the 10 kV side, close to overloading. According to demand projections from the public disco (Electro Puno), as economic recovery continues the system is likely to have overloads unless measures are taken. Given that the commissioning of the Maravilla Substation, approved in the PIT 2017-2021, is delayed, Electro Puno is evaluating different measures to solve the Juliaca substation transformer overload situation, including: (i) transferring the load from the 10 kV bus to the 22.9 kV bus; (ii) the splitting of the 10 kV bar; (iii) installation of the reserve transformer in parallel with the existing transformer.

ANNEX 6: Summary of Conceptual Framework for Power Sector Regulatory Reform

1. The essence of the regulatory and institutional model of the Peruvian electricity system was incorporated in 1992 through the Law of Electric Concessions (DL25844 of 1992) and in 2006 with the Law of Efficient Development of Electricity Generation (Law 28832 of 2006). During its more than 27 years of application, the model has undergone numerous adjustments and modifications, which have affected its integrity and its ability to give the necessary signals to allow and promote the modernization of the sector.

2. In order to formulate proposals aimed at the adoption of measures that guarantee sustainability and development in the activities of generation, transmission, distribution and commercialization/supply of electricity, through Supreme Resolution No. 006-2019-EM, the CRSE, was created. The modernization of the Peruvian electricity system should be understood as the process of change in the legislative, institutional, regulatory and normative spheres required to achieve the strengthening of the institutional framework, transformation of the wholesale market, innovation in distribution and the retail electricity market, and the improvement of regulations for the transmission system(s) and international interconnections.

3. To address the scope of the White Paper, four thematic pillars have been established, which are described below:

- ***Strengthening of the institutional framework.*** The actions identified seek to adapt the Peruvian electricity sector institutional framework for the transition towards a new sectorial architecture and electricity market, the consolidation of a comprehensive planning scheme, the revitalization of the natural gas market in its relationship with the electricity sector as a major fuel resource, and the review of the administrative regime of public-owned electricity companies. The development of the work under this pillar requires the definition and delimitation of functions and adequate coordination of the different entities acting in the energy and electricity sector.

- ***Transformation of the Wholesale Market.*** The analyzes carried out show the need to establish the most suitable model for the Peruvian electricity market in order to face the challenges of integration of variable renewable energy (VRE), guarantee supply security and sufficiency to achieve competitive-efficient generation prices. This will involve the redesign of the short-term market and the long-term generation sufficiency market, as well as the efficient integration of renewable energies, energy storage, response to demand and the provision of complementary and auxiliary and flexibility services.

- ***Innovation in distribution and retail market.*** The challenges posed by the incorporation of renewable energies and other distributed resources, the improvement of service quality and the expansion of coverage make it necessary to identify and develop a new model of economic regulation for electricity distribution, as well as the redesign of the Peruvian retail market, the independent development of the commercialization (supply) activity, and the potential active role of consumers as prosumers.

- ***Streamlining of transmission regulation and their management.*** The variety and multiplicity of regulatory approaches, planning institutions, special business arrangements and owners of transmission and subtransmission networks make it necessary a comprehensive review of these characteristics of the Peruvian electricity system, as well as the identification of the necessary actions for their coherent and efficient development. The actual dispersion of development, ownership and operation coordination of transmission systems need to be revised for the improvement of transmission management and

regulation. The current regulatory framework for the Andean regional interconnections should also be reviewed for its harmonization with the proposed design/model of the wholesale market.

4. The Conceptual Framework identified various challenges under the four different pillars, which are summarized in the table below.

