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DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

**HAITI**

**SUPPLEMENTARY FINANCING FOR THE PELIGRE HYDROELECTRIC PLANT  
(HA-L1038)**

**GRANT PROPOSAL**

This document was prepared by the project team consisting of: Natacha Marzolf, Team Leader (INE/ENE), Lumas Kendrick, Alternate Team Leader (ENE/CHA); Carlos Trujillo (INE/ENE); Alejandro Melandri (INE/ENE); Pilar Rodriguez (INE/ENE); Paola Mendez (INE/ENE); Dimitri Djivanides (INE/ENE); Emilie Chapuis (PDP/CHA); Nelly Wheelock (PDP/CHA); Patricio Crausaz (PDP/CHA); Denis Corrales (VPS/ESG); Marion Le Pommelec (RND/CHA) and Javier Jimenez (LEG/SGO); under the supervision of Leandro Alves, Chief of the Energy Division (INE/ENE) and Eduardo Almeida, Representative in Haiti (CCB/CHA).

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REQUIRED ELECTRONIC LINKS	
1. DEM Questionnaire	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36514309">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36514309</a>
2. Annual Work Plan (AWP)	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=1773108">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=1773108</a>
3. Monitoring and Evaluation Arrangements	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36514300">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36514300</a>
4. Complete procurement plan	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36080892">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36080892</a>
5. Environmental and Social Management Report (ESMR)	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36134091">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36134091</a>
6. Risk Assessment Matrix	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36514253">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36514253</a>

OPTIONAL ELECTRONIC LINKS	
1. Cost Benefit Analysis Update for the Peligre Hydropower Plant Rehabilitation Program	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36491124">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36491124</a>
2. Financial Analysis Update for the Peligre Hydropower Plant Rehabilitation Program	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36491123">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36491123</a>
3. Request from the GoH for Supplementary Financing of the Peligre Rehabilitation Program	<a href="http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36091998">http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36091998</a>
4. Project Monitoring Report	<a href="http://idbdocs.iadb.org/wsdocs/getdocument.aspx?DOCNUM=36504508">http://idbdocs.iadb.org/wsdocs/getdocument.aspx?DOCNUM=36504508</a>

## ABBREVIATIONS

AWP	Annual Work Plan
CMEP	Conseil de Modernization des Entreprises Publiques (Public Enterprise Modernization Board)
EA	Executing Agency
EDH	Électricité d'Haïti
EPC	Engineering, Procurement and Construction
ERP	Enterprise Resource Planning
ESA	Environmental and Social Assessment
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Management Report
ESR	Environmental and Social Review
FSO	Fund for Special Operations
GCI-IX	Ninth General Increase in Resources for the IDB
GEF	Global Environment Facility
GoH	Government of Haiti
GPRSP	Growth and Poverty Reduction Strategy Paper
GWh	Gigawatt-hour
ICAS	Institutional Capacity Assessment System
IDB	Inter-American Development Bank
IHSI	Statistics and Data Processing Institute of Haiti
IPP	Independent Power Producers
IRR	Internal Rate of Return
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
kV	Kilovolts
kWh	Kilowatt hour
MEF	Ministry of Economy and Finance
MTPTEC	Ministry of Public Works, Transport, Energy and Communication
MW	Megawatt
NPV	Net Present Value
OFID	OPEC Fund for International Development
OPEC	Organization of Petroleum Exporting Countries
PCU	Program Coordination Unit
PHP	Péligre Hydroelectric Plant
PNDA	Post Needs Disaster Assessment
PPA	Power Purchase Agreements
PPMR	Project Performance Monitoring Report
PTU	Program Technical Unit
ROT	Repair, Operate and Transfer
S-Financing	Supplementary Financing
SECCI	Sustainable Energy and Climate Change Initiative
TC	Technical Cooperation
USAID	United States Agency for International Development
USDOE	United States Department of Energy

**PROJECT SUMMARY**  
**HAITI**  
**SUPPLEMENTARY FINANCING FOR THE PELIGRE HYDROELECTRIC PLANT (PHP)**  
**(HA-L1038)**

Financial Terms and Conditions			
<b>Beneficiary:</b> Republic of Haiti			
<b>Executing Agency:</b> Ministry of Public Works, Transport, Energy and Communication (MTPTEC), with the participations of <i>Électricité d'Haiti</i> (EDH).			
Source (US\$)	Original Financing (HA-L1032)	Supplementary Financing (HA-L1038)	Total IDB Grant Facility
<b>IDB Grant Facility</b>	<b>US\$12,500,000</b>	<b>US\$20,000,000</b>	<b>US\$32,500,000</b>
<b>Local</b>	-	-	-
<b>Total</b>	<b>US\$12,500,000</b>	<b>US\$20,000,000</b>	<b>US\$32,500,000</b>
<b>IDB Disbursement period</b>	<b>4 years</b>		
Project at a Glance			
<b>Project Objective/Description:</b> The Supplementary Financing (S-Financing) will cover the funding gap for the rehabilitation of the Peligre Hydro Plant (PHP) envisaged under the original operation HA-L1032 (Grant 2073/GR-HA) with the objective to help restore and preserve Haiti's capacity to generate electrical power with renewable energy sources in order to satisfy the needs of the population (parag.1.20). No new or additional activities will be financed with the S-Financing but rather the incremental cost for the PHP rehabilitation. Such rehabilitation is designed to: (i) restore and maintain its generating capacity and (ii) improve the efficiency of the plant's generating units (parag.1.21 and parag.1.22). The main beneficiaries will be the population of Haiti, principally located in <i>Port-au-Prince</i> .			
<b>Special contractual clauses:</b> The following shall be presented to the Bank (parag.2.5): (i) as <u>a condition for execution and prior to rehabilitation works on the turbines</u> , a communication plan that is being implemented to ensure that all affected parties are informed of the schedule of works and can take necessary corresponding actions; (ii) as <u>a condition for execution and prior to resuming normal operation of the dam</u> , a procedure manual for multipurpose water management at the Peligre dam taking into account the three uses of the water at Peligre (electricity generation, irrigation, floods management); and (iii) as <u>conditions for execution</u> : (a) quarterly meetings of the Inter-Ministerial Commission with minutes issued of such meetings that will constitute a contractual condition for satisfactory execution for the Bank; and (b) the Executing Agency will ensure that the Program will be designed, built and operated in accordance with the final design, plans and environmental and social management measures agreed upon with the Bank in accordance with the framework established in the updated ESMR. ESG will hold annual socio-environmental supervision.			
<b>Exceptions to Bank policies:</b> None			
<b>Project consistent with Country Strategy:</b>		Yes [ X ]	No [   ]
<b>Project qualifies for:</b> SEQ[   ] PTI [   ] Sector [   ] Geographic[   ] Headcount [   ]			
<b>Procurement:</b> Procurement will be conducted in accordance with Bank policies and procedures.			

