



Project Information Document/ Integrated Safeguards Data Sheet (PID/ISDS)

Concept Stage | Date Prepared/Updated: 13-Feb-2018 | Report No: PIDISDSC23420



BASIC INFORMATION

A. Basic Project Data

Country Madagascar	Project ID P163870	Parent Project ID (if any)	Project Name Madagascar - Least-Cost Electricity Access Development Project - LEAD (P163870)
Region AFRICA	Estimated Appraisal Date Sep 17, 2018	Estimated Board Date Nov 05, 2018	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) REPUBLIC OF MADAGASCAR	Implementing Agency JIRAMA, Ministère de l'Eau, de l'Energie et des Hydrocarbures	

Proposed Development Objective(s)

The Project Development Objective is to increase the number of Malagasy households and businesses with access to reliable electricity services.

Financing (in USD Million)

Financing Source	Amount
International Development Association (IDA)	120.00
Total Project Cost	120.00

Environmental Assessment Category A-Full Assessment	Concept Review Decision Track II-The review did authorize the preparation to continue
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Other Decision (as needed)



B. Introduction and Context

Country Context

Madagascar is a low-income country with a population of approximately 24 million and a GDP in 2016 of US\$10 billion. In its 2016 Human Development Report, the United Nations ranked Madagascar 158 out of 188 countries covered, marking a decline in its relative performance in recent years. As of 2012, approximately four fifths of Malagasy live in extreme poverty, while over 90 percent live under the general poverty line, defined as per capita purchasing power of under \$1.90 and \$3.10 per day, respectively. The average Malagasy is 42 percent poorer today than she was in 1960¹, the year of Madagascar's independence. Madagascar is also highly vulnerable to natural disasters, including cyclones, droughts, and flooding. It is estimated that one quarter of the population, or approximately five million people, currently live in zones at high risk of natural disasters. The 2017 Enawo cyclone affected over 430,000 people with an estimated economic loss equivalent to 4 percent of gross domestic product (GDP). Madagascar's challenging topography, mostly characterized by thin coastlines separated by a rugged high plateau cut by deep gorges and waterfalls, much complicates the establishment of regional transport infrastructure and interconnected power grids.

The country is emerging from several years of political and economic turbulence, following a political crisis that started in 2009. Madagascar returned to constitutional order, when a duly-elected government took office in 2014, after a five-year political crisis, which had devastating effects on the economy, poverty, and social outcomes. Since 2014, efforts have been under way to bring about greater political stability and to strengthen democratic institutions at the central and local level: a new National Development Plan and its implementation strategy were elaborated; public expenditure was reoriented towards social spending and public investments; and constitutionally-mandated municipal and senatorial elections were held peacefully in 2015. All of the institutions planned under the Constitution have now been established, though some are awaiting nominations to be operational. Parliament adopted the new law on national reconciliation in late 2016, which foresees the establishment of a National Reconciliation Council. Strategic and operational plans of the General Policy Letter on Security Reform have been developed and should be validated by the Council of Ministers by mid-2017.

Madagascar's tax revenue as a share of GDP has historically been among the lowest in the world, hovering below 11 percent in 2016. Strategies for increasing tax revenue have been elaborated and efforts are underway, but they have yet to produce concrete results. Furthermore, the government still allocates a large share of discretionary spending, having amounted to 3.1 percent of GDP in 2016, to unaffordable and poorly-targeted fuel subsidies and transfers, mostly to finance the losses of the two troubled state-owned companies: JIRAMA², the public water and electricity utility, and Air Madagascar. The constraints of the government's fiscal space in combination with legacy distortions from the transition period continue to limit the administration's margin of maneuver for infrastructure investment, particularly in the power sector.

The country's development vision, laid out in the National Development Plan 2015-2019 (NDP), is aligned with the multidimensional approach to development set by the UN Sustainable Development Goals. National reconciliation, reinforcement of democratic institutions and a better management of the economy – these high-level objectives for 2019 rely on progress in reinforcing the rule of law, improving governance (also on the local level), ensuring a stable macroeconomic framework, promoting inclusive growth in combination with poverty reduction, investing in human capital, and valorizing natural resources of the country. Mining, tourism, agriculture and fisheries, helped by a

¹ Measured in real GDP per capita. Only DRC and Liberia fared worse than Madagascar over the 1960-2010 period.

² Acronym for Jiro sy Rano Malagasy.



comprehensive infrastructure development, are identified as the key productive sectors expected to fuel growth with spillovers for the overall economy. The NDP is the government's medium-term planning tool to progress on the overarching ambition of the General Policy of the State (*Politique Générale de l'Etat*) to transform Madagascar into a modern and prosperous nation, characterized by sound governance, strong and stable growth, and wide access to high-quality public services.

Sectoral and Institutional Context

B. Sectoral and Institutional Context

Insufficient and unreliable electricity continues to act as one of the most severe constraints in Madagascar's investment climate. In Doing Business 2017, Madagascar was ranked 185 out of 190 countries with regard to the difficulty, delay, and cost of getting electricity. The private sector has cited unreliability of electricity supply as one of the most important factors affecting competitiveness, having indicated a willingness to pay more if the reliability and quality of the electricity service were improved. Further expansion of mining, agriculture, and manufacturing, with the corresponding gains in terms of employment creation, will indeed require an enhanced availability and quality of electricity supply.