Sector Diagnostic	Recommendations
Pillar 1 – Strengthening of the Institutional Framework	
Supervision, Regulation and Dispute Settlement Responsibilities (OSINERGMIN)	

• OSINERGMIN is responsible for carrying out supervision, regulation, normative, fiduciary and sanctions functions, dispute resolution and complaint resolution by end-users
• OSINERGMIN could have specific biases when performing its functions of regulation, supervision, sanction and dispute resolution on the same matter.
• OSINERGMIN Board members are appointed mainly by government authorities.
• The Conflict Resolution Tribunal are independent from OSINERGMIN, however, are appointed mainly by government authorities.
	• Separate supervisory and regulatory duties into different public agencies:
	  ○ OSINERGMIN will retain rate-setting and regulatory duties only.
	  ○ The new Superintendency of Electricity and Hydrocarbons will have fiduciary, supervisory, and control duties (including the power to impose punishments).
	• Establish an Independent Experts' Panel responsible for settling disputes between COES and agents, and between the OSINERGMIN, the COES, and/or the agents (five independent members are proposed: at least one member with legal experience; at least one member with a background in economics; at least one member with experience in the electricity sector; at least one member with experience in the natural gas sector).

Strengthening of the System Operator (COES)	
• The COES Board is not completely independent from its members. Potentially some members may have more influence than others. • Insufficient representation of small agents and new entry agents. • Budget payments are assigned to each member based on income recorded in the spot market. • In conflict resolution, the Directors and the Executive Director of COES could act simultaneously as judge and party. The ad hoc tribunals are created only if disputes are raised to a higher level.	• Increase the number of COES council members (from five to seven) by including independent members: four dependent councilmembers, each elected by a Subcommittee (Gx, Tx, Dx, and end users); two independent directors elected by an Ad Hoc Committee; independent chairperson proposed by an independent recruiting firm and elected by the Assembly. • Increase the quorum for board meetings and the frequency of meetings (board meetings held at least once every two weeks, with at least five members in attendance). • Establish a market monitoring unit (reporting directly to the COES Board. The unit, focused primarily on the wholesale market, will provide inputs for the National Institute for the Defense of Free Competition and the Protection of Intellectual Property (INDECOPI). • The COES budget should be proposed by the COES, approved by OSINERGMIN, and, if there are any disagreements, resolved by the

Sector Diagnostic	Recommendations
	Independent Experts' Panel. Allocate the COES budget to end users via postmarked proof of receipt.
Energy Planning	
• The planning processes are carried out by multiple agents and there is no comprehensive planning of the energy sector. • There is no coordination between the energy sector and other industries. • There is no systematic planning process that pursues coherent public policies with a long-term vision. • The Transmission Investment plans, drawn up by the concessionaires, and the Transmission Plans, drawn up by COES, are not synchronized in time.	• Implement a long-term energy planning process designed by a unit from within the Ministry of Energy and Mines (MINEM). • Energy plans shall be drawn up every six years and revised every two years, based on a horizon of thirty (30) years. • The planning process shall involve the co-optimization of the electricity and gas sectors, as indicative guidance for generation and as primary inputs to be considered in transmission planning. • Merge the transmission plans and transmission investment plans into a single process. • Stakeholder engagement. However, final scenarios shall be defined based on metrics and objective criteria.
Natural Gas Market	

• Gas supply and transportation contract schemes signed by gas generators and suppliers include inflexible purchase or sale clauses.
• Gas-fired generation plants do not declare their total gas costs; they only declare the part that is not considered take or pay.
• Gas-fired generation plants must contract firm gas transportation to receive capacity payments.
• A proposed secondary market has not yet been implemented, considering electronic auctions. Only a few bilateral agreements between consumers are signed (currently bilateral sales are only allowed for transport capacity).
	• Combine the management and administration duties into an independent entity (market manager) responsible for managing the secondary gas market.
	• Standardize natural gas agreements for electricity generation.
	• The secondary market could include the following:
	  ○ A single independent entity (and not the MINEM) responsible for both the management and the administration of the secondary gas market.
	  ○ The duty of the market manager is to promote and manage the commercialization of the natural gas supply and transport capacity in the secondary market.
	  ○ Agreements negotiated in the secondary market must be standardized.
	  ○ The market manager must ensure adequate remuneration with appropriate incentives (symmetrical incentives with penalties and premiums).

