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The World Bank

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Report No: 127101-CO

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED IBRD GUARANTEE

IN THE AMOUNT OF US$41 MILLION

AND A

PROPOSED CTF GUARANTEE

IN THE AMOUNT OF US$40 MILLION

TO

THE REPUBLIC OF COLOMBIA

FOR A

COLOMBIA CLEAN ENERGY DEVELOPMENT PROJECT

June 22, 2018

Energy and Extractives Global Practice
Latin America and the Caribbean

CURRENCY EQUIVALENTS

(Exchange Rate Effective as of June 7, 2018)
CO$2,828 = US$1

FISCAL YEAR
January 1 - December 31

Vice President:	Jorge Familiar
Country Director:	Issam Abousleiman
Senior Global Practice Director:	Riccardo Puliti
Practice Managers:	Antonio Barbalho / Richard MacGeorge
Task Team Leaders:	Gabriela Elizondo / Satheesh Sundararajan)

ABBREVIATIONS AND ACRONYMS

4G	4th Generation Roads Concession
ANI	National Infrastructure Agency (*Agencia Nacional de Infraestructura)*
CAGR	Compound Annual Growth Rate
CEDP	Colombia Clean Energy Development Project
COA	Central Offtake Agency
COP21	Conference of the Parties 21 (Paris Agreement)
CPF	Country Partnership Framework
CONPES	National Council on Economic and Social Policy (*El Consejo Nacional de Política Económica y Social*)
CREG	Energy and Gas Regulatory Commission (*Comisión de Regulación de Energía y Gas*)
CTF	Clean Technology Fund
DERIVEX	Market for standardized derivatives of energy commodities (*Mercado de Derivados de Commodities Energéticos*)
DFI	Development Finance Institutions
DG	Distributed Generation
DNP	National Planning Department (*Departamento Nacional de Planeación*)
DSCR	Debt Service Coverage Ratio
E&S	Environmental and Social
ECA	Export Credit Agencies
EE	Energy Efficiency
EIA	Environmental Impact Assessment
ENSO	El Niño Southern Oscillation
ESCO	Energy Services Companies
ESDD	Environmental and Social Due Diligence
ESMF	Environmental and Social Management Framework
E&S	Environmental and Social
FDN	National Development Financing Institution (*Financiera de Desarrollo Nacional*)
FENOGE	Renewable Energy and Energy Efficiency Fund (*Fondo de Energías no Convencionales y Gestion Eficiente de la Energia*)
FI	Financial Intermediary
FM	Financial Management
FMA	Financial Management Assessment
GDP	Gross Domestic Product
GHG	Greenhouse Gas Emissions
GIF	Global Infrastructure Facility
ROC	Government of Colombia
GW	Gigawatt
GWh	Gigawatt-hour

IBRD	International Bank for Reconstruction and Development
IFC	International Finance Corporation
IMF	International Monetary Fund
IP	Indigenous Peoples
IPF	Investment Project Financing
IPP	Independent Power Producer
IPPF	Indigenous People's Planning Framework
IRENA	International Renewable Energy Agency
kWh	Kilowatt-hour
LAC	Latin America and the Caribbean
LLCR	Loan Life Coverage Ratio
LSRE	Large Scale Renewable Energy
LTMC	Long Term Marginal Cost
LULUCF	Land Use/Land Use Change and Forestry
MFD	Maximizing Finance for Development
M&E	Monitoring & Evaluation
M&V	Monitoring & Verification
MINHACIENDA	Ministry of Finance (*Ministerio de Hacienda y Crédito Público*)
MINMINAS	Ministry of Mines and Energy (*Ministerio de Minas y Energía*)
MIGA	Multilateral Investment Guarantee Agency
$MtCO_2eq$	Million tons of Carbon Dioxide equivalent
MW	Megawatt
MWh	Megawatt-hour
NDC	Nationally Determined Contribution
NCRE	Non-Conventional Renewable Energy
NDC PSP	NDC Partnership Support Facility
OECD	Organisation for Economic Co-operation and Development
OM	Operations Manual
OP	Operational Policy
PAD	Project Appraisal Document
PAI	Indicative Action Plan for Energy Efficiency (*El Plan de Acción Indicativo de Eficiencia Energética*)
PDO	Project Development Objective
PER	Renewable Energy Program (*Programa de Energías Renovables*)
PNACC	National Plan for Adaptation to Climate Change (*Plan Nacional de Adaptación al Cambio Climático)*
PPA	Power Purchasing Agreement
PPG	Project Preparation Grant
PPIAF	Public Private Infrastructure Advisory Facility

PS	Performance Standards
PV	Photovoltaic (Solar)
RE	Renewable Energy
RfP	Request for Proposals
RISE	Regulatory Indicators in Sustainable Energy
ROC	Republic of Colombia
RPF	Resettlement Policy Framework
RWA	Risk Weighted Assets
SE4All	UN's Sustainable Energy for All
SECO	State Secretary for Economic Affairs (Switzerland)
SER	Renewable Energy Association
SFC	Financial Regulator (La Superintendencia Financiera de Colombia)
SORT	Systematic Operations Risk-Rating Tool
SSE	Small Scale Energy Sub-projects
TA	Technical Assistance
TCF	Trillion Cubic Feet
TFEC	Total Final Energy Consumption
TOE	Ton of Oil Equivalent
TPES	Total primary energy supply
TWh	Terawatt hours
UNFCCC	United Nations Framework Convention on Climate Change
UPME	Energy Planning Unit (*Unidad de Planeación Minero Energética*)
USAID	United States Agency for International Development
VAD	Value Added Distribution (*Valor Agregado de Distribución*)
VRE	Variable Renewable Energy
WB	World Bank
WBG	World Bank Group
XM	Electricity Market Administrator / Operator

COLOMBIA: CTF Clean Energy Development Project

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PAD DATA SHEET

Colombia

Clean Energy Development Project (P161713)

PROJECT APPRAISAL DOCUMENT

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LATIN AMERICA AND THE CARIBBEAN

ENERGY AND EXTRACTIVES GLOBAL PRACTICE

Report No.: 127101-CO

Basic Information			
Project ID	Environmental Assessment Category	Team Leaders	
P161713	FI-2	Gabriela Elizondo/ Satheesh Sundararajan	
Lending Instrument	Fragile and/or Capacity Constraints [ ]		
Guarantee	Financial Intermediaries [X]		
	Series of Projects [ ]		
Project Implementation Start Date	Project Implementation End Date		
July 01, 2019	June 30, 2024		
Expected Effectiveness Date	Expected Closing Date		
July 01, 2019	June 30, 2024[1]		
Joint IFC			
No			
Practice Managers	Senior Global Practice Director	Country Director	Regional Vice President
Antonio Barbalho/ Richard McGeorge (Acting)	Riccardo Puliti	Issam Abousleiman (Acting)	Jorge Familiar
Borrower: Government of Colombia			
Responsible Agency: Ministerio de Hacienda y Crédito Público / Ministerio de Minas y Energía / Financiera de Desarrollo Nacional (Implementing Agency)			
Contact:	Mr. Clemente del Valle	Title:	President, Financiera de Desarrollo Nacional (FDN)
Telephone No.:	+ 57 1 326 4999	Email:	cdelvalle@fdn.com.co

[1] The project closing date is estimated based on the Availability Period of 5 years from the Effectiveness date. The Sub-projects covered within the Availability Period will be under corporate monitoring until the guarantee period is over.

Project Financing Data (in US$, Millions)					
[ ]	Loan	[ ]	IDA Grant	[X]	Guarantee
[ ]	Credit	[ ]	Grant	[ ]	Other
Total Project Cost (million):	1,015	Total Bank Guarantee(million):	81 (IBRD USD 41 and CTF USD 40)		
Financing Gap:	0.00				

Financing Source (estimate)	**Amount**
Total investments (million)	**USD 1,015**
Equity	USD 254
Debt	USD 761
Of which expected commercial debt (Commercial Banks and Institutional Investors)	USD 508
Of which expected DFIs and ECA tranche	USD 254
Total expected private capital (commercial debt + equity) (million)	**USD 761**

Institutional Data	
Practice Area (Lead)	
Energy & Extractives	
Cross Cutting Areas	
[X]	Climate Change
[ ]	Fragile, Conflict & Violence
[ ]	Gender
[ ]	Jobs
[X]	Public Private Partnership
Sectors / Climate Change	
Sector (Maximum 5 and total percent must equal 100)	

Major Sector	Sector	Percent	Adaptation Co-benefits percent	Mitigation Co-benefits percent
Energy and mining	Renewable Energy	95		95
	Energy Efficiency	5		5
Total		100		

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

Themes
Theme (Maximum 5 and total percent must equal 100)

Major theme	Theme	Percent
Financial and private sector development	Infrastructure services for private sector development	100
Total		100

Private Capital Mobilized (estimate)
US$761 million
Proposed Development Objective(s)
The project development objective is to assist Colombia in increasing electricity generation capacity from non-conventional renewable energy sources and energy savings in the industrial sector, through mobilization of private investment.

Systematic Operations Risk-Rating Tool (SORT)	
Risk Category	**Rating**
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	High
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate
7. Environment and Social	Substantial
8. Stakeholders	Moderate
OVERALL	**Substantial**

Compliance				
Policy				
Does the Project depart from the Country Partnership Strategy in content or in other significant respects?	Yes	[ ]	No	[X]
Does the Project require any waivers of Bank policies?	Yes	[ ]	No	[X]
Have these been approved by Bank management?	Yes	[ ]	No	[ ]
Is approval for any policy waiver sought from the Board?	Yes	[ ]	No	[X]
Does the Project meet the Regional criteria for readiness for implementation?	Yes	[X]	No	[ ]
Performance Standards Triggered by the Project	**Yes**	**No**		

PS 1: Assessment and Management of Environmental and Social Risks and Impacts	**X**	
PS 2: Labor and Working Conditions	**X**	
PS 3: Resource Efficiency and Pollution Prevention		**X**
PS 4: Community Health, Safety, and Security		**X**
PS 5: Land Acquisition and Involuntary Resettlement		**X**
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources		**X**
PS 7: Indigenous Peoples		**X**
PS 8: Cultural Heritage		**X**
OP 7.50 International Waterways		**X**
OP 7.60 Projects in Disputed Areas		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
IBRD Guarantee			

Description of Covenant

Usual and customary conditions for guarantee operations of this nature (as reflected in the Guarantee Term Sheet included in Annex 6) will be included in the Guarantee Agreement(s).

Conditions

Source of Fund	**Name**	**Type**
CTF Guarantee		

Description of Condition

Usual and customary conditions for guarantee operations of this nature (as reflected in the Guarantee Term Sheet included in Annex 6) will be included in the Guarantee Agreement.

Gender Tag Does the activity plan to undertake any of the following? Please select Yes or No for each:

Gender analysis and/or consultation on gender related issues. Yes

Specific actions to address the distinct needs of women and girls, or men and boys, or positive impacts on gender gaps. Yes

Mechanisms to facilitate monitoring and/or evaluation of gender impacts. No

Team Composition

Bank Staff

Name	**Role**	**Title**	**Unit**
Gabriela Elizondo Azuela	TTL	Senior Energy Specialist	GEE04
Satheesh Kumar Sundararajan	TTL (Guarantees)	Senior Infrastructure Finance Specialist	GEEFS
Karan Capoor	Team Member (CTF)	Senior Energy Specialist	GEESO

Erwin De Nys	Program Leader (Sustainable Development)	Program Leader	LCC1C
Luiz T. A. Maurer	Team Member (Economic Analysis, EE, DG)	Principal Industry Specialist	CBDSB
Catiana Garcia-Kilroy	Team Member	Lead Financial Sector Specialist	GFM3A
Ernesto Sanchez-Triana	Team Member (Safeguards)	Lead Environmental Specialist	GENDR
Ana Luisa Gomes Lima	Team Member (Safeguards)	Environmental Specialist	GEN04
Carlos Alberto Molina	Team Member (Safeguards)	Senior Social Development Specialist	GSU04
Ximena Talero	Team Member	Lead Counsel	LEGSG
Jeannette Estupinan	Team Member	Sr. Financial Management Specialist	GG002
Flor Maritza Martinez Camargo	Financial Management	Financial Management Specialist	GG002
Jose Vicente Zevallos	Team Member (Performance Standards)	Consultant, Lead Social Specialist	GEE04
Clara Galeazzi	Team Member	Consultant, Economist	GEE04
Santiago Rene Torres	Procurement Specialist	Procurement Specialist	GG004
Michael Tran	Team Member (GIF)	Infrastructure Specialist	GTPGF
Jiemei Liu	Economic Analysis	Consultant	GEE04
Nikola Kojucharov	Financial Modelling	Economist	GTC02
Jung Eun Yoon	Financial Modelling	Infrastructure Finance Specialist	GEEFS
Elisabeth Maier	Team Member	Operations Officer	GEE04
Niki Angelou	Team Member (Gender Analysis)	Consultant, Gender	GEE06
Luciana Guimaraes Drummond	Team Member	Consultant, PPIAF	GTPPF
Fernanda Pacheco	Team Member	Senior Program Assistant	GEE04

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Colombia					Nationwide

I. STRATEGIC CONTEXT

A. COUNTRY CONTEXT

1. **Colombia has exhibited a solid economic performance over the past several years.** Growth rates were sustained at high levels until 2014 (reaching 4.6 percent) mainly as a result of the liberalization of the oil sector, which allowed the country to take advantage of the oil price boom during 2000-2014 (the country doubled its oil production between 2007 and 2014). After this period, the sharp decline in oil and other commodity prices slowed down GDP growth to 3.1 and 2.0 percent in years 2015 and 2016. The IMF commended the government for its policy response to oil price trends, which included strengthening fiscal policy, and tightening monetary policy while allowing the exchange rate to depreciate. The rapid growth through 2014 was predominantly led by the construction, social services, and financial sectors. This growth was accompanied by a fall in unemployment to a record low of 9.1 percent in 2014 (the lowest figure since 2000). By contrast, extractive activities remained stagnant following the sharp drop in international commodity prices and interruptions in production. Gross capital formation—backed by the government's large infrastructure investment program—and household and government consumption were the main drivers of growth.

2. **The country's robust macroeconomic policy framework has made possible a gradual and orderly fiscal adjustment to the significant external shocks experienced since 2014.** The country experienced a significant terms of trade shock in 2014, estimated at nearly 4 percent of GDP, one of the largest in the region and its largest from a historical perspective. Yet the economy recorded one of the best economic performances in Latin America, growing at 3.1 percent in 2015. This resilience is underpinned by the far-reaching macroeconomic and structural reforms undertaken over the last decade. Economic growth decelerated to 2 percent in 2016, as heightened uncertainty and lower oil prices affected gross fixed capital formation. At the same time, private consumption supported growth, notwithstanding higher inflation and an uptick in unemployment to 9.2 percent in 2016. Economic growth decelerated marginally to 1.8 in 2017, but is expected to strengthen gradually over 2018-19 on the back of the gradual recovery of non-oil exports and oil prices, and of the fourth generation (4G) infrastructure program. Ongoing structural reforms are expected to enhance competitiveness and foster diversification, thereby supporting the growth recovery over the medium term. Inflation has decelerated and expectations are well-anchored.

3. **The Republic of Colombia (RoC) has recognized the importance of environmental sustainability and has embraced a Green Growth Strategy for promoting sustainable economic development and competitiveness, and reducing vulnerabilities to the impacts of climate change, which increasingly affect the poor**. Natural disasters and climate change are expected to impose significant economic and social costs in the years to come. Colombia has demonstrated its commitment to climate change mitigation, setting a unilateral and unconditional target of a 20 percent reduction in its greenhouse gas emissions (GHG) by 2030.[2] The deployment of clean energy projects—renewable energy and energy efficiency—will play a central role in achieving this target.

B. SECTORAL AND INSTITUTIONAL CONTEXT

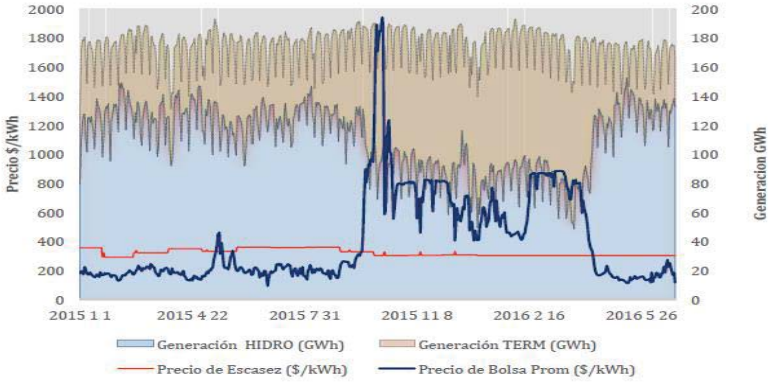
4. **Colombia has developed a mature and competitive electricity market.** The country reformed the power sector in 1994 and introduced a wholesale electricity market where competition was established

[2] With respect to the Business-as-Usual (BAU) scenario.

throughout the value chain, including in transmission (with tenders for transmission expansion) and retail (with free non-regulated consumers). Commercial transactions are conducted through spot (cost based bidding and marginal cost dispatch) and contracts' markets. Private sector participation is allowed in all segments of the value chain.

5. **The Colombian electricity system is hydro dominated and thus highly vulnerable to weather variability (notably El Niño Southern Oscillation, or ENSO events)**. About two-thirds of the installed capacity is hydro-based and roughly 80 percent of Colombia's energy is produced from hydro resources (the rest is supplied mainly by coal and natural gas-based generation). To ensure the availability of firm energy, the regulator introduced a capacity payment mechanism—whose design and procurement has experienced adjustments over time—to create incentives for the construction and availability of "firm energy services" during times of hydro scarcity. The original capacity charge has evolved into an auction for "firm energy" known as reliability payment.[3] From November 2015 to March 2016, Colombia endured a prolonged and intense drought, which lowered hydro reservoir levels, threatened the stability of the market and increased the risk of potential rationing. This episode illustrated once again the vulnerability of the Colombian power sector to ENSO events, and exposed the weakness of the regulations in place—notably the reliability payment—to ensure minimum levels of adequacy and reliability (the impact of this event on reservoir levels and electricity prices is illustrated in Figure 1, and described in more detail in Annex 2).

Figure 1. Performance of Wholesale Electricity Market in Colombia during ENSO 2015-2016



Source: Oren, Garcia (2016)

6. **Recent assessments have identified several emerging challenges affecting the performance of the electricity market in Colombia**. Including: i) high vulnerability to extreme weather shocks (notably ENSO events); ii) limited availability and access to natural gas, and high prices (a closed border with Venezuela has created congestion in port, pipeline and storage infrastructure); iii) low electricity prices during hydropower scarcity episodes (a scarcity price is paid to generators for delivering firm energy;

[3] The product defined in the auction for reliability payment is not suitable to the load profile of energy produced by wind and solar sources and is not designed to capture the value and benefits that NCRE could bring to the system (during water scarcity times and as complementary resources with zero variable costs and no risk of fuel price volatility and availability). Other countries in LAC and worldwide have found market-based solutions, involving the auctioning of long-term PPAs and special commercial arrangements to mitigate market risk to developers. The Ministry of Mines and Energy (MINMINAS) is now in the process of designing an auction mechanism to procure long-term PPAs, and a new resolution on this front is expected before the end of the term of the current administration.

however, the formula to calculate the scarcity price is a function of the Platts US Gulf Coast Residual Fuel Oil Price, which has been low in recent years); iv) the design of reliability payments has been challenged by intense or long droughts; v) lack of incentives for the development of non-conventional renewable energy (NCRE)[4] and energy efficiency; vi) a certain degree of market concentration and suspected exercising of strategic behavior by large incumbents (50 percent of the market dominated by vertically integrated utilities which own large hydropower capacity), and vii) potential conflicts of interest (the market operator and administrator is owned by transmission company ISA, which is in turn owned by companies operating in the market). The convergence of all these factors is impacting the economic efficiency of the electricity service and challenging the status quo, including both the regulatory framework and market organization. In addition, these problems are creating high uncertainty and deterring private sector participation and investment.

7. **Structurally, the power system still lacks resource diversity and thus the flexibility to cope with seasonal and weather shocks**. The reliability payment had the merit of providing firm energy when it was needed, but at an extremely high cost, and most recently the mechanism has not been effective during prolonged ENSO events. In practice, the existing regulation has not delivered the diversification of the energy mix necessary to cope with extreme episodes of climatic variability. Colombia needs to find other ways to diversify its energy mix and increase the resilience of the power sector, and both renewable energy and energy efficiency (and demand side management) could play a relevant role in supporting resource diversification and strengthening the resilience, security and sustainability of the system.

8. **Colombia is endowed with abundant and diverse clean energy resources, which could contribute to enhancing the resilience of the sector and reducing GHG emissions**. Non-hydro renewable energy resources in Colombia are significant, but largely untapped. The International Renewable Energy Agency (IRENA) estimates that Colombia has a high resource potential to develop wind, solar, hydro and geothermal generation[5]. Recent assessments conducted by the Energy Planning Unit of the Ministry of Mines and Energy (UPME) suggest that Colombia has a wind resource with the potential to develop approximately 30 GW of installed capacity, geothermal resources to develop around 1-2 GW, as well as regions with very high solar irradiation such as La Guajira and Costa Atlántica[6]. Demand side resources—i.e. the potential for energy efficiency—are also abundant and virtually untapped in Colombia (Annex 2 provides a benchmark analysis that compares Colombia with OECD and similar economies in terms of the implementation of key measures to harvest this resource).

9. **Studies by UPME have shown that wind patterns in several locations in Colombia are countercyclical to rain patterns, particularly during ENSO events**. This suggests that the development of wind resources, as well as solar and geothermal, could contribute significantly to the diversification and security of supply. For example, wind generation could contribute to maintain hydro reservoirs at higher levels during ENSO events, increasing the system's resilience to cope with prolonged droughts. Thus, the introduction of NCRE to a hydro system would be mutually beneficial (i.e. the water stored in large

[4] Renewable energy refers to electricity and heat derived from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources. In this document, we refer to non-conventional renewable energy (NCRE) as electricity or heat derived from solar, wind, ocean, small scale hydropower, biomass or geothermal resources.

[5] IRENA, 2012

[6] UPME, 2015

hydropower reservoirs can be operated in a way to mitigate the variability of wind and solar, and the counter-cyclical feature of wind generation enables a more reliable operation of the hydro system in times of water scarcity). Recent reference expansion plans released by UPME show that under a business-as-usual or baseline scenario (conventional mix) the average long term marginal cost (LTMC) for the system is 64 USD/MWh, and that for scenarios that allow the entrance of NCRE, the LTMC declines to 52-55 USD/MWh, in part due to the benefits of diversification and resource complementarity.[7] Energy efficiency and demand side management—still largely untapped—can also significantly complement supply side resources and contribute to strengthen the resilience and sustainability of the electricity system, as well as to reduce infrastructure capacity and investment needs.

10. **However, there remain various market and regulatory barriers that hinder the development of a clean energy market and private sector participation.** These include: i) the lack of specific market and procurement incentives that allow variable renewable energy generation (VRE) to compete on an equal footing with thermal and hydropower generation (hydropower and thermal generation receive a reliability payment); ii) a deep grid interconnection policy that imposes a high burden on project developers (i.e. the need to issue financial guarantees to secure transmission investment, which is more difficult for small and new project developers); iii) lack of scheduling and dispatching protocols as well as methodologies to estimate operative reserves to integrate VRE, and iv) the lack of specific regulatory measures and price signals that appropriately incentivize energy efficiency (Annex 2 includes a risk matrix that describes these and other barriers in greater detail).

11. **A key barrier to NCRE development is the lack of a market for long-term contracts, which translates into a high off-take, credit, and financing risk**. Colombia does not have open and competitive long-term power purchase contractual arrangements in the energy sector. The existing contractual arrangements are primarily bilateral (between generators and retailers) and short-term (most of them for less than three years), reflecting the open market regulation that encourages market participants to agree freely on the quantities, prices, and conditions of electricity purchases and sales. These conditions create selection bias among generators and retailers, and prevent wider competition from new renewable energy entrants in Colombia. which rely on stable and long-term contractual agreements. An additional key barrier to renewable energy development in the current market is the lack of creditworthy counterparties or off-takers for long-term power purchases. Because renewable energy projects with private participation rely on stable and long-term contractual arrangements, there would be a need for development of long-term offtake arrangements to attract wider competition.

12. **Small scale renewables in distributed generation and energy efficiency also face several barriers, including financing and implementation risks.** Small-scale renewables are primarily developed by private sector entities based on private or public off-take arrangements. Similarly, energy efficiency projects may be developed by energy services companies (ESCO) with services offered to industrial consumers. Both types are subjected to many barriers, such as the lack of standardization, no long-term offtake market, relatively limited financing needs at the project level, implementation issues and different counterparties, types and lengths of project life, and risk profiles. These barriers often result in an inability to finance the projects through efficient financing structures (e.g., project financing). The capital market, including banks and other financial institutions, is also not trained or familiar with risk assessments of small scale generation and energy efficiency initiatives. Considering the size of small-scale Sub-projects,

[7] UPME released an official reference expansion plan in 2016 (expansion period 2015-2029), and a preliminary or draft expansion plan in February 2018 (expansion period 2017-2031).

these barriers must be addressed through appropriate risk mitigation and credit enhancements, including financing and implementation arrangements such as standardization and aggregation mechanisms.

13. **In response to new market signals and the need to increase resource diversity to enhance security and reduce carbon emissions, Colombia has made strides in introducing a legal framework to support clean energy development.** The cost of renewable energy technology—notably wind turbines and solar photovoltaics—has decreased dramatically over the last decade and achieved grid-parity in most electricity markets around the world (for example, recent auctions in Mexico, Peru, Chile, Argentina, and Brazil have been successful in attracting private investment and delivering competitive and extremely low prices). Key institutions of the electricity market in Colombia have launched various initiatives to prepare the system for the integration of non-conventional renewable energy (NCRE) and increased energy efficiency. Colombia enacted the Energy Efficiency and Conservation Law in 2001 (Law 697, to promote the rational and efficient use of energy), and the Renewable Energy Law in 2014 (Law 1715, to promote the development and integration of non-conventional renewable energy (NCRE) in the electricity market and non-interconnected zones). Consistent with market signals, the CREG issued document CREG-161 (December 2016) for the consultation of four alternatives to procure NCRE. The National Planning Department (DNP) has also launched assessments to review appropriate market mechanisms and regulatory avenues needed to support the development of NCRE. Moreover, as part of the national commitments to reduce GHG emissions, MINMINAS has pledged to reduce 20.6% of its current GHG emissions (energy sector baseline) by 2030 through diversification of the energy matrix, demand side management, energy efficiency and the reduction of fugitive emissions.

14. **Recent developments include the awarding of a new national transmission line and the approval of a Decree that mandates the creation of a mechanism to procure long term contracts for electricity generation.** In June 2017, after obtaining the necessary guarantees from prospective wind energy developers, UPME launched the bidding process for the construction of a 500 KV transmission line connecting La Guajira (a department with significant wind resource potential) with the national transmission network.[8] The transmission line was awarded in February 2018. Additionally, MINMINAS issued Decree 570 (March 23, 2018), establishing the policy guidelines to define and implement a mechanism to procure long-term electricity generation contracts. The main objectives of the mechanism are to boost the resilience of power generation, promote competition and ensure the formation of efficient pricing in the sector, mitigate the effects of climate change and variability, promote sustainable economic development, and reduce greenhouse gas emissions (GHG). The Decree also outlined the main attributes of the mechanism, and studies are underway for the design of an auction mechanism (further information is provided in Annex 2).

15. **Colombia is faced with very large infrastructure financing requirements that need to be met through a diversification of financing sources.** Colombia has a limited project finance market and thus, infrastructure financing needs have been traditionally met through corporate loans or by a small set of commercial banks. Recent projects in 4G road program have attracted capital market financing, including through project bonds, however, such alternative financing sources are still in early stages. A high-level

[8] In a first stage UPME called potential wind developers to issue financial guarantees to secure a portion of the 500 KV transmission capacity (40% of the value of the transmission capacity needed to connect their specific generation capacity). UPME received guarantees for 1.4 GW and it already has a pipeline of 4.2 GW of projects ready for the next call (with advanced technical, economic, environmental and social studies, and that have secured most of the required environmental and land permits).

estimation of renewable and energy efficiency investments suggests that more than USD 2-5 billion[9] are required over the next few years. The current energy sector market structure for large and small-scale project development is not conducive to long term financing. In addition, local commercial banks and investors are not familiar with clean energy sector risks. For example, commercial banks and investors will be looking for certainty of revenues to minimize their financing risk. Thus, risk mitigation and credit enhancement will be necessary to manage the spectrum of financing risks and attract financiers to the clean energy sector. In the context of competing infrastructure financing needs, such as the 4G road program or the Bogota Metro Project in Colombia, there is a critical need to explore new financing sources including from sponsors, equity, and debt from local and international commercial banks, capital markets with participation of institutional investors, and/or intermediary investment vehicles including infrastructure funds.

16. **The development of NCRE in Colombia is imminent given the number of actions being advanced by the ROC, however, the lack of long-term offtake arrangements and lack of availability of adequate long-term financing, remain key barriers to market development**. While the policy and regulatory actions being taken provide a positive signal for the development of clean energy in Colombia, many of the underlying risks related to financing and implementation still prevail. Without clarity on long-term offtake contractual arrangements and long-term financing, clean energy project opportunities may not be implemented at scale. This includes development of market rules for long-term contracting, identification and selection of an appropriate off-take arrangement, development of mechanisms for competitive bidding, creation of standardized contracts, design and development of suitable financial products, such as risk mitigation and credit enhancement, to de-risk investments and attract long term financing. The operation is aimed at addressing both implementation and financing risks such that a track record for private investments can be established in the clean energy sector in Colombia.

Overall Energy Policy and Overarching Energy Strategy

17. **The overarching policy framework of the energy sector in Colombia is articulated in both the National Development Plan 2014-2018 and the National Energy Plan of 2015.** These two policy instruments establish a clear direction in the three areas of sustainable energy as well as in resilient growth vis-à-vis climate variability (see Annex 2 for a detailed description of relevant objectives in the NDP and NEP). The NDP supports various objectives under its "Green Growth Strategic Line" that relate to: the electricity sector (Objective 1), progress towards a sustainable and low carbon future (Objective 2), and the protection and sustainable use of natural capital with improvement in the quality of environmental governance (Objective 3). Under these three objectives, Colombia presents specific directions for promoting renewables and energy efficiency and the creation of a more resilient electricity sector, with an emphasis on modernizing the planning function. The 2015 National Energy Plan further details the strategic directions for the intended development of the energy industry and its subsectors (see Table 2.1 in Annex 2).

18. **Colombia also committed to a Nationally Determined Contribution (NDC) along with other countries after the COP 21 agreements (ratified on April 22, 2016) to underscore its climate mitigation**

[9] Estimated amount based on the expected NCRE capacity projected in UPME's current generation expansion plan (scenarios 8 through 12). UPME has also released a preliminary (draft) reference expansion plan for the period 2017-2031, which estimates a capital investment for NCRE capacity additions of around US$ 6 billion to 2031.

and adaptation priorities. In its NDC, Colombia committed to reduce 20 percent of its carbon emissions by 2030 when compared to a projected business as usual scenario.[10] The sectors targeted for mitigation purposes are: energy, transport, agriculture, land use/land use change and forestry (LULUCF), and industry. Colombia has laid out specific mitigation actions in its Low Carbon Development Strategy (*Estrategia Colombiana de Desarrollo de Bajo Carbono*, ECDBC), which includes actions to promote energy efficiency and renewable energy.

Relationship to Country Partnership Framework

19. **The Project is also fully aligned with Objective 8 "Improved Infrastructure Services and Enhanced Urban Planning to Develop Competitive Cities" of the Country Partnership Framework (CPF) 2016-2021 for Colombia (listed under Pillar 3 "Supporting Fiscal Sustainability and Productivity").[11]** The Colombia CPF proposes to address the country's complex development challenges with a flexible, six-year (FY16-21) engagement that builds on the strong and trusted client relationship established over recent years. The ROC is focusing on developing long term finance for its infrastructure initiatives, which aligns with Objective 7 of the CPF "Deepened Financial Intermediation for Productive Purposes". Under **Objective 7,** the CPF specifically states that the WBG will explore the possibility of credit enhancement (risk mitigation) to support renewable energy and energy efficiency. The Project is aligned to the WBG's twin goals of boosting shared prosperity and reducing poverty as it contributes to a more resilient, environmentally sustainable and competitive power sector.

C. HIGHER-LEVEL OBJECTIVES TO WHICH THE PROJECT CONTRIBUTES

20. **The Project would contribute to improving the implementation and financing of clean energy projects through the development of suitable financing and credit enhancement structures to mobilize long term competitive private sector participation and investments.** This high-level objective is aligned with national and World Bank strategic objectives and policy:

- *Alignment with national objectives:* The Project is fully aligned with the objectives of the National Development Plan 2014-2018, the National Energy Plan of 2015, and COP21's commitments (NDCs).
- *Alignment with World Bank policies.* The Project is fully aligned with the strategic lines and objectives established in the Country Partnership Framework 2016-2021. The WBG's Energy Sector Directions Paper launched in 2013 establishes both renewable energy and energy efficiency as strategic pillars of the WBG's future engagement in the energy sector. The WBG's strategic intent is also aligned with the Sustainable Development Goals (and SDG 7 in energy) as well as with the UN's Sustainable Energy for All (SE4All), which aim to double the rate of improvement of energy efficiency and significantly increase the share of renewable energy at the global level by 2030. The activity is also consistent with the WBG's targets in sustainable energy established in the Climate Change Action Plan 2016-2020.
- *World Bank Group value-added:* The WBG's policy dialogue and investments, accompanied by concessional finance such as that offered by the Clean Technology Fund (CTF) and coupled with technical assistance and capacity building, have been instrumental in catalyzing the

[10] This target could increase to 30% subject to the availability of international financial support. Colombia only contributes to 0.37% to global carbon emissions, however the amount of carbon emissions per unit of GDP is above the global average.

[11] IBRD, IFC, MIGA; 2016. Country Partnership Framework for the Republic of Colombia for the period FY16-FY21, Report No. 101552-CO. Discussed by the Board of Executive Directors on April 7, 2016.

transformation of renewable energy and energy efficiency markets in countries that faced barriers like those exhibited in Colombia, including in other LAC countries, and in Eastern Europe and Central, East and South Asia. The WB, through the Finance, Competitiveness & Innovation Global Practice, is also supporting Colombia in developing enabling environment for sustainable long-term financing through financial sector strategy. With its global and country-level knowledge, comprehensive financial sector support and convening ability, and extensive portfolio in clean energy around the world, the WBG is well-placed to support in the design and delivery of the operation.

- *Maximizing Finance for Development (MFD)*: This Project presents a clear opportunity to integrate the MFD approach of the WBG[12] by: a) addressing sector constraints in enabling environment to unlock private sector solution, and b) including increased sustainable private sector solutions with private finance from local and international markets.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PROJECT DEVELOPMENT OBJECTIVE

21. The project development objective is to assist Colombia in increasing electricity generation capacity from non-conventional renewable energy sources and energy savings in the industrial sector, through mobilization of private investment.

B. PROJECT BENEFICIARIES

22. **The Project beneficiaries will primarily be private sector investors and industrial and residential consumers**. The IBRD and CTF Guarantees will directly benefit private investors in, and lenders for, energy efficiency improvements, and nonconventional renewable energy projects (clean energy Sub-projects or Sub-projects), through IBRD/CTF Eligible Financial Products[13] offered by the financial intermediary, FDN, in their favor. Indirect beneficiaries include:

i. **Current and future consumers:** IBRD/CTF Eligible Financial Products will de-risk Sub-projects, contributing to increased used of clean energy and resulting benefits including increased reliability (through lower exposure to ENSO events) and lower marginal cost and electricity tariffs.
ii. **Proposed central offtake agency or other long term off take arrangement:** enhance creditworthiness of long term offtake arrangement to mitigate offtake risk.
iii. **Industrial consumers:** through cost reductions and energy savings from Sub-project activities.
iv. **Government of Colombia:** by meeting their (COP21) NDC commitments and other clean energy targets by gaining additional flexibility through diversification of the energy mix to address weather and climatic shocks more effectively.

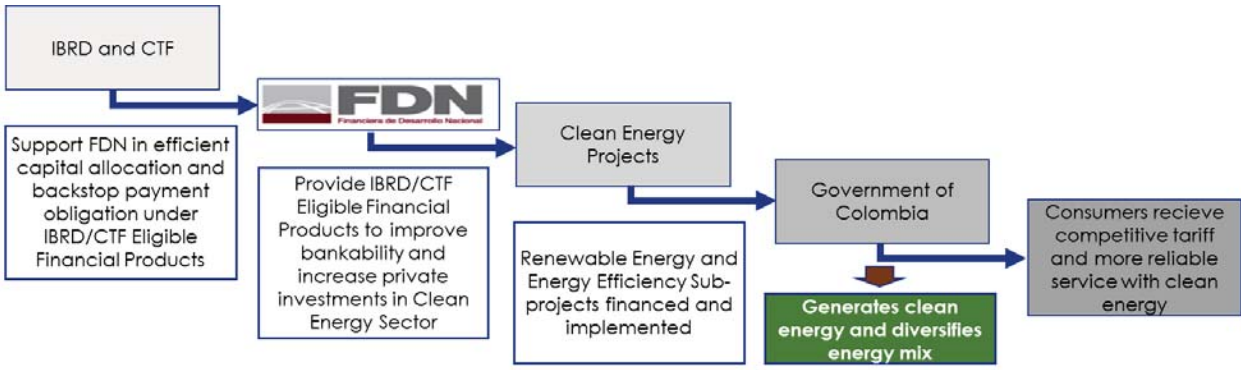
The expected pass-through benefits of IBRD and CTF resources to (large and small scale) clean energy Sub-

[12] Further details on the MFD, including potential participation of IFC and/or MIGA, are explained in Annex 2.