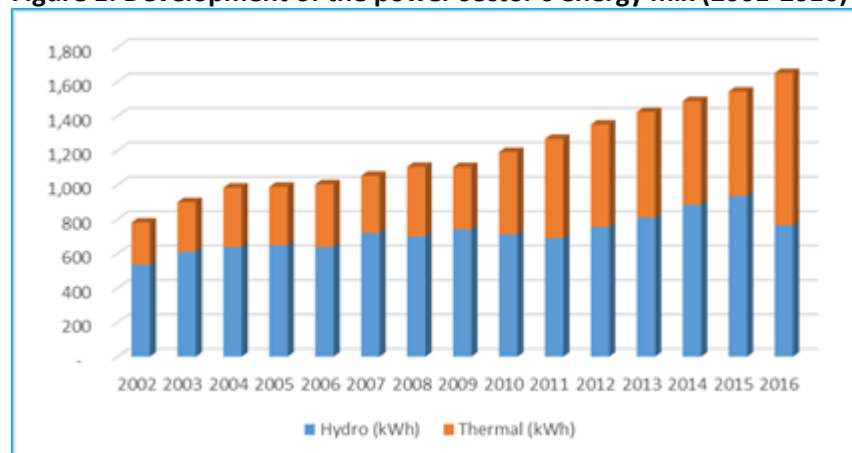
The electricity sector in Madagascar is dominated by JIRAMA, the vertically integrated state-owned utility. JIRAMA is responsible for much of the generation, transmission, and distribution of electricity in Madagascar. The Ministry of Water, Energy and Hydrocarbons (MEEH) implements government policy and provides strategic coordination of the energy sector, and oversight of JIRAMA's electricity sector activities. The Energy Regulation Office (ORE) reviews and approves tariffs. The Rural Electrification Agency (ADER) is responsible for rural electrification through grid-extension and/or off-grid and mini-grid systems. Other important sector agents include private companies that supply power to JIRAMA under an independent power producer (IPP) arrangement and through power rentals. The current legal and regulatory framework of the sector was developed in the last decade. The Electricity Law of 2000 and its regulations enabled the establishment of a fairly comprehensive institutional framework. Following the promulgation of the Electricity Law, private investment is legally possible in the energy sector in Madagascar. IPP tariffs are currently negotiated on a contract by contract basis and are supervised by ORE.

Electricity infrastructure is insufficient and deteriorating. The electrical system in Madagascar is composed of three types of installations: (i) three larger interconnected networks covering Antananarivo, Toamasina, and Fianarantsoa, which are managed by JIRAMA; (ii) about 130 isolated mini-grids installed by JIRAMA and the Rural Electrification Agency, ADER; and (iii) a number of privately-operated, mostly diesel-powered mini-grids that serve approximately 200 villages. The total installed capacity of the country stands at 569 MW, but available capacity has been wavering at around 60% due to a lack of maintenance. Consequently, the Malagasy system is currently unable to fully satisfy existing demand. What is more, the transmission and distribution networks are overloaded due to long-term, insufficient investment in expansion and rehabilitation of existing infrastructure. Most of the distribution assets are reaching the end of their economic life as key components in urban and peri-urban areas were installed in the early 1980s.

The sector is suffering from an increasingly costly energy mix. Over the past decade and a half, the Malagasy power sector's energy mix has been progressively reversing from an inexpensive 67% hydropower dominated generation infrastructure in 2001 to a predominantly (54%) thermal-powered generation park in 2016 (Figure 1). Today, the dramatically increased fuel bill and marginal cost of production are among the key challenges to the power sector's financial health and long-term sustainability.



Figure 1: Development of the power sector's energy mix (2001-2016)



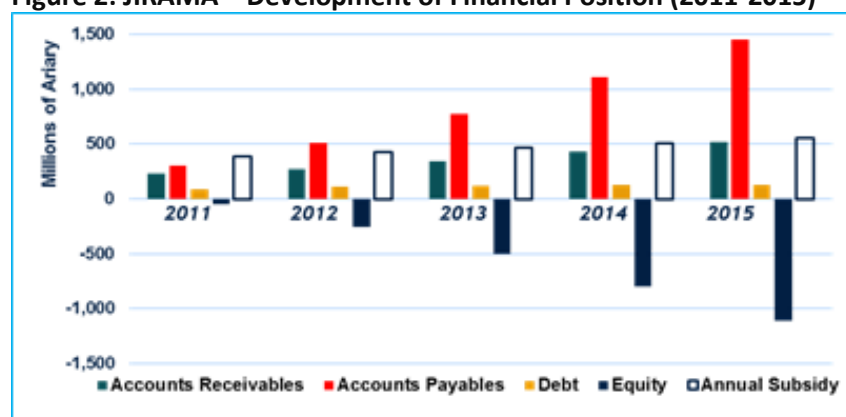
Source: ORE (2017)

JIRAMA's system losses are substantial. While the utility's total (technical and non-technical) system losses were 33 percent of production in 2016 with non-technical losses accounting for 20 percent, mainly driven by an exceptionally low bill collection rate at around 60 percent. Under the ongoing IDA-funded Electricity Sector Operations and Governance Improvement Project (ESOGIP) project, JIRAMA has started implementing a new commercial management system to improve billing and collection performance and is rehabilitating some of the most overloaded transmission lines. However, the benefits of improved customer management will only materialize gradually from Q1 2018 on, and far more investment will be needed to upgrade transmission infrastructure and reverse the continued aggravation of technical losses and system outages.

JIRAMA imposes a considerable burden on the state budget. JIRAMA continues to operate at a loss and relies on substantial government subsidies to pay fuel bills, generator rental fees, and make energy purchases from private power generators, thus adding significant fiscal pressures on the already resource-starved state. The government subsidy to JIRAMA imposes a heavy cost on the Malagasy treasury, and diverts resources from more productive expenditures with direct impacts on the poor. The amount of total government subsidies to JIRAMA has progressively risen to about 551 billion Ariary or over 170 million US\$ p.a. in 2015. However, despite the government's continued support, the utility has piled up short-term debt equivalent to almost US\$ 500 million mainly through up to four years of payment arrears on power purchase agreements and fuel bills [Figure 2].



