Funding Proposal

FP096: Democratic Republic of Congo (DRC) Green Mini-Grid Program

Democratic Republic of Congo | African Development Bank (AfDB) | Decision B.21/34

28 November 2018







Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title:	Democratic Republic of Congo (DRC) Green Mini-Grid Program
Country/Region:	Democratic Republic of Congo
Accredited Entity:	African Development Bank
Date of Submission:	July 2018



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Note to accredited entities on the use of the funding proposal template

- → Sections A, B, D, E and H of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- → The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name: "[FP]-[Agency Short Name]-[Date]-[Serial Number]"



List of Abbreviations

A2E	Access to Electricity
AfDB	African Development Bank
AMA	Accreditation Master Agreement
AMDA	African Mini-Grid Developers Association
ANAPI	Agence Nationale pour la Promotion des Investissements (National Investment
	Promotion Agency)
ANSER	Agence Nationale de l'Electrification et des Services Energétiques en Milieu
	Rural et Périurbain (National Agency for the Rural and Peri-urban Electrification)
ARE	Authorité de Régulation du secteur de l'électricité (Electricity Regulation Authority)
AMLCFT	Anti-Money Laundering/Combating the Financing of Terrorism
BAU	Business-as-usual
CAPEX	Capital Expenditures
CDC	Commonwealth Development Corporation
CDF	Congolese Franc
CDM	Clean Development Mechanism
CIF	Clean Investment Funds
CNE	Commission Nationale de l'Energie (National Energy Commission)
COD	Commercial Operation Date
DFI	Development Finance Institution
DFID	Department for International Development of UK
DRC	Democratic Republic of Congo
DSCR	Debt Service Coverage Ratio
EBITDA	Earnings before Interest, Taxes, Depreciation and Amortization
EPC	Engineering, Procurement and Construction
E&S	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EUR	Euro
FAA	Funded Activity Agreement
FiT	Feed-in-Tariff
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House Gas
GMG	Green Mini-grid
GoDRC	Government of the Democratic Republic of Congo
HOMER	Hybrid Optimization Model for Multiple Energy Resources



IDD	Integrity Due Diligence
IMF	International Monetary Fund
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
KYC	Know-Your-Customer
LDC	Least Developed Country
LLA	Lender's Legal Advisor
MERH	Ministère de l'Energie et des Ressources Hydrauliques (Ministry of Energy and
	Hydraulic Resources of the DRC)
MIGA	Multilateral Investment Guarantee Agency
MW	Megawatt
MWh	Megawatt Hour
ND-GAIN	Notre Dame Global Adaptation Initiative
NDC	Nationally Determined Contributions
O&M	Operation and Maintenance
OPEX	Operating Expenses
PEP	Politically Exposed Persons
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PRG	Partial Risk Guarantees
PV	Photovoltaic
RAP	Resettlement Action Plans
RE	Renewable energy
Regideso	Régie de Distribution d'Eau (Water Utility)
RfQ	Request for Qualifications
RPF	Resettlement Policy Framework
SEFA	Sustainable Energy Fund for Africa
SME	Small and Medium-sized Enterprise
SNEL	Société Nationale d'Electricité (National Power Company)
SPV	Special Purpose Vehicle
ТА	Technical Assistance
TBD	To Be Determined
UCM	Unité de Coordination et de Management (Unit for the Management and
	Coordination)
UNDP	United Nations Development Programme
USAID	US Agency for International Development
USD	United States Dollar



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PROJECT / PROGRAMME SUMMARY



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A.1. Brief Project / Programme Information						
A.1.1. Proje	ect / programme title	Democratic Republic of Congo (DRC) Green Mini-Grid Program				
A.1.2. Project or programme		programme				
A.1.3. Cour	ntry (ies) / region	Democratic Republic of Congo	(DRC)			
A.1.4. National designated authority (ies)		Ministry of Environment and Sustainable Development National Coordination of GCF Hans Andre Lohayo Djamba, GCF National Focal Point hansandrediamba@gmail.com / +243822541031				
A.1.5. Accr	edited entity	African Development Bank				
A.1.5.a. Acc	cess modality	🗆 Direct 🛛 🖾 Internationa	I			
A.1.6. Executing entity / beneficiary		Executing Entity: African Development Bank Beneficiaries: Three green mini-grid projects in the DRC; Ministry of Energy and Hydraulic Resources (MERH)/Unit for the Management and Coordination (UCM) and renewable energy sector stakeholders in the DRC				
A.1.7. Proje USD)	ct size category (Total investment, million	 □ Micro (≤10) ⊠ Medium (50<x≤250)< li=""> </x≤250)<>	□ Small (10 <x≤50) □ Large (>250)</x≤50) 			
A.1.8. Mitiga	ation / adaptation focus	☐ Mitigation ☐ Adaptation ☐ Cross-cutting				
A.1.9. Date	of submission	July 2018				
	Contact person, position	Namho Oh, Senior Investment Officer Matthieu Jalard, Senior Investment Officer				
A.1.10.	Organization	African Development Bank				
Project contact details	Email address	n.oh@afdb.org m.jalard@afdb.org				
dotano	Telephone number	+225 20 26 43 32				
	Mailing address	Av. Joseph Anoma, 01 BP 1387	' Abidjan 01, Côte d'Ivoire			

A.1.11. Re	sults areas (mark all that apply)
Reduced e	missions from:
\boxtimes	Energy access and power generation (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
	Low emission transport (E.g. high-speed rail, rapid bus system, etc.)
	Buildings, cities and industries and appliances (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
	Forestry and land use (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)
Increased	resilience of:
	Most vulnerable people and communities (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
	Health and well-being, and food and water security (E.g. climate-resilient crops, efficient irrigation systems, etc.)
	Infrastructure and built environment (E.g. sea walls, resilient road networks, etc.)
	Ecosystem and ecosystem services (E.g. ecosystem conservation and management, ecotourism, etc.)





A.2. Project / Programme Executive Summary

Please provide a brief description of the proposed project/programme, including the objectives and primary measurable benefits (see <u>investment criteria in section E</u>). The detailed description can be elaborated in <u>section C</u>.

Climate change in the Democratic Republic of the Congo (DRC) is evident from the records, and severe biophysical impacts and socio-economic downturn are anticipated with projected changes. Effects on temperatures and rainfall patterns are exacerbating the vulnerability of rural communities, key productive sectors and the overall socio-economic conditions. The DRC's electricity generation largely relies on hydroelectric power (over 95% of the total generation), and the country is expected to face increasing uncertainty and fluctuations in power generation with the changing rainfall patterns in the long run. Unreliable power supply will not only hurt the industrial activities and livelihoods of people but will also likely have adverse effect by increasing reliance on fossil fuel and biomass energy. The latter option is likely to have implications for the forest and land use ecosystems, and their potential to contribute to emissions associated to deforestation and forest degradation. This is particularly concerning as the DRC is the host of the second largest tropical moist forests in the world, with forested area covering about 67.3% of the country. This power sector vulnerability, and potential implications for other sectors with high potential to contribute to the country's low emission development, would aggravate pre-existing socio-economic vulnerability of the population in the context of severe energy precarity.

The DRC is the second biggest and fourth most populated country in Africa, which spreads over 2,345,441km² with a population of 78.7 million. Yet the DRC has one of the lowest rates of electrification in the world. Only approximately 10% of the population has access to electricity, 35% in urban areas (44% in Kinshasa) and less than 1% in rural areas. The national utility company, SNEL (Société Nationale d'Electricité), accounts for 94 % of the total installed capacity (2,677 MW) and nearly all electricity is produced from hydropower. The DRC has no national-wide transmission network and only three regional grids are covering parts of the country; hence there is a sizeable gap between the rate of electrification in Kinshasa and the rest of the country. In off-grid areas, electricity demands are met with small, scattered diesel generators, kerosene lamps and battery torches. Their fossil fuel dependence, which is unsustainable and costly, is expected to intensify as the population and power demand grow. With limited grid expansion prospects in near future, power sector development in the DRC will continue to rely on inefficient off-grid solutions with a high carbon footprint if not triggered to shift to a low emission pathway.

Recently, green mini-grid is gaining attention as an alternative solution to reverse this trend and accelerate energy access. Since the liberalization of the electricity sector in the DRC (the 2014 Electricity Law), a few local distribution concessionaires and individual mini-grid projects have emerged. Still, this has been done in a sub-optimal and heterogeneous manner primarily because of the lack of clear national regulation in the sector. Private investment to mini-grid has been slow, and clear barriers exist toward its full commercial viability especially for renewable energy mini-grid. In response to this challenge, the Essor Access to Electricity (Essor A2E), a technical assistance program financed by DFID, is assisting the Government of the DRC (GoDRC) to accelerate, optimize and standardize the development of private-led and renewable-based mini-grids across the country by building a robust, bankable and replicable structure.

Targeting mini-grid projects selected under the DFID-Essor A2E initiative, the AfDB-GCF Green Mini-Grid Program for the DRC (the Program) will pilot an innovative mini-grid model powered by solar, bringing clean and modern energy to sizeable towns. The Program will finance three solar hybrid mini-grid projects procured through a competitive tendering process in the towns of Isiro, Bumba and Genema (with 487,500 inhabitants altogether), each consisting of a hybrid PV power plant of 5-10 MW, battery storage, and associated distribution networks to reach consumers. The Program's climate additionality is significant as it will ensure that the major portion of future electricity demands are met by a clean source as opposed to a business-as-usual 100% diesel scenario. Mobile prepayment and smart metering technologies will ensure that consumptions are effectively monitored and controlled, while preventing potential fraud and non-technical losses. The overall number of connections (domestic and commercial) is expected to reach approximately 12,400 connections in Year 1 and 23,300 connections in Year 5 with a 24 hours-a-day service.

The procurement of the three pilot concessions is to be handled by a public agency within the Ministry of Energy Hydraulic Resources, namely the "Unité de Coordination et de Management" (UCM). The total cost of three projects is estimated at USD 87 million at COD, of which up to USD 40 million would be from the AfDB and the GCF senior debts to finance solar PV plant and battery storage, with the remainder financed by equity and quasi-equity (including investment grant). A financing package arranged by the AfDB will be offered to pre-qualified bidders as a recommended option. Awarded sponsors will create individual special purpose vehicles (SPV) and will enter into concession agreements with the central government for a 20-25 year period¹.

¹ A twenty-year concession period was assumed in the financial model and pre-feasibility studies. The exact concession period will be determined by the GoDRC before the launch of the tender.



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In addition, complementary technical assistance (TA) was designed to ensure that green mini-grids are scaled-up across the country beyond the pilot phase. The AfDB has approved USD 1 million grant for the TA, from the Sustainable Energy Fund for Africa (SEFA) hosted by the AfDB, and GCF co-financing of USD 1 million grant is requested. The TA activities will 1) strengthen the enabling framework for green mini-grid development in the DRC by building institutional capacity to manage and implement green mini-grid projects, standards and tariff guideline development, and local renewable energy ecosystem building; and 2) support project-level preparation of three mini-grids, as well as pre-feasibility studies and tender preparation for additional mini-grids in other sites in the DRC.

Envisioned mini-grids will displace fossil fuel-based generation and provide access to clean, reliable and more affordable energy to approximately 150,000 people who live off the grid, avoiding emission of 560,000 tCO₂eq over 20 years (28,000 tCO₂eq per year). Long-term and concessional financing provided by the AfDB and the GCF is critical to enhance the commercial viability of the selected projects while ensuring affordable tariffs for end consumers. Powering the entire off-grid towns with sustainable energy, and further supported by the TA, this Program will enable the transformation of the DRC energy sector by opening up a market for green mini-grid investments and thereby accelerating low emission development. In addition, energy access will strongly reinforce economic and social resilience of low income population living in climate vulnerable areas. The Program will be a test bed for an innovative mini-grid design, demonstrating a viable model for private-led, renewable based mini-grid financing which will be replicable in the DRC, other Sub-Saharan African countries and small island developing countries.

A.3. Project/Programme Milestone					
Expected approval from accredited entity's Board (if applicable)	Q4 2018 ²				
Expected financial close (if applicable)	Q1-Q2 2020				
Estimated implementation start and end date	Start: Q1 2019 End: Q4 2023				
Project/programme lifespan	23 years ³				

² AfDB contribution to the technical assistance (USD 1 million grant) has been approved in 2018.

³ A five-year implementation period plus a (up to) 18-year loan tenor.



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FINANCING / COST INFORMATION



B.1. Description of Financial Elements of the Project / Programme

Renewable-based green mini-grid is still a new business model in most parts of Sub-Saharan Africa including the DRC. As a mini-grid project is perceived risky and non-traditional, availability of debt financing has been limited and most projects relied on pure grant or equity. The financing barrier is even higher in the DRC where the overall private sector development is early and security concerns in some parts of the country still remain high. Compounded with legal and regulatory uncertainties around mini-grid, this has inevitably limited the number and scale of green mini-grid projects in the private sector.

The proposed AfDB-GCF debt financing envelop for three pilot solar hybrid mini-grid projects under the Program therefore fills the significant financing gap identified and at the same time pilot a financing structure that will bring the projects to commercial viability. Each project comes with two components – Component 1 covering solar PV generation plant and battery storage, and Component 2 covering distribution network, connections and backup. The CAPEX for the three projects is expected to be USD 87 million overall, of which USD 45 million will be for the Component 1 including PV plant (USD 22.9 million) and storage (USD 22.0 million); and USD 42 million for the Component 2 including distribution networks (USD 26.1 million), connections and metering infrastructure (USD 8.1 million), emergency backup genset (USD 2.6 million), and other costs including development cost and financing cost (USD 5.2 million).

USD 87 million of CAPEX only covers the initial investment to install the grid and reach 23,300 connections (for all three sites) in five years; it is expected that periodic re-investments will be made throughout the concession period (20-25 years) to expand the generation capacity and connections in response to increasing demand and to cover the battery replacement cost. Sponsors will be required to arrange re-investment financing as and when required.

Comp 1 (52%)	A blended senior debt tranche (AfDB, GCF and other lenders)					
(02/0)	equity					
Comp 2 (48%)	A tranche of equity and quasi-equity , including investment grants (sponsors and financial partners)					
	+					
Post- COD	Re-investments in years 5, 10 and 15 to extend supply and replace batteries <i>(not part of this AfDB-GCF envelope)</i>					

Figure 1. Preliminary financial structure of each mini-grid project

The overall USD 87 million (estimated) CAPEX of the three projects is expected to be financed through a blended senior debt providing about 45% of the funds, and a tranche of equity, quasi equity and investment grant (Figure 1). The GCF contribution amounting to USD 20 million is expected to contribute to half of the USD 40 million senior debt tranche which will finance generation and storage part of the projects (Component 1). The AfDB proposes to be a Mandated Lead Arranger for the three selected projects and is under discussion with potential co-financiers and donors. Table 1 below summarizes the Sources and Uses of Funds at the Program level for the three projects, and the Projects Preparation and Technical Assistance costs to be borne by the AfDB and the GCF. DFID's Essor Access to Electricity ("Essor A2E") program has supported the Congolese government to design a robust tender process and standardize legal documents for mini-grid concessions.



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It is important to note that GCF investment (USD 20 million) is only to cover the financing needs for renewable energy assets (i.e. solar PV and battery – Component 1) and not infrastructure and any other backup. Anticipated contributions to the CAPEX from other development partners in the form of grant or other quasi-equity (to be determined – discussions ongoing) is to support financing of the emergency backup, distribution networks and households connection (Component 2), which will serve as public infrastructure to ensure reliability through 24 hours energy supply with maximum coverage across customer segments, including essential public services such as water supply and hospitals. Grant for the distribution infrastructure (including distribution lines, transformers, metering infrastructure) is also being considered from the perspective of tariff affordability, with a purpose to benefit lowest income households among others. Any quasi-equity or grant will be subordinated to the AfDB-GCF loans or other senior loans. Any additional debt financing, for the initial investment or re-investment, will follow the terms acceptable to the AfDB as an Accredited Entity and Executing Entity.

Even though the GCF and the AfDB are financing only Component 1, from the perspective of ensuring success of the overall green mini-grid model which is proposed to be piloted in the three locations, it is absolutely essential that the necessary distribution infrastructure (which is separately being financed as Component 2) is in place in a timely fashion to ensure that the consumers have access to clean energy and do not resort to accessing unsustainable energy sources. Therefore even though Components 1 and 2 are financed separately, they are integral to each other and to the overall green mini-grid pilot projects.

Complementary technical assistance (TA) (USD 2 million grant) was designed to ensure that green mini-grids are scaledup across the country beyond the pilot phase. The TA activities will 1) strengthen the enabling framework for green minigrid development in the DRC with institutional capacity building, standards and tariff guideline development, and local RE ecosystem building; and 2) support project-level preparation of three target mini-grids, as well as pre-feasibility studies and tender preparation for additional mini-grids in other sites in the DRC. Project preparation support for the three projects, solely financed by AfDB-SEFA, is meant to supplement the development costs (under Component 2) by covering legal advisory services and additional technical studies (detailed feasibility studies and engineering design, environment and social impact assessment). GCF's contributions to the TA will finance the capacity building activities for the public sector and the local RE ecosystem. AfDB and GCF contributions through technical assistance will further strengthen the regulatory environment with necessary capacity building, and advance the preparation of mini-grid projects for the three target projects as well as for the subsequent rounds of tender.

Project Cost – Three Green Mini-Grids (Component 1 and 2)

Uses of funds (USD M)		Sources of funds (USD M)			
Component 1: Three Gro	een Mini-Grid Projects	- Solar PV generation and battery s	torage		
PV Power Plant	23.0	Senior Debt	40.0		
Battery Storage	22.0	Of Which GCF	20.0		
		Of Which AfDB	20.0		
		Equity	5.0		
Total	45	Total	45		

Uses of funds (USD M)		Sources of funds (USD M)				
Component 2: Three Green	Mini-Grid Projec	ts - Distribution, connections, backup and o	ther costs			
Total Networks	26.1	Equity, Quasi Equity and Grant	42.0			
Connections and Metering	8.1					
Emergency Backup	2.6					
Other Costs	5.2					
Total	42	Total	42			



FINANCING / COST INFORMATION

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Total	2	Total		2
		Of Wh	ich GCF	1.0
Sub-component 3.2	1.20	Of Wh	ich AfDB	1.0
Sub-component 3.1	0.80	Grant		2.0
Uses of funds (USD M)		Source	s of funds (USD N	/)
Technical Assistance Cost (C	omponent 3)			
Emergency Backup			х	х
Distribution & Connection			x	x
Component 2				
Battery Storage	x	х	x	
Solar PV	x	х	х	
Component 1				
	GCF	AfDB	Sponsors	Other Donors/ Financiers
Three Green Mini-Grids – So	urce of Financing fo	or Each Sub-Com	ponent	

Table 1. Sources and Uses of Funds

a breakdown of cost estimates for total project costs and GCF financing by sub-component in local and foreign currency and a currency hedging mechanism:

Component	Amount (for entire project)	Currency	Amount (for entire project)	Local currency	GCF funding amount	Currency of disbursement to recipient
Component 1: Three green mini- grid projects – generation and storage	Up to 45	<u>million USD</u> <u>(\$)</u>			Up to 20 million	USD
Component 2: Three green mini- grid projects – distribution, connection, backup and other costs	Up to 42	<u>million USD</u> (<u>\$)</u>			-	-
Component 3.1: TA - Green mini- grid enabling framework and capacity building	0.8	<u>million USD</u> <u>(\$)</u>			0.5 million	USD
Component 3.2: TA - Green mini- grid project development support	1.2	<u>million USD</u> (<u>\$)</u>			0.5 million	USD
Total project financing	Up to 89	million USD			21 million	USD

* Please expand the table if needed.



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B.2. Project Financing Information									
	Financial Inst	rument		Amount	Currency	Tene	or	Pricing	
(a) Total project financing	(a) = (b) +	(c)		89	<u>million USD</u> (<u>\$)</u>				
(b) GCF financing to recipient	(i) Senior loans (ii) Grant		20 1	<u>million USD</u> (\$) <u>million USD</u> (\$)	15-18 years N/A		Refer to the term sheet		
	* Please provide economic and financial justification in <u>section F.1</u> for the concessionality that GCF is expect provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in <u>section E</u> .						hat GCF is expected to een GCF financing and to the level of the <u>tion E</u> .) 1	
	Total requeste (i+ii)	d		21	<u>million USD</u> <u>(\$)</u>				
Co-financing to recipient	Financial Instrument	Αmoι	int	Currency	Name of Institution	Tenor	Pricing	g Seniority	
	<u>Senior</u> Loans	20		<u>million USD</u> (<u>\$</u>)	AfDB	15-18 years	[3/6] mon LIBOR + TBD ⁴	nth <u>senior</u> +	
	<u>Grant</u> / <u>Quasi-</u> Equity	32⁵		<u>million USD</u> (\$)	Other investors	N/A	TBD	junior	
	<u>Equity</u>	15		<u>million USD</u> (\$)	Project sponsors	N/A	TBD	junior	
	<u>Grant</u> (TA)	1		<u>million USD</u> (\$)	AfDB	N/A	N/A	<u>N/A</u>	
	Lead financing	institutior	n: AfDI	В					
	* Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution								

 ⁴ Subject to the detailed credit assessment of individual projects.
 ⁵ Investment grant, reimbursable grant or other forms of quasi-equity (TBD). Amount indicative only.



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B.3. Financial Markets Overview (if applicable)

How market price or expected commercial rate return was (non-concessional) determined? Please provide an overview of the size of total banking assets, debt capital markets and equity capital markets which could be tapped to finance the proposed project/programme. Please provide an overview of market rates (i.e. 1-year T-Bill, 5-year government bond, 5-year corporate bond (specify credit rating) and 5-year syndicate loan⁶.

The inflation rate in the DRC was highest in August 2017 at 70.8%, which was the peak in recent 5 years, and continuously decreased with the latest inflation rate standing at 43.2% (April 2018). The main instrument applied to curb the inflation rate was to increase the interest rate. Since 2017, the interest rate has been on the rise, to 14% from 7% at the beginning of 2017, in order to curb the escalating inflation rate. Although the policy implemented by the Central Bank has been effective, this has come with higher interest rates on lending and a cost to domestic credit expansion. As a consequence, domestic private sector investments struggle to access finance in the DRC.