## I. DESCRIPTION AND RESULTS MONITORING

### A. Background, proposal and rationale

- 1.1 **Current conditions in the sector.** The January 12<sup>th</sup> 2010 earthquake that struck Haiti and affected mainly the metropolitan area of *Port-au-Prince*, and *Petite* and *Grand Goave*, caused damages and losses of approximately US\$7.8 billion. The Post Disaster Needs Assessment<sup>1</sup> (PNDNA) energy group estimated investments of approximately US\$100 million in the short-term (February 2010 to September 2011) and US\$160 million in the medium-term. The direct damages to the power system were estimated at approximately US\$20 million. The earthquake also provoked the displacement of thousands of refugees in *Port-au-Prince*. In the past months, electricity service has been restored but will continue to be of poor quality (similarly to prior to the earthquake) until substantial and needed investments in the rehabilitation and strengthening of the power system are implemented and the financial and operating performance of *Electricité d'Haïti* (EDH) is improved.
- 1.2 **Energy sector organization.** EDH, the state-owned monopoly for the provision of public electricity service in Haiti, was established in 1971 together with the commissioning of the first units of the 54-Megawatt (MW) *Péligre* Hydroelectric Plant (PHP), which became the major source of electricity supply to the metropolitan area of *Port-au-Prince* until the early 1980's. Beginning in the 1980's, EDH relied on diesel generation plants to meet demand growth. In the mid 1990's, EDH began to contract energy supply from Independent Power Producers (IPP), under Power Purchase Agreements (PPAs) and Repair, Operate and Transfer (ROT) contracts using diesel engines. The transmission grid is served by an interconnected 69-Kilovolts (kV) transmission system and a 115-kV line from the *Péligre* station. There are four small isolated power systems that serve small cities and towns in other regions with 23-kV distribution lines (*Cap Haitien*, *Gonaives/Saint Marc*, *Les Cayes* and *Jacmel*). The total installed generation capacity in 2011 was estimated at approximately 300-MW, of which about 80% are diesel plants. In addition to the PHP, 6 small hydroelectric plants, with a total installed capacity of 7-MW, serve the isolated systems.
- 1.3 **Reliability and quality of electricity service.** The 300-MW installed generation capacity is not sufficient to meet a peak demand estimated at 218-MW since 45% of this capacity is not available on a firm basis. A low availability of generation capacity is related to inadequate maintenance and lack of spare parts for EDH's diesel generators as well as low availability of generation capacity at the PHP (due to sedimentation problems in the reservoir and electromechanical equipment which is near the end of its useful life). In combination with a low reliability of the transmission and distribution grids and lack of needed investments to strengthen the existing grids, electricity shortage in Haiti is chronic (average of 11 hours of electricity service per day in the *Port-au-Prince* Metropolitan Area).

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<sup>1</sup> PDNA, Assessment of damage, losses, general and sectorial needs. Annex to the Action Plan for the National Recovery and Development of Haiti. March 2010

Electricity coverage is very low (92% in the *Port-au-Prince* Metropolitan Area; 23% in other urban areas; 11% in rural areas and 32% at the national level) and reliable figures are currently unavailable following the 2010 earthquake.

- 1.4 **Tariff structure.** From December 2005 to July 2009, the average tariff was approximately US\$17/kilowatt hour (kWh), which was insufficient to cover supply costs, commercial losses and revenue collection. In August 2009, EDH's tariffs almost doubled for all consumers, except for residential consumers with monthly consumption below 200-kWh. In mid-2010, the average tariff was approximately US\$32.5/kWh and for commercial and industrial consumers approximately US\$35/kWh.
- 1.5 **Country's sector strategy.** In the PDNA, the Government of Haiti (GoH) established that reconstruction of the electricity sector should be part of an overall development plan to: (i) make the sector efficient and financially viable; (ii) operate as an open, transparent market; (iii) promote renewable energy; and (iv) attract sufficient capital to meet the rising demand while providing affordable, high-quality electricity service. The GoH has also decided to implement an integrated and coordinated program of reform and transformation of Haiti's energy sector.<sup>2</sup> In addition, it has also signaled the priority of strengthening the electricity sector with activities that will improve current conditions of energy supply and provide the basis for development in the medium-term, as part of the programming agreed with Haiti. The GoH is engaged, together with the international donor community, in improving Haiti's power generation, transmission and distribution network.
- 1.6 **Coordination with IDB Country Strategy for Haiti 2007-2011 and Programming Objectives.** The Inter-American Development Bank (IDB or the Bank) has been deploying a strategy of comprehensive support to the energy sector, which since 2006 has included the approval and execution of the following operations: (i) *Peligre* Hydroelectric Plant Rehabilitation Program (HA-L1032) approved in 2008 for an amount of US\$12.5 million; (ii) Program for the Rehabilitation of the Electricity Distribution System in *Port-au-Prince* (HA-L1014) approved in 2007 for an amount of US\$18.1 million and 23% disbursed and (iii) Supplemental Financing for the Program for Rehabilitation of the Electricity Distribution System in *Port-au-Prince* (HA-L1035) approved in 2010 for an amount of US\$14 million.
- 1.7 The proposed Supplementary Financing (S-Financing) is consistent with the IDB's updated country strategy with Haiti (document GN-2465-2) which identifies one of the pillars of the IDB's activities as improving conditions for supply of goods and services and basic infrastructure, including the electricity sector. The S-Financing (HA-L1038) supports the first operation (HA-L1032 or 2073/GR-HA) and the GoH's priority of strengthening the electricity sector, with