Figure 2: JIRAMA – Development of Financial Position (2011-2015)



Source: JIRAMA annual reports, World Bank staff analysis (2017)

High connection fees make grid electricity unobtainable for many households and small businesses. While JIRAMA offers highly-subsidized lifeline tariffs for monthly consumption up to 25 kWh, upfront connection fees remain a major barrier to grid access for most households and small businesses. Without any installment scheme to help shoulder the starting fee of \$165 (equivalent to four times the average monthly household income), a grid connection remains a luxury affordable only to a limited share of the population. And even in the capital Antananarivo, customers who can afford these charges have to wait up to 18 months to get connected.

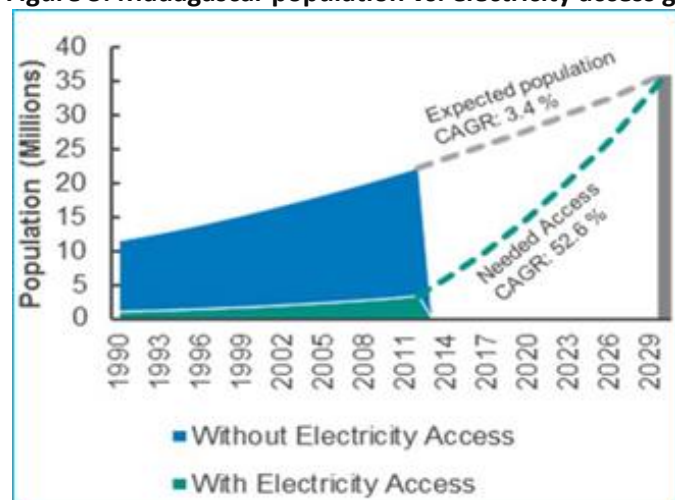
The electricity access rate in Madagascar, at approximately 13 percent, is less than half the average of Sub-Saharan Africa. Moreover, the overall rate masks considerable disparities between access levels in urban and rural areas. In reality, about 38 percent of urban and peri-urban households and just six percent of the rural population are connected to the grid. This is due in part to the country's high poverty levels and low population density outside urban areas. Of the households in the bottom income quintile—most of whom live in rural areas—just one percent have access to electricity.³ Electrification efforts in this context are particularly challenging given the difficulty of recouping the relatively high costs of grid extension from a large majority of low-income households that typically consume only small amounts of power. This, in combination with the adverse effects of the political crises of 2002 and 2009 and the general deterioration of JIRAMA's financial situation, has resulted in the country achieving very little progress in electrification since the early 2000s. Today, a compound annual growth rate (CAGR) above 50% (i.e. about 250,000 new connections in 2017)⁴ would be needed to reach universal electrification over the next decade [Figure 3].

³ World Bank staff analysis of household surveys.

⁴ See Fig. 2



Figure 3: Madagascar population vs. electricity access growth path 1990-2030



Source: Tractebel (2017)

The 2015 “New Energy Policy” (NEP) and Sector Policy Letter set an ambitious electrification target. While the NEP encourages a rapid scale-up of renewable energy and the development of public-private partnership schemes and concessions, the policy letter, covering the period 2015-2030 complements the NEP and spells out the GoM’s goal to increase household electricity access from 15 to 70 per cent by 2030. This ambitious target is to be reached through grid extension, scaling up decentralized power production from renewable energies, and providing affordable lighting solutions for rural households.

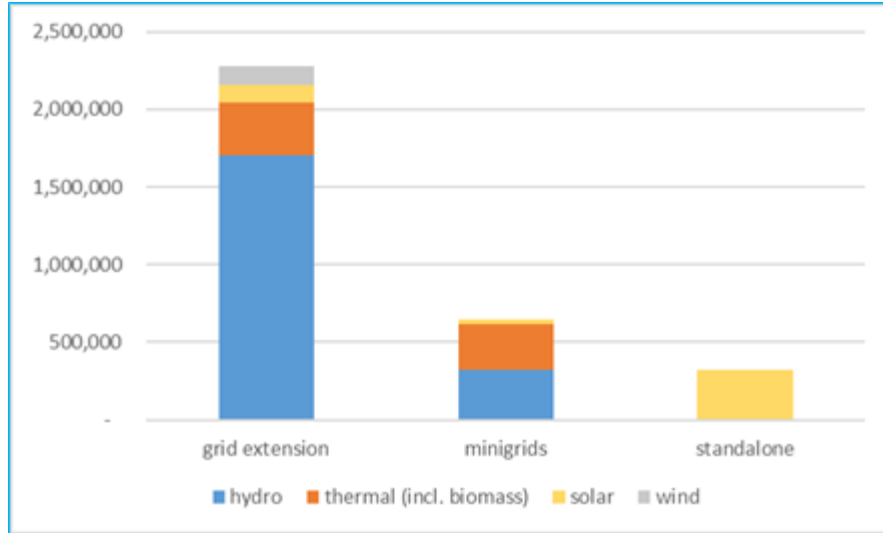
Strategic priorities of the GoM’s electrification policy framework zoom in on universal access. As it is derived from the National Development Plan (NDP, 2015-2019), the NEP is aligned with the one of the GoM’s key energy policy objectives “to guarantee universal access to reliable, sustainable and modern energy services at affordable cost”, as well as with the NDP’s strategic axis #3 “inclusive growth and territorial anchoring of development”. Through the latter, the NDP aims at universal access to energy services as a means for effective decentralization and regional development. Within this context, the NEP explicitly stipulates the use of land-use planning tools to further the NEP’s rural development agenda while fostering local and foreign private investment.