The country is ranked at 182nd out of 190 countries in the World Bank's 2018 Doing Business report. Financial intermediation is low in the DRC: most credit is informal and formal bank credit to the private sector accounts for less than 3 percent of GDP. Retail banking is largely undeveloped, and most banks act as financial agents for the government or extend credit to international institutions operating in the country. Foreign commercial banks dominate the industry as providers of funding for the mining and petroleum sectors. No stock market operates in the country, but a small number of private equity firms invest actively in the mining industry. The DRC's capital market consists primarily of government securities. With no corporate debt market present in the country, the fixed income market is restricted to short-term government issued treasury bills with maturities up to 28 days, which are dematerialized and freely tradable through commercial banks.

Borrowing options for small and medium-sized enterprises (SMEs) are limited. Maturities for loans are usually limited to 3-6 months, and interest rates typically hover around 16-18 percent. The weakness of the legal system discourages banks from providing long-term loans. Since local banks have limited holdings in the domestic currency (Congolese Franc (CDF)), there are limited possibilities to finance major projects in the domestic currency. Prior to 2016, the average CDF holding was roughly USD 12 million per bank, though the economic downturn prompted the Central Bank to mandate an increase in CDF holdings to USD 30 million per bank by October 2017. Foreign currency deposits currently account for almost 90 percent of bank holdings.

The DRC has roughly USD 3.6 billion of deposits in the banking system, up slightly from 2015. Estimated USD 10 billion of savings are existing outside the bank and most deposits reserved in the bank are U.S. dollar-denominated. A slight increase in bank penetration occurred after 2011 as the GoDRC switched public employee payments from cash to bank transfers. Bank penetration is roughly 6 percent, which places the country among the most under-banked nations in the world. According to the Banque Centrale du Congo (BCC) strategic plan, the aim is to reach more than 20 million bank accounts by 2030. Banks are increasingly offering savings accounts that pay approximately 3 percent interest, but few Congolese hold savings in banks. Of an estimated 65 percent of the population that saves, only 4.7 percent do so through a bank, according to the Banking Association of Congo (ACB). Most account holders withdraw their balance in full shortly after their salary is deposited.

The banking sector consists of twenty licensed banks. These include well renowned international banks that operate across much of Africa: Procrédit, Rawbank, Bank of Africa, and Ecobank. The rest of these financial institutions are local banks. Though the rate of access to banking services remains quite low in the DRC, mobile banking is fast-growing and spreading across the country, facilitating payments for multiple services, including for water and energy. The government, with the IMF technical assistance, is currently working on a legislation to improve the regulation of the commercial banks and to foster a modernization of the central bank. This new legislation will seek to strengthen shareholder rights, develop the legal and regulatory framework for liquidations and also develop a legal basis for acting as lender of last resort.

Making Finance Work for Africa (MFW4A)

⁶ US State Department's Office of Investment Affairs' Investment Climate Statement (<u>https://www.export.gov/article?id=Congo-Democratic-Republic-Financial-Sector</u>)

⁽https://www.mfw4a.org/democratic-republic-of-the-congo/financial-sector-profile.html)



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A review of the DRC's financial market and sector indicators clearly illustrates a unique challenge in obtaining local, commercial financing for any infrastructure project. Local financial institutions do not have experience of offering debt financing to energy projects, not to mention renewable energy mini-grid projects. Their financial position and institutional capacity is extremely constrained to consider such investment and the situation is not likely to change in the short to medium term.

Provide examples or information on comparable transactions.

With a very limited national grid covering only a fraction of the country and the various logistic issues related to fuel supply, the development of "green mini-grids", especially solar-based ones, represents an efficient way to improve access to electricity in the DRC in the short-to-medium term. Through the use of available renewable energy resources, green mini-grids fit very well with the specific needs in the DRC for improving access to energy to a large number of its people independently from the national grid. Following the liberalization of the electricity sector, a few initiatives, mostly driven by the local private sector, have already been undertaken leading to the successful implementation of a couple of green mini-grids, though not in a coordinated way. A few private operators have started to develop mini-grids, mainly in the southern part of the country, using mostly hybrid-technology combining hydro or solar power plants with diesel generators (Table 2). **Most of these projects have been negotiated on an ad hoc basis with the central or provincial governments without a national policy framework to facilitate these interventions**. It may also be noted that most of these projects were set up in response to the industry demand, primarily mining, in their catchment areas, as opposed to catering to needs of the local population. Further, most of these projects have relied on donor finance as opposed to commercial financing, in view of the prevailing challenges in the domestic financial system.

Area	Technology	Size	Operator
Tchikapa	Hydro	1.5 MW	STS
Kananga	Solar-diesel hybrid	2.5 MW	PPP consortium
Matebe	Hydro	13.8 MW	Virunga Sarl
Beni Butembo	Hydro	12 MW	STS
Manono	Solar	1 MW	Enerdeal
Kakobola	Hydro	9.3 MW	Government

Table 2. Examples of mini-grid projects in the DRC

As may be observed from the Figure 2, it is evident that the existing mini-grids are concentrated in regions of relatively high economic activity, primarily mining and trading. The three pilot mini-grids are proposed to be set up in areas which do not have the same degree of economic activity, making them relatively challenging from an economic perspective.



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Additionality of the AfDB-GCF Green Mini-Grid Program

- *Technology*: Unlike most other mini-grid projects relying on hydro or diesel, the Program will pilot solar PV hybrid mini-grids. A solar-based system is still more CAPEX intensive than alternative technologies, therefore developers have an incentive to go for a diesel-based system which requires lower upfront investment. The Program has an important role to play as it demonstrates a solar-based mini-grid business model, its technological advantage and financial viability. This is going to be the key first step to trigger the proliferation of solar-based mini-grids in the DRC.
- Location: Above-mentioned projects are all located in Southern or Eastern (Kivu) parts of the country where the infrastructure development is relatively advanced, with a significantly higher degree of economic activity as compared to the rest of the country (Figure 2). Three target projects under this Program are located in Northern Congo, introducing clean energy services in under-developed areas.
- *Financing*: Previously, mini-grid projects have been predominantly financed by small private companies or donor grants. The Program aims to increase the volume of debt financing for green mini-grid projects in the DRC, offering adequate price and tenor. The financing package will in turn encourage private investment for mini-grid and help build a business case for other financiers to step into the sector.
- *Replicability*: The Program is built on a robust legal framework and a competitive mini-grid tender process, which is the first time in the DRC, enabled by DFID's Essor A2E. This is a structure designed for replication across the country, moving away from individual and uncoordinated concession agreements. The Program will demonstrate how a government-led tender backed by a standardized concessions package can achieve cost efficiency and accelerate the deployment of green mini-grids. Furthermore, technical assistance under the Program will strengthen the capacity and regulatory systems of the GoDRC in managing and implementing green mini-grids, facilitating the model's replication beyond the pilot phase.





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Please fill out applicable sub-sections and provide additional information if necessary, as these requirements may vary depending on the nature of the project / programme.

C.1. Strategic Context

Please describe relevant national, sub-national, regional, global, political, and/or economic factors that help to contextualize the proposal, including existing national and sector policies and strategies.

Economic situation

The Democratic Republic of Congo (DRC) is the second biggest⁷ and the fourth most populated country in Africa, which spreads over 2,345,441km² with a population of 78.7 million.⁸ At the same time the DRC is a least developed country (LDC) and one of the poorest countries in the world with its GNI per capita standing at USD 460 (in 2016, current US dollar)⁹. The country's economy heavily relies on the extractive industry particularly copper and cobalt which account for 80% of the country's export revenue. The DRC is widely considered to be the richest in natural resources in the world, with large reserves of copper, cobalt, natural gas, iron ore, platinum, diamonds, gold and uranium. Growth in the extractive sector has driven the overall economic growth for the past few years, as demonstrated by the high average GDP growth rate between 2010 and 2015 (7.7%). However in 2016, the DRC's annual economic growth plummeted to 2.4%, its lowest point since 2001, as a combined result of shrinking global demand for raw materials and their declining prices. Economic development has been further hampered by political tension and uncertainty. Boosted by increasing commodity prices and good performance of mining and manufacturing industries, the growth is on a recovery track since 2017 and this is projected to continue this year. Despite a moderate economy recovery, the inflation rate is still very high, reaching 43,2% at the beginning of 2018.

The economic slowdown has had a direct impact on the level of public finance available. Government revenues, excluding grants, dropped from 13.6% of GDP in 2015 to 8.14% in 2017. Decreased government revenues subsequently caused a decline in the government expenditure, from 15.8% of GDP in 2015 to 10.8% in 2017¹⁰, in order to contain the deficit. Public consumption and investment have been inactive due to tight government spending. The DRC's economic and social development still ranks among the lowest in the world plagued by highest rates of extreme poverty. According to the most recent Human Development Index, the country is ranked at 178th out of 188 countries and it is estimated that over 77% of Congolese live on less than USD 1.9 per day¹¹.

Climate change context: [covered under Section C.2]

Energy sector overview

The DRC has one of the lowest rates of electrification in the world. Only approximately 10% of the population has access to electricity, 35% in urban areas (44% in Kinshasa) and less than 1% in rural areas¹². Number of people without access to electricity is 68 million in 2016, while the DRC targets universal access by 2050. Nearly 95% of the country's electricity (total 2,677 MW) is currently produced by hydropower plants (Table 3). Total installed capacity of hydropower is 2,542 MW which has seen little change over the past 30 years due to a lack of new investments. **Of this, only half of this potential is actually generated (producing about 8,349 GWh/year) due to breakdown, maintenance issues and low-water level, in part also underscoring climate vulnerability of hydro generation capacity. As illustrated in Table 4, most hydropower stations in the DRC are not operational at their full capacity as they suffer from the lack of spare parts and equipment maintenance. Moreover, the DRC has no national-wide transmission network. There are only three inter-provincial grids in the West (Central Congo and Kinshasa), East (North and South Kivu), and South (Haut-Katanga, Lualaba) of the country (Figure 3 and Figure 4). Some mining companies have developed their own power generation including small-hydro power, however, these do not supply electricity to surrounding population in most of the cases, as**

¹¹ UNDP, Human Development Report, 2016.

⁷ CIA, The World Fact Book, 2014.

⁸ World Bank Data, 2016.

⁹ Ibid.

¹⁰ IMF, AFR Regional Economic Outlook, 2018.

¹² IEA, World Energy Outlook 2017.



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contrasted to proposed pilot mini-grids. In several towns, power is supplied by few formal independent power companies such as EDC in Tshikapa, Virunga SARL in Mutwanga and Matebe, Enerka in Mbuji-Mayi, but also by mining companies such as SOKIMO (connecting local communities as part of community engagement initiatives) and faith-based and nongovernmental organizations (NGOs). (For more information of other mini-grid projects in the DRC, please see Section B.3.)



Figure 3. DRC Population Density Map and Existing/Planned Grid















SNEL mandated for generation, transmission, distribution and trading of electricity

• The Electricity Law of 2014 broke SNEL's monopoly

Generation Capacity

- SNEL: 94%
- Independent plant: 6% - Private power componies
- (Virunga SARL, STS, etc.) - Mining companies
- Religious and NGOs

Transmission and distribution network

- · SNEL: Three inter-provincial grids and limited regional networks
- (5,510km of HV, 4,484km of MV, 12,133 km of LV lines) Others (e.g. Virunga SARL: 40km transmission line
- Enerdeal: several km of MV and LV lines)

Figure 4. Value Chain of the DRC Electricity Sector

End-user



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Power station	Type of plant	Owner	Installed capacity (MW)	%
Bas Congo				
Inga 1	Hydro	SNEL	351	
Inga 2	Hydro	SNEL	1,424	
Zongo	Hydro	SNEL	75	
Sanga	Hydro	SNEL	12	
Мроzo	Hydro	SNEL	2.2	
Katanga				
Mwadingusha	Hydro	SNEL	68	
Koni	Hydro	SNEL	42.1	
Nseke & Nzilo	Hydro	SNEL	356.4	
Kyimbi	Hydro	SNEL	17.2	
Kilubi	Hydro	SNEL	9.9	
Piana Mwanga	Hydro	Congo Etain	29	
Kivu	,	<u> </u>		
Ruzizi 1	Hydro	SNEL	28.2	
Ruzizi 2	Hvdro	SNEL	43.8	
Ambwe/Kailo	Hvdro	Sominki	2.2	
Belia	Hydro	Sominki	2.2	
Mangembe	Hvdro	Sominki	1.8	
Lutshurukuru	Hvdro	Sominki	5.1	
Kasai Occidental				
Lunaudi	Hvdro	SNEL	1.6	
	Hvdro	Miba	8.6	
Orientale				
Tshopo	Hvdro	SNEL	18.8	
Budana	Hvdro	Kilomoto	13.8	
Nzoro	Hvdro	Kilomoto	1.4	
Soleniama1	Hvdro	Kilomoto	13.5	
Soleniama2	Hvdro	Kilomoto	1.6	
Equateur	,			
Mobavi & Mbongo	Hvdro	SNEL	11.4	
Total (Hydro) ¹³			2.542	94.95
Bas Congo			,	
Muanda	Thermal	SNEL	1.6	
Kasai Occidental				
Kananga	Thermal	SNEL	2.7	
Equateur			1	
Mbandaka	Thermal	SNEL	2.3	
Lisala	Thermal	SNEL	1.4	
Gemena	Thermal	SNFI	12	
Nord Kivu			1.2	
Kisangani	Thermal	SNFI	12.8	
Total (Thermal) ¹⁴			135	5.05
			100	0.00

Table 3. Major power plants installed and operating in the DRC¹⁵

¹³ This total amount is including small and micro-scale hydro power plants which are not on the list.

¹⁴ This total amount is including small and micro-scale thermal plants which are not on the list.

¹⁵ K. Kusakana, "A Review of Energy in the Democratic Republic of Congo", 2016.





Name of the Station	Last year of construction	No. of turbine installed	Total installed capacity (MW)	No. of turbine in operation	Current available power (MW)
Inga 1	1972	6	351	3	175
Inga 2	1982	8	1,424	3	534
Zongo	1975	5	75	1	13
Mpozo	1938	2	2.2	0	0
Sanga	1949	6	11.5	0	0
Nseke	1957	4	248	3	186
Nzilo	1954	4	108	4	108
Koni	1950	3	42	0	0
Mwadingusha	1954	6	68	6	68
Kalubi	1954	3	10	1	3
Ruzizi 1	1972	4	28	4	28
Tshopo	1974	3	18	1	6
Mobayi/Mbongo	1987	3	11	3	11
Kyimbi	1959	2	17	1	8
Lungudi	1949	2	1.6	1	0.78

Table 4. Operational status of hydropower stations in the DRC¹⁶

A poor quality of electricity services is prevalent, with blackouts and generally low reliability of power supply all too commonplace in the DRC. Accumulated delays in investments in power infrastructure, the degradation of hydro power plants, an over-reliance in unaffordable thermal power generation in provincial towns together with a rapid increase in electricity demand (which tripled over the last decade), resulted in large electricity shortages, which peaked at about 30% of power demand in 2012-2013. This low level of access to reliable energy is an important barrier to economic growth.

Energy sector major stakeholders

The electricity sector is dominated by the **Société nationale d'électricité (SNEL)**, the formal national utility enterprise responsible for 94% of all electricity production with 50+ power plants (15 hydroelectric and 36 thermal)¹⁷. SNEL has a mandate for electricity generation, transmission, distribution and trading of power in the DRC. However, SNEL has underperformed for a long time with continuous operating losses. This is a result of not only the lowest average electricity tariff in Africa (7c\$/kWh) that does not enable SNEL to cover its operational costs, but also the high rate of illegal connections and high rate of its unmetered customers (95%). A significant portion of electricity consumers are connected illegally or to informal grids, with the SNEL accounting for only 500,000 registered household connections. Lack of operational efficiency gave rise to large overdues from public institutions such as schools, health centres and public enterprises. To overcome long-term deficit, SNEL was transformed into a commercial limited liability company in 2011 (the process begun in 2009). Nevertheless, they have suffered from continuous operating losses. SNEL has not been able to improve the quality of its services or extend its network as it struggles with financial deficit caused by the imbalance between charges and revenues, and as a result, the DRC has one of the lowest rates of electrification in the world¹⁸. SNEL's monopoly was broken by the law n°14-011 dated 17th June 2014 (the "Electricity Law"). The law opens the

USAID, DRC Power Sector Overview, 2017.

J M Lukamba-Muhiya & E Uken, "The electricity supply industry in Democratic Republic of the Congo", Journal of Energy in South Africa 17(3): 21-28, 2006.

¹⁶ K. Kusakana, "A Review of Energy in the Democratic Republic of Congo", 2016.

¹⁷ USAID, Transmission and Distribution in the DRC, 2017.

¹⁸ SE4ALL, Stratégie Nationale SE4ALL-RDC, 2013.





electricity market to independent power producers to promote public-private partnerships and private investments¹⁹. However, legal framework to obtain concessions, leases, or management contracts are still under development while some independent power companies have implemented pilot projects without guidelines.

The main authority in the electricity sector is the **Ministry of Energy and Hydraulic Resources (MERH)** which is responsible for the development of the national energy strategy and oversight for the production and distribution infrastructure development for water and electricity. **The Unit for the Management and Coordination of the Ministry's projects (UCM)** under MERH is coordinating the ministry's electricity and water projects, implementing activities such as identifying renewable energy sites, selecting and preparing power plant projects through public-private partnership (PPP), analyzing regulations for the project's realization, and coordinating donor financing in the sector. The National Energy Commission (CNE) conducts studies on the energy sector and reports to the Ministry to inform energy policy decisions. The National Investment Promotion Agency (ANAPI) is mandated to promote investments and improve business climate in the country. The 2014 Electricity Law created new agencies, the Electricity Regulation Authority (ARE) and the National Agency for the Electrification of Rural and Peri-urban areas (ANSER). The ARE ensures fair competition and respect of all laws, norms and standards in the electricity sector while ANSER promotes planning and financing of rural electrification projects. However, both ARE and ANSER have not been operationalized yet.

Key energy sector challenges and constraints (root causes and barriers)

As described, the DRC's energy generation is highly dominated by hydropower and the grid coverage is extremely limited. While off-grid towns rely on micro-scale diesel generation, off-grid solutions such as mini-grid and independent solar home systems powered by renewable energy are yet to get traction in the market as a viable alternative solution. As a result, a large part of the country remains without access to power infrastructure, limiting access to electricity to just above 10% of the population with a high urban-rural divide. However, neither the public sector nor private investors are capable of actively investing in the DRC energy sector. The country's rapid growth in population and economic activities will add a tremendous pressure on energy demand, which will lead to increased GHGs emission if no alternative is provided. Figure 5 illustrates vividly how electrification has not kept pace with the population and economic growth in the DRC. On this aspect the performance of DRC has been much weaker than that of other developing countries. Policy and investment incentives for sustainable electricity projects remain very weak, and a shift toward renewable-based low emission energy system is highly unlikely in near future without focused and substantial interventions.

The government's financial situation, political risk and regulatory weaknesses are pointed out as key barriers in expanding investment in the energy sector, both on-grid and off-grid. The government of DRC (GoDRC) is facing serious deficit in revenue so that they are not able to concentrate investments in the generation, grid expansion and rural electrification. On the other hand, private companies are reluctant to invest because of volatile political situations that lasted over several years in different parts of the country. This has been a dominant disabling factor for business activities, discouraging private-led power projects even in the market liberalized under the new Electricity Law. For off-grid projects, low income level of households and weak industrial base for commercial consumers undermine risk-adjusted returns expected by investors. They face additional challenge as the technology and business models for off-grid solutions are still nascent not only in the Sub-Saharan African setting but globally. Inappropriate regulatory environment is another key barrier. The 2014 Electricity Law created two national agencies, the Electricity Regulation Authority (ARE) and the National Agency for the Electrification of Rural and Peri-urban areas (ANSER). However, neither of these two agencies are fully operational at this point while they have been expected to play a significant role in the development of rural electrification projects.

¹⁹ AfDB, Mini Grid Market Opportunity Assessment: Democratic Republic of the Congo, 2017.



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Figure 5. Population growth and growth in population with electricity²⁰

C.2. Project / Programme Objective against Baseline

Describe the baseline scenario (i.e. emissions baseline, climate vulnerability baseline, key barriers, challenges and/or policies) and the outcomes and the impact that the project/programme will aim to achieve in improving the baseline scenario.

<u>Baseline:</u> Climate change in the DRC is evident from the records. Temperature has been increased by 0.25°C every decade in its warmest day and is projected to increase by 2.7-3.2°C by 2100 as compared to the 1990 baseline²¹. Rainfall in the DRC has been decreasing over the past decades while the frequency of intense rainfall events increased. It is projected that most regions in the country will experience a decrease in rainfall of 0.8-11.4 percent by the 2100s and the southern region will have a shortened rainfall season²². During the dry season in 2017, water levels in the Congo River were at their lowest point in more than a century²³.

The DRC is one the most vulnerable countries to climate change in the world. The country is ranked at 170th out of 181 countries according to the 2016 ND-GAIN Country Index for vulnerability to climate change²⁴. While the DRC's climate vulnerability is multifaceted, the impact for the power sector is expected to be severe. As the DRC's electricity generation largely relies on hydroelectric power (over 95% of the total generation), the country is expected to face increasing uncertainty and fluctuations in power generation with the changing rainfall patterns in the long run²⁵. Unreliable power supply will hurt the industrial activities and livelihoods of people. In addition, climate impact for the forest, ecosystem and natural resource is going to be significant as the DRC is a host to the second largest tropical moist forests in the world, with forested area covering about 67.3% of the country. The country sits on low lying central plains through which the Congo River flows, surrounded by mountainous terraces in the west, savannas in the southwest and dense grasslands in the north. Further, changes in rainfall and temperature are likely to develop disease pathways, rendering the country more susceptible to vector- and water-borne diseases.

