Monitoring and Evaluation Plan of the Liberia Compact between the United States of America, acting through the Millennium Challenge Corporation and the Republic of Liberia

July 2016

Version 1

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PREAMBLE

This Monitoring and Evaluation (M&E) Plan:

- is part of the action plan set out in the MILLENNIUM CHALLENGE COMPACT (Compact) signed on October 2, 2015 between the United States of America, acting through the Millennium Challenge Corporation, a United States Government corporation (MCC), and the Republic of Liberia acting through its government;
- will support provisions described in the Compact; and
- is governed by and follows principles stipulated in the *Policy for Monitoring and Evaluation of Compacts and Threshold Programs* (MCC M&E Policy).

This M&E Plan is considered a binding document, and failure to comply with its stipulations could result in suspension of disbursements. It may be modified or amended as necessary following the MCC M&E Policy, and if it is consistent with the requirements of the Compact and any other relevant supplemental legal documents.

LIST OF ACRONYMS

BA	Beneficiary Analysis
CA	Constraints Analysis
CCR	Compact Completion Report
CPS	Common Payment System
CT	Current transformer
DQR	Data Quality Review
EPA	Environmental Protection Agency
ERR	Economic Rate of Return
ESP	Environmental and Social Performance
GoL	Government of the Republic of Liberia
GPOBA	Global Partnership on Output-Based Aid
GSI	Gender and Social Inclusion
HFO	Heavy Fuel Oil
ITT	Indicator Tracking Table
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
LACEEP	Liberia Accelerated Electricity Expansion Project
LCPDP	Least Cost Power Development Plan
LEC	Liberia Electricity Corporation
LISGIS	Liberia Institute of Statistics and Geo-Information Services
M&E	Monitoring and Evaluation
MCA	Millennium Challenge Account
MCA-L	Millennium Challenge Account Liberia
MCC	Millennium Challenge Corporation
MCC MIS	MCC Management Information System
MCHPP	Mt. Coffee Hydropower Plant
MHI	Manitoba Hydro International
MLME	Ministry of Lands, Mines and Energy
MoGCSP	Ministry of Gender, Child and Social Protection
MoT	Ministry of Transportation
MPW	Ministry of Public Works
MW	Megawatts
NGO	Non-governmental organization
NPV	Net Present Value
PIU	Project Implementation Unit
POC	Point of contact
PV	Present Value
QDRP	Quarterly Disbursement Request Package
RMC	Regional Maintenance Center
RMMS	Road Maintenance Management System
RREA	Rural Renewal Energy Agency
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SGA	Social and Gender Assessment

WAPP	West African Power Pool
WDI	World Development Indicator

COMPACT AND OBJECTIVE OVERVIEW

Introduction

This Monitoring and Evaluation Plan serves as a guide for program implementation and management, so that the Millennium Challenge Account Liberia (MCA-L) management staff and Board of Directors, the Board of Directors of the Liberia Electricity Company (LEC), Implementing Entities, implementers, beneficiaries, and other stakeholders understand the progress being made toward the achievement of objectives and results, and are aware of variances between targets and actual achievement during implementation.

This Monitoring and Evaluation Plan is a management tool that provides the following functions:

- *Describes the program logic and expected results.* Gives details about what impacts the Compact and each of its components are expected to produce in economic, social inclusion, and gender-related outcomes and how these effects will be achieved.
- *Sets out data and reporting requirements and quality control procedures.* Defines indicators, identifies data sources, and frequency of reporting in order to define how performance and results will be measured. Outlines the flow of data and information from the project sites through to the various stakeholders both for public consumption and to inform decision-making. It also describes the mechanisms that assure the quality, reliability and accuracy of program performance information and data.
- *Establishes a monitoring framework.* Establishes a process to alert implementers, MCA-L management, LEC management, stakeholders and MCC to whether or not the program is achieving its major milestones during program implementation and provides the basis for making program adjustments.
- *Describes the evaluation plan.* Explains in detail how MCA-L and MCC will evaluate the Compact interventions to determine whether they are achieving their intended results and expected impacts over time.
- *Includes roles and responsibilities.* Describes in detail what the M&E staff are responsible for and outlines any M&E requirements that MCA-L and LEC must meet in order to receive disbursements.

Program Logic

Compact Background

Liberia is located on the western coast of Africa and has a population of approximately 4.4 million[1] people covering 37,420 square miles that border Guinea to the north, Côte D'Ivoire to the east, Sierra Leone to the west, and the Atlantic Ocean to the south.

Liberia is a post conflict country still working to revive itself from a fourteen year civil war, which decimated much of the country's existing infrastructure before ending in 2003. Despite

[1] World Bank, WDI, 18 September 2015. Washington, DC. However, the Least Cost Power Development Plan (LCPDP) estimates the population at approximately 4.0 million.

Liberia's strong economic growth, averaging 7%[2] since 2009, it ranks 168th out of 214 countries in terms of Gross National Income per capita, at approximately US$700 (Purchasing Power Parity).[3] The economy is primarily dependent on subsistence agriculture and export of raw materials. Approximately half of the population is rural.

Despite the macroeconomic gains and relative stability over recent years, the Liberian economy remains vulnerable to external shocks given the volatility of commodity prices, its limited diversification, its dependence on imported foods and fuel, constraints to business investment and productivity, the insufficient supply and prohibitive high cost of energy generation and its deplorable road network.[4]

The Government of Liberia (GoL) and MCC undertook a Constraints Analysis (CA) to better understand the constraints to economic growth in Liberia. The CA, which was completed in September 2013, was based on the growth diagnostic methodology developed by Ricardo Hausmann, Dani Rodrik and Andrés Velasco of the Kennedy School of Government at Harvard University. Liberia's CA revealed two binding constraints to private sector investment, poverty reduction and economic growth in Liberia: (i) lack of access to reliable and affordable electricity; and (ii) high cost of and limited access to road infrastructure.

In September 2013, the GoL and MCC also conducted a Root Cause Analysis workshop to dive deeper into the underlying causes of the two binding constraints. Utilizing the principles of Results Focused Project Design,[5] the GoL and MCC, together with key stakeholders, identified a variety of root causes that contributed to the binding constraints identified in the CA. The root causes for unreliable power infrastructure were organized into three overarching areas: the existence of weak policy and regulatory environment, insufficient supply and distribution of electricity, and weak capacity across institutions in the electricity sector. The root causes of poor road infrastructure were also grouped into three areas: a weak policy and regulatory environment, inadequate planning and budgeting, and inadequate implementation and maintenance.

On October 2, 2015, the United States of America through the Millennium Challenge Corporation and the Government of Liberia signed a US$257 million Compact designed to reduce poverty through economic growth by investing in energy and road maintenance projects in Liberia. The selection and design of Compact Projects was informed by the Constraints Analysis and subsequent Root Cause Analysis. The Compact also supports key development priorities of the GoL as identified in the *Agenda for Transformation*, a five-year development strategy for FY 12-17, and *Liberia RISING 2030*, which is Liberia's long-term vision of socio-economic and political transformation and development.

The Compact officially entered into force on January 20, 2016.

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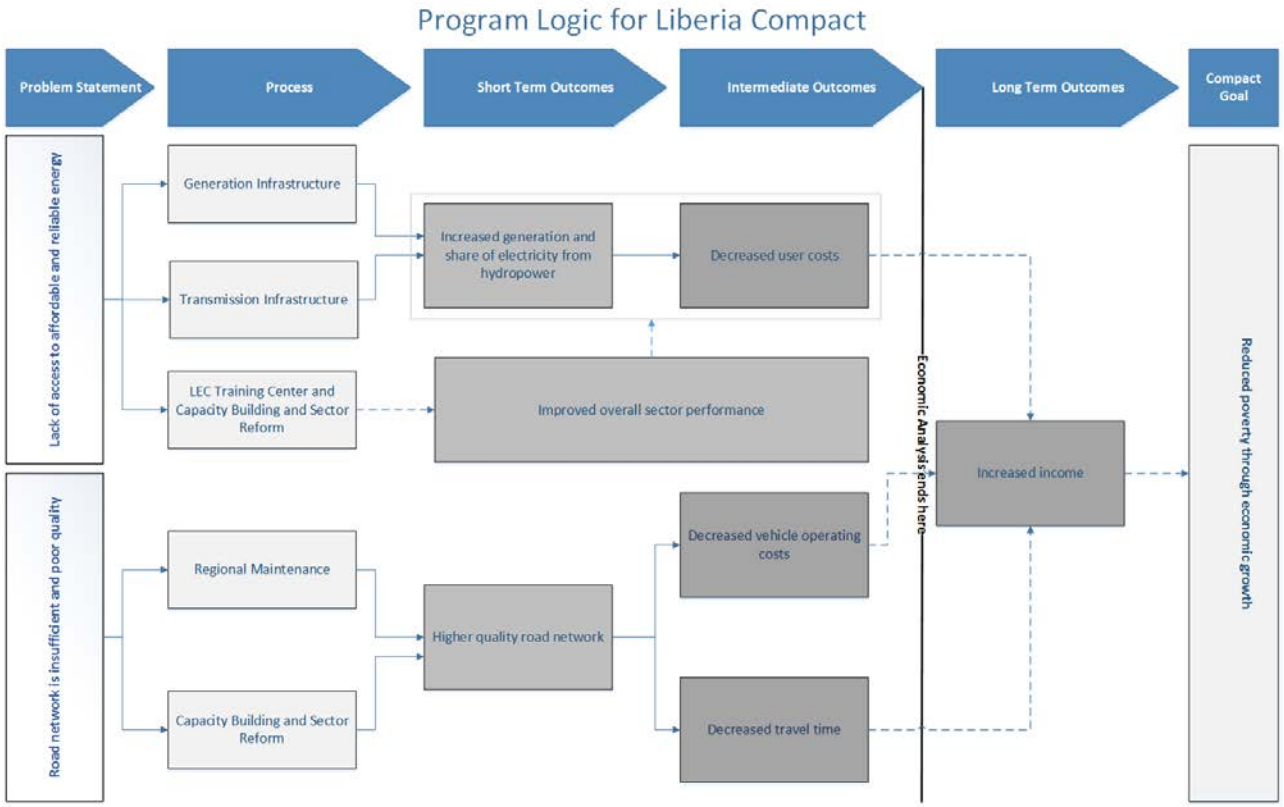
[2] World Bank, Project Appraisal Document, Liberia Accelerated Electricity Expansion Plan, p.1. May 2013.
[3] Ibid., WDI.
[4] See Liberia Constraints Analysis, MCC & Liberia Core Team, 2013 and World Bank, Liberia Accelerated Electricity Expansion Project, Project Appraisal Document, 2013, p.1.
[5] Asian Development Bank, "Guidelines for Preparing a Design and Monitoring Framework," Project Performance Management System, Second Edition, July 2007.

Compact Logic

The goal of the Liberia Compact is to reduce poverty through economic growth. MCC's assistance will be provided in a manner that strengthens good governance, economic freedom, and investments in the people of Liberia. The objectives of the Projects are to: (i) provide access to more reliable and affordable electricity; and (ii) improve the planning and execution of routine, periodic and emergency road maintenance. These goals and objectives are expected to be realized through MCC's investments, which are expected to increase power generation and the share of generation from renewable sources, improve overall power sector performance, and provide funding and support to improve the road maintenance system.

The diagram below illustrates and describes the expected causal relationships among the program components and synthesizes outcomes intended to achieve the Project objectives and the program goal.

Figure 1: Liberia Compact Logic



Project Description and Logic

Energy Project Description and Logic

Liberia has an electrification rate of less than two percent and one of the highest electricity tariffs in the world at US$0.49 per kilowatt hour (kWh). The average cost of generation for countries in sub-Saharan Africa is about US$0.15 per kWh, ranging from US$0.05 in energy-rich countries such as Nigeria to about US$0.25 for less energy-endowed countries like Cabo Verde. According to the World Bank, "the main reason for high cost of electricity in Liberia is the dependency on high-cost diesel generation."[6] The CA also asserts that these costs mainly

[6] World Bank, Project Appraisal Document - LACEEP, May 2013, p.2.

result from the destruction of Liberia's hydroelectric dam, which was the country's single largest source of power before the war, and the diminished capacity of LEC which provided as much as 191 Megawatts (MW) of electricity prior to the war. LEC currently provides 22 MW of power, which is an increase from 9.6 MW in 2009. Liberia's power supply is also unreliable with frequent planned and unplanned outages.

The Compact's Energy Project aims to address several of the problems facing the energy sector in Liberia through four Activities. The Mt. Coffee Rehabilitation Activity aims to address the overarching problem in the energy sector, i.e., the lack of access to affordable and reliable electricity by increasing the amount of electricity generated in Liberia, facilitating a decrease in the overall electricity tariff, and helping to increase reliability and adequacy of electricity.

The Mt. Coffee Rehabilitation Activity builds on ongoing rehabilitation efforts funded by the Government of Norway, the German Development Bank, and the European Investment Bank. Initially, Mt. Coffee Hydropower Plant (MCHPP) was to be rehabilitated to a rated capacity of 66 MW with the GoL providing 20% of the costs. Rehabilitation costs have increased substantially as a result of cost overruns and changes to the design, delays caused by the Ebola Virus Disease outbreak, and the decision to expand MCHPP's capacity to 88 MW in part due to the expected availability of MCC funding. The Mt. Coffee Rehabilitation Activity to be funded under the Compact assumes responsibility for the GoL's financial commitment and includes the following specific components:

- the additional cost required to provide a total installed generation capacity of up to 88 MW;
- funding to cover gaps between existing stakeholder commitments and a total cost to complete the rehabilitation of MCHPP in an amount not to exceed $357 million;
- the cost of a second 66 kV transmission line from MCHPP to the Paynesville substation;
- the cost of rehabilitating the raw water intake at MCHPP from the power house to the MCHPP site boundary; and
- costs related to the establishment of certain dispute adjudication boards.