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<sup>2</sup>

A Memorandum of Understanding (MOU) was signed by IDB, the GoH and the Government of the United States in February 2011 to facilitate collaboration to modernize the energy sector in Haiti.



activities that will improve current conditions of energy supply and provide the basis for development in the medium-term as part of the programming agreed with Haiti. The S-Financing is also included in the 2011 Country Programming Document (CPD) for Haiti. Lastly, the S-Financing is also in line with the IDB's institutional priorities as outlined in the Report on the Ninth General Increase in Resources for the IDB (GCI-IX) (AB-2764) as it contributes to the goal of "supporting development in small and vulnerable countries" (such a Haiti) and to that of "assisting borrowers in dealing with climate change, sustainable energy (including renewable) and environmental sustainability".

- 1.8 IDB presence in the sector also includes the development of a White Paper to discuss policy options for the sector, support infrastructure reconstruction efforts post-earthquake and engage in key initiatives in order to increase supply and reliability of the electricity system. Additional technical assistance programs led by the Bank include, amongst others, installation of solar power generators, autonomous solar application energy systems and refrigerators for vaccines conservation for emergency centers and key establishments (US\$1 million funded through the Sustainable Energy and Climate Change Initiative (SECCI) (HA-1019 GRT/MC12067-HA with currently 24% disbursed) and US\$3 million funded through the resources from the Global Environment Facility (GEF) (HA-X1018 GRT/FM-12093-HA and which is 100% disbursed).
- 1.9 IDB, together with the international donor community, particularly the World Bank, the United States Agency for International Development (USAID), the United States Department of Energy (USDOE) and the Japan International Cooperation Agency (JICA) and the GoH have established short and medium-term strategy and long-term vision for power generation, transmission and distribution, focusing in particular on restoring the electricity sector's sustainability.
- 1.10 **Consistency with IDB policies.** As set forth in the first Programmatic Policy-Based Grant Program "Institutional Transformation and Modernization Program of the Energy Sector –I" (HA-L1065) approved by the IDB Board of Executive Directors in July 2011, although Haiti's energy sector does not comply with all the conditions in OP-708, Haiti has embarked on a rigorous sector reform process to comply with the objectives and basic conditions of this policy and with the support of the IDB, the World Bank and the United States Government.
- 1.11 **Progress on execution of grant 2073/GR-HA.** The Peligre dam, built to control the waters upstream of the *Artibonite* Valley, was completed in 1956. By 1971, the installation of three 18-MW generating units was complete and the PHP began to produce electricity. The PHP performs the following functions: (i) it regulates and controls the flooding in the *Artibonite* Valley, and (ii) serves as Haiti's only large-scale renewable energy plant, providing, when fully operational, close to 50% of Haiti's energy supply. PHP's electromechanical equipment has reached its useful life. Average annual production has only been 162-Gigawatt-hour (GWh) of the potential 320-GWh capacity under optimum operating conditions (i.e.,

- average availability of 22-MW out of 54-MW) primarily due to reduced water volumes in the reservoir and the impact of electro-mechanical failures on the generator's availability. The problems of an aging physical plant are compounded by sedimentation caused primarily by deforestation, inadequate management of the *Artibonite* watershed, and natural effects of environment, which further hinder the unit's availability.
- 1.12 As a result of the above and in order to rehabilitate the only large-scale reliable renewable source of energy in Haiti, the Bank approved the grant proposal for Peligre Hydroelectric Plant Rehabilitation Program (HA-L1032, grant 2073/GR-HA) on November 18, 2008 to generate electrical power with renewable energy sources and to ensure the supply of electricity to Haiti's capital by rehabilitating the transmission line to *Port-au-Prince*. The contract was signed on December 14<sup>th</sup>, 2008 and the first operation was declared eligible on July 29, 2009. As of October 2011, an amount of US\$1,215,682 was disbursed (10% disbursement level) and current outstanding amount is US\$11,284,317. Two separate bid processes have been undertaken by EDH following IDB procurement rules under this grant: (i) the bid for PHP contract supervision and (ii) the bid for the rehabilitation of the PHP equipment. The supervision contract was awarded to Fitchner GmbH from Germany for US\$3.2 million in June 2010 and the contract for the rehabilitation of the PHP equipment is anticipated to be signed in the 4<sup>th</sup> quarter of 2011. Execution of 2073/GR-HA is proceeding satisfactorily (see electronic link) given the impact of the 2010 earthquake.
- 1.13 In addition to the above, three technical studies have been conducted under grant 2073/GR-HA. (i) A Sedimentation Study to analyze the sedimentation levels in the basin was conducted by Greg Morris Engineering. Results obtained indicate that current and projected sedimentation levels are not considered a threat to the PHP in the near-term or medium-term and proposed mitigation actions to consider for the long-term scenario were provided in the study. (ii) A Post-Earthquake Structural Study was commissioned by the Bank in March 2010 to ascertain the structural integrity of the *Peligre* dam post earthquake. The study found that the dam's integrity had not been affected and that there was no evidence proving any alteration of the safety of the dam whether in terms of cracks or water losses. (iii) An Electrical Stability Study which was conducted to determine the impact of the additional power delivered on the function of the electrical network.
- 1.14 **Proposal for Supplementary Financing.** When grant 2073/GR-HA was under preparation in 2008, IDB financing available for Haiti was limited. Thus the first operation was designed based on a modular technical and economic structure in order to maximize resources and gain access to additional co-financing from other potential donors. Such structure involved the preparation of three technically independent operations (that would mirror three stages or "*étapes*", one each for each of the three turbines) and would yield the specific cumulative benefits of rehabilitating the PHP. The first operation was to be the one financed by the IDB for an amount of US\$12.5 million to cover the costs for the *étape* 1 (i.e. first