²⁰ IFC, Off-Grid Solar Market Trends Report, 2018.

²¹ USAID, DRC Climate Vulnerability Profile, 2012.

²² Ibid.

²³ https://www.voanews.com/a/democratic-republic-congo-power-shortage-drought/3760562.html

²⁴ University of Notre Dame Global Adaptation Initiative, ND-GAIN Country Index, 2017.

²⁵ UNFCCC, Third National Communications of the DRC, 2015.



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The DRC's third National Communication to the UNFCCC (2015) reports that the country's total GHG emission for the period from 2000 to 2010 slightly decreased by 0.45%, from 242 MtCO₂eq in 2000 to 241 MtCO₂eq in 2010. Meanwhile the net CO₂ removals from the forest decreased from 321 MtCO₂eq in 2000 to 204.5 MtCO₂eq in 2010 (36.4% decrease). As a result, the net GHG emission/removal balance of the country has switched from net removal to net emission (36.5 MtCO₂eq in 2010). Land-use change and forestry sector contributes to over 90% of the emission while agriculture and energy sector are other important components of the DRC's emissions profile²⁶. Currently there is no precise emissions inventory available in the DRC after year 2010. Further, the data gap in estimating fossil fuel use in off-grid areas makes it challenging to calculate and report potentially significant GHG emissions from the use of diesel, kerosene and biomass.

Nevertheless, it is evident that most of the off-grid towns in the DRC are relying on expensive, unreliable and inefficient scattered diesel generators and kerosene lamps offering electricity to a very limited number of people, or inefficient diesel based mini-grids operated by the national utility – SNEL. Such 100% diesel/fossil fuel baseline situation will continue to prevail if no intervention is made to introduce sustainable energy solutions.

Actions proposed by the GoDRC under the Nationally Determined Contributions: The DRC's Nationally Determined Contributions (NDC) indicates climate change as one of the major threats to sustainable development in the country²⁷. The GoDRC is conditionally committed to reduce its greenhouse gas (GHG) emissions by 17% by 2030 compared to the business-as-usual (BAU) scenario (which is estimated at 430 MtCO₂eq), avoiding over 70 MtCO₂eq per year of emissions (Figure 6). However, GHG emissions (MtCO₂eq) per capita of the DRC has decreased from 0.98 in 1990 to 0.55 in 2013 due to slow infrastructure development while the population doubled. Renewable energy development including hydropower is identified as a key sector for mitigation with its potential emissions reduction of 9.65 MtCO₂eq by 2030 (Figure 7). The total cost required to reach the mitigation goals is estimated at USD 12.54 billion.



²⁶ Ibid.

28 Ibid.

²⁷ UNFCCC, Nationally Determined Contributions of the DRC. 2015.

²⁹ The second line (bottom) illustrates the emission scenario for the land use and forestry sector only.

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Figure 7. Potential of emissions reduction by sectors (MtCO₂eq) estimated in the NDC

The AfDB-GCF Green Mini-Grid Program is consistent with the objectives of the Nationally Determined Contribution and development plans of the DRC. The DRC is committed to avoid near 10 MtCO₂eq per year GHG emissions by 2030 through the deployment of renewable energy. In order to achieve the target, the central and provincial government of the DRC are supporting strategic reforms in the power sector that includes liberalization, increased transparency, and attraction of a greater number of national and international private and public partners.

The Program aims to deploy green mini-grids in a cost-effective manner and with the objective of providing the lowest end user tariffs possible while still making the investor returns attractive. The contribution of the AfDB and the GCF through the Program will improve the commercial viability of the projects and enable them to provide low emission electricity to consumers who have been left out of the basic energy service. Solar PV based mini-grids, which are easy to implement on a decentralized basis without a significant planning, will directly reduce emissions by displacing the extensive potential future use of diesel generators in the target areas. Additionally, the business model built from this Program will improve the investor's confidence and help kick-start private-led mini-grid investment across the country. This process will be further facilitated by strengthened regulatory framework and project development support from this Program's TA. Therefore the Program's potential contribution to the DRC's mitigation roadmap implementation is highly substantial.

Without the Program's interventions, the baseline scenario (micro-scale diesel generation and kerosene lighting in offgrid towns) will continue to prevail, as significant barriers exist to investment in renewable energy such as solar PV. With high perceived country and economic risks, entrepreneurs are very likely to go for diesel generation where the upfront investment cost is lower. Timing of expenses and risk profiles will naturally encourage the path toward the baseline scenario.

In addition, clean and stable electricity provided to off-grid households and SMEs will build the economic and social resilience of beneficiaries how are often vulnerable to changing climatic conditions. Climate change and variability will severely affect the agricultural productivity, water availability and ecosystem services, and its impacts will hit the poorest population hardest. People reside remotely from developed and industrialized parts of the country without access to modern energy are the most vulnerable among all groups. While the adaptation benefits from the Program are clear from this perspective, benefits are often difficult to quantify or track due to lack of credible data. Therefore this Program will be considered as a mitigation project without reporting its adaptation results.





C.3. Project / Programme Description

Describe the main activities and the planned measures of the project/programme according to each of its components. Provide information on how the activities are linked to objectives, outputs and outcomes that the project/programme intends to achieve. The objectives, outputs and outcomes should be consistent with the information reported in the logic framework in section H.

Component 1 and 2. Three Green Mini-Grid Projects - Overview

The DRC Green Mini-Grid Program will pilot an innovative, private-led electrification approach with renewable-based mini-grid solutions, and thereby bring clean power to sizeable cities without any access to modern energy and reduce emissions by displacing the potential future use of diesel and kerosene. High solar irradiance, speedy implementation and the possibility to locate the power plants near the demand areas thus minimizing transmission-related issues make this solar power solution the best option to achieve low-emission energy access. By doing so, the Program will fulfil recognized basic human needs for thousands of Congolese people, and accelerate the country's transition toward a low carbon development pathway. As the Program targets populated areas with vibrant economic activities, a significant amount of fossil fuel use will be avoided over the next 20-25 years as a direct outcome of the Program. A standardized mini-grid package and tender process piloted under this Program will lay the ground for replication across the country, which will eventually enable the emissions reduction at scale beyond the three projects.

The preparation of the mini-grid projects have been led by the DIFD-supported Essor Access to Electricity (Essor A2E) initiative which aims at supporting the development of green mini-grid solar projects in the DRC over the next few years. Phase I will procure three solar PV mini-grids through a competitive tendering process (to be launched in Q4 2018) in the towns of Isiro, Bumba and Genema, while subsequent tenders will replicate the scheme and scale up investment to the sector. Envisioned mini-grids would consist of two components: the first component including solar PV power plants and battery storage, and the second component with emergency backup generation, distribution and LV networks to reach scattered consumers, and connections (Figure 8). Anchor customers such as Regideso (water supplier) and SMEs will be identified for each mini-grid, while the payment by end-users will be based on a prepaid system with mobile money to improve payment collection. Total estimated CAPEX of three projects, at COD, is up to USD 87 million and additional financing may be required for the expansion of generation and distribution capacity over the lifetime of the installed systems. The AfDB is engaging closely with the DFID-Essor team to provide debt financing and arrange co-financing from the GCF and others for the three selected projects as a lead arranger.

The AfDB-GCF financing envelope under this funding proposal will provide up to USD 40 million of blended debt finance to the Component 1 of the three mini-grids (solar PV and battery storage) whereas the second component (distribution, connections, backup and other costs) will be financed by equity, quasi-equity and grants from other co-financers.





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Figure 9. Selected Project Sites

DFID's Essor Access to Electricity (A2E)

The overall strategy and objective of the DFID's Essor Access to Electricity (A2E) initiative is to decrease perceived risks from investors toward green mini-grid projects through the provision of pre-feasibility studies, credible processes, standardized concession agreements, and a stapled financing package to selected projects.

The DFID-Essor has provided advisory services to the GoDRC and provinces for the procurement of the projects with an aim to develop a coherent and predictable long-term strategic governance framework to encourage private sector investments in mini-grids. It is expected that initiatives will eventually lead to lower the entry barriers to mini-grid investment thereby increase competition in the market, which will ultimately ensure lower tariffs for end-consumers.

In addition, the Sustainable Energy Fund for Africa (SEFA) housed-in within the AfDB has approved the grant for project preparation supports for finalizing project-level feasibility studies and Environmental and Social Impact Assessments. Further, the SEFA grant will help build an enabling framework and stakeholders' capacity for green mini-grid development and management. The GCF's TA grant contribution will co-finance and scale-up SEFA-funded activities.

Three pilot sites with strong unmet demand potentials have been identified for the Phase I through a market assessment (Figure 9). Demand studies and technical pre-feasibility studies have been performed for the three sites, proposing a technical solution that balance the cost, sustainability and reach of the mini-grids. The tendering processes will be run for those areas on the basis of the pre-feasibility studies undertaken and the concessions agreement template prepared. The sponsors for each of the mini-grid will be selected through a competitive two steps process, including an open Request for Qualification and a Request for Proposal in line with the AfDB guidelines. Bidders will be provided with the pre-feasibility studies including detailed demand studies, technical studies, normalized financial models including key assumptions, and a standard concession agreement template. A minimum number of connections and minimum share of PV generation will be set as requirements for bidders. The main selection criteria will be end-users tariffs, but technical experience and connection targets will be considered.

The Ministry of Energy and Hydraulic Resources, at central level, will be awarding the Concession Agreement -"Délégation de Service Public (DSP)" under the 2014 Electricity Law to preferred bidders. Generation and distribution will be bundled within one single concession for a 20-25 years³⁰ period held by one special purpose vehicle (SPV), covering the financing, construction, ownership and operatorship - BOOT model. It is considered that provincial governments will sign the Concession Agreements together with the central Ministry to ensure local ownership. The concessionaire will

³⁰ A 20-year concession period was assumed for the purpose of financial modelling and pre-feasibility studies. The exact concession period will be determined by the UCM/Ministry of Energy and Hydraulic Resources in due course.





have key performance obligations (number of connections, COD, etc.) to be checked by an Independent Engineer on behalf of the conceding authorities. No guarantee will be provided on commercial risk such as low demand and inability to collect revenues and it is clarified for avoidance of doubt that these risks are ultimately assumed by the private sector developers of the three mini-grids.

The key features of the DFID Essor A2E initiative are:

- A pilot project comprising three Congolese towns of approximately 150,000 people each (Gemena, Bumba and Isiro), targeting a combined number of 12,400 connections in Year 1 and 23,300 connections in Year 5 with a 24 hours-a-day service with plots of land being secured upfront with the support of the local authorities;
- Providing upfront technical pre-feasibility studies based on solar hybrid technology;
- Identifying targeted demand volume: anchor customers (industries, water stations, etc.), SMEs (craftsmen, banks, etc.) and a few thousand households, based on a thorough and on-the-ground demand assessment;
- Providing a standard single Concession Agreement covering both generation and distribution of electricity, and embedding an ad-hoc regulatory structure;
- Mobilizing upfront attractive financial resources and possible guarantee instruments;
- Guaranteeing a transparent selection process supported by both central and local governments, while closely monitored by external parties, due to start in the fall of 2018;
- Pilot projects are to be tendered together to achieve critical mass with an incentive to bid for the three concessions within one lot, while leaving the door open for awarding the projects to more than one bidder.

The Program seek to deliver on the main following outcomes:

- Lower barriers to entry for the market and attract investors for the development of privately led minigrids through a well-structured and transparent tendering process. Most of the development risks are being borne by DFID and the AfDB funding for the necessary technical studies and legal and financial advisory services for the structuring of the tendering process. From this pilot round, a business model and technical design for a solar hybrid and battery-supported mini-grid will be demonstrated in the market and lessons gained for the next phase of green mini-grid investment in the DRC.
- Improve environmental sustainability of electricity generation and reduce GHG emission in the DRC through renewable energy generation, which produces considerably less emissions than diesel or fossil fuel alternatives with minimal social impact as it is not anticipated that these solar mini-grids would lead to any resettlement.
- **Increased access to electricity** is expected after a full roll out of the projects by providing energy network servicing a large number of clients independently of the national grid. This first phase will provide access to clean, reliable and more affordable energy to at least 150,000 people with no or limited access to energy in the DRC.
- **Increased productive use of energy** that will drive local development. In fact, more affordable and reliable electric supply will lead to more efficient allocation of precious resources toward other uses such as new investments, leading to additional productivity, economic growth and job creation.
- Provide opportunities for local communities and participate in building resilient societies through inclusive and green growth. The Program will strongly reinforce economic and social resilience of low income population living in climate vulnerable areas. The Program will consider promoting local employment as well as consider how opportunities for girls and women may be maximized and potential negative impacts may be avoided.

This will eventually help the DRC to scale up and optimize the development of a sustainable power solution involving the private sector, all in a timely manner. By significantly lowering the barrier of entry and offering balanced concession terms to private operators being appointed through a transparent process, the initiative aims at setting up a replicable structure to be spread across other places in the DRC, once the pilot projects have been successfully awarded, leading to a significant increase of access to electricity in a sustainable manner.



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Overall timeline

During a pre-structuring and market testing phase, which took place in late 2016-early 2017, the DFID Essor A2E initiative was introduced to the private sector market as well as to the main Development Finance Institutions (DFIs) active in the African energy sector. The market response was very positive with twenty expressions of interest received from both local and international private investors, developers and operators, many of whom were large and reputable utility companies. Following this conclusive testing phase, the GoDRC and DFID approved the launch of the pilot phase in May 2017. The preparation of the tender for the three pilot projects has then consisted of (i) selecting the three pilot sites based on both desktop studies and on-the-ground site visits, (ii) drafting a standard and balanced Concession Agreement, (iii) designing a robust tendering process, (iv) carrying out the technical and demand pre-feasibility studies in the three pilot sites and (v) developing a preliminary financial structure and mobilizing potential financiers, with the objective of obtaining the best financial conditions (Figure 10). A five-year implementation period for this Program (2019-2023) is proposed to allow sufficient time for the tendering, negotiation and financial close with selected bidders, and construction of mini-grids, in consideration of unexpected factors that may slow down and delay the process.



Site selection

Following an initial screening of potential pilot sites conducted during the preliminary phase of the DFID-Essor A2E initiative, it was possible to develop a list of twenty-seven towns throughout the DRC which could serve as potential sites for the pilot projects. This shortlist was further whittled down to six, based on the following discriminating factors:

- The security situation of the area;
- If the SNEL was known to already be active;
- The level of solar irradiance;
- The economic activity, and;
- Logistical issues affecting access to the site.

Preliminary site visits were organized in six shortlisted towns to assess each potential site along the following criteria:

- Population
- Economic potential
- Security
- Logistics and connectivity
- Presence of industrial activity



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- Solar irradiance
- Presence of the financial sector
- Existing activity of the SNEL
- Estimated willingness to pay

Following the visits of the six shortlisted sites, three towns were retained based on the abovementioned criteria. These are Bumba, Isiro and Gemena. This shortlist received a full and formal endorsement from the MERH.

Bumba

While Bumba is not the provincial capital or "chef-lieu" of the Mongala Province (which is Lisala), it is considered to be as important, if not more so. It has a population of some 180,000, and is home to important economic activities with the town acting as a stopping point for traders on the Congo River between Kinshasa and Kisangani. With short dry seasons, and an average solar irradiance of 5.23kWh/m²/day, the site presents a good level of solar irradiance.

Gemena

Gemena is the capital of the Province of Sud-Ubangi with an estimated population around 170,000. The town benefits from an average solar irradiance of 5,21kWh/m²/day, and the solar potential is good throughout most of the year. The town economy is geared towards agricultural production and trade, with goods, people and finances commonly transferred through the town on the way to Zongo or Mogalo. The town is also relatively easy to access with flights (including freight) from Kinshasa directly to Gemena, or from boat from Kinshasa to Akula and from there to Gemena via a relatively well-maintained road (albeit a non-asphalted road).

lsiro

Isiro is the "Chef Lieu" of the newly created Haut-Uele province, which, as with other new administrative centres, makes it a politically attractive site for an electrification project. The town has an estimated population of 137,500 and was once very prosperous with a burgeoning coffee industry, but economic decline, war and insecurity in areas of the province have seen it regress. While there were security concerns about operating in the Province, a detailed assessment of the situation was made by the Essor Security team ruling that the level of risk to operate in the town was in fact acceptable. As the other sites Isiro benefits from a good level of solar irradiation (5,0kWh/m²/day,).

	Bumba	Gemena	Isiro
Solar irradiance (kWh/m ²) in 2018	5.23	5.21	5.00
Population	180,000	170,000	137,500
Number of shops and services	557	211	1,098
Number of public institutions	292	152	170
Security situation	Good	Very Good	Medium
Logistics and connectivity	Weak	Good	Medium

Table 5. Key characteristics of the target towns

Key principles of the tendering process

The purpose is to conduct a tender as transparent and clear as expected for such international auctions. The following procurement principles, as established by the World Bank and the AfDB, will be applied:

- A wide-reaching advertisement is done providing potential bidders with detailed information and enough time for preparation of proposals;
- Prequalification of potential bidders is done using well designed criteria;
- Bidding documents are well-prepared, clear and non-discriminatory bidding documents;



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- Procedures for bid submission are clear and bid opening is public;
- Bid evaluation criteria are transparent, well-defined in the bidding documents;
- Negotiation of the final contract, if required, is done only within the parameters defined in the bidding document;
- Selection of firm(s) for award of contract is done based on the most economically advantageous offer (given the complexity of this offer, other criteria will also be taken into account but the economic criteria will be key); and
- Appropriate complaint handling mechanisms exist.

The criteria of selection will consider the tariff, the number of connections proposed by the bidder, the Equity IRR targeted to fund additional investments such as the grid extension post Year 5. A weighted average tariff would be calculated if there is a multiple-tariff framework. It is envisaged that the tariff framework includes a mechanism to lower the tariff for basic consumption (social tariff) to ensure affordability for all sections of the society.

The Concession Agreement

The private operator will be entitled to produce and distribute electricity under a Service Concession Agreement (Délégation de Service Public) signed by the relevant conceding authority, which is the Central Government. It is expected that the Province in which the projects will be located will also acknowledge the award of the Concession Agreement.

The proposed Concession Agreement, which will be part of the tendering package, is designed with a view to be balanced and is to include robust mechanisms in line with the international best practice in the sector (regarding risk allocation, state risks, force majeure, arbitration, etc.). The Concession Agreement will consist of a standard generic part to be used for all projects and a specific part taking into account each project's specificities where required. Given that the generation assets and the distribution grid will be located very close to each other, the Concession Agreement does not need to include any considerations with respect to the transmission of electricity.

Pre-feasibility studies

One of the key concerns of the projects developers, investors and operators is the difficulty to get accurate and reliable demand estimation (anchor off-takers, SMEs, and households), viewed as a "volume risk". Reliable estimates will be necessary to set up reliable financial forecasts, to adequately size the power plant facilities and the distribution grid, to assess the expected demand growth and to define the appropriate financial structure. Robust pre-feasibility studies (demand and technical studies), performed to the level of standard expected by international investors and DFIs, have been carried out and will be provided to the bidders as part of the tender package.

Demand studies require as much granularity as possible with a preliminary geographical scanning of the population and on-the-ground surveys based on statistically significant sample sizes of the different demand segments. The main outcomes were detailed for the main customer segments such as anchor customers (significant local industrial players), households and small businesses over the concession period on: i) the estimated electricity demand (kWh) as a function of the tariff and the service offer, ii) peak load demand (MWp) iii) the willingness-to-pay and iv) forecasting of the demand growth. Demand studies also provide a sensitivity analysis and an estimation of price elasticity.

For the demand study, historical and current industrial activities and socio-economic profiles of the three towns have been analyzed in-depth through field visit, survey and desk research, and this has formed the basis of the 20-year demand forecast. In order to have a comprehensive view of the demand forecast, multiple simulations were developed: including a baseline model with realistic assumptions of growth in consumption, and an optimistic model characterized by a strong economic dynamism. For each town, an optimistic model was built assuming high suppressed demands and anticipating new industrial development (such as agro-processing, chemical and manufacturing) as a result of stable electricity access.





Based on the demand studies, the technical studies aimed at establishing the technical system design including the sizing of the equipment and a preliminary design of the distribution network, as well as highlighting the potential technical issues (including environmental and social ones) and options to mitigate them.

CAPEX estimation

An indicative capital expenditure schedule was established on the basis of these preliminary technical outputs. At inception, the backbone of MV/LV lines and transformers would be built to support the connections schedule over 20 years. The power plant is based on a technology mix which matches the energy needs forecasted in Year 5. Extension CAPEX are regularly needed throughout the concession life to extend consistently the distribution network and power plant capacity (not part of the initial CAPEX estimation). The additional connections would take place on a yearly basis. It is assumed that the power plant would be extended every five years to cover the electricity consumption for the following five years. Should no other extension CAPEX (both in terms of new connections and additional capacity) take place after Year 5, the plant designed at inception would be able to match the electricity consumption forecasted in Year 20 based on the number of connections achieved in Year 5, taking into account a consumption growth of 1.5% per annum.

Component 3. Technical Assistance grant (USD 2 million by AfDB and GCF)

The enabling environment, institutional capacity and finance are critical challenges facing renewable energy development. The Ministry of Energy and Hydraulic Resources (MERH) and its project coordination and management unit (UCM) have huge task but lack the capacity to take projects through their necessary cycles. Creating attractive conditions for private sector involvement is one of the key pillars to mobilizing renewable energy investments and improving the country's electrification rate while reducing GHG emissions. Well-conceived policies (with appropriate strategies) and regulatory frameworks are key factors in attracting private sector investments into the renewable energy mini-grid space in the DRC. At the moment, the country lacks this institutional, legal and regulatory framework for green mini-grids, and lacks the necessary awareness and capacity among all relevant stakeholders.