The remaining activities in the Energy Project are intended to support the results of the Mt. Coffee Rehabilitation Activity and address other root causes of the problems in the sector. The Capacity Building and Sector Reform Activity aims to address the weak policy and regulatory environment by providing support to the key institutions responsible for policy making, investment planning, asset management, and environmental, gender and social oversight of the sector – namely Ministry of Lands, Mines and Energy (MLME), LEC, and the Environmental Protection Agency (EPA). This Activity comprises three Sub-Activities:

- *Establishment of an Independent Regulator Sub-Activity*. Building upon planned programming from the European Union and the Government of Norway which focuses on the development of MLME's Department of Energy, this Sub-Activity will assist the Department of Energy in standing up an independent regulatory agency over a three year period. The Sub-Activity will include a number of studies, including a situation assessment for the sector; demand, willingness-to-pay, and cost of service studies; and a connection assessment analysis, which is intended to identify obstacles to customers connecting to the electricity network.

- *Institutional Strengthening for the Environmental Protection Agency Sub-Activity*. This Sub-Activity aims to enhance the capacity of the EPA to better manage its core functions.

- *Management Support to LEC Sub-Activity*. This Sub-Activity aims to support the tendering and implementation of a management services contract for LEC. This short-term plan, selected by the GoL and informed by a study of public management and private sector participation options for LEC, will help lead to a financially sustainable utility. Other management options, such as a concession, are still within LEC's long-term vision for the utility.

The LEC Training Center Activity aims to improve capacity in the sector by building LEC's technical, operational, financial, and administrative capacity, and forming the core base for training of technicians in the electricity sector.

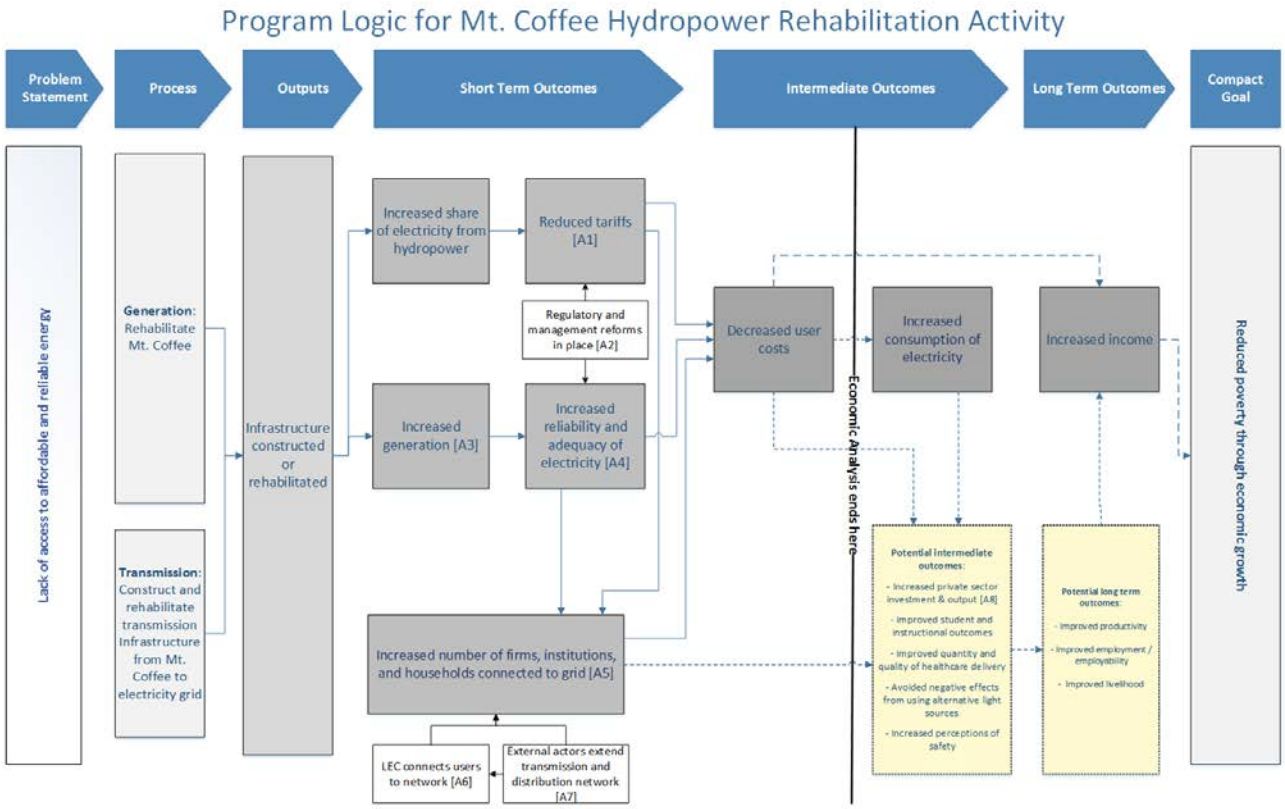
The Mt. Coffee Support Activity aims to provide additional support to the Mt. Coffee Rehabilitation Activity to mitigate environmental and social risks and ensure long-term sustainability. For example, MCC funding will support:

- the provision of small-scale community infrastructure (e.g., bridges) in order to ensure communities and/or settlements surrounding the MCHPP reservoir are not permanently blocked from accessing their farms, settlements, and/or other social services (e.g., health clinics, schools);
- additional human resources support to LEC, including the Project Implementation Unit (PIU), to ensure timely and professional management, oversight and reporting of environmental and social impacts and risks;
- a watershed management plan (including climate change and fisheries studies); and
- rehabilitation of the raw water transmission line from MCHPP to the White Plains Water Treatment Works.

Finally, the Energy Project will also include technical assistance support to strengthen socially inclusive and gender-responsive planning and implementation capacity of MLME and LEC as a part of the Energy Sector Reform Activity, and a separate effort to increase productive uses of electricity by enhancing capacity, skill and entrepreneurship development of women, youth, and other marginalized groups as a part of the Mt. Coffee Support Activity.

The diagram below illustrates and describes the expected causal relationships for the Mt. Coffee Rehabilitation Activity and synthesizes expected outcomes of that Activity. This program logic will be expanded to incorporate other Energy Activities, and/or separate logics will be developed once the remaining Activities are more defined.

Figure 2: Mt. Coffee Rehabilitation Activity Program Logic



The logic diagram above reflects the following set of assumptions:

A1 – Tariffs will be cost-reflective, which is critical for running a sustainable utility.

A2 – Regulatory reforms will be implemented.

A3 – LEC has the capacity and resources to manage its system effectively and efficiently, including performing routine maintenance.

A4 – Heavy Fuel Oil (HFO) plants will come online as planned. This complementary infrastructure is critical for enabling LEC to increase the number of users connected to the grid in the short-term; testing of the MCHPP turbines will be constrained without additional users connected to the network and consuming power. The HFOs will also help meet electricity demand during the dry season.

A5 – Connection costs are not prohibitive, and a sufficient number of users (including large users) will have sufficient confidence in LEC and will be willing and able to consume and pay for available electricity; this is key to LEC covering its costs and operating sustainably.

A6 – LEC must have sufficient manpower, skill, and administrative capacity to respond to user requests for connections.

A7 – External actors will extend the transmission and distribution networks as planned. These extensions are critical to expanding LEC's consumer base.

A8 – Cost savings are invested and other constraints such as access to finance, or lack of political stability do not inhibit additional investments.

Roads Project Description and Logic

Although responsible for road maintenance, the Ministry of Public Works (MPW) does not currently have the financial resources to conduct sufficient maintenance. This is further exacerbated by the lack of existing data. An inventory of the road network does not currently exist, and assessments are only done visually. This situation would make it impossible to take a holistic approach to road maintenance planning and execution, even if funding was not a constraint. Additionally, maintenance standards - routine, periodic, rehabilitation - are not well defined. MPW is not able to state what the backlog or future maintenance requirements are for the network as a whole. What data is collected is at a very basic level and done sporadically.

Before the war, the unpaved road network was maintained in fairly good, all-weather quality. Since the war, however, maintenance has deteriorated for the reasons described above. In addition, during the rainy season most, if not all, of the unpaved roads deteriorate significantly, exerting a severe toll on individuals and businesses. Liberia records the highest freight cost during the rainy season at about US$0.50/MT/km compared to the rest of sub-Saharan Africa, where costs range from US$0.04-US$0.14/MT/km. The cost of transporting goods during the rainy season from parts of the country where road networks deteriorate significantly to Monrovia escalates by about 53%.[7] Further, road maintenance is undertaken mostly on an emergency repair basis, significantly raising the cost of road works and straining further an already miniscule budget.

The Roads Project aims to address such problems in the sector and improve the quality of Liberia's road network by supporting the piloting of a new maintenance regime and by building capacity. The Project Activities are expected to improve the weak policy and regulatory environment and inadequate maintenance occurring in the roads sector. Ultimately, improved management of the road sector is expected to result in a larger stock of well-maintained roads, which will decrease vehicle operating costs and provide time savings for road users.

The Roads Project consists of the National Road Maintenance Activity and the Roads Sector Reform Activity.

The National Road Maintenance Activity is further comprised of two Sub-Activities:

- *Construction of Road Maintenance Centers Sub-Activity*. This Sub-Activity consists of design and construction of two pilot Regional Maintenance Centers (RMCs), and the provision of data collection equipment, lab equipment and vehicles to the RMCs. One of the pilot RMCs will be located in the western region of Liberia, in Tubmanburg, Bomi County and one will be located in the southeastern region of Liberia, in River Gee County. MCC may agree with the Government to fund an additional three RMCs upon successful completion and assessment of viability of the first two RMCs under the Compact.

[7] CA, p. 156.

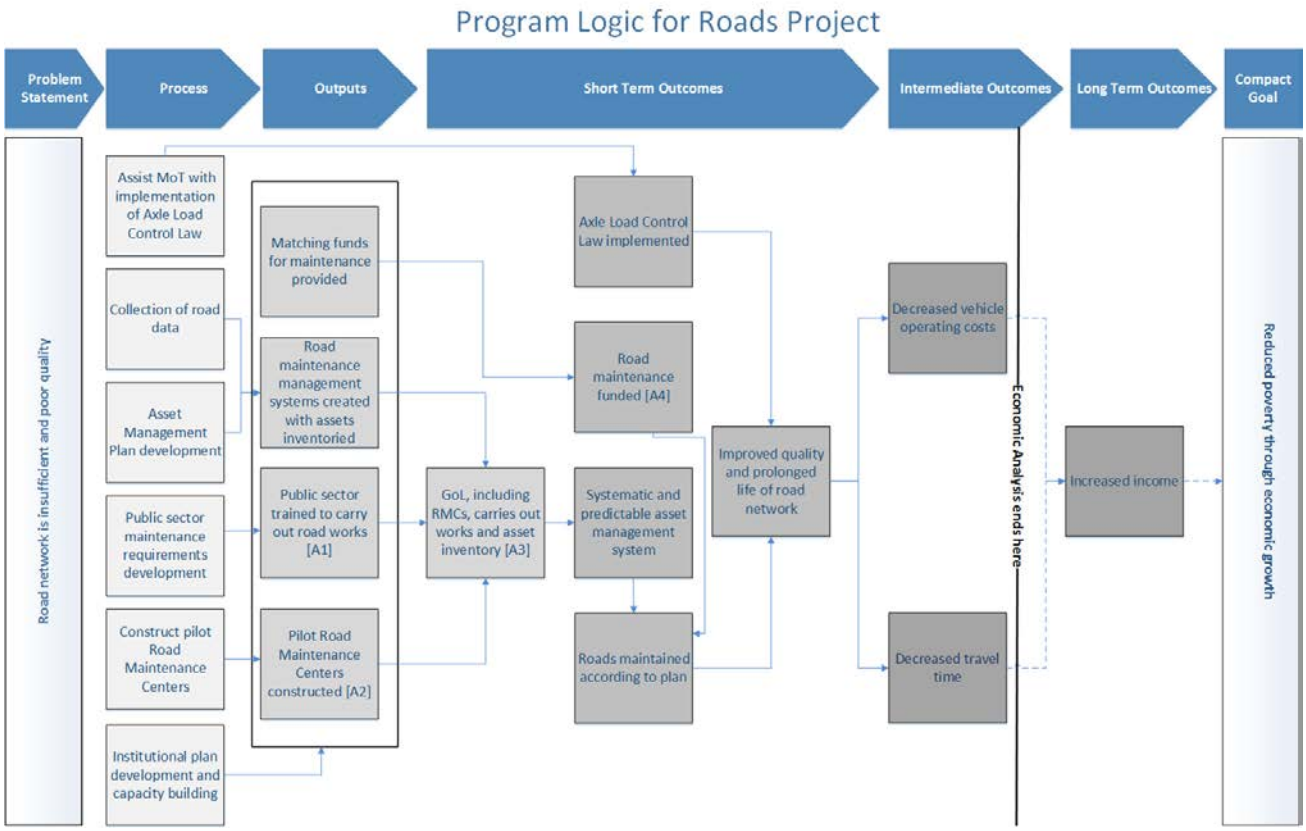
- *Matching Road Maintenance Fund Sub-Activity*. MCC funding will be used to finance periodic road maintenance works through an incentive matching fund (Road Fund) to be established during the first year of the Compact. MCC will match GoL contributions to the Road Fund dedicated to periodic road maintenance on a one to one basis up to $8 million during the Compact, subject to measurable indicators of performance on maintenance planning, capacity and implementation.