turbine to be rehabilitated) of the PHP rehabilitation; the second one to be co-financed by the OPEC Fund for International Development (OFID) for an amount of US\$15 million where resources would be allocated to fund the costs for the *étape* 2 (i.e. second turbine) and the last operation was to be funded by IDB to fund the remaining costs for the third turbine to be rehabilitated (as well as miscellaneous costs) for an additional provisional amount of US\$12.5 million.

- 1.15 **Rationale.** The first IDB operation (grant 2073/GR-HA) was approved in 2008 and the OFID concessional loan was approved in October 2009 (currently pending parliamentary approval). In November 2010, *Kreditanstalt für Wiederaufbau* (KfW) approved a €10 million grant (equivalent to US\$13.7 million) to participate in the rehabilitation of the PHP and cover the remaining costs under *étape* 1 and *étape* 3 which were originally envisioned to be funded by the IDB as the last operation for the PHP rehabilitation (HA-L1032; HA-L1038; OFID financing and KfW grant financing together the “Program”). Notwithstanding the mobilization of additional resources from OFID and KfW and as a result of the technical and economic bids for the supervision and rehabilitation contracts for PHP, total Program costs have increased from US\$40 million (amount originally contemplated in 2008 under 2073/GR-HA) to US\$61.20 million (costs in 2008 had been sized based on preliminary technical and feasibility studies that were undertaken for the Program). Thus KfW financing resources have been reallocated<sup>3</sup> together with those of the S-Financing.
- 1.16 The results of the two competitive bidding processes carried out (mentioned above) were higher than the original budgeted amount prepared for the PHP rehabilitation (US\$30 million approximately). Such increased costs are the results of several causes: (i) the increased country risk due to the political situation and the likely adoption by bidders of measures to hedge against such risk; (ii) the 1.5 year delay incurred in the process of the rehabilitation contract award subsequent to the 2010 earthquake; (iii) the lack of interest of firms to work in Haiti resulting in a reduced number of proponents (12 bidders purchased the documents and only 3 proposals were presented); (iv) premium risks attached to carrying out work in Haiti; (v) the higher cost of basic materials (e.g. in the fourth quarter of 2007, when the Program first documents were put together, the market price of carbon steel for structural sections was approximately US\$500/ton whereas in January 2011, the price had reached US\$855/ton); and (vi) the appreciation of the Euros against the US\$ which affected the Supervision Contract (denominated in Euros) and the rehabilitation equipment bid that has over 50% of the proposed amount also denominated in Euros.<sup>4</sup> In addition, the eight-month lapse of time between the approval of the first operation and compliance with conditions precedent, although customary for operations in Haiti, further delayed the timing attached to the competitive bidding process. Lastly, and as referred in (ii) above, the 2010

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<sup>3</sup> KfW agreement provides for flexibility regarding allocation of such resources.

<sup>4</sup> The Rehabilitation and Supervision Contracts represent the major part of the Program. The analysis of their respective offers using an US\$/Euros exchange rate of 1.37; the Supervision Contract cost increased by US\$1 million to US\$3.15 million (vs. US\$2.02 million originally budgeted) and the Rehabilitation Contract increased by US\$24.61 million to US\$51.39 million (vs. US\$26.78 million originally budgeted).

earthquake was the ultimate compounding factor that not only significantly impacted the country but also paralyzed the moving forward of the bidding process and evaluation of the latter, resulting in a 1.5 year delay from the original contemplated timeline. Such extraordinary circumstances, beyond the control of MTPTEC and EDH significantly contributed to such cost increases given that (i) additional studies had to be undertaken to ensure the integrity of the structure of the dam (see section above) and (ii) the rehabilitation equipment contract award had to be delayed resulting in receiving bids at a later time than originally contemplated and thus correspondingly associated with higher revised figures, reflecting current world commodity prices.

- 1.17 As a result of the above, and the reallocation of the transmission line rehabilitation investment to the Program for Rehabilitation of Electricity Distribution System in Port-au-Prince,<sup>5</sup> the PHP Rehabilitation Program costs have been revised and are presented in Table 1 below, which compares the original costs under grant 2073/GR-HA and the revised total Program costs broken by investment category.

**Table 1. Revised Costs for PHP Rehabilitation Program**

INVESTMENT CATEGORY	Original Cost 2008 (US\$'000)	Updated Cost 2011 (US\$'000)	Difference (US\$'000)
<b>Direct Costs – Component I</b>	<b>30.78</b>	51.39	<b>20.61</b>
Sub-Component I. Rehabilitation of PHP equipment	26.78	51.39	24.61
Sub-Component II Rehabilitation of Transmission Line	4.00	-	0.00
<b>Engineering and Administration</b>	<b>2.72</b>	3.85	<b>1.13</b>
1. Support for administration (PCU / PTU)	0.30	0.30	0.00
2. Consulting and supervisory firm	2.02	3.15	1.13
3. Evaluation and audit	0.20	0.20	0.00
4. Environmental and Social Management	0.20	0.20	0.00
<b>Unallocated expenses</b>	<b>6.50</b>	5.96	-0.54
<b>TOTAL</b>	<b>40.00</b>	<b>61.20</b>	<b>21.20</b>