[13] IBRD/CTF Eligible Financial Products include credit enhancement and risk mitigation products (e.g. liquidity guarantees, credit guarantees, payment risk mitigation guarantees, funded and/or unfunded contingent instruments, etc.) issued by FDN to IBRD/CTF Eligible Beneficiaries in support of IBRD/CTF Eligible Sub-projects and accounted for under the PER Account. These terms are defined in the Term Sheet included in Annex 6.

projects and ultimately the consumers are illustrated in Figure 1.[14]

Figure 1. Cascading Benefits of IBRD and CTF Guarantees



C. PDO Level Results Indicators

23. **Progress toward achieving the PDO would be assessed through the set of indicators presented in Annex 1**. The PDO-level results indicators are the following:

- Volume of direct finance leveraged through CTF and IBRD resources (US$ Million) (Private capital mobilized) –Core
- Generation capacity of renewable energy constructed under the Project (MW) – Core
- Annual energy savings (MWh) – Core

A summary of the Project results is provided in Table 1 below:

Table 1. Summary of Project Results

Results	Indicator	Expected Results of the IBRD and CTF Guarantees (1)
Volume of direct finance leveraged through CTF and IBRD resources	Public	US$ 187 Million
	Private capital mobilized (core)	US$ 761 Million
Increased capacity of renewable energy	Installed Capacity Added lifetime of the Project (core)	716 (MW)
Increased energy efficiency	Annual savings	227 (GWh)

(1) Assumes an average FDN contribution of up to US$ 400 million, via IBRD/CTF Eligible Financial Products.
(2) The calculation for carbon emissions reductions resulting from the diffusion of renewable energy is based on an emissions factor of 0.283. This is based on dispatch factors and information from expansion plans (simulated via SDDP dispatch optimization modelling run by UPME). The emissions factor is also consistent with the information on grid factors reported by the International Energy Agency for Colombia (weighted average of operating and build margins is 0.288).

[14] This flow of pass-through benefits would be similar for energy efficiency projects in the industrial sector (the benefits of FDN support to Energy Service Companies or Aggregation Vehicles would be transferred to the industry and ultimately the consumer).

III. PROJECT DESCRIPTION

A. DESCRIPTION

24. **To meet the National Development Plan (2014-18) and National Energy Plan (2015) objectives of achieving sustainable and low-carbon development and reducing vulnerability to climate change,** Colombia has initiated the development of a new clean energy program to tap into its abundant and diverse renewable energy resources. The current electricity generation and transmission expansion plan (for 2015-2029) estimates that a capital investment in the range of US$ 2-5 billion[15] will be needed to develop non-conventional renewable energy (NCRE) through to 2024. MINMINAS and FDN have agreed to join forces to undertake the technical, financial and legal studies necessary to develop a new Renewable Energy and Energy Efficiency Program (*Programa de Energías Renovables y Eficiencia Energetica* or PER); and as a result, Colombia and FDN have requested support from the IBRD and CTF.

25. **The Project, through the PER, will support the development of clean energy projects, including both renewable energy and energy efficiency.** The Project will contribute to unlocking Colombia's abundant clean energy resources through credit enhancement. The operation will support three categories of Sub-projects:

Category 1. Large scale renewable energy (wind, solar, > 20 MW).

Category 2. Small scale renewable energy (<20 MW) including ground mount and rooftop solar photovoltaic in distributed generation, self-generation and co-generation.

Category 3. Energy efficiency activities in the industrial sector.

26. **FDN, as financial intermediary, will be undertaking a 'market enabler' role for the clean energy sector.** FDN is a national development finance institution with majority ownership by the Government of Colombia[16]. With Government and other shareholder support, FDN has strong capital position and has set high governance[17] standards. Its operations, however, are highly concentrated on the 4G road program and therefore exposed to adverse macroeconomic events. FDN is expected to coordinate with relevant institutional stakeholders and market participants the activities necessary for the development and implementation of the PER. Due to existing market and regulatory barriers, as explained above, the clean energy market is expected to require credit enhancement and risk mitigation from a creditworthy counterpart, such as FDN. FDN's main role will be to develop and offer innovative IBRD/CTF Eligible Financial Products to de-risk Sub-projects by improving bankability, mitigating policy and regulatory risks and improving investment recovery for long-term investors. These financial products should be sustainable and effective in attracting competitive investments such that the benefits are passed down to the consumers through affordable tariffs and increased reliability during weather or climatic shocks.

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[15] Estimated amount based on the expected NCRE capacity projected in UPME's current generation expansion plan (scenarios 8 through 12). UPME has also released a preliminary (draft) reference expansion plan for the period 2017-2031, which estimates a capital investment for NCRE capacity additions of around US$ 6 billion to 2031.

[16] FDN Shareholders include Government of Colombia (73.37%), International Finance Corporation (8.89%), Sumitomo Mitsui Banking Corporation (8.89%) and Development Bank of Latin America, CAF (8.65%). Further details of FDN shareholding are included in Annex 2.

[17] FDN Board comprises of three Board members from the Government, other three shareholders have one member each and there are three independent members.

B. PROJECT COMPONENTS

27. **The Project consists of one or more IBRD Guarantees in an aggregate amount of up to US$41[18] million and a CTF Guarantee in an amount of up to US$40 million to backstop FDN's payment obligations.** Under the Project, IBRD and CTF will guarantee, through FDN as the financial intermediary, the payment obligations of FDN under the IBRD/CTF Eligible Financial Products in support of Eligible Sub-projects and Eligible Beneficiaries.[19]

28. **The key rationale for IBRD and CTF Guarantees is to help, through FDN, the ROC in establishing a long-term and creditworthy offtake market, thereby building a track record for long term investments in clean energy**. As mentioned above, establishing a long-term and creditworthy offtake market is essential to provide revenue certainty for renewable energy, for both small and large scale Sub-projects. The IBRD and CTF Guarantees, through the provision of IBRD/CTF Eligible Financial Products by FDN, will contribute to establishing a successful track record in clean energy financing and implementation through initial rounds of auctions of large scale Sub-projects and potentially through a pilot aggregation model for small scale Sub-projects.

29. **FDN will explore two main functions to catalyze the market for small scale renewable energy generation and energy efficiency initiatives.** The first function involves designing and developing credit enhancement and risk mitigation products to help mobilize long term financing for clean energy sector. The second function involves reviewing the potential for implementation of an aggregation vehicle to reduce transaction costs and attract commercial financing for small scale Sub-projects. It is important to note that support to small scale renewables (behind the meter) and energy efficiency are considered only as pilot activities that seek to plant the seeds to demonstrate the implementation potential for further development of the market.

30. **Under the proposed IBRD and CTF Guarantee structure, FDN will segregate its IBRD/CTF eligible clean energy business under a specific ring-fenced account to offer IBRD/CTF Eligible Financial Products**. FDN will establish within its financial and management accounting system an internal account, referred to as the PER Account, to offer only[20] IBRD/CTF Eligible Financial Products. The purpose of ringfencing the PER Account is to ensure the financial exposure of Sub-projects that are supported by FDN with IBRD/CTF

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[18] IBRD guarantees may be sequentially implemented via one or two agreements to reflect the timing difference in the implementation of small scale and large scale Sub-projects.

[19] Annex 6 provides further details on IBRD/CTF Eligible Financial Products, Eligible Sub-Projects and Eligible Beneficiaries to be covered under the IBRD and CTF guarantees. The eligibility criteria for Sub-project include the following:

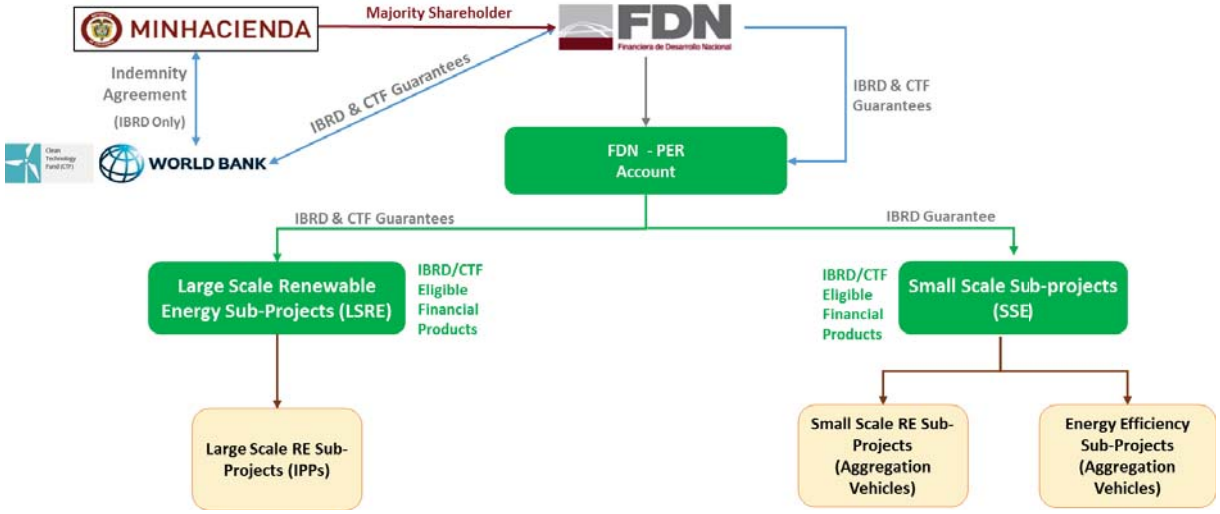
(a) has the ability to manage the environmental and social aspects of the respective Sub-project in a manner compliant with World Bank Performance Standards and IFC Performance Standards;
(b) meets industry standards for technical, financial and economic viability, financial management, and procurement, and
(c) neither it, nor its affiliates nor direct or indirect shareholders, nor any person acting on their behalf is debarred by the World Bank for a Sanctionable Practice (i.e., a corrupt, fraudulent, collusive, coercive or obstructive practice) or sanctioned by the UN Security Council.

[20] FDN may continue to provide other financial products outside the PER Account for ineligible Sub-projects and Beneficiaries, whose financial obligations will not be covered by the IBRD and CTF Guarantees.

Eligible Financial Products are separately reported and accounted. There will not be any transfer of IBRD and CTF Guarantee amounts to FDN, except upon occurrence of CTF Guaranteed Events or IBRD Guaranteed Events, as defined in the Term Sheet in Annex 6. Thus, the PER Account is created for accountability, reporting and traceability purposes and all transactions under the PER Account will be accounted and reported by FDN throughout the Project duration of 20 years. The PER Account will also form the basis for a specialized financial regulatory treatment (explained in Annex 2) for FDN with the provision of IBRD and CTF Guarantees[21].

31. **Under the PER Account, FDN will create two windows to provide IBRD/CTF Eligible Financial Products, one for Large Scale Renewable Energy (LSRE) Sub-projects and the other for Small Scale Sub-projects (SSE) Sub-projects**. The LSRE window will account for renewable energy projects of at least 20 MW. The SSE window will account for small-scale renewable energy (< 20 MW) as defined by the legal and regulatory framework[22] and energy efficiency investments. The proposed IBRD and CTF Guarantees structure is illustrated below. The IBRD Guarantee is expected to be used to support both small scale and large scale Sub-projects[23] while the CTF Guarantee will be used only for large scale Sub-projects. The exact proportion of IBRD resources to be allocated to small scale and large scale Sub-projects will be determined before the effectiveness of the respective IBRD and CTF Guarantees.

Figure 2. Proposed Structure of IBRD and CTF Guarantees



32. **IBRD and CTF Guarantees support FDN in offering cost effective IBRD/CTF Eligible Financial Products and in obtaining additional leverage.** The current applicable Colombian financial regulations would require that IBRD/CTF Eligible Financial Products be given a 100% risk weighting (Decree 2555). The regulation requires FDN to allocate regulatory core capital against its risk-weighted assets (or financial exposure) created from such financial products. The IBRD/CTF Eligible Financial Products issued by FDN under the PER Account are expected to leverage commercial finance at the Sub-project level up to 4 times the financial exposure of such products, which reflects an efficient use of IBRD and CTF resources. A

[21] Subject to confirmation from the Superintendencia (SFC) on regulatory treatment of IBRD and CTF Guarantees.
[22] Distributed generation facilities (small or large) as well as the possibility to sell excess or surplus energy are defined in Decree 2469 (MINMINAS), CREG Resolution 024 (CREG) and UPME resolution 281 (UMPE), as "self-generation".
[23] Refer Maximum IBRD Guaranteed Amount Sub-Caps for Small Scale and Large Scale sub-projects in Annex 6.

specialized financial regulatory treatment for the PER Account[24] has been proposed in the Colombian financial regulation. This proposal is consistent with the regulatory treatment given to WB guarantees based on international experience and on similar operations in other middle-income countries. The proposed treatment[25] seeks a much lower risk weighting for IBRD/CTF Eligible Financial Products issued by FDN and backed by IBRD and CTF Guarantees. If approved, this treatment would allow FDN to leverage IBRD and CTF Guarantees up to five times, and offer IBRD/CTF Eligible Financial Products in a more capital- and cost-efficient manner.

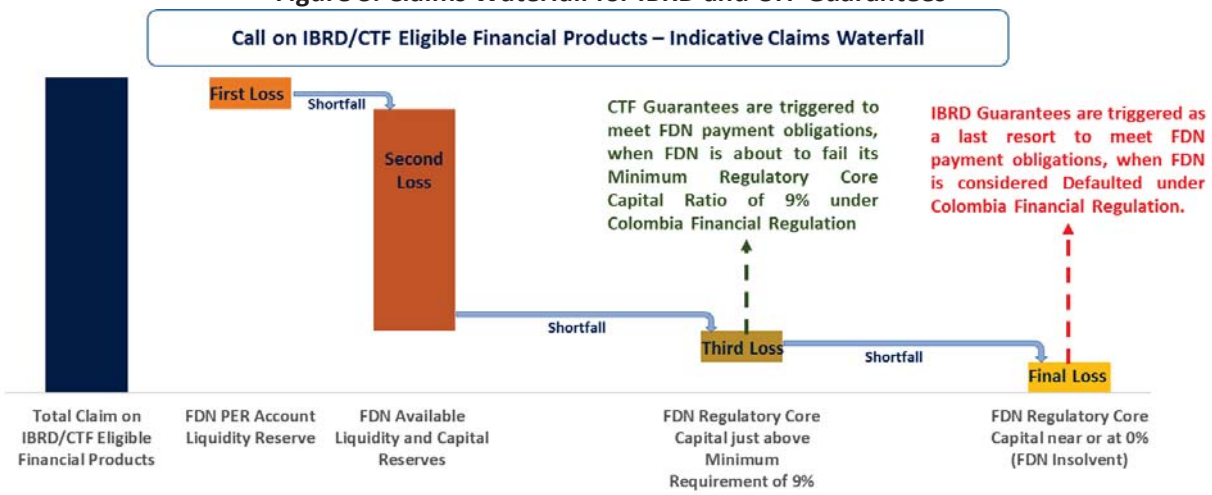
33. **The innovative design of IBRD and CTF Guarantees not only helps FDN in offering cost-effective financial products but also will be treated as a last resort option.** If one or more IBRD/CTF Eligible Beneficiaries have submitted an eligible claim(s) under IBRD/CTF Eligible Financial Products issued by FDN, then FDN will initially use the following steps to meet its payment obligations before triggering the CTF and IBRD Guarantees:

a) use of the available liquidity reserve under the PER Account (first loss tranche); and

b) use of other available liquidity and capital reserves at FDN (second loss tranche)

If the above steps are insufficient to meet FDN's total payment obligations to IBRD/CTF Eligible Beneficiaries, then FDN may submit a demand notice for payment to the CTF (third loss tranche) and finally the IBRD (final loss or last resort). Notably, IBRD and CTF Guarantees are limited only to an aggregate maximum of US$81 million, which is likely to be a proportion of the total payment obligations to meet eligible claims under IBRD/CTF Eligible Financial Products. As FDN will have to meet its payment obligations initially with its own resources, it will be incentivized to manage risks efficiently by minimizing losses from such financial products**.** As mentioned before, CTF Guarantees are only used for eligible claims under large scale Sub-projects, while IBRD Guarantees are likely to be split between large scale and small scale Sub-projects. The CTF and IBRD Guarantee payouts will be made, as a third loss and final loss tranche, respectively, based on the following claims waterfall arrangement:[26]

Figure 3. Claims Waterfall for IBRD and CTF Guarantees



[24] The proposal seeks a 20% risk weighting for PER Account financial exposure for IBRD/CTF Eligible Financial Products to be covered by IBRD and CTF guarantees.

[25] Subject to approval by the Superintendencia (SFC) and adopted through an appropriate form, such as an official Circular or other amendments to the relevant banking law and/or regulation (such as Decree 2555).

[26] Claims waterfall arrangements are further explained in Annex 2 and in the Term Sheet in Annex 6.

34. **The innovative and efficient approach to structuring the CTF Guarantee to function as a liquidity reserve helps FDN to restore its minimum regulatory core capital ratio requirements. If drawn, CTF Guarantees are expected to be repaid and reinstated**. The CTF Guarantee acts like a liquidity reserve to meet FDN's minimum regulatory core capital requirements under the Colombian financial regulation. If FDN exhausts its available capital reserves (first and second loss tranches) to meet its payment obligations for eligible claims under IBRD/CTF Eligible Financial Products, FDN's capital position would continue to deteriorate. FDN would reach a point where any further use of capital reserves to meet payment obligations would lead to failure in meeting the minimum regulatory core capital[27] requirements. At this point, FDN could call on CTF Guarantees to meet its payment obligations such that its minimum regulatory core capital requirements are maintained. If drawn, FDN will have an obligation to repay[28] the amount drawn under the CTF Guarantee. If any such amounts are repaid by FDN, they will be reinstated and available to be drawn on under the CTF Guarantee, following the same trigger events. This is an innovative and efficient approach for the use of CTF resources.

35. **While IBRD and CTF Guarantees are used to backstop FDN's payment obligations under IBRD/CTF Eligible Financial Products, the trigger events for IBRD and CTF Guarantees are also linked to the overall financial strength of FDN**. The overall financial strength of FDN is represented by its regulatory core capital[29] position, which, as of December 2016, is at 139 percent, compared to a minimum requirement of 9 percent set in Colombian financial regulation, and is therefore many times more than the base requirement. Annex 7 provides further details on the trends of FDN's core capital ratio and financial exposures, which are mostly related to 4G projects. FDN may diversify in future into education, PPPs and other sectors, whose risk profiles may be different from the 4G road and clean energy sectors. Considering the long Project duration of 20 years and varying sector exposures, the amount of available regulatory core capital ratio may drop over time. Thus, WB implementation support for the PER Account along with regular monitoring[30] of FDN's operations is critical to ensure adequate risk management and preservation of capitalization levels to prevent calls on CTF and IBRD Guarantees. Annex 4 and 5 provide further details on the implementation and supervision arrangement and monitoring of overall FDN's operation throughout the Project duration.

36. **Overall, the benefits of IBRD and CTF Guarantees are multifold:** i) enhance the creditworthiness and overall bankability to help create a long term offtake market for clean energy in Colombia; ii) support initial phases of the Sub-projects to build a track record for the clean energy sector; iii) backstop FDN's payment obligations to eligible Beneficiaries; iv) if approved, optimize capital allocation for FDN through the specialized regulatory treatment (which would facilitate offering cost effective financial products), and v) leverage public resources, while keeping the IBRD guarantee call as a last resort.

37. **Global experience indicates that once a track record is built with private sector participation, the need for risk mitigation and credit enhancement declines**. Once the IBRD and CTF Guarantees are fully committed through IBRD/CTF Eligible Financial Products, FDN will continue to assess the need for similar financial products and offer them only when either the market still requires them or there are no market instruments (insurance policies, etc.) available, as illustrated in Figure 4.

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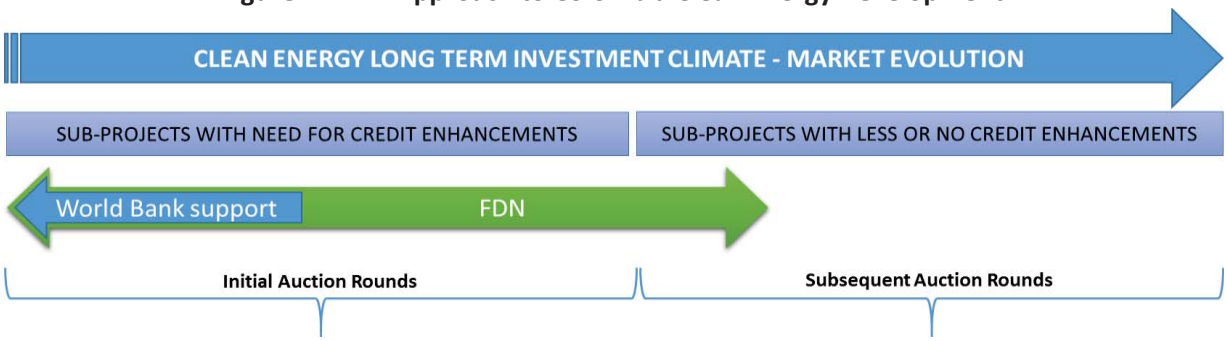
[27] Regulatory core capital position of FDN as of December 2016 is 139% of its total risk-weighted assets against a minimum requirement of 9% set in Colombian financial regulation.

[28] Refer to 6 for repayment obligations on FDN on CTF Guarantees.

[29] Refer to Annex 6 for the definition

[30] Refer to Annex 5 for implementation monitoring and supervision of PER Account and FDN's overall operations.

Figure 4. MFD Approach to Colombia Clean Energy Development



38. **The Project benefits from a CTF Project Preparation Grant (CTF PPG) to support FDN developing the activities and assessments necessary to develop a pipeline of Sub-projects** and to build the capacity of FDN. This includes: i) market sounding to prepare a robust pipeline of projects and identification and quantification of risks; ii) technical and prefeasibility studies of selected renewable energy and energy efficiency projects; iii) development of a study to assess the cumulative environmental impacts of potential wind projects in La Guajira; iv) additional training to support the activities established in the ESMS to FDN's employees, including the environmental and social team, loan officers and credit risk officers; v) advisory services on financial structuring (design and development of appropriate credit enhancement and risk mitigation products), and vi) project coordination with other Government agencies and structuring of a PIU within FDN. These TA funds will be administered by FDN as a recipient-executed project preparation grant.

39. **Other on-going Bank initiatives support the ROC with complementary technical assistance to strengthen the regulatory framework and market and operation rules for a higher integration of clean energy in the electricity market.**[31] These initiatives focus on adjustments to the regulatory framework, market operational rules and administration (such as improvements to grid code, and creation of a proposed Central Off-Take Agency), structuring of transmission line, creating enabling environment[32] for long term financing and the design of investment pooling vehicles and products, among others (these complementary activities are described in detail in Annexes 2).

C. Project Cost and Financing

40. **The estimated Project costs and financing structure are shown in Table 2 below.**

[31] As described in Annex 2, energy sector institutions of the electricity sector in Colombia will be supported with complementary technical assistance from the World Bank through various Trust Fund resources, including from PPIAF, CTF, NDC PSP, GIF and SECO.

[32] The World Bank's Finance, Competitiveness and Innovation Global Practice, through SECO-funded TA, has been developing a financial sector strategy to develop enabling environment for sustainable long-term financing, which will be coordinated with this operation.

Table 2: Indicative Project Costs, Guarantee Sizing and Private Sector Investments

Description	Total Expected Clean Energy [33] (USD Million)
Timing of Investments (Year)	
Installed Capacity Large Scale Renewable Energy (>20 MW) (MW) (5-year project implementation)	578
Installed Capacity Small Scale Renewable Energy generation (< 20MW, co-generation, self-generation) (MW) (5-year project implementation)	138
Energy Savings (GWh/year) (5-year project implementation)	1,135
Capital Structure	
Total investments	USD 1,015
Equity	USD 254
Debt	USD 761
Of which commercial debt (commercial banks, Institutional Investors)	USD 508
Of which DFIs and ECAs (including FDN, IFC and MIGA support)	USD 254
Total private capital [1]	USD 761
IBRD-CTF Guarantee Amount (indicative)	**USD 81**

[1] Based on total private investment, including commercial debt and equity

D. LESSONS LEARNED AND REFLECTED IN THE PROJECT DESIGN

41. **The Project incorporates lessons learned from the implementation of similar projects and instruments globally, including from IBRD and CTF Guarantee projects.** These include:

i. To develop a clean energy market, governments need to create an enabling environment that effectively promotes investment: i) policy and regulatory measures that consider the special characteristics and value of renewable energy and energy efficiency, and that allow them to compete on a level playing field with conventional alternatives, ii) access to the grid (including transmission capacity and adequate interconnection rules), iii) appropriate operational rules and protocols for the integration of variable renewable energy, among others. During Project preparation, the WB supported Colombia with a comprehensive technical assistance to strengthen the policy, regulatory and operational frameworks for NCRE integration.

ii. Long-term PPAs are an important instrument to develop a market for renewable energy projects. PPAs, if properly designed and procured via auctions, can enhance the competitiveness of the power sector. As part of complementary technical assistance, a new Central Offtake Agency (COA) role has been proposed to create long term offtake market. FDN, supported by IBRD and CTF Guarantees, is expected to provide IBRD/CTF Eligible Financial Products to the COA or another appropriate off-take agency to help create long-term offtake market in Colombia.

iii. Availability of sufficient transmission grid capacity is essential to support a bankable power purchase agreement. Colombia is in the process of building adequate transmission capacity to evacuate non-conventional renewable energy generation from the areas where the resource is high. The

[33] Including Large Scale Renewable Energy, Small Scale Renewable Energy (< 20 MW) and Energy Efficiency sub-project investments.

complementary TA activities described in Annex 4 will support UPME and XM in developing the protocols and methodologies necessary for a better integration, operation and dispatching of NCRE.

iv. Adequate risk management capacity through establishing proper eligibility criteria for Sub-projects, conducting adequate due diligence, addressing unallocated and residual risks through design of appropriate risk mitigation products are key to implement clean energy Sub-projects in a new market. In this operation, FDN retains maximum flexibility in the choice of product offering, however, it is also in FDN's interest to design and offer IBRD/CTF Eligible Financial Products that will provide them with the leveraging and cost efficiency benefits from the IBRD and CTF Guarantees. The complementary technical assistance will help support FDN in designing such financial products, including bringing IBRD's global experience in offering similar products in clean energy sector.

v. The structure of the proposed guarantees is informed by experience from similar CTF and IBRD guarantee structures involving FIs in clean energy sector, for example in India and Argentina, namely: the India Partial Risk Sharing Facility for Energy Efficiency (PRSF) (P132620, Board approval in 2015); and the Argentina FODER Renewable Energy Fund Guarantee (P159901), Board approval in February 2017).

vi. Risk mitigation instruments, such as guarantees, are needed to enable clean energy Sub-projects to be bankable and reach successful financial close. In Colombia, the ongoing 4G road sector projects received a liquidity guarantee from FDN, which is likely to be one of the products to be considered by FDN to be offered to the clean energy sector.

vii. Selection of an appropriate financial intermediary is critical to achieve the objectives of the Project. FDN is a national development bank with technical, managerial and financial resources, and a mandate from the ROC to develop and implement clean energy sector. FDN also functions as a quasi-private entity, with experience in offering financial products to infrastructure sectors (e.g., the 4G road program). FDN's experience in structuring credit enhancement products using risk-based approach to pricing, project selection, due diligence, implementation and monitoring will be of added value in meeting the PDO.

viii. Guarantees are designed to provide comfort in support of good, financially viable Sub-projects and are typically designed not to be called in the normal course of business. The main aim of the IBRD and CTF Guarantees is to provide additional comfort to lenders and investors for Sub-projects by strengthening FDN's capital allocation more efficiently to meet its guarantee obligations.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

42. **The Ministry of Mines and Energy (MINMINAS) has legal obligations established in Law 1715, including promoting the low-carbon development of the energy sector and deployment of renewable energy and energy efficiency.** With this obligation, MINMINAS will lead the interinstitutional dialogue, policy formulation, and activities necessary to address the market failures affecting the development of clean energy. MINMINAS—through UPME—will plan and launch the procurement processes required to build the transmission capacity to interconnect the volume of large scale renewable energy that the market is prepared to deliver (notably in the Guajira department). MINMINAS is also in charge of formulating and issuing the policy to promote renewable energy auctions.

43. **The success of the Project depends also on the formulation of appropriate regulatory measures and market arrangements which are necessary for attracting long term financing and private participation in clean energy.** Market institutions such as the Energy Regulatory Commission (CREG) and the Electricity Market Operator and Administrator (XM) have a key role to play in unlocking the

development of grid-connected NCRE in Colombia. MINMINAS recently issued Decree 570 (March 23, 2018), establishing the policy guidelines to define and implement a mechanism to procure long-term electricity generation contracts and it is in the process of designing an auction mechanism, which will consider the specific characteristics and value of variable NCRE. MINMINAS, UPME, CREG and XM (or another agency, such as the National Compensation Chamber, Risk Chamber, or DERIVEX), needs to evaluate the possibility of adopting the function of a COA or other long-term offtake arrangement, acting as a "custodian" of long-term PPAs, and managing credit, liquidity and operational risks.

44. **The implementing agency FDN, as a financial intermediary, has the main function of catalyzing private investment in clean energy.** In coordination with MINMINAS and UPME, FDN will maintain a continuous dialogue with key stakeholders of the energy sector to discuss and promote the introduction of appropriate market and regulatory measures necessary to strengthen the enabling environment for clean energy development in the country. FDN will also develop and maintain strong relationships with multilaterals, DFIs, private commercial banks, institutional investors, rating agencies and sponsors interested in participating in the clean energy market. The experiences brought by IBRD and CTF Guarantees, from other operations, will also help improve the capacity of FDN.

45. **To accommodate the readiness of Sub-projects, the Project may be implemented sequentially.** Depending on the readiness, the LSRE and SSE Sub-projects are expected to be implemented on different timelines. The IBRD Guarantees may therefore be split between large-scale and small-scale Sub-projects, and may be delivered sequentially when SSE and LSRE Sub-projects become ready for implementation.

46. **To implement the Project, a detailed Operations Manual will be developed before the guarantee effectiveness** that will set out the principles, operational policies and procedures, financial management procedures, implementation of performance standards (Environmental and Social Management System, including gender considerations), reporting, monitoring and supervision of Sub-projects. The Operations Manual will also include a Business and Implementation Plan for planning and implementing the Project. A key role for FDN will be to select Sub-projects and beneficiaries based on pre-defined eligibility criteria and conduct detailed due diligence on technical, economic, social and gender, environmental, financial feasibility and other project related assessments. The Operations Manual will also focus on standardizing certain transaction documents, creating processing efficiencies and enabling speedier scale-ups. The Operations Manual will have specific procedures for small-scale and large-scale Sub-projects to accommodate the timing.

B. Results Monitoring and Evaluation

47. **Results monitoring and evaluation will be the primary responsibility of FDN, as the financial intermediary.** The operation's support to all M&E tasks—as well as to overall project implementation supervision and reporting—will be twofold: (i) FDN will develop and deploy monitoring and evaluation systems, indicators, reports, and other instruments as necessary through the Operational Manual, and (ii) relevant data and information will be gathered by FDN and relevant ROC stakeholders. IBRD M&E and implementation supervision will place emphasis on: (a) monitoring compliance of FDN and ROC agencies under the Project with relevant agreements and with the Operations Manual; (b) ex-post supervision of environmental and social safeguards compliance of FDN; (c) monitoring at required intervals of the results and impacts of implementation of Sub-projects including review of potential risks of default from Sub-projects, which might lead to a call on FDN financial products and in turn to the IBRD and CTF Guarantees; (d) monitoring at required intervals of FDN's overall financial strength and regulatory core capital position, which in combination with call on FDN financial products might lead to a call on IBRD and CTF Guarantees;

(e) monitoring of all Project indicators; and (f) undertaking a mid-term review to assess progress towards achievement of the PDO.

C. SUSTAINABILITY

48. **The Bank will play a critical role in supporting the ROC in the design and development of a clean energy program, strengthening of the enabling environment, and mobilizing private participation and financing.** The technical assistance (TA) provided by the Bank through complementary Trust Fund Resources (as described in Annex 2) will build the capacity of various institutions of the energy sector – including MINMINAS, UPME, FDN, and XM – to create an enabling environment for the development of clean energy to meet ROC's targets in a sustainable manner. In addition, Colombia's financial sector strategy, prepared with Bank technical assistance funded by SECO, is supporting Colombia to develop an enabling environment for sustainable long-term financing and to design and implement investment pooled vehicles for infrastructure and clean energy. These two TAs will jointly address various barriers to private investment and support in unlocking existing supply and demand side resources, including institutional, regulatory, procurement, financial and technical fronts.

49. **The three areas of the enabling environment that require immediate attention are the creation of an appropriate regulatory framework, strengthening of transmission infrastructure and enhanced access to long-term finance.** In particular, the regulatory framework needs to include incentives and procurement for renewable energy projects, including auction design; the strengthening of transmission infrastructure involves structuring and procurement to lower the risk associated with transmission interconnection and integration (as discussed in Annex 2), and the development of long term financing can include investment pooled vehicles among other forms of long term finance. These areas will be supported with on-going World Bank technical assistance via PPIAF, NDCPFS, SECO and GIF resources (as described in Annexes 2 and 4). The WB presence can also facilitate the participation of other WBG entities, including IFC via loans and MIGA via provision of political risk insurance directly to Sub-projects to support mobilization of long term private investments.

50. **The Project is intended to support Colombia and FDN build a track record with investors.** Supporting the Government plans in this initial phase is of highest importance as investors will gain confidence and, over time, should be ready to take uncovered risk or access other risk mitigating instruments. The Project's overall sustainability will be ensured by Colombia's clear commitment towards clean energy, including both renewable energy and energy efficiency; the obligations established in the legal framework, and the positive development impact that it will have by reducing the need for fossil fuel and helping to provide reliable and clean energy sources.

V. KEY RISKS

A. OVERALL RISK RATING AND EXPLANATION OF KEY RISKS

51. **The overall risk rating for the Project is *Substantial***. This risk is assessed for the overall duration of the guarantees (about 20 years).

52. **Political and governance risk**. This risk is rated *Moderate* considering that the country's political system and governance arrangements are solid and are not expected to affect the Project over its expected life. However, managing political economy challenges and inter-institutional coordination is

critical to gain investor confidence. Presidential elections in Colombia took place on May 27, 2018, with a second round slated for June 17, 2018, however, a smooth transfer of functions is expected.

53. **Macroeconomic risk.** The Macroeconomic risk is rated *Moderate* given the relatively stable economy and investment grade credit rating.[34] However, availability of long term financing is critical to the successful delivery of the Project. In addition, risk of depreciation of the local currency would increase the mismatch between electricity tariffs and any hard currency investments.

54. **Sector strategies and policies risk.** This risk is rated *High*. Even though the Colombian Electricity Market is mature and it has systematically developed a sophisticated operational experience since its inception in 1994, the existing policy and regulatory framework does not yet adequately value the special characteristics and benefits of clean energy; moreover, incentives such as the reliability payment do not favor the entrance of variable renewable energy generation or the participation of demand side resources. Recently, MINMINAS introduced Decree 570, which sets the basis for the consideration of specific technical attributes (more aligned to the benefits offered by NCRE) and the long term contracting of electricity (as described in Section 1.B and Annex 2). MINMINAS is in the process of designing the auction mechanism that would allow renewable energy to compete on a level playing field in the market; however, incumbents have exercised strong political pressure to maintain the status quo. There is a risk that the political pressure of incumbents affects the timing of the first and subsequent auctions for the long-term contracting of electricity and deployment of NCRE. In addition, the design and implementation of the proposed long-term offtake arrangement is critical to the successful implementation of renewable energy Sub-projects and in turn the use of IBRD/CTF Eligible Financial Products and subsequently, the IBRD and CTF Guarantees. Similarly, design and feasibility of aggregation vehicles for SSE Sub-projects are critical to unlock a potentially significant market. These require detailed assessment of ROC's financial regulation, institutional coordination, standardization of contracts (such as Power Purchase Agreements) and other market rules. With regards to the technical design, an important risk is seen in the potential delay in the construction of transmission infrastructure necessary to evacuate electricity from La Guajira region, one of the areas where the wind resource is high (a key mitigation action includes strengthening the capacity of UPME for structuring future transmission expansion projects, as described in Annex 2). This would affect only Sub-projects located in La Guajira.

55. **Technical design.** This risk is rated *Substantial*. The design of the IBRD and CTF Guarantees is based on experiences and lessons gained from many similar operations. However, considering FDN's relatively limited experience in the clean energy sector, the technical design should consider the limited experience of FDN to design and offer financial products to mobilize long term financing, as well as limited experience in managing Sub-project risks as a Guarantor. The Operations Manual will provide detailed requirements in design and offering IBRD/CTF Eligible Financial Products to Sub-projects and will also guide supervision of the operation's implementation.

56. **Institutional capacity for implementation and sustainability.** This risk is rated *Substantial.* While Colombia has a mature electricity market, the country has relatively less experience in renewable energy and energy efficiency. Similarly, the IBRD-CTF guarantee beneficiary FDN has no experience in clean energy. In addition, the Project needs extensive coordination between various government agencies, regulator, distribution companies, financing market and system operator. FDN in its role as market enabler has limited experience in undertaking such role in clean energy sector. The complementary technical assistance under the CTF and other sources (as described in Annex 2) will help mitigate the risks through

[34] BBB with stable outlook by Fitch; BBB with negative outlook by S&P; and Baa2 with stable outlook by Moody's

sharing international experiences and targeted capacity building for coordination.

57. **Fiduciary risk**. This risk is rated as *Moderate*. The Project is a Financial Intermediary (FI) operation with an established counterpart. FDN will develop a detailed Operation Manual to describe, amongst other aspects, the financial management principles for this Project.