Sector Diagnostic	Recommendations
Public Electricity Distribution Companies	

• Legal barriers prevent public distribution companies to increase their financial leverage and issue debt.
• FONAFE retrieves the totality of the net income generated by public distribution companies.
• State owned companies cannot independently decide on the allocation of the cash flow generated by their operations.
• FONAFE must approve the investment and operative budgets.
• Obstacles to lay off employees in state owned companies and lower average wages in the public sector.
	• Transmission assets owned by public distribution companies could be:
	  ○ Put up for competitive bidding and granted through concessions to private companies for a concession period of thirty (30) years.
	  ○ New infrastructure will be put up for competitive bidding following the tender rules for existing subtransmission systems. Existing infrastructure will be grouped into regional groups and put up for competitive bidding in public tenders.
	• Distribution assets could be grouped into regional groups:
	  ○ EDENOR: Electronoroeste, Electronorte, and Electro Oriente.
	  ○ EDECENTRO: Electrocentro, Hidrandina, and Electro Ucayali.
	  ○ EDESUR: Electro Sur Este, Electrosur, Electro Puno, and SEAL.
	• Regional electricity distribution clusters will be granted to private investors through tenders:
	  ○ Distribution companies will continue to be public property, but the operation and administration of the distribution assets will be put up for competitive bidding by private operators for a concession period of thirty (30) years.
	  ○ Distribution companies will continue to comply with regulations (including the setting of rates).
	  ○ Concessionaires will be required to meet supply quality standards in order to participate in any future bidding process involving the same or different distribution assets.

Pillar 2 – Transformation of the Wholesale Market	
Fundamental Principles	

• Reduce the average price paid by Peruvian consumers for a reliable electricity supply that meets the government's environmental objectives, consistent with the industry's long-term financial viability.
• All generation resources needed to achieve targets recover operating costs plus the return on capital invested.
	• Introduce the day-ahead market and the joint optimization of energy and operating reserves:
	  ○ The system operator simultaneously minimizes the cost to meet the tender demand in all network locations for all twenty-four hours of the following day.
	  ○ Provides financial incentive to schedule demand with the

Sector Diagnostic	Recommendations
• Support the adoption of new technologies at the lowest cost: batteries, automated response systems, ancillary services, etc. • Competitive markets offer a strong incentive for lower-cost production. Suppliers who cannot affect the price paid to them for their production maximize gains by minimizing production cost. • All wholesale electricity markets must adapt to changing technology, political objectives, and market participants' behavior. • An important consideration in the potential evolution of the short-term electricity market in Peru is whether to move from a short-term market based on costs to a short-term market based on offers. • A concern in the Peruvian context is the duration of long-term generation sufficiency commitments. The current long-term mechanism (LT-RA) mainly involves full requirements contracts between owners of generation units and charging service entities, acquired through bilateral negotiations subject to the regulated bar rate or price cap in bar or through a competitive bidding process. • Peru could review its policies to support renewable resources, especially given the decreasing costs of the technology, with the aim of having these resources participate in the energy market through technology neutral auction that incorporate renewables. • The challenges of integrating VRE have significantly increased the importance of operating reserves to maintain the balance in real time between supply and demand of electricity in all nodes of the transmission network. There is a general agreement that the market for short-term operating reserves should be co-optimized with the energy market of marginal location prices in real time and on a day-to-day basis as existed in the Peruvian electricity system.	highest possible precision in the daily market. ○ Generation units eliminate positive and negative imbalances in relation to their daily sales at real-time prices. ○ The daily market rewards suppliers for their flexibility, but still pays the same price for all resources in each market. ○ Dispatchable units are rewarded with a higher average price than the non-dispatchable intermittent unit, despite the fact that both units are paid the same price in the daily markets, in real time. • Introduce the renewable energy certificates (REC) market in place of the current REC auction premiums mechanism. RECs allow renewable resources to be treated like any other generation unit in the long-term resources adaptation process and the day-to-day, real-time operation of the market. • The active participation of distribution companies and free consumers in the real-time daily markets will represent a major paradigm shift for Peru: ○ Distribution companies and free consumers will offer demand in the daily market. ○ The compensation of the daily market will result in daily energy schedules and prices for all distribution companies and free consumers. ○ Any energy consumed in real time that is not bought in the daily market must be purchased at a real-time price. • Introduce standardized fixed-price futures contracts to adapt long-term resources. The standardized fixed-price futures contract approach allows small suppliers, distribution companies, free consumers, and purely financial participants to compete with large suppliers in the future market and the short-term energy market. • Create regulatory supervision in the wholesale market. An independent supervisor for the electricity market improves the process of detecting flaws in the market design that impair market efficiency and the effectiveness of the stakeholder process for improving market rules.