Implementation approach of the GoM’s electrification policy framework is underpinned by three principles. With regard to implementation, the strategic guidelines defined by the NEP stipulate the following three-pronged approach: (i) “**Least Cost**” - the electrification of specific sites and localities to make use of the most economical technology option for providing the needed minimum service level and resulting economic benefits; (ii) “**Grid-based renewable energy solutions**” – the prioritization of grid-based renewable energy solutions and explicitly specifies both the technological options and energy mix to reach the above access target, namely 70% of new connections through grid extension (with a predefined production mix of 75% hydroelectric, 15% thermal, 5% wind, and 5% solar); 20% through mini-grids (with a 50% hydroelectric generation mix, 20% biogas from rice husk, 25% diesel, and 5% solar), and 10% through standalone solutions incl. an equal share of Solar Home Systems (SHS) and solar lanterns⁵ [Figure 4]. (iii) “**Social justice**” - introduces the notion of modern lighting solutions as economically and financially viable means to accelerate efforts to reduce inequality and close the persistent gap between urban and rural electricity services.

⁵ See Fig. 6



Figure 4: NEP 2015 objectives - new connections by technology and energy resource



Source: NPE (2015), World Bank staff analysis (2017)

Currently, progress towards the GoM’s electrification objectives remains sluggish. The GoM’s current goal of doubling the electrification rate by 2025 would still require a compound annual growth rate (CAGR) of almost 12% to overtake population growth with over 75,000 connections needed in 2017 alone. The more ambitious vision of the GoM New Energy Policy aimed at providing 70% of Malagasies with electricity services by 2030 would imply an even higher CAGR of over 16% with 107,000 new customers to be reached in 2017. In comparison, over the past decade, JIRAMA never managed to connect more than 20,000 new households (less than 2%) per year with less than 5,000 new connections added in 2016⁶. These numbers illustrate the need for a profound paradigm change in the way electrification efforts are planned and implemented [Figures 5 and 6].

Figure 4: GoM New Energy Policy 2030 and medium-term electricity access agenda

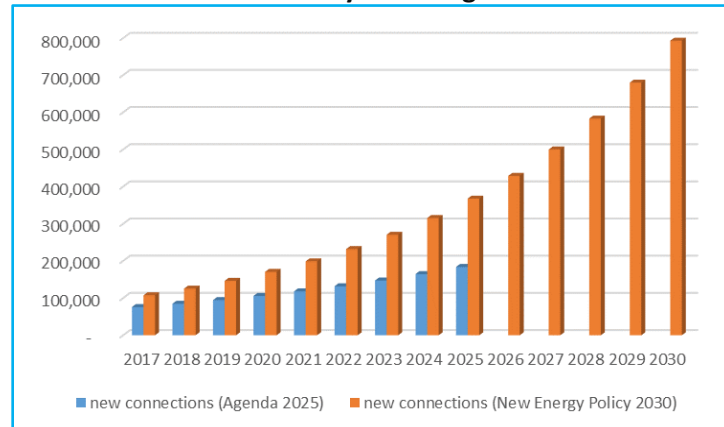
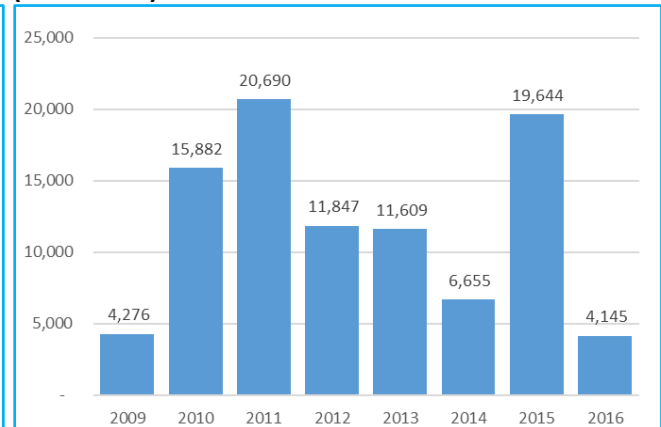


Figure 5: JIRAMA addition of new connections (2009-2016)



Sources: GoM New Energy Policy (2016), ORE (2017), World Bank staff analysis (2017), JIRAMA (2017)

⁶ See Fig. 3



To address this challenge, Madagascar is currently preparing a National Electrification Strategy (NES). The NES, being developed as part of the IDA-funded Electricity Sector Operations and Governance Improvement Project (ESOGIP), will further define the technical, financial, and institutional key parameters of the GoM's electrification approach. In line with the directives of the NEP, the NES is expected to attribute a strong priority to supporting the development of rural growth poles and foster the productive use of electricity in key industries including agricultural transformation, fisheries, mining and tourism.

The NES is complemented by the following analytic tools:

Geospatial planning analysis. Supported by the Bank, the employment of GIS mapping systems will allow planners to model least-cost electrification technologies and thus determine how to optimally expand the electrical grid, while identifying economically-viable mini-grid sites, and suggesting priority focus areas for private-sector standalone solar companies. These assessments analyze key geolocated data sets that include the whereabouts of households, existing grid and micro-grid assets, energy resources (solar insolation, micro-hydro sites), potential produce use cases (factories, mills, cold storage, etc.), and then apply algorithms that leverage key costing data for grid extension, mini-grid, and standalone solar technology. If done well, outputs should form the basis for all short- to medium-term electrification planning.

Off-grid market assessment study. Supported by the Bank, this study will map out areas that will need to be served by off-grid solutions; estimate the size of the potential commercial off-grid market through countrywide household and SME surveying; take stock of institutional electricity access; identify barriers/risks across the local off-grid solar value chain; and review the regulatory structure as it pertains to the products and range of distribution models.

While encouraging the development of the standalone solar system industry, regulatory measures are needed to protect consumers from low-quality products. Following the recent exemption of SHS and Solar PV components from import duties and VAT, the Malagasy market is likely to experience an inflow of low-quality products prone to fail within months after purchase while providing no warranty to customers. Through its Lighting Africa and Lighting Global programs, the Bank is currently preparing an intervention to protect customers and assist the GoM in adopting national standards in line with the Lighting Global Quality Standards that set a baseline level of quality, durability, and truth in advertising for standalone solar systems.