The country has fairly recently passed a new Electricity Law (2014) that has liberalized the power sector, however, the law still remains generic and lacks details on incentive, potential subsidy framework, tariff framework, technical standards for mini-grids and grid management. These discourage investor interest in the sector. A lack of institutional capacity to promote and develop green mini-grids is another challenge in the DRC. The existing institutional framework is still undergoing a learning curve. The government has recently established a dedicated unit for coordination and management of energy projects, especially off-grid and mini-grids, however the unit has insufficient capacity to drive projects through the process of investment to financial close and commissioning. The Law (2014) also created the rural energy agency and the sector regulatory authority, though neither institution is as yet operational. This calls for capacity building to those key institutions, enabling them to promote and manage mini grid investments in the country.

There are currently a few examples/business models of public-led or private sector operated mini-grids in the country (see section B.3.). It is critical for the UCM to demonstrate that those types of schemes can be viable. This will in turn serve the institution in building its capacity, create new avenues for public-private development of the off-grid sector, and strengthen the overall position of this institution.

The Sustainable Energy Fund for Africa (SEFA), in-housed in the AfDB, has already set aside USD 1 million grant for the technical assistance (TA) and the GCF is request to top-up USD 1 million to share the cost. The proposed TA grant will establish the necessary framework to attract private/PPP investments into green mini-grids, enabling the sustainable deployment of green mini-grids in the DRC. Private sector-led investment in green mini-grids is the best solution for the country given its large size, limited public financing capacity and infrastructure challenges. To demonstrate the concept and validate a potential business model for green mini-grids (with the objective of stimulating rapid replication) the grant will supplement the already on-going Essor A2E initiative. In addition, the TA will promote the local technical ecosystem for solar PV and mini-grid, by training local technicians and SMEs for their operations, maintenance and repair capacity.



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The AfDB is an Executing Entity (EE) for the TA component, with UCM as a partner for implementation of activities. During the project appraisal for the SEFA grant request, it was established that UCM has the capacity to implement the project, as UCM has gained substantial procurement experience through implementation of other donor-funded projects in the energy sector. UCM has worked/are still working with the World Bank, DFID, KfW and AfDB. The GoDRC, through the MERH/UCM, will contribute for the project coordination unit cost (USD 55,000). The TA implementation arrangement is described in Section C.7.

The proposed TA has two major sub-components (Table 6):

Sub- component	Key activities	Budget (AfDB/SEFA)	Budget (GCF)
1. Green mini- grid enabling framework and capacity building	 (i) Develop green mini-grid strategy and regulations (ii) Develop mini-grid standards and guidelines (iii) Establish green mini-grid tariff guideline (iv) Train key institutions to be able to manage and implement green mini-grid projects development (UCM, MERH, ANSER and benefiting provincial governments) (v) Train project developers (for the subsequent rounds) on green mini-grid projects development and management 	USD 0.3 M	USD 0.2 M
	 (vi) Build a local RE ecosystem by training local technicians and SMEs for operations and maintenance of green mini-grid (vii) Gender action plan implementation 	-	USD 0.3 M
2. Green mini- grid project development support	 Support three solar based mini-grids under the Essor A2E (detailed technical studies and legal cost) 	USD 0.35 M	-
	 (ii) Conduct feasibility studies for other selected potential green mini-grid sites (up to five) (iii) Develop an investment and tender plan for UCM's green mini- grid pipeline 	USD 0.35 M	USD 0.5 M
Total		USD 1 M	USD 1 M

Table 6. Components of the Technical Assistance

Sub-Component 3.1: "Green Mini-Grid Enabling Framework and Capacity Building"

This component will build on existing regional best practices in terms of policy, institutional and regulatory frameworks and financial incentive measures that guide green mini-grid projects.

- Key activities and outcomes
 - 1) Drafting and validation of a mini-grid strategy, regulatory framework and standards:

Drafting and validation of a mini-grid strategy document that defines the strategic direction and policy alignment of the developing green mini-grid sector, and outlines the institutional arrangements, financial incentive measures, and regulatory framework. Once this outline is validated by sector stakeholders, specific regulatory texts (e.g. decrees, orders), frameworks (e.g. guidelines for tariff models to be used by the regulators and licensing frameworks) and institutional documents (e.g. strategies) will be drafted and validated through rounds of stakeholder consultations. The preparation of these documents will closely refer and align with the already established pieces including the existing Electricity Law 2014.

 Guidelines for green mini-grid tariff framework and financing mechanisms: This activity will involve undertaking a comprehensive sector/green mini-grid analysis to develop the viable cost-based tariff framework for green mini-grid projects and recommending appropriate financing





mechanism suitable for green mini-grid development in the DRC. It will also include preparation of the tool/guideline for determining tariff for the green mini-grids. This guideline will inform the regulator on the appropriate tariff determination models and assist them in assessing for the projects that are procured competitively. The tariff guideline will cover for both off-grid and grid connected scenarios.

3) Capacity building of UCM staffs and other relevant stakeholders:

This activity will equip UCM staffs with necessary knowledge and ensure that skills are in place to perform their roles determined in the green mini-grid framework once it is launched. A "needs assessment" will be carried out at the program inception to inform a "training program" to be delivered. The beneficiaries are primarily the public officials who will administer the process of green mini-grid project development, currently employed within the UCM or the MERH. Provincial governments under the three pilot sites will also be part of the beneficiaries of the capacity building program. Other training/advisory services will be given to private sector green mini-grid developers, targeting the subsequent rounds. Key training themes will include: (i) Implementation of the green mini-grid framework including the relevant regulations (targeting the UCM, regulator, and MERH, and selected provincial governments); (ii) Training on feasibility and Environmental and Social Impact Assessment (ESIA) studies, project management, finance, technology, green mini-grid operations and maintenance (targeting UCM staffs and private sector developers); (iii) Training of local technicians and SMEs, through private sector developers, to build local capacity for solar hybrid mini-grid operations, maintenance and repair. This activity will also support gender-responsive programming in the renewable energy and mini-grid sector, through the implementation of the Gender Action Plan.

Sub-Component 3.2: "Green Mini-Grid Project Development Support"

The Program will undertake key project preparation work geared towards attracting and supporting private investments into green mini-grids. The support is two-fold, one to provide technical assistance to the three Essor pilot sites and secondly, to the new selected sites across the country. This technical assistance will simultaneously serve as capacity building opportunities for UCM staffs and the benefiting provincial governments, learning by doing.

- Key activities and outcomes
 - 1) Support three solar based mini-grids under Essor A2E initiative:

Grant support comes in after the investors have been selected under the competitive bidding process. Technical assistance under the grant will cover the finalizing of pre-investment activities, moving the projects towards actual implementation. The TA will include legal advisory services (concessional agreements, land acquisition and rights) and technical studies (ESIA, detailed feasibility studies and engineering design).

2) Project preparation support for the new selected sites:

In additional to the Essor A2E project sites, the TA will support additional sites to be implemented in the country under the leadership of UCM. The sites will be selected jointly by the government in consideration of the work that has been done by other partners to identify potential projects which can be supported for further development. TA support to these new additional green mini-grid projects will also serve as capacity building opportunities for UCM staff, including via carrying out detailed feasibility studies, detailed engineering designs, ESIAs and financial modeling. As part of the support for a wide uptake of green mini-grid projects which will include such approaches as business plan competition which will be able to identify the private sector appetite in investing in the mini-gird space. This activity will go hand in hand with identifying appropriate financing mechanisms for mini grids, especially those in micro scale. A call for green mini-grid project concepts will be communicated widely throughout the DRC through such channels as the Chamber of Commerce and the national association of NGOs. Projects selected through the competition will likely be smaller in size than the Essor-supported green mini-grids (perhaps measured in kilowatts instead of megawatts) and will more likely be the concepts of local Congolese developers rather than international firms.

3) Roll-out plan to attract investments in the green mini-grid projects:



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In addition to the green mini-grids supported under the Essor A2E and those identified via the business plan competition, the UCM has a pipeline of other green mini-grids to be developed. These include water sector related green mini-grids being developed with the GIZ, up to fifteen green mini-grids to be developed under the World Bank EASE program, a number of green mini-grids around airports supported by the AfDB, and others. This sub-component of the TA will organize these future green mini-grid projects into an investment pipeline. Key activities include: (i) elaboration of project concepts focusing on technical and economic criteria to inform potential investors; (ii) preparation of key parameters for investment decisions, including licensing and permitting processes, relevant fiscal/financial incentives available to investors, as well as possible co-financing instruments/facilities available; (iii) structuring, administering and procurement processes that will be used to attract qualified developers to the selected sites. It is anticipated that this "roll-out plan" will test the tendering business model established under the Essor A2E, and increase investors' confidence in the DRC green mini-grids sector.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

Describe the quality of the management team, overall strategy and financial profile of the Sponsor (Executing Entity) and how it will support the project/programme in terms of equity investment, management, operations, production and marketing.

Institutional background

Established in 1964, the African Development Bank (AfDB) is the premier pan-African development institution, promoting economic growth and social progress across the continent. There are 80 member states, including 54 in Africa (Regional Member Countries). The Bank's development agenda entails delivering the financial and technical support for transformative projects that will significantly reduce poverty through inclusive and sustainable economic growth. In order to sharply focus the objectives of the Ten Year Strategy (2013 – 2022) and ensure greater developmental impact, five major areas (High 5s) have been identified, namely: energy, agro-business, industrialization, integration and improving the quality of life for the people of Africa.

The Vice Presidency for 'Power, Energy, Climate and Green Growth' is a Sector Complex focusing on the Bank's Ten Years Strategy and one of the High 5s priority of "Light up and Power Africa". In order to translate this strategic goal into concrete actions, the AfDB launched the "New Deal on Energy for Africa" strategy which is built on five inter-related and mutually reinforcing principles: (i) raising aspirations to solve Africa's energy challenges; ii) establishing a transformative partnership on energy for Africa; (iii) mobilizing domestic and international capital for innovative financing in Africa's energy sector; (iv) supporting African governments in strengthening energy policy, regulation and sector governance; and (v) increasing the African Development Bank's investments in energy and climate financing³¹.

<u>New Deal on Energy for Africa</u>: The AfDB's energy strategy, central to implementing the New Deal, focuses on seven areas, which are: (i) setting up an enabling policy environment, (ii) transforming utility companies for success, (iii) dramatically increasing the number of bankable energy projects, (iv) increasing the funding pool to deliver new projects, (v) supporting 'bottom of the pyramid' energy access programs, particularly for women, (vi) accelerating major regional projects to drive integration and (vii) rolling out waves of country-wide energy 'transformations'. The Bank will implement these priorities through a series of flagship themes such as: IPP procurement, power utility transformation, early stage project support and related catalytic programs, mobile payment initiatives, and a regional project acceleration program. The overall goal is to help the continent achieve universal energy access by 2025 with a strong focus on encouraging clean and renewable energy solutions. This will require providing 160 GW of new capacity, 130 million new on-grid connections, 75 million new off-grid connections and providing 150 million households with access to clean cooking solutions. It is estimated that the investment needed ranges between USD 60 billion and USD 90 billion per year. The Bank intends to invest USD 12 billion of its own resources in the energy sector during 2016-2020 (Figure 11).

³¹ AfDB, New Deal on Energy for Africa strategy, 2016.



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Figure 12. Power, Energy, Climate and Green Growth Complex organizational structure

Under this strategic framework, the Power, Energy, Climate and Green Growth Complex's objectives are (i) to develop enabling sector policy and strategy; (ii) to provide deep sector technical expertise to the regions by gathering pool of experienced individuals who can be consulted for their expertise on complicated transactions; (iii) to develop new financing instruments; and (iv) to act as spokesperson to represent the Bank with external stakeholders on all aspects of "Light Up and Power Africa". This AfDB-GCF Program will be executed by the Power, Energy, Climate and Green Growth Complex of the AfDB, following the Bank's established rules and procedures for the project and financial management (Figure 12). The Climate Change and Green Growth Department, which is part of the Power, Energy, Climate and Green





Growth Complex, is in charge of the Bank's climate change strategy and climate finance programs. The AfDB will constitute an implementation team to undertake due diligence and execution of individual sub-projects as well as the management of the overall Program.

AfDB renewable energy (RE) and climate investments overview and project examples (2011-2017): Over the last 7 years (2011-2017), the AfDB has invested around UA³² 1.25 billion from its own resources in support of renewable energy (in addition to ~UA 390 M in co-financing channeled by the Bank). Operations range from project preparation to infrastructure investment using various Bank instruments - loan, grant, line of credit, partial risk/credit guarantee and equity. The Bank's investment during 2011-2017 in RE (excluding early stage project preparation support) will contribute towards ~3 GW in additional RE generation capacity (of which ~1 GW from hydro, ~900 MW from wind, ~860 MW from solar, ~175 MW from geothermal and ~75 MW from biomass). Further, under its climate finance mobilization efforts, the AfDB is committed to increasing its annual climate financing to reach USD 5 billion a year by 2020 – 40% of its total new investments by 2020. This will be implemented by the "Africa Thriving and Resilient: The Bank Group's Second Climate Change Action Plan, 2016-2020 (CCAP2)" approved by the Board of Directors in 2017. The strategic vision of CCAP2 is to enable the achievement of 'low-carbon and climate-resilient' development in Africa with four Pillars: Mitigation, Adaptation, Climate Finance and a Cross Cutting Pillar that addresses technology transfer, capacity development, institutional reforms as well as other cross-cutting activities that will create of the enabling environment for its successful implementation. The AfDB's climate finance portfolio 2011-2017 has well over 300 projects with climate mitigation and/or adaptation benefits based on the joint MDB climate finance tracking methodology. This portfolio is dominated by mitigation projects; the CCAP2 will aim to raise adaptation finance to reach parity with mitigation.

The AfDB commitment to RE has grown from UA 655 million in 2008-12 to above UA 1 billion in 2013-17. The share of RE in power generation investments increased from 20% to over 65% between the two periods. The AfDB has been associated with the landmark RE transactions in Morocco, South Africa, Egypt, Kenya, and other countries (details provided in Section E.5.2). Most recently, in 2017, 100% of the UA 465 million invested by the African Development Bank in power generation supported renewable energy projects, which will contribute to 1.4 GW of additional renewable generation capacity (950 MW from solar, 473 MW from hydro) while reducing greenhouse gas (GHG) emissions by over 2.3 million tons annually.

The AfDB also uses its various trust funds to support African Governments and private sector developers in scaling-up renewable energy across the continent. For example, the AfDB's Sustainable Energy Fund for Africa (SEFA) supports small- and medium-scale renewable energy projects and energy efficiency through project preparation and technical assistance grants. In 2017 alone, SEFA approved 7 project preparation grants (aiming to add an additional 166 MW of renewable energy and leverage USD 340 million) and 5 technical assistance grants to help African countries create a conducive environment for more private sector investments in the off-grid and mini-grid sub-sectors. Following its fifth year of operations, SEFA has cumulatively committed the vast majority of its USD 95 million capitalization across a portfolio of over 30 projects in approximately 20 countries, including multinational projects.

AfDB-GCF Zambia Renewable Energy Financing Framework

Zambia Renewable Energy Financing Framework is the AfDB's first collaboration with the GCF, approved by the GCF's Board at its 19th meeting in February 2018 (USD 50 million concessional loans and USD 2.5 million grant for technical assistance). It is designed to 1) arrange debt financing for 5-6 small-scale (up to 20MW each) renewable energy independent power producer (IPP) projects selected under the "Global Energy Transfer Feed-in Tariffs" (GETFiT) Zambia Program, and 2) provide complementary technical assistance to develop the ecosystem and value chain for renewable energy-based electrification in Zambia. The AfDB-GCF financing envelope aims to provide USD 100 million of senior debt and standby loan facility (as a tenor extension instrument for commercial banks' loans) to the selected GETFiT projects. As a co-financer and an executing agency, the Bank has committed up to USD 50 million of senior loans and USD 1.5 million of grant for technical assistance. Discussions with other potential co-financiers (commercial banks, National Pension Fund of Zambia (NAPSA), etc.) are ongoing.

³² Unit of Account, equivalent to the IMF's Special Drawing Right.



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The Framework is expected to catalyze private investment in the Zambian renewable energy sector, thereby accelerating the achievement of the country's electricity generation targets and diversification of its energy mix. By doing so, it aims to fast-track Zambia's transition toward a low-emission sustainable development pathway. It will be a test bed for a renewable energy financing model that crowds in local commercial banks and institutional investors, further supplemented with the proposed technical assistance grant facility. This is expected to have a strong demonstration effect across Sub-Saharan Africa.

AfDB support to Green Mini-Grids

The AfDB is currently the focal point for all mini-grid activities on the continent. Through its Green Mini-Grids Market Development Program (GMG MDP), the Bank offers technical assistance to mini-grid developers and mini-grid policy makers through its Green Mini-Grids Help Desk (<u>http://greenminigrid.se4all-africa.org</u>). The AfDB is currently providing support to more than 60 green mini-grid developers in 30 countries, as well as to several Ministries of Energy.

The Green Mini-Grid Africa Strategy, drafted by the GMG MDP, was endorsed in 2017 by the African Union Commission. The Green Mini-Grid Africa Strategy is a document that prescribes the baseline policy principles required to foster private sector investment into mini-grids development in a particular country. These principles include simplified licensing, the liberty to apply cost-reflective tariffs, predictable outcomes in the case of main-grid arrival into a mini-grid market, integrated energy sector planning (between main grid, mini-grids and off-grid solutions) and capacity building at all levels. The Market Development Program conducts country specific green mini-grid opportunity assessments, with studies already concluded for Mozambique, Ethiopia, Burkina Faso, Cameroon, the DRC, Nigeria, Uganda, Madagascar and Mali. The program is introducing the National Renewable Energy Laboratory's Quality Assurance Framework³³ for mini-grids to 12 green mini-grid developers in Nigeria.

The AfDB is the current Chair of the Mini-Grids Partnership (MGP), a body of sector stakeholders that coordinates concepts and interventions related to mini-grids development. Other MGP Steering Committee members include DFID, Power Africa, the World Bank, EUEI, GIZ, IRENA, the Rockefeller and UN Foundations, the Alliance for Rural Electrification, the Clean Energy Solutions Center, Club-ER (the association of African rural electrification agencies), SNV, Power for All and African Mini-Grid Developers Association (AMDA).

While the AfDB does not have a record of direct investment to private sector mini-grid projects yet, the AfDB has accumulated a wealth of sector experience and knowledge through the above-mentioned support programs and public sector operations for rural electrification. The proposed AfDB-GCF Program is built on the collaboration with DFID (Essor A2E) drawing on both organizations' expertise.

AfDB's energy sector involvement in DRC

The AfDB has been one of the key development partners working with the GoDRC to tackle existing challenges and enhance socio-economic development. Under the DRC Country Strategy Paper of 2013-2017, the AfDB's support focused on lifting the DRC out of its fragile state status and creating the conditions for strong and inclusive growth driven by the increased dynamism of the economy's productive sectors. Energy is a key focus under the pillar related to attracting private investment through the creation of a favorable business environment. The AfDB has also financed a peri-urban electrification project (Projet d'Electrification Peri-urbaine et Rurale) to strengthen part of the transmission network supplying Kinshasa and the northern zone of the Kinshasa distribution network. Recently approved financing for a new electricity access and sector governance improvement project would expand the rehabilitation of the distribution network in Northern Kinshasa, develop the Lungundi II Hydropower Plant to add supply in Tshikapa (Kasai Province), and assist MERH to improve sector governance. Through its Sustainable Energy Fund for Africa (SEFA), the AfDB has awarded a project preparation grant for two hydropower mini grids (combined 12 MW capacity). For this Program, AfDB will act as an Executing Entity for both mini-grid project loans (financial and technical due diligence of sub-projects) and TA grant components.

³³ The Quality Assurance Framework is a monitoring and reporting framework related to mini-grid performance.


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C.5. Market Overview (if applicable)

Describe the market for the product(s) or services including the historical data and forecasts. Provide pricing structures, price controls, subsidies available and government involvement (if any).

A review of the DRC electricity sector and market conditions reveals that the grid coverage by the utility (SNEL) is extremely limited and it is unlikely that the grid will be expanded nation-wide in short- to medium-term future. Electricity supply to the grid is highly dependent to large hydro power, which is vulnerable to climatic variability. Off-grid towns, some of them with large population (more than 100,000) and sizeable industrial activities, rely on micro-scale diesel generators and kerosene lights for their energy use. This calls for an alternative approach such as renewable-based mini-grid financed by private investment.

In July 2017, the AfDB published a report "Mini-Grid Market Opportunity Assessment: Democratic Republic of the Congo" as part of the Green Mini-Grid Market Development Program activities. It provides a comprehensive and detailed review of the mini-grid market potential in the DRC. Following paragraphs are brought from this report to provide an overview of the green mini-grid market in the DRC.

Mini-grid development in the DRC

The DRC has a significant green mini-grid market potential. The country is home to nearly 80 million people, populated over a vast land area where most of them suffering from lack of electricity access. Only 20 million people are living within 15km of the current grid and more than 50 million people are living beyond the reach of the current grid. The size of the country makes it difficult and expensive to expand the existing power grid. Besides three regional grids covering major cities in the DRC³⁴, only few towns are supplied by mini-grids operated by SNEL (please see section B.3) and other power producers.

Based on current grid coverage, an annual potential market of USD 921 million for mini-grid and off-grid solutions is estimated³⁵. This assumes that 61 million people will be connected to mini-grid and off-grid solutions. The potential market size could be even larger as modern decentralized solutions may also be feasible in areas within grid proximity where population centres close to the grid are not yet electrified due to limitations of the national power network assets. The same analysis, conducted taking into account the planned grid extensions scenario, yields an annual market size of 47 million people, representing USD 721 million per year.

Main cities and towns across the country represent an obvious priority target for mini-grid solutions. The main 170 population centers across the country with a total population of about 31 million represent a priority target for mini-grid solutions. Of these, 20 million people living in 29 towns are situated within 15km of the existing power network. The remaining **141** populated towns situated beyond the current grid are the primary targets for electrification through mini-grid solutions, whose theoretical market size is estimated at about USD 153 million per year³⁶.