Sector Diagnostic	Recommendations
Pillar 3 – Innovation in Distribution and Retail Market	
Restructuring of Distribution Activities	
• The 1992 Law established the vertical separation of electricity generation, transmission and distribution, but not retail. Today there are some exceptions that integrate generation and distribution or transmission and distribution. The distribution companies sell to all regulated customers and some free. There are 23 distribution companies (private and public). • There is a proposed regulation of distributed generation: To be carried out (financed and developed) by the interested party or by the distributor. It will enable to sell energy contracts to distribution companies or to the free market, subject to firm capacity requirements.	• Proposal 1: Separation of distribution and retail sale o Legal and functional separation with strict supervision standards (EU model). o Mandatory for distributors with more than 50,000 customers. o Gradual implementation. o Separation of ownership between distribution and retail sale is not considered feasible in Peru. • Proposal 2: Separation of distribution and DER o The ownership, development, management, or operation of distributed energy resources and storage by distribution companies will not be allowed. o Review of the Peruvian regulation proposal for distributed generation. • Proposal 3: Smart meter data management o Data will be provided to actors in the competitive market, guaranteeing that customers maintain full ownership and control of their data. o Implement a decentralized model under the responsibility of distribution companies. • Proposals 4: Storage capacity and flexibility market maps: DSOs will facilitate the connection of new network users, improving transparency in the calculation of connection charges and the available network storage capacity. • Proposal 5: Improve TSO/DSO coordination. With high penetration of distributed resources providing network and systems services, it is necessary to guarantee coordination between the COES and distribution companies, such as network operators.
Smart Metering	
• Supreme Decree 018-2016-EM: Obligation of distribution companies to present to the regulator an 8-year deployment plan, which includes: ownership	• Proposal 1: Cost-benefit analysis. The CBA must be based on a prior categorization of consumers and the benefits calculated for each

Sector Diagnostic	Recommendations
and installation of meters per distribution company; Investment and operation costs of smart meters to be included in the VAD. • OSINERGMIN has also proposed a list of smart meter functionalities (2017). • Currently, some AMI pilot projects in operation (80k consumers, approximately 1% of the total meters installed)	consumer category. The CBA must be periodically repeated (every few years) to update the benefits and costs. • Proposal 2: Implementation plan. The national CBA determines and prioritizes the customer categories to be included with particular targets for each distribution company. The distribution companies submit a rollout plan to the regulator, with intermediate milestones to hit the required targets. • Proposal 3: Functionalities and interoperability. Overall set of functionalities to ensure interoperability. • Proposal 4: Ownership/cost recovery. It is recommended that distribution companies have and install smart meters (international experience). The investment, installation, and operation of AMIs will be included in the CAPEX (RAB) and OPEX along with the expected savings. • Proposal 5: Data management. It is initially recommended to take a decentralized approach to data management. • Proposal 6: Customer commitment and acceptance. The cost recovery strategy must be clearly communicated, explaining when and how the expected savings will be transferred to consumers.
Establishment of Distribution Revenues	
• Value Added Distribution (VAD) regulation: price cap scheme based on the "efficient model company". VAD calculations are performed separately for large companies (> 50k consumers) • Investment plans (PIDE) are added for public distribution companies (financed through FONAFE). Public distribution companies (serving 60% of clients) face institutional, financial and management problems. • The computation of the VAD implies the calculation of the annuity of the VNR which implicitly implies that the RAB is reopened and reassessed in each regulatory period. Readjustment factors are applied to improve service quality (up to 5% VAD) or innovation projects (up to 1% VAD) • The current VAD scheme has not been able to provide network companies with adequate incentives to make adequate investments in the network, use new distributed resources efficiently, support decarbonization, encourage innovation and provide value to current consumers and futures.	• Proposal 1: From ADV to construction blocks (CAPEX + OPEX): o Menu of CAPEX profit-sharing agreements (ex-ante CAPEX revenue: weighted average of DSO and regulator's investment estimates). o Historical RAB: change framework from NRV to RAB (initial RAB = historical RAB). o OPEX efficiency: allocations of controllable OPEX revenues are subject to an RPI-X price-cap regulation. • Proposal 2: Supply quality, incentives for energy losses. A bonus-malus system to improve the quality of supply indicators (SAIDI and SAIFI) or energy losses. • Proposal 3: Innovation projects. Innovation projects incorporated into the RAB. The allocation of these incentives based on competitive bidding processes carried out by the regulator.