- 1.18 The proposed S-Financing meets all and each of the criteria set forth in Operational Policy OP-310, “Additional Financing of Cost Overruns for Operations in Progress” (document GN-2329), namely:
- The increase financing request due to cost overruns of the PHP Program was made to the IDB by the GoH within the disbursement period for the grant 2073/GR-HA which ends on December 14, 2013, and it was included in the programming financing for 2011;
  - The PHP Rehabilitation Program is proceeding satisfactorily (parag. 1.12);
  - The cost overruns resulted from extraordinary circumstances beyond the control of the beneficiary and the executing agency (paragraphs 1.15 and 1.16);

<sup>5</sup> During the preparation of HA-L1038, the transmission line cost was reviewed. As a result, it was estimated that such investment will require an amount of financing lower than that originally envisioned and a decision was taken to fund the transmission line investment under the Programs for the Rehabilitation of Electricity Distribution System in Port-au-Prince (HA-L1014; HA-L1035).

- d. An adjustment in the volume or coverage of the PHP Rehabilitation Program to the amount available would significantly compromise the ability to achieve its objectives. The scope of the S-Financing, which consists in the rehabilitation of the PHP at its full operational capacity, would be reduced and would, by definition, result in a lower available capacity of the plant and thus not comply with the objective of the PHP;
  - e. The additional financing makes it possible to achieve the objectives of the PHP Rehabilitation Program without impairing its economic, financial, institutional, and environmental viability (paragraph 2.6);
  - f. The GoH does not have the additional resources required to complete the PHP and has been unable to obtain financing from other sources on reasonable terms;
  - g. The PHP Rehabilitation Program does not include local counterpart; and thus the *pari-passu* condition is not applicable; and
  - h. As of October 2011, the GoH is current in their payments to the IDB, according to the policy in effect.
- 1.19 The S-Financing of the PHP, through additional financing, would make it possible to complete the PHP rehabilitation and achieve the corresponding planned objectives.

**B. Objective, components and cost**

- 1.20 The S-Financing will cover the funding gap for the rehabilitation of the PHP envisaged under the first operation HA-L1032 (grant 2073/GR-HA) with the objective to help restore and preserve Haiti's capacity to generate electrical power with renewable energy sources in order to satisfy the needs of the population. No new or additional activities will be financed with the S-Financing but rather the incremental cost for the PHP rehabilitation. Such rehabilitation is designed to: (i) restore and maintain its generating capacity and (ii) improve the efficiency of the plant's generating units. The main beneficiaries will be the population of Haiti, principally located in *Port-au-Prince*. The S-Financing will support the following components of HA-L1032:
- 1.21 **Component I: Investments in rehabilitating PHP electro-mechanical components and transformers.** This component finances electro-mechanical rehabilitation of the PHP and the related civil works. The three 18-MW units, including the rehabilitation of the electro-mechanical components, the turbines and insulation for the alternators, amongst others. Common electrical works for the PHP, including the rehabilitation of the external 13.8-kV/115-kV substation, protective equipment, 13.8-kVt electrical equipment, auxiliary services, remote control and command, signaling and alarms is also financed.
- 1.22 **Engineering and administration.** The Program supports the execution through institutional strengthening of the "*Unité de Coordination du Programme*" or Program Coordination Unit (PCU) and "*Unité Technique du Programme*" or Program Technical Unit (PTU); program supervision including environmental and social supervision, audit and evaluation. Resources under grant 2073/GR-HA were already utilized to support the work carried out by the PCU and PTU as well

as for the three studies that were mentioned above. In addition, the costs for the consulting and supervisory firm have been equally allocated amongst IDB, OFID and KfW. Table 2 below presents the PHP Rehabilitation Program costs and financing where the S-Financing up to US\$15 million will be drawn from the resources of the IDB Grant Facility.

**Table 2. Program Costs and Financing (US\$ thousands)**

INVESTMENT CATEGORY	HA-L1032	HA-L1038	TOTAL	OFID	KfW	Total
	2073/ GR-HA	2073-1/ GR-HA	IDB			
<b>Direct Costs - Component I</b>						
Rehabilitation of PHP equipment	<b>11.15</b>	<b>14.99</b>	<b>26.14</b>	<b>13.39</b>	<b>11.86</b>	<b>51.39</b>
<i>étape 1</i>	11.15	0.00	11.15	0.00	11.86	23.01
<i>étape 2</i>	0.00	2.69	2.69	13.39	0.00	16.08
<i>étape 3</i>	0.00	12.30	12.30	0.00	0.00	12.30
<b>Engineering and Administration</b>	<b>1.35</b>	<b>0.00</b>	<b>1.35</b>	<b>1.05</b>	<b>1.45</b>	<b>3.85</b>
1. Support for administration (PCU / PTU)	0.15	0.00	0.15	0.00	0.15	0.30
2. Consulting and supervisory firm	1.05	0.00	1.05	1.05	1.05	3.15
3. Evaluation and audit	0.10	0.00	0.10	0.00	0.10	0.20
4. Environmental and Social Management*	0.05	0.00	0.05	0.00	0.15	0.20
<b>Unallocated expenses</b>	<b>0</b>	<b>5.01</b>	<b>5.01</b>	<b>0.56</b>	<b>0.39</b>	<b>5.96</b>
<b>TOTAL</b>	<b>12.50</b>	<b>20.00</b>	<b>32.50</b>	<b>15.00</b>	<b>13.70</b>	<b>61.20</b>
	20.43%	32.68%	53.11%	24.51%	22.38%	100%

\* Such line item will cover the following studies specifically: (i) Peligre optimization study; (ii) downstream optimization study; (iii) residual impact and support plans; (iv) baseline and communication plan and (v) operational procedures for operation phase (see section II B for further details).