Off-grid developments and support for energy access

The opening up of the power generation and distribution sectors to private operators has been a remarkable achievement of the 2014 Electricity Law. Several independent mini-grids have come on-line in relation to the development of the electricity law and a number of green mini-grid projects are at the development stage. Mining companies such as the Société des mines d'or de Kilo-Moto (SOKIMO) and Société Minière de Bakwanga (MIBA) own hydro plants and inject

 ³⁴ The western grid covers the Central Congo and Kinshasa province, the eastern grid covers North Kivu and South Kivu provinces and the southern grid covers the Haut-Katanga and Lualaba provinces.
 ³⁵ Calculations based on the World Bank Global Consumption Database. The data is from 2010 in USD. Nominal 2010-2016 GDP growth rates from the IMF were applied to calculate a 2016 approximation. Total market size is estimated based upon household energy market size which assumes that 60% of household energy spend is on electricity, and the household spending comprises 60% of the total revenue of a mini-grid.

³⁶ Calculations based on the World Bank Global Consumption Database.





excess energy in local grids. Existing SNEL mini-grids, mostly hydro and diesel, offer additional opportunities for privatisation and rehabilitation. The Modern Villages program by the Ministry of Energy and Hydraulic Resources aims to electrify 100 villages using hydro green mini-grids, but implementation has been slow.

DFID and the World Bank are committing significant funding to further development of mini-grids. **DFID's Essor program** plans to support the construction of up to 30 solar green mini-grids by 2021 through the "Access to Electricity" work stream. The World Bank's Energy Access and Services Expansion (EASE) program, with a budget of USD 147 million, aims to electrify provincial capitals using green mini-grids. In addition, it aims to rehabilitate the Mobayi hydro plant and the Gbadolite grid. The program will also support the creation of a Credit Support Facility (CSF), administered by a financial institution, and a Rural Electrification Fund (REF), administered by UCM and ANSER. These Facilities, once operational, will provide much needed capital in the form of lines of credit, subsidies and grants for private rural electrification projects.

Renewable energy potential for mini-grids

Through the use of available renewable energy resources, green mini-grids fit very well with the specific needs in the DRC for improving access to energy to a large number of its people independently from the national grid. Hydro and solar powered mini-grids have the largest potential to accelerate electrification rates. The United Nations Development Program (UNDP) produced a Renewable Energy Atlas in 2014 that identified 317 potential small hydro sites³⁷. According to this data, 51 out of 141 towns identified above are located within 20km of a potential hydro site. These towns have a total population of 2.7 million and a few major towns (e.g. Thsikapa) are already being served with hydro mini-grids, while others are being served by diesel mini-grids. These sites and town could be primary targets for electrification through hydro powered mini-grids. Some of the mini-grids can go large enough to provide electricity to tens of thousands of people. Solar powered mini-grids have potential to electrify most of other towns, or even those towns in proximity to hydropower sites if solar makes better economic and technological justification.

- Hydro: The DRC has significant hydro power mini-grids potential across the country. Several existing isolated mini-grids are hydro powered, such as the Electricité du Congo (EDC) grid in the city of Tshikapa (1.5MW), the Virunga SARL grids in Mutwanga (0.4MW) and Matebe (12.6MW), the Société d'énergie du Kasaï (Enerka) grid in Mbuji-Mayi (18.48MW) and the Société des Mines d'Or de Kilo-Moto (SOKIMO) grid in Bunia and Mongbwalu (11MW). SNEL also operates two hydro mini-grids in the cities of Kindu and Kisangani. Nevertheless, most of the potential remains untapped. 183 small hydro sites with a combined theoretical capacity of 1,110MW have been identified across 19 provinces. 57 sites with a potential of 165MW are located within 15km of the existing power network, and could contribute to develop the capacity and distribution network of the main gird. Beyond the 15km buffer, 126 sites with a potential of 945MW have been identified that could contribute to the development of hydro-based mini grids.
- Biomass: The DRC has solid potential for energy production from forestry and agricultural waste and methane, although no comprehensive studies exist. The DRC Renewable Energy Atlas provides high level estimates for land cover, distribution of crops, estimated energy from agricultural residue, livestock and biogas potential from livestock waste. On methane potential, Lake Kivu has an estimated 50 billion m³ of methane reserves. Agricultural waste has potential as well, with an estimated 25 million hectares of cultivated arable land in 2013 (FAO). Manioc is the primary crop, with maize, cassava, plantain and sugarcane also grown. Agriculture is generally dominated by subsistence production and characterised by low crop productivity, low diversification and limited participation of formal private businesses. Livestock waste is a further potential source of energy. A 2010 CIAT survey in Kivu, which has a population of approximately one million, showed that 25% of households had sufficient livestock for implementing a biogas digester. Utilization of these sources however, is limited by poor distribution channels, a lack of existing waste collection mechanisms, a lack of technical expertise and low average household income relative to technology costs. Despite the significant potential of biomass for power production, only three biomass projects have been identified.
- Solar: Solar energy is abundant in the DRC with higher potential in the south. Average daily irradiation ranges from 3.5 to 5.5 kWh/m². In the provinces with the highest irradiance such as Kwilu, Lomami, Haut-Lomami, Kasaï-Oriental, Lualaba, Tanganyka and Haut-Katanga the average daily solar irradiance reaches 5kWh/m²/day and up to 6.75kWh/m². Solar energy has not been tapped to supply the main grid, but offers significant potential to

³⁷ UNDP, SNV, SEforALL, DRC Renewable Energy Atlas, 2014.



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power mini-grids over the next few years. The main existing solar project is a 1MW hybrid plant developed by ENERKAC and powering SNEL's Kananga mini-grid in the Kasaï Central province.

C.6. Regulation, Taxation and Insurance (if applicable)

Provide details of government licenses or permits required for implementing and operating the project/programme, the issuing authority, and the date of issue or expected date of issue. Describe applicable taxes and foreign exchange regulations.

Existing regulatory regime

The GoDRC is supporting strategic development and reforms in the power sector, which is in the midst of a significant transition. Key objectives have been outlined for the energy/electricity sector that include liberalization, increased transparency, and the attraction of a greater number of national and international private and public partners.

The law n°14-011 dated 17 June, 2014 (the Electricity Law, "Loi sur l'Electricité") regulates the electricity sector. It provides the background *inter alia* for a diversification of the energy mix; a focus on a greater energy productivity through energy conservation and efficiency measures; and energy pricing policies that reflect economic costs for both suppliers and users in the domestic energy market. The 2014 Electricity Law liberalizes the generation, transmission, distribution and export of electricity. SNEL was transformed into a commercial limited liability company in 2011. The 2014 Electricity Law has put an end to the *de facto* monopoly of SNEL in the generation, transmission, and distribution of power and the DRC energy market is now open to independent power producers subject to the compliance with the provisions of the Electricity Law.

This law introduced the creation of two institutions under the supervision of the Ministry of Hydraulic Resources and Energy (Ministère de l'Energie et des Ressources Hydrauliques):

- The Regulatory Authority (Autorité de Régulation de l'Electricité, "ARE"): will have the mandate of monitoring sector reforms and private sector participation (including tariff settlement). Decree n°16/013 dated 21 April 2016 provides for the creation, organisation and functioning of the ARE.
- The Rural Electrification Agency (Agence Nationale des Services Energétiques Ruraux, "ANSER"): Will have the mandate of increasing access to energy services in rural and peri-urban areas and will be in charge of accompanying the private or community project leaders. A Decree n°16/014 dated 21 April 2016 provides for the creation, organisation and functioning of the ANSER.

These two agencies are still in the process of being created. A preparatory committee has been established to set up the constitution of ARE. Meanwhile all the decisions that should be taken by ARE will be directly taken by the MERH. A specific provision in the Concession Agreement states that ARE, once created and fully operational, will not be able to contest the tariffs agreed in the three concession agreements. It is assumed however that if any change in tariff occurs during the concession lifetime, it will have to be discussed with ARE if the latter is functional.

Mini-grid concessions awarding authority

The existing law does not state precisely who should be the Awarding Authority in the case of a mini-grid (which covers both generation and distribution). Following a thorough analysis, the most suitable mechanism is through a service concession agreement or "délégation de service public", which allows to have both the generation and distribution covered within the same concession contract and which makes the State the Awarding Authority rather than the Province.

The Program is to be handled by a single state agency within the MERH. This role should have been played by Autorité de Régulation de l'Electricité (ARE) but it is still in the process of being established. In its absence, this role is being carried out by UCM under the Ministry. This unit is in charge of electricity projects in the country and has been actively associated with the DFID-Essor A2E project. UCM will be responsible for the oversight and management of the tendering process with the support of the DFID-Essor. The idea of centralizing the process within the MERH is key to this project since the objective is to simplify the upstream administrative process for the developers during the tendering process and once the concession is awarded.

Permits, licenses and land



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As mentioned above the private operator that will be selected will be entitled to produce and distribute electricity under a Service Concession Agreement (Délégation de Service Public) signed by the relevant conceding authority, which is the Central Government. The local authorities at the Provincial level where the mini-grids will be located will also acknowledge the award of the Service Concession Agreement. Furthermore, Under the 2014 Electricity Law, the plant and the grid connection assets are to be owned by the State and be financed and managed by the Concessionaire under the terms and conditions of the concession agreement. They will be built on the public domain (the rights of the Concessionaire to occupy the public domain will be granted under the concession agreement).

Currency regime

The local currency is the Congolese Franc (CDF), although the economy is highly dollarized with around 90% of the banking sector deposits and lending conducted in US Dollars. In addition, most goods, services and financial activities are indexed to the US dollar. As a multilateral development institution the AfDB enjoys a preferred creditor status which gives preferential access to foreign currency in case the country is imposing any restrictions in regard to the foreign currency conversion. The currency conversion risk is low in the DRC as the economy is highly dollarized and US dollar is widely used in daily transactions.

Privileges and Immunities

Chapter VII of the Agreement Establishing the African Development Bank describes the agreements among the AfDB's member countries with regard to the status, immunities, exemptions and privileges. This includes immunity of the Bank's assets and archives, freedom of assets from restriction, privilege for communications, and exemption from taxation. The GCF resources will enjoy an equal treatment with the AfDB resources in terms of privileges and immunities. The parties acknowledge that the Accredited Entity's privileges and immunities bestowed upon it by the Agreement Establishing the African Development Bank are applicable to the GCF Proceeds and other GCF Funds held in trust and/or disbursed by the Accredited Entity for implementation of the activities under this funding proposal.

Tax regime

Discussions about the tax structure that should apply to the projects are still ongoing with the MERH and Ministry of Finance. The "Agence Nationale pour la Promotion des Investissements" ("ANAPI") already defines a tax frame for projects related to energy. Import duties and VAT on equipment, tools and spare parts destined exclusively for the production of electricity have been reduced. According to the law n° 004/2002 du 21/02/2002 of the investment code, a 5-year exemption applies to

- Corporate tax
- Property tax
- Entry tax on equipment goods

<u>Tariffs</u>

Under the 2014 Electricity Law, private operators are authorized to propose specific tariffs for each project. These tariffs will be established so that the project offers a reasonable tariff for the consumers while also offering a reasonable return to the operators. In the course of the tender process, proposed tariffs will be submitted by the bidding operators to UCM. These tariffs will be captured in the Concession Agreement. The latter will indicate that the tariffs is to be calculated in USD but invoiced and paid in Congolese Francs and will specify a clear indexation formula reflecting the local inflation and changes in the CDF/USD conversion rate. The indexation mechanism will take place on a quarterly basis thereby partially mitigating foreign exchange and inflation risks.

Insurance

The AfDB, as a lender of record, will ensure that the each project is adequately insured as per standard industry practices. Specific insurance instruments may be sought to protect the project/sponsors from classical political risks (e.g. MIGA).



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	Enabling Factors	Limiting Factors
Planning and institutional setting	 Private sector is allowed to operate in the energy sector. Some private sector led mini-grids are operational. The 2014 Electricity Law aims to foster private investment and streamline administrative processes by transferring responsibilities to provincial governments. 	 Complex institutional setting, with multiple agencies involved in planning and delivery including at the provincial and central government levels. Limited planning capabilities hamper development of nationwide electrification strategies.
Data availability	• A Renewable Energy Atlas for DRC was produced in 2014 by UNDP and is currently being updated. The Atlas is available in PDF format online.	 The information contained in the RE Atlas is not made available in any GIS-friendly format. Many ministries and agencies do not have a website and relevant sector information is not available online.
Licensing	• Private operators can build and operate mini- grids, subject to a government concession.	 According to the Electricity Law 2014 all transmission and distribution activities require a concession, which in the case of local projects are granted by the provincial authorities. No provisions are made to streamline the installation of small rural mini-grids. Concessions must be an object of public tenders, limiting the ability of new entrants to deploy small-mini grids in rural areas.
Tariffs	• Mini-grid operators can propose tariffs that guarantee an appropriate return, but these are subject to government approval.	• Tariff affordability for poor consumers. This will be partly mitigated by the introduction of a social tariff structure (see section F.1). It is also expected that a competitive tender process will effectively drive down the overall tariff level.
Subsidies and incentives	 Import duties and Valued Added Tax (VAT) have been lifted for generation equipment including renewable generation. 	 No specific incentives for mini-grid projects exist.
Power purchasing agreements (PPA)	• There is limited experience with PPAs for small scale plants. Hydroforce and Enerkac sell electricity to the SNEL in Kananga	• Standard PPAs and provisions for green generation projects do not exist, although a standardized Concessions Agreement for green mini-grid is developed with the DFID-Essor A2E support
Arrival of the grid	 Mini-grids are subject to government concessions of up to 30 years. Most of the country is not covered by the national grid and will remain so for the foreseeable future. 	• No provisions existed specifically protecting mini-grids from the arrival of the main grid. (However, a standardized Concessions Agreement for this Program will include clauses specifying the arrangement upon arrival of the main grid.)
Technical rules	• There are general norms and standards to be respected for any electricity project.	• The general norms and standards are appropriate for utility scale mini-grids, but are too stringent and limit the potential activities of modern mini-grid companies targeting rural areas.
Mobile services	Mobile money service is available through various operators.	Mobile coverage must be strengthened.
	Table 7. Summary of the DRC's regulatory and p	olicy environment for mini-grids ³⁸



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C.7. Institutional / Implementation Arrangements

Please describe in detail the governance structure of the project/programme, including but not limited to the organization structure, roles and responsibilities of the project/programme management unit, steering committee, executing entities and so on, as well as the flow of funds structure. Also describe which of these structures are already in place and which are still pending. For the pending ones, please specify the requirements to establish them. Describe construction and supervision methodology with key contractual agreements. Describe operational arrangements with key contractual agreements following the completion of construction. If applicable, provide the credit analysis of key counterparties of key contractual agreements and/or structural mitigants to cover the counterparty risks.

The AfDB will be responsible for the overall oversight of the framework implementation and will report to the GCF per the terms to be agreed under the Accreditation Master Agreement (AMA) and the Funded Activity Agreement (FAA). For managing the GCF resources, a GCF Account will be set-up within the AfDB as a stand-alone facility and the Bank's role will be to administer the funds. Under this scheme, the AfDB will be a direct lender to the projects in its capacity as an Accredited Entity (Figure 13, Figure 14).

The pipeline mini-grid projects will be selected through a competitive tendering process (tendering process and criteria outlined in detail under Section C.3). The AfDB will apply its credit evaluation, due diligence and approval procedures in appraising potential clients, and only those sub-projects qualified under the AfDB's internal criteria will be eligible for investment under this framework.



Figure 13. Overall structure of the AfDB-GCF Program and the flow of funds



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For the TA grants component, the AfDB (Renewable Energy and Energy Efficiency Department) will be the Executing Entity whereas the activities will be implemented in partnership with UCM under the MERH. Fund management and procurement will follow relevant policies and rules of the AfDB, guided by the grant agreement to be signed between UCM and the AfDB. While TA grantee will procure and contract consultants and service providers, the AfDB will hold and manage the grant resources and make a direct payment to consultants/service providers (more detail under section F.4) (Figure 15).



³⁹ In addition, each SPV will enter into the EPC and O&M agreements with the contractors.



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C.8. Timetable of Project/Programme Implementation⁴⁰

Please provide a project/programme implementation timetable in <u>section I (Annexes)</u>. The table below is for illustrative purposes. If the table format below is used, please refer to the activities as numbered in Section H. In the case of outputs, please mark when all the required activities will be completed.

	2018	3			2019)			2020)			2021	1			2022	2			2023	3 ⁴¹		
TASK				Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q 10	Q 11	Q 12	Q 13	Q 14	Q 15	Q 16	Q 17	Q 18	Q 19	Q 20
Component 1 and 2. Three Green Mini-Grid Projects																								
GCF Board Approval				x																				
AfDB Board Approval				x																				
Projects Tendering – Request for Qualification				x	x																			
Offer of AfDB-GCF financing package ⁴²						x																		
Projects Tendering – Request for Proposal						x	x																	
Evaluation & Selection of project sponsors							x	x																
Financial Close									x	x														
Construction											x	x	x	x	x	x	x	x	x	x	x			
Commercial Operation Starting Date																					x	x		

⁴⁰ In addition to this timetable, financial and operational reporting schedule will be specified in the term sheet.

⁴¹ The Program is designed with a five-year implementation period (2019-2023), to allow sufficient time to deal with possible delay in projects selection, financial close and construction up to commercial operations.

⁴² AfDB-GCF financing package and its indicative terms will be made available to pre-qualified bidders, at the Request for Proposal stage, in order to encourage sponsors' participation to the Program.



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Component 3. Technical Assistance Grant																					
GCF Board Approval				x																	
Grant agreement					x	x															
3-1. Green mini-grid enabling framework and capacity building						x	x	x	x	x	x	x	x	x	x	x	x				
(i) Develop GMG strategy and regulations						x	x	x	x	x	x	x	x								
(ii) Develop mini-grid standards and guidelines						x	x	x	x	x	x	x	x								
(iii) Establish GMG tariff guideline						x	x	x	x	x	x	x	x								
(iv) Train key institutions to be able to manage and implement GMGs						x	x	x	x	x	x	x	x	x	x	x	x				
(v) Train project developer on GMGs						x	x	x	x	x	x	x	x								
(vi) Build a local RE ecosystem by training local technicians/SMEs											x	x	x	x	x	x					
(vii) Gender action plan implementation							x	x	x	x	x	x	x								
3-2. Green mini-grid project development support						x	x	x	x	x	x	x	x	x	x	x	x				
(i) Support three solar based mini-grids under the Essor A2E						x	x	x	x	x	x	x									
(ii) Conduct feasibility studies for other selected potential GMGs											x	x	x	x	x	x	x				
(iii) Develop an investment and tender plan for UCM's GMGs									x	x	x	x									



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Reporting schedule ⁴³																			
APR									x			x			x		x		
Inception report						x													
Interim evaluation													x	x					
Completion report (final APR) ⁴⁴																			x
Final evaluation ⁴⁵																			x

 ⁴³ In addition to the project reports, financial reports will be submitted as per the agreed AMA and FAA.
 ⁴⁴ Completion report is due within 3 months after the end of the relevant reporting period.
 ⁴⁵ Final Evaluation report is due within 6 months after the project completion.



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D.1. Value Added for GCF Involvement

Please specify why the GCF involvement is critical for the project/programme, in consideration of other alternatives.

<u>NDC implementation</u>: The DRC's Nationally Determined Contributions (NDC) indicates climate change as one of the major threats to sustainable development in the country. The GoDRC is conditionally committed to reduce its GHG emissions by 17% by 2030 compared to a business-as-usual (BAU) scenario (which is estimated at 430 MtCO2eq in 2030) thereby avoiding over 70 MtCO2eq per year of emissions. Albeit the large share of the emission reduction potential of the country is in the land use and forestry sector, providing clean and affordable electricity to underserved areas will not only contribute to greening the future power supply of the country but will also contribute to avoiding emissions from alternative polluting electricity sources such as diesel and kerosene.

<u>Barriers to renewable energy (RE) investment</u>: There are several obstacles for investment in the RE sector in the DRC, ranging from lack of a robust legal, regulatory and institutional framework to poor investment climate and complex trade barriers that have prevailed in the country. In terms electricity provision, the government have mainly focused on the promotion and development of medium- and large-scale hydropower project spearheaded by the utility SNEL with little to no incentives for national and international private sector operators in the RE sector to enter the market and contribute to national electricity expansion. A few local private companies are operating several diesel-based power plant and a few small hydropower plants to provide electricity service to households and anchor customers in the mining sector. However, these are site specific and do not meet the need of the population throughout the country. Solar PV hybrid mini-grids can be deployed relatively quickly and at a competitive cost compared to the alternative diesel genset solution. Albeit the cost of Solar PV has dropped in the past decade the initial investment cost is still relatively high in the DRC and thus out of reach from most of the electricity-starved population. Policy and investment incentives for sustainable electricity projects remain very weak, and a shift toward renewable-based low emission energy system is highly unlikely in near future without focused and substantial interventions.

<u>Justification of GCF funding request</u>: The public sector has limited fiscal capacity to expand the infrastructure for electricity generation, transmission and distribution while private sector investors are reluctant to invest in the DRC energy sector due to high risks perceived. As a result, only approximately 10% of people have access to electricity nationally and the regional disparity is high. Some of the key barriers to electrification in the DRC include the government's poor financial situation, political insecurity and weak regulatory environment. The barriers for deploying renewable energy are even higher, as the technology is still new to the market and there has been no demonstrated renewable energy-based business model in the country, for both on-grid and off-grid. The national utility company, SNEL (Société Nationale d'Electricité), is in a financially vulnerable position hence not capable of driving the national electrification efforts.