58. **Environmental and Social (E&S) risk. FDN has adopted an Environmental and Social Management System (ESMS) in accordance with IFCs[35] Performance Standards for its operations.** For the Project, FDN meets the criteria necessary to be considered a "Private Entity" under paragraph 3 of OP 4.03. FDN is established for a business purpose, operates on a commercial basis, and is managerially and financially autonomous. Therefore, FDN has revised its ESMS in accordance with World Bank [36] Performance Standards (OP 4.03). Although the Sub-projects are not expected to cause significant environmental and social impacts, the E&S risk is rated *Substantial* both because FDN does not have experience in implementing Performance Standards specifically to clean energy projects, and because of potential cumulative impacts of Sub-projects located in the department of La Guajira (for example, impact on migratory bird and bat species with the constructions of several wind projects). The region is part of a migratory route for multiple bird and bat species. In addition, indigenous people represent 42 percent of the population of the department of La Guajira. The E&S risk will be monitored throughout the life-cycle of the Project. The Bank has supported FDN in strengthening its ESMS during project preparation, including support to integrate gender considerations in the ESMS. Among other measures, FDN has expanded the ESMS to add guidance for implementation of Performance Standards at the Sub-project level; agreed to hire additional staff with social development and gender expertise to strengthen the capacity of the Environmental and Social Unit; agreed on specific training on Performances Standards in wind and solar power projects, and developed terms of reference for an environmental cumulative impact assessment for wind projects in La Guajira. The Bank team will continue to support FDN during the implementation phase. The Bank will review the Environmental Assessment summary reports of all Category A/1 Sub-projects, and will review the due diligence report of the first Sub-project in each category (as described in Section IV, E and F, and Annex 4).

Stakeholders risk. This risk is rated as *Moderate,* given the experience of the country in reforming and adjusting regulations and market rules to accommodate emerging challenges and opportunities, as well as the technical and financial capacity of the stakeholders involved. As indicated above in the sector strategies and policy risk, incumbents have exercised strong political power to delay and potentially, influence the Government's objective to introduce long-term contracting of electricity and deployment of NCRE. The design of the auction mechanism may propose an inclusive approach to accommodate incumbents in the process, while still allowing a level playing field for new entrants to the market. Compliance with WB policies and procedures under IBRD and CTF Guarantees would be required for all stakeholders.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

59. **The economic viability of the Project is confirmed**. The Project is expected to have a clear

[35] With IFC as one of the shareholders, FDN has been adopting IFC Performance Standards for their operations.

[36] The WB has adopted the eight IFC Performance Standards as the World Bank Performance Standards for application to WB support for Projects supported by the Private Sector.

development impact; the net present values (NPV) of the different project portfolios are: US$238 million for wind, US$242 million for small-scale renewables (behind the meter, such as self-generation, co-generation and small IPP), US$117 million for energy efficiency, and US$58 million for large scale solar. These NPV values were obtained based on an indicative split of portfolio of large and small scale Sub-projects, as explained in Annex 7. The Project will also deliver positive externalities, notably regarding GHG emission reductions. The Economic Internal Rate of Return (EIRR) is 11.2 percent for wind, 17.5 percent for large scale solar, 20.1 percent for small-scale renewables and 40.22 percent for energy efficiency. The sensitivity analysis shows the Project is robust to variations in key assumptions, including the amount generated as well as avoided cost estimates. Annex 7 provides further details.

60. **The financial viability of FDN's PER Account and of selected Sub-projects was tested under a range of scenarios through a high-level financial model (see Annex 7).** The model, designed to assess financial viability, was developed with a single [37] IBRD/CTF Eligible Financial Product (partial credit guarantees) for an assumed profile of Sub-project investments over the Availability Period of 5 years. As explained in Annex 7, the PER Account is expected to be financially viable throughout the duration of the Project. The PER Account Financial Model will be developed in detail, and reflected in the Operations Manual, and will be updated with all IBRD/CTF Eligible Financial Products. Separate financial viability assessments were conducted for an indicative set of large scale solar, large scale wind, small scale solar and energy efficiency Sub-projects. The tariffs derived from such financial models confirm the financial viability of the Sub-projects when compared to recent LAC regional examples. Annex 7 provides further details on sensitivity results indicating the robustness of the Sub-projects under different pricing, plant capacity factor and investment costs.

61. **High-level analysis indicates that the IBRD Guarantee is expected to be triggered only when a combination of two downside events happens at the same time – event 1) probability of default rate of all Sub-projects covered under PER Account is 100%; and event 2) probability of default of all other financial exposures of FDN's existing businesses is over 36.7%. Considering the historical probability of default of loans for projects in transport, energy and infrastructure PPPs, the joint occurrence of these events may be treated as a remote and unlikely scenario.** These combined events require FDN to exhaust the Liquidity Reserve amount (set under the PER Account) as well as all available liquidity and capital resources, such that FDN is considered in defaulted under Colombian financial regulations. These events are derived based on several conservative assumptions such as: FDN's annual risk weighted assets created from its financial products increases at 10% each year and there is no further capital increase in FDN; 36.7 percent of all other sector products defaulted and 100 percent of the PER Account is defaulted. However, as indicated in Annex 5, regular monitoring of FDN's capital position and performance of Sub-projects supported under the PER Account and other sectors supported by FDN are important to understand potential impact, if any, on FDN's regulatory core capital ratios and in turn their impact on calls of CTF and IBRD resources.

B. TECHNICAL

62. **The IBRD and CTF Guarantees will only support Sub-projects that meet eligibility criteria and have adopted known and proven technologies.** Sub-projects will be implemented in accordance with local laws and internationally accepted technical standards relevant to renewable and energy efficiency.

[37] As defined in the Term Sheet in Annex 6, FDN will be developing a number of credit enhancement and risk mitigation products under the IBRD/CTF Eligible Financial Products; however, for the high-level modelling purposes, a single partial credit guarantee product was assumed.

The premise under the PER is that Colombia has significant clean energy potential, but it is yet to realize this potential and capture the full value and benefits of these resources. A few of the barriers to the development of clean energy in Colombia, notably grid-connected NCRE, are the following:

i. Lack of regulatory mechanism to procure renewables (such as auctions)
ii. Decentralized electricity market structure with bilateral short-term contracts between generation and distribution companies (or *comercializadores*)
iii. Lack of long term offtake arrangement and entry barriers
iv. Competing needs for long term commercial finance

63. **This Project is the first of its kind to develop a long-term offtake arrangement by attracting new entrants to Colombia to create a competitive renewable energy market.** Through an interagency cooperation agreement with MINMINAS, FDN has been undertaking the role of a coordinator for the PER. With the support of this operation, FDN is planning to create adequate products and instruments for the participation of long term investors. However, the development of clean energy Sub-projects depends on many external and market factors such as conducive regulation, availability of transmission networks, auctioning, long term offtake arrangements, etc. The WB's ongoing technical assistance support is helping to address some of the key the building blocks (see Annex 2 and 4). If the above issues are addressed, then Colombia offers significant opportunities for private sector participation in clean energy.

C. Financial Management

64. **A Financial Management Assessment of FDN[38] was carried out in accordance with the World Bank's Investment Project Financing (IPF) policy for the implementation of the Project.** FDN, as the project implementing agency, has generally sound capacity to manage the FM aspects of the Project, including managing of flow of funds, budgeting, accounting and reporting. The entity has sound internal controls and risk procedures, has financial policies and procedures in place, is audited by the Office of the Comptroller General of Colombia and by external auditors, and is supervised by the Financial Superintendence of Colombia as a financial institution. Nevertheless, the assessment identified the following FM issues which represent risks for Project implementation: i) FDN has no previous experience executing or implementing WB-financed projects, and ii) FDN staff lack knowledge about policies and procedures applicable to WB-financed projects. To mitigate these risks, the Operations Manual will specify clear roles, procedures and responsibilities for the Project execution and monitoring, including procedures to assure proper use of funds at FDN and at the Sub-project level. As a result, at entry, the overall FM-assessed risks for the Project are rated as moderate. The rating could be reviewed and updated after the implementation of mitigation measures. Annex 3 has further details on the Financial Management Assessment.

D. Procurement

65. **The World Bank's "Procurement Regulations for Investment Project Financing (IPF) Borrowers"**

[38] *Financiera de Desarrollo Nacional (FDN)* is a national financial institution with mixed capital, linked to the ministry of finance (MINHACIENDA). FDN emerged from Financiera Energética Nacional (FEN), an inactive State-owned enterprise established originally to finance energy infrastructure development. As such, FDN was essentially a start-up financial institution with an entirely new structure, operations, and corporate governance. In 2014, IFC and CAF acquired equity stakes, reducing the government's stake to around 65%, and FDN became a private sector entity no longer governed by the regulations and procedures applicable to state firms. The Government's stake is expected to be 73.37 percent after the current capitalization process is completed.

govern the procurement of goods, works, non-consulting services, and consulting services financed by the Bank (in whole or in part) through IPF operations. As per the Section 2.2.a of the Procurement Regulation, procurement under Bank guarantees are excluded from these Regulations. However, a separate assessment of procurement capacity was conducted for the CTF-PPG that concluded that FDN has adequate procurement capacity.

E. ENVIRONMENT

66. **The Project is classified as FI-2 based on the following criteria:** For the purposes of OP 4.03 on Performance Standards for Private Sector Activities, FDN is considered a private entity. FDN carries out a business purpose, operates on a commercial basis, is financially and managerially autonomous, and its day-to-day management is not controlled by the government. The great majority of Sub-projects are expected to have limited adverse environmental or social risks or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures. Only very few, if any, of the subprojects may have significant adverse environmental or social risks or impacts that are diverse, irreversible, or unprecedented.

67. **Under the proposed structure, FDN will segregate its financial exposures for the IBRD/CTF eligible clean energy sector.** The PER account is aimed at segregating FDN's IBRD/CTF eligible clean energy sector exposure from other sectors. This will allow FDN to offer targeted financial products and better management of risks. In this respect, all Sub-projects supported under the PER account will be subject to the social and environmental provisions described in the disclosed ESMS.

68. **It is important to note that IFC is an equity investor in FDN.** With the support of the IFC, FDN developed an ESMS and capacity to review all Sub-projects in its portfolio as per applicable environmental and social laws and regulations and the IFC's Performance Standards.[39] It should be noted that IFC classified FDN as a FI-1, for the following reasons: i) as an equity investor IFC has exposure to the entire portfolio, which may include large infrastructure projects across different sectors, many of which are category A projects, including large highways infrastructure (the 4G program), and ii) at that time, IFC identified risks related to FDN's capacity to identify and manage the impacts of its portfolio.

69. **As an FI operation, only Performance Standards (PSs) 1 and 2 are applicable to the operation (see table below).** In this type of Project, the Bank reviews the existing portfolio and/or proposed business activities of the FI to identify risks, and assesses whether the Environmental and Social Management System (ESMS) for the Bank-supported activity is appropriate and is being followed for managing those risks. However, the application of the ESMS must ensure that Sub-projects supported under the operation comply with all applicable Performance Standards (PS1 to PS8).

Application of Performance Standards			
Performance Standards	**Yes**	**No**	**TBD**
PS 1: Assessment and Management of E&S Risks and Impacts	X		
PS 2: Labor and Working Conditions	X		
PS 3: Resource Efficiency and Pollution Prevention		X	
PS 4: Community Health, Safety, and Security		X	
PS 5: Land Acquisition and Involuntary Resettlement		X	

[39] For more information, see: https://disclosures.ifc.org/#/projectDetail/SII/33862.

PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources		X	
PS 7: Indigenous Peoples		X	
PS 8: Cultural Heritage		X	
OP 7.50 International Waterways		X	
OP 7.60 Projects in Disputed Areas		X	

70. **IBRD and CTF will backstop IBRD/CTF Eligible Financial Products issued by FDN to Eligible Sub-projects which FDN will screen and assess for potential social and environmental impacts, as well as potential gender issues.** However, considering the types of Eligible Sub-projects, these are expected to have well-known, moderate, site-specific and largely reversible impacts related to construction (dust; noise, air, land and water pollution; access; potential of tree cutting, among others) and operation (potential adverse impacts on landscapes, local fauna, avifauna, and endemic plants and trees).

71. **FDN's ESMS is commensurate with the level of social and environmental risks in its portfolio, and prospective business activities, including energy efficiency and renewable energy Sub-projects.** The ESMS has appropriate procedures for conducting environmental and social due diligences (ESDD), with the help of qualified professionals, to identify the applicable environmental risks of each Sub-project and to require corrective actions as needed to ensure that these risks are managed according to the Performance Standards and applicable laws. The ESMS also envisages clear procedures and resources for monitoring environmental and social performance of Sub-projects, including gender aspects. The ESMS describes FDN's organizational capacity, responsibilities, and accountability within the organization for implementing the system. Among its responsibilities, the Environmental and Social Department (ESD) provides periodic progress reports to FDN's senior management.

72. **The ESMS also determines that, before completing the final report on the due diligence procedure, FDN will share with the World Bank the summary report of the environmental and social assessment for any Sub-project considered a high risk (Category A/1), in accordance to FDN's "Guidance Note: Exclusion List and Project Categorization".** Within 10 (ten) business days and on an Absence of Objection basis, the Bank will review the summary in accordance with all applicable Performance Standards and, if needed, will request clarifications and/or recommend additional studies to complement the due diligence process. FDN will coordinate with the Sub-project developer to carry out additional studies, as applicable, and incorporate the Bank's comments in the summary. After incorporating the Bank's comments, FDN will send the revised summary for the Bank's final approval on an Absence of Objection basis. If the Bank does not provide any comment or express an objection within 5 (five) business days, FDN will consider the summary approved and will disclose it on its webpage. FDN will also refer to the developer's webpage for further information. In addition, for Sub-projects supported by international finance institutions, the ESMS requires FDN to follow the reporting and access to information policies of those institutions. Consequently, on an annual basis, FDN will submit an environmental and social performance report that summarizes the status of implementation of the ESMS to the WB.

73. **During Project preparation, the WB has provided advice to FDN in a manner consistent with the principles of the relevant Performance Standards.** Under complementary technical assistance, the Bank has supported FDN to strengthen its ESMS, by refining relevant documents to add more guidance on the implementation of performance standards at the Sub-project level, and will provide further support to integrate gender considerations as needed. Considering the potential cumulative impacts of multiple wind power Sub-projects, the Bank recommended FDN to conduct a cumulative impact assessment for wind power investments in La Guajira.

74. **Additionally, the Bank found that FDN's experience in implementing the Performance Standards covers mainly road infrastructure subprojects**. Considering the new portfolio of energy efficiency and renewable energy Sub-projects, the Bank agreed with FDN to review the due diligence process for the first of each type of Eligible Sub-project. The Bank will provide comments to the draft due diligence report within 15 (fifteen) business days—on an Absence of Objection basis—requesting clarifications and/or recommending additional studies to complement the due diligence process. After incorporating the Bank's comments, FDN will send the revised due diligence report for the Bank's final approval on an Absence of Objection basis. If the Bank does not provide any comment or objection within 5 (five) business days, FDN will complete the due diligence process. Additionally, as part of the staff training program, FDN will conduct two trainings on the use of performance standards in wind and solar Sub-projects. The Bank will support FDN in planning and conducting these learning activities.

F. SOCIAL

75. **Eligible Sub-projects are expected to have well-known, moderate, site-specific and largely reversible social impacts.** Only a limited number of large-scale wind or solar energy Sub-projects may have significant potential social impacts and risks. Utility-scale photovoltaic power plants could require significant and long-term land acquisition and conversion, which can result in physical and/or economic displacement. Indigenous peoples are closely tied to land and natural resources and can suffer disproportionately from land takes for development projects or degradation of natural resources. Additionally, the sound and visual impact of wind facilities can be a concern if neighboring communities are located nearby the project facility, and they could generate opposition to the Project. Both kinds of projects (utility-scale photovoltaic plants and wind farms) often require the establishment of worker accommodation camps involving an influx of outsiders into local communities. Labor influx can be very disruptive for indigenous communities and pose significant risks, particularly for indigenous women.

76. **Gender-sensitive approaches will be adopted as needed across project activities.** A gender analysis identified that women's participation in technical training and labor force in the energy sector in Colombia is lower than men's. Women's participation -especially indigenous women- in decision making positions is also limited, particularly in the context of project development. FDN's ESMS includes due diligence actions that ensure that both men's and women's perspectives, priorities, needs and opportunities are adequately taken into account in the design and implementation of subprojects. To foster women's voice and agency, the ESMS will require gender-balanced consultations, ensuring that both men and women—including women's association and indigenous women—are invited and enabled to participate (e.g. meetings scheduled at a convenient time and location, with separate meetings if needed), as well as gender-inclusive negotiations and decision-making processes. Adequate monitoring of gender-inclusiveness will be carried out (e.g. participant lists with name and gender will be available, and minutes of meetings with records of women's comments and corresponding responses). To promote equal access to assets, in case Sub-projects require land acquisition resulting into a compensation procedure, women and men will be equally involved. For example, any cash compensation will be disbursed into spouses' joint accounts, and any compensation in kind (e.g. community infrastructure and services) will ensure that both men's and women's priorities and needs are adequately assessed and

addressed.[40] In case worker accommodation camps are established in the communities, adequate gender-sensitive procedures will apply to ensure safety and prevent gender-based violence (GBV) (e.g. working with contractors on codes of conduct and GBV prevention in the community).[41] To promote women's access to technical education, any proposed training activities will ensure that both men and women are equally invited and enabled to participate. Again, adequate monitoring of gender-inclusiveness will be carried out (e.g. invitations and participant lists with name and gender will be available). Gender considerations may also be included as qualification or eligibility criteria for ESCOs (e.g. entities with gender policies in place will be given priority). Finally, the WB will provide gender training to the relevant stakeholders (e.g. FDN), to ensure adequate integration of gender aspects into project activities.

77. **FDN's ESMS is commensurate with the level of social risks in its portfolio.** As part of its due diligence, FDN will verify that the projects it finances, when applicable, comply with all relevant provisions on Prior Consultation in Law 21 of 1991 and the Colombian Constitution. In addition, FDN will review the outcomes of the consultation process and the agreements reached with indigenous communities, and will ensure that such agreements are consistent with the requirements of PS5 and PS7, where applicable. FDN's due diligence will also evaluate occupational health and safety of labor issues, including gender considerations. Additionally, FDN will verify that the compensation provided for the loss of assets or restrictions on land use (including those created by rights of way for transmission lines or easements) are gender-sensitive and consistent with the requirement of PS5. In cases where the Project poses a risk to known cultural heritage, FDN will require that the Sub-project sponsor develops a plan to avoid any adverse impacts to cultural heritage. In Sub-projects that involve excavations and soil movement, FDN will review the Sub-project chance find procedures and will ensure that management plans to protect cultural heritage meet the requirements of PS8. Also, following the Bank's recommendation, FDN will hire a social development specialist (with experience in gender issues) in its Environmental and Social Department. FDN can hire the social development specialist either as a permanent employee of the ESD or from a roster of qualified consultants, on a case by case basis depending on the type, area and other relevant characteristics of the proposed Sub-project. In all cases, from the screening stage and prior to categorization, the ESD will count with a social development specialist to assess social impacts and risks of the Sub-projects under the PER account.

78. **The Bank also assessed FDN's human resources policy in accordance with PS2.** The policy is consistent with the requirements of national legislation and a recent review indicates that it is accessible to FDN's employees and easy to understand. This review also concluded that FDN has adequate policies and procedures to manage and monitor labor conditions among direct employees and contractors, and that it has a functioning grievance redress mechanism for employees, contractors, and the general public. The review concluded that FDN meets all relevant requirements of PS2.

G. OTHER SAFEGUARDS POLICIES TRIGGERED

None.

[40] Women tend to have less access to land ownership or experience legal and practical barriers to land registration and titling. Thus, they often face greater risks during resettlement and compensation procedures, which also tend to ignore their important role in traditional agriculture.

[41] Influx of male migrant workers during construction of infrastructure projects, increases in some cases the risk of gender-based violence for women and girls in the community.

H. World Bank Grievance Redress

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

Annex 1: Results Framework and Monitoring

COLOMBIA: Clean Energy Development Project

PDO Statement The project development objective is to assist Colombia in increasing electricity generation capacity from non-conventional renewable energy sources and energy savings in the industrial sector, through mobilization of private investment.							
These results are at:	**Project Level**						
Project Development Objective Indicators							
		Accumulated Target Values					
Indicator Name	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**End Target**
Non-Conventional Renewable Energy Generation Capacity (MW) (Core) (1)	**0**	20	50	300	500	716	716
Increased energy efficiency (energy savings) (GWh/year) (Core)	**0**	227	454	681	908	1,135	3,405 (2)
Private capital mobilized (million US$) – (Number) – (Core)	**0**	21	53	300	531	761	761
Intermediate Results Indicators							
		Annual Target Values					
Indicator Name	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**End Target**
GHG emissions avoided (million tCO_2eq) – (Number) – (Custom)	**0**	0.04	0.11	0.30	0.52	0.74	**17.3** (3)

Note 1. Includes large scale and small-scale grid connected NCRE, as well as NCRE behind the meter in distributed generation schemes.

Note 2. Assumes a 15-year period.

Note 3. Assumes 25 years for large scale solar and wind subprojects, 20 years for distributed generation and 15 for energy efficiency.

Indicator Description

Project Development Objective Indicators				
Indicator Name	**Description (indicator definition)**	**Frequency**	**Data Source / Methodology**	**Responsibility for Data Collection**
NCRE Generation Capacity	This custom indicator measures total installed capacity (including hydropower and other renewable energy) constructed under the Project. The baseline value is expected to be zero.	Biannual	Project owner/developer	MINMINAS /UPME, FDN
Private capital mobilized	This core indicator tracks the amount of direct financing (in the form of equity and/or debt) mobilized by private entities—and using private funding—to finance investments within an IBRD operation or investments directly linked to that operation. For the Project the private capital mobilized has been calculated by estimating the private equity and the commercial borrowing mobilized under the PER.	Biannual	Project owner/developer	MINMINAS /UPME, FDN
Energy savings	Projected energy or fuel savings, with underlying indicators on projected lifetime energy savings; projected lifetime fuel savings; projected electricity generation savings.	Biannual	Project owner/developer	MINMINAS, UPME/FDN/ESCOs

Intermediate Results Indicators				
Indicator Name	**Description (indicator definition)**	**Frequency**	**Data Source / Methodology**	**Responsibility for Data Collection**
GHG emissions avoided (tCO_2)	This indicator measures the tons of carbon dioxide equivalent that have been avoided as a result of the Project. The baseline value is expected to be zero.	Annual	XM, UPME	MINMINAS /UPME, FDN

Annex 2: Detailed Sector Background and Project Description

COLOMBIA: Clean Energy Development Project

This Annex is organized in three parts:

2.1 Overarching National Energy Policy and Strategy
2.2 Energy Sector Background
2.3 Detailed Project Description

2.1 Overarching National Energy Policy and Strategy

80. **The overarching policy framework of the energy sector in Colombia is articulated in both the National Development Plan (NDP) 2014-2018 and the National Energy Plan of 2015.** These two policy instruments establish a clear direction in the three areas of sustainable energy as well as in resilient growth vis-à-vis climate variability. The NDP supports various objectives under its "Green Growth Strategic Line" that relate to the electricity sector (Objective 1), progress towards a sustainable and low carbon future (Objective 2), and the protection and sustainable use of natural capital with improvement in the quality of environmental governance, and (Objective 3), achieve a resilient growth and reduce vulnerability to climate change and disaster risk. Under these three objectives, the ROC outlines specific directions for promoting renewable energy and energy efficiency and creating a more resilient electricity sector, with an emphasis on modernizing the planning function.

81. **The National Energy Plan 2015 (PEN 2015) further details the strategic directions for the intended development of the energy industry and its subsectors.** The table below summarizes the key objectives of the PEN 2015.

Table 2.1. National Energy Plan 2015: Objectives and Specific Actions	
Specific Objectives for the energy sector	1. Reliable supply and diversification of the energy basket
	2. Efficient energy demand
	3. Universal and affordable energy access
	4. Promote investment in international interconnections and infrastructure for the commercialization of strategic resources
	5. Maintain revenue and promote a viable productive transformation and value propositions
Cross-sectoral objectives	6. Link information to decision making and create knowledge, innovation and human capital for the development of the energy sector
	7. Consolidate the institutionalism of the sector and enhance public sector efficiency and regulation

82. **Colombia submitted an Intended Nationally Determined Contribution (INDC) during COP 21 (ratified on April 22, 2016 as NDC) to underscore its climate mitigation and adaptation priorities, which are expected to collectively cost an estimated annual amount of US$ 1.06 billion or 0.15 percent of GDP**

per year. A major innovation in the run-up to the Paris Agreement was the establishment of a voluntary process whereby countries indicated their intended contribution towards global efforts to reduce the amount of greenhouse gases (GHG) entering the atmosphere. In its NDC, Colombia committed to reducing 20 percent of its carbon emissions by 2030 when compared to a projected business as usual scenario.[42] The sectors targeted for mitigation purposes are: energy, transport, agriculture, land use/land use change and forestry (LULUCF), and industry. Colombia has laid out specific mitigation actions in its Strategy for Low Carbon Development (*Estrategia Colombiana de Desarrollo de Bajo Carbono*, ECDBC), which includes actions to promote energy efficiency and renewable energy.

83. **On the adaptation front, the country's NDC commits to the implementation of measures in sectors with high exposure and vulnerability to climate change, including energy, transport, water, agriculture, health, social development, environment, education and tourism.** Colombia has emphasized the importance of prioritizing adaptation and resilience measures in the energy sectors in the NDC, the NDP, and the National Plan for Adaptation to Climate Change (*Plan Nacional de Adaptación al Cambio Climático*, PNACC). The PNACC, in particular, establishes the inclusion of climate change considerations into the energy sector planning process as a key priority.

2.2 Energy Sector Background

Energy Balance and Resources

84. **The Colombian economy relies predominantly on fossil fuels, with hydropower playing an important role in electricity generation, and non-conventional renewables largely unexploited.** Total primary energy supply (TPES) reached 34 Million Tones Oil Equivalent (Mtoe) in 2015, of which 77 percent was fossil fuel based. The supply was mainly in oil (39 percent of the total), natural gas (26 percent) and coal (12 percent). Hydropower also played an important in 2015 in overall TPES (11.41 percent); the remaining generation involved sugarcane, wood and non-conventional renewables.

85. **In terms of Total Final Energy Consumption (TFEC), Colombia primarily relies (about 71 percent) on fossil fuels** (47.4 percent from oil and LPG, 16.8 percent from natural gas, and 6.6 percent from coal). Renewable energy resources include bioenergy (12.4 percent), hydropower (15.1 percent) and wind and solar (0.02 percent). The industrial, residential, and transport sectors consume 28, 19, and 40 percent of TFEC, respectively. The electricity sector, on the other hand, relies mainly on hydropower (65 percent of total production in 2015), gas (19.3 percent), coal (11.9 percent), bioenergy (3.2 percent) and oil (0.6 percent). Wind and solar have made only a minor contribution to electricity generation (with only 0.08 percent in 2015).

86. **The country has maintained a large degree of energy independence**. The trilemma index of the World Energy Council ranks Colombia as one of the countries with the highest overall energy security at the global and regional levels (11th and 3rd place, respectively).[43] Coal plays a minor role in the domestic

[42] This target could increase to 30% subject to the availability of international financial support. Colombia only contributes to 0.37% to global carbon emissions, however the amount of carbon emissions per unit of GDP is above the global average.

[43] The World Energy Council (WEC) "trilemma index" includes three dimensions: energy security, environmental sustainability and energy equity. The dimension of "energy security" is scored with six indicators: Ratio of total

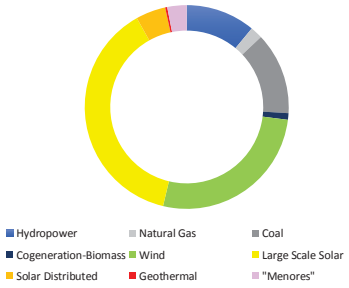
consumption basket given that a high percent of total production is exported (93 percent in 2015). The country also exported about 3 percent of its natural gas production in 2015, decreasing from 14 percent in 2014, due to production constraints. Colombia is a net exporter of electricity, mainly to Venezuela and Ecuador. Colombia does import about 40 percent of its diesel oil and gasoline demand due to its limited refining capacity, but overall it has a limited energy dependency.

87. **Colombia is endowed with abundant and diverse energy resources**. In recent years, Colombia has increased its importance as an energy producer in the Western Hemisphere. The country is currently the third-largest oil producer of the LAC region and the seventh-largest crude exporter to the United States (EIA, 2015). Colombia is also the largest coal producer in the region and has one of the highest total recoverable coal reserves at the global level. About 67 percent of the coal production is exported to Europe.

88. **Both hydro and non-hydro renewable energy resources in Colombia are significant.** The International Renewable Energy Agency estimates that Colombia has a "high" resource potential to develop wind, solar, hydro and geothermal generation (IRENA, 2012). Recent assessments suggest that Colombia has a wind resource with the potential to develop 30 GW of installed capacity, geothermal resources to develop 1-2 GW, as well as regions with very high solar irradiation such as La Guajira and Costa Atlántica (UPME, 2015). The world atlas of the International Journal of Hydropower and Dams places Colombia's (economically feasible) hydropower potential at 140 TWh per year (which is significant considering the current system's average annual generation i of about 45 GWh). In addition, renewable resources in Colombia present a high degree of seasonal complementarity which enables the country to produce energy more reliably and at a lower cost (Figures 2.2 a-d).

89. **UPME has estimated a high potential for the expansion of the electricity sector with NCRE**. The total capacity of candidate projects considered for the 2017-2031 expansion is shown in Figure 2.1 below. Just wind and solar based projects represent 69 percent of the total; of course, deployment of NCRE (from the technical perspective) depends on the overall operational balance, restrictions and capacity of the system to integrate NCRE variability.

Figure 2.1 Total Capacity of Candidate Projects for Generation Expansion Estimated by UPME.

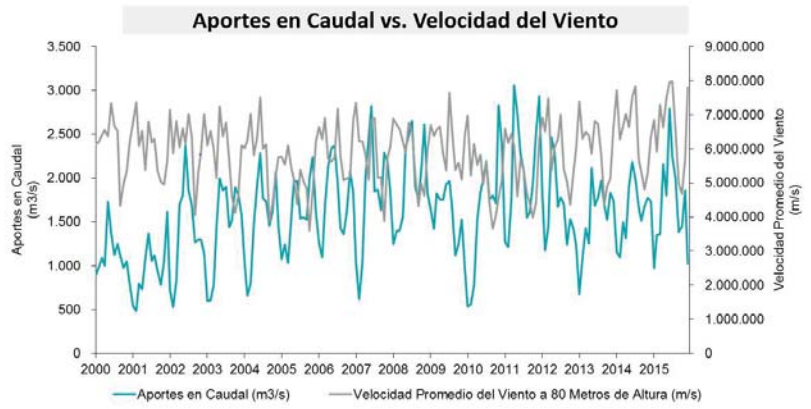


Source: UPME (2017).

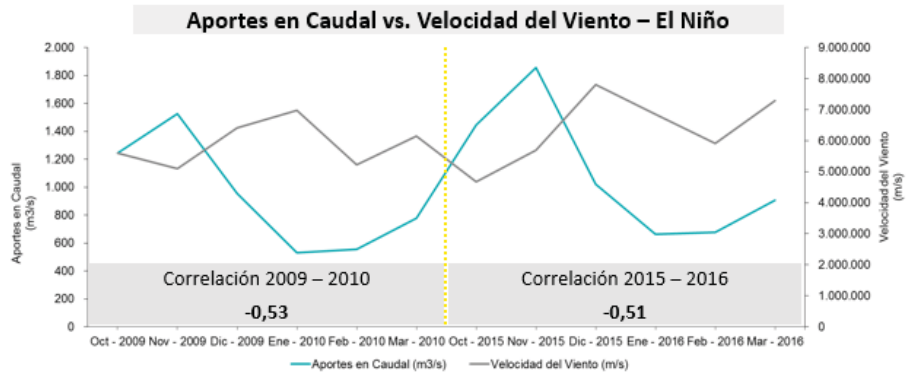
energy production to consumption; ii) Diversity of electricity generation; iii) Distribution losses as a percentage of generation; iv) Five-year CAGR of the ratio of TPEC to GDP; v) Days of oil and oil product stocks, and vi) Net fuel imports as a percentage of GDP (for importers) or fuel exports as a percentage of GDP (for exporters).

Figure 2.2. Seasonal Complementarity of Wind and Hydro Resources in Colombia

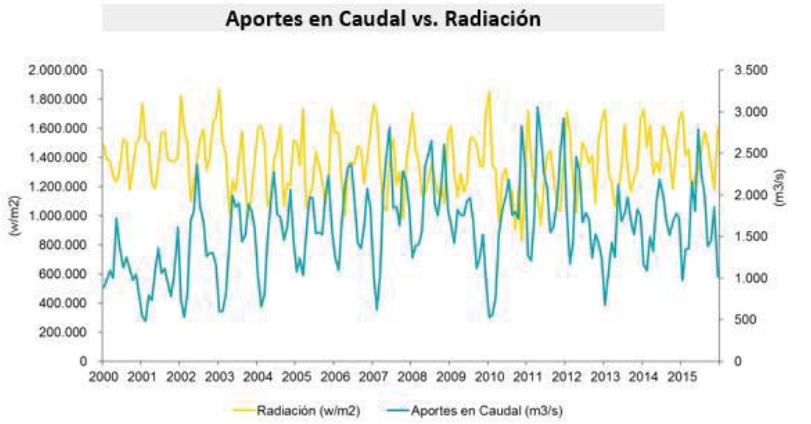
(a) Complementarity between hydro and wind resources



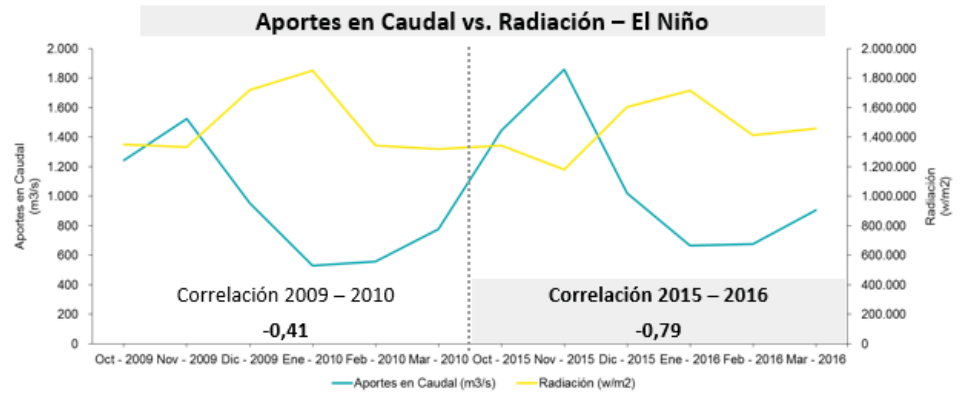
(b) Complementarity between hydro and wind resources during ENSO



(c) Complementarities between hydro and solar resources



(d) Complementarities between hydro and solar resources during ENSO



Source: Ernst & Young (April 2017); Alternatives for the Integration of NCRE in the Colombian Power Sector, commissioned by the Renewable Energy Association (SER).

Vulnerability to Weather and Climatic Shocks

90. **In the period November 2015-March 2016, Colombia endured a prolonged and intense drought, which lowered hydro reservoir water volumes to minimum levels, threatening the stability of the market and increasing the risk of rationing.** The length of the episode tested the effectiveness of the regulatory framework (specifically the reliability payment) and the ability of reserve generators to deliver the "firm capacity" they had committed to maintain. In March 2016, the aggregated hydro reservoir reached a record low of 30 percent.[44] As a result, the spot price exhibited spikes of 370 US$/MWh (November 2015) and 270 US$/MWh (March 2016), while the scarcity price remained at 100 US$/MWh (lower than the variable cost of most thermal plants).

Figure 2.3a Hydro Reservoir Reserve (%) [Capacidad Útil - Volumen Útil Diario]

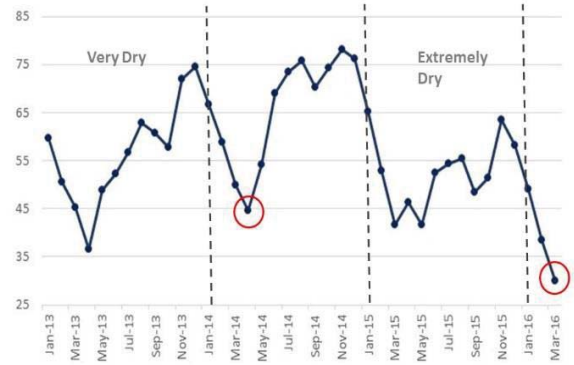
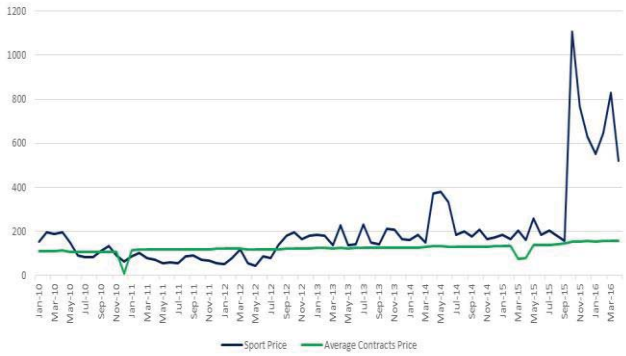


Figure 2.3b Spot Price and Average Contracts Price (2010-2016) (CP$/KWh)



Source: Prepared by authors with Sistema de Información Eléctrico Colombiano (SIEL-UPME) Data.