## C. Key results indicators and results matrix

- 1.23 The results expected from the Program are: (i) restore and maintain the capacity and availability of the three generating units of the PHP; (ii) increase efficiency in the operation of three units; and (iii) extend the useful life of the PHP for 20 years.
- 1.24 Results matrix for the Program is based on the matrix that was prepared and approved for grant 2073/GR/HA (which included the indicators associated with its main outputs and impacts) and was subsequently updated to reflect the S-Financing. The matrix also incorporates the corresponding means of verification (sources and data collection systems) and key assumptions for risks identified. The direct impact indicators include the relevant baselines as well as the intermediary and final targets.

## II. FINANCING STRUCTURE AND MAIN RISKS

### A. Financial instrument

- 2.1 This proposed operation is structured as S-Financing to grant 2073 GR-HA. This structure is justified because it contributes to reach the objectives of the first operation for the PHP rehabilitation Program (given the IDB limited available resources to Haiti at the time of approval of the first operation in 2008) and the S-Financing thus is necessary to complete the rehabilitation of PHP and

corresponding engineering expertise for the PHP. This instrument also provides an option to meet the country's urgent needs in the electricity sector and is consistent with the strategy set by the GoH for its recovery post-earthquake.

## **B. Environmental and social safeguard risks and mitigation measures**

- 2.2 The PHP is the main source of renewable energy in Haiti and the only hydroelectric plant, so the Program will have a positive impact on the country, taking into account that if the PHP is not rehabilitated, the installed capacity should be replaced in the short-term with fossil generation, which has negative environmental and social impacts, local and global. The Program has significant positive environmental and social impacts to improve the living conditions of people, particularly the capital city *Port-au-Prince* and increase productivity by providing reliable electric service, and enable beneficiaries to make better use and promotion of renewable energy. The main environmental and social impacts expected are as follows: (i) control of the cleanup of the reservoir and control of flow of water from the hydroelectric dam, and (ii) poor coordination between the EDH and the ODVA (Organization for the *Artibonite* Valley) presenting, on a recurring basis, the risk of affecting some 50,000 small farmers located in the *Artibonite* Valley irrigation district and people living in the area near the valley. As a result, settling and clogging of irrigation canals de l'*Artibonite* district, increasing costs of maintenance and repair of irrigation system, affected crops and agricultural productivity and erosion of river banks are most likely to occur. Additional moderate impacts include, amongst others, disruption of families due to vehicular traffic, safety, oil spills, toxic waste -both solid and liquid- for which management plans establish socio-environmental measures. In addition to the problems of useful life of PHP electromechanical equipment, there is a process of sedimentation of the reservoir, mainly due to deforestation activities and improper management in the *Artibonite* Valley watershed with additional negative effects on the energy generation capacity of the CPH. Lastly, seismic risk is existent and could affect the PHP and as such, this risk must be taken into account as warning and preventive measures for people living downstream in the *Artibonite* Valley.
- 2.3 Haiti, and particularly the *Artibonite* river basin, is often subject to impacts of floods and hurricanes, which cause negative effects of sedimentation and on the capacity of flood control of the dam, affecting farmers and residents located downstream in the *Artibonite* Valley. During the preparation of the Program (HA-L1032), a Social and Environmental Analysis (EA) was performed, which included the results of the study on sedimentation in the PHP and the environmental and social impacts generated from the electro-rehabilitation Program. Also, the EA Program includes an Environmental and Social Management Plan (ESMP) for each stage of the rehabilitation Program, particularly focused on the management of solid and liquid waste, safety and occupational health and management control systems flow of water from the hydroelectric dam, and according to environmental regulations and social of Haiti and the Environmental and Social Policy of IDB. For monitoring and enforcement of environmental and social measures of the Program, the contracts for the rehabilitation of the PHP, as well as monitoring activities, must include

compliance with the requirements of ESMP. Taking into account the results of the EA and the Environmental Policy and Safeguards Bank (OP-703), the S-Financing is classified as Category B.

- 2.4 Since the approval of the first operation (HA-L1032) financed by the IDB, there have not been changes in the environmental and social strategy adopted by the IDB, which was taken into account in assessing the environmental and social impacts of the Program performed. Mechanisms, institutional arrangements and responsibilities established for environmental and social management remain unchanged from the original scheme under the first operation.
- 2.5 In order to complement the above and also have an integrated and coordinated approach of the PHP rehabilitation with the Agricultural Intensification Program grants (HA-0016 and HA-L1021) in the Valley de l'Artibonite, a socio-economic audit was carried out in June 2011. As a result of the audit, the following was agreed to be presented to the satisfaction of the Bank and to be included as contractual conditions for the S-Financing: (i) as a condition for execution and prior to rehabilitation work on the turbines, a communication plan that is being implemented to ensure that all affected parties are informed of the schedule of works and can take necessary corresponding actions; (ii) as a condition for execution and prior to resuming normal operation of the dam, a procedure manual for multipurpose water management at the Peligre dam taking into account the three uses of the water at Peligre (electricity generation, irrigation, floods management); and (iii) as conditions for execution: (a) quarterly meetings of the Inter-Ministerial Commission with minutes issued of such meetings that will constitute a contractual condition for satisfactory execution for the Bank; and (b) the Executing Agency will ensure that the Program will be designed, built and operated in accordance with the final design, plans and environmental and social management measures agreed upon with the Bank in accordance with the framework established in the updated ESMR. ESG will hold annual socio-environmental supervision.