The Roads Sector Reform Activity aims to build capacity and provide technical assistance at the national and regional level through the development of a national roadway inventory report and database, and training of staff to update and use the data for maintenance planning; and provide sector reform/institutional strengthening/capacity building aimed at ensuring that Compact investments in the transportation sector are coordinated with and complement the investments made by other major donors.

Finally, the Roads Project will also aim to strengthen socially inclusive and gender-responsive planning and implementation capacity of MPW and the Ministry of Transportation, and support stakeholder and community engagement in the two pilot RMCs.

The diagram below illustrates and describes the expected causal relationships for the Roads Project and synthesizes expected outcomes of that Activity.

Figure 3: Roads Project Program Logic



The logic diagram above reflects the following set of assumptions:

A1 – The private sector is prepared and capable of performing maintenance.

A2 – The GoL will ensure that the pilot Road Maintenance Centers have an appropriate number of staff, who are compensated sufficiently.

A3 – The GoL will determine which units will carry out relevant functions as a part of the Compact interventions.

A4 – Funds continue to be available with some level of predictability.

Projected Economic Benefits

An initial economic analysis of the Mt. Coffee Rehabilitation Activity was carried out prior to Compact approval. As shown in Table 1, using base-case assumptions (which are described below), the economic rate of return (ERR) for the Activity is 13%; however, Table 3 provides a range of ERRs that vary depending on key parameters of the model; these parameters will be reassessed as the project is implemented. This initial economic analysis was developed before other components of the Energy and Roads Projects were fully designed. It is expected that further cost benefit analysis will be done as the remaining Compact investments are defined sufficiently to calculate their economic returns.

Table 1. Summary of Economic Analysis Results

Project	Activity	Original Project-Level ERR	Original Activity-level ERR	Date Original Economic Rate of Return (ERR) Established	Revised Project-Level ERR	Revised Activity-level ERR	Date Revised Economic Rate of Return (ERR) Established
Energy Project	Mt. Coffee Rehabilitation Activity	11%	13%	06/2015	N/A	N/A	N/A
	Mt. Coffee Support Activity		Not Calculated	N/A		N/A	N/A
	LEC Training Center Activity		Not Calculated	N/A		N/A	N/A
	Energy Sector Reform Activity		Not Calculated	N/A		N/A	N/A
Road Project	National Roads Maintenance Activity	Not Calculated	Not Calculated	N/A	N/A	N/A	N/A
	Roads Sector Reform Activity		Not Calculated	N/A		N/A	N/A

Energy Project Economic Analysis

The supply and distribution of electricity in Liberia is extremely limited, both in terms of the number of connections and the total demand for those connections. The table below shows the number of existing, active customers on the grid and their estimated peak load use of electricity at the time the Liberia Least Cost Power Development Plan (LCPDP) was prepared. Until May 2016, customers paid a tariff of $0.52/kWh (as reported by Manitoba Hydro International

(MHI)),[8] due to the high fuel price for the high speed diesel generators that are currently used for LEC's entire supply of electricity.

Table 2. LEC Customer Structure (2013)[9]

Customer Category	No. of Active Customers	Estimated Average Peak Load per Customer
Low income (single phase prepaid meter)	6,459	0.21 kW
Residential/small commercial, GoL and NGO single phase	6,447	0.59 kW
Commercial, GoL and NGO (three phase)	490	3.4 kW
GoL CT-metered	44	49 kW
Commercial CT-metered	65	25 kW
TOTAL	**13,505**	

As described above, power generated by MCHPP is expected to reduce the price of electricity for customers. For those already on the grid, they are expected to have fairly minimal increase in demand due to the change in cost. The estimated price elasticity of demand is -0.2.[10] The largest portion of the benefits for existing customers is from a one-time price decrease. After that, their utility will be measured by the amount they consume. The majority of the increase in demand, thus, is expected to be gained through additional connections to the grid. For new customers to the grid, they will receive a one-time benefit scaled by their willingness to pay, followed by a similar valuation based on their consumption. The economic rate of return depends heavily on this increase in demand from new connections.

Developing new connections is critical to the commercial viability of LEC. Until now, LEC has kept their customer base relatively small, largely because they did not have enough generation capacity to increase their base without worsening already considerable load shedding. As a result, however, we know little about what the potential scale up of the customer base will look like. While we know that there are generally plans by donors to fund up to 90,000 new household and commercial connections, we only know the general expected timing of those new connections, the timing of new industrial connections.[11] We still do not know much about the capacity of LEC and/or its contractors to make the connections, and the readiness of the households and firms to access grid electricity, but LEC, donors funding connections, and McKinsey (which has developed a set of private sector management options for LEC) are confident in the overall number of connections to be established. Given the uncertainty around

[8] MHI is a private company that has been contracted to manage LEC.
[9] "Preparation of a Government of Liberia Least Cost Power Development Plan (LCPDP)," 2014. Prepared by Fichtner for MLME and LEC.
[10] Fichtner, LCPDP; 5-9.
[11] MCC has learned about plans to fund additional connections since the economic analysis of MCHPP was initially developed. However, we are still trying to clarify the magnitude and timing of those plans, along with longer-term plans for the electricity tariff. We expect that the economic analysis will be updated once these inputs have been obtained.

connections, the following are some potential scenarios of connections and the concomitant ERRs.

Table 3. Connection Scenarios and ERRs

Scenario Name	Demand (MW)	Number of Connections (Industrial)	Number of Connections (Household)	Timeline for Connections	ERR (all Project costs)	ERR (Mt. Coffee Rehabilitation Activity costs only)
Base scenario from LCPDP	52	1,450	90,000	2020	11%	13%
Pessimistic scenario (Low demand, slow connections)	26	1,000	90,000	2025	3%	5%
Low trust of LEC scenario (Low demand, quick connections)	26	1,000	90,000	2018	7%	9%
Low LEC capacity scenario (High demand, slow connections)	75	3,000	150,000	2025	14%	16%
Optimistic scenario (High demand, quick connections)	75	3,000	150,000	2018	17%	20%

The base case scenario, as outlined in Fichtner's LCPDP, includes a number of assumptions about growth and demand of users connected to the grid. Aside from the numbers of connections to the grid and the decreased tariff rate after MCHPP begins operating, other assumptions include:

- Price elasticity of demand = -0.2[12]
- World Price of Oil = US$100 per barrel in 2015, assumed to drop to $75 per barrel after that[13]

[12] LCPDP, 5-9.
[13] Calculations based on Technical and Financial Feasibility Study for the Reconstruction and Expansion of the Mount Coffee Hydropower Facility in Liberia, Stanley Consultants; 8-38.

- Capacity Factor = .592 once all four Mount Coffee turbines are online[14]
- Load Factor = 0.72 for commercial users and 0.5 for residential[15,16]

While it is clear from available demand surveys that there is market demand for the cheaper generation provided by MCHPP, there is much that is uncertain about the scope and timeline of connecting that additional demand and whether there are other hindrances to connecting customers and to reaching the level of demand that would make generation at this scale economically viable.

There are very limited large businesses or housing complexes that could readily connect to the grid under the current scale of grid penetration. The question thus remains on how the grid will expand, who will pay for the expansion of connections, and whether businesses and households will be able and willing to connect. A willingness-to-pay study executed in the Monrovia area by the World Bank's Global Partnership on Output-Based Aid (GPOBA) in 2010 suggested that there is a fairly high willingness to pay, and only a small percentage (~15%) of households would not be able to afford to wire their house or purchase a Ready Board (small unit that obviates the need to wire a house, meant primarily for one room households). Donors have plans to fund over 90,000 new household and commercial connections, and LEC has done a demand study of potential larger customers to target for connection. Nevertheless, MCC experience in other contexts suggest that even when, by all accounts, there are customers clamoring for connections, they do not always take the steps required to acquire network connections. Thus the question remains how and when these connections will be completed and whether the demand projections by various parties (Fichtner (in the LCPDP), LEC, and others) will play out.

If we follow the base case for demand projected by Fichtner, we get an ERR of 11%, inclusive of all capacity building activities that support the Mt. Coffee Rehabilitation Activity (both operations and maintenance) and connecting new customers to the grid (e.g. the LEC Training Center Activity). Just including costs currently envisioned by the donors, the ERR would be 13%. However, if the connection activities do not progress as envisioned or there are unforeseen barriers to accessing electricity, the ERR could drop well below the hurdle rate of 10%. For this reason, the Compact includes a connection assessment analysis that could identify and potentially help close the gaps to facilitate network access.

There are a number of investments included in the costs, whose potential benefits were not quantifiable at the time of the investment decision and which thus are not included in the model. When designs for these activities are developed, the economist will revisit the possibility of developing cost benefit analysis. These include:

i. **LEC Training Center Activity.** Though the benefits have not been quantified, in the medium or long term, the capacity to train staff locally will be necessary to support LEC's operations and maintain their fixed capital resources.

ii. **Second circuit transmission line to Paynesville (part of the Mt. Coffee Rehabilitation Activity).** The purpose of this transmission line is as a redundancy in case the first circuit ever fails. The probability of this occurring and then knowing how long the ensuing outage would last would be two critical variables to know in order to calculate the benefit of adding the second circuit.

[14] LCPDP, 11-21.
[15] LCPDP, 5-16
[16] For a full list of assumptions used in Fichtner's Least Cost Power Development Plan, see pages 5-12 and 5-14.

Unfortunately, we have no historical data or other means by which to estimate these figures and thus cannot calculate the benefits directly attributable to this redundancy.

iii. **Capacity Building and Sector Reform Activity.** Lack of capacity was highlighted in the Root Cause Analysis along a number of dimensions, affecting the ability to operate, maintain, and expand electricity operations by LEC and MLME. Because designs do not yet exist for these activities, nor specific targeted outcomes, it is at the moment infeasible to conduct cost benefit analysis on this Activity.

iv. **Mt. Coffee Support Activity.** Similar to the Capacity Building and Sector Reform Activity, there is no detailed design of these activities to be able to create a cost benefit analysis.

v. **Water intake (part of the Mt. Coffee Rehabilitation Activity) and water pipeline (part of the Mt. Coffee Support Activity).** Based on the information available at the time of the investment, salinity increases as a result of the MCHPP and downstream of the MCHPP was considered a serious risk created by the MCHPP and mitigation measures were included in the Compact. These investments are not necessary to see the benefits of MCHPP, but they respond to MCC's concerns at the time the investment decision was made. There could be a completely separate program logic related to water intake. However, based on the information available at the time of the investment decision, it was not possible to build a robust economic model. Apart from mitigating a serious risk there would be additional benefits from a substantially expanded supply of water for Monrovia and decreased operating costs associated with a gravity-fed supply as opposed to pumping water from the river as currently occurs. Since this cost is included in the MCHPP rehabilitation contracts, the costs have been included in the ERR model for the Mt. Coffee Rehabilitation Activity.

Roads Project Economic Analysis

At the time of MCC's investment decision, economic analysis was not available for the Roads Project. In general, road maintenance programs are expected to have significantly better economic returns than upgrading individual road segments. Thus it is expected that, once the Roads Project is designed, the team economist will conduct economic analysis and the Project has a good likelihood of achieving sufficient returns to justify the investment.

Projected Program Beneficiaries

According to the *MCC Guidelines for Economic and Beneficiary Analysis*, beneficiaries of projects are considered individuals who experience better standards of living due to Compact activities aimed at increasing their real incomes. The economic rate of return analysis for proposed projects gives details on benefit streams through which beneficiaries should experience increased income.

A general overview of the span of program benefits across the population of Liberia, used for Compact justification to MCC's Investment Committee, is presented in the table below.

Table 4: Projected Program Beneficiaries

Project	Program Beneficiary Definition	Est. Number of Beneficiaries	Present Value (PV) of Benefits[17]	Net Present Value (NPV)[18]
Mt. Coffee Rehabilitation Activity	Number of individuals in households connected to the grid plus the number of commercial enterprises connected	460,000	$517,899,307	$83,718,571
Road Project	TBD	TBD	TBD	TBD

Energy Project Beneficiary Analysis

The total beneficiary count for the Energy project, using the Fichtner base scenario, is approximately 460,000 people. If the number of household connections increased to 150,000, then a beneficiary count of 766,000 people is expected.

The Beneficiary Analysis (BA) for this project builds on the customer profile outlined in the ERR model. Beneficiaries, in this case, are defined as individuals who benefit from the increased availability of electricity through the Compact activities. This increased availability of electricity is expected to yield cost savings or otherwise improve beneficiaries' current standard of living. In the case of households, the BA counts all members of the household benefitting from the Compact, assuming an average household size of 5.1.[19]

In the case of firms benefitting from the Compact, only the owner is counted as a beneficiary. Within the ERR model, benefits accrue to firms with existing connections due to increased consumption of grid-supplied electricity, valued at an assumed willingness to pay. What the firm does with the assumed cost reduction is unknown; assuming that wages increase or that employment increases would be to include multiplier effects. Liberia experiences high unemployment which would lead to the expectation that wages would not increase without increases in labor productivity. Labor productivity increases may result from increases in capital productivity, but this would be expected to result from the employment of new capital. New capital could reduce the need for labor. Assumptions for such changes should only be made for targeted investments where extensive data has been collected on a specific sector, leading to a reasonable understanding of the expected adjustments. Thus, for the case of firms with existing grid connections, no assumption is made that firm employees benefit from the Compact. Firm owners are counted as beneficiaries but then removed, as they are expected to have been previously counted among those benefitting from residential connections and thus may be double counted.