91. **Colombia was able to "keep the lights on" during the last ENSO event, but at a significant cost, resulting in financial imbalances for many players.** The costs to mitigate the impact of low hydrology between November 2015 and March 2016, reached US$ 7 billion (mainly in capacity payments, known as *cargo por confiabilidad*). Payments to generators during the crisis, at scarcity price, were not sufficient to cover their variable costs, resulting in a financial imbalance for most of them.[45] Contract sanctity was preserved and no bail-outs were necessary; however, it was clear that a longer drought would have resulted in an acute rationing period, raising issues regarding the sustainability of the system under more severe climate conditions. This episode emphasized the importance of diversifying the power sector matrix and tapping into the country's abundant renewable energy and demand side resources.

[44] Colombia endures ENSO events periodically, which vary by intensity and duration. The system however needs to plan reserves and introduce demand side measures to be able to absorb intense shocks and avoid rationing costs, which are extremely high.

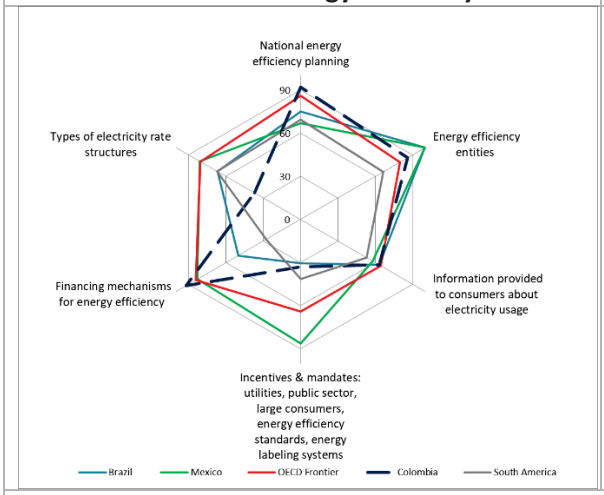
[45] Spot prices reflect the short term marginal cost of electricity generation (including cost of natural gas) while the scarcity price is an administratively set price indexed to fuel oil price. The scarcity price serves as the basis for the payment of firm capacity services, and it also acts as a striking price for the firm energy obligations acquired by eligible generators (if the generator does not deliver the firm energy commitment when needed, it has to pay the difference between the spot and strike price to avoid high market prices).

Regulatory Indicators for Sustainable Energy (RISE)

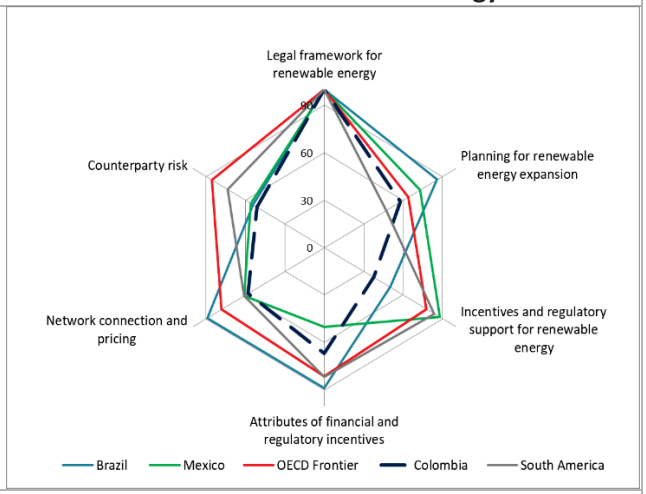
92. **Renewable energy and demand side interventions can play a key role in increasing the overall economic efficiency and resilience of the power sector in Colombia; the RISE index suggests that there are still areas to be strengthened to effectively develop sustainable energy in Colombia**. Colombia is yet to create an enabling environment for the creation of a market and investment in NCRE and energy efficiency. The RISE Index (Regulatory Indicators in Sustainable Energy) provides a good proxy for the measures needed to establish a conducive environment for clean energy development. In the RISE Index for renewable energy, Colombia scores 59 points out of 100 (2016 data), which is low when compared with OECD and regional peers. Similarly, in energy efficiency Colombia scores 51, compared to Mexico and OECD, which score 78 and 83, respectively. Promisingly, Colombia has started more recently to evaluate, design and consult new measures that would allow NCRE to compete in the market, as well as possible schemes to better integrate demand side and distributed generation resources, as described below.

Figure 2.4 Regulatory Indicators for Sustainable Energy (RISE)
Colombia and Comparators (2016 data)

RISE Index: Energy Efficiency



RISE Index: Renewable Energy



1. Countries in South America: Argentina, Chile, and Peru
2. OECD: Australia, Canada, Chile, France, Italy, Republic of Korea, Mexico, Poland, Turkey, and United Kingdom

Large Scale Non-Conventional Renewable Energy (NCRE)

93. **Colombia has a robust legal framework to support the development of NCRE. The ROC has enacted a specific law to promote renewable energy (Law 1715, revised in May 2014),** which explicitly recognizes the contribution of NCRE sources to sustainable economic growth, reduction of greenhouse gas (GHG) emissions, and energy security. Law 1715 mandates the introduction of fiscal and financial incentives in the form of investment and production tax credits, as well as the creation of a fund to support programs, plans, or projects in renewable energy. In September2017, MINMINAS issued Decree 1543 to define the provisions of a Renewable Energy and Energy Efficiency Fund (Fondo de Energías no Convencionales y Gestion Eficiente de la Energia). FENOGE will accept resources from public and private parties, as well as from multilateral or international organizations. Law 1753 (June 2015), which issued

the National Development Plan 2014-2018, established that, starting in January 2016, a portion of the resources collected from the energy sold in the spot market (40 cents per kWh) would be allocated to FENOGE (Law 1819 of 2016 allows the collection of this contribution after the expiration of Law 1753).

94. **In response to strong market signals for the development of renewable energy, key institutions of the electricity market are working towards developing a regulatory framework.** The Energy Regulatory Commission (CREG) issued document CREG-161 (December 2016) for the consultation of four contractual alternatives to procure NCRE which included: i) green premium; ii) Energy Purchase Agreement (*contrato de Energia media*); iii) "Pay as Contracted" (*pague lo contratado*), and iv) "Pay as Generated" (*pague lo generado*).[46] The National Planning Department (DNP) launched a series of assessments to review options to modernize the electricity market. And the Energy Planning Unit (UPME)—after obtaining the necessary guarantees from prospective wind energy developers—completed a bidding process in February 2018, for the construction of a 500 KV transmission line to connect La Guajira (where the potential for wind generation is high) with the national transmission network.[47]

95. **A fundamental barrier to NCRE development is the lack of a market for long-term contracts, which translates into high off-take, credit and financing risks.** Colombia does not have an open and competitive long-term power purchase contractual arrangement in the energy sector. The existing contractual arrangements are primarily bilateral in nature (between generators and retailers), following the open market regulation to freely agree between market participants on the quantities, prices and conditions of purchase and sale. These conditions could create a selection bias among generators and retailers without an open and transparent process. A lack of an open and competitive long-term market creates important barriers to the development of NCRE resources. These barriers include not only the non-availability of a long term contractual market (such as Power Purchase Agreements) but also counterparty creditworthiness risks related to the off-takers. Without a long-term contractual arrangement and credit worthy off-taker, the availability of long term financing will also be limited. Because NCRE markets primarily rely on the stability of long-term power purchase contracts and credit worthy off-takers, the current market barriers may severely constrain the growth of NCRE in Colombia.

96. **In March 2018, MINMINAS and the President of Colombia approved Decree 570 that sets the basis for the introduction of long-term contracting of electricity which is extremely relevant to the development of NCRE.** Decree 570 establishes the policy guidelines to define and implement a mechanism to promote long-term electricity generation contracts. The main objectives of the mechanism are: "to boost the resilience of power generation, promote competition and increase price efficiency in the sector, mitigate the effects of climate change and variability, promote sustainable economic development, and reduce greenhouse gas emissions (GHG)." The Decree also outlined the main attributes of the mechanism, and studies are underway to establish the most effective design. During the International Renewable Energy Congress in Barranquilla Colombia ("*El Despertar de un Gigante*", April 4-5, 2018), the Minister of Mines and Energy announced that MINMINAS will soon launch an auction for the long term contracting of electricity that considers the specific attributes of NCRE, and emphasized the need to diversify the electricity matrix given the high reliance on hydropower and exposure to ENSO

[46] CREG resolution is pending after a long period of consultation.

[47] In a first stage UPME called potential wind developers to issue financial guarantees to secure a portion of the 500 KV transmission capacity (40% of the value of the transmission capacity necessary to connect their specific generation capacity). UPME received guarantees for 1.4 GW and it already has a pipeline of 4.2 GW of projects ready for the next call (with advanced technical, economic, environmental and social studies, and that have secured most of the required environmental and land permits).

events. On June 8th 2018, MINMINAS issued a draft ministerial resolution with a proposal for the introduction of a mechanism that would allow the long term contracting of electricity (auction mechanism), levelling the playing field for renewable energy participation in the market. The draft resolution will undergo a public consultation until the end of July 2018.

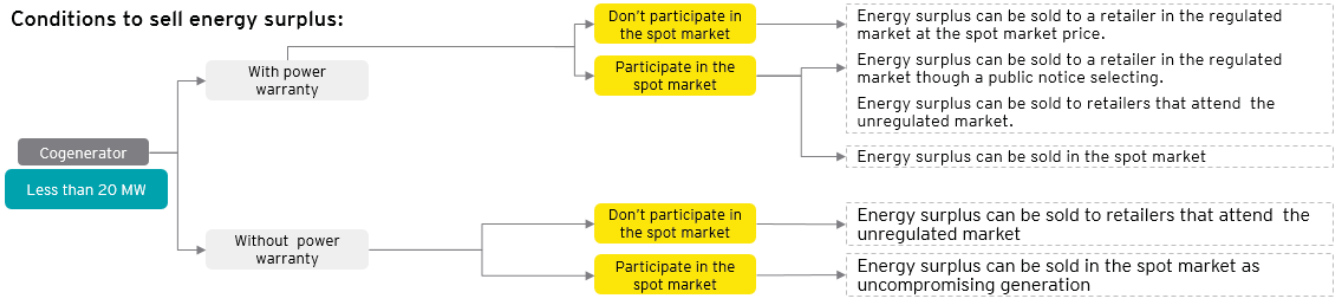
97. **Other institutions are preparing for the introduction of NCRE.** UPME and XM are starting to develop the protocols necessary to integrate variable renewable energy and preparing for the creation of new functions: (i) an entity to administer the auctioned long-term contracts (i.e.; a central off-taker or agency to manage residual off-take risk), (ii) regulations that facilitate access and connection to the grid, and iii) an adjusted grid code to support the optimal dispatching of supply and demand side resources and enhance the complementary value of available flexible resources, among others.

Small Scale Generation (Distributed Generation, Self-Generation, and Co-Generation)

98. **Colombia has issued an initial legal framework for the development of small-scale renewable energy**. Through different laws and decrees, the Government offers tax, customs and accounting incentives, as well as the opportunity to sell electricity surplus to the grid from small-scale projects. All of this is contributing now to the registration and initial development of multiple small-scale renewable energy projects, including in distributed generation (self-generation) and co-generation schemes. A brief description of the main laws and decrees applying to small scale generation is provided below:[48]

- **CREG Resolution 085 of 1996:** Regulate the activities of co-generators connected to the National Interconnected System (SIN) *"A co-generator is a natural or legal person who develops a production process that combines power and thermal energy as an integral part of their productive activity"*
- **CREG Resolution 005 of 2010**: Establishes and regulates the technical conditions which need to be considered by co-generators for the selling of energy surplus (Figure 2.54).

Figure 2.5: Rules for the selling of energy surplus by co-generation



- **Law 1715 of 2014 (Small- scale auto generation):** the national government promotes small-scale and distributed generation through various mechanisms, including: i) the delivery of surplus as measured

[48] This relatively recent legal instruments are linked to both Law 142 of 1994, which establishes the regime of public residential services, and Law 143 of 1994, which establishes the regime for generation, interconnection, transmission, distribution, and commercialization of electricity in Colombia, guarantees the expansion of the system to maintain sufficient reserves, and defines the key elements of a tariff regime.

by a bidirectional system, and ii) remuneration for energy sales by distributed generators as a function of the benefits to the system.

- **CREG Document 097 of 2014:** Regulates the self-generation activity.
- **UPME Resolution 281 of 2015:** Defines the maximum power capacity of small-scale self-generation (1 MW).
- **MME Decree 348 of 2017:** Efficient energy management and delivery of surplus from small-scale self-generation: i) no restrictions on the quantity of surplus sales, ii) self-generation assets can be owned and or operated also by third parties (other than consumers, such as market aggregators), and iii) self-generators with installed capacities below 0.1 MW are exempted from issuing the contract necessary to secure grid availability.
- **CREG Resolution 121 of 2017:** defines the *distributed generator* as a natural or legal person that produces electricity at the level of distribution and close to the consumption centers with an installed capacity below 0.1 MW. The integration of distributed generators and self-generators is expected to be gradual: i) for now, distributed generation capacity must be less or equal than 5 percent of the substation capacity at the connection point, and the amount of energy from these sources cannot exceed 50 percent of the minimum hourly demand. The retailer that represents the small-scale self-generators has to register the self-generator in its commercial and generation frontier. Also, simplification of the connection and measurement mechanisms applies to distributed generation facilities with capacities of up to 5MW.

Energy Efficiency

99. **The Indicative Action Plan for Energy Efficiency (El Plan de Acción Indicativo de Eficiencia Energética PAI-PROURE) establishes four strategic sub-programs of cross-sectorial nature**: i) institutional and financial markets strengthening; ii) capacity building, innovation and technology development; iii) promotion and monitoring of NCRE, and iv) four priority sector programs that focus on the transport, industry, residential and tertiary sectors. The national target for cumulative savings in electric energy consumption (kWh) was set at 14.8 percent by 2015, relative to a 2010 baseline. The PAI includes an analysis of the potential electric and other energy savings and actual targets by sector and by year (residential, industrial, commercial, and transportation sectors). The ROC has also introduced financing mechanisms to support energy efficiency—for example, through a Banco de Comercio Exterior de Colombia (BANCOLDEX) credit line, and another Colombian bank's (Bancolombia) environmental sustainability line.

100. **The ROC is in the process of developing the "Caribbean Sustainable Energy" strategy (El Consejo Nacional de Politica, Economica Y Social, CONPES), which will include a component to enhance energy efficiency in the industrial sector.** This CONPES will promote energy efficiency measures in the industrial sector located in the Northern region (Caribbean Coast). These measures will likely promote the upgrade and/or replacement of old inefficient equipment, including: i) a movement towards the use of steam and waste heat and cogeneration; ii) replacement of inefficient motors and upgrading of furnaces and boilers, and iii) good operational practices. UPME recently carried out detailed energy audits in industrial companies located in the Cartagena Area. Improving energy efficiency in those areas has the additional benefit of contributing to improving reliability in the supply of electricity. Under the CONPES, sixteen industrial companies have been selected for immediate support and financing, including in such areas as agrochemicals, cement, waste management, plastics, packaging, and chemicals, among others.

101. **In March 2016, and pursuant to the 2015-2016 recent ENSO event, the Energy Regulatory Commission (CREG) introduced incentives for energy savings, via Decree 388.** Consumers were granted discounts, which were reflected in the electricity bill when consumption levels dropped below pre-established thresholds. The incentives, in tandem with an effective savings campaign led by the President Santos himself, achieved the desired energy savings – i.e. 5 percent, without the need for the power system to resort to black-outs or brownouts. This market-based mechanism for energy efficiency has been used successfully in other countries, such as Brazil and South Africa. Indeed, demand side management measures have the potential to contribute significantly to strengthening the resilience of the energy sector in times of hydropower scarcity. Given the effectiveness of this type of energy efficiency measures, President Santos recommended, via DNP, that the CTF Clean Energy Development Project include a component for energy efficiency targeting the industrial sector.

102. **In terms of energy efficiency, 16 large industrial companies in the Mamonal region** have already been assessed on a preliminary basis for their energy savings potential. Targeting this region for energy efficiency interventions is particularly important given its high vulnerability to electricity supply constraints (energy shortages). With resources from USAID, UPME has also assessed the potential for energy efficiency activities in industries in various other regions in Colombia with USAID support, and under the coordination of UPME. Upon the establishment of an appropriate financing mechanism to support investment, these projects can be quickly developed.

2.3 Detailed Project Description

Market Scope: Renewable Energy

103. **UPME released a formal Reference Expansion Plan in 2016 (covering the period 2015-2029), and issued a preliminary update in 2018 (for period 2017-2031).** The 2016 expansion exercise provides a baseline or business-as-usual scenario (identified as scenario 5), and two scenarios "with renewables" (scenarios 9 and 10).[49] The 2017 (preliminary) exercise only considers two scenarios (1 and 2), both with renewables, and includes solar generation (both utility scale and in distributed generation schemes). A comparison of scenarios 5 and 9 (2016 Expansion Plan) and scenarios 1 and 2 (2017 preliminary update) is provided in Table 2.2 and Figures 2.6 a-d). The scenario analysis of the 2017 Expansion Plan suggests that in the period 2019-2023 (the five-year Availability Period of the CTF Clean Energy Development Project), the system would introduce between 990 and 1825 MW of NCRE capacity, mainly in wind and solar generation, including both large and small-scale projects (see Figure 2.6 below). Under Scenario 10 (2016 Expansion Plan), the system would add 1,718 MW of NCRE (wind, solar and geothermal) between 2019-2021.

104. **The investment for NCRE scale-up contemplated in the new 2017-2031 electricity generation expansion plan is estimated in US$4.6–6.2 billion.** In the preliminary plan, investment needs in generation capacity are estimated at US$68-73 billion (Table 2.2). Renewables alone, under scenarios 1 and 2 of the preliminary expansion plan would require investments in the order of US$4.6 to 6.2 billion. It is important to note that coal based generation continues to be a firm energy alternative for Colombia; renewable energy deployment would contribute to substantially lowering potential coal-based capacity additions (about 1.5 GW) and displace coal-based generation, notably during dry seasons and intense

[49] Scenario 9 however has been regarded as unrealistic, as it considers the introduction of 3.3 GW of wind-based generation before the year 2021.

droughts. In this sense, the introduction of renewable energy is both a resilience and climate change mitigation strategy.

Table 2.2. Generation Expansion Plan by UPME (Total Capacity, MW)						
	2015-2029 (published in 2015)		Period 2017-2031 (released preliminary as a draft Nov 2017)			
Resource	**Scenario 5** (Conventional Mix, BAU), MW (1)	**Scenario 10 (with RE Block)**	**Baseline 2017** (only existing & under construction capacity, MW)	**Scenario 1** ("without transmission restrictions"), MW	**Scenario 2** ("with transmission restrictions")	**Reference Capital Cost** (US$ Thousand /MW)
Hydro	13,682	14,643	13,363	13,418	13,729	1,250 (UPME)
Natural gas	3,924	3,809	3,816	3,566	3,770	550 (UPME)
Coal	2,991	1,423	1,428	1589	1,989	1,200 (UPME)
Co-generation (Biomass)	77	285	126	280	272	1,800-1,900 (UPME)
"*Menores*"	1,504	1,504.1	789	1,262	1,262	-
Wind		1,624	18	2,876	1,249	1,200-1,300 (LAC region)
Solar (utility scale)		240	0	633	1,086	1,200-1,300 (LAC region)
Solar, Distributed Generation	-	-	0	560	595	
Geothermal		50	0	-	-	4,500 – 6,400 (Lazard)
Other	88.3	88.3	0	89	89	-
Total Capacity (MW)	**22,268**	**23,743**	**19,540 (2)**	**24,272**	**24,040**	
Total Investment Cost	-	-	-	~73 Billion	~68 Billion	
Long Run Marginal Cost (USD/MWh)	64.37	50.22	116.03 (2)	52.23	55.24	

Sources: UPME (2015), UPME (2017), Lazard (2015), UPME (2013)

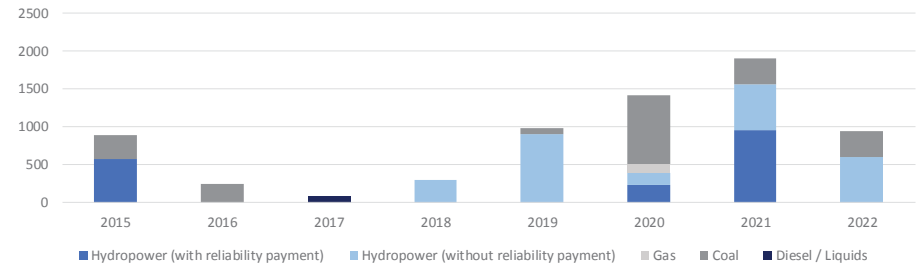
(1): Scenario with conventional mix from the 2015 Expansion Plan is added in this table as a reference (the preliminary 2017 Expansion Plan focuses only on two scenarios in which renewable energy is allowed to compete with fossil fuel based generation).

(2) The baseline considers system's expansion to 2031 with only existing and "under construction" generation capacity, the high Long Run Marginal Cost (LRMC) reflects the need for capacity expansion from January 2026.

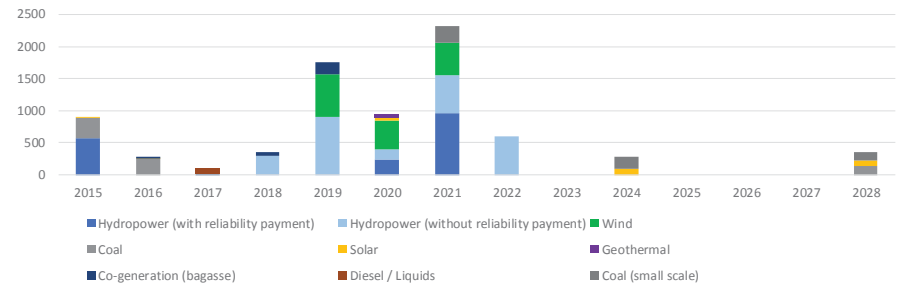
Figure 2.6 (a-d) UPME Expansion Plans, 2015-2029 and 2017-2029 (preliminary)

Expansion Plan 2015-2029

a. Baseline -Business as Usual- (Scenario 5)

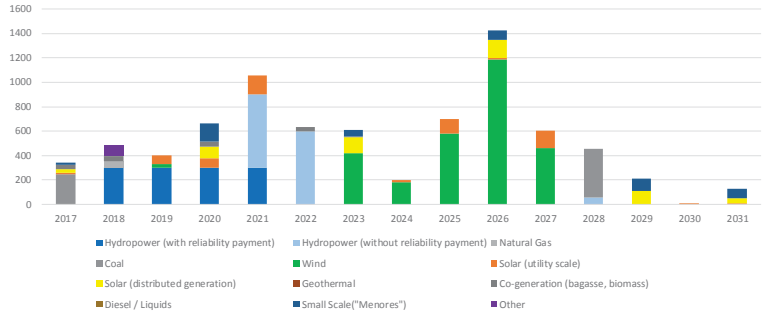


b. Scenario with NCRE (Scenario 10)

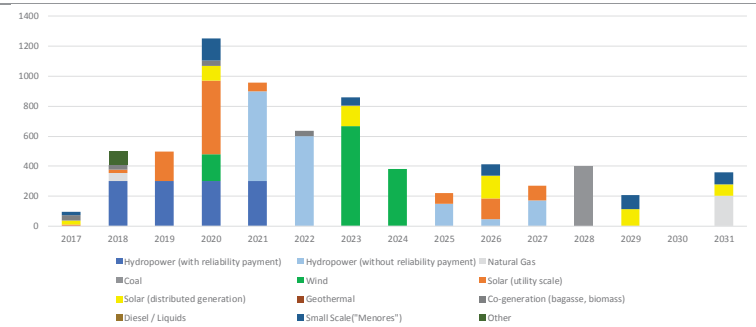


[Preliminary] Expansion Plan 2017-2031

c. Scenario 1



d. Scenario 2



Source: UPME (2015, 2017)

Market for ESCOs and Small Scale Renewable Energy Developers

105. **Colombia's market for small scale sub-projects is quite fragmented between the main large and small utilities generating renewable energy and a few energy services company (ESCOs) that engage in energy efficiency investments.** The WB team engaged an international consultant to assess the market size and identify sponsors and developers working on small scale Sub-projects. The initial assessment found that the market size is not fully transparent and is currently small, but has significant potential. The consultant will continue to develop financing and implementation models for executing small scale projects, including potentially with a design for a pilot aggregation model.

106. **With regards to solar projects in distributed generation schemes, the 2017 Expansion Plan exercise conducted by UPME found a potential in the range of 560-595 MW** (scenarios 1 and 2, see Table 2.2 and Figures 2.6 a-d). The same analysis found a potential expansion in co-generation with biomass of 272-280 MW for the period 2017-2031.

Need for Aggregation in the Market of small scale Renewable Energy and Energy Efficiency

107. **As for identified projects in the small-scale renewable energy and energy efficiency market, UPME has registered over 400 small-scale renewable energy projects, of which the majority are solar projects.** In total, these projects represent a potential of 2,381MW of potential capacity. However, many of these projects are in the early stages of development. Based on UPME's registry, approximately 133 projects, representing 800MW, have advanced to pre-feasibility or feasibility stages of preparation.

108. **The market for small-scale renewable energy and energy efficiency projects faces several barriers in Colombia, including:** i) lack of familiarity of the financing markets with renewable energy (notably small scale), ii) smaller size of individual investments prevent access to capital on a project finance basis, and iii) perceived lack of creditworthiness of individual off-takers and smaller period of offtake. The financing market participants (including banks and other financial institutions) are not trained and/or familiar with risk assessments of small scale generation and energy efficiency initiatives. In the international market, especially in developed countries, these technologies are mature and "green banks", commercial lenders, private equity, and even institutional investors are now active in this market.

109. **The small size of the individual projects presents an issue that deters commercial banks and other financiers.** The relatively high transaction cost required for small scale projects acts as a barrier for commercial banks. In addition, the sponsors and developers in Colombia are relatively new and have not yet developed a track record of performance, which is typically required by commercial lenders to demonstrate bankability. For small-scale projects, the developers are often small to medium-sized business that do not have the financial capacity to undertake these investments on their balance sheet. Similarly, off-takers do not have appetite to enter long term PPAs. Therefore, the current market for small-scale investments is mainly focused on projects introduced by large companies with substantial balance sheets. Project developers in Colombia are willing to make these investments on a non-recourse basis and sign PPA-type agreements with commercial and industrial business, but have limited access to capital.

110. **FDN will explore two main functions to catalyze the market for small scale renewable energy generation and energy efficiency initiatives.** The first is to review the potential for an aggregation vehicle to reduce transaction costs and attract capital from commercial banks and other investors. The consultant, engaged with the support of the GIF, is currently exploring the feasibility of aggregation

vehicle for small scale projects. If an aggregation vehicle approach is found to be feasible, the financing scale required by aggregation vehicles would make it more attractive for commercial banks to assess and finance projects. The aggregation vehicle will also offer diversification into a portfolio of Sub-projects, thereby reducing risks and financial exposure to individual generators and off-takers. In addition, the second function of such a vehicle is to design and develop new credit enhancement and risk mitigation products (IBRD/CTF Eligible Financial Products) to attract commercial financing.

Project Description

111. **FDN, as financial intermediary, will be undertaking a 'market enabler' role for the clean energy sector.** FDN's shareholders include Government of Colombia (73.37%), International Finance Corporation (8.89%), Sumitomo Mitsui Banking Corporation (8.89%) and Development Bank of Latin America, CAF (8.65%). [50]. FDN's mandate is to catalyze investment in Colombian infrastructure, address market failures and attract long term local and foreign currency lending to infrastructure projects. The financial strength of FDN and an analysis of its asset base and capital position are presented in Annex 7. For the clean energy sector, it is expected to coordinate with relevant institutional stakeholders and market participants on activities necessary for the development and implementation of the PER. Due to existing market and regulatory barriers—mainly the lack of experience with the provision of price or quantity setting mechanisms, and with long-term offtake arrangements—the clean energy market is expected to require credit enhancement and risk mitigation from a creditworthy counterpart, such as FDN. FDN's main role will be to develop and offer innovative financial products to de-risk projects and attract long-term investors. For the PER program, FDN will design and offer IBRD/CTF Eligible Financial Products.

112. **The IBRD/CTF Eligible Financial Products offered by FDN should be sustainable and effective in attracting competitive investments and affordable tariffs**. The financial products will help mitigate policy, regulatory and offtake risks to improve bankability and investment recovery. The rationale for FDN to provide IBRD/CTF Eligible Financial Products includes the following:

- The untested market for non-conventional renewables in Colombia is likely to cause first mover investors and lenders to require mitigation of risks.
- The untested regulatory framework and lack of long term PPAs for renewables in Colombia poses uncertainty with regard to the long-term tariffs that long term investors normally require.
- A lack of certainty about the timely availability of transmission infrastructure to evacuate and distribute power from renewable generation plants.
- Other infrastructure programs such as the ongoing 4G road program that has government support still requires FDN credit enhancements to attract long term private financing.

Maximizing Finance for Development (MFD)

113. **The Project applies the MFD approach of the World Bank by leveraging the private sector and optimizing the use of scarce public and concessional resources for clean energy development**. The capacity of public sector institutions (UPME, XM, FDN, CREG) in planning, preparing and structuring clean energy Sub-projects and attracting and negotiating with the private sector is still evolving in Colombia. In other sectors such as in transport (the 4G roads program), Colombia has built a good track record of long term financing. This track record was materialized with the strengthening of the capacity of various

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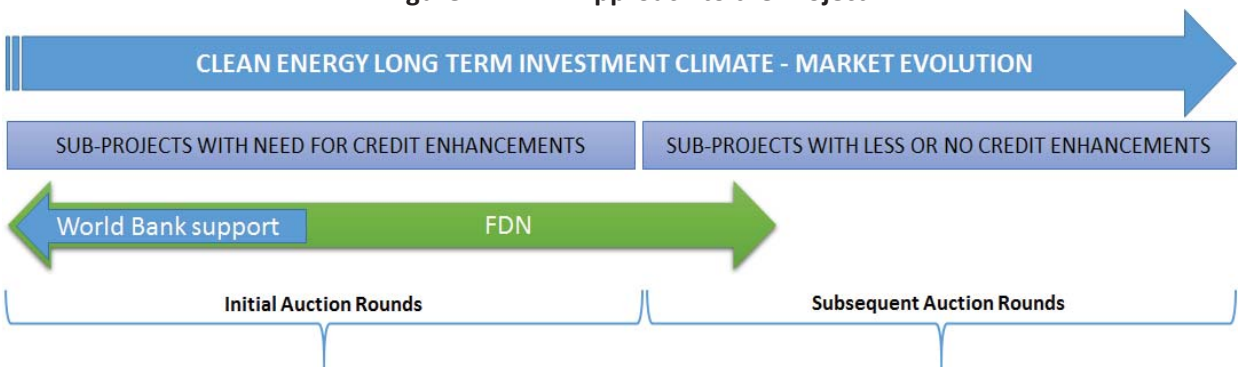
institutions to prepare, structure and procure projects. The experience of the 4G program, combined with the proposed auction mechanism currently being designed by MINMINAS with support from the DNP, UPME, and CREG on the policy, and regulatory front, XM and UPME on the operational front, and FDN on the financing front (in part supported by technical inputs and advice from the World Bank), will address the creation of a solid enabling environment for private solutions in clean energy.

Project Selection, Delivery Method, Financing Instrument and Source – Role of Multilaterals

114. **Table 2 (under Section C in the body of the PAD) and economic and financial analyses (Annex 7) indicate the level of potential investment required from the clean energy market, stressing the need for long term financing solutions.** However, considering the untested market conditions, private sector solutions alone cannot address the investment needs until the sector risks are appropriately mitigated and sufficient investor confidence is established. Thus, the role of a domestic development institution such as FDN, and of multilaterals such as IBRD, becomes important in helping to create enabling conditions, mitigate investment risks and develop implementation and financing models for the development of a nascent clean energy market. However, at the Sub-project level, various financial products and instruments such as lending, risk insurance (such as business insurance, weather insurance, etc), and other enhancements are also necessary, and could be delivered by IFC, Inter-American Investment Corporation of the IDB, MIGA, CAF and other multilaterals. In addition, bilaterals and DFIs are also expected to have a key financing role in the early stage of the clean energy market development. Once a track record is built, private sector solutions can either co-exist with Development Finance Institutions (DFI) and Multilateral Development Banks (MDBs) or alternatively be adopted independently.

Figure 2.7 MFD Approach to the Project



115. **In addition to providing support to FDN in advancing private sector solutions, IBRD is also providing key analytical and technical assistance support, as described below, via complementary technical assistance activities.** The risks related to the application of MFD private sector solutions, along with relevant mitigation mechanisms, are explained in Clean Energy Sector Risk Assessment Matrix in Table 2.4 below.

Project Components

116. **The Project has one component.** The component consists of one or more IBRD Guarantees in an

aggregate amount of up to US$41[51] million and a CTF Guarantee in an amount of up to US$40 million. Under the Project, IBRD and CTF will guarantee, through FDN as the financial intermediary, the payment obligations of FDN under the IBRD/CTF Eligible Financial Products to Eligible Sub-projects and Eligible Beneficiaries.[52]

117. **The key rationale for IBRD and CTF Guarantees is to help build a track record for long term investments in clean energy in Colombia**. The development of a long-term offtake market is key to implementation and financing of clean energy Sub-projects, both in the large-scale and the small-scale space. In this context, FDN will be coordinating with relevant ROC agencies to prepare the PER. With IBRD/CTF Eligible Financial Products, FDN will help mitigate sector and investment risks to increase competition and participation by the private sector. IBRD and CTF Guarantees, through the provision of IBRD/CTF Eligible Financial Products by FDN, will help contribute to establishing a track record in clean energy financing and implementation. IBRD and CTF Guarantees are expected to support initial auction rounds of large scale RE and potentially through pilot aggregation models for small scale renewable energy and energy efficiency Sub-projects. Once a track record is built, the private sector should be ready to absorb risks or access other market-based financial products.

118. **FDN will explore two main functions to catalyze the market for small scale renewable energy generation and energy efficiency initiatives.** As explained before, FDN's functions will help mobilize long term financing to large and small scale Sub-projects through development of financial products and reviewing the potential for aggregation vehicle. If an aggregation vehicle approach for small scale Sub-projects is found feasible, the sizes of the financing required by aggregation vehicles would make it more attractive for commercial banks to assess and finance small scale Sub-projects. The aggregation vehicle would also offer diversification into a portfolio of Sub-projects (and off-takers), thereby reducing risks and exposure to investors. The specific type of IBRD/CTF Eligible Financial Products would depend on the nature of Sub-projects and structure of the aggregation vehicle. The small-scale market is still nascent in Colombia and therefore, the support to small scale renewables (behind the meter) and energy efficiency is considered only a pilot activity that seeks to plant the seeds to demonstrate the potential for further development of the market.

119. **Under the proposed IBRD and CTF Guarantee structure, FDN will segregate its IBRD/CTF eligible clean energy business through a specific ring-fenced Account to offer IBRD/CTF Eligible Financial Products**. As explained above, FDN will establish within its financial and management accounting system an internal account, referred to as the PER Account, as illustrated in Figure 3.1 in Annex 3, which will be ringfenced so as to segregate it from financial exposure to other sectors. The purpose of ringfencing the PER Account is to ensure the financial exposure of Sub-projects that are supported by FDN with IBRD/CTF Eligible Financial Products are separately reported and accounted for. Considering that the IBRD and CTF Guarantees are not expected to be transferred to FDN, except under the IBRD and CTF Guaranteed Events, all transactions under the PER Account will be prepared, accounted and reported on by FDN and monitored by the IBRD. The transactions to be reported under the PER Account include the types and number of IBRD/CTF Eligible Financial Products offered to Eligible Sub-Projects, current status of financial

[51] IBRD guarantees may be sequentially implemented via one or two agreements to reflect the timing difference in implementing Small-scale and Large-scale Sub-projects.

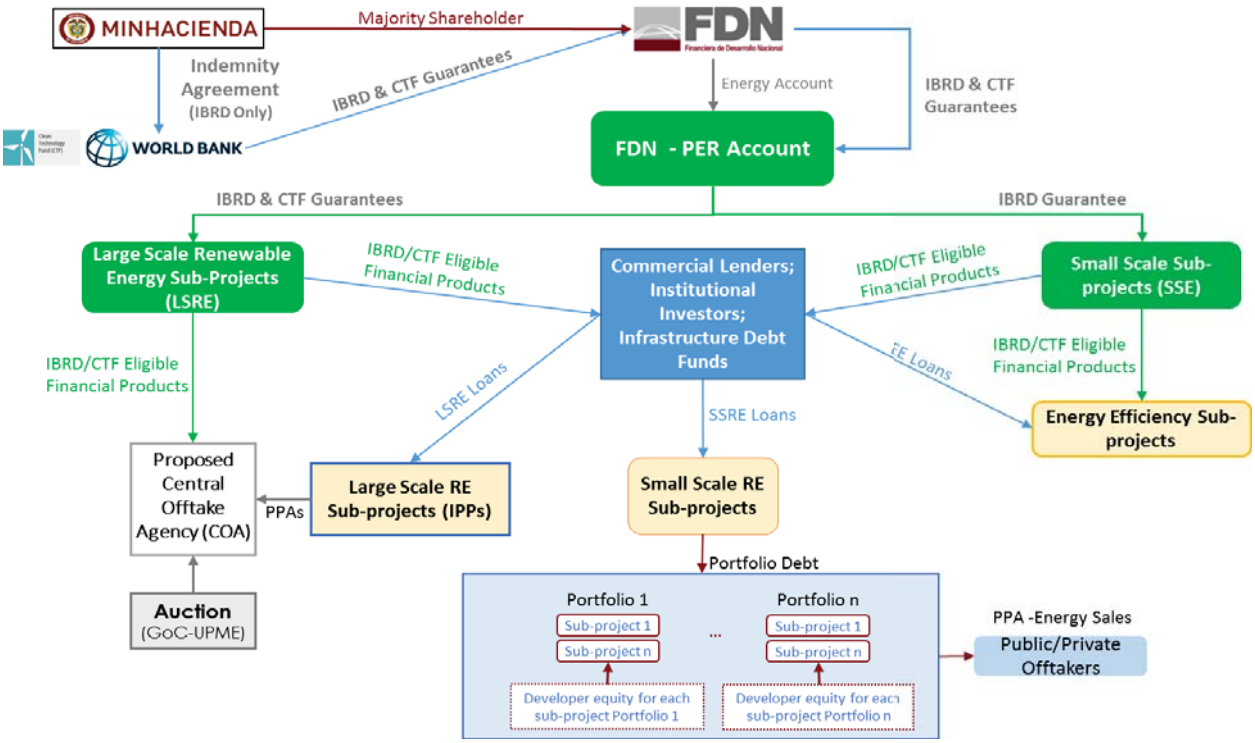
[52] Annex 6 provides further details on IBRD/CTF Eligible Financial Products, Eligible Sub-Projects and Eligible Beneficiaries to be covered under the IBRD and CTF guarantees.

exposure from such financial products, amount of liquidity reserves, leverage achieved, etc. The PER Account will be the basis for FDN to:

a. design, develop and offer only[53] IBRD/CTF Eligible Financial Products
b. receive specialized financial regulatory treatment for the use of IBRD and CTF Guarantees (subject to approval from the Superintendencia).
c. monitor financial exposure under the IBRD/CTF Eligible Financial Products and overall performance of Sub-projects

120. **To manage risk exposure,[54] FDN will create two windows to provide IBRD/CTF Eligible Financial Products, one for Large Scale Renewable Energy (LSRE) Sub-projects and the other for Small Scale Sub-projects (SSE) Sub-projects.** The Large Scale Renewable Energy Sub-projects window will offer IBRD/CTF Eligible Financial Products for Sub-projects that involve at least 20 MW capacity. The Small Scale Sub-projects window will offer IBRD/CTF Eligible Financial Products for Sub-projects in small-scale renewable energy (< 20 MW) as defined by the legal and regulatory framework[55] and energy efficiency investments. The details of each window and the proposed guarantee structure is illustrated below.