### **C. Risks and special considerations**

- 2.6 **Economic analysis.** A Cost-Benefit Analysis (CBA) for the Program was carried out using the following parameters: (i) increase of total Program costs; (ii) two-year delay in the initiation of the rehabilitation work and (iii) plant fully operational in 2015. Results obtained indicate satisfactory internal rates of return (IRR) of 20.8% and Net Present Value (NPV) of US\$46.7 million. The benefits of the Program would stem from savings of rehabilitating the PHP which is more cost effective than pursuing any other new power plants generation investments.
- 2.7 In addition, a sensitivity analysis was performed using the following key assumptions: (i) 10 to 20% capital cost investments increase; (ii) 10 to 50% O&M cost increase and (iii) 10 to 20% operational benefits decrease. In these three scenarios, the IRR is satisfactory and the NPV is positive (see CBA electronic link).
- 2.8 **Fiduciary Risk.** During the preparation of the first operation, the latter was deemed to have high fiduciary risk, stemming from EDH's inadequate managerial



and organizational capabilities, as well as the inexperience and understaffing of the newly formed PCU and PTU. The weaknesses at the level of the EDH are being addressed through initiatives to strengthen its financial and operational management capabilities in the context of grant 2394/GR-HA, formerly loan 1813/SF-HA, and the PREPSEL program financed by the World Bank. The implementation of the new Enterprise Resource Planning (ERP) system and the training for personnel at the different management levels concluded in the fourth quarter of 2010. An important aspect that remains to be resolved is the inexistence of EDH's consolidated financial statements for the years 2005 and onwards, information required to establish the initial balances in the accounting module of the ERP system. Such situation is expected to improve given the implementation of the new ERP.

- 2.9 The PCU, responsible for administrative and financial management of the Program, is currently staffed in accordance with the requirements set forth in the fiduciary agreements and mitigation measures of the original grant 2073/GR-HA. Risks identified in the second quarter of 2010, during the formulation of grant 2349/GR-HA Rehabilitation of the Electricity Distribution System in *Port-au-Prince*, included the probability of not detecting on time any inaccuracy and/or error on the financial reporting due to continuing utilization of Excel spreadsheets for the accounting and formulation of financial statements of loan 1813/SF-HA and grant 2073/GR-HA, as well as the probability of losses due to lack of a mechanism to control the expiration dates of guarantees of contracts in execution.
- 2.10 During the third quarter of 2010, the ACCPAC accounting software was adopted to register Program transactions and produce financial statements and reports. In the fourth quarter of 2010, the personnel received exposure to IDB new Program financial management policies and procedures and as of October 2011, such management policies and procedures were being implemented and applied by the UCP.
- 2.11 A financial management capacity and risk analysis of PCU was also conducted in November 2010 by applying the Institutional Capacity Assessment System (ICAS). The analysis determined a medium level of fiduciary risk for the financial management functions, with the lowest score affecting the internal control system. This translates into the following risks: (i) lack of compliance with standards of economy, efficiency and effectiveness, (ii) loss by theft or destruction of parts and inventory due to weak control mechanisms and inventory management practices, and (iii) deviations in Program costs or execution times due to weakness in budget execution and monitoring procedures.
- 2.12 To mitigate the outlined risks, a standard set of financial planning formats and procedures have been introduced for use by the PCU, and the adoption of a more comprehensive methodology for inventory control has been recommended. In addition, the Bank continues to pro-actively support the efforts of the PCU in reaching a closer level of coordination with EDH and specialists across the Bank (i.e., VPS, PDP and VPC) are providing on-going support to ensure a steady execution and advancement.

- 2.13 **Procurement Risk.** The components of the S-Financing will be executed by the PCU (currently staffed with a procurement specialist and with a consultant assigned to support the procurement area) following Bank procurement policies: “Policies for the Procurement of Goods and Works financed by the Inter-American Development Bank” (GN-2349-9) and “Policies for the Selection and Contracting of Consultants financed by the Inter-American Development Bank” (GN-2350-9), and the “*Disposiciones especiales sobre adquisiciones para atender la emergencia causada por el terremoto del 12 de enero de 2010 en la República de Haití*” (OP-387-1). The risk involved in the procurement to carry out in this Program is medium-high and will be mitigated with ex-ante supervision and support from the IDB procurement specialist to the executing agency as needed (please refer to Fiduciary Arrangements electronic link).
- 2.14 **Execution Risk.** Previously existing organizational conditions which gave rise to the low level of engagement on the part of EDH are undergoing a period of significant transformation, resulting from concerted action on the part of the donor community engaged in the energy sector: (i) the Director General of EDH has been replaced by a more responsive and results-oriented Director who is in the process of redesigning the senior management team at EDH; (ii) the US and Haitian governments and the IDB signed a MoU (see footnote above) that sets forth the process of an Interim Management Contract for EDH (the management firm has been hired, is currently mobilized, and is anticipated to assume operational control of the day-to-day operations of EDH in 4<sup>th</sup> quarter 2011, bringing about fundamental capacity changes in EDH); (iii) the World Bank has engaged four high-level consultants as shadow managers to strengthen the managerial and technical capacity of EDH senior management, and (iv) IDB, under 2394/GR-HA, has allocated US\$515,000 targeted at training EDH management to strengthen the capacity of the management team and provide for a higher level of strategic planning. The ensemble of these reinforcements efforts greatly increase the likelihood that EDH will be more directly engaged in the project and greatly increase the probability of timely project completion.

#### **D. Other Risks**

- 2.15 Additional risk includes rehabilitation risk to complete rehabilitation of the PHP on a timely basis and within budget. In order to mitigate this risk, both the PCU and PTU will continue to prepare a joint Annual Work Plan (AWP) that will include: (i) an updated procurement plan; (ii) an installation and supervision timetable; (iii) a timetable for executing the different works; (iv) a works maintenance plan; and (v) a timetable for preparation of semiannual reports and programming of monitoring and evaluation meetings.
- 2.16 The risk of escalation of costs, although still one to be flagged given the premium risk attached to carrying out work in Haiti, the portion of parallel financing resources denominated in Euros (KfW financing) and the additional studies associated with the rehabilitation work<sup>6</sup>, is mitigated by: (i) the monitoring and

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<sup>6</sup> An important lesson learned from the design of HA-L1032 is related to the methodology for the PHP rehabilitation works. Under HA-L1032, the methodology contemplated the emptying of the

supervision arrangements mentioned in 2.15 and (ii) the allocation of US\$5.9 million to contingencies (from all financing sources).