All these circumstances combined, it is extremely challenging to develop a bankable energy project in the DRC market. Green mini-grid led by private sector is a solution with high potential but the concept and business model needs to be tested to give comforts to most of the investors including debt financiers. Even if financiers decide to bear the risks and make investment, high interest rates from commercial investors will inevitably raise the end-consumer tariff to an unacceptable level so that end-users will not be able to afford to pay. This is exactly why the GCF is needed: primarily to fill the financing gap in terms of volume and price. **Involvement of the GCF will enable a financing scheme that will offer long-term and reasonably priced loans to innovative green mini-grid projects in the DRC. This will make the project bankable with affordable tariff as risks decreased and investors are crowded-in with confidence.**

The Program aims to ensure cost-effectiveness and efficiency by introducing an adequate financial structure that is carefully designed to meet multiple needs. The AfDB-GCF blended debt will be offered at a reasonable cost and a long tenor to ensure that the end-user tariff is acceptable. The GCF's concessional financing in terms of pricing is critical for the entire structure to be financially viable since the cost of the project and associated risks are high by its nature. Without the GCF's concessional loan, there will be a direct impact to the tariff and the project will have to bear significant market risks while transferring economic burden to the consumers. Hence, the GCF's participation will be a key enabler for the projects to gain bankability at an acceptable tariff.



RATIONALE FOR GCF INVOLVEMENT

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By enabling the projects, GCF's involvement will directly contribute toward emissions reduction in the target towns where the use of micro-scale diesel generators and kerosene light dominate the electricity sector. Furthermore, once a green mini-grid business model backed by a standardized legal framework and a robust tender process is demonstrated with GCF's supports, a vibrant green mini-grid market with private investment will be opened up for the entire country and the model will be replicated. GCF's value addition at this early phase is thus transformational.

D.2. Exit Strategy

Please explain how the project/programme sustainability will be ensured in the long run, after the project/programme is implemented with support from the GCF and other sources, taking into consideration the long-term financial viability demonstrated in $\underline{\text{E.6.3}}$. This should include a description of strategies for longer term maintenance of physical assets (if applicable).

Qualifying projects under the Program will be fully evaluated using the AfDB's internal credit approval process to ensure the soundness of the projects in the long term. The evaluation will include the financial assessments, strategic fit, regulatory compliance, environmental, social and gender considerations all aimed at ensuring that approval for the projects is based on a comprehensive due diligence exercise. Legal documentations covering the loan structure and covenants will ensure the repayments of the loans are made on time and according to schedule.

Once the funds have been disbursed and the loans are running, the projects will be monitored by the AfDB's portfolio management department to ensure that project is being executed as planned and the mini-grids are being managed in a way that does not jeopardize the investments of the Program. Such periodic monitoring activities allow the AfDB to intervene and offer support as and when required to ensure the objectives are achieved. The debt will be paid over a period of 15-18 years through payment made by end users comprises of households, businesses and anchor customers such as water suppliers (Regideso) and industries. The use of prepaid metering infrastructure with mobile money will mitigate collection risks of consumers.

In terms of replicability, this Program seeks to set a precedent in the field of private sector led green mini-grids deployment in a country where there is big market potential for green mini-grid. The demonstration effect is expected to promote private sector participation in further developing green mini-grids in the DRC, enabling market transformation and paradigm shift.



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In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's <u>Investment Framework</u>, should be addressed where relevant and applicable. This section should tie into any request for concessionality made in <u>section B.2</u>.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

Specify the mitigation and/or adaptation impact, taking into account the relevant and applicable sub-criteria and assessment factors in the Fund's <u>investment framework</u>. When applicable, specify the degree to which the project/programme avoids lock-in of long-lived, high emission or climate-vulnerable infrastructure.

The proposed Program will finance three solar PV-based mini-grid power plants of around 5 to 10 MW each with battery storage and distribution networks. The Program is estimated to avoid 560,000 tCO2eq over a 20 years operation lifespan (see methodology in E.1.2)⁴⁶. The emissions reduction will directly contribute to attain the DRC's commitment outlined in its Nationally Determined Contribution (NDC) to reduce emissions by 70 MtCO2eq/year by 2030 with appropriate international assistance as compared to the BAU (430 MtCO2eq in 2030). Its replication to other towns in the DRC will provide further contribution to the NDC emissions reduction objectives of the country.

The Program presents an environmentally viable and economically cost effective alternative to speedily implementable decentralized diesel power. The Program also prevents a shift to the intensified use of diesel generator and biomass in off-grid towns by providing an alternative solution. This business model has a high potential to be replicated and scalable in the country and in the region. Ten million people in 141 towns in the DRC are the priority targets (see Section C.5), who are living with limited electricity access relying on the diesel generators and kerosene lights. The model can be replicated to other non-priority towns in the future and it is estimated that up to 51 million people in the DRC can be connected to mini-grids once a viable model is established. Further supported by the TA, this Program will enable the transformation of the DRC energy sector by opening up a market for green mini-grid investments and thereby accelerating low emission development. In addition, through the provision of constant, affordable and sustainable electricity, the Program will support socio-economic development of these towns. Essential service providers and industrial players (e.g. water suppliers and SMEs) will be connected to green mini-grids in addition to households, which will unlock the potential for local economic growth and bring high development impacts.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	Expected tonnes of carbon dioxide equivalent (t CO ₂	Annual	28,000 tCO ₂ eq (average)				
	eq) to be reduced or avoided	Lifetime	560,000 tCO₂ eq				
	Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);	Total	At least 150,000 people directly benefited from low-emission electricity				

⁴⁶ A 20 years concession period is assumed but it could be extended to up to 25 years, subject to the final decision by the GoDRC.



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		Percentage (%)	Less than 1% (out of 78.7 million ⁴⁷)
Other relevant indicators	 Proportion of low-emission power supply in a ju MWs of low emission energy capacity installed Number of additional green mini-grid projects de technical assistance 	risdiction or marl	ket ached financial close following

Describe the detailed methodology used for calculating the indicators above.

GHG accounting methodology: In order to estimate the total GHG emissions reduction of the three projects, the off-grid electrification methodology of CDM Standard baseline AMS-1.A and AMS-I.L (for electrification of rural communities using renewable energy) is applied. These methodologies are suitable for this project given the fact the three localities are not connected to the national grid and are not likely to be connected in the short to medium term. Also historically, the electricity provided in these towns by SNEL and the municipality was through the use of diesel generators only functioning for a few hours and only covering a small portion of the town. It is worth noting that these SNEL-owned diesel systems have stopped providing electricity for more than 10 years ago and businesses and households supply themselves using their own gensets.

GHG accounting assumptions and calculation

Assumptions

Given the current electricity access rate is extremely low, one must compare the CO₂ emission implied by the project's technology mix to the CO₂ emission levels which would be produced if the same amounts of electricity were produced by diesel. A detailed demand study was performed for each town with three scenarios being developed:

- A low growth scenario with only 16 hours of electricity generation and consumption throughout the 20 years of operation
- An optimum scenario with 24 hours of electricity generation and consumption including steady demand growth
- A high case scenario with 24 hours of electricity generation and consumption with rapid demand growth

The optimum scenarios data were used to calculate both the baseline emissions and the project emissions. Given the historical use of diesel generator to provide electricity and the relative low capital expenditure for generation, the baseline emissions is computed assuming that diesel gensets provide all of the electricity generated to meet the optimum scenario demand.

The following assumptions were made to estimate the baseline and project emissions :

- An emission factor of 0.8 tCO₂/MWh has been assumed and which correspond to relatively efficient gensets.
- Final electricity consumption and PV penetration modelled with the HOMER software (one of the leading • software for mini-grid power plant sizing) based on the optimum scenario elaborated for the three towns
- The yearly electricity generation is calculated for the 20 years of operation.

Baseline and Project emissions reduction per site:

Bumba

- Baseline average annual emissions = 17,756 tCO₂eq/year (a) . (b)
- Project average annual emissions = 3,149 tCO₂eg/year •
- Project average annual emissions reduction = 14,600 tCO₂eq/year (a-b)



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•	Project total emissions reduction (over 20 years) = 292,000 tCO₂eq/year	20*(a-b)
Gemer	a	
•	Baseline average annual emissions = 5,558 tCO ₂ eq/year Project average annual emissions = 1,080 tCO ₂ eq/year Project average annual emissions reduction = 4,470 tCO ₂ eq/year Project total emissions reduction (over 20 years) = 89 530 tCO₂eq/year	(c) (d) (c-d) 20*(c-d)
Isiro •	Baseline average annual emissions = $10,596$ tCO ₂ eq/year	(e)
• •	Project average annual emissions = 1,657 tCO ₂ eq/year Project average annual emissions reduction = 8,940 tCO ₂ eq/year Project total emissions reduction (over 20 years) = 178,785 tCO₂eq/year	(f) (e-f) 20*(e-f)

The projects should generate an average of about 5,900 tCO₂/year and a total of 118,000 tCO₂ over 20 years. Should the same electricity generation profile come from a 100%-based diesel power plant, the emissions would go up to 678,000 tCO₂ over 20 years (with an average of 34,000 tCO₂/year). Therefore, the project is estimated to avoid a total of **560,000 tCO₂ eq**.

Expected total number of beneficiaries: The project is expected to connect 21,200 households and 2,100 SMEs over the first five years with AfDB-GCF direct investment. Average size of household in the DRC is 5.3 people⁴⁸. It is estimated that each enterprise has 20 employee on average, which is close to the definition of a micro-enterprise than a SME (A SME is commonly defined as an enterprise employing less than 250 people). With this number, it can be estimated that at least 150,000 people will benefit directly from the clean electricity generated from the projects.

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

Describe how the proposed project/programme's expected contributions to global low-carbon and/or climate-resilient development pathways could be scaled-up and replicated including a description of the steps necessary to accomplish *it.*

The country is facing serious energy deficit whereby the population with access to electricity from the national grid is less than 1% in rural areas and around 10% nationally, while the average in Sub-Saharan African is 24.6%. The DRC's electricity generation heavily relies on hydropower, rendering the whole system vulnerable to variabilities in rainfalls. The government's efforts have mainly focused on large on-grid hydro projects, and renewable based off-grid projects such as solar PV mini-grid still face a high barrier for financing and implementation. Off-grid towns, some of them with large population and sizeable industrial activities, rely on micro-scale diesel generators and kerosene lights for their energy use. New transaction models need to be developed, since weak utility off-taker (SNEL) would not allow to structure a bankable private operation in the DRC and there exists no clear plan for grid expansion.

The AfDB-GCF Green Mini-Grid Program for the DRC will provide senior debt to selected private mini-grid projects under the DFID-supported Essor A2E Phase 1. This Program will reduce current and future emissions in the target towns and enable the transformation of the DRC energy sector by accelerating low emission energy access which will bring together high development outcomes. As a direct outcome, total 23,300 households and SMEs will be connected to electricity, benefitting from sustainable energy and moving away from diesel and kerosene. **The Program will be a test bed for an innovative mini-grid design, demonstrating a viable model for private-led, renewable based mini-grid financing**

⁴⁸ United Nations, Department of Economic and Social Affairs, Population Division, 2017.



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which will be replicable in the DRC, other Sub-Saharan African countries and small island developing countries. At the same time the experience will strengthen the GoDRC's institutional and regulatory systems to adequately manage mini-grids and associated technologies (e.g. battery storage) and to crowd-in private financing. Over time, this will enable the DRC to increase energy access for the off-grid population with renewable energy solutions without capital-intensive grid expansion or large hydro development, leading the country to a low carbon development pathway.

A standardized and robust financial and legal package is being structured for this initiative, which will allow similar project tenders to be easily repeated across the DRC, using a harmonized approach. The ambition of the Program if the pilot phase proves to be successful is to replicate the tender offer to 10 to 15 other large towns in the DRC. The replication phase would benefit from the experience of the pilot phase, taking into account key lessons learned, and from its international publicity with DFIs and other investors, unlocking further capital funding. A number of potential provinces for replication have already been identified and detail studies will be conducted in due course, which will be supported by this Program's TA. With a large number of cities and towns remaining without access to electricity and far from the main grid, there is a huge potential to scale up this green mini-grid experience throughout the country.



Aligned with the investment program, AfDB-GCF TA will invest in making enabling framework for green mini-grid projects in the DRC, capacity building for key stakeholders, and next rounds of mini-grid project development. Through this grant, key stakeholders will be able to manage and implement green mini-grid projects and especially UCM's tendering capacity enhancement is expected so that private-led green mini-grid projects can be boosted up in other regions in DRC as a standardized model. On the policy side, green mini grid strategy, regulations and guidelines will be prepared so that a



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sustainable green mini-grid market will be built. The TA also aims to build local technical capacity for the RE and minigrid management, creating a foundation for the local green mini-grid ecosystem.

E.2.2. Potential for knowledge and learning

Describe how the project/programme contributes to the creation or strengthening of knowledge, collective learning processes, or institutions.

The Program will generate knowledge that will inform the design and implementation of similar green mini-grid programs across the country and in the region. An innovative large (MW-scale) green mini-grid tendering program structure that leverages international financial institutions, key government institutions (UCM, MERH, ANSER and benefiting provincial government), and investors will have a high demonstration effect and set the bar for replication in urban/peri-urban settings and in islands. Together with learning from the TA component, lessons learned from the green mini-grid tendering process and financing will be distilled and shared systematically through the AfDB and GCF knowledge network. Primarily this will involve the knowledge sharing with the DRC, inviting all the relevant stakeholders in the energy, financial and climate change sector.

During the implementation of this pilot program, knowledge will be generated and embedded within the institutions that are responsible or have critical roles to play for scaling-up sustainable energy generation and distribution in the DRC. Capacity building under the TA component will ensure that public officials and relevant stakeholders capacity are enhanced to integrate green mini-grid into the national energy system.

The AfDB and DFID's Essor A2E have a plan to scale up and replicate this model in other DRC regions and/or other countries where needs are identified. This Program is critical to build a commercially viable model for future AfDB engagement in the sector. The experience in the DRC will demonstrate what works and what does not work - the knowledge that scarcely exists in the Sub-Saharan African context. The AfDB is determined to play a role of knowledge broker, to ensure that the ambitious goals under the New Deal on Energy for Africa can be attained with continuous learning and scaling up.

E.2.3. Contribution to the creation of an enabling environment

Describe how proposed measures will create conditions that are conducive to effective and sustained participation of private and public sector actors in low-carbon and/or resilient development that go beyond the program. Describe how the proposal contributes to innovation, market development and transformation. Examples include:

- Introducing and demonstrating a new market or a new technology in a country or a region
- Using innovative funding scheme such as initial public offerings and/or bond markets for projects/programme

<u>Innovativeness</u>: The objective of this initiative is to improve access to electricity with low-emission technologies for people across large urban areas in the country, located remotely from main grid connections in the South (Inga-Kolwezi) and the Eastern parts of the country (Goma area) and counting between 100,000 and 300,000 inhabitants each, through the auctioning to the private sector of new concessions covering the design, financing, construction and operation of large urban independent grids supplied by solar hybrid power generation systems. Such concessions are the first of a kind in terms of business model, as the size of the projects exceeds typical mini-grid projects which have been developed so far in the DRC and in other African countries, rather targeting rural areas. The current initiative has an implicit objective of accelerating, optimizing and standardising the development of mini-grids across the country, through providing bankable opportunities to the private sector, based on a robust structure which can be replicated to various locations.

<u>Sustainability of outcomes and results beyond completion of the intervention</u>: Through this Program, the capacity of key sector institutions, especially Project Management Coordination Unit (UCM) under the MERH will be enhanced. UCM's role in coordinating and conducting green mini-grid project tendering process will equip them with requisite skills and



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enable them to coordinate and replicate private-led mini grid projects in the future by their own capacity. This Program is in line with the Electricity Law of 2014 that allows for the concession of generation and distribution to the private sector. This has yet to be applied in the area of green mini-grid and the Program will help reinforce the framework in place and make the sector attractive for private investors and developers by decreasing perceived and real risks through the implementation of a clear, robust and transparent tendering procedure. In the long term, it will demonstrate the capacity of the government to process tender to procure private concessionaires, establish the needed contractual documents and agreements in a satisfactory and bankable way thereby reducing uncertainties and costs. The complementary TA will add further support for the enabling framework, capacity building and mini-grid project development.

<u>Mobilization of other relevant actors</u>: This pilot Program will mobilize the participation and collaboration from a diverse and comprehensive range of actors in the country's energy, climate and financial sectors. This includes the public authorities, RE project companies and industry players, investors, civil society groups, research and sector experts, and development partners including DFIs.

<u>Market development and transformation</u>: As described above, the Program makes a crucial contribution to the creation and development of green mini-grid market in the DRC.

E.2.4. Contribution to regulatory framework and policies

Describe how the project/programme strengthens the national / local regulatory or legal frameworks to systematically drive investment in low-emission technologies or activities, promote development of additional low-emission policies, and/or improve climate-responsive planning and development.

The GoDRC has made policy reforms to address the challenges of the electricity subsector. The Growth and Poverty Reduction Strategy Paper (PRSP 1 and 2, adopted in 2006 and 2012 respectively) underlines the importance of the energy sector in the socio-economic development of the country. The ultimate objective is to ensure that access to reliable electricity reaches the entire nation. In order to achieve this objective, the Ministry (MERH) drew up a "Five-Year Action Plan 2007 - 2011" under which it formulated a new energy policy and regulatory framework to facilitate rapidly expanded access to energy services for the entire population. In 2014, the government approved a new electricity regime (Electricity Act 2014) aimed at attracting private sector investment through measures including sector liberalization, the establishment of the sector regulatory authority and the agency for rural energy services. The government is now in the process to operationalizing those two institutions with technical assistance from the USAID.

Through this Program, the capacity of key sector institutions, especially Project Management Coordination Unit (UCM) under the MERH will be enhanced. The TA aims to create enabling environment by developing green mini-grid strategy, regulations, standards and guidelines in the DRC. This will involve drafting and validation of mini-grid strategy document that defines the strategic direction and policy alignment of the developing green mini-grid sector, and outlines the institutional arrangements, financial incentive measures and regulatory framework. To this end, the TA will facilitate the replication of the green mini-grid model across the country. The improvement of the mini-grid regulatory framework and policies will be also guided by the learnings from the three pilot projects under this Program.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact



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Environmental co-benefits: The implementation of these green mini-grids will allow the reduction of GHG emissions from diesel-based generation and will reduce indoor air pollution from the use of kerosene lamps for lighting. Pollutant emissions such as nitrogen oxides, non-methane volatile organic compounds and sulphur dioxide from diesel combustion will be reduced altogether.

Social co-benefits: The availability of electricity will have positive social and welfare impact, particularly promoting education and health by powering public facilities such as schools and hospitals. Lack of power will no longer constitute barriers to practical teaching methods that require electrical appliances for optimal learning, thus higher education outcomes can be expected. Access to electricity will further allow for a wider use of ICT and facilitate access to information and knowledge. Electricity also has positive effects on the time available for children to study with improved lighting.

For the impact on health, healthcare centers will benefit from the projects as the current poor access to electricity compromise the frequency of medical interventions and the conservation of medical products. Indirectly, a better access to electricity may have a positive impact on health by improving the municipal water system run by Regideso. With access to a viable source of electricity, Regideso should be able to provide a continuous service and expand its network through the city. The source of household drinking water has important public health implications. Water from springs/lakes/rivers or wells may be contaminated with disease-causing bacteria. This is less likely for water distributed from a municipal water system. Reduction of toxic emissions from diesel and kerosene also brings substantial health benefit. In addition, electricity will lower the fire risk from the use of kerosene lamp and wood for lighting, and reduce the incidence of respiratory and eye diseases.

Economic co-benefits: The availability of electricity will allow for a number of households and businesses to access a more reliable and affordable source of power when compared to the current alternatives. These three towns rely mostly on small auto producers with diesel generators, on barely operating SNEL network and solar home systems for a few households. The electricity supply depends on diesel, making the kWh price reach between 1.20\$/kWh and 1.50\$/kWh. Local businesses will be able to increase production and reduce energy related cost in their daily operations, while households will reduce the use of inefficient and expensive means of lighting such as kerosene lantern and dry batteries lamps thereby inducing economic savings. Further, the Program will create job and income opportunities related to operation, repair and maintenance of the system; and reduce vulnerability of households and businesses to fossil fuel price fluctuations. On a macro level, the GoDRC will benefit from savings in direct investment in electricity expansion.

Gender-sensitive development impact: Various studies indicate that female-headed businesses generally face more impediments than men in accessing grid electricity – experiences suggest that women entrepreneurs can face discrimination e.g. in the form of delays in obtaining electrical connections, and/or the expectation that they will be willing to pay bribes to access those services. Women - especially poor ones living in rural areas - generally face specific energy constraints within the household: as they tend to be primarily responsible for chores, they are generally tasked with fetching wood, charcoal or other forms of fuel, and burning it to prepare food for all family members – this not only generates significant demand on their time, but also exposes them to increased health risks derived from unsafe burning practices.

Access to energy allows for more efficient products to be available in the household, from basic ones such as solar lanterns to more sophisticated appliances - these can significantly reduce the burden on women, and release their time for more productive, income-generating activities including outside the household. In terms of comfort and protection, electrification can lead to the installation of public lighting which in turn increases the perceived level of security of households, especially of women. Improved access to electricity can also then positively affect women's educational outcomes, which in turn are key for their employment and economic advancement prospects as lighting increases the availability of time for studying. In order to ensure gender-balanced green mini-grid and energy sector development, a Gender Action Plan is developed and implemented as part of this Program.



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E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

N/A

E.4.2. Financial, economic, social and institutional needs

Describe how the project/programme addresses the following needs:

- Economic and social development level of the country and the affected population
- Absence of alternative sources of financing (e.g. fiscal or balance of payment gap that prevents from addressing the needs of the country; and lack of depth and history in the local capital market)
- Need for strengthening institutions and implementation capacity

Electrification and development levels are very uneven in the DRC. The population with access to electricity is 44% in the capital city, Kinshasa, while less than 1% in rural area. In the DRC, the accumulated delays in investments in power infrastructure, degradation of hydropower plants, over-reliance in unaffordable thermal power generation in provincial cities together with a rapid increase in electricity demand resulted in large electricity shortages. Most cities (with population over 100,000 inhabitants) in the country are not connected to the national grid, and are not likely to be in the mid-term. Economic activities of the targeted towns, primarily driven by agricultural production and agro-industrial processing with individuals or small businesses, are hampered by the lack of stable electricity supply. This is an important barrier to economic growth, as it poses a major constraint to businesses and productive activities of households. Access to electricity to these underserved urban areas is therefore a pressing issue to be dealt with as it will contribute to improve the living conditions of these population and be a vector for growth. Public investment capacity by the GoDRC to expand energy access is seriously constrained due to its tight budget situation. Political and economic instabilities have deterred participation from private companies and investors as well. Overall there is a lack of capital for power projects in the DRC, which is more severe when it comes to mini-grid projects marked by high perceived risks.