Sector Diagnostic	Recommendations
• The General Rural Electrification Law defined the Rural Electrification Systems and the sources of financing and organized rural electrification through the National Rural Electrification Plan (SER are considered as rural systems with separated tariffs that are individually calculated for each SER).	• Proposal 4: Long-term TOTEX approach. After at least two regulatory periods, migrate to a more advanced TOTEX approach.
Tariff Design	
• Peru's electricity tariff regime is designed to recover the total costs of each of the three segments: generation, transmission and distribution, where each component presents a different methodology. In addition to these components, there are also cross-subsidies between consumers. • Generation Rate: Free users can contract directly with a generator or a distributor the price of their electricity generation supply rate. • Generation Rate: The generation rate for regulated users (Price at Generation Level) is established by OSINERGMIN, as the weighted average of bilateral contracts and long-term auction contracts. • Generation signals are (almost) exclusively long-duration signals. Difficult to unbundle the contract to achieve granularity. Rigid contracts for distributors. • Transmission fee: costs are charged to the matching peak component. These fees are being misused to allocate costs for various policy-driven mechanisms. • Many of the transmission charges are not allocated efficiently through a capacity charge, therefore giving excess incentive to reduce the coincident peak consumption. • Distribution rate: based on VAD and capacity-based cost allocation.	• Eliminate the residual costs of volumetric components and rate capacity and charge these costs via a fixed charge. • Redesign subsidies. Subsidize a decrease in the fixed charge. • Avoid net metering policies for distributed microgeneration (MCG). • Ensure that prices and charges are non-discriminatory and technologically neutral. • Introduce flexible access and surface charges (small DG). Once the smart meters have been installed: • Expose regulated customers to more granular energy prices. • Apply coincident peak demand charges.
Retail Market	
• The creation of a fully liberalized retail market is considered the final step in the liberalization of the Peruvian electricity sector. • Some generally cited reasons for liberalizing retail trade in Peru: (i) introduce competitive pressure on operating costs from retail and upward costs of electricity; (ii) expand the range of rates available to end consumers; (iii) engaging consumers in the market; and (iv) opens the door to the elimination of regulated tariffs.	• Proposal 1: Do not deregulate residential users. • Proposal 2: Set generation rate (through energy auctions). • Proposal 3: Stranded costs. Stranded costs associated with past energy agreements shall be treated as residual costs, allocating them via a fixed charge dependent upon the consumer. • Proposal 4: Gradual implementation: o The first two measures requiring urgent reform are as follows: (i) Separate "free retail market" activity from the distribution and generation market; and (ii) Adjust long-term auctions and their associated cost allocation.