[17] The PV of benefits are included in the ERR as the "estimated discounted increase in income over the life of the project" or the "beneficiary income gain."

[18] The NPV illustrates the net benefits, which subtract the discounted costs from the discounted benefits. Cost-benefit analysis produces two main outputs: the ERR and NPV. This provides a more complete picture and allows for comparison at this level across projects.

[19] 2008 National Population and Housing Census: Preliminary Results. Liberia Institute of Statistics and Geo-Information Services (LISGIS), 2008.

When the results of the model indicate expected *new* commercial and industrial connections resulting from the Compact, the expected employees associated with these firms are included as beneficiaries. The average size of existing firms is used as the expected size of new firms, and the average size of households in Liberia is used to determine the assumed size of the employee's household. We do not currently have this data, so for the sake of the initial beneficiary count, all new commercial connections are estimated to have one beneficiary.

Roads Project Beneficiary Analysis

The activities under the Road Project are not sufficiently designed to develop a beneficiary analysis.

MONITORING COMPONENT

Summary of Monitoring Strategy

The Compact will be monitored systematically and progress reported regularly through the Indicator Tracking Table (ITT). There are four levels of indicators that follow from the program logic framework: (i) goal, (ii) outcome, (iii) output and (iv) process. The various indicator levels map to the program logic and thus allow Project developers and managers to understand to what extent planned activities are likely to achieve their intended objectives. Monitoring data will be analyzed regularly to allow managers of MCA-L and MCC to make programmatic adjustments as necessary with a view towards improving the overall implementation and results of the Compact. Often most outcome and goal indicators are not monitored during the life of the Compact, but rather are reported through evaluations after the Compact is complete. Those levels of results typically take longer to be achieved.

Monitoring data will be analyzed regularly to allow managers of MCA-L and MCC to make programmatic adjustments as necessary with a view towards improving the overall implementation and results of the Program.

- Goal indicators measure the economic growth and poverty reduction that occur during or, most likely, after implementation of the program. For MCC Compacts, goal indicators will typically be a direct measure of local income and are typically measured through post compact evaluations.
- Outcome indicators measure intermediate effects of an Activity or set of Activities and are directly related through the program logic to the output indicators.
- Output indicators measure the direct result of the Project Activities. They describe and quantify goods or services produced directly by the implementation of an Activity.
- Process indicators record an event or measure progress toward the completion of Project Activities. They are a forerunner to the achievement of Project outputs and a means to ensure the work plan is proceeding on a timely basis.[20]

MCC has introduced common indicators for external reporting across all MCC Compacts. The common indicators relevant to the MCA-L Compact are included in this M&E Plan.

[20] The indicator levels are formally defined in MCC's *Policy for Monitoring and Evaluation of Compacts and Threshold Programs*.

MCC is interested in monitoring the general operations of LEC and may seek to include indicators in this Plan that are more contextual in nature than a direct reflection of project performance. This will be determined during a future revision of this M&E Plan.

Annex III of the Compact outlines the initial indicators for the Compact. The M&E Plan builds on this information with additional relevant indicators developed by MCC, MCA-L project managers, and implementers in the early stage of project implementation. Additional indicators will be added as Compact investments are further defined.

The Indicator Definition Table provides relevant details for each indicator by Project and can be found in Annex I. It provides descriptions for the indicator structure by specifying each indicator's: (i) name; (ii) definition; (iii) unit of measurement; (iv) level of disaggregation; (v) data source; (vi) frequency of reporting; and (vii) party or parties responsible.

To ensure that the Program is on track to meet its overall goals and objectives, the monitoring indicators will be measured against established baselines and targets, derived from the ex-ante economic rate of return analysis, other types of analysis, and project planning documents. The targets reflect the underlying assumptions made in program design about what each Activity would likely achieve. Baselines and target levels for each indicator are defined in Annex II.

Indicators may need to be modified in future versions of the M&E Plan. Modifications and revisions to the indicators may only be made according to the MCC M&E Policy. Any significant modifications to the indicators or other content will be summarized in Annex III of the M&E Plan per the M&E Policy.

The M&E Unit shall consult and assist Implementing Entities in setting up their data collection plans and reporting templates.

Data Disaggregation

Where feasible and appropriate, monitoring and evaluation indicators will be disaggregated by sex, age, income, and/or vulnerable groups.

Data Sources

The indicators identified in the M&E Plan will require the collection of a range of data from various sources within Liberia such as the Implementing Entities and implementers. To the greatest extent possible, MCA-L will attempt to harmonize data collection with other existing data sources or planned surveys and ensure that the data collected through the project are useful and cost-effective. Specific data sources are outlined in Annex I of this M&E Plan.

Data Quality Reviews (DQRs)

Data quality is the primary responsibility of the MCA-L staff, led by the M&E Unit. The M&E Unit, other MCA-L staff, as appropriate, and implementing entities should regularly check data quality. The M&E Unit should verify that all reported data have appropriate source documentation and that calculations have been done correctly. The MCA-L M&E Unit will conduct field visits on a regular basis or whenever requested by MCC, to review the quality of the data gathered through this M&E Plan. MCA-L may also hire individual data quality monitors to monitor data collection and quality, as needed.

In addition to regular data quality checks by MCA staff, independent Data Quality Reviews (DQRs) will be conducted in accordance with the requirements of the MCC M&E Policy.

The objectives of DQRs are to assess the extent to which data meet the standards defined in the MCC M&E Policy in the areas of validity, reliability, timeliness, precision and integrity. DQRs will be used to verify the consistency and quality of data over time across implementing agencies and other reporting institutions. DQRs will also serve to identify where the highest levels of data quality is not possible, given the realities of data collection.

The particular objectives for the DQRs will include identification of the following parameters: i) what proportion of the data has quality problems (completeness, conformity, consistency, accuracy, duplication, integrity); ii) which of the records in the dataset are of unacceptably low quality; iii) what are the most predominant data quality problems within each indicator; iv) what are the main reasons behind low quality; and v) what steps can be taken to improve data quality. An initial DQR will be contracted by MCC during Year 1 of the Compact; subsequent DQRs will be contracted by MCA-L in compliance with MCC Program Procurement Guidelines.

M&E Capacity Program

MCA-L will be responsible for ensuring regular training of key project stakeholders in monitoring and evaluation in order to build the capacity of these stakeholders to remain compliant with the M&E requirements of the Compact. The capacity building program will be need-based, as determined through a) regular staff assessments, and b) as identified in the findings of the independent DQRs.

Standard Reporting Requirements

Reporting to MCC: Quarterly Disbursement Request Package

Performance reports serve as a vehicle by which the MCA Management informs MCC of implementation progress and on-going field revisions to Project work plans. Currently, MCC requires that MCA-L submit a Quarterly Disbursement Request Package (QDRP) each quarter. The QDRP must contain an updated ITT and a narrative report. A complete ITT presents the preceding quarters' indicator actuals and current quarter indicator progress against targets set forth in this M&E Plan. The QDRP narrative report provides a brief description of the previous quarter's Compact implementation progress and explains how requested funds will be used in the coming quarter. The QDRP narrative is the responsibility of all staff of MCA-L. The ITT is the source for MCC's internal and external reporting on indicator progress.

Additional guidance on reporting is contained in MCC's *Guidance on Quarterly MCA Disbursement Request and Reporting Package*.

Reporting to MCA and Local Stakeholders

Even though the QDRP is required to be sent to MCC, MCAs should also use these reports and the data included in them to assess progress and performance internally. The M&E teams

attempt to align MCC and MCA reporting so that data are used to inform decision-making at both levels.

MCA-L Board Coordination Meetings

The M&E Directorate shall be responsible for reporting M&E results to the MCA-L Board on a quarterly basis. The reports will consist of ITTs and other materials that help depict progress towards Compact targets. These updates may include recommendations that are crucial to change or guide the implementation of projects for consideration by the MCA- L Board.

EVALUATION COMPONENT

Summary of Evaluation Strategy

While good program monitoring is necessary for program management, it is not sufficient for assessing ultimate results. Therefore, MCC and MCA-L will use different types of evaluations as complementary tools to better understand the effectiveness of its programs. As defined in the MCC M&E Policy, evaluation is the objective, systematic assessment of a program's design, implementation and results. MCC and MCA-L are committed to making the evaluations as rigorous as warranted in order to understand the causal impacts of the program on the expected outcomes and to assess cost effectiveness. This Evaluation Component contains three types of evaluation activities: (i) independent evaluations (impact and/or performance evaluations); (ii) self-evaluation, and (iii) special studies, each of which is further described below. The results of all evaluations will be made publicly available in accordance with the MCC M&E Policy.

Independent Evaluations

According to the MCC M&E Policy, every Project in a Compact must undergo a comprehensive, independent evaluation (impact and/or performance). The next section on Specific Evaluation Plans will describe the purpose of each evaluation, methodology, timeline, and the process for collection and analysis of data for each evaluation. All independent evaluations must be designed and implemented by independent, third-party evaluators, which are hired by MCC. If MCA-L wishes to engage an evaluator, the engagement will be subject to the prior written approval of MCC. Contract terms must ensure non-biased results and the publication of results.

For each independent evaluation, MCA-L and relevant stakeholders are expected to review and provide feedback to independent evaluators on the evaluation design reports, evaluation materials (including questionnaires), baseline report (if applicable), and any interim/final reports in order to ensure proposed evaluation activities are feasible, and final evaluation products are technically and factually accurate. MCC's evaluation review process will follow the guidelines outlines in the MCC M&E Policy.

Self-Evaluation

If determined by MCC and MCA to be desirable and useful, MCA may contract a mid-term evaluation to assess performance against the M&E Plan in the middle of the Compact.Upon completion of each Compact program, the MCA will produce the Compact Completion Report (CCR) to document and reflect on implementation and lessons learned. The MCA-L staff will draft the CCR in the last year of Compact implementation. It should be noted that each

department will be responsible for drafting its own section to the report for its own activities, subject to cross-departmental review. Upon agreement with MCC, the MCA may contract an independent evaluator to prepare a final process evaluation to collect information and conduct analysis to be used in the CCR.

Special Studies
Either MCC or the Government may request special studies or ad hoc evaluations of Projects, Activities, or the Program as a whole prior to the expiration of the Compact Term.

At this time, no special studies have been planned.

Specific Evaluation Plans

Summary of Specific Evaluation Plans

The following table summarizes specific evaluation plans.

Table 5: Compact Evaluation Plans

Evaluation Name	Evaluation Type	Evaluator	Primary/ Secondary Methodology	Final Report Date
Energy Project Evaluation	Performance	TBD – To be contracted by late 2016	TBD	TBD
Roads Project Evaluation	Performance	TBD – To be contracted by mid-2017	TBD	TBD

Energy Project Evaluation

At the time of drafting this plan, more information is available on the Mt. Coffee Rehabilitation Activity than the other Activities included in the Energy Project. Given that too little is known about these Activities to prepare a detailed program logic diagram, an evaluation strategy or evaluation questions cannot be developed at this time. As a result, the current evaluation plan is focused primarily on the Mt. Coffee Rehabilitation Activity. As more information becomes available, this evaluation plan will be updated.

Evaluation Questions

Overarching:

1. Was the Energy Project evaluable?
2. Was the Energy Project implemented as planned?
3. What lessons can be drawn from the Liberia Energy Project to inform future projects?

Grid-level impacts:

1. To what extent, if any, has increased electricity generation contributed to increased reliability of the electricity supply, such as a reduction in planned and unplanned outages and improvements in voltage stability?
2. To what extent, if any, has increased electricity generation contributed to increased adequacy of the electricity supply, i.e., a reduction in the gap between electricity supply and demand?

End user impacts:

1. What has been the pattern of users connecting to the grid? Have there been changes in demand for connections among unconnected households? How did new households, commercial, industrial and other consumers decide whether to connect? For potential consumers of these types (particularly industrial consumers) that have not connected, why have they not connected? What barriers do potential consumers face when trying to connect to the grid? Have there been changes in energy demand for consumers already connected to the network? Have there been changes in energy demand for unconnected households that already had access to electricity?
2. To what extent, if any, do increases in energy availability and reliability lead to changes in energy sources used (such as moving away from the use of generators, kerosene, etc.)? To what extent, if any, have Compact investments resulted in cost savings for energy users?
3. To what extent, if any, have customers invested in new energy-intensive appliances or equipment and increased use of existing energy-intensive appliances or equipment?
4. What is the effect of the increased availability and reliability of electricity on time use (e.g., time spent on wage, non-farm enterprise and farm labor, household production, leisure and school work)? What is the effect on labor market participation on the extensive margin?
5. How have changes in the reliability of electricity affected connected and unconnected households' perceptions of service quality?
6. What spillover effects has the increased availability and reliability of electricity had on neighboring non-electrified households (if feasible to detect)?
7. How are the above effects moderated by sex of household head or enterprise owner, income group, and commercial enterprise type?

Utility impacts

1. How has the electricity tariff changed since MCHPP was rehabilitated? To what extent does it cover the costs of electricity generation and other operating costs?
2. What is the operations and maintenance plan for MCHPP? To what extent is LEC implementing that plan?
3. How sustainable is LEC as a utility? What are the biggest barriers to its sustainability?

Energy sector impacts

1. What effect did the increased reliability and availability of electricity have on informal independent power producers in Monrovia?