Where grid extension is prioritized, low cost techniques can be employed to maximize access while optimizing resources. Within the Malagasy context for grid-based electricity access expansion, a number of longstanding but underutilized techniques to maximize the impacts of new grid extension projects appear particularly promising. Leveraging some of these techniques, particularly single-wire earth return (SWER) and shield wire schemes (SWS) could maximize the number of villages that can be connected to the existing high-voltage network while limiting development costs.

Madagascar's experience with mini-grids can be built upon to further support productive use of electricity in rural areas. Since 2004, Madagascar has been granting mini-grid concessions to private operators to electrify rural villages. Thirty organizations now operate mini-grids that provide electricity to around 200 villages, serving approximately 7,000 consumers in total. They generate power using diesel, biomass, or small hydro generators with capacities ranging from 40kW to slightly more than 200kW. The majority obtained their authorization contracts through bottom-up proposals to ADER, as allowed under the law. Now, with the costs of solar PV hardware, battery storage and metering technology dropping precipitously, there are opportunities to hybridize and densify existing systems and build new solar-powered mini-grids that could promote both rural economic development and electricity access.



In sparsely-populated locales, pico-PV and SHS technology can provide electrification solutions. At lower population densities, the short-term economics of grid extension and mini-grids can be challenging. In these contexts, the latest generation of standalone solar technologies can instead provide affordable, basic electricity access. While, in Madagascar, the underlying elements to support such an industry exist—namely a good solar resource, a critical mass of off-grid households, and widespread mobile money payment infrastructure—activity remains limited. However, an initiative launched the MFI, Microcred, in August 2016 has shown promise. The service, dubbed Baobab+, offers both top-up loans to existing customers and small loans to new customers for off-grid solar products. A range of activities will be undertaken to support this nascent industry and to increase the number of households with access to alternative electrification modalities.

Recent sustained growth of the Malagasy microfinance industry is an opportunity for the off-grid market. Albeit from a very low level, the Malagasy microfinance industry has experienced a promising half-decade of sustained dynamic growth. While both the total number of customers (US\$ 1.5 million in 12/2016) and deposits (US\$ 150 million in 12/2017) have grown at an average rate of 11%⁷, total assets (US\$ 1.5 billion in 12/2016) have grown at 9%. Today, both formal and informal MFIs offer a nationwide coverage with around 945 mostly rural service points throughout the country with a penetration rate above 30% of all Malagasy households. However, despite the dynamic growth of the financial sector, a large share of the growing demand for financing in the off-grid electricity market will likely remain untapped due to continued reluctance to invest due to knowledge gaps and lack of confidence of Banks and MFIs regarding the nature and risks of off-grid products.

The proposed project will support the GoM’s ambitious electrification agenda though a well-balanced least cost approach to electrification based on both grid- and off-grid solutions. Regarding grid extension and densification, the project will leverage both geospatial analysis and low cost electrification technologies to maximize the number of new connections per dollar. Similarly, vis-à-vis off-grid solutions, the GoM acknowledges that a least-cost approach to electrification will necessarily involve new solutions as, even in the long term, large areas of the country will likely remain beyond the technical and economic reach of both national grid and minigrad schemes. Preliminary analyses suggest that at least 40 percent of Malagasy households will require off-grid solutions, if they are to obtain access to electricity within the next 15 years. The project will help to address this challenge by offering a wide-ranging support for the off-grid sector.

C. Relationship to CPF

The proposed project directly contributes to Focus Area II “Promote Inclusive Growth” of the current CPF (2018-2021) and will contribute to the achievement of the area’s Objective #8 “Priority Infrastructure Improved”.

The CPF for Madagascar highlights that of all household and community-level factors, electrification is one of the most robust predictors of welfare gains with electrification efforts recognized as critical success factor for the country’s overall poverty reduction strategy. Accordingly, the CPF puts electrification among its key priorities while stipulating (i) for additional resources that may materialize during the CPF period to be dedicated to electrification programs; and (ii) for the programs to be sustained beyond 2021.

The proposed project is contributing to the GoM’s target of doubling electricity access in the country by 2021 through efficient least-cost investments in both grid and off-grid solutions and to the objective of further streamlining sector

⁷ See Figure 8



governance in the interest of scaling up private sector investments in electricity access.

C. Proposed Development Objective(s)

The Project Development Objective is to increase the number of Malagasy households and businesses with access to reliable electricity services.

Key Results (From PCN)

PDO level indicators will incorporate the new Corporate Results Indicators,⁸ and thus, as applicable, may include:

- 1) People provided with access to electricity service (number) – measured as the number of people that newly benefit from electricity services
- 2) People provided with new or improved electricity service (number) (Corporate Results Indicator); of which women (number).
- 3) Enterprises provided with access to electricity (number).

D. Concept Description

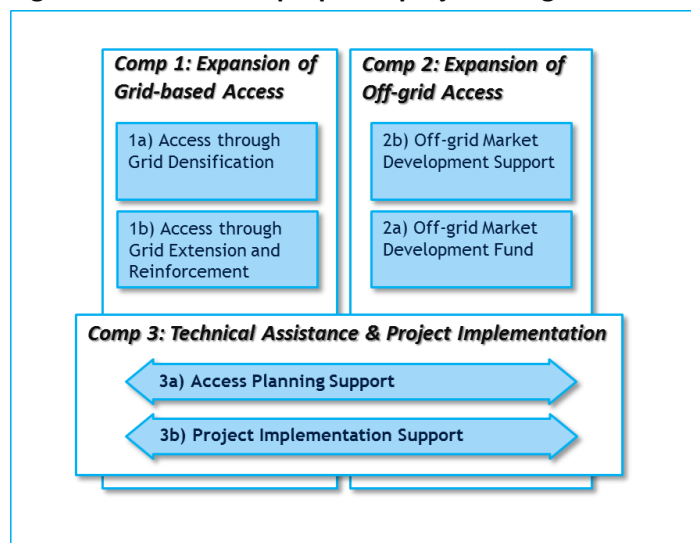
In line with the strategic priorities and implementation approach of the GoM's electrification policy framework, and the technical, financial, and institutional parameters being currently defined as part of the upcoming NES, the project will support the GoM's key energy policy objectives "to guarantee universal access to reliable, sustainable and modern energy services at affordable cost". Through the extensive use of geospatial analysis and GoM land-use planning during the inception phase, the project will aim to maximize the number of households provided with electricity services while fostering local and foreign private investment. Consistent with the implementation approach of the NPE prioritizing socially equitable and grid-based renewable energy solutions at least cost, the project's investments will focus on:

- (i) The least-cost expansion, densification and reinforcement of electricity distribution and transmission infrastructure to reach a maximum of affordable new connections and enhance the system's ability to absorb new renewable energy generation capacity coming online in the next 3-5 years;
- (ii) The private sector driven scale-up of low-cost PV-powered off-grid electricity services to rapidly reach households, enterprises, and community facilities unlikely to be connected to the electric grid in the short to medium term

⁸ These are all relevant Bank CRI with respective underlying intermediate indicators. At QER stage, it will be decided which indicators will be used.



Figure 9: Overview of proposed project design



Component 1 (US\$M 75): Expansion of Grid-based Electricity Access

This component will finance cost-effective, priority investments in grid extension and densification, while leveraging geospatial analysis and low cost electrification technologies to maximize the number of new connections per US\$ invested. This approach is expected to boost access particularly in villages relatively near to existing and planned transmission and distribution infrastructure. Activities under this component will follow a two-pronged approach comprising:

Sub-component 1a: Access through Grid Densification

This sub-component will focus on multiplying the number of connections within existing JIRAMA grids in urban and peri-urban areas and in main districts. So far, Malagasy electrification programs of the past were often exclusively focused on grid extension to rural areas, leaving out opportunities for increasing access in already electrified communities. Within this context, grid densification has become a valuable and often-overlooked opportunity as the potential for connecting large numbers of poor households at minimal cost is high with basic low voltage lines and infrastructure already being in place. Densification efforts will aim exclusively at closing the electricity access gap in already electrified areas while specifically targeting poor households not yet connected.

Sub-component 1b: Access through Grid Extension and Reinforcement

This component will support the connection of new consumers to JIRAMA's grid by constructing new transmission and distribution lines and service connections, and upgrading or constructing substations. The component will finance the electrification of all structures in villages located nearby transmission networks using low cost technologies such as single-wire earth return and shield wire scheme technologies and other low cost schemes. This activity will specifically target villages in peri-urban and rural areas that can be reached at minimal costs. Transmission investments will focus on the construction of new and reinforcement of existing HV line that are essential for the evacuation of new hydro and solar power generation capacity coming online over the next 3-5 years.



Component 2 (US\$M 40): Expansion of Off-grid Electricity Access

This component will finance interventions that promote electricity access for households, enterprises, and community facilities that are not likely to be connected to the electric grid in the short to medium term. Geographical areas and specific clusters most in need of said interventions will emerge from an associated geospatial plan (described below).

Activities under this component will support the private-sector-led rollout of standalone solar PV systems and mini-grids, with a focus on zones that have neither sufficient density nor load diversity to justify grid extension given prevailing costs. Project preparation will aim to identify the most suitable business models and technological packages to support, with the intention of leveraging and empowering private-sector companies with expertise in distribution and after-sales service of standalone solar PV systems. The off-grid solar market assessment will inform the exact design, targeting and scope of the below financial support mechanisms with a goal of both catalyzing the growth of existing market players and attracting experienced regional off-grid companies to Madagascar.

Sub-component 2a: Off-grid Market Development Support

This sub-component will support establishing an enabling environment for the off-grid solar market development in Madagascar through (i) targeted government policy and regulation; (ii) quality assurance; and (iii) consumer awareness.

- (i) *Policy and regulation* - this sub-component will help the MEEH and ORE to establish an adequate policy and regulatory framework for the off-grid solar sector, with the intention of providing clear rules to companies and their investors; protecting consumers; and ensuring subsidy and taxation regimes are optimized. The government has already made efforts to exempt small standalone solar systems from import duties and value-added tax (VAT); the associated cost savings are expected to be passed, in large part, onto the low-income Malagasy households that purchase solar products. However, the government requires further support to ensure such exemptions are consistently and fairly applied, to ensure transparency for importers and to avoid delays in the clearance of containers.
- (ii) *Quality assurance* - this sub-component will provide support to MEEH, ADER, the Bureau of Standards (BNM), and the customs authorities to help Madagascar address issues regarding off-grid solar product quality in the market. Given the current lack of standards in combination with the impending suspension of import duties for standalone solar systems, the market will likely be flooded with low-quality products. To prevent this, the project will support the government in the adoption of the Lighting Global standards for standalone solar systems. These international standards were developed by the World Bank Group and ensure that products which conform are high quality (as verified through testing at international labs) and offer at least a two-year warranty to consumers.
- (iii) *Consumer awareness* - the project will fund the design and rollout of a wide-ranging campaign to increase consumer awareness as one of the most significant drivers of both market growth and increased consumer confidence, particularly when mated with efforts to support distribution of quality of products. Consumer awareness can help to tackle consumers' lack of understanding of the comparative advantages of off-grid solar products to fuel-based lighting; their initial reservations regarding the adoption of new technology; their inability to make informed purchasing decisions and identify quality products; and a lack of information on how to access said products. This activity will promote face-to-face, experiential events such as forums and roadshows as well as efforts leveraging mass media including print, radio, and billboards.