There are barely 2,000 connections (household and non-residential consumers) in the three target towns currently. These three off-grid towns rely mostly on small auto producers with diesel generators, on barely operating SNEL network and solar home systems for a few households. These are individuals or small traders who once having acquired a generator for their own needs, sell their excess electricity within their local neighborhood. The electricity supply depends on diesel, making the kWh price reach between 1.20\$/kWh and 1.50\$/kWh. For their day-to-day needs, households mainly rely on coal and wood for the cooking and on kerosene lamps and battery torches for the lighting. Without any alternative energy solutions, fossil fuel and biomass dependence will only intensify in these towns.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

Please describe how the project/programme contributes to country's identified priorities for low-emission and climateresilient development, and the degree to which the activity is supported by a country's enabling policy and institutional framework, or includes policy or institutional changes.

The Program is consistent and closely aligned with the objectives of the Nationally Determined Contribution (NDC) and developmental plans of the DRC. The DRC is committed to avoided over 70 MtCO₂eq per year GHG emissions by 2030 through the deployment of renewable energy. In order to achieve the target, the central and provincial government of DRC are supporting strategic reforms in the power sector that includes liberalization, increased transparency, and the attraction of a greater number of national and international private and public partners.



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E.5.2. Capacity of accredited entities and executing entities to deliver

Please describe experience and track record of the accredited entity and executing entities with respect to the activities that they are expected to undertake in the proposed project/programme.

The African Development Bank (AfDB) has an extensive experience in financing RE projects in Sub-Saharan Africa. While the summary of the AfDB's energy sector involvement both in the continent and in the DRC is provided in Section C.4, below are some of the key highlights of recent RE financing led by the AfDB:

- The Ouarzazate Concentrated Solar Power (CSP) Complex in Morocco for which the AfDB has committed EUR 134 million as well as USD 219 million from the Clean Investment Funds (CIF) for the two phases respectively in 2012 and 2014, aims to produce 500 MW of solar power. The 160 MW first phase was inaugurated in 2016 while the second phase of 350 MW is under construction – which will make Ouarzazate one of the largest solar complexes in the world.
- Three Solar PV IPPs in Egypt with a total installed capacity of 50 MW each for which the AfDB has approved UA 34 million from its own resources and UA 5 million mobilized from the Global Environment Facility (GEF) in 2017, in support to the implementation of the government's Feed-in-Tariff (FiT) Program. The program was first conceived by the AfDB in late 2016 and the three projects were approved by the Board of Directors in September 2017.
- The initial development of Kenya's Menengai geothermal steam field for which the AfDB has committed around UA 80 million as well as USD 25 million from the CIF in 2011, has the potential to produce steam for around 105 MW of generating capacity. Building on this support, Kenya has selected the first group of the IPPs in the Menengai field that are working towards financial close by 2018. The Bank is continuing to support this by providing partial risk guarantees (PRGs) to backstop the obligations of the state-owned entities vis-àvis the IPPs. The PRG program of USD 12.7 million was approved by the Bank in 2014.
- The 100 MW Sere Wind Farm that was developed by South Africa's national utility, for which the AfDB has provided USD 45 million as well as USD 50 million from the CIF through its sovereign lending window, commenced operation in 2016.
- The 100 MW Xina concentrated solar IPP in South Africa that has a storage component to help meet peak demand in the evening is now in commercial operation. In 2014, the AfDB has approved a senior loan of USD 100 million along with a senior loan of USD 41.5 million from the CIF.
- The 120 MW Itezhi-Tezhi Hydro Power Plant is situated at the existing Itezhi Tezhi dam on the Kafue River in Zambia. The plant is developed by a joint venture SPV equally owned by ZESCO and a private sponsor. The SPV has a 25-year concession and a 25-year off take agreement with ZESCO. The AfDB has provided a mix of financing: the public sector funds (around USD 50 million) contributed to financing half of ZESCO's equity participation in the SPV, technical assistance to ZESCO, as well as co-financing of the 276 km transmission line to evacuate the power, while the AfDB's private sector funds provided a USD 38 million senior debt to the SPV.
- The 42 MW Achwa 2 IPP is a run-of-river hydro power plant in Uganda that will have an annual output of 162 GWh. The Uganda Electricity Transmission Company Limited will purchase the power under a 40-year PPA. In 2016, the AfDB has approved a senior loan of up to USD 20 million towards the investment cost of USD 110 million.
- The 33 MW Segou Solar IPP is Mali's first utility-scale solar project. The plant will generate 52.7 GWh annually (~10% of the country's current generation) which will be bought by Mali's national utility under the aegis of a 25-year PPA. In 2016, the AfDB has approved a senior loan of USD 8.5 million along with a senior loan of USD 25 million from the Climate Investment Funds (CIF) towards the investment requirement of approximately USD 52 million.
- The AfDB has approved the financing package of USD 100 million, comprising USD 50 million equity and USD 50 million convertible senior loan, to the Facility for Energy Inclusion (FEI) in late 2016. FEI is positioned as a global facility with two distinctive windows managed by two separate fund managers: (i) the On-Grid window (USD 400 million), and (ii) the Off-Grid Window (USD 100 million). Fund raising and pipeline building activities will continue over the next months.



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The AfDB's power sector support to its regional member countries is far-reaching, with a concrete track-record of sovereign projects for improved energy access, transmission and distribution infrastructure, power sector reform and capacity building. Some of the examples that can be highlighted include:

- Kenya Last Mile Connectivity Program: The project aims at extension of the low voltage network to reach around 1.2 million people. The total project cost is estimated at UA 108.6 million, out of which the Bank is contributing UA 95 million (~USD 130 million). The population located in rural areas, low income groups as well as small businesses will particularly benefit from this project.
- Burkina Faso The Electrification Project for Semi-Urban Areas of Ouagadougou and Bobo-Dioualasso: The
 project aims to restructure and expand the medium and low-voltage distribution networks in the country's two
 largest towns and establish 17,500 connections to households. The project also comprises several activities
 intended to strengthen SONABEL's operational capacity. The total project cost is UA 37.76 million. The project
 will be co-financed by the AfDB (72%), SONABEL (15%) and the GoBF (13%).
- Lesotho Electricity Supply Project (UA 10.85 million loan/grant): The project is approved in 2009 and the Implementation has completed in 2014. Project Completion Report was approved in 2016. The project helped increase the country's power supply and its reliability, as well as increase electricity access with the rehabilitation of the 2 MW Mantsonyane mini-hydropower station, installation of 200 individual home solar systems, and reinforcement and expansion of the distribution network to additional 6,230 consumers.

<u>Collaboration with the GCF</u>: The AfDB has recently launched the "Zambia Renewable Energy Financing Framework", co-financed with the GCF. The AfDB-GCF financing envelope for the Framework aims to provide USD 100 million of senior debt and standby loan facility (as a tenor extension instrument for commercial banks' loans) to the renewable energy feed-in-tariff projects (smaller than 20MW each) in Zambia. USD 4 million TA is arranged to develop the ecosystem and value chain for renewable energy-based electrification in Zambia. The implementation is expected to start in Q4 2018.

<u>The AfDB mini-grid sector support</u>: The AfDB is currently the focal point for all mini-grid activities on the continent. Through its Green Mini-Grids Market Development Program (GMG MDP), the Bank offers technical assistance to minigrid developers and mini-grid policy makers through its Green Mini-Grids Help Desk. The AfDB is providing support to more than 60 green mini-grid developers in 30 countries, as well as to several Ministries of Energy. (see more detail under Section C.4.)

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

Please provide a full description of the steps taken to ensure country ownership, including the engagement with NDAs on the funding proposal and the no-objection letter. Please also specify the multi-stakeholder engagement plan and the consultations that were conducted when this proposal was developed.

The AfDB's engagement with the DRC energy sector stakeholders for green mini-grid development started years ago with its Green Mini-Grids Market Development Program. Under this support, a green mini-grid market opportunity assessment has been produced (July 2017) which formed the evidence basis for the preparation of this Program. The AfDB's enabling environment supports for the GoDRC has recently led to the approval of USD 1 million technical assistance grant for institutional capacity building and mini-grid project preparation (which is seeking co-financing from GCF under this Program). Building on this long time engagement and collaboration with country and sector stakeholders, it was proposed that the AfDB-GCF arranges a financing envelop for the DFID Essor Access to Electricity (A2E) projects.

The country ownership for the Program is ensured by close collaboration with the NDA and key sector stakeholders in the DRC during the preparatory stage. The concept has been developed with close consultation with the Ministry of Energy and Hydraulic Resources (MERH) - Project Management Coordination Unit (UCM) who is responsible for tendering and granting concessions to mini-grid projects to be financed, as well as with the DFID-Essor team supporting UCM for the entire preparatory works. Stakeholders and beneficiaries in the prospective project sites have





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been consulted during the site selection and subsequent pre-feasibility studies. The engagement with a wider scope of national and local stakeholders took place during the development of the Funding Proposal. As a result, a **No-Objection Letter from the NDA was received in July 2018**.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

Describe how the financial structure is adequate and reasonable in order to achieve the proposal's objectives, including addressing existing bottlenecks and/or barriers; providing the least concessionality; and without crowding out private and other public investment.

Please describe the efficiency and effectiveness, taking into account the total project financing and the mitigation/ adaptation impact that the project/programme aims to achieve, and explain how this compares to an appropriate benchmark. For mitigation, please make a reference to E.6.5 (core indicator for the cost per tCO2eq).

The Program aims to deploy green mini-grids in a cost effective manner and with the objective of providing the lowest end user tariffs possible while still making the returns attractive. In order to achieve this, a preliminary financial structure envisaged a 45% blended senior debt tranche from the AfDB and the GCF and a 55% tranche of equity and quasiequity in the form of reimbursable/investment grant from the sponsor and other financiers. The contribution of the AfDB and the GCF through the Program will improve the commercial viability of the projects and enable them to provide electricity to a wider share of connections at affordable rates. While operating under the principle of minimum concessionality, the GCF's concessional financing in terms of pricing is critical for the entire structure to be financially viable. In term of efficiency the indicator can be derived from the total investment cost (USD 87 Million) and the expected lifetime emission reductions (0.56 MtCO₂eq) giving an efficiency indicator value of 155 USD/tCO₂eq.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

Please provide the co-financing ratio (total amount of co-financing divided by the Fund's investment in the project/programme) and/or the potential to catalyze indirect/long-term low emission investment. Please make a reference to <u>E.6.5 (core indicator for the expected volume of finance to be leveraged)</u>.

Expected co-financing ratio is 1 : 3.35 (GCF providing close to one fourth of the project cost). A relatively low cofinancing ratio needs to be understood in consideration of the unique challenge of the DRC's renewable energy and mini-grid market, where private sector co-financing for mini-grid project is almost non-existent. For the TA and project preparation component, the total estimated budget for the various assignments will be up to USD 2 million which will be co-financed by GCF and AfDB in the ratio of 1:1.

E.6.3. Financial viability

Please specify the expected economic and financial rate of return with and without the Fund's support, based on the analysis conducted in F.1.

Please describe financial viability in the long run beyond the Fund intervention. Please describe the GCF's financial exit strategy in case of private sector operations (e.g. IPOs, trade sales, etc.).



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A preliminary financial model was produced to analyze the impact of the GCF's funding on the project's DSCR and IRR. The terms presently reflected in the model are based on the base case of P90 solar radiation and energy yield assessment for the DSCR analysis, which means that the estimates will be met or exceeded 90% of the time on an annual basis.

With the GCF funding included, the financial model presents a convincing financial case for the project. Given that the current market conditions in the DRC are not favorable and that commercial banks are risk adverse, the GCF's participation will be critical not only to fill the financing gap with adequate price and tenor but also to bring other investors onboard (see more under Section F.1).

E.6.4. Application of best practices

Please explain how best available technologies and practices are considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices.

The AfDB will ensure to apply the best available technologies. Competitive bidding will ensure the use of most efficient and advanced industry technologies and practices. In such way, the implementation of the Program will bring the best international practices as well as technologies for the solar hybrid mini-grid systems well-adjusted for the project environment in the DRC. These best practices include the assessments of financially and technically feasible technologies as well as the high-standard procurement principles which will also bring desirable environmental and social benefits.

E.6.5. Key efficiency and effectiveness indicators

Estimated cost per t CO₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)

(a) I otal project financing	USD 87 million
(b) Requested GCF amount	USD 20 million
(c) Expected lifetime emission reductions overtime	560,000 tCO2eq
(d) Estimated cost per tCO ₂ eq (d = a / c)	USD 155 / tCO₂eq
(e) Estimated GCF cost per tCO₂eq removed (e = b / c)	USD 36 / tCO₂eq

indicators Describe the detailed methodology used for calculating the indicators (d) and (e) above.

Assumptions:

GCF core

The baseline calculation is computed assuming that the most likely technology to be used to meet the electricity needs estimated in the demand study, which in this case would be a diesel or heavy fuel oil power plant. The following assumptions and parameters are used for the GHG emissions estimations:

Emission factor of 0.8 tCO₂/MWh assuming efficient diesel gensets are being installed,
 Total electricity generation and PV penetration modelled with the software HOMER (one of the leading software for mini-grid power plant sizing) based on the detailed electricity demand study elaborated for the three town,



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	The yearly electricity generation is calculated for the 20 years of operation.								
Expected of	co-financing ratio	1 : 3.35							
Other relevant indicators (e.g. estimated cost per co- benefit generated as a result of the project/programme) N/A									



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* The information can be drawn from the project/programme appraisal document.

F.1. Economic and Financial Analysis

Please provide the narrative and rationale for the detailed economic and financial analysis (including the financial model, taking into consideration the information provided in <u>section E.6.3</u>). Based on the above analysis, please provide economic and financial justification (both qualitative and quantitative) for the concessionality that GCF provides, with a reference to the financial structure proposed in section B.2.

A preliminary financial model was built for each project site based on the outputs of the demand and technical studies performed. The CAPEX estimated for Bumba, Gemena, and Isiro are expected to amount to USD 40.1 million, 21.8 million and 25 million respectively, total USD 87 million.

For the modelling purpose, the following tariff structures were computed. Bidders will have the freedom to define their own tariff structures, although it is anticipated a ceiling will be set and a social tariff will be introduced as requirements. These indicative structures are based on consumption thresholds, which allows low-income and medium-income households to benefit from lower rates. A social tariff is applied to the lowest level of consumption (e.g. 0 to 15kWh/month; enough to service lighting and other basic uses such as phone charging), and tariffs range increase with the level of consumption.

An estimated range of the mini-grid tariff is comparable to other operating mini-grids in the DRC and the region⁴⁹. While the tariff is still higher than that of the national utility, it is considerably lower than what people would currently pay for the use of diesel gensets in the target towns (in the range of 1.2-1.5\$/kWh). It is also expected that a competitive tender will effectively drive down the overall tariff level.

Sensitivity analysis

Without GCF's investment, it is assumed that an all-in rate of debt goes up significantly. Under this scenario, the tariff should increase by 6c\$/kWh in order to maintain the same level of IRR. If demand was to be lower than expected, the impact on IRRe would be -3% in the case of a 10% demand decrease, and -6% for a 20% demand decrease. The Concession Agreement comprises an adjustment mechanism if such decrease was to take place during the first five years. However, such tariff increase should be limited given the elasticity of demand to prices.

F.2. Technical Evaluation

Please provide an assessment from the technical perspective. If a particular technological solution has been chosen, describe why it is the most appropriate for this project/programme.

Through the pre-feasibility study for the three target sites, a very thorough and detailed demand and technical assessment for the mini-grid projects have been undertaken. The outcome of the pre-feasibility study will be provided to prospective bidders.

⁴⁹ World Bank ESMAP. Benchmarking Study of Solar PV Mini-Grids Investment Costs, 2017. IFC, Operational and Financial Performance of Mini-Grid DESCOs, 2017.

IFC, Operational and Financial Performance of Mini-Grid DESCOS, 2017.

USAID Power Africa, Tariff Considerations for Micro-Grids in Sub-Saharan Africa, 2018.

Nigeria Rural Electrification Agency, Nigeria Minigrid Investment Brief, 2017.

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Technical guality and compliance with the technical specifications will be an important part of the evaluation criteria during the selection and due diligence process, with detailed technical assessment to be conducted for each selected sub-project.

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F.3. Environmental, Social Assessment, including Gender Considerations

Describe the main outcome of the environment and social impact assessment. Specify the Environmental and Social Management Plan, and how the project/programme will avoid or mitigate negative impacts at each stage (e.g. preparation, implementation and operation), in accordance with the Fund's Environmental and Social Safeguard (ESS) standard. Also describe how the gender aspect is considered in accordance with the Fund's Gender Policy and Action Plan.

The Environment and Social Management Framework (ESMF) and the Gender Assessment and Action Plan documents are developed for this Funding Proposal. No Category A project will be financed under this Program.

Environmental and Social Management Framework (ESMF)

Since specific locations of investments will be determined during project design under this Program, an Environmental and Social Management Framework (ESMF) has been prepared that defines the environmental and social (E&S) planning, review, and clearing processes in compliance with national and AfDB safeguard guidelines. The ESMF will ensure that energy is produced and utilized in an environmentally sound manner; and provide a corporate environmental and social safeguard policy framework, institutional arrangements and capacity available to identify and mitigate potential safeguard issues and impacts of RE projects. The ESMF will specify the following procedures:

- Environmental and Social Impact Assessment (ESIA) to identify key environmental and social impacts (i) and corrective measures for each sub-project once exact intervention locations are known.
- Environmental and Social Management Plan (ESMP) to translate the ESIA into coordinated activities at (ii) local level, with detailed checklists and mitigation measures in order to address expected environmental and social impacts.
- Resettlement Policy Framework (RPF) followed by Resettlement Action Plans (RAP), if relevant, to (iii) present legal and institutional framework, eligibility criteria, methodology for asset valuations and mechanisms for stakeholder consultations and grievance redress.

Stakeholder consultations.

The ESMF contains detailed checklists and generic mitigation measures to ensure that potential impacts are addressed in the E&S assessments and sub-project management plans. In preparing the required detailed E&S studies (e.g., ESIA, ESMP, and RAP), the sub-project operators must ensure that participatory stakeholder consultations take place as required by the E&S policies, guidelines, and standards of the AfDB. Participatory consultations will be held with all stakeholders (including ministerial officials, representatives of local governments, the private sector and associations of civil society, including women associations) in order to:

- provide adequate information about the nature, timing, and scope of the relevant project impacts and mitigation measures;
- highlight gender issues (in order to improve women's access to lower-cost and cleaner energy); and
- guide E&S study development.

Responsibilities



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Projects operators will be responsible, in compliance with national law and regulations and the AfDB safeguard policies, guidelines and standards, for conducting the required detailed E&S studies (e.g., ESIA, ESMP, and RAP), obtaining clearances and licenses from relevant authorities, organizing stakeholder consultations, implementing all required mitigation measures, and conducting monitoring activities.

The detailed E&S studies must be submitted to both the National Authority in charge and the AfDB for review and approval. The authority's approval is based on the Congolese laws and regulations, while that of the AfDB is based on the AfDB's E&S policies, guidelines, and standards. The authority in charge of environment will be responsible for the review and clearance of ESIAs and ESMPs for sub-projects. It provides a one-stop clearance process by involving all other key governmental agencies in the approval process.

Gender Considerations - Gender Assessment and Action Plan

The gender assessment for the Program provides a summary of the gender equality situation in the DRC with a specific focus on women's inclusion in the energy sector. The assessment identifies potential entry points to promote women's participation as business leaders and owners in renewable and clean energy, and proposes a series of actions that will ensure the participation of women.

F.4. Financial Management and Procurement

Describe the project/programme's financial management and procurement, including financial accounting, disbursement methods and auditing.

Due Diligence

The AfDB team responsible for project origination will carry out due diligence and assessments of financing proposals for each sub-project. The origination team's findings and recommendations undergo a rigorous internal review process before they are cleared by Senior Management to be presented to the Bank's Board of Directors for approval. This includes various interdepartmental committee reviews.

The AfDB will, through its Anti-Corruption and Integrity department, provide Integrity Due Diligence (IDD) for the project operations through a structured, systematic analysis to identify, assess, mitigate, manage and monitor potential loss from integrity risks and riskier exposure. This is to ensure that funds are used for their intended purposes and with due attention to considerations of economy, efficiency and competitive trade. The Bank will use the following assessment criteria to safeguards its investment. (See also the Bank's IDD Policy for further information.)

- Identification of beneficial ownership
- Assessment of civil and regulatory backgrounds
- Identification of sanctioned persons and entities
- Identification of Politically Exposed Persons (PEPs) and other high risk relationship

Corporate financial transactions are closely monitored through the MDB harmonized treatments of corporate groups and also through the AfDB's established guidelines on anti-fraud, anti-corruption and anti-money laundering policies (AMLCFT)⁵⁰. The AfDB continues to ensure that its financing operations and investments are not used for illegal or tax-

ADF/BD/WP/2014/64), June 2014, and

⁵⁰ Relevant frameworks and policies within the AfDB include:

⁻ The Bank's revised Strategic Framework and Action Plan on the Prevention of Illicit Financial Flows in Africa and Policy on the Prevention of Illicit Financial Flows,

⁻ Strategy for the Prevention of Money Laundering and Terrorism Financing in Africa (ADB/BD/WP/2007/70 and ADF/BD/WP/2007/46), July 2007,

⁻ Integrity Due-Diligence Policy for Non-Sovereign Guaranteed Operations (ADB/BD/WP/2014/96 -



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evasion purposes. In addition, measures are currently in place to address the issue of tax havens and the accompanying risks.