Sector Diagnostic	Recommendations
	○ Progressively deregulate the different demand segments. First introduce the option of choosing between the regulated rate and the free market. Gradually reduce the threshold of eligibility for this choice. Maintain the predetermined rate for at least a few years and eliminate it for larger users.
Pillar 4 – Streamlining of Transmission Regulation and Management	
Planning and execution of subtransmission investments	
• Some subtransmission concession holders show little commitment to subtransmission planning. OSINERGMIN often ends up acting as a network planner, which is beyond the typical roles and responsibilities of a regulator. • There is limited specific coordination measures with transmission planning and some partial COES proposals have not yet been fully tested. • The tendering mechanism is not an appropriate model for subtransmission assets, as it leads to fragmentation of ownership. • Public distribution companies are slow to invest in subtransmission.	• For demand areas in which multiple distributors operate, it could be necessary to designate a "reference distributor" in charge of planning and implementing subtransmission investments. • A budget shall be permitted for the resources the distributor needs to perform the subtransmission planning duty. • The COES could provide technical assistance on subtransmission planning as a service to distributors in exchange for a fee. This will address issues tied to distributors' lack of knowhow on high-voltage assets. • The planning of the distribution and subtransmission network could be performed in accordance with a well-structured, open, and transparent process. This shall include the codification of interactions among distributors, OSINERGMIN and COES. • OSINERGMIN could be assigned the task of ruling on all disputes tied to distribution planning, including those between the distributor and the COES, among others.
Planning and implementation of Transmission Investments	
• The transmission plan, the ex-contract plans, the rural electrification plans and the subtransmission plans are uncoordinated (they are based on independent analyzes, with separate bases and methodologies). • Lack of information or outdated partial information on high demand connection requests can result in suboptimal planning decisions.	• Formal consultation must be implemented by the COES to ensure coordination between the Transmission Plan, the transmission development plans (PITs) prepared by the holders of the Concessions inherited under the provisions of the Contract-Law and the rural electrification plans. of the MINEM. • In the event that the link between the transmission and subtransmission plans through the COES proposals is insufficient, a more structured interaction between the COES and the distributors

Sector Diagnostic	Recommendations
	should be regulated, with the participation of OSINERGMIN in case of controversies. • Requests for connection to the main transmission network by large end consumers must be channeled through the COES transmission planning process.
Reinforcements	
• The tendering system for this type of infrastructure is ineffective. • Delays, possibly leading to suboptimal investment, are the result of arbitrage between different regulatory regimes by the owner of assets in need of reinforcement.	• OSINERGMIN will classify the network updates as reinforcements, case by case, according to the COES proposal; • The default mechanism will be such that the owner of the infrastructure that needs to be strengthened has the obligation to implement the reinforcement; • The permitted cost of reinforcement will be determined by OSINERGMIN through an incentive scheme based on a combination of standard (or budgeted) costs and costs actually incurred. • The owner of the infrastructure will be obliged to purchase the main inputs for the reinforcements (for example, network elements, construction works, etc.) through public tenders. • Failure to implement a reinforcement will be considered as a breach of the Concession's obligation and will be sanctioned accordingly.
Private Network Infrastructure (unplanned)	
• Third party access regime is not effective. Peru's experience indicates that disputes are likely to arise over the technical and economic terms of third-party access to a network asset built to meet the needs of a single user. • Planning by individuals of shared transmission resources can result in inefficient solutions (for example, in the sizing of the infrastructure)	• Limited to assets that are unlikely to be shared; otherwise, implement a proper connection regime. • Integrate authorization to build an unplanned transmission with the subtransmission planning process. • The selected implementation mechanism will ensure that the connection rights for the party seeking authorization to build a private (unplanned) transmission line are guaranteed, regardless of whether the asset is built and owned by that party or the distribution entity.
International Interconnections	

Sector Diagnostic	Recommendations
• Multiple studies suggest that cross-border interconnectors will generate positive net benefits for Peru (benefits greater than costs) • The fundamentals and organization of the market in Peru and neighboring countries change over time, requiring: (i) regular reassessment of the benefits and costs of additional cross-border capacity; and (ii) a robust model for cross-border exchanges.	• Cross-border commercial investment will be allowed, possibly empowering national regulators to require that a certain part of the capacity be made available to the market for short-term trading; • COES, as part of the network planning activity, periodically assesses the opportunity to increase cross-border capacity, possibly by testing the value of potential improvements in the market; • In the case of interconnectors built under the regulated regime, at least initially, the capacity of the interconnector will be used to support long-term contracts or exchanges (short-term) between designated entities in the different countries.