Figure 2.8 Structure of the Project



[53] FDN may continue to provide other financial products outside the PER Account for ineligible Sub-projects and Beneficiaries, whose financial obligations will not be covered by the IBRD and CTF Guarantees.

[54] Details of each financial product, their risk coverage, pricing and other terms and conditions will be explained in the Operations Manual once the risks of underlying sub-projects are identified.

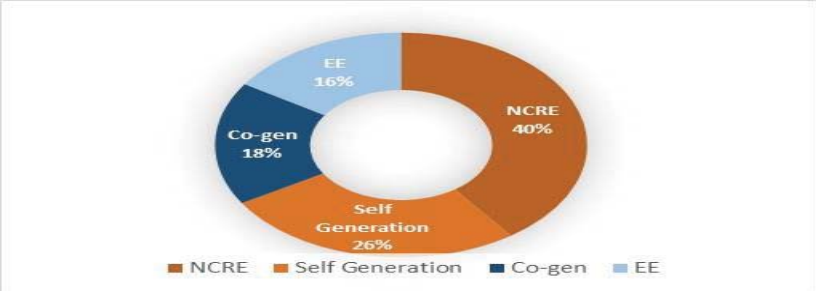
[55] Distributed generation facilities (small or large) as well as the possibility to sell excess or surplus energy are defined in Decree 2469 (MINMINAS), CREG Resolution 024 (CREG) and UPME resolution 281 (UMPE), as “self-generation”.

121. **Under both windows, FDN will offer IBRD/CTF Eligible Financial Products for clean energy Sub-projects** directly based on due diligence and eligibility criteria, as defined in the Term Sheet in Annex 6. The IBRD Guarantee is expected to be used to support both small scale and large scale Sub-projects[56] and the CTF Guarantee will be used only for large scale Sub-projects. The exact proportion of IBRD resources to be allocated to small scale and large scale Sub-projects will be made before effectiveness of the respective IBRD and CTF Guarantees. The primary recourse for FDN to manage its financial exposure will be through contractual remedies and other mitigation instruments covered under the Sub-projects (insurances, warranties, performance bonds, etc.). The fees for IBRD/CTF Eligible Financial Products will follow a risk-based pricing approach and provides fee income to manage financial exposure under the PER Account. Key features of the two Guarantee windows are highlighted below:

a) Large Scale Renewable Energy Sub-projects (LSRE) Window: Under this window, IBRD/CTF Eligible Financial Products could be offered as part of the proposed auction mechanism. In addition, they could also be offered to enhance the proposed central offtake or other appropriate offtake arrangements to be proposed under the auction mechanism. For example, FDN may provide partial credit guarantees to mitigate debt service default risk of power producers against non-payment by the off-taker, payment risk mitigation guarantees to mitigate PPA payment risks under the central offtake arrangement, or other offtake arrangements. The financial products will be confirmed in conjunction with the auction mechanism being designed by the MINMINAS.

b) Small-Scale Sub-projects Window: Under this window, there may be two sub-windows, small scale (< 20 MW) renewable energy Sub-projects and energy efficiency Sub-projects, respectively. For small scale Sub-projects, FDN's credit enhancement product are offered to lenders and investors for specific Eligible Sub-projects or through Aggregation vehicles. The small scale Eligible Sub-projects include renewable energy capacity below 20 MW, but could include self-generation, co-generation and non-conventional renewable energy. The types of energy efficiency Sub-projects will likely promote the upgrade and/or replacement of old inefficient equipment, including: i) a movement towards the use of steam and waste heat and co-generation; ii) replacement of inefficient motors and upgrading of furnaces and boilers; iii) upgrades for lighting and building insulation, and iv) good operational practices. The following figure illustrates the split between such Sub-projects, based on preliminary feasibility studies conducted by UPME.

Figure 2.9: Small Scale Renewable – Indicative Split of Eligible Sub-projects

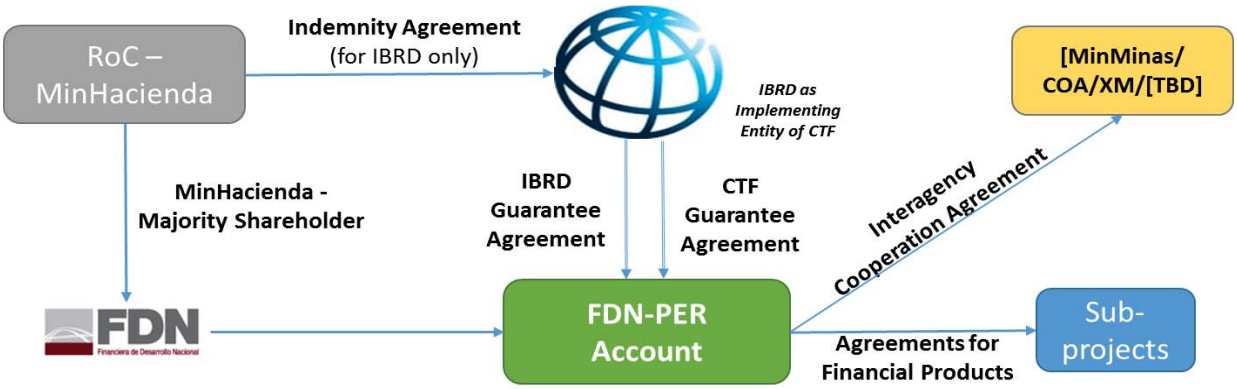


[56] Refer to definition of Maximum IBRD Guaranteed Amount Sub-Caps for Small Scale and Large Scale sub-projects in Annex 6.

122. **While the auction design and procurement of large scale renewable energy will primarily be led by MINMINAS and other government institutions, the small scale renewable energy and energy efficiency market is largely driven by the private sector and non-regulated market.** To assess the small-scale market, the World Bank engaged an international consultant, with support from Global Infrastructure Facility (GIF) trust fund resources, to review existing and potential sub-projects that could be brought together under an aggregation model in the small-scale market (both behind-the-meter renewable energy and energy efficiency), including an assessment of the need for IBRD/CTF Eligible Financial Products. Early stage assessments by the consultant indicate that the small-scale market is still at a nascent stage and that it may take more time to develop suitable financing and implementation models. The CTF PPG provides additional resources for FDN to conduct due diligence on specific small-scale Sub-projects by engaging with sponsors, developers, financiers and off-takers. The CTF PPG support will help FDN to better assess the projects in terms of technical performance, expected savings and monitoring and verification (M&V) methodologies. If adequate sub-projects are identified for a pilot aggregation model, the GIF could consider providing additional reimbursable resources[57] to structure and execute a pilot aggregation model vehicle**.**

123. **FDN will enter into two or more guarantee agreements, one or more directly with IBRD with respect to the IBRD guarantees, and one with IBRD acting as implementing entity of the CTF with respect to the CTF guarantee.** Under applicable CTF rules, a counter-guarantee from the ROC is not required for the CTF guarantee exposure. CTF guarantees are expected to be committed only for Large Scale Sub-projects. The proposed contractual agreements are as illustrated below:

Figure 2.10 Agreements Between Project Stakeholders



124. **FDN operates as a financial corporation and as such its financial strength is monitored by the SFC (*Superintendencia Financiera de Colombia)* that oversees the Colombian financial markets.** Colombia's financial regulations require FDN to hold regulatory core capital against the financial exposures (or risk weighted assets) created by its financial products. The regulatory core capital ratio[58] must be reported under Colombian financial regulations,[59] and is currently set at a minimum of 9 percent of risk weighted asset exposure. If regulatory core capital falls below this minimum level, the SFC may impose capital restrictions and if it becomes closer to zero, then FDN would be considered insolvent and

[57] As Recipient Executed Trust Fund (RETF) activity through GIF's Project Preparation & Structuring Activity (PPSA).
[58] Refer to the Term Sheet in Annex 6 for definition.
[59] Colombia has adopted Basel II but is moving towards Basel III financial regulations, and therefore the minimum core capital requirements may change in future.

the SFC may intervene and restructure the entity. FDN's support to the clean energy sector, by offering IBRD/CTF Eligible Financial Products to Eligible Sub-projects, will create new financial exposures and therefore increase regulatory core capital requirements. The proposed specialized regulatory treatment (explained below) would potentially allow FDN to have more efficient capital allocation using IBRD and CTF Guarantees. By optimizing capital allocation for FDN under the PER Account, IBRD and CTF Guarantees can potentially help FDN to offer cost-efficient financial products that support the mobilization of private investments at competitive and attractive tariffs for consumers, which otherwise would not be possible.

125. **The amount of IBRD and CTF Guarantees will be limited to a maximum of US$81 million to backstop payment obligations of FDN under eligible claims related to IBRD/CTF Eligible Financial Products**. With respect to potential financial exposure of the FDN-PER Account, the IBRD and CTF Guarantee resources will only be a proportion of the total payment obligations to meet any eligible claims under IBRD/CTF Eligible Financial Products. The amount of financial exposure that FDN may have to absorb under IBRD and CTF Guaranteed Events is calculated via a high level financial analysis detailed in Annex 7. Because FDN will have to initially meet its payment obligation with its own resources, it will be incentivized to manage risks of the PER Account efficiently by minimizing losses from such financial products.

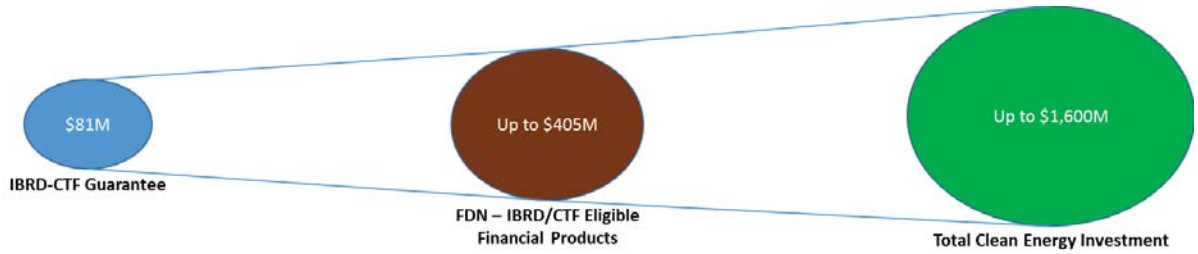
126. **The proposed guarantee structure under the existing Colombian financial regulatory framework is expected to leverage up to four times as much private commercial finance at the level of Sub-projects, which reflects an efficient use of IBRD and CTF resources.** The Sub-project level leverage ratio of up to four times is calculated based on the overall financial exposure of IBRD/CTF Eligible Financial Products over the Availability Period of five years. The current financial regulatory treatment requires FDN to reserve 100 percent regulatory capital for financial exposure (or risk weighting) under guarantee products, thus generating no additional leverage in offering such products to mobilize long term financing from the private sector. Benefitting from the experience of IBRD and CTF from similar operations, FDN has proposed a specialized financial regulatory treatment for a much lower risk weighting for FDN for financial exposures covered by the IBRD/CTF Eligible Financial Products under the PER Account.

127. **Specialized regulatory treatment of IBRD and CTF Guarantees proposed by FDN, if approved, could provide additional leverage of up to five times for FDN under the PER Account**. The proposed regulatory treatment seeks a 20 percent[60] risk weighting for financial exposures from IBRD/CTF Eligible Financial Products under the PER Account to be covered by IBRD and CTF Guarantees, thus offering a potential leverage of up to five times. Thus, the IBRD and CTF Guarantees are expected to be committed in line with the commitments of IBRD/CTF Eligible Financial Products to Sub-projects, up to the PER Account leverage ratio.[61] For example, if the financial exposure of IBRD/CTF Eligible Financial Products is US$100 Million, then the corresponding commitments of IBRD and CTF Guarantees would be US$20 Million, reflecting a leverage ratio of five times. In effect, the overall leverage under this scenario would potentially be up to nine times (with up to five times at the PER Account level and up to four times at the Sub-project level).

[60] Under Basel 3 regulations, MDB/IBRD Guarantees are given a zero percent risk weighting. However, the proposal is seeking 20 percent as a conservative treatment under Colombian financial regulations.

[61] Refer to PER Account Leverage Ratio and Committed IBRD and CTF Guaranteed Amount definitions in the Term Sheet in Annex 6.

Figure 2.11. Expected Leverage from IBRD and CTF Guarantees from Specialized Regulatory Treatment



Note: Total Clean Energy Investment includes both private commercial and non-commercial amounts

128. **The split of CTF and IBRD guarantees will be committed based on the nature of Sub-projects and the length of exposure**: Based on the projected financing plan (section III. C above), it is expected that a small proportion of small scale Sub-projects will be covered by the IBRD/CTF Eligible Financial Products. CTF guarantees of US$ 40 Million are expected to be committed for exposures of IBRD/CTF Eligible Financial Products under large scale renewables. Thus, the IBRD guarantee is likely to be split between small scale and remaining large scale exposures.[62] The exact split will be firmed up based on large scale and small scale Sub-project pipeline. The confirmation of the pipeline is expected to be made through the auction process and development of pilot aggregation vehicle, respectively. The decision to split exact proportions between the IBRD and CTF resources will be made before effectiveness of the respective IBRD and CTF Guarantees. If IBRD/CTF Eligible Financial Products are not fully committed within the Availability Period (e.g., because of poor demand for such financial products from potential lenders to and investors in clean energy sector), the IBRD and CTF Guarantee amounts will be proportionally reduced.

129. **The IBRD/CTF Eligible Financial Products are expected to generate sufficient fee income during the Project period of 20 years to meet operating expenditures under the PER Account.** The PER account will generate fee income from such products, which is expected to be sufficient to cover preparation, due diligence, monitoring and supervision and other operational costs as well as to meet any expected losses.[63] The PER Account is expected to be financial viable by maintaining a positive net balance after meeting its expenditures. Further details on the amount of financial exposure and impact on regulatory capital are explained in Annex 7 – Financial Analysis.

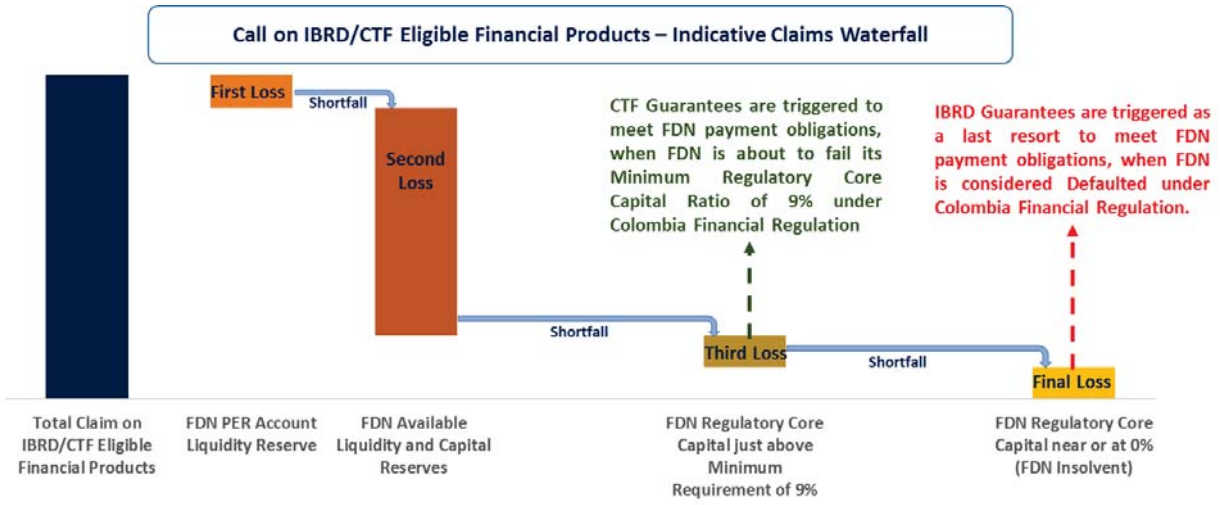
130. **The innovative design of the IBRD and CTF Guarantee structure not only helps FDN to offer cost-effective financial products for clean energy subprojects but the IBRD Guarantee is also to be treated as a last resort option.** As explained above, the PER Account is expected to generate sufficient income to meet its operating expenses and payouts, if any, to Eligible Beneficiaries over the Project duration. Nevertheless, considering the untested regulatory framework and lack of a long-term offtake market in Colombia, in the early stages of an untested small-scale market, there could be calls on IBRD/CTF Eligible Financial Products. If one or more IBRD/CTF Eligible Beneficiaries have submitted valid claim(s) under IBRD/CTF Eligible Financial Products issued by FDN, FDN can call on the CTF Guarantee to pay such IBRD/CTF Eligible Beneficiaries if FDN's regulatory core capital ratio is close to the minimum requirements.

[62] Refer to definition of Maximum IBRD Guaranteed Amount Sub-Caps for Small Scale and Large Scale sub-projects in Annex 6.

[63] Based on the historical probability of default and expected losses from default rates in energy sector.

FDN can call on the IBRD Guarantee if FDN's available liquidity and capital resources are insufficient to meet its payment obligations to Eligible Beneficiaries. The CTF and IBRD Guarantee payout will be made based on the following claims waterfall arrangement[64]:

Figure 2.12 Expected Leverage Potential from IBRD and CTF Guarantees



Step 1: FDN will use the available Liquidity Reserve[65] under the PER Account as a first loss tranche amount.

Step 2: If shortfall in payment obligation exists after Step 1, FDN will use its available liquidity and capital sources as a second loss tranche amount to meet the obligations. If FDN's available capital resources continue to be exhausted, then FDN will reach a point where its regulatory core capital ratio is just above the minimum requirements. This means, if additional resources are not provided to meet eligible claims, FDN potentially will fail to meet Colombia's minimum regulatory core capital ratio[66] requirement. At this point, FDN can draw upon CTF Guarantees as a third loss tranche amount up to a maximum of US$ 40 million to meet such payment obligations.

Step 3: If shortfall in payment obligation continue to exist after above steps, then to avoid FDN having to use all remaining liquidity and capital sources such that the regulatory core capital ratio becomes zero (or it reaches a state of default as per Colombia financial regulation), IBRD Guarantees would be drawn upon as a last resort up to a maximum of US$ 41 million to meet payment obligations related to IBRD/CTF Eligible Financial Products. Any payment made by the IBRD guarantee under Step 3 will trigger ROC's obligation to repay IBRD under the Indemnity Agreement.

131. **The CTF Guarantee helps FDN to restore its minimum regulatory core capital ratio requirements by providing a source of liquidity and is expected to be repaid. Upon repayment by FDN, amounts drawn under the CTF Guarantees will be reinstated**. FDN will have an obligation to repay[67] the amount drawn

[64] Refer to Annexes 7 for details on trigger events and claims waterfall arrangements under different scenarios.
[65] Liquidity Reserve held by FDN based on annual financial exposure, as defined in the Term Sheet in Annex 6.
[66] As defined in the Term Sheet in Annex 6.
[67] Refer to Annex 2 and 6 for further details on repayment obligations on FDN on CTF Guarantees.

under the CTF Guarantee according to the following arrangement:

a. FDN to repay to the IBRD, acting as Implementing Entity of the CTF, any amounts drawn under the CTF Guarantee prior to the end of FDN's fiscal year in which the amount was drawn; or
b. If FDN cannot pay to the IBRD the drawn CTF Guarantee amount within the FDN's current fiscal year, then FDN may delay the repayment of all or part of such amounts until the end of its next fiscal year by posting, prior to the end of the then current Fiscal Year, a first priority perfected security interest over liquid assets in an amount equivalent to 100 percent of the outstanding amounts.

If any such amounts are repaid by FDN, they will be reinstated and available to be drawn under the CTF Guarantee, following trigger events. This approach is both innovative and efficient, considering that CTF Guarantees once drawn are typically considered as a grant,[68] the recipient does not have a reimbursement or repayment obligation, and the member country does not have a reimbursement obligation under an Indemnity Agreement. In addition, the proposed CTF Guarantee structure retains the ability to be recycled within the Guarantee Period, thus maximizing the value of CTF resources to support clean energy sector.

132. **FDN has a strong capital and liquidity position and has high governance standards. Its financial exposure is, however, highly concentrated on the 4G road program.** FDN's capitalization and liquidity positions are strong, with a good potential to earn steady income from their current products under the 4G roads program. As of December 2016, FDN does not have any non-performing assets (NPA) or credit losses on its balance sheet from their current financial exposure to 4G roads. This is evidence of their prudential business operation and conservative practices in offering financial products. FDN is currently rated by leading ratings agencies at par with the Colombian sovereign,[69] due to high level of shareholding by the Government and the critical role that FDN plays in Colombia's infrastructure sector. However, the current business operations of FDN are heavily concentrated on the 4G program and require diversification to manage financial exposure. The clean energy sector will provide such diversification and broaden FDN's product offerings.

133. **IBRD and CTF Guarantee trigger events are linked to both the amount of financial exposure from eligible claims from IBRD/CTF Eligible Financial Products under the PER Account and to the overall financial strength of FDN**. Annex 7 provides further details on the expected financial exposure for FDN from IBRD/CTF Eligible Financial Products under the PER Account, and on the financial strength and regulatory core capital position of FDN. Table 7.8 in Annex 7 provides the total regulatory core capital ratio of FDN from 2012-2016. As of December 2016, the regulatory core capital position of FDN is 139 percent. This implies FDN has significant capital resources available to meet Colombia's regulatory core capital requirements. However, the trend in the ratio has been declining from 2014 (221.7 percent) to 2016 (139 percent), although it still remains well above the minimum requirements. FDN may diversify into education, PPPs and other sectors whose risk profile may be different from that of the 4G roads and clean energy sector. Considering the long Project duration of 20 years and varying sector exposures, the amount of regulatory core capital ratio may drop over time. Thus, monitoring and implementation support to PER Account, along with regular monitoring[70] of FDN's overall operations, are critical to ensure adequate risk management and capitalization levels are preserved to prevent a call on CTF and IBRD Guarantees. Annexes 4 and 5 provide further details on implementation arrangements, monitoring and

[68] From guarantee structures of similar CTF operations such as Partial Risk Sharing Facility (PRSF, Effective August 2015) and the Philippines Renewable Energy Development Project (PHRED, Board Approved in May 2016)

[69] As of December 2017, FDN is rated at BBB/Negative by S&P and BBB/Stable by Fitch.

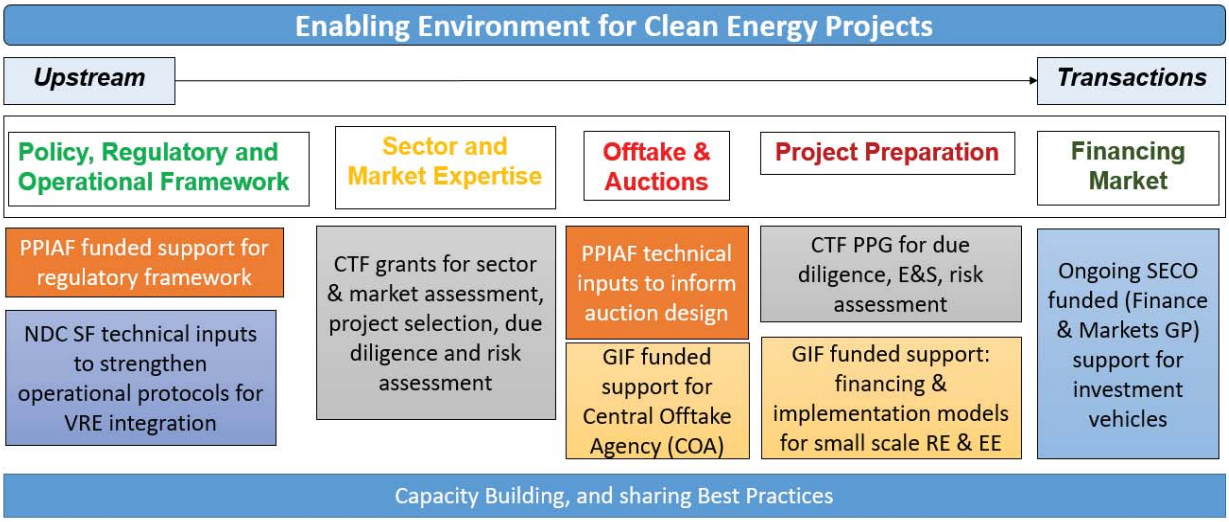
[70] Refer to Annex 5 for further details on implementation monitoring and supervision of PER Account and FDN's overall business operations.

overall supervision of FDN's operation throughout the Project duration.

Complementary Technical Assistance

134. **In parallel to this CTF Project, the World Bank has provided complementary technical assistance to support Colombia in creating a strong enabling environment for clean energy development and investment.** The complementary technical assistance has supported MINMINAS, DNP, FDN, and XM with specific studies, including:

Figure 2.13 Complementary World Bank Technical Assistance



1) **Policy and regulatory Dimension** (*PPIAF, FY18*): approved and launched on April 2017, the activity supported Colombia with the following activities: i) elements and options for the design of competitive mechanisms to procure electricity contracts in the Colombian power system including auction design, rules and procedures (with a focus on non-conventional renewable energy); ii) elements and options for the design of long term PPAs to procure NCRE projects; iii) elements for the monitoring of wholesale (spot and contract) markets performance, and iv) assessment of the costs and benefits of introducing multi-nodal (locational) pricing in Colombia.

2) **Renewable Energy Integration** (*NDC Partnership Support Facility, FY18*): Approved in July 2017 and launched on January 2018, the activity is supporting technical assistance to develop the operational protocols necessary to integrate and dispatch variable renewable energy (large-scale and distributed), for example, upgrading methodologies to estimate operational reserves and forecasting, understanding impact of distributed energy resources, and integrating forecasting into operational protocols.

3) **Program Design** (*Global Infrastructure Facility, FY18*). Launched in July 2017, the activity contributed to developing the assessments necessary for a more detail project design during project preparation, including: i) legal, financial and economic analyses; ii) implementation and business models for energy efficiency projects; iii) definition of institutional and implementation arrangements (including the conceptualization of a Central Off-take Agency), and iv) assessment of optimal market interventions by FDN, to support FDN in identifying and determining the most optimal financial interventions to attract long term finance to clean energy projects, and creation

of protocols for the oversight and supervision of social and environmental dimensions.

4) **Capital markets strengthening** (*SECO, FY18*). Approved and launched on December 2015. The SECO-funded technical assistance provided by World Bank Finance, Competitiveness & Innovation Global Practice) has supported the development of a financial sector strategy for a "Capital Markets Strengthening Facility Deep Dive", including an enabling environment for sustainable long-term financing. The technical assistance started with the 4th Generation (4G) toll road program and is now expanding into other sectors such as clean energy. This ongoing WB technical assistance activity has primarily focused on developing suitable risk mitigation and credit enhancement products to enhance long term financing. The activity provides a linkage to the proposed IBRD-CTF guarantee program and both operations will be fully coordinated.

135. **In addition, a recipient-executed CTF Project Preparation Grant (PPG) will support FDN in various aspects of project preparation**, including the following: i) a market sounding assessment to prepare a robust project pipeline and a methodology for risk identification and quantification; ii) the design of commercial and approval processes, as well as financial instruments that include credit enhancement, risk mitigation, and legal considerations; iii) the application of technical and prefeasibility studies, as well as risk management training for selected projects; iv) a cumulative environmental impacts assessment of potential wind projects in La Guajira; v) additional training for FDN staff (including the environmental and social team, as well as loan and credit risk officers) to support the activities established in the ESMS and the procurement guidelines, and vi) the structuring of a Project Implementation Unit (PIU) within FDN and project coordination with other Government agencies.

Readiness of Project for Implementation

136. **The procurement of large scale NCRE projects depends on the issuance of a Ministerial Resolution or Regulatory Instrument that operationalizes the mandate of Decree 057.** As discussed before, MINMINAS is in the process of designing an auction mechanism to procure long-term PPAs that considers the appropriate criteria to achieve the policy objectives of increased system's resilience during Nino events (including through resource complementarity), security (reliability), sustainability (less carbon emissions), and economic efficiency; and that will allow the appropriate valuation of the benefits offered by NCRE. MINMINAS is planning to issue a new Ministerial Resolution with the auction design and launch the auction before the end of the present administration (end of July 2018). A second element that will determine the effectiveness of this procurement mechanism (auction) is the consideration of a Central Off-Take Agency or function to adequately manage the long-term PPAs and off-take risk.

137. **The information on readiness of small scale Sub-projects is quite fragmented.** A screening process was undertaken during the Project preparation stage to understand the readiness of small scale Sub-projects. This includes a review of the pre-feasibility studies that UPME conducted with USAID support and of the several investment grade audits carried out in industrial companies. The studies identified a pipeline of Sub-projects that needs further development. In addition, with the support of GIF, an international consultant was engaged to review the scope and size of the of market for the small-scale sector. Preliminary conclusions of the initial review conducted by the consultant indicate significant market scope for the small-scale sector; however, the information on specific Sub-projects under preparation is not readily available for reasons of confidentiality. Within the set of Sub-projects reviewed, the role of an aggregation vehicle was identified as a potential mechanism to pool small projects to attract long term financing.

Pipeline Development: Screening Criteria

138. **The World Bank, in coordination with FDN, conducted a pre-screening process to identify potential projects to be supported under the PER Account.** The preliminary project pipeline includes four types of small and medium sized eligible interventions:

a. Energy Efficiency per se, in areas such as efficient motors and lighting, heat recovery, HVAC, etc.;
b. Self-generation, including the production of energy "behind the meter" for the customer's own use (grid-connected or off-grid);
c. Co-generation – simultaneous production of steam (for process) and electricity (for own use or sale of excess energy to the grid), resulting in overall efficiency gains; and
d. IPPs – small and medium generation (<20 MW), whose energy is to be sold to third parties. Projects under 20 MW are subject to a simpler regulatory framework, and the trading of energy happens on a bilaterally negotiated basis (without a need for formal competitive auctions).

Self-Generation, Co-Generation and IPP are part of "Category 2" while Energy Efficiency is part of "Category 3" (Category 1 being large scale wind and solar projects).

139. **A pipeline of potential Sub-projects was developed during preparation, based on the following sources:**

a. List prepared by UPME, resulting from rigorous energy audits jointly funded by UPME and USAID about three years ago;
b. List prepared by the *Asociación Nacional de Empresarios de Colombia* (ANDI) including potential energy efficiency projects for industries located in the Mamonal Area (Cartagena). The list is based on preliminary assessments of energy efficiency potential (i.e., based on walk-in audits and preliminary evaluations); and
c. List of projects prepared by FDN with information from host industries or sponsors interested in receiving financing to develop energy efficiency projects.

140. **From these three lists, a set of high-chance Sub-projects was selected, based on the following considerations:**

a. Eliminating redundancies;
b. Excluding projects which may have a link to "coal based activities" – even if they result in more efficiency use of this fuel (for not meeting CTF requirements);
c. Excluding mini-hydros – considering that this type of renewable energy entails a much more rigorous scrutiny from the World Bank in term of environmental and social safeguards, and with a high possibility to be rated as Category A risks; and
d. Excluding projects at an advanced stage of implementation – for which CTF funds do not guarantee "additionality".

141. **For each of the remaining Sub-projects, the WB team identified basic information, with UPME and FDN support, to assess the technical, economic and financial feasibility, as well as the GHG impact.** The information made available to the Bank only allowed a preliminary assessment of the Sub-projects. Ideally, the information package should have included investments required, energy generated and/or saved, operating costs, financial benefits, and GHG impact. In a few cases (e.g. projects thoroughly audited by UPME and/or submitted to FDN for financing), information existed but was not made fully available to the World Bank for reasons of confidentiality. In several cases (e.g. projects in Phase II), detailed information simply did not exist and key variables had to be estimated based on interventions of a similar nature and size. Therefore, it will be necessary to reassess the feasibility and GHG impact of those

projects at a greater level of detail during appraisal by FDN for financial support to Sub-projects. FDN will also have to assess the possibility and interest in the market for aggregation of this type of projects (e.g., the ESCO model).

142. **A shorter list of projects was prepared following the above exclusions. It was divided into two phases:**

a. Phase I – projects at an advanced stage of design, for which rigorous audits have been carried out (in the case of energy efficiency) or economic and financial feasibility assessments have been developed (in the case of small generation projects). In some cases, sponsors have already been identified. It is expected that those projects can be developed within a 12-18-month timeframe.

b. Phase II – projects at an early stage of design, with preliminary economic and financial feasibility studies, where sponsors have not been clearly identified or industrial companies have not yet vetted the implementation and financing of the corresponding projects. It is expected that those projects can be developed within a 12-24-month timeframe.

143. The last step in the screening process, was to notionally scale down (or scale up) the projects based on the amount of funds available in Category 2 (divided into Self-Generation, Co-Generation, and IPPs) and Category 3 (Energy Efficiency). A precise list of projects to be supported by the facility will have to be further developed in the future, after a more elaborate assessment is carried out. A summary of the portfolio of potential Sub-projects is provided in the table 2.3 below:

Table 2.3 Indicative List of Small Scale Sub-Projects

Category	Type	Phase	Investments (US$)	Revenues first year (US$)	Emissions avoided CO2 tons/year	Project count
Category 2 - Small Scale Renewable	Self Generation	Phase 1	55,299,311	11,059,912	168,649	12
		Phase 2	21,839,333	4,367,887	29,354	6
		Sub-total	**77,138,644**	**15,427,799**	**198,003**	**18**
	IPPs	Phase 1	55,190,957	8,813,339	56,656	10
		Sub-total	55,190,957	8,813,339	56,656	10
	Cogeneration	Phase 1	107,918,482	13,789,910	179,720	2
		Phase 2	36,082,361	4,610,633	60,089	3
		Sub-total	**144,000,843**	**18,400,543**	**239,809**	**5**
	Sub-total		276,330,444	42,641,681	494,469	32
Category 3 - Energy Efficiency	EE	Phase 1	22,616,055	8,946,873	24,700	10
		Phase 2	38,895,846	15,387,130	151,719	31
		Sub-total	**61,511,901**	**24,334,002**	**176,419**	**40**
Total			337,842,344.18	66,975,683.61	670,888.01	73

Table 2.4 Clean Energy Sector Risk Assessment

Risk Category/Rating	Risk Assessment	Mitigating Factors
Power Market Risk Risks arising from limitations and uncertainties in the capacity/energy and renewables markets **HIGH**	**Electricity price shocks/volatility:** under the current market conditions and regulatory framework, renewable energy projects are exposed to high price uncertainty: the spot price is extremely volatile (notably during ENSO events), contracts are medium term and the "reliability charge", which is granted to eligible generators for their long-term firm energy services, is not designed to promote variable renewable energy generation. Incumbents have exercised strong political pressure to slow down the entrance of NCRE and maintain their market power through increased hydropower capacity additions. There is a risk that the political pressure of incumbents affects the timing of the first and subsequent auctions for the long-term contracting of electricity and deployment of NCRE.	The energy agencies of the Colombian electricity sector, including DNP, FDN, CREG, MINMINAS, UPME and XM are in the process of designing new regulatory and operational provisions/protocols to promote variable renewable energy development. Recently, MINMINAS introduced Decree 570, which sets the basis for the consideration of specific technical attributes (more aligned to the benefits offered by NCRE) and the long term contracting of electricity. MINMINAS is also in the process of designing the auction mechanism that would allow renewable energy to compete on a level playing field in the market. The auction design could introduce the appropriate market segmentations, quotas, and criteria to address and mitigate the pressure/concerns regarding incumbent utilities. At the same time, many Government institutions have launched studies to review policy and regulatory options that could address the market concentration problem, the power of incumbents and biases in the design and allocation of the reliability payment.