Subcomponent 2b: Off-grid Market Development Fund (OMDF)

The OMDF will help address access to finance and affordability constraints to accelerate growth of the off-grid



electrification market in Madagascar by enabling local financial institutions to extend credit to households and micro, small, and medium enterprises, and provide loans to private companies engaged in off-grid electrification (incl. off-grid solar companies and mini-grid developers). The component will use existing country systems to facilitate access to finance for households and businesses, improve affordability of solar electricity services, and maximize geographic coverage.

Component 3 (IDA US\$M 5 equivalent): Technical Assistance and Project Implementation Support

This component will assist MEEH ADER, JIRAMA and ORE in building technical expertise and operational capacity of their staff and help the four agencies devise enabling policies and regulatory frameworks to further their respective mandates. Therefore, the component will provide a broad range of technical and financial support in access planning, implementation support and capacity building activities.

Sub-component 3a: Access Planning Support

This sub-component will finance planning tools and training to inform future investment decisions in grid extension and the localized promotion of mini-grid and standalone solar solutions to advance electrification goals of the GoM:

- (i) *Geospatial Analysis and Planning Platform (GAPP)*: This activity will help MEEH, ADER and JIRAMA to identify and differentiate between areas most suitable for grid extension and densification, mini-grids, and standalone solar systems. The activity will involve the generation and employment of a range of GIS layers for the country as a whole, mapping existing electrical grid infrastructure, household and business locations, renewable energy resources, and potential productive-uses and anchor clients. These layers will be mated with current and forecasted cost estimates for different electrification modalities, creating a platform for determining least-cost electrification planning by region and district. The platform and planning tools will be built and populated in close cooperation with all three agencies who will receive all training and assistance needed to “own” and update the tool independently.
- (ii) *National Electrification Investment Plan (NEIP)*: This activity will support the key actors in the establishment of the country’s first NEIP covering the entire national territory. The plan will draw on the above sub-activity (i) as well as conclusions of ongoing work on Madagascar’s National Electrification Strategy and findings of ongoing geospatial studies - all of which are funded by the Bank and will be completed prior to project appraisal. The NEIP will provide MEEH, ADER and JIRAMA with an optimized least-cost investment pipeline to maximize electricity access across the national territory and form the crucial basis for investment and budget planning, fund raising and donor coordination.
- (iii) *National Electricity Access Planning and Program Coordination Unit (PPCU)*: The mandate of the PPCU, to be established within MEEH, will be to provide effective centralized coordination and oversight in terms of policy development, strategic planning, as well as project design and implementation. The unit will set the strategic direction for national electrification, including preparation and updating of the above NEIP for both on- and off grid electrification. The PCU will coordinate donor and GoM- funded studies, regularly update sector key performance indicators and act a depository of sector data and studies, including hosting and updating the geospatial platform.

Sub-component 3b: Project Coordination and Implementation Support

- (i) *Project Coordination and Implementation*: This sub-component will strengthen the capacity of implementing agencies for access project planning, coordination and management. Activities will include the hiring of a Project Coordinator and creation of a PIU within MEEH as well as the strengthening of the existing implementation unit at



JIRAMA. Moreover, the subcomponent will fund the establishment of an Electricity Access Planning and Program Coordination Unit as well as capacity building and training activities for all key staff in MEEH, JIRAMA, ADER and ORE.

- (ii) *Off-grid Services Quality Control and Supervision*: Regarding component 2, ADER will play a crucial role in supporting ORE in monitoring off-grid electricity service quality of both SHS distributors and minigrad operators including compliance with technical standards, warranty services and reactivity to customer complaints.

SAFEGUARDS

A. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

Environmental and social risks of the proposed project are considered 'high' because of its large geographical scope in rural and urban areas at national level and the type of investments it will support. In particular, the transmission lines and upgrading or constructing substations to be funded as part of component may affect environmental sensitive areas such as wetlands, forests and socioeconomic areas (residential zones, agriculture zones, ...etc.) and in addition affect an area broader than the sites subject to physical works in terms of land acquisition and its likely impacts that include displacement and loss of livelihoods. Moreover, environmental and public health risks might arise from improper disposal of SHS batteries or old generators with PCB and social impacts are possible from limited resettlement that might be necessary to accommodate the estimated 10 ha of solar PV installations. The World Bank's Operational Safeguard Policies will be applied for all the investment supported by the proposed project. The Borrower under the Jirama Environment Department has an experience in implementing Bank funded investments throughout the current MG-Electricity Sec Operations & Governance Improvement Project(ESOGIP) (P151785). It has gained some tangible know-how in handling social and environmental safeguards operations, especially during the implementation of the current energy project. The proposed project builds upon the current ESOGIP and will be implemented by the same agency.

B. Borrower's Institutional Capacity for Safeguard Policies

At the national level, Madagascar has a legislative and regulatory framework which is conducive to good environmental management, notably the Malagasy Environment National Law under Décret N°2004-167 (MECIE) that mentions the requirement to prepare an Environmental assessment for both private and public development investments. The national environmental law will be reinforced by the World Bank safeguard policies for this proposed project.

JIRAMA with its Environment and Risk Prevention Department will be in charge of the project safeguard environmental and social compliance. The department will carry out ESMP/RAP, to ensure that the mitigation measures are being effectively implemented, and will conduct field visits on a regular basis. Monitoring checklists will be prepared on the basis of the mitigation plans for this purpose. Progress Reports (PR) shall document the progress of ESMF implementation. From experience with ongoing bank projects, Jirama has been proactive and responsive in addressing safeguards issues. The project will engage specialists/firms to conduct detailed environmental and social studies (ESIA/ESMP/RAP).