2. To what extent, if any, have energy sector reform activities contributed to improvements in electricity regulation, policy formulation and monitoring?

Evaluation Methodology Description

The evaluation of the Mt. Coffee Rehabilitation Activity should explore the short-term and intermediate outcomes in the program logic, the role of critical assumptions, and whether any of the potential intermediate or long-term outcomes (that are noted in the program logic diagram but not quantified in the economic analysis) have come to fruition.

The methodology for the evaluation has not been determined yet, but it will likely include before-after comparisons of key outcomes, along with with key informant interviews to understand why certain results did or did not occur.

The following key outcomes will be included in those measured through the evaluation:

Table 6: Energy Project Key Outcomes

Program Logic Result	Indicator	Definition	Unit	Baseline	Target	Target Date
Decreased user costs	Cost savings to existing customers	Cost savings experienced by current LEC customers as a percentage of original electricity costs	Percentage	0	TBD	TBD
Decreased user costs	Cost savings to new and previously-electrified customers	Cost savings experienced by new and previously-electrified LEC customers as a percentage of original electricity costs	Percentage	0	TBD	TBD

The exposure period (the period of time between project completion and final data collection) has not been determined.

Data Sources

Two types of data will be used in the evaluation: primary data collected specifically for the evaluation and secondary data, such as administrative data, which already exists.

Table 7: Energy Project Primary Data Collection

Survey Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
Household/ Firm/ Institution Survey	Quantitative	TBD	TBD	TBD	TBD	Baseline: (TBD) Endline: (TBD)
Qualitative Data Collection	Qualitative	TBD	TBD	TBD	TBD	Baseline: (TBD) Endline: (TBD)

Existing Data

- LEC Administrative Data
- Other secondary data

Summary of Activities or Sub-Activities without Evaluations

The Mt. Coffee Support, LEC Training Center, and Energy Sector Reform Activities will be covered by the Energy Project Evaluation; however, detailed evaluation questions will not be developed until these Activities have been designed further.

Roads Project Evaluation

In the last year, MCC has reviewed its early investments and evaluations in the transport sector and has developed a set of lessons for improving our transport practice going forward for both project design and evaluation design. In particular, this review has highlighted the importance of understanding the program logic of the investment before designing an evaluation, collecting updated high quality data, as well as ensuring that the benefit of the evaluation is greater than its cost. Keeping these lessons in mind, it is expected that for the Liberia Road Project Evaluation, MCC will contract an independent evaluator to assess the performance of the road maintenance regime resulting from the National Road Maintenance and Capacity Building and Sector Reform Activities.

Evaluation Questions

1. Was the Roads Project implemented according to plan?
2. Did the Compact have any influence on the GoL's maintenance regime and practice?
    a. What are the governance arrangements that explain road maintenance practices? How is road maintenance regulated? How and to what extent did the Compact help to clarify

and strengthen governance and regulatory arrangements for road maintenance? How is the sector funded?

b. How were routine and periodic maintenance costs determined and planned by the Government before the Compact? Were there any changes made during the Compact period? What is the status of these procedures since the end of the Compact? Has the average cost of road maintenance decreased? What is the role of the private sector in the new maintenance regime and to what extent is the private sector able to play the envisioned role?
c. How effective have the road maintenance centers been? To what extent are MPW and the road maintenance centers planning and implementing road maintenance as introduced by the Compact? What is the condition of the roads served by those centers compared to other roads in Liberia?
d. How and to what extent is the Axle Control Law being implemented? How does it affect the road network, including how it is used and its condition?
e. How sustainable is the new road maintenance regime?

3. What is the post-Compact ERR of the Roads Project?

Evaluation Methodology Description

The evaluation of the Roads Project should explore the short-term and intermediate outcomes in the program logic and the role of critical assumptions.

The methodology for the evaluation has not been determined yet, but it will likely include before-after comparisons of key outcomes, with key informant interviews to understand why certain results did or did not occur.

The following key outcomes will be included in those measured through the evaluation:

Table 8. Roads Project Key Outcomes

Result	Indicator
Improved quality and prolonged life of road network	Roughness
Decreased vehicle operating costs	Vehicle operating costs on maintained roads
Decreased travel time	Travel time on maintained roads

The exposure period (the period of time between project completion and final data collection) has not been determined.

Data Sources

Two types of data will be used in the evaluation: primary data collected specifically for the evaluation and secondary data, such as administrative data, which already exists.

Table 9: Energy Project Primary Data Collection

Survey Name	Quantitative or Qualitative	Define Sample	Sample Size	Number of Rounds	Exposure Period (months)	Expected Dates of Primary Data Collection
TBD	TBD	TBD	TBD	TBD	TBD	Baseline: (TBD) Endline: (TBD)

Existing Data

- MPW Administrative Data
- Other secondary data

IMPLEMENTATION AND MANAGEMENT OF M&E

Responsibilities

MCA-L M&E Unit

The MCA-L M&E Unit will be part of the MCA Management Team, and will be composed of an M&E Director who will have the key responsibility of leading and managing all M&E activities and an M&E Manager who will support the M&E Director in performing the M&E activities. Additionally, the M&E Unit will hire short-term support on an as-needed basis. The M&E Unit will carry out, or hire contractors to complete the following and other related activities:

- Direct implementation of all activities laid out in the M&E Plan and ensure all requirements of the M&E Plan are met by MCA-L and reporting entities;
- Ensure that the M&E Plan is modified and updated as improved information becomes available;
- Oversee development and execution of an M&E system (including data-collection, data analysis and reporting systems) integrated with the MCC Management Information System (MIS);
- Elaborate and document M&E Policies, Procedures and Processes in an M&E Manual or other format, to be used by all MCA-L staff and project implementers;
- Communicate the M&E Plan and explain the M&E system to all key stakeholders involved in the Compact, particularly project implementers (including the MCHPP PIU), to ensure a common understanding by all. This could take the form of orientation and capacity building sessions or ongoing coordination efforts, and could focus on issues such as:
    - Explaining indicator definitions, data collection methods, and timing/frequency of data collection and reporting,
    - Data quality controls and verification procedures,
    - Evaluation questions and methodology, etc.;
- Develop and use a documentation system to ensure that key M&E actions, processes and deliverables are systematically recorded. This may be accomplished either as part of the M&E information system or independently. The documentation may encompass the following elements:
    - Indicators and material evidence for reported values,
    - M&E Plan versions,
    - Reporting manuals and templates,
    - Key M&E deliverables including TORs, contracts/agreements, data collection instruments, reports/analyses, etc.;
- Develop (with the MCA-L Communications/Outreach Unit and Environmental and Social Performance (ESP), and Gender and Social Inclusion (GSI)/Social and Gender Assessment (SGA) officers) and implement a systematic results dissemination approach that draws on verified ITT data to ensure participation of all stakeholders, and to facilitate feedback of lessons learned into the Compact implementation process;

- Organize and oversee regular independent data quality reviews on a periodic basis to assess the quality of data reported to MCA-L;
- Participate in project monitoring through site visits, review of project reports and analysis of performance monitoring and other data;
- Update the M&E work plan periodically;
- Manage the M&E budget efficiently;
- Contribute to the design of the evaluation strategy;
- Collaborate with the Procurement Director to prepare and conduct procurement of M&E contracts;
- Ensure that data collection mechanisms are designed to collect data disaggregated by gender, income category, age, and other dimensions, as applicable and practical, and that the findings are presented at the appropriately disaggregated level;
- As the champion of results based management, the M&E Unit will take steps to foster a results oriented culture throughout MCA-L and its implementing partners – this includes making sure that M&E information is used by the MCA management and project teams to improve Compact performance (feedback loop).
- Ensure data collection, storage, and dissemination activities maximize protection of confidentiality of survey respondents' personally identifiable information. This may require:
    - Facilitating local Institutional Review Board clearance for data collection,
    - Using lock and key cabinets for paper files,
    - Using secure file transfer systems,
    - Encrypting data files,
    - Employing password protection on data systems and data encryption,
    - Requiring signed acknowledgements of roles and responsibilities,
    - Requiring relevant stakeholders to sign non-disclosure agreements, and
    - Incorporating data protection standards into the organization's records management procedures, or if necessary, developing a records management procedure that includes such standards.

The M&E Director will be a part of MCA-L's internal Management Unit, composed from MCA leadership, Project Directors and other Directors. The M&E Director will report directly to the MCA-L CEO and maintain close cooperation with Project Directors. Collaboration with the procurement team will be very important to prepare and conduct timely procurement of M&E related contracts as well as ensuring that other implementation contracts contain necessary data reporting provisions.

Seminars, workshops, elaboration and distribution and dissemination of M&E materials shall be conducted in close cooperation with the MCA-L Communications/Outreach Unit.

In order to prepare for post Compact monitoring by the Government, the MCA-L M&E Unit should identify a post Compact point of contact (POC) for MCC early on in the program and work with that POC to build understanding of the MCC program and monitoring process. This POC should be part of the Government entity that will commit to continuing M&E of Compact investments after the Compact End Date. The M&E Unit should also identify the team that will be responsible for reviewing evaluation reports that are delivered post Compact (e.g., project leads), to ensure that the relevant project stakeholders review and provide feedback prior to the publication of final reports.

Monitoring and Evaluation (M&E) Director

The M&E Director shall be responsible for the overall M&E strategy and review of Compact implementation. The Director will also act as an advisor to the CEO and MCA-L Senior Management. The Director shall periodically measure, report and communicate (in collaboration with the Communications/Outreach Unit) the performance and results of the Compact, which will inform implementation decisions and help the Compact achieve its objectives. The Director will also analyze the overall program execution, covering both financial and physical implementation and monitoring key assumptions and risks made in the ERR calculations for the program.

Monitoring and Evaluation Manager

The Monitoring and Evaluation Manager shall assist in the full range of M&E activities, including day to day monitoring and analysis, and providing timely and relevant information to key project stakeholders.

Coordination

MCA- L Data Management System for Monitoring and Evaluation

All MCAs must use the MCC MIS for reporting the QDRP (including the ITT) to MCC. In addition, an MCA may decide to develop its own MIS for M&E to collect data from implementers that can track program progress and monitor each Activity to facilitate timely and accurate reporting. However, any MIS development must be coordinated closely with both the MCC MIS and MCA MIS initiatives, other service providers, and government ministries.

Review and Revision of the M&E Plan

The M&E Plan is designed to evolve over time, adjusting to changes in program activities and improvements in performance monitoring and measurement. The M&E Plan may be modified or amended without amending the Compact. However, any such modification or amendment of the M&E Plan by MCA-L must be approved by MCC in writing and must be otherwise consistent with the requirements of the Compact and any relevant supplemental agreements. With notice to MCA-L, MCC may make non-substantive changes to the M&E Plan as necessary. Some examples of non-substantive changes could include revising units to correspond to MCC's approved list of units of measurement or standardizing indicator names.

Timing and Frequency of Reviews and Modifications

In the fourth quarter of every Compact year, starting in calendar year 2016, or as necessary, the M&E Director of MCA-L and representatives of MCC M&E staff will review how well the M&E Plan has met its objectives (i.e., an "Annual Review"). The Annual Review is intended to ensure that the M&E Plan measures program performance accurately and provides crucial information on the need for changes in project design. More specifically, the review:

- Ensures that the M&E Plan shows whether the logical sequence of intervention outputs and outcomes is occurring;
- Checks whether indicator definitions are precise and timely;
- Checks whether M&E indicators accurately reflect program performance;
- Updates indicator targets, as allowed by the MCC M&E Policy; and

- Adds indicators, as needed, to track hitherto unmeasured results.

The M&E Plan will be revised by MCA-L, in agreement with MCC M&E, when the need for change has been identified in an Annual Review. The revision and approval process will follow the guidelines outlines in the MCC M&E Policy.

The Annual Reviews will adhere to the following schedule; however, the M&E Plan may be reviewed and modified at other times, e.g., as Compact investments are further defined:

Table 10: Schedule for Annual Reviews

Compact Year	Timing of Annual Review
1	July-September 2017
2	July-September 2018
3	July-September 2019
4	July-September 2020

Documenting Modifications

Justification for deleting an indicator, modifying an indicator baseline or target, modifying Beneficiary information or major adjustments to the evaluation plan will be adequately documented in English in Annex III to the revised M&E Plan. MCA-L shall use the standard modification template provided by MCC for documenting these modifications.

Approval and Peer Review of M&E Plan Modifications

All M&E Plan modifications made by the MCA-L will be submitted to MCC for formal approval. The M&E Plan may undergo peer review within MCC before the beginning of the formal approval process. Before requesting MCC approval, changes to the M&E Plan shall be approved by the MCA-L Board of Directors if they are considered substantial, as determined by MCA-L and MCC.

M&E BUDGET

The budget for the implementation of the proposed M&E activities for the five-year term of the Compact is US$ 5.5 million. The line items of this budget will be reviewed and updated as the program develops, on an annual or quarterly basis, when the respective quarterly detailed financial plan is submitted to MCC with the quarterly disbursement request.

The M&E budget does not include the M&E staff in the MCA-L Management Unit whose salaries and field trips are included in the administrative budget of the Compact. The budget should not exceed the total amount over the five years, but the distribution of funding between line items and years may be adjusted according to the results of the M&E Plan's annual or quarterly reviews, if needed.

While the resources for carrying-out surveys are allocated by MCA-L using Compact funds, the evaluation design and analysis is to be funded directly by MCC. MCC will commit to fund the external evaluators. A high-level evaluation budget will be added to this plan once the

evaluations are more defined; that budget will also account for the cost of an initial DQR, which is being funded directly by MCC.