The AfDB will lead standard KYC due diligence process including anti-money laundering and other evaluations of sponsors.

Financial Management

For the senior loans, financial management will follow the AfDB's "Guidelines for Financial Management and Financial Analysis of Projects", which describes and explains the AfDB' policies, procedures and approaches to the financial management and analysis of projects and programs that the AfDB finances.

Disbursement

Loans: The borrower is entitled to request disbursements of funds from the AfDB, for amounts spent or planned to be spent for the purposes set out in the financing agreement between the two parties, subject to fulfilment of conditions outlined in the financing agreement. Except with the AfDB's consent, no disbursements shall be made (a) on account of expenditures procured in violation of the AfDB's Procurement Rules; or (b) to finance expenditures incurred prior the date of the financing agreement other than those that are expressly permitted. Requests for disbursement shall be made promptly and in conformity with the AfDB's disbursement rules and procedures.

Supervision and Portfolio Management

The AfDB is responsible for fulfilling the reporting obligations to the donors. Reporting is based on the progress of indicators included in the Results Measurement Framework. The AfDB management will ensure that the project portfolio are diligently managed, through close dialogue with clients and periodic monitoring and evaluation. The objective is to enhance the prospects of: (a) delivering expected development outcomes; (b) minimizing harmful environmental and social impacts over the course of projects' economic life; and (c) meeting debt repayment obligations for the loans. At least, bi-annual supervision missions will be organized to review implementation progress and performance of the activities under the framework.

Procurement

To ensure that financing is applied in ways that adequately secure the AfDB's mandate while maximizing development effectiveness, the Bank encourages and promotes sound, fair, transparent and well performing procurement systems. The Bank Group's "Procurement Policy for Bank Group Funded Operations" (dated August 2015) applies to the framework. This Policy sets out the principles that apply to Borrowers' procurement of goods, works and acquisition of consulting services financed in whole or in part by the AfDB. It is supplemented by three additional documents: (i) Methodology for Implementation of the Procurement Policy of the African Development Bank (Methodology); (ii) Operations Procurement Manual for the African Development Bank (OPM); and (iii) Procurement Toolkit for the African Development Bank (Toolkit). Collectively, the Policy, the Methodology, the OPM and the Toolkit are referred to as the "Procurement Framework". The Policy is the overarching document and in the event of a conflict between it and any other documents of the Procurement Framework, this Policy will prevail. In the event of any inconsistency between the remaining documents comprising the Procurement Framework, the following hierarchy shall be followed: the Methodology, the OPM, and the Toolkit.

<u>Audit</u>

The framework will be subject to the AfDB's normal internal audit policies, meaning it will be audited annually by external auditors. The utilization of the AfDB's and the GCF resources will be subject to audit by an independent external auditor

⁻ Integrity Due-Diligence Guidelines for Non-Sovereign Guaranteed Operations 2014.



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acceptable to the AfDB every year and at the completion of the activity for which support has been provided. Beneficiaries of externally executed grants shall recruit an auditor for these as per the terms of the grant agreement to be signed. The cost of audit services shall be incorporated into the cost estimates for each approved project/activity.



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G.1. Risk Assessment Summary

Please provide a summary of main risk factors. Detailed description of risk factors and mitigation measures can be elaborated in G.2.

The main risks of the project will be linked to the political situation and the market risk to be borne by the project.

Political instability and change of regulations: Developers feel at risk from the overall political situation in the DRC. Any disturbance to the peace would impact or otherwise halt the construction or operation of the project. Developers are also concerned with the risk of any non-respect of the Concession Agreement, and a political entity appropriating the assets of the project. To mitigate this risk, standards concession agreements have been negotiated and political risk insurances will be considered as described in more details below. High corruption risk also prevail in the country and will be addressed by the institutional setting of the project handled by one stop-shop within the GoDRC (MERH - UCM).

Market risk: The mini-grids projects are developed on a merchant basis without any demand guarantee from the provincial authorities or offtake agreements with the SNEL. As such, the projects rely on a detailed demand projection taking into account the willingness and ability to pay. Foreign exchange risks will be mitigated through a quarterly update of tariff.

Other risks, including construction, O&M risks, environmental and social risks, payment risks are expected to be of lower magnitude and will be addressed by specific provisions as detailed below.

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring						
Political instability: Developers feel at risk from the overall political situation. Any disturbance to the peace would impact or otherwise halt the construction or operation of the project.	Other	High (>20% of project value)	Medium						
Mitigation Measure(s)									

In addition to the provision of the Concession Agreement, specific insurance instruments from DFIs (e.g. MIGA) will be sought to address classical political risks for the sponsors.

Selected Risk Factor 2									
Description	Risk category	Level of impact	Probability of risk occurring						
Change of regulations: Developers are concerned with the risk of any non-respect of the Concession	Other	High (>20% of project value)	Medium						



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Agreement, and a political entity appropriating the assets of the project.									
Mitigation Measure(s)									

Standard Concession Agreements are currently under negotiations with the Government. The political risk is covered in the Concession Agreement by a broad definition of the State Risk and by the Change in Law clause. Compensation payments will be agreed in the Concession Agreement for termination upon event of default by Project Company or Conceding Authority, force majeure, and political event. It is expected that all permits and authorizations required for the projects will be delivered in due time before construction. Legal compliance will be further reviewed during due diligence by the Lender's Legal Advisor (LLA). The Concession Agreement includes protection for new or changes to taxes applicable to the Concessionaires.

Selected Risk Factor 3

Description	Risk category	Level of impact	Probability of risk occurring		
Demand risk : The demand risk lies with the difficulty to get accurate and reliable demand estimation (anchor off-takers, SMEs, and households). These estimations are necessary to set up reliable financial forecasts, to adequately size the power plant and the distribution grid, to define the expected demand growth and to define the appropriate financial structure.	Financial	High (>20% of project value)	High		
Nitization Magazina(a)					

Mitigation Measure(s)

This risk is expected to be mitigated as selected mini-grid projects will primarily target the areas with significant economic activities and a large population basis without access to modern energy. They currently rely on small scale individual diesel generator with a cost higher than 1\$/kWh. Individual projects are expected to supply power to consumers (households and businesses) with a competitive tariff, depending on financing conditions. Anchor customers such as the government, water supplier, and SMEs will be identified for each site.

In order to limit the risk borne by the Concessionaire, pre-feasibility studies were undertaken in line with the level of standards expected by international investors. These were done to a high level of granularity with a preliminary geographical scanning of the population, on-the-ground surveys based on statistically significant sample sizes of the different demand segments (anchor off-takers, SMEs, and households). These studies also assess the willingness to pay, revenues and energy needs.

Selected Risk Factor 4 Description Risk category Level of impact Probability of risk occurring Payment risk Financial Low (<5% of project value)</td> Low Mitigation Measure(s) Mitigation Measure(s) Low Systems with meters. The use of prepaid metering infrastructure with mobile money will mitigate collection risks of



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consumers. Payment risk for larger private customers is assumed to be reduced as non-payment would result in the disconnection of their electricity service.					
Selected Risk Factor 5					
Description	Risk category	Level of impact	Probability of risk occurring		
Environmental and Social risks	Social and environmental	Low (<5% of project value)	Low		
Mitigation	n Measure(s)				
By essence, solar PV technology has minimal physical and economic displacement. For the battery treatment after its life time, a recycling obligation will be included to the list of technical requirements The AfDB and the client are jointly working on an Environmental and Social Impact Assessment (ESIA) including an Environmental and Social Management Plan (ESMP). Appropriate measures including the Resettlement Action Plan will be prepared in line with the AfDB's requirements if relevant. The safeguards and compliance department of the AfDB will review available documentation and provide the necessary guidance to ensure compliance with the Integrated Safeguard System's requirements. A detailed analysis of potential environmental and social risks and their management framework is outlined in the Environmental and Social Management Framework (ESMF) for this Funding Proposal.					

Selected Risk Factor 6

Description	Risk category	Level of impact	Probability of risk occurring		
Construction, Operation and Maintenance risks	Technical and operational	Medium (5.1- 20% of project value)	Low		
Mitigation Measure(s)					

Risk will be borne by the Concessionaire with traditional insurance tools.

The construction of a PV power plant, distribution networks and storage facility involves a proven technology. Construction risks will be mitigated trough a turnkey EPC contract. Adequate completion guarantees and liquidated damages will be requested by the lenders. Construction and interference risk will be further assessed during due diligence. Large provisions for transport cost, amounting to 8% of total CAPEX for each site, have been earmarked to cover risk related to transportation of materials.

The operation and maintenance of the solar PV power plant itself is usually relatively simple as it consists of cleaning, regular inspections, minor repairs and measurements, data verification, reporting and site security. At the mini-grid level, the management of the intermittent source of energy will have an impact on the operation. Consequently, any large fluctuation of power from the solar plant will require a quick compensation from the storage facility and/or the spinning reserve to maintain the stability of the network. These risks will be mitigated with the implementation of an adequate power management system and the definition and implementation of operating/dispatch measures to be followed by the operators. Lenders will thus assess the capacity of the sponsors to provide backup generation, maintain the required spinning reserve and manage power fluctuations and the measures to be put in place, as needed.



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Selected Risk Factor 7					
Description	Risk category	Level of impact	Probability of risk occurring		
Foreign Exchange and Inflation	Financial	Medium (5.1- 20% of project value)	Medium		
Mitigation	n Measure(s)				
The foreign exchange and inflation risks will be partially offset by the fact the tariffs will be calculated in USD but invoiced and paid in Congolese Francs and will be adjustable every three months. Non-convertibility of Congolese Francs or the impossibility to transfer USD outside DRC is listed as a case of State Risk in the Concession Agreement. If this event was to occur for more than 60 consecutive days, the Concessionaire would be entitled to terminate the Concession Agreement for default of the Awarding Authority.					
Selected Risk Factor 8					
Description	Risk category	Level of impact	Probability of risk occurring		
Corruption risk	uption risk Other Composition		Low		
Mitigation	n Measure(s)				
A robust tender process has been established with the DFID-Essor support and the proceedings of the tender will be documented and shared with lenders. A centralized one-stop-shop which handles all administrative procedures should limit of the risk of corruption borne by multiple administrative layers. The AfDB will ensure compliance with its anti-corruption and integrity policies and as per the AMA with the GCF.					
Other Potential Risks in the Horizon					
Please describe other potential issues which will be monitored as "emerging risks" during the life of the projects (i.e., issues that have not yet raised to the level of "risk factor" but which will need monitoring). This could include issues related to external stakeholders such as project beneficiaries or the pool of potential contractors.					
comprehensive due diligence covering technical, commercial, financial, legal, social and environmental, procurement, insurance aspects of the mini-grid projects, as well as appropriate regulatory Know Your Customer checks. The AfDB will put in place an implementation team for the Program who will be in charge of due diligence and execution of individual sub-projects.					





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H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's Performance Measurement Framework under the Results Management Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level⁵¹						
Paradigm shift objective	S					
Shift to low-emission sustainable development pathways	The AfDB-GCF Green Mini-Grid Program for the DRC aims to deliver each 5-10 MW solar based mini-grid in three towns of the country, supplying electricity from a sustainable and efficient energy source than micro-scale diesel generation currently used to bridge the gap. The Program arranges a financing envelope for the DRC's first round of green mini-grid projects selected through the government's tendering process. Use of locally available renewable energy resources, rapid deployment, easy scalability from the modular design, and possibility to locate the power plants near the demand areas make this technological choice the best solution to achieve increased energy access with lowest emission. Envisioned mini-grids will provide access to clean energy to approximately 150,000 people who live off the grid, avoiding emission of 560,000 tCO ₂ eq over 20 years. The Program aims to set a paradigm-shifting milestone as it pilots a new business model providing sizeable supply of clean electricity with private sector investment. Deployment of renewable energy mini-grid, coupled with technical assistance to strengthen regulatory framework and capacity of key stakeholders, will enable the transformation of the DRC energy sector by accelerating low emission energy access. In addition, energy access will strongly reinforce economic and social resilience of low income population living in climate vulnerable areas. In the DRC where the concept of solar powered mini-grid and the model for private-led energy project financing is still new, this Program has an important role to play by demonstrating a viable green mini-grid business model scalable across the country and in the region.					
Expected Popult	Indicator	Means of	Basalina	Tar Mid torm	get	Assumptions
Expected Result	mulcator	(MoV)	Daseinie	(if applicable) ⁵²	Final	Assumptions
Fund-level impacts						
M1.0 Reduced emissions through increased low- emission energy access and power generation	Tonnes of carbon dioxide equivalent (t CO2eq) reduced as a result of Fund-funded projects/ programmes	Program report (mid-term and final) Regular reporting from AfDB to GCF as agreed in	0	-	560,0000 tCO2eq (20 years) Total funding	Financing of all selected three sub- projects by AfDB- GCF, provided that selected bidders choose to borrow from AfDB-GCF ⁵³
	through the facilities	the AMA			USD 87m	Successful completion of the

⁵¹ Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf ⁵² Mid-term target is not applicable.

⁵³ AfDB-GCF financing envelop will be available for all successful bidders, however successful bidders have a liberty to choose alternative financing options. In such case, not all three projects will be financed hence the impact achieved from the Program will be reduced. If this situation arises, it will be reported at the mid-term evaluation and re-sizing of the Program may be considered.



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Cost per tCo2eq decreased for achieved project0-USD 36 tCO2eqmini-grid construction Full disbut the approx financing	n sement of ed
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H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level						
		Means of		Target		
Expected Result	Indicator	Verification (MoV)	Baseline	Mid-term (if applicable)	Final	Assumptions
Project/programme outcomes	Outcomes that contribute to Fund-level impacts					
M6.0 Increased number of small, medium and large low-emission power suppliers	 6.1 Proportion of low- emission power supply in a jurisdiction or market 6.2 Number of households, and individuals (males and females) with improved access to low-emission energy sources 	Reports from the project sponsors; regular reporting from AfDB to GCF as agreed in the AMA	Non-hydro RE sources less than 1% of the national energy mix	-	1+% non- hydro RE in the national energy mix 23,300 connectio ns / 150,000 people	All three mini-grid projects are financed (see footnote 53.) Macro-economic and political stability Support from central and provincial governments Increasing market confidence for green mini-grid from the GoDRC and private sector
	6.3 MWs of low emission energy capacity installed, generated and/or rehabilitated as a result of GCF support		0	-	18.5 MW solar PV with battery installed	
M5.0 Strengthened institutional and regulatory systems	Number of additional green mini-grid projects developed and reached financial close following technical assistance	Reports from the TA recipients (UCM); regular reporting from AfDB to GCF as agreed in the AMA	0	5	10	Strong ownership from UCM and RE stakeholders for the subsequent roll-out of green mini-grids ⁵⁴

⁵⁴ AfDB's historical and current engagements with MERH/UCM and more broadly with the Congolese power sector will ensure that the activities are designed and implemented closely with key sector stakeholders.


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FUND						
Project/programme outputs	Outputs that contribu	ute to outcome	es			
Component 1. Three green mini-grid projects – generation and storage						
Mini-grid projects financed, installed and operational	Number of green mini- grid projects financed and constructed (solar PV plants and battery storage)	AfDB monitoring	0	-	3 projects: 1 Bumba 1 Gemena 1 Isiro	All three mini-grid projects are financed (see footnote 53.) Successful tender, financial close and construction
Component 2. Three greer	n mini-grid projects – dis	stribution, conne	ections, bacl	kup and oth	er costs ⁵⁵	
Mini-grid projects financed, installed and operational	Number of green mini- grid projects financed and constructed (distribution networks and connections)	AfDB monitoring	0	-	3 projects: 1 Bumba 1 Gemena 1 Isiro	All three mini-grid projects are financed (see footnote 53.) Successful tender, financial close and construction
Component 3. Technical Assistance grant						
3.1) Green mini-grid enabling framework improved and capacity building	Green mini-grid strategy document and regulatory frameworks developed and validated	Reports from the TA recipients (UCM)	0	-	1	Strong ownership from UCM and RE stakeholders for the subsequent roll-out of green mini-grids
	Green mini-grid standards and guidelines developed and validated		0	-	•	Strong interests for green mini-grid training
	A green mini-grid tariff guideline developed and validated		0	-	1	
	Number of key institutions officials trained on green mini-grid development and management		0	-	40 (of which 30% are women)	
	Number of private developers trained on green mini-grid development and management		0	-	50 (of which 30% are women)	

 $^{\rm 55}$ Not financed by AfDB and GCF



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	Number of local technicians and SME staffs trained on operations &maintenance of green mini-grid [Gender Action Plan]		0	-	20	
	Number of gender mainstreaming policies and action plans developed in the energy sector		0	-	2	
	Number of women and youth trained on green mini-grids in target areas		0	-	50	
	% of women and youth employed by target green mini-grids		0	-	40%	
	Number of market scoping study developed		0	-	1	
	Site-specific gender analyses for the Program		0	-	3	
3.2) Green mini-grid project development support	Number of technical feasibility studies (including ESIA) for target green mini-grid sites completed		0	-	3	A concrete pipeline exists for future green mini-grid projects
	Number of feasibility studies for other selected potential green mini-grid sites conducted		0	-	5	
	An investment and tender plan for UCM's green mini-grid pipeline developed		0	-	1	
Activities	Description		Inputs		Description	
Component 1. Project financing – generation and storage	Three green mini-grid projects financing (solar PV generation and battery storage)		AfDB and GCF – senior loans; Sponsors – equity		The activities and inputs will follow the cases of other power projects financed by the AfDB.	



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TOTAL			
 Procurement of mini- grid projects Complete additional project-specific technical studies as necessary AfDB due diligence Financial close 			
 Component 2. Project financing – distribution, connections and backup Procurement of mini- grid projects Complete additional project-specific technical studies as necessary Due diligence Financial close 	Three green mini-grid projects financing (distribution networks, connections and emergency backup)	Sponsors – equity; Other financiers – quasi- equity and grant	The activities and inputs will follow the cases of other power projects.
Component 3. Technical Assistance (TA) grant 1) Green mini-grid enabling framework and capacity building 2) Green mini-grid project development support	 Green mini-grid enabling framework and capacity building Develop green mini-grid strategy and regulations Develop mini-grid standards and guidelines Establish green mini-grid tariff guideline Xarafield and guidelines Train key institutions to be able to manage and implement green mini-grid projects development (UCM, MERH, ANSER and benefiting provincial governments) Train selected project developers on green mini-grid projects development and management Train local technicians and SMEs for operations and maintenance of green mini- grid	Expert consultancy, other goods and services as required	Consultants and other goods and services will be procured as per the TA budget and procurement plan.

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H.2. Arrangements for Monitoring, Reporting and Evaluation

Besides the arrangements (e.g. semi-annual performance reports) laid out in AMA, please provide project/programme specific institutional setting and implementation arrangements for monitoring and reporting and evaluation. Please indicate how the interim/mid-term and final evaluations will be organized, including the timing.

Please provide methodologies for monitoring and reporting of the key outcomes of the project/programme.

Monitoring of the project

All projects financed under the proposed Program will be monitored by the AfDB's Portfolio Management team as per the relevant internal policies and procedures. The AfDB – as the accredited executing agency – will be responsible for direct monitoring of implementation conditions and reporting periodically to the GCF under the terms to be agreed between the AfDB and the GCF. All mini-grid projects financed under the proposed Program will comply with the AfDB appraisal, approval, monitoring and supervision standards and procedures involving representatives or all relevant teams (engineers, lawyers, project finance specialists, procurement experts, E&S specialists, climate finance officers, financial management officers, supervision and monitoring specialists). The implementation and monitoring of each stage of the project will be guided and managed by the AfDB project lifecycle management framework⁵⁶. The key task managers, who will perform due diligence, implementation monitoring, risk monitoring and mitigation, will be located in the relevant teams in the headquarters and the country office in Kinshasa.

Reporting

- 1) Reporting of project companies to the AfDB will be in line with the standard loan agreement, and the AfDB will conduct a biannual supervision.
- 2) Reporting of the AfDB to the GCF: The AfDB will comply with the relevant GCF policies (as specified under the AMA) in reporting and evaluation arrangements for this Program. The AfDB will provide the annual performance report (APR) to the GCF during the five-year implementation period. In addition, during the sub-loan lifetime, semi-annual performance information report on the status of the GCF-financed individual sub-projects will be provided. For the TA component, reports from the beneficiary will be consolidated by the AfDB for reporting to the GCF. In addition, following the arrangement under the AMA and the FAA, inception report, mid-term and final evaluation reports, and financial information reports (semi-annually throughout the life of the loan) will be submitted.

Evaluation

The evaluation arrangements for this framework will comply with the related AfDB and GCF policies. Both the independent mid-term and final evaluation will be carried out by the AfDB's independent evaluation unit (IDEV). The work of the AfDB's independent evaluation work is guided by internationally accepted principles for the evaluation of development assistance, in particular, the Organization for Economic Co-operation and Development's Development Assistance Committee (OECD DAC) evaluation guiding principles and the good-practice standards issued by the Multilateral Development Banks' Evaluation Cooperation Group (ECG).

⁵⁶ <u>https://www.afdb.org/en/projects-and-operations/project-cycle/</u>

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ANNEXES

	FUND
I. Sup	oporting Documents for Funding Proposal
\boxtimes	NDA No-objection Letter
\boxtimes	Feasibility Study (Market Study)
\boxtimes	Integrated Financial Model that provides sensitivity analysis of critical elements (xls format, if applicable)
	Confirmation letter or letter of commitment for co-financing commitment (If applicable)
\boxtimes	Project/Programme Confirmation/Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) – see the Accreditation Master Agreement, Annex I
\boxtimes	Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan
	(If applicable)
	Appraisal Report or Due Diligence Report with recommendations (If applicable)
	Evaluation Report of the baseline project (If applicable)
\boxtimes	Map indicating the location of the project/programme
\boxtimes	Timetable of project/programme implementation
* Ple supp	ease note that a funding proposal will be considered complete only upon receipt of all the applicable porting documents.