C. Environmental and Social Safeguards Specialists on the Team

Paul-Jean Feno, Environmental Safeguards Specialist
Peter F. B. A. Lafere, Social Safeguards Specialist



Andrianjaka Rado Razafimandimby, Social Safeguards Specialist

D. Policies that might apply

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	The proposed project will have important environmental impacts, as a result of the construction of new and reinforcement of existing transmission lines and distribution infrastructures, upgrading or constructing substations, environmental and public health risks might arise from improper disposal of SHS batteries or old generators with PCB. The client will prepare detailed environmental and social studies (ESIA/ESMP) for all activities whose locations are well known before appraisal and Environmental and Social Management Framework (ESMF) for the remaining with detailed studies conducted during implementation. The instruments will be prepared in accordance with relevant WB safeguard policies and WBG General EHS Guidelines and Industry Sector Guidelines for Electric Power Transmission and Distribution. The safeguard instruments will be disclosed both in country and in Infoshop prior to Appraisal.
Natural Habitats OP/BP 4.04	Yes	The instruments to mitigate any potential impacts are described under Environmental Assessment OP BP 4.01. The ESMF and specific ESIA with their ESMPs documents will determine whether natural habitats are likely to be affected by the proposed project. The instruments to mitigate any potential impact are described under the Environmental and Social Management Framework. The ESMF will indicate the extent to which natural habitat might be affected by the physical investments and thus will provide appropriate guidance for sub-project implementation. The ESMF will be publicly disclosed both in- country and at the World Bank InfoShop prior to Appraisal.
Forests OP/BP 4.36	Yes	Likewise, result of the construction of new and reinforcement of existing transmission lines and distribution infrastructures, upgrading or constructing substations, may require the clearing of forest areas. This will be assessed during preparation and will be evaluated in the ESMF. The safeguard instruments to mitigate any potential impacts will be described under the Environmental and Social Management Framework.



Pest Management OP 4.09	No	The project requires no Pest Management measures.
Physical Cultural Resources OP/BP 4.11	Yes	OP 4.04 Physical Cultural Property is triggered to address potential cultural heritage issues related to graves or sacred natural assets along the transmission line.
Indigenous Peoples OP/BP 4.10	No	There are no indigenous Peoples in the project area.
Involuntary Resettlement OP/BP 4.12	Yes	The proposed project will have important social impacts including involuntary resettlement as a result of the construction of new and reinforcement of existing transmission lines and distribution infrastructures, upgrading or constructing substations. In addition to the environmental and social studies (ESIA/ESMP), the client will prepare Resettlement Action Plans (RAPs) for all activities whose locations are well known before appraisal. The Resettlement Policy Framework will be prepared for activities whose locations and scope will not be known at the time of appraisal and will be disclosed both in country and in Infoshop prior to Appraisal.
Safety of Dams OP/BP 4.37	No	The Project is not financing any activities related to dams. This policy is not expected to be triggered by any of the Project activities.
Projects on International Waterways OP/BP 7.50	No	Madagascar is an Island. The policy on Projects on International Waterways is not triggered given location and potential impact of the Project.
Projects in Disputed Areas OP/BP 7.60	No	There are no disputed areas associated with the Project.

E. Safeguard Preparation Plan

Tentative target date for preparing the Appraisal Stage PID/ISDS

Apr 30, 2018

Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing should be specified in the Appraisal Stage PID/ISDS

These proposed activities under Component 1 to be financed by the project may affect environmental sensitive areas such as wetlands, forests and socioeconomic areas (residential zones, agriculture zones, ...etc.). These proposed activities could generate large and irreversible impacts with of involuntary resettlements during the construction of new transmission lines. Moreover, environmental and public health risks might arise from improper disposal of SHS batteries or old generators with PCB and social impacts are possible. Therefore, The proposed project is classified as a Category A project Full Assessment according to the World Bank safeguard policy on Environmental Assessment (OP/BP 4.01). To meet the requirements of triggered safeguard policies, the Borrower will hire a consultant under a Project Preparation Advance (PPA) to carry out ESIA, ESMPs, and RAPs for all activities whose locations and technical designs are well known



before appraisal. The framework documents – ESMF and RPF will be prepared for activities whose locations and scope will not be known enough at the time of appraisal.

With regard to component 2, Funds provided through the OMDF will support the facilitation of off-grid market development through the mobilization of all key market enablers in parallel: Local FIs and non-banking financial service providers including microfinance, PAYGO and mobile money providers, as well private companies (off-grid developers and standalone solar home system technology distributors). However, at this early PCN stage, technical and fiduciary details of the support mechanisms have not yet been developed and will only be determined during project preparation. Depending on the final proposed design a standalone ESMF and RPF for the activities under component 2 may be warranted. If needed, the latter will apply the traditional Bank Safeguard Policies or to apply OP 4.03 on Performance Standards. It is also expected that more specific instruments including Quality Standards will be developed and adopted to supplement Safeguard Policies and/or Performance Standards to more effectively target the key health and safety issues related to the SHS market (including de-manufacturing, recycling, storage, transport and disposal of spent batteries). All these documents will be disclosed both in country and in Infoshop prior to Appraisal.

CONTACT POINT

World Bank

Jan Friedrich Kappen, Miarintsoa Vonjy Rakotondramanana
Senior Energy Specialist

Borrower/Client/Recipient

REPUBLIC OF MADAGASCAR
Alain Rasolofondraibe
Governor of the Central Bank of Madagascar
cab.gov@bfm.mg

Implementing Agencies

JIRAMA
Olivier Jaomiary
Managing Director
dg@jirama.mg

Ministère de l'Eau, de l'Energie et des Hydrocarbures
Laurent Rajaonarivelo
Secrétaire General
meeh.sg@gmail.com



FOR MORE INFORMATION CONTACT

The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 473-1000
Web: <http://www.worldbank.org/projects>

APPROVAL

Task Team Leader(s):	Jan Friedrich Kappen, Miarintsoa Vonjy Rakotondramanana
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Approved By

Safeguards Advisor:	Nathalie S. Munzberg	11-Feb-2018
Practice Manager/Manager:	Sudeshna Ghosh Banerjee	11-Feb-2018
Country Director:	Raymond Bourdeaux	15-Feb-2018