Table 11: Estimated Compact M&E Budget

Item	Total
Monitoring Oversight	$1,050,000
Capacity Building for M&E	$450,000
Surveys	$3,500,000
MCA Process Evaluations	$500,000
Total	**$5,500,000**

OTHER

M&E Work Plan

The MCA-L M&E Directorate shall develop an M&E work plan based on the proposed activities in the M&E budget. This work plan shall be for the whole duration of the Compact five year period. The main activities shall include the development and implementation of an M&E MIS, if applicable, procurement of consultant services, procurement of monitoring equipment, if necessary, and software, stakeholder workshops, data collection and analysis, and procurement and implementation of surveys. The M&E work plan will be developed and available within the second quarter of Compact implementation.

ANNEX I: INDICATOR DOCUMENTATION TABLE

Liberia
Annex I: Indicator Documentation Table

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
	Energy Project									
	Mt. Coffee Rehabilitation Activity									
Increased consumption of electricity	P-23	Outcome	Total electricity sold	The total megawatt hours of electricity sales to all customer types.	Megawatt hours	Tariff class	LEC Quarterly Reports	LEC	Quarterly	The categories for the disaggregation "Tariff class" are: Residential (P-23.1); Commercial (P-23.2); Industrial (P-23.3); Government; and Other.
Increased number of firms, institutions, and households connected to the grid	P-25	Outcome	Percentage of households connected to the national grid	Number of households that have access to a legal connection to electricity service from an electrical utility or service provider / Total number of households in the country.	Percentage		LEC Quarterly Reports and LCPDP	LEC, MCA-L	Annual	
Increased number of firms, institutions, and households connected to the grid	P-25.1	Outcome	Households that have access to a legal connection to electricity service from an electrical utility or service provider	Number of households that have access to a legal connection to electricity service from an electrical utility or service provider.	Number		LEC Quarterly Reports	LEC	Annual	
Increased number of firms, institutions, and households connected to the grid	P-25.2	Outcome	Total number of households in the country	Total number of households in the country.	Number		LCPDP	MCA-L	Annual	In the absence of a means to track annual changes in the number of households, the projections from the LCPDP on page 5-8 (i.e., targets for this indicator) will be treated as actuals in Compact reporting.
Increased number of firms, institutions, and households connected to the grid		Outcome	Percentage of households in LEC service area connected to the national grid	Number of households in LEC service area that have legal connections to electricity service from LEC / Total number of households in LEC service area	Percentage		LEC Quarterly Reports and LCPDP	LEC, MCA-L	Annual	For consistency over time, the "LEC service area" includes all areas expected to be serviced by LEC during the life of the Compact. As a result,

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
										areas that will be serviced by the three corridor (Kle, Kakata, and Roberts International Airport) and West African Power Pool (WAPP) projects have been accounted for in this indicator although they are not currently connected to the grid. If the three corridor and WAPP areas were excluded from this indicator, the baseline value would be 9.9%.
Increased number of firms, institutions, and households connected to the grid		Outcome	Households in LEC service area that have legal connections to electricity service from LEC	Number of households that have legal connections to electricity service from LEC	Number		LEC Quarterly Reports	LEC	Annual	This indicator is the same as P-25.1, but is included in order to calculate "Percentage of households in LEC service area connected to the national grid."
Increased number of firms, institutions, and households connected to the grid		Outcome	Total number of households in LEC service area	Total number of households with access to the national grid	Number		LCPDP	MCA-L	Annual	In the absence of a means to track annual changes in the number of households, the projections from the LCPDP on page 5-8 (i.e., targets for this indicator) will be treated as actuals in Compact reporting.
Increased number of firms, institutions, and		Outcome	Customers connected to the grid	Number of customers that have a legal connection to electricity service from LEC	Number	Customer class	LEC Quarterly Reports	LEC	Quarterly	

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
households connected to grid										
Increased reliability and adequacy of electricity	P-22	Outcome	System Average Interruption Frequency Index (SAIFI)	Sum of customer-interruptions in a quarter / Total number of customers connected to network in the same quarter.	Rate		LEC Quarterly Reports	LEC	Quarterly	Targets will not be established for this indicator because the magnitude of change that can be expected as a result of the Liberia Compact and how that might be affected by other rapid changes within the sector are unclear. However, the indicator is expected to improve (i.e., decline) over time.
Increased reliability and adequacy of electricity	P-21	Outcome	System Average Interruption Duration Index (SAIDI)	Sum of durations, in customer-hours, of all customer interruptions in a quarter / Total number of customers connected to network in the same quarter.	Hours		LEC Quarterly Reports	LEC	Quarterly	Targets will not be established for this indicator because the magnitude of change that can be expected as a result of the Liberia Compact and how that might be affected by other rapid changes within the sector are unclear. However, the indicator is expected to improve (i.e., decline) over time.
Increased reliability and adequacy of electricity		Outcome	Adequacy of supply	Average generation capacity available from all power plants divided by average peak demand in a quarter	Rate		LEC Quarterly Reports	LEC	Quarterly	

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Increased reliability and adequacy of electricity		Outcome	Available power plant generation capacity	Quarterly average of the following: total generation capacity available from all power plants in a month	Megawatts		LEC Quarterly Reports	LEC	Quarterly	Formula: available power plant generation capacity in a month = power plant availability during the month * generation capacity * hours in the month
Increased reliability and adequacy of electricity		Outcome	Peak demand	The quarterly average of daily peak demand for on-grid power in a month	Megawatts		LEC Quarterly Reports	LEC	Quarterly	
Reduced tariffs		Outcome	Electricity tariff	Average tariff per kilowatt-hour	US Dollars	Customer class	Tariff documentation from LEC Board	LEC	Quarterly	LEC does not currently differentiate between customer classes but plans to introduce a new tariff regime eventually. The "average" tariff will be the weighted average of different classes based on consumption amount and number of customers.
Increased share of electricity from hydropower	P-26	Outcome	Share of renewable energy in the country	Total installed generation capacity of on- or off-grid renewable energy, in megawatts / Total installed generation capacity (P-17).	Percentage		LEC Quarterly Reports and TBD	LEC, RREA	Quarterly	
Increased share of electricity from hydropower		Outcome	Percentage of electricity supplied by Mt. Coffee Hydropower Plant	Total electricity, in megawatt hours, produced by MCHPP in a quarter / Total electricity, in megawatt hours, produced or imported in a quarter for supply to the grid	Percentage		LEC Quarterly Reports	LEC	Quarterly	Targets will not be established for this indicator given the number of factors that contribute to it (e.g., changes in demand for electricity over time and changes in the sources of electricity) and how movement in them

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
										might affect reported values.
Increased generation	P-15	Outcome	Total electricity supply	Total electricity, in megawatt hours, produced or imported in a year.	Megawatt hours	Electricity supply source	LEC Quarterly Reports	LEC	Quarterly	The categories for the disaggregation "Electricity supply source" are: Domestic (P-15.1) and Imports (P-15.2).
Increased generation	P-17	Outcome	Installed generation capacity	Total generation capacity, in megawatts, installed plants can generate within the country.	Megawatts	Power generation source	LEC Quarterly reports and RREA reports	LEC, RREA	Quarterly	The categories for the disaggregation "Power generation source" are: On-grid (P-17.1) and Off-grid (P-17.2).
Increased generation		Outcome	Mt. Coffee Hydropower Plant Capacity Factor	Annual electricity generated by MCHPP in megawatts divided by MCHPP maximum capacity to generate power in a year	Percentage		LEC Quarterly Reports	LEC	Annual	Formula: Annual electricity generated (MWh)/installed capacity (MW) * (24 hours/day) * 365 days
There is no specific result in the program logic that this indicator links to, but it is included because it is a common indicator to which the Mt. Coffee Rehabilitation Activity will contribute.	P-16	Outcome	Power plant availability	Unweighted average across all power plants of the following: total number of hours per quarter that a plant is able and available to produce electricity / Total number of hours in the same quarter.	Percentage	Liberia power plants	LEC Quarterly Reports	LEC	Quarterly	Targets will not be established for this indicator because it aggregates values that do not reflect Compact performance directly and for which LEC does not have operational targets. The categories for the disaggregation "Liberia power plants" are: Mt. Coffee, HFO, and Diesel generators.

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Infrastructure constructed or rehabilitated	P-6	Output	Generation capacity added	Generation capacity added, measured in megawatts, resulting from construction of new generating capacity or reconstruction, rehabilitation, or upgrading of existing generating capacity funded with MCC support.	Megawatts	Power generation source	PIU Quarterly Reports	PIU	Quarterly	This indicator is only referring to generation capacity from MCHPP. The disaggregation "Power generation source" is included for tracking purposes only and all generation capacity is considered on-grid (P-6.1).
Infrastructure constructed or rehabilitated	P-9	Output	Transmission substation capacity added	The total added transmission substation capacity, measured in mega volt amperes, that is energized, commissioned and accompanied by a test report and supervising engineer's certification resulting from new construction or refurbishment of existing substations that is due to MCC support.	Megavolt ampere		PIU Quarterly Reports	PIU	Quarterly	This indicator is only referring to transmission substation capacity from MCHPP.
Infrastructure constructed or rehabilitated	P- 7	Output	Kilometers of transmission lines upgraded or built	The sum of linear kilometers of new, reconstructed, rehabilitated, or upgraded transmission lines that have been energized, tested and commissioned with MCC support.	Kilometers		PIU Quarterly Reports	PIU	Quarterly	
Rehabilitate MCHPP and Construct and rehabilitate transmission infrastructure from MCHPP to electricity grid	P-4	Process	Percent disbursed of power infrastructure construction contracts	The total amount of all signed construction contracts for power infrastructure investments disbursed divided by the total current value of all signed contracts.	Percentage		Common Payment System (CPS) Monthly Report	MCC	Quarterly	This indicator represents the percentage of MCC's financial commitment to the Mt. Coffee Hydropower Rehabilitation Activity that has already been fulfilled.
Rehabilitate MCHPP and Construct and rehabilitate	P-3	Process	Value of signed power infrastructure construction contracts	The value of all signed construction contracts for power infrastructure investments using compact funds.	US Dollars		Liberia Compact	MCC	Quarterly	This indicator tracks MCC's contribution to the Mt. Coffee Hydropower.

Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
transmission infrastructure from MCHPP to electricity grid										Rehabilitation Activity rather than the actual value of signed infrastructure contracts, which is tracked in a different indicator. These construction costs also include approximately $2 million to rehabilitate a water intake at the MCHPP site as these costs cannot be separated from the other MCHPP contract costs.
Rehabilitate MCHPP and Construct and rehabilitate transmission infrastructure from MCHPP to electricity grid	P-4.1	Process	Value disbursed of power infrastructure construction contracts	The amount disbursed of all signed construction contracts for power infrastructure investments using compact funds.	US Dollars		CPS Monthly Report	MCC	Quarterly	The value disbursed will be equal to the value signed.
Rehabilitate MCHPP and Construct and rehabilitate transmission infrastructure from MCHPP to electricity grid		Process	Percent disbursed for Mt. Coffee Hydropower Plant rehabilitation	The total amount disbursed for MCHPP rehabilitation divided by the total current amount allocated for MCHPP rehabilitation	Percentage		PIU Quarterly Reports	PIU	Quarterly	This indicator reflects pooled donor funding
Rehabilitate MCHPP and Construct and rehabilitate transmission infrastructure from MCHPP to electricity grid		Process	Total amount allocated for Mt. Coffee Hydropower Plant rehabilitation	The total value of all signed construction contracts and funding allocated for oversight, environmental and social mitigation, initial operations and maintenance, and contingencies for MCHPP rehabilitation	US Dollars		PIU Quarterly Reports	PIU	Quarterly	This indicator reflects pooled donor funding

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Rehabilitate MCHPP and Construct and rehabilitate transmission infrastructure from MCHPP to electricity grid		Process	Value disbursed for Mt. Coffee Hydropower Plant rehabilitation	The amount disbursed for MCHPP rehabilitation, including costs associated with construction, oversight, environmental and social mitigation, initial operations and maintenance, and contingencies	US Dollars		PIU Quarterly Reports	PIU	Quarterly	This indicator reflects pooled donor funding
	Mt. Coffee Support Activity									
	LEC Training Center Activity									
	Energy Sector Reform Activity									
	Roads Project									
Improved quality and prolonged life of road network		Outcome	Percentage of road network in good or fair condition	The number of road segments that are found to be in “good” or “fair” condition / The total number of road segments (found to be in “good,” “fair,” or “poor” condition)	Percentage		TBD Will be determined by end of 2017 and Asset Management Plan	MPW	Annual	
Improved quality and prolonged life of road network		Outcome	Road segments in good or fair condition	The number of road segments that are found to be in “good” or “fair” condition	Number	Road condition	TBD Will be determined by end of 2017	MPW	Annual	The categories for the disaggregation “Road condition” are: Good and Fair. “Good,” “Fair,” and “Poor” will be defined as part of the Asset Management Plan.
Improved quality and prolonged life of road network		Outcome	Road segments in Liberia’s road network	The total number of road segments (found to be in “good,” “fair,” or “poor” condition)	Number		Asset Management Plan	MPW	Annual	