Regulatory Risk Suboptimal regulations and/or uncertainty regarding the design and implementation of future regulatory frameworks and rules **SUBSTANTIAL**	**Uncertain legal and regulatory framework in renewable energy**: Laws 788 of 2008 and 1715 of 2014 provide fiscal and financial incentives for RE, but there is no specific price or quantity setting instrument promoting the development of variable renewable energy. The existing reliability charge is not designed to support intermittent generation and does not value the services that renewable energy provides to the system during water scarcity times or other potential shocks (such as fuel shortages, or high fuel prices). See Box 2.1 under section 2.1 of Annex 2.	Same as above.
Grid Transmission Risk Risk arising from inexistent or inadequate grid infrastructure, high connection/interconnection costs imposed on developers, risks, limitations in grid code and grid management **SUBSTANTIAL**	**There is no transmission infrastructure connecting La Guajira area (where the wind resource is high) with load centers.** There are two barriers affecting renewable energy development in the area: 1. There is a quasi-deep interconnection policy in Colombia: developers are required to issue financial guarantees to secure access to transmission infrastructure (40 percent of transmission infrastructure investment distributed among potential generators/developers). Although this would not be a barrier to large incumbent utilities, it is more difficult for smaller individual developers to obtain counter guarantees from commercial banks to fulfill this condition. Ultimately, the total investment cost is passed through to the consumer tariff, but the initial request for a	The Project will support solar and wind projects located across Colombia, and not necessarily only in the Guajira region, such as the Atlantic coast (although the Guajira area is the most prominent hot spot for wind). The Energy Planning Unit (UPME) launched the bidding process for the construction of a 500 KV transmission line (phase 1) to La Guajira in June 2017, after obtaining financial guarantees from various prospective developers. The transmission line was awarded in February 2018. In this case, the requirement of a guarantee did not deter the reservation of transmission capacity by key prospective developers, although it is indeed a barrier to smaller developers.

	guarantee is a barrier to new companies. Lowering this barrier would increase the level of competition in the system, considering that the Colombian market operates under an oligopoly-like structure. 2. The construction of transmission lines is generally delayed for many reasons, but mainly due to social and environmental constraints. The risk of transmission infrastructure delay is 100 percent absorbed by the potential developers. This is a barrier that affects more new and smaller private developers due to their lower financial capacity to shoulder this risk. Experienced transmission companies such as ISA estimate that delays are generally of the order of 1-2 years.	In future transmission expansions to La Guajira, UPME will consider assistance from multilateral development institutions and other parties such as the National Infrastructure Agency (*Agencia Nacional de Infrastructura*, ANDI) to strengthen the preparation and structuring of the project, notably on the possibility to advance the social and environmental assessment, and minimize the burden on developers.
Permits Risk Risk arising from the public sector's inability to efficiently and transparently administer licensing and permitting processes and approvals **MODERATE**	The licensing system in Colombia is as complex as in other countries, especially in the case of transmission and road infrastructure, which cuts across many jurisdictions and different land use areas. However, institutions are regarded as relatively solid and transparent, and permitting *per se* is not regarded as a critical bottleneck to energy sector infrastructure.	Existing transmission developers in Colombia have built robust capacity in the management of social and environmental issues (including in the preservation of cultural property), land use, public order, and political issues. These companies have been effective in managing the processes required to obtain licenses.
Resource & Technology Risk Risks arising from inaccurate resource assessments and technology/services supply chain bottlenecks	Existing resource assessments are technically robust. The Project will only support Sub-projects based on proven and commercial technologies.	Not applicable.

LOW		
Offtake Risk Colombia does not have long-term offtake arrangement for clean energy sector. Without clarity on long-term offtake contractual arrangements and long-term financing, clean energy project opportunities may not be implemented at scale. **HIGH**	The existing contractual arrangements are primarily bilateral (between generators and retailers) and short-term (the majority of them below three years), reflecting the open market regulation designed to encourage market participants to agree freely on the quantities, prices, and conditions of electricity purchases and sales. These conditions create selection bias of generators and retailers, and prevent wider competition from new renewable energy entrants in Colombia. which rely on stable and long-term contractual agreements. An additional key barrier to renewable energy development in the current market is the lack of creditworthy counterparties or off-takers for long-term power purchases. Because renewable energy projects with private participation rely on stable and long-term contractual arrangements the development of long-term offtake arrangements is needed to attract wider competition.	As part of the preparation of the PER, a concept of a central offtake agency (COA) has been conceived as a potential function that would address the offtake risk. The concept of the proposed COA has been further developed by a local consulting company (PHC – report included in the project files) and was widely consulted among the key stakeholders of the electricity system in Colombia (MINMINAS, XM, CREG, UPME) and accepted as a key measure to mitigate offtake risk. FDN had a extensive dialogue with XM to assess the possibility of harboring this function under their operations, and XM confirmed their interest. It is expected that the COA function will be considered by MINMINAS in the resolution that will mandate the auctioning of long term contracts for electricity (and operationalize Decree 570). This resolution is expected before July 2018 (public consultation of the draft resolution was launched on June 8, 2018). FDN will continue to monitor the development of long term offtake arrangements. FDN is expected to provide additional credit enhancement products, through IBRD/CTF Eligible Financial Product, to enhance the creditworthiness of the proposed COA.

Small Scale Sub-Projects - Industrial Energy Efficiency **Lack of Experience and knowledge; and Lack of ESCO Market** **SUBSTANTIAL**	Industrial companies typically do not have experience in and systematic knowledge of the potential for energy efficiency. This knowledge is often fragmented at the shop-floor, but it is rarely consolidated (via investment grade audits) and presented to top management in a rigorous and compelling way. ESCO-like business is not yet developed in the Colombian market, thus making hosts responsible for performance and financing risks.	Support the development of investment grade audits (like UPME's initiative with USAID resources). Support the development of aggregators, like service providers, and ESCO-type institutions. Work with financial institutions to develop innovative, off-balance financing solutions and tailored service contracts to scale up industrial energy efficiency.
Financial Risk Risk arising from general scarcity of investor's capital (debt and equity) and investor's lack of information and of a track record on renewable energy **SUBSTANTIAL**	Colombia is faced with very large infrastructure financing requirements over the next few years that need to be met through diversified financing sources. Lack of long term financing has been a critical challenge in implementing infrastructure projects. Lack of project preparation and risk mitigation for new sectors such as renewable energy could affect the ability to attract long term financing.	To prioritize the clean energy sector amongst other competing infrastructure sectors, and to maximize the use of available and new financing sources, FDN plans to develop innovative de-risking structures and financial products to attract long term financing. As FDN will develop innovative credit enhancement products to de-risk projects and attract long term investments, the joint IBRD and CTF Guarantees will backstop FDN's payment obligations to help ROC build a track record in supporting financing and investments in the clean energy sector. The WB, through a SECO-funded trust fund, is also providing technical assistance for developing a financial sector strategy, including developing an enabling environment for sustainable long-term financing. This financial sector strategy is being supported by a larger WB technical assistance known as the "Capital Markets Strengthening Facility Deep Dive". Thus, it provides a strong

		linkage to the proposed IBRD and CTF Guarantee and both operations will be coordinated.
Social Acceptance Risk Risk arising from lack of awareness and resistance to wind energy in communities and end-users. **SUBSTANTIAL**	Wind projects located in La Guajira (and others in the portfolio) are on indigenous peoples' land. The Wayuu Indians in Colombia are acquainted with compensation protocols, and negotiations regarding land use, compensation, and other issues are expected to be difficult.	National transmission companies are strong and experienced in dealing with communities (which can be challenging at times but is constantly confronted and addressed).
Political and Governance Risk Risk arising from country specific governance and legal characteristics. **MODERATE**	Key governance and political risks affecting institutional coordination, procurement and auctioning, financing and implementation processes including policy, regulatory and legislative constraints that affects participation of domestic and international private sector in renewable energy and energy efficiency Sub-projects	Colombia is an investment grade country (although it was recently downgraded by one notch in 2017 by the major rating agencies) and the Government has undertaken a number of measures to address the financing needs through the creation of appropriate regulatory frameworks and government agencies. Recent enactment of the PPP Law (1508/2012), Infrastructure Law (1682/2013) and Standardized Contracts, along with the creation of specialized government agencies such as National Infrastructure Agency (ANI) and FDN are some of the examples under the 4G road program which brought comfort to international investors and lenders to come to Colombia. Colombia signed an accession agreement with the OECD on May 30, 2018. Five years earlier, on May 29, 2013, the OECD Council Meeting at the Ministerial Level decided to open accession discussions with Colombia. The ROC has systematically considered and adopted

		recommendations that have strengthened the overall governance of the country.
Currency / Macro-Economic Risk Risks arising from the currency volatility and broader macro-economic environment and market dynamics **MODERATE**	Currency volatility and lack of appropriate mechanism to pass through currency depreciation risks to the consumer may cause shortfalls in cash flow to the Sponsors as well to the off-taker. The impact of the Project on external debt ceiling under the IMF's Debt Limits Policy.	The IMF recently commended the government for its policy response to oil price trends, which has involved strengthening fiscal policy and tightening monetary policy while allowing the exchange rate to depreciate. Such policies provide comfort that the ROC is intent on maintaining macroeconomic stability. However, currency depreciation is critical for international sponsors and lenders as they provide foreign currency financing. Experience from 4G and other infrastructure sectors can help to develop a targeted product for renewable energy Sub-projects.

Risk Category/Rating	Risk Assessment	Mitigating Factors
Industrial Energy Efficiency Competition of EE projects with core business activities	Even when Energy Efficiency projects are presented in a compelling fashion to top-management, resources to develop EE projects will compete with scarce resources to expand the market, develop new markets, and other activities	Support the development of aggregators, like service providers, and ESCO-type institutions. Work with financial institutions to develop innovative, off-balance-sheet financing solutions

SUBSTANTIAL	which are related to the core business. Top-managers are reluctant to use company's equity or to borrow. They would rather find third parties to make the investments and share the savings. However, these (ESCO-like) entities are not yet consolidated in the Colombian market.	and tailored service contracts to scale up industrial energy efficiency.
Distributed Generation (DG) (behind the meter) Investment Constraints **SUBSTANTIAL**	Distributed energy offers significant potential for users (residential, commercial, and industrial). Regulations on net-metering are favorable to end-users in Colombia. However, DG represents a significant upfront investment. 70 percent of DG installations in the US happen on an off-balance-sheet basis. However, this is still a nascent market in Colombia, and there will be a need to develop service providers (aggregators) offering financial packages. Furthermore, commercial banks should become comfortable with this market, offering innovative financial solutions to both end-users and aggregators.	Support the development of service providers and creative financial solutions to reduce the initial capital barriers.

Annex 3: Implementation Arrangements

COLOMBIA: Clean Energy Development Project

Project Institutional and Implementation Arrangements

144. **The Ministry of Mines and Energy (MINMINAS) has established Law 1715 to ensure the low-carbon development of the energy sector and promote the deployment of renewable energy and energy efficiency**. With this obligation, MINMINAS will lead the interinstitutional dialogue, policy formulation, and activities that are needed to address the market failures affecting the development of clean energy. MINMINAS, through UPME, launched the procurement processes to build the transmission capacity (phase 1) necessary to interconnect La Guajira Region (where the wind resource is present) with the national network and load centers. The transmission line contract was awarded in February 2018.

145. **The success of the Project depends also on the formulation of appropriate regulatory measures and market arrangements which are necessary for attracting long term financing and private participation in clean energy**. The energy agencies of the Colombian electricity sector, including MINMINAS, UPME, CREG, and XM are in the process of designing new regulatory and operational provisions and protocols to promote variable renewable energy development. Recently, MINMINAS introduced Decree 570, which sets the basis for the consideration of specific technical attributes (more aligned to the benefits offered by NCRE) and the long term contracting of electricity. MINMINAS is also in the process of designing the auction mechanism that would allow renewable energy to compete on a level playing field in the market. It is expected that MINMINAS will issue a formal resolution with clear specifications on the design of the mechanism for the long-term contracting of electricity (auction and central offtake function), before the end of the term of the current administration (July 2018).

146. **The proposed Central Offtake Agency (COA) or other forms of long term offtake arrangements to fulfill this role may be undertaken by XM or another agency, such as the National Compensation Chamber, Central Risk Chamber, or DERIVEX.** Once the COA or other forms of long term offtake responsibility is assumed by any agency, there will be a need to evaluate ways to manage credit, liquidity and operational risks, that could be supported by adequate credit enhancement by IBRD/CTF Eligible Financial Products. Further review on the role of proposed COA or other appropriate offtake arrangement will be discussed as part of the auction design process.

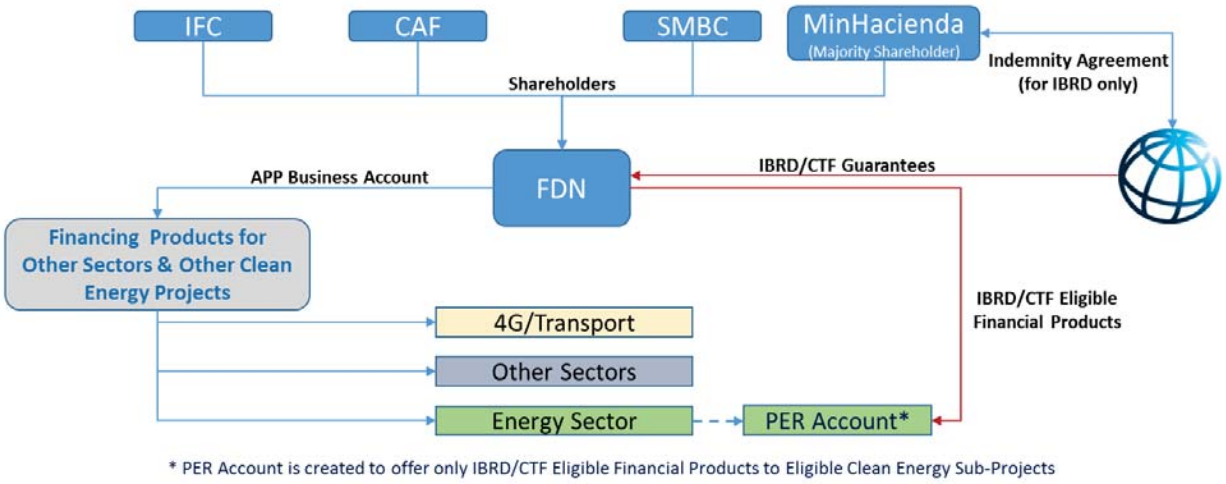
147. **The Project involves a Financial Intermediary structure to be implemented by FDN, in its capacity as Project coordinator and financial and credit enhancement provider, and MINMINAS in its capacity as implementing authority of PER** FDN's mandate is to be the principal catalyst in developing the infrastructure finance market in Colombia. It offers products and services, at competitive market rates, that are critical to financing infrastructure—including long tenor loans, subordinated debt, and credit enhancements.

148. **The implementing agency FDN, as a financial intermediary, has the main functions of catalyzing private investment in clean energy and supporting energy sector institutions in addressing some of the key market failures that prevent long term financing.** FDN will prepare and implement a program to support the financing of renewable energy and energy efficiency in Colombia. To develop the program - and in coordination with MINMINAS and UPME- FDN will maintain a continuous dialogue with key stakeholders (agencies) of the energy sector to discuss and promote the introduction of appropriate

market and regulatory measures necessary to strengthen the enabling environment for clean energy development in the country.

149. **For the Project, FDN will create a PER Account to offer IBRD/CTF Eligible Financial Products**. To segregate financial exposures related to IBRD/CTF Eligible Financial Products under the clean energy sector, FDN will establish within its financial and management accounting system, an internal business account, named as PER Account, as illustrated below. PER Account is not a distinct bank account or an off-balance sheet vehicle, but only a financial account within FDN. The PER Account will be created for accountability, reporting and traceability purposes such that all transactions made under the PER Account will be accounted and reported for by FDN to the WB.

Figure 3.1 FDN-PER Account



150. **FDN will also develop and maintain strong relationships with multilaterals, IFIs, DFIs, private commercial banks, institutional investors, rating agencies and sponsors with interested in participating in the clean energy market.** FDN is also currently strengthening its team to develop the program, including structuring projects and designing new financial products. The experiences brought by IBRD and CTF Guarantees, from other clean energy operations, will also help improve the capacity of FDN to design and provide IBRD/CTF Eligible Financial Products. A key role for FDN under the PER Account will be to select Eligible Sub-projects and Eligible Beneficiaries based on pre-defined eligibility criteria and to conduct detailed due diligence on the technical, economic, environmental and financial feasibility of Sub-projects. The eligibility criterion for Sub-Projects, Beneficiaries and Financial Products are defined in the Term Sheet in Annex 6. FDN will be the entity responsible for evaluating whether Sub-projects and beneficiaries meet the eligibility criteria. However, the sponsors and lenders for Sub-projects will be primarily responsible for their own due diligence, execution, monitoring and supervision. To implement the Project, a detailed Operations Manual will be developed, before Effectiveness of the Guarantees, that will set out the principles, operational policies and procedures, financial management procedures, implementation of performance standards (Environmental and Social Management System), reporting, monitoring and supervision requirements for eligible Sub-projects. The Operations Manual will also include a Business and Implementation Plan for planning and implementing the Project.

Financial Management, Disbursement, and Procurement

Financial Management Arrangements

Description and Assessment of Overall Project FM arrangements

151. **A Financial Management Assessment of the** *Financiera de Desarrollo Nacional (FDN* was carried out in accordance with the World Bank's Investment Project Finance policy for the implementation of the Colombia Clean Energy Development Project. FDN, as the Project executing agency, has the capacity to manage the FM aspects of the Project, including, managing the flow of funds, budgeting, accounting and reporting. The entity has sound internal controls and risk procedures, has financial policies and procedures in place, is audited by the Office of the Comptroller General of Colombia and by external auditors, and is supervised by the Financial Superintendence of Colombia due to its status as a financial institution. Nevertheless, the FM assessment identified some FM matters that could represent a moderate FM risk during Project implementation, as follows: i) FDN has no specific experience executing Bank-financed guaranteed projects; ii) FDN's fiduciary team [71] needs to strengthen its knowledge of policies and procedures for Bank guaranteed projects, and iii) FDN lacks experience in the design and development of financial products for clean energy Sub-projects, including procedures for due diligence, execution and monitoring. As a result, at entry, the overall FM-assessed risks for the Project are rated as moderate.

152. **The assessment has concluded that, to ensure acceptable financial management arrangements for project implementation, risk mitigation measures will be required, including**: (i) adoption of the Operations Manual with clear roles, responsibilities and procedures, including all related to FM arrangements; (ii) adequate training for FDN's fiduciary team; (iii) unaudited interim financial reports agreed and incorporated in the Project Operations Manual; (iv) audited financial statements will be required (prepared by auditors acceptable to the Bank). Additionally, FDN: i) shall ensure that a qualified fiduciary team is in place throughout Project implementation; ii) will maintain adequate FM arrangements throughout the life of the Project, and iii) throughout implementation, the supervision and coordination of FM aspects will be planned and executed according to FM risk ratings.

153. **FM action plan and FM-related conditions.** The action plan agreed upon as a result of the assessment is described in table below:

Table 3.1 FM action plan

Description of Action/Condition	By When
i) Project Operations Manual has been adopted by FDN in a manner satisfactory to the Bank, which shall include, *inter alia*, the following features: • An FM section that describes the planning and budgeting, accounting, financial reporting and monitoring of the overall PER Account during the Guarantee Period. • Documentation of financial management processes and procedures related to the IBRD/CTF Eligible Financial Products to be developed by FDN. • A section describing the review and due diligence process established by FDN, of the eligibility of Sub-projects and Beneficiaries of IBRD/CTF Eligible	Before Effectiveness of the Guarantees.

[71] *Fiduciary Team* refers to the members of FDN with precise roles related to supporting the design, development, risk management, procurement, financial management and other related matters of offering IBRD/CTF Eligible Financial Products to Eligible Sub-projects and Eligible Beneficiaries under the PER Account.

Financial Products for necessary internal approvals. • Unaudited interim financial reports and audited reports to illustrate the financial strength of FDN, such as regulatory core capital ratios and other relevant indicators and measures.	
ii) Fiduciary team has been trained in Bank policies and procedures and FDN shall ensure roles and responsibilities of PER Account fiduciary team are confirmed in the Project Operations Manual.	Before Effectiveness of the Guarantees.

154. **Implementation arrangements.** FDN will be the implementing agency and financial intermediary, and will have overall responsibility for the project implementation, monitoring and evaluation. FDN will enter into one or more Guarantee agreements under the Project. FDN will make use of the existing organizational infrastructure, processes and procedures for the execution of the Project. Project technical matters will be handled by the Financing and Structuring Vice-presidencies; while fiduciary and administrative matters will be assumed by the Finance, Treasury, and Operations Vice-presidencies. Final organizational structure, as well as roles and responsibilities to the project implementation, will be included in the Operations Manual.

155. **Staffing.** As noted earlier, FDN is adequately staffed and the FM functions will be performed through FDN's existing organizational structure, including planning, budgeting, accounting, internal controls, flow of funds management, as well as the preparation and reporting of financial information required by the Bank. Consequently, no additional hiring is envisaged at this stage of the Project. FDN will guarantee to retain qualified financial staff throughout Project implementation.

156. **Planning and Budgeting.** Funds for the Project will be part of FDN's own budget, which is approved by FDN's board of directors following the internal budget policies. FDN will be responsible for preparing and monitoring the annual operating plan and budget. FDN, through the Finance Vice-presidency, shall ensure budget allocation throughout the project life, in accordance with FDN policies and procedures. The budget, and any modification made to it, will be recorded and monitored through the enterprise resource planning – standard application and products (ERP SAP) systems.

157. **Accounting and financial reporting.** Financial statements of FDN are prepared in accordance with international financial reporting standards (IFRS), issued by the International Accounting Standards Board (IASB) and other financial reporting standards, issued by the Superintendencia. Budgeting, accounting and treasury functions will be integrated in the ERP SAP. FDN will have a specific accounting and reporting obligation to the IBRD/CTF under the PER Account, to be established in the Operations Manual. FDN is responsible for preparing the Project's financial reports and disbursement requests (as applicable, through a Demand Notice as explained in the Term Sheet in Annex 6), as will be specified in detail in the Operations Manual.

158. **Internal controls (control environment).** The Process Management, attached to the Operations Vice-Presidency, is the area in charge of maintaining a set of manuals and procedures that regulate the administrative processes of the entity and cover, among others, accounting, budgeting, procurement and financial reporting. This includes the continuity in procedures required to safeguard assets, ensure accuracy of the financial information and guarantee compliance with all financial and operational requirements. Moreover, Internal audit functions are carried out by FDN's Internal Audit Unit, which

reports directly to the presidency of FDN and has an internal audit charter and a manual defining the internal audit activity's purpose, authority, and responsibility. FDN shall maintain an adequate segregation of duties for each process and prepare an annual audit plan, including a specific plan for the PER Account. Additionally, because of the Government of Colombia's stake, FDN falls under the control and monitoring of the Office of the General Controller of Colombia.

159. **Unaudited interim financial reports (UIFRs) will be prepared by FDN**, under formats agreed with the Bank and to be documented in the Operations Manual. As mentioned above, this will include specific reporting of all accounting matters related to the PER Account. FDN will submit UIFRs on a semiannual basis within 45 days after the end of each such period. The UIFRs will serve as a basis for the annual financial statements and audit purposes.

160. **External audit arrangements.** In addition to FDN's overall annual financial statements, FDN will have an external audit for the PER Account. This will include, accounting for the IBRD/CTF guaranteed amounts and FDN's own financial exposures under the PER Account in its annual financial statements. These will be audited by its external auditors in line with International Standards on Auditing (ISAs). Each audit of the Financial Statements shall cover the period of one fiscal year of the Recipient. The audited financial statements will be submitted to the Bank no later than six months after the end of each audited period. Additional audit arrangements will be evaluated, agreed and documented in the Operations Manual.

161. **FDN shall retain all records (contracts, orders, invoices, bills, receipts, and other documents)**, evidencing expenditures for PER Account until at least the later of: (i) one year after the Bank has received the audited financial statements; and (ii) two years after the completion of Project. The FDN shall enable the Bank's representatives to examine such records.

162. **Access to information**. According to the access to information policy for the Bank-financed operations, FDN will disclose the audited financial statements on FDN's website. Following the IBRD's formal receipt of these statements from the Borrower, the Bank will make them available to the public.

163. **Implementation support and supervision strategy.** The Bank FM team will monitor all the FM action plans to ensure successful implementation and that the deadlines are met, and the FM risk rating may be updated accordingly. Moreover, during Project implementation FM supervisions will be conducted in accordance with the FM risk rating, and periodic unaudited IFRs and the annual external audit reports will be reviewed.

Disbursements

164. **Disbursement arrangements.** Disbursement will be contingent upon FDN filing a claim along with relevant document evidencing need for release of funds under IBRD and CTF Guaranteed Event, as specified in the Term Sheet (Annex 6), Guarantee Agreements (to be developed) and Operations Manual (to be developed).

165. **The World Bank "Procurement Regulations for Investment Project Financing (IPF) Borrowers" govern the procurement of goods, works, non-consulting services, and consulting services financed by the Bank (in whole or in part) through IPF operations.** As per the Section 2.2.a of the Procurement Regulation, procurement under Bank guarantees are excluded from these Regulations.

Environmental and Social

166. **FDN was created with business purpose, and operates on a commercial basis. Also, FDN is financially and managerially autonomous, and its day-to-day management is not controlled by the government.** Thus, FDN is considered a private entity for the purposes of OP 4.03 on Performance Standards for Private Sector Activities.

167. **The Project is classified as Category FI-2. IBRD and CTF will guarantee, through a financial intermediary (FDN), initially unspecified Sub-projects that may result in limited adverse environmental or social risks and impacts.** However, considering the types of eligible Sub-projects, the potential risks and impacts are expected to have well-known, moderate, site-specific and largely reversible impacts mainly related to construction (dust; noise, air, land and water pollution; access; potential of tree cutting, among others) and operation (potential adverse impacts on landscapes, local fauna, avifauna, and indigenous plants and trees). Only a very limited number of large-scale wind or solar energy Sub-projects are expected to have potential significant adverse environmental or social impacts and risks. Utility-scale photovoltaic power plants could require significant and long-term land acquisition and conversion, which could result in physical and/or economic displacement. Indigenous people in la Guajira may be particularly vulnerable if their lands and resources are transformed, encroached upon, or degraded because of solar energy projects and/or their ancillary infrastructure. The sound and visual impact of wind facilities can be a concern if neighboring communities are located near the project facility, and can generate opposition to the project. Both kinds of projects (utility-scale photovoltaic plants and wind farms) often require the establishment of worker accommodation camps involving an influx of outsiders into local communities. Indigenous Peoples, and especially women, are particularly vulnerable to this impact.

168. **However, the great majority of Sub-projects are expected to have limited adverse environmental or social risks or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures**. Only very few, if any, of the subprojects are expected to have significant adverse environmental or social risks or impacts that are diverse, irreversible, or unprecedented.

169. **As the Project involves a FI, only Performance Standards 1 and 2 are applicable. In those cases, the FI needs to develop and implement an Environmental and Social Management System (ESMS) commensurate with the level of social and environmental risks in the Bank-supported portfolio.**

170. **In 2014, IFC acquired 15,70 percent of FDN's total capital, as part of the transformation of FDN into a catalytic entity for infrastructure financing in Colombia.** With the support of the IFC, FDN developed an Environmental and Social Management System (ESMS) and capacity to review all Sub-projects in its portfolio per the applicable environmental and social laws and regulations and the Performance Standards.[72] Since 2015, FDN has adopted IFC's Performance Standards for its portfolio, especially in road infrastructure projects. In the past three years, FDN has developed capacities for the environmental and social management of the diverse activities related to infrastructure development, including the knowledge of and coordination with the local, regional, and national jurisdictional environmental impact assessment (EIA) systems.

[72] For more information, see: https://disclosures.ifc.org/#/projectDetail/SII/33862.

171. **During Project preparation, the Bank assessed the adequacy of the original ESMS developed with IFC's support for the upcoming portfolio of renewable energy Sub-projects.** After identifying some areas for improvement, the Bank proposed adjustments to better describe the steps and requirements of the due diligence process and other aspects of the ESMS. FDN fully incorporated those recommendations in the revised ESMS.

172. **Through the ESMS, FDN will ensure that all Sub-projects supported by the IBRD and CTF Guarantees comply with applicable national and local laws and regulations, and are implemented in a manner consistent with the Performance Standards.**

173. **FDN's senior management is ultimately responsible for environmental and social risk management and allocates the resources to implement the ESMS.** The Environmental and Social Department (ESD), under the Vice Presidency of Credit and Risks, is the unit in charge of day-to-day implementation of the ESMS. ESD relies on a team of qualified experts to conduct due diligence processes that integrate desk review with regular field activities in all stages of the Sub-project cycle – from design to construction, installation, operation and closure – and periodically informs FDN's senior management about its activities and Sub-projects' environmental and social performance. ESD currently comprises a director and a technical specialist. As both staff have a background in environmental engineering, upon the Bank's recommendation, FDN will hire a social development specialist to join the ESD team. FDN can hire such specialist either as a permanent employee of ESD or from a roster of qualified consultants, on a case by case basis depending on the type, area and other relevant characteristics of the Project. In all cases, from the screening stage onwards and prior to categorization, ESD will count with a social development specialist to assess the social impacts and risks of the Sub-projects under the PER account. As needed, FDN will also hire additional consultants to support the due diligence processes, in accordance with its ESMS.

174. **Additionally, the ESMS envisages continuous training on relevant social and environmental management topics, aimed at regularly improving its staff's capacity (not limited to the SED team) to apply the performance standards and national regulations to Sub-projects.** As part of the training program, FDN will conduct training on the use of performance standards in wind and solar Sub-projects, as specified in the ESMS. The Bank will support FDN in planning and conducting this learning activity.

Annex 4: Implementation Support Plan

COLOMBIA: Clean Energy Development Project

Strategy and Approach for Implementation Support

175. **The Plan will be implemented by the Bank team involved in the operation considering country level risks, legal framework, and local context.** The Implementation Support Plan is indicative and flexible, relies on experiences and lessons learned from Colombia and elsewhere, and will be revisited during Project implementation, based on progress made on the ground. The Bank strategy to support implementation will rely on continuous monitoring, advice for and interaction with FDN (as well as for MINMINAS, UPME, XM and CREG). Even though FDN will count with proven, capable, and experienced staff, hands-on and constant collaboration and advice will be necessary to overcome the challenges associated with the implementation of regulatory and market measures (auctions, establishment of a Central Offtake Agency), public auction arrangements and financial products development. The Implementation Support Plan (ISP) designed for the Project has been developed taking this into account, as well as the following factors: i) FDN has reasonable experience and proven capacity to implement infrastructure projects; it will be supported by the Bank in complying with Bank Performance Standards and IFC performance standards; ii) FDN will be supported by the Bank in designing and offering financial products that incorporate risk capital and risk premiums; and iii) FDN will also act as the coordinator of the PER with other stakeholders.

176. **Project Coordination and Review Mechanism** – a Project coordination and review mechanism (e.g., Committee[73]) will be introduced, with a membership composed of relevant ROC ministries and agencies and other stakeholders. MINHACIENDA and MINMINAS may participate as observers, should they so choose. The Committee's review shall happen not less than once per year, to monitor implementation progress, coordination, compliance, and other issues.

Overall Project Implementation

177. **Satisfactory implementation from start will require the following critical tasks to be undertaken:**

(a) Legal:

(i) The Bank team will work closely with FDN to assist FDN in expedite the preparation of relevant material Sub-project documents between all relevant stakeholders (for example, between the IPP and the off-taker).

(b) Technical:

(i) The Bank team will support the training and enlargement of the FDN team as well as relevant knowledge transfer between key stakeholders, as needed.

(ii) The Bank team will oversee progress with the design and implementation of auctions for NCRE and definition/implementation of a Central Offtake Function or other appropriate offtake Agency.

[73] To be explained in detail in the Operations Manual.

(iii) The Bank team will carry out and finalize the assessments supported by complementary support (PPIAF, NDCPF, GIF) as described in Annex 2.

(c) Financial:

(i) Bank team will undertake an analysis of FDN's PER Account and its sustainability with respect to provision of financial products, income and operational expenses.

(d) Financial management:

(i) Provide training, as needed, to FDN in the review processes, including financial reporting of PER Account.

(e) Safeguards

(i) The Bank team will provide training to FDN's environmental and social teams, products, commercial, risk and other relevant teams (as needed); and

(ii) The Bank team will supervise the implementation of FDN's Environment and Social Management System in accordance to the World Bank Performance Standards

(iii) The Bank team will support FDN in conducting and reviewing a cumulative impact assessment for potential wind power Sub-projects;

(f) M&E

(i) Support FDN in the drafting of terms of reference to prepare activities needed for a successful M&E framework and systems.

178. **Specific key issues to be addressed also include:**

(a) Implementation capacity

The development of a clean energy market in Colombia within the proposed years of Project implementation will be a key challenge (which requires the convergence in the introduction of various measures, as described in the body of this PAD and Annex 2):

There is a risk that the Project is affected by delays in decision making by various institutions - MINMINAS, UPME, XM, or CREG- as all of them need to deliver specific actions to launch the new platform required for the development of this market. To mitigate this risk, the Bank will provide complementary and targeted technical assistance to these relevant stakeholders on different areas (as described in Annex 2). The team will also provide support to FDN as needed, supervise the implementation of safeguards instruments by FDN, and prepare specific technical and safeguard guidelines and training activities with FDN through knowledge exchanges and sharing lessons learned elsewhere.

There is also a risk that FDN, as financial intermediary of the Project, does not perform its contractually required actions due to lack of experience and capacity, so that for instance if it does not manage its financial exposure adequately this could lead to a call on IBRD and CTF Guarantees. In addition, the call on IBRD and CTF Guarantees is also linked to the overall financial strength of FDN (refer to the Term Sheet in Annex 6) and therefore the risks around overall financial performance of FDN are also important. However, FDN has an established track record, albeit for a short time period, in managing similar exposures in the transport sector. The team will review the contractual relationship between ROC agencies and FDN to ensure adequate checks and balances, and will receive notices in the event of non-compliance with contractual obligations.

(b) Stakeholder involvement

Lack of Sub-projects and IBRD/CTF Eligible Financial Products not used in Large Scale and/or Small Scale Sub-Projects: The CTF PPG will help FDN engage more closely with Sub-project developers to support in development of pipeline of Sub-projects and potential use of IBRD/CTF Eligible Financial Products. As indicated in Annex 2, the Large Scale Sub-projects may advance earlier. Notwithstanding this, the exact role of FDN and use of IBRD/CTF Eligible Financial Products for Large Scale Sub-projects will be determined once the procurement of Sub-projects is completed. The Bank will continue to assist ROC agencies and provide implementation support to FDN in the assessment and development of this pipeline.

Implementation Support Plan

179. **The Bank team will undertake field visits when needed and convene technical workshops with FDN and relevant stakeholders as needed.** During Project implementation, the Bank will also maintain a constant presence in the field with at least two supervision missions per year (and at least 3 during the first year of implementation). The team will also support the continuous capacity building of FDN and will support training workshops for other stakeholders. The Bank will work together with FDN throughout the implementation period and continuously provide support via staff based in the country.

180. **Implementation support will be carried out at the following levels:**
(a) Technical: Technical staff will primarily be located in Washington and possibly in the Bogota office. Additional technical experts will also be engaged, especially to support the process of drafting regulations, and developing the rules to integrate and maximize the value of both renewable energy and energy efficiency (for example, to support the preparation of a revised grid code).

(b) Financial and Guarantees: As is usual for guarantee operations, specialized guarantee specialists and guarantee lawyers, respectively from the Financial Structuring and PPPs and from the Legal Structured Finance & Guarantees units, will provide advice and support from Washington D.C. in reviewing the Operations Manual, the development of IBRD/CTF Eligible Financial Products to be offered to Sub-projects, and in the supervision and monitoring of the PER Account and the Project.

(c) Safeguards: The Bank will support FDN with senior staff, as well as local experts and consultants, working both at Headquarters and in Bogotá.

181. **Based on the factors mentioned above, the implementation support plan (ISP) would focus on:**

i) Continuous training of FDN staff (including other ROC stakeholders, in regulation, auction mechanisms, central offtake arrangements, etc.) on design of suitable financial products, financial management and World Bank Performance Standards;
ii) Ensuring the FDN-PER Account receives sufficient income to pay for PER related costs, including due diligence and monitoring responsibilities, adequate liquidity, certain level of guarantee payouts, etc.
iii) Assisting FDN in the preparation and implementation of small scale renewable energy (RE) and energy efficiency (EE) aggregation vehicles; and
iv) Participating in Project Review meetings for both renewable energy and energy Sub-project implementation.

182. **The Implementation Support Plan is presented in the following table.**

Table 4.1 Implementation Support Plan

Time	Focus	Skills Needed/ Functional Specialist	Est. Staff week /year	Notes
	PER Account Monitoring	Energy Sector Specialists, Guarantee Specialists from Financial Structuring and PPPs; and Guarantee Lawyers from LEGSG	10	Specifically, for clean energy development and monitoring of FDN-PER Account financial performance.
	Training FDN and ROC Staff: The Bank will provide updated fiduciary and safeguards training, as needed.	Bank procurement, FM, and safeguards specialists.	4	
	Project Management and Coordination: The Bank will work with MINMINAS, UPME, XM, CREG and other ROC institutions to ensure effective coordination	Project Management	4-6	4-6 weeks per year during the first two years; 4 weeks subsequently.
	Project Monitoring and Evaluation: The Bank will work with FDN to develop and put in place a template for monitoring project implementation progress	Project Management M&E framework expert	4	Will be part of the Operations Manual (to be completed before effectiveness)
	Environment, Social, and Technical: Participate in Project Review meetings, on an as-needed basis	Safeguards Specialists and other members of task team	4	This ensures regular trips to project areas, as needed

Annex 5: Monitoring and Evaluation

COLOMBIA: Clean Energy Development Project

183. **Results monitoring and evaluation will primarily be the responsibility of FDN, as the financial intermediary and implementing agency.** The operation's support to all M&E tasks—as well as to overall Project implementation supervision and reporting—will be twofold: (i) FDN will develop and deploy monitoring and evaluation systems, indicators, reports, and other instruments as necessary through the Operations Manual, and (ii) relevant data and information will be gathered by FDN and relevant ROC stakeholders.