- 2.17 Lastly, in March 20<sup>th</sup>, 2011, the people of Haiti elected the new President of the Republic and on October 4<sup>th</sup> 2011, the Prime Minister for the newly-elected government was confirmed by the Haitian Parliament.

### III. IMPLEMENTATION AND MANAGEMENT PLAN

#### A. Summary implementation arrangements

- 3.1 **Beneficiary and Executing Agency.** The beneficiary will be the GoH and the EA will be the *Ministère* of Public Works, Transport, Energy and Communication (MTPTEC), in cooperation with EDH. The S-Financing will use the same execution mechanism as the one contemplated in grant 2073/GR-HA, namely: (i) the PCU, which reports to the MTPTEC and is physically located in EDH, responsible for administrative and financial aspects of the PHP; (ii) the PTU, created in EDH, responsible for technical aspects and (iii) the Steering Committee, at the head of the organizational structure, formed by representatives of the MTPTEC, MEF, EDH, the Ministry of Planning and External Cooperation (MPCE), and the Public Enterprise Modernization Board (CMEP) responsible for maintaining political support for the Program at the highest level.
- 3.2 The MTPTEC's responsibilities as EA will remain the same as under the original Program. The MTPTEC, acting through the PCU, will be responsible for the following amongst others: (i) procure works, goods and services and consulting services for the S-Financing, in compliance with Bank policies; (ii) facilitate the activities of the consultants and suppliers of goods and services in relation to EDH, through the PTU; (iii) undertake Program accounting and financial management, and (iv) manage all Program procurement and financial and accounting information. In addition, technical responsibilities of the MTPTEC include: (i) provide the PCU with corresponding technical inputs for the preparation of the bidding documents; (ii) undertake technical supervision of consulting services procurement; (iii) coordinate procurement of goods installation within EDH different units and (iv) monitor the Program's main indicators.
- 3.3 **Procurement.** Procurements for the S-Financing will be carried out in accordance with the Policies for the Procurement of Works and Goods Financed by the Inter-American Development Bank (GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (GN-2350-9); and will be complemented by the "*Disposiciones especiales sobre adquisiciones para atender la emergencia causada por el terremoto del 12 de enero de 2010 en la Republica de Haiti*" (OP-387-1).

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Peligre reservoir. Such methodology was reviewed during the preparation of the S-Financing in light of the environmental and social impacts and reputational risks that would have been associated with the emptying of the reservoir. As a result, the Bank and EDH agreed to change such methodology, which is now based on the non-emptying of the reservoir for the rehabilitation of PHP.

- 3.4 **Financial management and disbursements.** Financial management will be carried out in accordance with policy OP-273. Disbursements will be based on cash flow plans that will be sized according to the Program execution liquidity needs and with a rolling twelve-months planning horizon. Disbursements for costs pertaining to Component I Rehabilitation of PHP Equipment will be made via direct payment to suppliers. Other costs will be covered with advance of funds equivalent to four months of operations and will be subject to ex-post supervision.

**Table 3. Updated Disbursement schedule (US\$ thousands)**

	2011 */	2012	2013	2014	TOTAL
<b>IDB HA-L1032 (2073/GR-HA)</b>	2.50	2.50	3.75	3.75	<b>12.50</b>
<b>KfW</b>	0.00	4.11	5.48	4.11	<b>13.70</b>
<b>OFID</b>	0.00	4.50	6.00	4.50	<b>15.00</b>
<b>IDB HA-L1038 (2073-1/GR-HA)</b>	0.00	6.00	8.00	6.00	<b>20.00</b>
<b>TOTAL</b>	<b>2.50</b>	<b>17.11</b>	<b>23.23</b>	<b>18.36</b>	<b>61.20</b>
	2011 */	2012	2013	2014	TOTAL

\* Including 2010 and previous disbursements.

- 3.5 **External audit:** Financial statements will be subject to annual audits. An external audit firm acceptable to IDB will be hired based on procedures set forth in document AF-200 and on terms of reference agreed upon between the PCU and the Bank. The audit firm will also perform disbursements ex-post reviews.

## **B. Summary of arrangements for monitoring and evaluation results**

- 3.6 The Beneficiary and IDB have agreed to use the Result Matrix and the activities defined in the Performance Monitoring Report (PMR) as the principal elements for monitoring and evaluating the Program (both budgeted for in HA-L1032 and HA-L1038). EDH will be responsible for compiling all required and necessary information and the Bank will be responsible for verifying that such monitoring information is in compliance. Specifically, the following will be monitored: (i) description of activities conducted; (ii) timetable and disbursement; (iii) compliance with performance indicators; (iv) 6-month looking forward activity plan; and (v) updated procurement plan and annual working plans.
- 3.7 In addition, the Bank is conducting ongoing supervision of project execution under the monitoring and supervision framework set out in grant 2073/GR-HA (annual administration missions and semi-annual progress reports mainly) where the Regional Energy Specialist and specialists from Headquarters have assisted the PCU and PTU on an ongoing basis, and have performed reviews and periodic visits to assess the primary issues arising in execution.
- 3.8 A mid-term evaluation will be carried out when 50% of the resources are disbursed. A final evaluation (which will also include an ex-post benefit analysis) will be performed 90 days prior to the last disbursement of the grant resources where the Bank will review compliance with targets established according to the result indicators agreed in the Result Matrix and in accordance with IDB guidelines for development effectiveness for sovereign transactions (see monitoring and evaluation electronic link attached).