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Roads maintained according to plan		Outcome	Percentage of roads maintained according to the annual maintenance plans developed under the Compact	Number of kilometers receiving periodic maintenance / Number of kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (regardless of available funding)	Percentage		Contractor reports and Asset Management Plan	MPW	Quarterly	
Roads maintained according to plan		Outcome	Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact	Number of kilometers of roads receiving periodic maintenance	Number	Road type	Contractor reports	MPW	Quarterly	The categories for the disaggregation "Road type" are: Primary, Secondary, and Feeder Roads.
Roads maintained according to plan		Outcome	Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact	Number of kilometers that needed periodic maintenance according to the annual maintenance plans developed under the compact (regardless of available funding)	Number	Road type	Asset Management Plan	MPW	Quarterly	
Roads maintained according to plan		Outcome	Expenditures on road maintenance	Actual expenditures on road maintenance by the Government	US Dollars	Type of road maintenance Road type	MPW Annual Report	MPW	Annual	The categories for the disaggregation "Type of road maintenance" are: Emergency, Routine, and Periodic.
Systematic and predictable asset management system implemented		Outcome	Percentage of periodic maintenance projects completed on time	Number of periodic road works projects delivered within 30 days of the contract deadline / Number of periodic road works projects to be completed that year	Percentage	Road type	Certificates of completion and signed contracts	MPW	Annual	
Systematic and predictable asset management system		Outcome	Variance of amount paid for periodic maintenance projects from original contract cost	Average variance across all contracts that conclude within a year of the following: (original contract costs for periodic maintenance projects - amount paid for periodic maintenance projects) / original contract costs for periodic maintenance projects	Ratio	Road type	TBD	MPW	Annual	Positive values indicate that, on average, payments were lower than the original contract value, while negative values indicate that, on average, payments exceeded the original contract value

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
This is not explicitly part of the program logic because MCC resources are not being used to establish the road fund directly.		Process	Road Fund operational	Date the Road Fund is operational; "operational" is defined as the date the first disbursement is made by MPW.	Date		TBD	MPW	Once	This is a Condition Precedent.
This is not explicitly part of the program logic because MCC resources are not being used to establish the road fund directly.		Process	Road Fund passed and signed into law	Date the Road Fund Act is signed into law	Date		Law	MPW	Once	
This is not explicitly part of the program logic, but is necessary for project implementation.		Process	Agreement with Volpe for implementation signed	Date the agreement between Volpe and MCC is signed	Date		Contract	MCC	Once	
National Road Maintenance Activity										
Road maintenance funded		Outcome	Funds provided to the Road Fund	Actual amount deposited in the Road Fund account	US Dollars	Liberia Road Fund source	TBD	TBD	Quarterly	The categories for the disaggregation "Liberia Road Fund source" are: Government appropriations, Grants and loans, and Road user charges.
Public sector trained to carry out road works		Output	Percentage of relevant positions that are occupied by a trained staff member	Number of relevant positions that are occupied by a trained staff member / Number of relevant positions	Percentage		TBD	Volpe, MPW	Annual	
Matching funds for maintenance provided		Output	Matching funds for road maintenance provided by MCC	Matching funds provided to the Government by MCC for road maintenance	US Dollars		CPS Monthly Report	MCA-L	Quarterly	

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Pilot road maintenance centers constructed		Output	Pilot road maintenance centers operational	Pilot road maintenance centers built or rehabilitated, equipped, and staffed	Number		Taking over certificate for building, Contractor report for equipment, Proof key staff positions have been filled	MCA-L	Quarterly	
	Road Sector Reform Activity									
Road maintenance management systems created with assets inventoried		Output	Road Maintenance Management System accepted	Either improved Road Maintenance Management System (RMMS) or new RMMS accepted by MPW	Date		Documentation of acceptance of RMMS	MPW	Once	The RMMS is the decision-support model used to prioritize road maintenance works.
Public sector trained to carry out road works		Output	Percentage of relevant positions that are occupied by a trained staff member	Number of relevant positions that are occupied by a trained staff member / Number of relevant positions	Percentage		TBD	Volpe, MPW	Annual	
This is not explicitly part of the program logic because MCC resources are not being used to develop or pass the law.		Process	Axle Load Control Law passed and signed into law	Date the Axle Load Control Law is signed into law	Date		Law	MoT	Once	This is a Condition Precedent.
Collection of road data		Process	Roadway inventory developed	Database of roadway condition data and other data related to structures on the road network accepted by MPW	Date		Documentation of acceptance of database and data dictionary	MPW	Once	The exact types of data will be determined in consultation with GoL/GIZ who are involved in roadway inventory work currently.
Collection of road data		Process	Traffic counts conducted	Database of traffic volume data by vehicle type for dry and wet seasons on the primary and secondary road network using the count locations from the Transport Master Plan completed	Date		Documentation of acceptance of database and data dictionary	MPW	Once	

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Program Logic Result	CI Code	Indicator Level	Indicator Name	Definition	Unit of Measure	Disaggregation	Primary Data Source	Responsible Party	Frequency of Reporting	Additional Information
Asset Management Plan development		Process	Asset Management Plan developed	Date upon which an Asset Management Plan for prioritizing and allocating road maintenance resources has been accepted by MPW	Date		Documentation of acceptance of Asset Management Plan	MPW	Once	

ANNEX II: TABLE OF INDICATOR BASELINES AND TARGETS

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Energy Project											
Mt. Coffee Rehabilitation Activity											
Outcome	Total electricity sold	Megawatt hours	Level (Cumulative)	36,956 (2015)	TBD	TBD	TBD	TBD	289,396	289,396	Year 5 targets are based on the initial economic analysis described in the Compact; this target will be updated and the others will be established based on updates to the analysis once planned connections and long-term plans for tariff-setting have been clarified. Updated economic analysis expected in Y2.
Outcome	*Total electricity sold (Residential)*	*Megawatt hours*	*Level (Cumulative)*	17,430 *(2015)*							
Outcome	*Total electricity sold (Commercial)*	*Megawatt hours*	*Level (Cumulative)*	8,656 *(2015)*							

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	*Total electricity sold (Industrial)*	*Megawatt hours*	*Level (Cumulative)*	*0 (2015)*							
Outcome	*Total electricity sold (Government)*	*Megawatt hours*	*Level (Cumulative)*	*8,592 (2015)*							
Outcome	*Total electricity sold (Other)*	*Megawatt hours*	*Level (Cumulative)*	*2,255 (2015)*							
Outcome	*Total electricity sold (Unspecified)*	*Megawatt hours*	*Level (Cumulative)*								
Outcome	Percentage of households connected to the national grid	Percentage	Level	3.9% (2015)	TBD	TBD	TBD	TBD	TBD	TBD	Targets may be established based on revised economic analysis of MCHPP. Updated economic analysis expected in Y2.
Outcome	Households that have access to a legal connection to electricity service from an electrical utility	Number	Level	30,475 (2015)	TBD	TBD	TBD	TBD	TBD	TBD	Targets may be established based on revised economic analysis of MCHPP. Updated economic analysis expected in Y2.

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
	or service provider										
Outcome	Total number of households in the country	Number	Level	789,245 (2015)	808,465	827,685	846,904	866,124	885,344	885,344	
Outcome	Percentage of households in grid service area connected to the national grid	Percentage	Level	8.4% (2015)	TBD	TBD	TBD	TBD	TBD	TBD	Targets may be established based on revised economic analysis of MCHPP. Updated economic analysis expected in Y2.
Outcome	Households in LEC service area that have legal connections to electricity service from LEC	Number	Level	30,475 (2015)	TBD	TBD	TBD	TBD	TBD	TBD	Targets may be established based on revised economic analysis of MCHPP. Updated economic analysis expected in Y2.
Outcome	Total number of households in grid service area	Number	Level	362,489 (2015)	371,253	380,017	388,780	397,544	406,308	406,308	
Outcome	Customers connected to the grid	Number	Level	34,231 (2015)	TBD	TBD	TBD	TBD	TBD	TBD	Targets will be established based on revised economic analysis of MCHPP. Updated economic analysis expected in Y2.

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Annex II: Table of Indicator Baselines and Targets

Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Compact Target	Timeline for resolving TBDs
					Jan-16 to Dec-16	Jan-17 to Dec-17	Jan-18 to Dec-18	Jan-19 to Dec-19	Jan-20 to Jan-21		
Outcome	*Customers connected to the grid (Residential)*	*Number*	*Level*	*30,475 (2015)*							
Outcome	*Customers connected to the grid (Commercial)*	*Number*	*Level*	*3,534 (2015)*							
Outcome	*Customers connected to the grid (Industrial)*	*Number*	*Level*	*0 (2015)*							
Outcome	*Customers connected to the grid (Government)*	*Number*	*Level*	*158 (2015)*							
Outcome	*Customers connected to the grid (Other)*	*Number*	*Level*	*64 (2015)*							
Outcome	*Customers connected to the grid (Unspecified)*	*Number*	*Level*								
Outcome	System Average Interruption Frequency Index (SAIFI)	Rate	Level	25.1 (2015)							Targets won't be established per Additional Information in Annex I

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	System Average Interruption Duration Index (SAIDI)	Hours	Level	109.5 (2015)							Targets won't be established per Additional Information in Annex I
Outcome	Adequacy of supply	Rate	Level (Average)	0.96 (2015)			1.2	1.2	1.2	1.2	
Outcome	Available power plant generation capacity	Megawatts	Level (Average)	10,194 (2015)							
Outcome	Peak demand	Megawatts	Level (Average)	10,657 (2015)							
Outcome	Electricity tariff	US Dollars	Level	0.52 (2016)	TBD	TBD	TBD	TBD	TBD	TBD	Targets are TBD pending a Cost of Service study to occur in Y2 and a determination of whether to establish a target or consider as "N/A" since it is unclear that a single tariff will be "correct" though it might be possible to identify a single point if a suitable range is narrow enough. Determination expected in Y2 or Y3.

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Compact Target	Timeline for resolving TBDs
					Jan-16 to Dec-16	Jan-17 to Dec-17	Jan-18 to Dec-18	Jan-19 to Dec-19	Jan-20 to Jan-21		
Outcome	*Electricity tariff (Residential)*	*US Dollars*	*Level*	*0.52 (2016)*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	
Outcome	*Electricity tariff (Commercial)*	*US Dollars*	*Level*	*0.52 (2016)*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	
Outcome	*Electricity tariff (Industrial)*	*US Dollars*	*Level*		*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	
Outcome	*Electricity tariff (Government)*	*US Dollars*	*Level*	*0.52 (2016)*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	
Outcome	*Electricity tariff (Other)*	*US Dollars*	*Level*	*0.52 (2016)*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	*TBD*	
Outcome	*Electricity tariff (Unspecified)*	*US Dollars*	*Level*								
Outcome	Share of renewable energy in the country	Percentage	Level	0.3% (2015)	28%	61%	57%	57%	57%	57%	
Outcome	Percentage of electricity supplied by Mt. Coffee Hydropower Plant	Percentage	Level	0% (2015)							Targets will not be established per Additional Information in Annex I.
Outcome	Total electricity supply	Megawatt hours	Level (Cumulative)	48,975 (2015)	TBD	TBD	TBD	TBD	TBD	TBD	Total electricity supply is related to Total electricity sold; the

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
											former simply accounts for electricity losses (which averaged 29.2% for 2015). Targets will be established based on revised economic analysis of MCHPP. Updated economic analysis expected in Y2.
Outcome	*Total electricity supply (Domestic)*	*Megawatt hours*	*Level (Cumulative)*	*48,975 (2015)*							
Outcome	*Total electricity supply (Imports)*	*Megawatt hours*	*Level (Cumulative)*	*0 (2015)*							
Outcome	*Total electricity supply (Unspecified)*	*Megawatt hours*	*Level (Cumulative)*								
Outcome	Installed generation capacity	Megawatts	Level	22.06 (2015)	79.06	145.06	155.06	155.06	155.06	155.06	
Outcome	*Installed generation capacity (On-grid)*	*Megawatts*	*Level*	*22 (2015)*	*79*	*145*	*155*	*155*	*155*	*155*	

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Compact Target	Timeline for resolving TBDs
					Jan-16 to Dec-16	Jan-17 to Dec-17	Jan-18 to Dec-18	Jan-19 to Dec-19	Jan-20 to Jan-21		
Outcome	*Installed generation capacity (Off-grid)*	*Megawatts*	*Level*	*0.06 (2015)*	*0.06*	*0.06*	*0.06*	*0.06*	*0.06*	*0.06*	
Outcome	*Installed generation capacity (Unspecified)*	*Megawatts*	*Level*								
Outcome	Mt. Coffee Hydropower Plant Capacity Factor	Percentage	Level	0% (2015)		55.6%	55.6%	55.6%	55.6%	55.6%	
Outcome	Power plant availability	Percentage	Level	63% (2015)							Targets will not be established per Additional Information in Annex I.
Outcome	*Power plant availability (Mt. Coffee)*	*Percentage*	*Level*	*0% (2015)*			97%	97%	97%	97%	
Outcome	*Power plant availability (HFO)*	*Percentage*	*Level*	*0% (2015)*							
Outcome	*Power plant availability (Diesel generators)*	*Percentage*	*Level*	*63% (2015)*							

Liberia
Annex II: Table of Indicator Baselines and Targets

Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Compact Target	Timeline for resolving TBDs
					Jan-16 to Dec-16	Jan-17 to Dec-17	Jan-18 to Dec-18	Jan-19 to Dec-19	Jan-20 to Jan-21		
Outcome	*Power plant availability (Unspecified)*	*Percentage*	*Level*								
Output	Generation capacity added	Megawatts	Cumulative	0 (2016)	22	88	88	88	88	88	
Output	*Generation capacity added (On-grid)*	*Megawatts*	*Cumulative*	*0 (2016)*	*22*	*88*	*88*	*88*	*88*	*88*	
Output	Transmission substation capacity added	Megavolt Ampere	Cumulative	0 (2016)	200	200	200	200	200	200	
Output	Kilometers of transmission lines upgraded or built	Kilometers	Cumulative	0 (2016)	24	51	51	51	51	51	
Process	Percent disbursed of power infrastructure construction contracts	Percentage	Level	0% (2016)	54%	100%	100%	100%	100%	100%	
Process	Value of signed power infrastructure construction contracts	US Dollars	Cumulative	0 (2016)	$146,800,000	$146,800,000	$146,800,000	$146,800,000	$146,800,000	$146,800,000	
Process	Value disbursed of power	US Dollars	Cumulative	0 (2016)	$80,000,000	$146,800,000	$146,800,000	$146,800,000	$146,800,000	$146,800,000	

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
	infrastructure construction contracts										
Process	Percent disbursed for Mt. Coffee Hydropower Plant rehabilitation	Percentage	Level	39% (2016)	86%	100%	100%	100%	100%	100%	
Process	Total amount allocated for Mt. Coffee Hydropower Plant rehabilitation	US Dollars	Cumulative	$356,762,257 (2016)	$356,762,257	$356,762,257	$356,762,257	$356,762,257	$356,762,257	$356,762,257	
Process	Value disbursed for Mt. Coffee Hydropower Plant rehabilitation	US Dollars	Cumulative	$137,924,885	$308,371,500	$356,762,257	$356,762,257	$356,762,257	$356,762,257	$356,762,257	
Mt. Coffee Support Activity											
LEC Training Center Activity											
Energy Sector Reform Activity											
Roads Project											
Outcome	Percentage of road network in good or fair condition	Percentage	Level	TBD (2017)			TBD	TBD	TBD	TBD	Baseline is pending Volpe's analysis of road network, expected in Y2.