184. **IBRD M&E and implementation supervision will review:**
(a) *FDN's compliance with relevant agreements and the Operations Manual*. FDN should comply with the provision of the Guarantee Agreement(s) and Operations Manual for the implementation of the Project. This includes first establishing a segregated PER Account to provide IBRD/CTF Eligible Financial Products, followed by the adaptation of FDN's existing preparation and approval processes to meet clean energy sector requirements, for both Small Scale and Large Scale Sub-projects. The Project screening, identification and preparation processes will help follow up on initial activities and criteria that are needed to screen and approve potential supported Sub-projects. These activities would include the processes to appraise, implement, supervise, certify and accept potential Sub-projects using FDN financial products and in turn requiring IBRD and CTF Guarantees. The Sub-project beneficiaries (sponsors and lenders) hold primary responsibility for appraising the Sub-projects, however, FDN as a provider of IBRD/CTF Eligible Financial Products will have to ensure that the risks of such projects are properly assessed and mitigation mechanisms are adopted. The procedures for FDN to undertake this will be described in the Operations Manual. IBRD's supervision will monitor compliance with the Operations Manual.

(b) *Ex-post supervision of environmental and social safeguards compliance by FDN*. FDN will develop—including by adapting current processes—a detailed monitoring and evaluation system for clean energy Sub-projects. Taking into account the reporting obligations included in this PAD, the Operations Manual and any other agreement, the supervision and monitoring system will allow FDN to compile information, request, and gather data from relevant stakeholders and produce reports as needed. In particular, FDN will produce all monthly, biannual, mid-term and completion reports as well as satisfy any reasonable additional information needs the Bank may have. The Operations Manual will include further information on the monitoring system design, tasks, inputs needed, and methodologies.

(c) *Monitoring, at the PER Account level, of the results and impacts of implementation of Sub-projects including monitoring of FDN's overall financial performance to review potential risks of default from Sub-projects, which might lead to a call on IBRD/CTF Eligible Financial Products and in turn on the IBRD and CTF Guarantees*. FDN will produce periodic reports for the IBRD on the PER Account, including performance of Sub-projects, guarantee payouts made, if any, and assessment of probability of default of Sub-projects. In the event of a claim submitted by a beneficiary of an IBRD/CTF Eligible Financial Product, FDN will verify the claim and review potential recourse mechanisms. Where needed, FDN will hire external advisors to assess the validity of the claims. IBRD's monitoring and supervision will include a review of FDN's PER Account and overall business performance reports in relation to portfolio performance, potential risks and mitigation arrangements. The overall monitoring process of the PER Account will be included in the Operations Manual.

(d) *Monitoring of FDN's Financial Strength* – As IBRD and CTF 'trigger events' are linked to the regulatory

core capital ratio of FDN, reviewing and monitoring FDN's financial strength is critical. This will be undertaken through a review of audited and unaudited financial statements, and of credit rating reports. The Operations Manual will also provide details of financial reporting by FDN.

(e) *Monitoring of all Project indicators* - The key outcome indicators for this Project, such as renewable energy generation capacity, energy efficiency savings, CO_2 savings and private capital mobilization achieved by Sub-projects will be tracked at the aggregate level for the PER Account.

(f) *Monitoring regulations* – The Bank will track the evolution of the regulatory and procurement mechanisms considered and issued by MINMINAS, CREG, XM and other relevant institutions, including those that will support the operationalization of Decree 057, notably the mechanism for the long-term contracting of electricity (auctions) and the consideration of a Central Offtake Agency or other appropriate measures that address the regulatory and off-take risks.

(g) *Mid-term Review* – The Bank will conduct a Mid-term Review to assess progress towards reaching the PDO and propose any adjustments that may be required to achieve the PDO.

185. **The Project will also prepare the following reports**: baselines on renewable energy demand and supply prior to Sub-projects implementation; mid-term review report; impact assessment and evaluation, to be produced after implementation; and implementation completion and results report and associated documents.

Annex 6: IBRD Indicative Term Sheet

COLOMBIA: Clean Energy Development Project

Indicative Terms and Conditions of CTF and IBRD Guarantees

The International Bank for Reconstruction and Development ("**IBRD**"), acting for itself and in its capacity as implementing entity of the Clean Technology Fund (CTF), is considering supporting Financiera de Desarrollo Nacional ("**FDN**") through one or more IBRD guarantees and a CTF guarantee, each as further described below, in support of a new Clean Energy Development Project ("**CEDP**" or the "**Project**") for the development of renewable energy and energy efficiency in Colombia. This summary of indicative terms and conditions of these proposed guarantees (this "**Term Sheet**") is for discussion purposes only and does not constitute an offer to provide any guarantee. The provision of these proposed guarantees is subject, inter alia, to satisfactory appraisal of the Project by IBRD, compliance with all applicable policies of the World Bank, review and acceptance of the structure and project/transaction documentation by the IBRD, approval by the management and Executive Directors of the IBRD in their sole discretion, and final agreement by IBRD, FDN and the Republic of Colombia on the legal documentation for these proposed guarantees.

The Programa de Energía Renovable y Eficiencia Energetica ("**PER**")[74] of the Republic of Colombia ("**RoC**") seeks to assist the country in the mobilization of private investment for the development of renewable energy and energy efficiency. Within the framework of the PER, FDN will establish within its financial and management accounting system an internal account (the PER Account) for segregating financial exposure [75] under targeted financial products that will support the financing and development of renewable energy and energy efficiency projects in Colombia and that meet eligibility criteria for the proposed IBRD and CTF guarantees. The PER Account will be created solely for accountability, reporting and traceability purposes.

Definitions	
Sub-projects	"**Sub-projects**" means energy efficiency improvements and renewable energy projects implemented by project companies, aggregation vehicles, energy service companies, or similar; "**Large Scale Renewable Energy Sub-projects**" or "**LSRE Sub-projects**" means renewable energy sub-projects that have an installed capacity of not less than 20 MW[76];

[74] *Programa de Energía Renovable y Eficiencia Energética* (PEREE or PER) is the name of the program described in the CONPES document expected to be approved by, among others, the Colombian Ministry of Finance, Ministry of Energy and Mines, National Planning Department, and FDN in June/July 2018.

[75] Financial exposure refers to the concept of risk weighted assets, as calculated in accordance with Colombian Law and its main financial regulation (Decreto 2555).

[76] If there is any subsequent amendment in the definition of small or large scale renewable energy sub-project under the applicable law, FDN will seek approval from the IBRD/CTF on potential changes to classification of large and small scale sub-projects to be covered under the IBRD/CTF Guarantees.

	"**Small Scale Sub-projects**" or "**SS Sub-projects**" means renewable energy sub-projects that have an installed capacity of less than 20 MW, and energy efficiency improvements.
IBRD/CTF Eligible Sub-project	Means LSRE Sub-projects and SS Sub-projects implemented by a Private Entity(ies) (as defined below) that: (a) has the ability to manage the environmental and social aspects of the respective Sub-project in a manner compliant with World Bank Performance Standards and IFC Performance Standards; (b) meets industry standards for technical, financial and economic viability, financial management, and procurement, and (c) neither it, nor its affiliates nor direct or indirect shareholders, nor any person acting on their behalf is debarred by the World Bank for a Sanctionable Practice (i.e., a corrupt, fraudulent, collusive, coercive or obstructive practice) or sanctioned by the UN Security Council.
Private Entity	For IBRD/CTF guarantee purposes, a "private entity" is one that is wholly or predominantly privately owned or that is publicly owned but is an autonomous entity established and operating under commercial law for the purpose of pursuing profit.
IBRD/CTF Eligible Beneficiary	Means a direct beneficiary of an IBRD/CTF Eligible Financial Product that is a Private Entity, and that neither it, nor its affiliates nor direct or indirect shareholders nor any person acting on their behalf is debarred by the World Bank for a Sanctionable Practice or sanctioned by the UN Security Council. An IBRD/CTF Eligible Beneficiary may be different from the entity that is implementing the IBRD/CTF Eligible Sub-project.
IBRD/CTF Eligible Financial Products[77]	Credit enhancement products (e.g. liquidity guarantees, credit guarantees, payment risk mitigation guarantees, funded and/or unfunded contingent instruments, etc.) issued by FDN to IBRD/CTF Eligible Beneficiaries in support of IBRD/CTF Eligible Sub-projects and accounted for under the PER Account.
PER Account	A financial account created for segregating FDN's exposure resulting from IBRD/CTF Eligible Financial Products. Under the PER Account, FDN may issue IBRD/CTF Eligible Financial Products up to the PER Account Leverage Ratio (as defined below).
PER Account Leverage Ratio	Means the ratio of:

[77] All eligible financial products to be covered under IBRD/CTF Guarantees will be explained in an Operations Manual to be adopted by FDN and satisfactory to the World Bank, that will set out the principles, operational policies and procedures, eligibility criteria, financial management procedures, implementation of performance standards, reporting, monitoring and supervision of Sub-projects. For the avoidance of doubt, FDN may design and offer other financial products in support of the clean energy sector at its sole discretion and according to: (i) its internal policies on product design, and (ii) the specific needs of clean energy projects. Exposures under such other financial products will not be eligible to be covered under the IBRD/CTF Guarantees.

	$$\frac{[(Maximum\ IBRD\ Guaranteed\ Amount)\ + (Maximum\ CTF\ Guaranteed\ Amount)]}{[Expected\ Maximum\ Financial\ Exposure\ from\ IBRD/CTF\ Eligible\ Financial\ Products]}$$ wherein, • the *Maximum IBRD Guaranteed Amount* and *Maximum CTF Guaranteed Amount* are defined below; and • *Maximum Financial Exposure from IBRD/CTF Eligible Financial Products* is the aggregate financial exposure amount of IBRD/CTF Eligible Financial Products. The PER Account Leverage Ratio cannot exceed an amount to be determined by IBRD based on the final specialized financial regulatory treatment granted to the IBRD and CTF guarantees by the SFC (Superintendencia Financiera de Colombia).[78]
Provisions Specific to IBRD Guarantee(s)	
Guarantor:	International Bank for Reconstruction and Development ("**IBRD**" and, together with IBRD/CTF (as defined below), collectively, the "**Guarantors**" and each, a "**Guarantor**")
Purpose:	To support FDN's payment obligations under IBRD/CTF Eligible Financial Products by providing one or more[79] guarantees (the "**IBRD Guarantee(s)**") through FDN to IBRD/CTF Eligible Beneficiaries. FDN may call on the IBRD Guarantee(s) solely to pay a claim under an IBRD/CTF Eligible Financial Product (see Use of IBRD Proceeds below), upon the occurrence of an IBRD Guaranteed Event.
Timing for the signing of legal agreements:	The legal agreements for the IBRD Guarantee(s) are signed after IBRD Board approval and completion of negotiations. If such legal agreements are not signed within 24 months of IBRD's Board approval, IBRD may withdraw the offer of the IBRD Guarantee(s).
Use of IBRD Proceeds:	Proceeds from the IBRD Guarantee(s) may only be used to pay claims under IBRD/CTF Eligible Financial Products (a) in the case of amounts committed under the Large Scale IBRD Guaranteed Sub-Cap, solely to cover IBRD/CTF Eligible Financial Products in support of LSRE Sub-projects, and only after proceeds from the CTF Guarantee have been fully exhausted (see Provisions Specific to CTF Guarantee below), and (b) in the case of amounts committed under the Small-Scale Sub-Cap, solely to cover IBRD/CTF Eligible Financial Products in support of SS Sub-projects.

[78] If the SFC approves the proposed specialized financial regulatory treatment, the leverage ratio could be up to 5 times (1:5). Without full approval from SFC, the leverage ratio could be a minimum of 1 times.

[79] The timing of the implementation of the different sub-project categories (i.e. EE sub-projects, SSRE Sub-Projects, and LSRE Sub-Projects) will determine if IBRD guarantee support will be reflected under one IBRD guarantee agreement, or under separate IBRD guarantee agreements.

	Under no circumstance may any such proceeds be used for covering any other costs or expenses of FDN.
IBRD Guaranteed Event:	FDN may submit a demand notice for payment[80] under the IBRD Guarantee(s) (with a copy to Hacienda) ("**IBRD Demand Notice**") if and only to the extent that[81]: (a) one or more IBRD/CTF Eligible Beneficiaries have submitted valid claim(s) in connection with an IBRD/CTF Eligible Financial Products; (b) FDN's available resources accounted for allocation under the PER Account are insufficient to cover the entire eligible claim after taking into account available Liquidity Reserve (as defined below); and (c) FDN's available resources under any other liquidity and capital sources are insufficient to cover the entire claim(s).
Maximum IBRD Guaranteed Amount:	US$[41] million. In no instance, will IBRD have any liability to pay any amount under the IBRD Guarantee(s) in excess of the Maximum Guaranteed Amount. The Maximum IBRD Guaranteed Amount may be permanently reduced upon written request to IBRD from FDN [with copy to Min. Hacienda]. Such request (i) will permanently reduce the Maximum IBRD Guaranteed Amount in increments of at least $1,000,000 and integral multiples of [$500,000][82], (ii) may not be delivered more often than once every 12 months, (iii) will not carry any additional fee, charge or penalty for FDN, and (iv) will not require that IBRD reimburse any IBRD Guarantee Fees received that may relate to the reduced amount. Reductions of the IBRD Large Scale IBRD Guaranteed Sub-Cap will require a proportional[83] reduction of the Maximum CTF Guaranteed Amount.
Maximum IBRD Guaranteed Amount Sub-Caps for Small Scale and Large Scale Sub-projects:	A portion of the aggregate Maximum IBRD Guaranteed Amount of $[41] million will be available solely to cover SS Sub-projects (the "**Small Scale Sub-Cap**"), and the remaining portion will be available solely to cover LSRE Sub-projects (the "**Large Scale IBRD Guaranteed Sub-Cap**"). If IBRD support is provided through different guarantee agreements for LSRE Sub-projects and SS Sub-projects, the respective sub-caps will be included in the respective Guarantee agreements.
IBRD Proportionality	Means: $$\frac{[Large\ Scale\ IBRD\ Guaranteed\ Sub{-}Cap]}{[(Large\ Scale\ IBRD\ Guaranteed\ Sub{-}Cap) + (Maximum\ CTF\ Guaranteed\ Amount)]}$$

[80] Payment made by the IBRD under the IBRD Guarantee(s) will be limited to the then applicable Committed IBRD Guaranteed Amount.

[81] For LSRE Sub-Projects, IBRD Guaranteed Event will be coordinated with CTF Guaranteed Event to ensure Committed CTF Guarantee has been fully utilized before the Committed IBRD Guarantee can be called.

[82] If IBRD support is provided through different guarantee agreements for Large Scale and Small Scale, the $1,000,000 limit will be split proportionally between each IBRD guarantee agreement.

[83] In the context of exposures related to LSRE Sub-projects, IBRD proportionality is calculated as the ratio of Large Scale IBRD Guaranteed Sub-Cap to sum of Large Scale IBRD Guaranteed Sub-Cap and Maximum CTF Guaranteed Amount. In the context of exposures related to SS Sub-projects, IBRD's proportionality is 100%.

	wherein, • *Large Scale IBRD Guaranteed Sub-Cap* (as defined above); and • *Maximum CTF Guaranteed Amount* (as defined below)
Committed IBRD Guaranteed Amount:	The portion of the Maximum IBRD Guaranteed Amount that, in advance of each Fee Period (as defined below), FDN indicates to IBRD that is committed, and calculated as follows: **(a) During the Availability Period**: $$\{[Committed\ IBRD\ Guaranteed\ Amount\ at\ the\ beginning\ of\ the\ then\ current\ Fee\ Period] + [(PER\ Account\ Leverage\ Ratio) \times (Upcoming\ Maximum\ Financial\ Exposure) \times (IBRD\ Proportionality)]\}$$ wherein, • *PER Account Leverage Ratio* (as defined above) • *Upcoming Maximum Financial Exposure* is the financial exposure from all IBRD/CTF Eligible Financial Products that will be committed as of the first day of the upcoming Fee Period; • *IBRD Proportionality* (as defined above) **(b) After the end of the Availability Period**: $$[(PER\ Account\ Leverage\ Ratio) \times (Outstanding\ Maximum\ Financial\ Exposure) \times (IBRD\ Proportionality)]$$ wherein, • *PER Account Leverage Ratio* (as defined above) • *Outstanding Maximum Financial Exposure* is the outstanding financial exposure[84] from all the IBRD/CTF Eligible Financial Products as of the first day of the upcoming Fee Period. • *IBRD Proportionality* (as defined above) If IBRD guarantee support is provided through one single guarantee agreement for LSRE Sub-projects and SS Sub-projects, such committed amounts will include a break-down by the amount committed under the Small Scale Sub-Cap (the "**Committed Small Scale IBRD Guaranteed Amount**") and the amount

[84] For example, in the case of risk coverage provided through partial credit guarantee type of IBRD/CTF Eligible Financial Products, as each Eligible Sub-project reaches its commercial operations date (COD) and starts amortizing the loans, the respective financial exposure for FDN reduces to zero at the end of the risk coverage period.

	committed under the Large Scale IBRD Guaranteed Sub-Cap (the "**Committed Large Scale IBRD Guaranteed Amount**") (See Provisions Common to both Guarantee Agreements - Extension of Guarantee Coverage to IBRD/CTF Eligible Financial Products below). If IBRD guarantee support is provided through different guarantee agreements for LSRE Sub-projects and SS Sub-projects, FDN will report separately under each guarantee agreement the respective Committed Small Scale IBRD Guaranteed Amount and Committed Large Scale IBRD Guaranteed Amount.
Uncommitted IBRD Guaranteed Amount:	The Maximum IBRD Guaranteed Amount minus the Committed IBRD Guaranteed Amount. The Uncommitted IBRD Guaranteed Amount equals the sum of (1) the **Uncommitted Small Scale IBRD Guaranteed Amount** (i.e., the Small Scale Sub-Cap minus the Committed Small Scale IBRD Committed Amount) plus (2) the **Uncommitted Large Scale IBRD Guaranteed Amount** (i.e., the Large Scale IBRD Guaranteed Sub-Cap minus the Committed Large Scale IBRD Guaranteed Amount). IBRD shall have no obligation to make any payment with respect to any Uncommitted IBRD Guaranteed Amount.
Fee Period	Semi-annual.
Liquidity Reserve	Amount of funds set aside by FDN to be accounted for, in each year, under the PER Account based on an agreed level, calculated as a fixed percentage of the following year's annual financial exposure arising from Eligible Sub-projects supported by Eligible IBRD/CTF Financial Products. The reserve amount will be used only to meet payment obligations under any claims for sub-projects under the PER Account, as defined in the Operations Manual.
Regulatory Core Capital Ratio	Regulatory Core Capital Ratio is defined as the amount of regulatory core capital, as defined by the applicable Colombian financial regulation, divided by the amount of risk weighted assets.
Initiation Fee:	15 bps of the Maximum IBRD Guaranteed Amount (but not less than USD 100,000). Payable by FDN, if invoiced prior to effectiveness, as a condition of effectiveness of the IBRD Guarantee Agreement[85].
Processing Fee:	50 bps of the Maximum IBRD Guaranteed Amount. Payable by FDN, if invoiced prior to effectiveness, as a condition of effectiveness of the IBRD Guarantee Agreement[86].
Front-end Fee:	25 bps of the Maximum IBRD Guaranteed Amount payable by FDN as a condition of effectiveness of the first IBRD Guarantee Agreement[87].

[85] If IBRD support is provided through different guarantee agreements for Large Scale and Small Scale, the full Initiation fee will be payable as a condition of effectiveness of the first IBRD Guarantee to become effective.
[86] If IBRD support is provided through different guarantee agreements for Large Scale and Small Scale, the full Processing fee will be payable as a condition of effectiveness of the first IBRD Guarantee to become effective.
[87] If IBRD support is provided through different guarantee agreements for Large Scale and Small Scale, the full Front-end fee will be payable as a condition of effectiveness of the first IBRD Guarantee to become effective.

Standby Fee (recurring):	25 bps per annum of the Uncommitted IBRD Guaranteed Amount, accruing 60 days after the signing of the IBRD Guarantee Agreement[88]. The IBRD Standby Fee is payable no later than the effective date of the IBRD guarantee[89]. Standby Fee also applies if IBRD limits coverage of the IBRD Guarantee(s) pursuant to any limitation event. Payment of the Standby Fee is the obligation of FDN and must be paid in advance semi-annually (each such semi-annual period, a "**Fee Period**") on regular payment dates (each, a "**Recurring Fee Payment Date**"). IBRD will have the right to terminate the IBRD Guarantee(s) in the event of nonpayment of the Standby Fee.
Guarantee Fee (recurring)[90]:	[50-100][91] basis points per annum. The Guarantee Fee is assessed on IBRD's periodic committed and outstanding financial exposure under the IBRD Guarantee(s) (i.e., the Committed IBRD Guaranteed Amount). Payment of this fee is the obligation of FDN and must be paid in advance with respect to each Fee Period on the relevant Recurring Fee Payment Date. IBRD will have the right to terminate the IBRD Guarantee(s) in the event of nonpayment of the Guarantee Fee.
FDN Indemnity:	FDN will indemnify on demand and hold IBRD harmless against all actions, proceedings, liabilities, claims, damages, costs and expenses brought against, suffered or incurred by IBRD directly or indirectly in relation to or arising out of or in strict connection with the IBRD Guarantee Agreement. Prior to submitting a request to be indemnified, IBRD will notify FDN in writing of its intent and provide FDN an opportunity to express its views.
Indemnity Agreement	
Parties:	IBRD and the Republic of Colombia (the "**Member Country**")
Indemnity:	If for any reason whatsoever FDN has not fully indemnified IBRD within thirty (30) days of IBRD's request to FDN to do so pursuant to the IBRD Guarantee Agreement, to indemnify IBRD on demand and hold IBRD harmless against all actions, proceedings, liabilities, claims, damages, costs and expenses brought against, suffered or incurred by IBRD directly or indirectly in relation to or arising out of or in strict connection with the IBRD Guarantee Agreement
Covenants:	Usual and customary covenants included in indemnity agreements between member countries and IBRD.

[88] Or of the respective IBRD Guarantee Agreement, in the event that IBRD guarantee support is provided under separate IBRD Guarantee Agreements.

[89] If applicable, IBRD does not charge a standby fee in respect of an IBRD guarantee that does not become effective. As a condition of effectiveness, IBRD charges retroactively any standby fee that has accrued from 60 days after the signing of the IBRD Guarantee Agreement until the date on which the guarantee becomes effective.

[90] FY18 pricing. All fees will be updated based on the pricing applicable at the time of approval by IBRD's board of directors.

[91] The guarantee fee level is determined by the average life of the guarantee. FY18 Pricing: 50bps up to 8 years, 60bps from 8 to 10 years, 70bps from 10 to 12 years, 80bps from 12 to 15 years, 90bps from 15 to 18 years and 100bps from 18 to 20 years. The average life of the guarantee will be calculated separately for the Large Scale Sub-Cap and the Small Scale Sub-Cap.

Remedies:	If the Member Country breaches any of its obligations under the Indemnity Agreement, IBRD may suspend or cancel, in whole or in part, the rights of the Member Country to make withdrawals under any other loan or credit agreement with IBRD.
Governing Law:	The Indemnity Agreement will follow the usual legal regime and include dispute settlement provisions customary for agreements between member countries and IBRD.
Provisions Specific to CTF Guarantee	
Guarantor:	IBRD as implementing entity of the Clean Technology Fund ("**CTF**"; IBRD acting in such capacity, "**IBRD/CTF**").
Purpose:	To support FDN's payment obligations under IBRD/CTF Eligible Financial Products that support LSRE Sub-projects (a "**CTF Eligible Financial Product**") by providing a guarantee (the "**CTF Guarantee**") through FDN to IBRD/CTF Eligible Beneficiaries. FDN may call on the CTF Guarantee solely to pay a claim (see Use of IBRD/CTF Proceeds below) under a CTF Eligible Financial Product upon the occurrence of a CTF Guaranteed Event.
Use of IBRD/CTF Proceeds:	Proceeds from the CTF Guarantee may only be used to pay claims under CTF Eligible Financial Products. Under no circumstance may any such proceeds be used for covering any other costs or expenses of FDN.
CTF Guaranteed Event	FDN may submit a demand notice for payment [92] under the CTF Guarantee ("**IBRD/CTF Demand Notice**") if and only to the extent that: (a) one or more IBRD/CTF Eligible Beneficiaries have submitted valid claim(s) under CTF Eligible Financial Products; and (b) Payment by FDN using available Liquidity Reserve amount and other liquidity and capital resources would result in FDN's Regulatory Core Capital Ratio going below the minimum required Regulatory Core Capital Ratio applicable as of the date of the Guarantee Agreement.
Reimbursement by FDN to CTF and Reinstatement of CTF Guarantee	FDN will repay to IBRD/CTF any amounts drawn under the CTF Guarantee prior to the end of the FDN fiscal year in which the amount was drawn (the "Current FDN Fiscal Year"). FDN may delay the repayment of all or part of such amounts until no longer than the end of the next FDN fiscal year by posting, prior to the end of the then Current Fiscal Year, a first priority perfected security interest over liquid assets in an amount equivalent to 100% of the outstanding amounts. Any such amounts repaid by FDN will be reinstated and available for draw under the CTF Guarantee.

[92] Payment made by the IBRD/CTF under the CTF Guarantee will be limited to the then applicable Committed CTF Guaranteed Amount.

Maximum CTF Guaranteed Amount:	The aggregate of $[40] million. In no instance will IBRD/CTF have any liability to pay any amount under the CTF Guarantee in excess of the Maximum CTF Guaranteed Amount. The Maximum CTF Guaranteed Amount may be permanently reduced upon written request to IBRD/CTF from FDN. Such request (i) will permanently reduce the Maximum CTF Guaranteed Amount in increments of at least $1,000,000 and integral multiples of $500,000, (ii) may not be delivered more often than once every 12 months, (iii) will not carry any additional fee, charge or penalty for FDN, and (iv) will not require that IBRD/CTF reimburse any CTF Guarantee Fees received that may relate to the reduced amount. Reductions of the Maximum CTF Guaranteed Amount will requires a proportional[93] reduction of the Large Scale IBRD Guaranteed Sub-Cap.
CTF Proportionality	Means $$\frac{[Maximum\ CTF\ Guaranteed\ Amount]}{[(Large\ Scale\ IBRD\ Guaranteed\ Sub{-}Cap) + (Maximum\ CTF\ Guaranteed\ Amount)]}$$ wherein, • *Large Scale IBRD Guaranteed Sub-Cap* (as defined above); and • *Maximum CTF Guaranteed Amount* (as defined above)
Committed CTF Guaranteed Amount:	The portion of the Maximum CTF Guaranteed Amount that, in advance of each Fee Period (as defined above), FDN indicates to IBRD/CTF that is committed, and calculated as follows: (a) **During the Availability Period**: $$\{[Committed\ CTF\ Guaranteed\ Amount\ at\ the\ beginning\ of\ the\ then\ current\ Fee\ Period] + [(PER\ Account\ Leverage\ Ratio) \times (Upcoming\ Maximum\ Financial\ Exposure) \times (CTF\ Proportionality)]\}$$ wherein, • *PER Account Leverage Ratio* (as defined above) • *Upcoming Maximum Financial Exposure* is the financial exposure from all IBRD/CTF Eligible Financial Products that will be committed as of the first day of the upcoming Fee Period; • *CTF Proportionality* (as defined above) (b) **After the end of the Availability Period**: means

[93] CTF proportionality is calculated as the ratio of Maximum CTF Guaranteed Amount to sum of Large Scale IBRD Guaranteed Sub-Cap and Maximum CTF Guaranteed Amount.

	$$[(PER\ Account\ Leverage\ Ratio) \times (Outstanding\ Maximum\ Financial\ Exposure) \times (CTF\ Proportionality)]$$ wherein, • *PER Account Leverage Ratio* (as defined above) • *Outstanding Maximum Financial Exposure* is the outstanding financial exposure[94] from all the IBRD/CTF Eligible Financial Products as of the first day of the upcoming Fee Period. • *CTF Proportionality* (as defined above).
Uncommitted CTF Guaranteed Amount:	The Maximum CTF Guaranteed Amount minus the Committed CTF Guaranteed Amount. IBRD/CTF shall have no obligation to make any payment with respect to any Uncommitted CTF Guaranteed Amount.
Extension of CTF Guarantee Coverage to IBRD/CTF Eligible Financial Products:	Upon entering into a CTF Eligible Financial Product and providing to IBRD/CTF the related documentation demonstrating IBRD/CTF eligibility, in accordance with [PER Account Leverage Ratio and] requirements of the Operations Manual, such IBRD/CTF Eligible Financial Products will be accounted for under the PER Account and will benefit from CTF Guarantee coverage in accordance with the CTF Guarantee Agreement, and the Committed CTF Guaranteed Amount will be increased accordingly.
Counter-Guarantee:	Sovereign government counter-guarantee is not required for the CTF Guarantee, consistent with relevant CTF policy.
CTF Management Fee:	One-time charge of $200,000, to be payable by FDN to cover IBRD/CTF's appraisal, negotiation, supervision, disbursement and reporting costs, payable by FDN as a condition of effectiveness of the CTF Guarantee Agreement.
CTF Guarantee Charge:	0.1% per annum of the undisbursed balance of the Maximum CTF Guaranteed Amount (accrues to the CTF Trust Fund), payable [semi-annually] in advance by FDN. IBRD/CTF will have the right to terminate the CTF Guarantee in the event of nonpayment of the CTF Guarantee Charge.

[94] For example, in the case of risk coverage provided through partial credit guarantee type of IBRD/CTF Eligible Financial Products, as each Eligible Sub-project reaches its commercial operations date (COD) and starts amortizing the loans, the respective financial exposure for FDN reduces to zero at the end of the risk coverage period.

Payment of the Management Fee and the first installment of the CTF Guarantee Charge:	Immediately after the declaration of effectiveness of the CTF Guarantee.
Provisions Common to both Guarantees	
Counterpart:	FDN
Currency:	US Dollars
Availability Period:	A period starting on the Effective Date and ending on the earlier of (a) the fifth anniversary of the Effective Date of the IBRD Guarantee Agreement and (b) the date when the sum of the Committed IBRD Guaranteed Amount and Committed CTF Guaranteed Amount is equal to the sum of the Maximum IBRD Guaranteed Amount and the Maximum CTF Guaranteed Amount. Coverage under the Guarantees will only be available to support FDN payment obligations to IBRD/CTF Eligible Beneficiaries under IBRD/CTF Eligible Financial Products that are issued by FDN during the Availability Period. If the Availability Period ends on the fifth anniversary of the Effective Date, at the end of the Availability Period, the Maximum CTF Guaranteed Amount and the Maximum IBRD Guaranteed Amount (collectively, the **Maximum Guaranteed Amounts**) will automatically be reduced to the Committed IBRD Guaranteed Amount and the Committed CTF Guaranteed Amount, respectively.
Guarantee Period:	The Guarantees will be available until the [20th] anniversary of the Effective Date of the first Guarantee Agreement.
Guarantee Effectiveness Date:	Date on which all the conditions precedent to the effectiveness of each Guarantee have been met or waived (the "**Effective Date**").
Claim process:	FDN may submit a CTF Demand Notice to the IBRD/CTF following any CTF Guaranteed Event, and an IBRD Demand Notice to IBRD following any IBRD Guaranteed Event, provided that in the case of amounts committed under the Large Scale IBRD Guaranteed Sub-Cap, FDN must first submit a CTF Demand Notice, and may only submit an IBRD Demand Notice to the extent that there are not sufficient CTF funds available to cover the entire IBRD/CTF eligible claim. In the Demand Notice, FDN will certify, together with relevant documentary evidence (as defined in the Operations Manual), inter alia, as to each of the conditions to the existence of such CTF Guaranteed Event or IBRD Guaranteed Event, as the case may be. IBRD/CTF and/or IBRD, as the case may be, will pay within [TBD] number of days after its receipt of a conforming Demand Notice in accordance with the terms of the relevant Guarantee Agreement.

Funds recovered by FDN:	If any amount is recovered by FDN in respect of any payouts for eligible claims under the IBRD/CTF Eligible Financial Products, such amount (net of eligible recovery costs incurred by FDN) will be applied first, to reimburse the Guarantors (net of any reimbursement by the Republic of Colombia under the Indemnity Agreement) up to the amount of any outstanding payments made pursuant to the Guarantees, and second, to be allocated to the PER Account and available for use in paying further claims under IBRD/CTF Eligible Financial Products.
Reimbursement by FDN:	If, at the expiry of the Guarantee Period, any amount remains in the PER Account, FDN will apply such amount to reimburse the Guarantors for any payments made by the Guarantors under the Guarantee Agreements on a pro rata basis. The foregoing rights to reimbursement are in addition to the Guarantors' subrogation rights and other rights to recovery under the respective Guarantee-related agreements (including IBRD's rights under the Indemnity Agreement).
Exclusions:	Neither Guarantor will be liable for payment of any amount if any of certain exclusion events standard for transactions of this nature occurs, including but not limited to the following: (a) A non-conforming Demand Notice is made by FDN; (b) the call on the IBRD/CTF Eligible Financial Products in relation to which FDN has submitted a Demand Notice is made otherwise than in accordance with the relevant terms of the IBRD/CTF Eligible Financial Products [and the Operations Manual]; or (c) the call on the IBRD/CTF Eligible Financial Products in relation to which FDN has submitted a Demand Notice is connected to any act that constitutes a Sanctionable Practice in connection with the Project engaged in by: (i) FDN, or (ii) any person acting on its behalf, eligible beneficiaries, or [other eligible sub-project participants].
Limitation of Coverage:	If any of certain limitation events standard for transactions of this nature occurs and is continuing, including but not limited to the events listed below, each Guarantor may notify FDN (with a copy to MinHacienda) that any further IBRD/CTF Eligible Financial Products issued by FDN [TBD] days after such notice from such Guarantor will not be covered under the respective Guarantee until such Guarantor issues a revocation notice: (a) The Superintendencia Financiera or equivalent regulatory authority, or the Republic of Colombia in its capacity as FDN shareholder, has taken any action, which materially and adversely affects the operations or financial condition of FDN; (b) Suspension or lapse of Colombia from membership in IBRD, the International Development Association ("**IDA**") or the International Monetary Fund ("**IMF**"); (c) Suspension of lending by IBRD or IDA (if applicable) to Colombia;

	(d) Breach by FDN of its material obligations under the relevant Guarantee Agreement, which breach has not been remedied within the applicable cure period or it has not been waived by IBRD; (e) Breach by Colombia of any of its material obligations under the Indemnity Agreement; or (f) Under each Guarantee Agreement, a limitation notice being outstanding under the other Guarantee Agreement(s).
Termination of Coverage:	Each Guarantee Agreement may be terminated if: (a) FDN has failed to pay any installment of the IBRD or CTF Guarantee Charge, the Standby Fee or the Guarantee Fee; (b) FDN intentionally makes an untrue statement in, or intentionally omits material information or evidence from, a Demand Notice under such Guarantee Agreement; (c) FDN has engaged in Sanctionable Practices; (d) the Effective Date does not occur within [nine (9)] [[TBD] months from the date of signature of the respective] IBRD/CTF Guarantee Agreements; or (e) if the other Guarantee Agreement(s) is/are terminated. (f) if there is a material change in the nature or scope of the role of FDN with respect to the PER; (g) if FDN is dissolved or disestablished; or (h) if there is a material change in RoC's level of control of, or shareholding in, FDN, such that FDN ceases to be a public entity [TBD].
Conditions Precedent:	The conditions precedent to the effectiveness of the Guarantees under the Guarantee Agreements would include inter alia the following: (a) Execution, delivery and effectiveness of the Indemnity Agreement between the RoC and IBRD, in form and substance satisfactory to IBRD; (b) Execution, delivery and effectiveness of all other relevant agreements or amendments related to the PER program, establishment of the PER Account, all in form and substance satisfactory to the Guarantors; (c) Delivery of all legal opinions, satisfactory to the Guarantors, including legal opinions from: (i) the Ministry of Finance (*Ministerio de Hacienda*) relating to the Indemnity Agreement; (ii) in-house general counsel to FDN relating to the Guarantee Agreements; [and (iii) [to be determined]]; and (d) Payment in full of: (i) the Front-End Fee and the first installment of the Guarantee Fee and Standby Fee as applicable; (ii) the Initiation Fee and Processing Fee (if invoiced by IBRD to FDN); and (iii) the CTF Management Fee and the first installment of the CTF Guarantee Charge.
Representations and Warranties:	FDN will represent, among other standard and project-specific provisions, as of the Effective Date, that:

	(a) it is in compliance with applicable environmental and social laws and applicable World Bank Performance Standards and IFC Performance Standards; (b) neither it (nor, to the best of its knowledge after due inquiry, its direct and indirect shareholders and any other relevant project participants), nor any of its affiliates has engaged in any Sanctionable Practices[95] in connection with the PER. (c) customary corporate housekeeping representations and warranties (e.g. power and authority, binding obligations, requisite authorizations and consents in place, etc.).
Covenants:	FDN will covenant, among other things, that it will: (a) comply with applicable laws, including environmental laws, the applicable World Bank Performance Standards, and IFC Performance Standards; (b) provide annual audited financial statements, [semi-annual] interim unaudited statements and other reports of the PER Account[96]; (c) provide certain notices and other information to IBRD; (d) provide access to the sub-projects supported by IBRD/CTF Eligible Financial Products; (e) not engage in (or authorize or permit any affiliate or any other person acting on its behalf to engage in) any Sanctionable Practices; (f) comply with World Bank requirements relating to Sanctionable Practices regarding individuals or firms included in the World Bank Group list of firms debarred from World Bank Group-financed contracts; and (g) obtain IBRD's consent prior to agreeing to any change to any material [PER] related document to which it is a party which would materially and adversely affect the rights or obligations of IBRD or IBRD/CTF under either Guarantee Agreement.
Subrogation:	If and to the extent a Guarantor makes any payment under the respective Guarantee(s), such Guarantor will be subrogated immediately to the extent of such unreimbursed payment to the rights of FDN under the respective IBRD/CTF Eligible Financial Products, including any subrogation rights of FDN with respect to the beneficiary of such IBRD/CTF Eligible Financial Product (including, if applicable, any rights of FDN and/or such beneficiary to recover amounts from any government agencies whose actions/inactions may have resulted in the payment under the relevant IBRD/CTF Eligible Financial Product). To maximize the Guarantors' and FDN's ability to recover such unreimbursed payments, the Operations Manual will include obligations to ensure that such subrogation rights of the Guarantors and FDN flow down through the transaction documentation relating to the IBRD/CTF Eligible Financial Product, the beneficiaries thereof and the related sub-projects to allow the Guarantors to enforce such subrogation rights not only against FDN but also against IBRD/CTF Eligible Beneficiaries and their relevant counterparties.