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
											Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.
Outcome	Road segments in good or fair condition	Number	Level	TBD (2017)			TBD	TBD	TBD	TBD	Baseline is pending Volpe's analysis of road network, expected in Y2. Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.
Outcome	*Road segments in good or fair condition (Good)*	*Number*	*Level*	*TBD (2017)*			*TBD*	*TBD*	*TBD*	*TBD*	*Baseline is pending Volpe's analysis of road network, expected in Y2.* *Targets will be established after approval of the Asset Management Plan and will also take into*

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
											account the available budget.
Outcome	*Road segments in good or fair condition (Fair)*	*Number*	*Level*	*TBD (2017)*			*TBD*	*TBD*	*TBD*	*TBD*	*Baseline is pending Volpe's analysis of road network, expected in Y2.* *Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.*
Outcome	*Road segments in good or fair condition (Unspecified)*	*Number*	*Level*	*TBD (2017)*			*TBD*	*TBD*	*TBD*	*TBD*	*Baseline is pending Volpe's analysis of road network, expected in Y2.* *Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.*
Outcome	Road segments in Liberia's road network	Number	Level	TBD (2017)			TBD	TBD	TBD	TBD	Baseline is pending Volpe's analysis of road network, expected in Y2.

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
											Targets will be established after approval of the Asset Management Plan and will also take into account the available budget.
Outcome	Percentage of roads maintained according to the annual maintenance plan developed under the compact	Percentage	Level				TBD	TBD	TBD	TBD	Targets to be established after the asset management plan is developed; expected in Y3.
Outcome	Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact	Number	Level				TBD	TBD	TBD	TBD	Targets to be established after the asset management plan is developed; expected in Y3.

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	*Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact (Primary)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*
Outcome	*Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact (Secondary)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	*Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact (Feeder roads)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*
Outcome	*Kilometers receiving periodic maintenance according to the annual maintenance plans developed under the Compact (Unspecified)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact	Number	Level				TBD	TBD	TBD	TBD	Targets to be established after the asset management plan is developed; expected in Y3.
Outcome	*Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (Primary)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*
Outcome	*Kilometers that need periodic maintenance according to the annual maintenance plans developed under the*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
	Compact (Secondary)										
Outcome	*Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (Feeder roads)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*
Outcome	*Kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (Unspecified)*	*Number*	*Level*				*TBD*	*TBD*	*TBD*	*TBD*	*Targets to be established after the asset management plan is developed; expected in Y3.*

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	Expenditures on road maintenance	US Dollars	Level	TBD (2015)			TBD	TBD	TBD	TBD	Targets will be set after the Road Fund is in place and projections are made based on expected revenue for the Road Fund. Funds will begin to be collected in Y3.
Outcome	*Expenditures on road maintenance (Primary)*	*US Dollars*	*Level*								
Outcome	*Expenditures on road maintenance (Secondary)*	*US Dollars*	*Level*								
Outcome	*Expenditures on road maintenance (Feeder roads)*	*US Dollars*	*Level*								
Outcome	*Expenditures on road maintenance (Unspecified)*	*US Dollars*	*Level*								

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	*Expenditures on road maintenance (Emergency)*	*US Dollars*	*Level*								
Outcome	*Expenditures on road maintenance (Routine)*	*US Dollars*	*Level*								
Outcome	*Expenditures on road maintenance (Periodic)*	*US Dollars*	*Level*								
Outcome	Percentage of periodic maintenance projects completed on time	Percentage	Level	0% (2015)			60%	80%	100%	100%	
Outcome	*Percentage of periodic maintenance projects completed on time (Primary)*	*Percentage*	*Level*								

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	*Percentage of periodic maintenance projects completed on time (Secondary)*	*Percentage*	*Level*								
Outcome	*Percentage of periodic maintenance projects completed on time (Feeder roads)*	*Percentage*	*Level*								
Outcome	*Percentage of periodic maintenance projects completed on time (Unspecified)*	*Percentage*	*Level*								
Outcome	Variance of amount paid for periodic maintenance projects from original contract cost	Ratio	Level	TBD (2015)	TBD	TBD	TBD	TBD	0	0	Baselines and targets expected in Y2. Volpe will develop baseline of existing conditions during implementation; this information is

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
											needed before targets can be established.
Outcome	*Variance of amount paid for periodic maintenance projects from original contract cost (Primary)*	*Ratio*	*Level*								
Outcome	*Variance of amount paid for periodic maintenance projects from original contract cost (Secondary)*	*Ratio*	*Level*								
Outcome	*Variance of amount paid for periodic maintenance projects from original contract cost (Feeder roads)*	*Ratio*	*Level*								
Outcome	*Variance of amount paid for*	*Ratio*	*Level*								

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
	periodic maintenance projects from original contract cost (Unspecified)										
Process	Road Fund operational	Date	Date			01-Apr-17				01-Apr-17	
Process	Road Fund passed and signed into law	Date	Date		01-Oct-16					01-Oct-16	
Process	Agreement with Volpe for implementation signed	Date	Date	N/A	15-Jul-16					15-Jul-16	
National Road Maintenance Activity											
Outcome	Funds provided to the Road Fund	US Dollars	Cumulative	0 (2016)			TBD	TBD	TBD	TBD	Targets to be established after the road fund legislation has been passed. Funds will begin to be collected in Y3.

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
Outcome	*Funds provided to the Road Fund (Government appropriations)*	*US Dollars*	*Cumulative*	0 (2016)							
Outcome	*Funds provided to the Road Fund (Grants and loans)*	*US Dollars*	*Cumulative*	0 (2016)							
Outcome	*Funds provided to the Road Fund (Road user charges)*	*US Dollars*	*Cumulative*	0 (2016)							
Outcome	*Funds provided to the Road Fund (Unspecified)*	*US Dollars*	*Cumulative*								
Output	Percentage of relevant positions that are occupied by a trained staff member	Percentage	Level	0% (2016)			100%	100%	100%	100%	
Output	Matching funds for road maintenance	US Dollars	Cumulative	0 (2016)			TBD	TBD	$8,000,000	$8,000,000	Interim targets are pending further information about the

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1 Jan-16 to Dec-16	Year 2 Jan-17 to Dec-17	Year 3 Jan-18 to Dec-18	Year 4 Jan-19 to Dec-19	Year 5 Jan-20 to Jan-21	End of Compact Target	Timeline for resolving TBDs
	provided by MCC										Activity. Funds will begin to be collected in Y3.
Output	Pilot road maintenance centers operational	Number	Cumulative	0 (2016)	0			2	2	2	
Road Sector Reform Activity											
Output	Road Maintenance Management System accepted	Date	Date				31-Mar-18			31-Mar-18	
Output	Percentage of relevant positions that are occupied by a trained staff member	Percentage	Level				100%	100%	100%	100%	
Process	Axle Load Control Law passed and signed into law	Date	Date		01-Oct-16					01-Oct-16	
Process	Roadway inventory developed	Date	Date				31-Dec-17			31-Dec-17	

Liberia Annex II: Table of Indicator Baselines and Targets											
Indicator Level	Indicator Name	Unit of Measure	Indicator Classification	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	End of Compact Target	Timeline for resolving TBDs
					Jan-16 to Dec-16	Jan-17 to Dec-17	Jan-18 to Dec-18	Jan-19 to Dec-19	Jan-20 to Jan-21		
Process	Traffic counts conducted	Date	Date				30-Jun-18			30-Jun-18	
Process	Asset Management Plan developed	Date	Date				30-Jun-18			30-Jun-18	

ANNEX III: M&E PLAN MODIFICATIONS

Indicator Changes:

Customers added		
Project:	Energy Project	
Activity:	Mt. Coffee Rehabilitation Activity	
Sub-Activity:	N/A	
July 2016	**Change Description:**	Indicator removed
	Justification:	Indicator was redundant
	Justification Description:	This indicator intended to track the number of new customers added to the electricity grid during the Compact. However, another indicator (*Customers connected to the grid*) tracks the total number of customers connected to the electricity grid before, during, and after the Compact making the removed indicator redundant.

Roughness		
Project:	Roads Project	
Activity:	N/A	
Sub-Activity:	N/A	
July 2016	**Change Description:**	Indicator removed
	Justification:	Not a monitoring indicator
	Justification Description:	This indicator is still expected to be key in assessing the result of "Improved quality and prolonged life of road network." However, it will be measured through an independent evaluation, rather than through routine monitoring.

Percentage of roads maintained according to the maintenance plan		
Project:	Roads Project	
Activity:	N/A	
Sub-Activity:	N/A	
July 2016	**Change Description:**	1. Indicator name changed 2. Indicator definition changed
	Justification:	1. To add clarity 2. To add clarity
	Justification Description:	1. Indicator name changed to "*Percentage of roads maintained according to the annual maintenance plans developed under the Compact*" to clarify annual nature of plans 2. Indicator definition changed to "Number of kilometers receiving periodic maintenance / Number of kilometers that need periodic maintenance according to the annual maintenance plans developed under the Compact (regardless of available funding)" to clarify that only periodic maintenance will be tracked

Expenditures on road maintenance		
Project:	Roads Project	
Activity:	N/A	
Sub-Activity:	N/A	
July 2016	**Change Description:**	Indicator definition changed
	Justification:	To add clarity
	Justification Description:	The indicator definition now specifies that expenditures will be made "by the Government."

Road fund established		
Project:	Roads Project	
Activity:	N/A	
Sub-Activity:	N/A	
July 2016	**Change Description:**	1. Indicator name changed 2. Indicator definition changed
	Justification:	1. To add clarity 2. To add clarity
	Justification Description:	1. Indicator name changed to "*Road Fund passed and signed into law*" to clarify what is being tracked 2. Indicator definition changed to "Date the Road Fund Act is signed into law" to clarify when the indicator will be tracked

Fuel levy collected and provided to the Road Fund		
Project:	Roads Project	
Activity:	National Road Maintenance Activity	
Sub-Activity:	N/A	
July 2016	**Change Description:**	Indicator replaced
	Justification:	To add clarity and provide more useful information
	Justification Description:	The new indicator (*Funds provided to the Road Fund,* defined as "Actual amount deposited in the Road Fund account") will report on all funds added to the Road Fund rather than just those coming from a fuel levy. It will also be reported in US Dollars rather than as a percentage of the amount targeted for collection; this can then be compared to the indicator *Matching funds for road maintenance provided by MCC*.

Staff trained		
Project:	Roads Project	
Activity:	National Road Maintenance Activity, Road Sector Reform Activity	
Sub-Activity:	N/A	
July 2016	**Change Description:**	Indicator replaced
	Justification:	To add clarity and provide more useful information
	Justification Description:	The new indicator (*Percentage of relevant positions that are occupied by a trained staff member,* defined as "Number of relevant positions that are occupied by a trained staff member / Number of relevant positions") will provide critical information about whether the people trained under the Compact are (and continue to be) in the positions where key skills are needed.

Pilot road maintenance centers developed		
Project:	Roads Project	
Activity:	National Road Maintenance Activity	
Sub-Activity:	N/A	
July 2016	**Change Description:**	Indicator name changed
	Justification:	To add clarity
	Justification Description:	Indicator name changed to "*Pilot road maintenance centers operational*" to be clearer about what the indicator intends to measure.

Axle control law passed		
Project:	Roads Project	
Activity:	Road Sector Reform Activity	
Sub-Activity:	N/A	
July 2016	**Change Description:**	3. Indicator name changed 4. Indicator definition changed
	Justification:	3. To add clarity 4. To add clarity
	Justification Description:	1. Indicator name changed to "*Axle Load Control Law passed and signed into law*" to clarify what is being tracked 2. Indicator definition changed to "Date the Axle Load Control Law is signed into law" to clarify when the indicator will be tracked