[95] "Sanctionable Practices" include corrupt, fraudulent, collusive, coercive, or obstructive practices, as defined in IBRD's Anti-Corruption Guidelines.

[96] Formats for reporting requirements (other than Audited Financial Statements) will be included in the Operations Manual.

	IBRD will not exercise its subrogation rights with respect to the IBRD Guarantee(s) to the extent IBRD is reimbursed for such payment by the Republic of Colombia under the Indemnity Agreement.
Governing Law:	New York Law
Dispute Resolution:	Arbitration in Washington, DC according to UNCITRAL Arbitration Rules.

IBRD/CTF Documentation

Guarantee Agreement(s):	The terms and conditions of the CTF Guarantee and the IBRD Guarantee(s) will be set out in the CTF Guarantee Agreement and the IBRD Guarantee Agreement(s), respectively, to be entered into between FDN and IBRD/CTF or IBRD, respectively. The Guarantee Agreements also set out certain warranties, representations and covenants of FDN, including, but not limited to, provision of relevant Project-related information, compliance with applicable World Bank Performance Standards and IFC Performance Standards, World Bank requirements relating to Sanctionable Practices and the Operations Manual in form and substance satisfactory to IBRD.
Cooperation Agreement/Memorandum of Understanding/ Letter of Support[97]:	RoC, acting through the Ministry of Mines and Energy, will provide to IBRD in the form of a Cooperation Agreement, or a Memorandum of Understanding or a Letter of Support, inter alia, PER related undertakings, including provision of relevant information.
Operations Manual:	The Operations Manual means the Operations Manual of the Project to be adopted by FDN and satisfactory to the World Bank, as such manual may be amended by the FDN from time to time with the prior written consent of the World Bank][98].

[97] Precise form TBD.

[98] The Operations Manual will contain operating procedures for the implementation of IBRD/CTF Guarantees, including guidelines on eligibility of sub-projects and beneficiaries, description of each IBRD/CTF eligible financial product, due diligence criteria, processes, documentation, monitoring and reporting requirements of sub-projects, compliance requirements for financial management including financial reporting, WB performance standards and other operational related aspects.

Annex 7: Economic and Financial Analyses

COLOMBIA: Clean Energy Development Project

Economic Analysis

186. **The analysis, based on an indicative split of Sub-projects between large scale and small scale Sub-project categories, confirms the economic attractiveness of the Project and of its major Categories.** All Project Categories, including large scale Renewables (Solar and Wind), Small-scale Renewables (self-generation, co-generation projects and Independent Power Producer (IPP), and Energy Efficiency projects exhibit positive NPVs and IRRs. These projects will also generate positive externalities, notably regarding GHG emissions reductions.

187. **The economic analysis shows that the Economic Internal Rate of Return (EIRR) and Net Present Value (NPV) are strong.** The EIRR is 11.2 percent and 17.5 percent for large scale wind and solar projects, respectively. The EIRR for small-scale renewable energy projects (<20 MW) is 20.1 percent. Among small scale renewable energy projects, the EIRR for co-generation is 24.0 percent, the largest, with a NPV (US$ 84 million) about 1.5 times the investment amount (US$ 60 million). The NPV is US$ 238 million for wind (503 MW), US$ 58 million for solar (75 MW) and US$ 242 million for small scale renewables (138 MW). Sensitivity analysis based on change in capacity factor, energy price/tariff, emission factor and investment cost shows that EIRRs for both renewable energy (including large and small-scale) and energy efficiency projects are robust to such changes. The tables below show key assumptions and results and the generation per renewable technology awarded.

Table 7.1 Economic Analysis - Key assumption and results

Assumption	Unit	Category 1 -Large Scale Renewable		Category 2- Small Scale Renewable	Category 3- Energy Efficiency
		Wind	Solar	Small RE	EE
Capacity – total	MW	503	75	138	-
O&M cost*	USD/MWh	12.6	12.6	19.6	5
Capacity factor*	percent	40%	22%	65%	90%
Estimated investment cost*	US$ million/MW	1.3	1.0	1.7	
Benefit of displaced/saved energy**	US$/MWh	0.04	0.09	0.09	0.08
Grid emission factor***	tCO2/MWh	0.283	0.283	0.283	0.283
Carbon benefit	US$/tCO2	40	40	40	40
Energy Loss	Percent	4%	5%	5%	3%
Project Life Span	Year	25	25	20	15
Degradation Factor (linear p.a.)	Percent	0%	0.70%	0.50%	0
Discount rate	Percent	6.10%	6.10%	6.10%	6.10%

Economic NPV - base case	USD Million	238	58	242	117
Economic IRR - base case	%	11.2%	17.5%	20.1%	40.2%
EIRR - 20% capacity factor decrease	%	8.0%	12.9%	15.0%	40.2%
EIRR - 20% energy price decrease	%	7.9%	12.7%	14.4%	32.4%
EIRR - 20% investment cost increase	%	8.5%	13.6%	15.8%	33.2%
EIRR - 20% emission factor decrease	%	6.9%	14.5%	16.6%	34.6%

Note: The project size under each category is based on demand and feasibly studies. The allocation amount in terms of capacity added and investment in the small-scale renewable category is based on historical and current project lists provided by FDN and USAID.

*Weighted average among technologies within the small RE category

** The benefit of displaced energy /energy tariff refers local energy price in each scenario.

*** The current number references Dispatch Scenarios model developed by UPME (2015-2029). This number is also consistent with the emissions factor reported by the International Energy Agency for Colombia, which is around 0.283 (weighted average of "operating" and "build" margins).

Table 7.2 Investment required, generation capacity and estimated annual generation by technology type

	Investments	**Capacity**	**Generation**
	US$ Million	**MW**	**GWh/year**
Category 1 Large RE			
Wind	$661	503	1692
Solar	$75	75	123
Category 2 Small RE			
Co-generation	$60	27	200
Self-Generation	$88	40	11
IPP<20 MW	$85	71	145
Category 3 Energy Efficiency	**Investment**	**Capacity**	**Generation Avoided**
Energy Efficiency	$46	---	227
Total	**$1,015**	**716**	**2,398**

188. **The Colombia Clean Energy Development Project, including scaling up of renewables and energy efficiency, will help the country's ongoing efforts to decouple energy consumption from economic growth.** Associated benefits include: (i) enhanced power system robustness through the diversification of the energy matrix and exploitation of the abundant renewable energy resources in the country; (ii)

displaced fossil fuels for energy generation; (iii) contributions to increased national energy security; (iv) increased renewable energy installed capacity in the short, medium and long term; (v) incentivizing and developing the national renewable energy industry and its value chain (equipment manufacturers and services providers); and (vi) mitigating related risks, allowing Colombia to minimize energy prices in the long term.

Greenhouse Gas (GHG) Analysis.

189. **The Project will have a positive impact on the environment, especially in the reduction of GHG emissions.** The GHG emission reductions have been estimated for 0.74 million MtCO2eq annually. The following assumptions were considered in the calculation of the emission reductions: (i) a grid emission factor of 0.283 CO2/MWh[99] as per the UPME Dispatch Scenarios model; and (ii) a plant load factor for each technology have been estimated based on the project list provided by FDN, USAID and ANDI as well as Bank renewable energy project experiences in LAC.

190. **Based on the assumptions mentioned above, the Project is expected to result in a total reduction of 17.3 million MtCO2 over the life of the CTF/IBRD Guarantee.** The 0.74 million Mt CO2eq reduction per year is equal to approximately 19.2 percent of the GHG emissions generated by Colombia in 2016.

Table 7.3 GHG emission reductions

	Generation	**CO2eq reduced**
	GWh/year	**tons/ year**
Category 1 Large RE		
Wind	1692	478,800
Solar	123	23,715
Category 2 Small RE		
Co-generation	200	56,627
Self-Generation	11	65,675
IPP<20 MW	145	41,200
	Generation avoided (energy savings)	**CO2eq reduced**
Category 3 Energy Efficiency		
	227	62,433
Total	**2,398**	**739,535**

[99] The number refers to the Dispatch Scenarios (model) prepared by UPME (Planning Agency for Colombia Energy and Mining Sector).

Financial Analysis

191. **The guarantees required by the Sub-projects are provided directly by FDN.** However, it is important to assess that the selected Sub-projects by FDN are financially viable and sustainable to minimize potential calls on FDN guarantees, and in turn IBRD and CTF Guarantees. The criteria and process for selection, due-diligence, implementation and monitoring of Sub-projects will be included in the Operations Manual. To assess financial viability of Sub-projects, an indicative financial analysis was prepared, the results of which are presented below. In addition, a program level model for the PER Account was also prepared to assess its financial sustainability. The program model was also used to assess the level of potential shortfalls at the PER business account that might trigger calls on CTF and IBRD guarantees. For the purpose of this analysis, assumptions used in the financial models are more conservative than what is expected in renewable energy sectors in similar regions and the actual outcome of the sub-projects could be more favorable to the government or end-users of Colombia**.**

High level analysis of indicative Sub-projects

192. **Conclusion from high level analysis of a typical large-scale wind energy sub-project confirmed the viability of Sub-projects, under a set of assumptions extracted from results of recent auctions in LAC region[100] and based on informal market sounding.** The Financial Internal Rate of Returns (FIRR) - Project IRR (PIRR) of 8.0 percent and the shareholder or Equity Internal Rate of Returns (SIRR) of 10.7 percent, is competitive compared to similar projects in the region. The financial debt service ratios reflecting the ability to service debt[101] also confirm the financial viability of sub-projects. Sensitivity analyses were conducted to determine the impact of capacity factor, energy price, investment costs and financing costs. The results demonstrate PIRR over 8.0 percent and cover ratios in all upside scenarios for large scale wind Sub-projects. For large-scale solar, the auction price of solar energy is expected to reach as high as US$ 79/MWh to achieve a SIRR of 11.2 percent, due to the relatively weak geographical condition for generating solar energy in Colombia, resulting in a low solar capacity factor of 22 percent. The results indicate wind energy is a more competitive source than solar energy in Colombia.

193. **Unlike large scale, small scale solar sub-projects will not be traded through the public auction market but through negotiations with private and unregulated entities.** As small-scale sub-projects will not benefit from economies of the scale, long term financing and long term PPA, we expect unit investment cost to be higher, resulting in higher solar energy prices compared to large scale solar energy Sub-projects (US$ 79/MWh). Based on this, we assumed the solar energy price as US$ 114/MWh in our model. The results show financial viability, with PIRR of 8.2 percent and SIRR of 10.0 percent. Scenario analyses demonstrate small scale sub-projects are highly sensitive to impact of changes in capacity factor, tariff, investment and financing costs. Similarly, obtaining financing may also be a challenge due to smaller investment amounts and high transaction costs. As mentioned in Annex 2, small scale Sub-projects can be executed through Aggregation Vehicles, which can aggregate the sub-projects and benefit from economies of scale in financing and transaction costs. The tables below show the key assumptions and results.

Table 7.4. Financial Analysis of a Renewable Energy Sub-project

		Large Scale Wind	Large Scale Solar	Small Scale Solar
Installed Capacity	MW	50	50	20

[100] From the results of recent auction prices from Argentina, Peru, Mexico, Chile and Brazil.

[101] Through calculation of cover ratios such as Debt Service Cover Ratio (DSCR) and Loan Life Cover Ratio (LLCR)

Capacity Factor	%	40	22	22
Energy Price	U$/MWh	48	69	114
Unit Investment Cost	1000U$/MW	1310	1000	1200
Unit Operating Cost	U$/MWh	2.5	2.2	2.2
Degradation	%/Year	0	1%	1%
Debt	%	75	75	75
Weighted Average Cost of Debt	%	7.6	7.6	8.8
Length of Financing	Year	15	15	8
Duration of PPA Contract	Year	20	20	10
Financial Viability Criterion	**Min. Required (Large-scale only)**	**Base Case**	**Base Case**	**Base Case**
Project IRR	8%	8.00%	8.00%	8.20%
Shareholder IRR	10%	10.70%	10.80%	10.00%
Average DSCR	1.30	1.48	1.46	1.31
Minimum DSCR	1.10	1.1	1.13	1.16
LLCR	1.23	1.27	1.25	1.19

Table 7.5. Sensitivity Analysis of Typical Renewable Energy Sub-project

	A. Capacity Factor (%)		B. Energy Price (U$/MWh)		C. Unit Investment Cost (1000U$/MW)		D. Financing Cost (%)	
	Downside	Upside	Downside	Upside	Downside (10%↓)	Upside (10%↑)	Downside (10%↓)	Upside (10%↑)
1) Large Scale Wind	**35%**	**45%**	**38**	**58**	**1,441**	**1,179**	**8.3**	**6.9**
Project IRR	6.5%	9.5%	5.4%	10.5%	7.0%	9.3%	8.0%	8.0%
Shareholder IRR	7.2%	14.5%	5.4%	17.5%	8.1%	14.1%	9.8%	11.6%
Average DSCR	1.29	1.61	1.15	1.70	1.34	1.60	1.43	1.52
LLCR	1.11	1.41	1.00	1.51	1.16	1.40	1.21	1.33
2) Large Scale Solar	**20%**	**24%**	**69**	**89**	**1,100**	**900**	**8.3**	**6.9**
Project IRR	6.7%	9.1%	6.1%	9.6%	6.7%	9.4%	7.9%	7.9%
Shareholder IRR	7.7%	14.8%	6.3%	16.3%	7.7%	15.6%	10.2%	12.4%
Average DSCR	1.22	1.45	1.18	1.50	1.22	1.48	1.30	1.38
LLCR	1.15	1.36	1.10	1.40	1.15	1.38	1.21	1.30
3) Small Scale Solar	**20%**	**24%**	**104**	**124**	**1,320**	**1,539**	**9.6**	**9**
Project IRR	5.9%	10.4%	5.9%	10.3%	5.9%	10.8%	8.1%	8.1%
Shareholder IRR	3.5%	16.3%	3.7%	16.1%	3.5%	17.6%	8.5%	11.5%
Average DSCR	1.19	1.43	1.20	1.43	1.19	1.46	1.28	1.35
LLCR	1.08	1.30	1.09	1.30	1.08	1.33	1.16	1.23

194. **Two model energy efficiency Sub-projects were also analyzed to confirm their financial viability.** A combustion efficiency sub-project that increases the energy efficiency of a pulp and paper manufacturing facility by optimizing the combustion process[102] was considered as one of the example Sub-projects. This Sub-project is expected to generate a benefit of US$ 1.45 million per year with the required investment of US$ 2.5 million. The results of the analysis confirmed a strong financial viability with a PIRR of 49 percent and an SIRR of 138 percent, showing an average DSCR of 3.05X and LLCR of 3.10X. Scenario analysis demonstrates robust results up to a 150 percent increase in investment costs and a 58 percent decrease in revenues. Similarly, an efficient motors Sub-project that improves the energy efficiency of electric motors, by replacing around 100 units in the textile industry was also considered. It is expected to require a total investment of about US$ 1.46 million which can bring about US$ 0.492 million of savings per year. The results demonstrate a strong financial viability with a PIRR of 26 percent and a SIRR of 51 percent, with healthy cover ratios. Scenario analyses also suggests robust results up to a 39 percent increase in investment costs and a 25 percent decrease in yearly revenue. The tables below show key assumptions and results.

Table 7.6. Financial Analysis of Energy Efficiency Sub-project

		Combustion Efficiency	Efficient Motors
Revenue	1000U$/Year	1,445	492
Total Investment Cost	1000U$	2,500	1,460
Energy Loss	%	3	3
Operating Cost	1000U$/Year	45.5	38
Debt	%	75	75
Weighted Average Cost of Debt	%	9.9	9.9
Length of Financing	Year	7	7
Project Life	Year	15	15
Financial Viability Criterion			
	Min. Required	**Base Case**	**Base Case**
Project IRR	8%	49%	26%
Shareholder IRR	10%	138%	51%
Minimum DSCR	1.10	1.20	1.20
Average DSCR	1.25	3.05	1.82
LLCR	1.3	3.1	1.81

B. Financial viability assessment of FDN's PER Account:

Overview

195. **A high level financial model was prepared to determine the financial viability of FDN's PER Account.** As mentioned before, FDN will segregate the clean energy sector account from other sectors through the PER Account to offer IBRD/CTF Eligible Financial Products as well to receive specialized financial regulatory treatment. Thus, the financial viability in this context of the PER Account can be

[102] It consists of reclaiming the spent pulping chemicals in the "black liquor," to capture the heating value as steam, to generate electricity and/or supply process steam that the process needs.

considered as the ability to manage financial exposures from IBRD/CTF Eligible Financial Products through potential fee income, adequate loss exposure amounts and liquidity reserves such that the minimum requirements of Colombian regulatory core capital requirements are always maintained for the duration of the Project. This financial viability is assessed over a 20-year horizon, covering the initial 5-yearAvailability Period during which both IBRD/CTF Eligible Financial Products are committed; and the remaining 15 years (to match the expected length of commercial finance loans) when Sub-project loans are amortized. The projections are based on an indicative pipeline supported by IBRD/CTF Eligible Financial Products for Eligible Sub-projects over 5 years at an estimated total investment cost of $1,015 million. Several assumptions for the PER Account – such as risk capital reserves and financing terms for IBRD/CTF Eligible Financial Products – were made based on discussions with FDN. For the high level financial model, a single[103] product (partial credit guarantee with 80% risk coverage on principal) was assumed to be provided to commercial lenders to provide long term financing to Sub-projects. The financial projections were analyzed under different scenarios for underlying Sub-project portfolio performance (i.e. loss rates) under the PER Account as well as FDN's overall business performance. The scenario analyses tested the probability that the IBRD and CTF Guarantees backstopping FDN's payment obligations to IBRD/CTF Eligible Financial Products might be called**.**

196. **A detailed model for the PER Account will be developed as part of the Operations Manual to reconfirm the financial viability**. Considering the early stage of the Project, the results of this financial analysis are provisional and based on the initial Sub-project information. A detailed model is expected to be developed as part of the Operations Manual once the timeline for large scale renewable energy auctions is confirmed and small-scale aggregation models are structured and thus, its inputs and outputs will be reviewed and audited for consistency and accuracy purposes.

Results and sensitivity analysis

197. **In the base case scenario (table below), FDN issues a gross[104] of US$405 million in IBRD/CTF Eligible Financial Products, as illustrated below.** The proposed specialized financial regulatory treatment is expected to allow FDN to consider only a 20 percent[105] risk weighting for risk weighted assets from IBRD/CTF Eligible Financial Products that is backstopped by IBRD and CTF Guarantees. When IBRD/CTF Eligible Financial Products from FDN are committed to Sub-projects, new risk weighted assets will be created under the PER Account. The IBRD and CTF Guarantees will be committed up to PER Account leverage ratio[106] in line with the commitments of IBRD/CTF Eligible Financial Products. If large scale renewable energy and small scale Sub-projects are implemented up to an investment amount of US$ 1,015 million with the use of IBRD/CTF Eligible Financial Products, the PER Account is expected to

[103] As defined in the Term Sheet in Annex 6, FDN will be developing a number of credit enhancement and risk mitigation products under the IBRD/CTF Eligible Financial Products, however, for the high-level modelling purposes a single partial credit guarantee product was assumed.

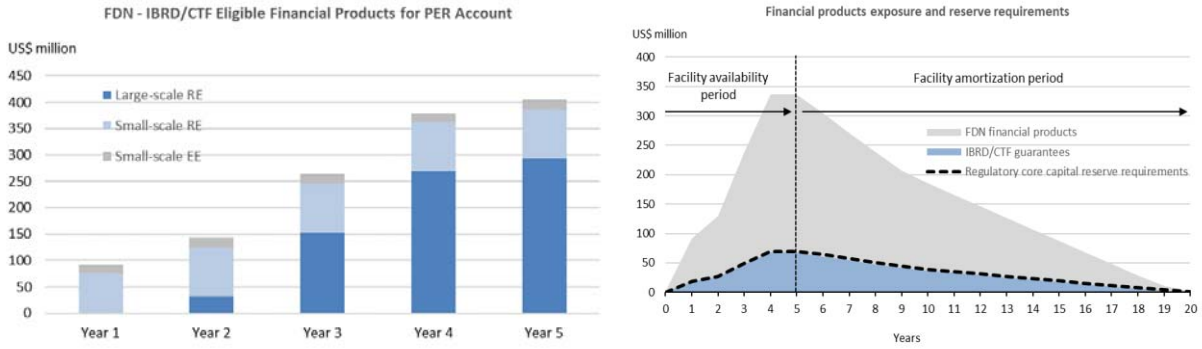
[104] Gross commitment refers to commitments made for all Eligible Sub-projects within the Availability Period of 5 years from the effectiveness date. However, energy efficiency sub-projects are expected to have a much shorter loan life than renewable energy sub-projects, thus allowing potential reductions in financial exposure and guarantee amounts within the Availability Period.

[105] Subject to confirmation from the Superintendencia (SFC) on the financial regulatory treatment of IBRD and CTF Guarantees.

[106] The ratio of (a) the sum of the Maximum IBRD Guaranteed Amount and the Maximum CTF Guaranteed Amount to (b) the aggregate amount of IBRD/CTF Eligible Financial Products accounted for under the PER Account.

mobilize US$761 million of private capital (US$254 million equity and US$508 million debt), implying an expected leverage ratio of 9 for IBRD and CTF. The cumulative commitments of IBRD/CTF Eligible Financial Products within the Availability Period of 5 years, and thus in turn the IBRD and CTF Guarantees, are illustrated below.

Figure 7.1: FDN-IBRD/CTF Eligible Financial Products and IBRD/CTF Guarantee commitments



198. **The high-level model indicates the financial viability of the PER Account throughout the 20-year Project duration, generating sufficient cash flow to meet operating and financing expenses and cover potential guarantee claims.** The PER Account net earnings are expected to be sufficient to cover all potential guarantee claim payouts based on an assumed probability of default of Sub-projects over the 20-year period. In the base case scenario, the estimated total commercial lending amount for the whole project portfolio is approx. US$508 million and the amount of IBRD/CTF Eligible Financial Product provided to the commercial lenders is US$405 million, based on an assumed partial credit guarantee coverage of 80 percent. The model was also tested with shocks to three key variables affecting the PER account: (1) default rates for the underlying portfolio of Sub-projects; (2) the coverage rate of FDN's partial credit guarantee; and (3) the pricing of FDN's partial credit guarantees. High-level sensitivity results indicate robustness of PER Account cash flows without the need for calling additional capital resources from FDN.

199. **The likelihood of a call on CTF and IBRD guarantees is linked to the available liquidity and to capital resources available within FDN to meet its minimum regulatory core capital requirements.** As indicated in the Term Sheet in Annex 6 and the claims waterfall in Annex 2, the CTF Guarantees are called when FDN fails to meet its minimum regulatory core capital ratio requirements of 9 percent; and IBRD Guarantees are called when FDN is considered defaulted under the Colombian financial regulation and thereby, the Superintendencia or other relevant authorities have stepped in to undertake the operations of FDN, including any payouts under the IBRD/CTF Eligible Financial Products. The regulatory core capital ratio[107] and risk-weighted assets[108] (or financial exposure) are calculated as per table[109] below, based on data from Fitch Ratings report.

Table 7.8. Regulatory Core Capital calculation (Source: Fitch Rating Report, Jan 9, 2018)

[107] Refer Annex 6 – Term Sheet for definitions of regulatory core capital and regulatory core capital ratios

[108] For this Annex, the terminology 'risk weighted assets' are used for consistency with regulatory and credit rating reports. However, risk weighted assets were referred to as 'financial exposure' in other parts of this document.

[109] For 2017, only half yearly results were reported.

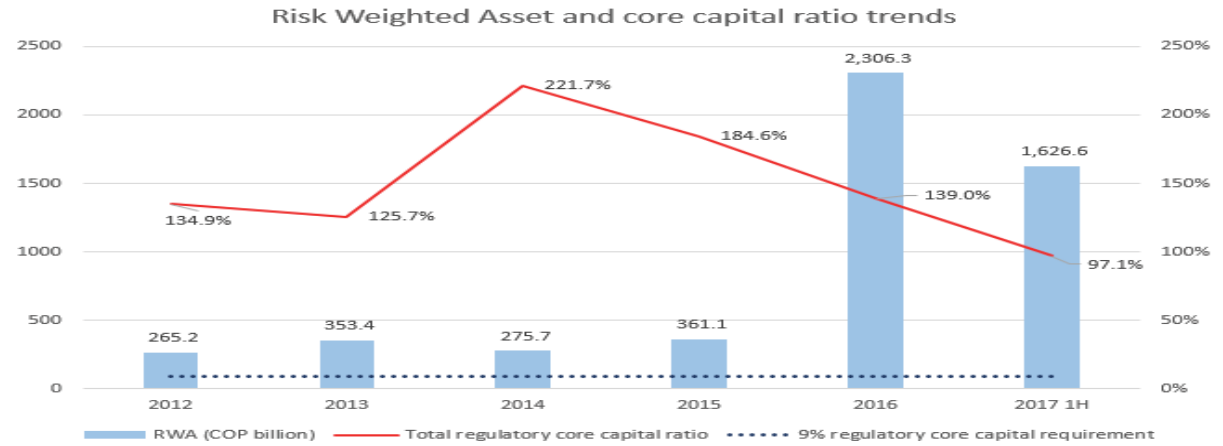
	2017 1H	2016	2015	2014	2013	2012
* From Fitch Ratings report						
Operating profit (COP billion)	47.2	71.2	26.0	16.1	125.8	75.4
Net Income (COP billion)	39.5	49.4	9.1	10.7	81.5	52.5
Operating profit / RWA	2.9%	3.1%	7.2%	5.8%	35.6%	28.4%
Net Income / RWA	2.4%	2.1%	2.5%	3.9%	23.1%	19.8%
Total regulatory core capital ratio	97.1%	139.0%	184.6%	221.7%	125.7%	134.9%
Tier 1 regulatory core capital ratio	20.5%	28.2%	181.4%	217.2%	N/A	N/A
* Calculated						
RWA (COP billion)	**1,626.6**	**2,306.3**	**361.1**	**275.7**	**353.4**	**265.2**
Total regulatory core capital (COP billion)	**1,579.7**	**3,206.7**	**666.7**	**611.3**	**444.4**	**357.7**
Tier 1 (COP billion)	333.0	651.3	654.9	598.8	N/A	N/A
Tier 2 (COP billion)	1,246.8	2,555.4	11.8	12.5	N/A	N/A

Note: For 2017, only half of Total regulatory core capital, Tier 1 capital and Tier 2 capital is presented to reflect actual operational data and the risk weighted asset base for the first semester of 2017. However, the available Total regulatory core capital, Tier 1 capital and Tier 2 capital are twice the amounts presented in the table.

200. **FDN has sufficient liquidity and capital available to meet minimum regulatory requirements.** The result shows that total regulatory core capital available in FDN is COP3,206.7 billion or roughly US$1.07 billion[110] and the total RWA amount is COP2,306.3 billion or US$769 million at December 2016. The regulatory core capital position of FDN as of December 2016 is 139 percent of its total risk-weighted assets, versus a minimum requirement of 9 percent set in Colombian financial regulations, which implies that FDN has significant additional capital resources available to meet regulatory capital requirements. This high level of FDN's capital base illustrates the relatively new institutional set up of FDN with a significant amount of newly injected subordinated debt capital (Tier 2 core capital). However, as FDN makes more commitments to other sectors, including the clean energy sector, the amount of risk weighted assets will increase and consequently the ratio of regulatory core capital to risk-weighted assets will decline, as illustrated in 2014 (221.7%) and 2015 (184.6%). However, if further equity or subordinated debt are added, then regulatory core capital will be strengthened. The graph below also shows that in 2016, amount of RWA increased significantly due to loan disbursements to infrastructure projects.

[110] Based on an assumed exchange rate of US$1: COP 3,000.71

Figure 7.2: FDN trends in Regulatory Core Capital and Risk Weighted Assets (RWA)



Source: Calculated as in Table A 7.8 above, based on data from credit ratings report

201. **IBRD and CTF Guarantees will backstop only the payment obligations of FDN under the PER Account with IBRD/CTF Eligible Financial Products**. When FDN provides IBRD/CTF Eligible Financial Products under the PER Account, it is expected to increase FDN's risk-weighted assets from the clean energy sector by a maximum of US$405 million, from the current level of US$769 million to US$1,174 million at 100 percent risk-weighting. Although the proposed specialized financial regulatory treatment of IBRD and CTF Guarantees could offer 20 percent risk-weighting, a prudent risk-weighting of 100 percent is considered for the modelling purposes. The PER Account, therefore, could reduce the total regulatory core capital ratio to 91 percent at the end of Availability Period, still well above the minimum regulatory core capital requirements. However, there may be other risk weighted assets added from other sectors or further exposure to 4G road programs, or alternatively there may be new capital injections.

Table 7.9. Risk-Weighted Assets and regulatory core capital forecast[111]

(in US$ million)	2016	2017	2018	2019	2020	2021	2022	2023
RWA from FDN's existing business	769	*1,084*	*1,192*	*1,312*	*1,443*	*1,587*	*1,746*	*1,920*
RWA from PER Account	-	-	-	*91*	*143*	*264*	*379*	*405*
Total	769	*1,084*	*1,192*	*1,403*	*1,585*	*1,851*	*2,125*	*2,325*
Total Regulatory Core Capital Amount	1,069	*1,069*	*1,069*	*1,069*	*1,069*	*1,069*	*1,069*	*1,069*
Regulatory Core Capital Ratio	139%	*99%*	*90%*	*76%*	*67%*	*58%*	*50%*	*46%*

202. **A call on IBRD and CTF Guarantees depends on FDN's overall business performance and on how risk-weighted assets and regulatory capital change over time**. Although calls on IBRD and CTF Guarantees are used only to backstop FDN's payment obligations under the PER Account, they are directly related to FDN's overall regulatory capital strength and amount of risk-weighted assets. To better understand the impact, the following scenarios are used to assess the likelihood of such calls on IBRD and CTF resources. These scenarios are run using FDN's current financial position and making certain assumptions about FDN's growth as well as expected probability of default and loss given defaults on both the PER Account and other sector operations of FDN. It should be noted that the results presented below are highly sensitive to these assumptions:

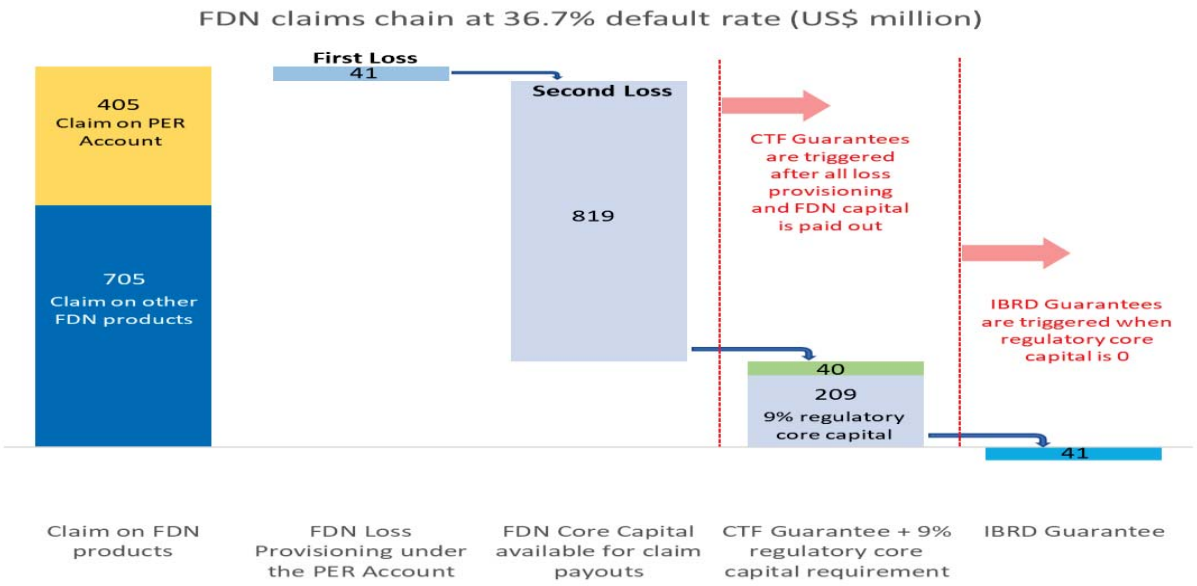
[111] RWA in 2016 and 2017H are actuals. For the remaining half of 2017 through to 2023, an increase in RWA of 10% per annum is forecast.

a. **Scenario 1 - FDN's risk-weighted assets from all sectors (existing businesses outside the PER Account) increase at 10 percent each year; the probability of default of all other sectors is at 10 percent, leading to losses in liquidity and other capital sources; and the probability of default on all Sub-projects supported under the PER Account is 100 percent; and there is no further capital increase at FDN from its current capital position**: This scenario envisages a 100 percent probability of default on all Sub-projects that use IBRD/CTF Eligible Financial Products under the PER Account, leading to a potential claim payout amount of the entire US$405 million (i.e., the maximum exposure). In addition, there is also a 10 percent probability of default on all sectors outside the PER Account, leading to liquidity and capital losses of US$192 million. Following the claims waterfall arrangement explained in Annex 2, FDN uses US$556 million of its available liquidity and capital resources and will have US$513 million of core capital (after taking into account a Liquidity Reserve amount of US$41 million). In this scenario, the core capital ratio will drop to 22 percent but it is still above the minimum capital requirement, thus leading to no potential call on CTF or IBRD Guarantees.

b. **Scenario 2 - FDN's risk-weighted assets from all sectors (existing businesses outside the PER Account) increase at 10 percent each year; the probability of default of all other sectors is at 20 percent, leading to losses in liquidity and other capital sources; and the probability of default of all Sub-projects supported under the PER Account is 100 percent; and there is no further capital increase at FDN from its current capital position**: This scenario envisages a 100 percent probability of default on all Sub-projects that use IBRD/CTF Eligible Financial Products under the PER Account, leading to a potential claim payout amount of the entire US$405 million (i.e., the maximum exposure). In addition, there is also a 20 percent probability of default on other all sectors outside the PER Account leading to liquidity and capital losses of US$384 million. Following the claims waterfall arrangement explained in Annex 2, FDN uses US$748 million of its available liquidity and capital resources and will have US$321 million of core capital (after taking into account a Liquidity Reserve amount of US$41 million). In this scenario, core capital ratio will drop to 14 percent but it is still above the minimum capital requirement, thus leading to no potential call on CTF or IBRD Guarantees.

c. **Scenario 3 Breakeven Scenario - FDN's risk-weighted assets from all sectors (existing businesses outside the PER Account) increase at 10% each year; the probability of default of all other sectors is at 26 percent leading to losses in liquidity and other capital sources; and the probability of default of all Sub-projects supported under the PER Account is 100 percent; and there is no further capital increase at FDN from its current capital position**: This scenario envisages a 100 percent probability of default on all Sub-projects that use IBRD/CTF Eligible Financial Products under the PER Account, leading to a potential claim payout amount of the entire US$405 million (i.e., the maximum exposure). In addition, there is also a 26 percent probability of default on other all sectors outside the PER Account leading to liquidity and capital losses of US$499 million. Following the claims waterfall arrangement explained in Annex 2, FDN uses US$863 million of its available liquidity and capital resources and will have US$209 million of core capital (after taking into account a Liquidity Reserve amount of US$41 million), which could lead to potential failure to meet minimum regulatory core capital requirements of 9 percent. In this scenario, the CTF Guarantee is drawn to ensure the core capital ratio meets the minimum requirement of 9 percent. If the probability of default of all sectors reaches 36.7 percent, then it will lead to a potential call on IBRD Guarantees, as illustrated in the following figure.

Figure 7.3: FDN trends in Regulatory Core Capital and Risk Weighted Assets



203. **The above high-level analysis indicates that the IBRD Guarantee is expected to be triggered only when a combination of two downside events happens at the same time – event 1) probability of default of the all Sub-projects covered under PER Account is 100 percent; and event 2) probability of default of all other financial exposures of FDN's existing businesses is over 36.7 percent. Considering the historical probability of default of projects loans in transport, energy and infrastructure PPPs, the simultaneous occurrence of these two events may be treated as a highly remote and unlikely scenario.** Event 1 refers to all Sub-projects that receive IBRD/CTF Eligible Financial Products under the PER Account defaulting, such that FDN makes full guarantee payouts up to the maximum financial exposure under IBRD/CTF Eligible Financial Products to all Eligible Beneficiaries. Event 2 refers to FDN incurring losses on all other financial exposures equivalent to 36.7 percent of its risk weighted assets. These combined scenarios require FDN to exhaust the Liquidity Reserve amount (set under the PER Account) as well as all available liquidity and capital resources, such that they are considered defaulted by the Colombian financial regulation. These events are derived based on several conservative assumptions and are considered extremely remote. However, as indicated in Annex 5, regular monitoring of FDN's capital position and of the performance of Sub-projects supported under the PER Account and other sectors supported by FDN remains important to understand the potential impact on FDN's regulatory core capital ratios and in turn its impact on the likelihood of a call on CTF and IBRD Guarantees.