Hydropower Sustainability Assessment Protocol

Official Assessment

Empresa de Generación Huallaga S.A. / Odebrecht Energia S.A.

Chaglla Hydropower Project

Peru

Project Stage: Implementation

Assessment Date: 11/06/2015 to 17/06/2015

Final

Report Date: 10/02/2015

Client: Empresa de Generación Huallaga S.A., a subsidiary of Odebrecht Energia S.A.

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Project size: 456 MW

Cover page photo: Final concrete works on upstream dam face, with spillway tunnel entrances on left

Acronyms

Acronym	Full Text
ANA	Autoridad Nacional del Agua
BNDES	Banco Nacional de Desenvolvimento Econômico e Social
CCC	Chaglla Construction Consortium
CDM	Clean Development Mechanism
CMVC	Comité de Monitoreo y Vigilancia Ciudadana
CNO	Constructora Norberto Odebrecht
COES	Comité de Operación Económica del Sistema Interconectado Nacional
COFIDE	Corporación Financiera de Desarrollo
DEVIDA	Comisión Nacional para el Desarrollo y Vida sin Drogas
DGAE	Dirección General de Asuntos Ambientales Energéticos
EGH	Empresa de Generación Huallaga S.A.
ESHSMP	Environmental, Social, Health, and Safety Management Plan
EIA	Environmental Impact Assessment (or Environmental and Social Impact Assessment)
EMP	Environmental Management Plan (or Environmental and Social Management Plan)
EMS	Environmental Management System (or Environmental and Social Management System)
EPC	Engineering, Procurement and Construction
GHG	Greenhouse Gases
GRI	Global Reporting Initiative
GWh	Gigawatt-hour
HR	Human Resources
ICOLD	International Commission on Large Dams
IDA/IDS	Indicadores de Desempeño Ambiental/Social
IDB	Inter-American Development Bank
IFC	International Finance Corporation
IHA	International Hydropower Association
ILO	International Labour Organization
INDECI	Instituto Nacional de Defensa Civil
ISO	International Standards Organization
m.a.s.l.	meters above sea level
MEM	Ministerio de Energia y Minas, Peru
MPF	Maximum Probable Flood
MW	Mega watt

NHC	Northwest Hydraulic Consultants
OCE	Odebrecht Comercializadora de Energía
OEFA	Organismo de Evaluación y Fiscalización Ambiental
OEP	Odebrecht Energia del Peru S.A.
OHS	Occupational Health & Safety
OHSAS	Occupational Health & Safety Advisory Services
OLF	Odebrecht Latin Finance
O&M	Operation & Maintenance
OPIC	Odebrecht Perú Ingeniería y Construcción S.A.S.C.
OSINERGMIN	Organismo Supervisor de la Inversión en Energía y Minería
PDD	Project Design Document
Q1	Quarter 1
SCADA	Supervisory control and data acquisition
SERNANP	Servicio Nacional de Áreas Naturales Protegidas
SST	Seguridad y Salud en el Trabajo
STD	Sexually Transmitted Disease
TDS	Total Dissolved Solids
TEO	Tecnología Empresarial Odebrecht
TL	Transmission Line
ToR	Terms of Reference
TSS	Total Suspended Solids
UNFCC	United Nations Framework Convention on Climate Change
USD	US dollars
WWTP	Wastewater Treatment Plant

Table of Contents

Executive Summary

This report represents an Official Assessment with the Implementation Tool of the Hydropower Sustainability Assessment Protocol (the 'Protocol'). The assessment was conducted for the Chaglla hydropower project, under construction in central Peru in the department of Huánuco on the Huallaga River. The project developer and future operator is Empresa de Generación Huallaga S.A. (EGH), a single-project company owned by Odebrecht Energia Peru S.A., a unit of Odebrecht, a large contractor and infrastructure group from Brazil. This is the first ever Protocol assessment conducted in Peru.

Once commissioned, the Chaglla project will provide up to 456 MW to the national grid, making it the third largest hydroelectric power plant in Peru. It will generate approximately 6% of the country's power and make a significant contribution to climate change mitigation, as it will displace natural gas (the default source of power in Peru), reducing annual greenhouse gas emissions by an estimated 1.8 million tCO_2e. The project will not generate significant emissions from construction activities or from its small reservoir. It will boost regional socio-economic development and help people adapt to future climate change, for example through technical assistance for cocoa and coffee production. It will also set precedents through its environmental management program, including one of the first aquatic biodiversity offsets in Latin America.

The assessment focuses on the sustainability aspects of the Chaglla project and EGH specifically. This said, under several Protocol topics, the corporate-level performance of the owner Odebrecht is relevant.

The Implementation tool contains 20 topics, 19 of which were assessed and scored by the Assessment Team. The topic Indigenous Peoples was not relevant due to the location of the project.

Appendices B and C contain information on the interviews conducted and the documents reviewed. EGH/Odebrecht staff as well as the assessment team have done their best to ensure the accuracy of the information provided in those appendices. Appendix D contains photos taken by the assessment team.

Triangulation of evidence – visual, verbal and documentary – is an important requirement for the evidence-collection process. In this respect particular attention was paid to interviews with project-affected communities. The project-affected area is small, and the assessment team was able to meet a representative sample of affected people and their representatives.

Follow-up evidence was requested by, and provided to, the assessors in the weeks following the on-site assessment. A draft report was reviewed by EGH/Odebrecht. This final report was provided to EGH/Odebrecht on Oct. 2, 2015.

At the time of the assessment, the Chaglla project was close to finalizing construction and commissioning. This allowed the assessment team to review not just plans for different activities during the implementation stage, but to actually review the results of most plans. Reservoir filling was begun on Sept. 1st, and some information on the initial results could still be integrated into this report.

An important aspect of the assessment is that significant gaps identified by the assessors are not double-counted. As such, a significant gap might be identified against the criteria in the scoring statements for several aspects of the same topic, or for several topics. It will, however, only be scored in one place.

The Chaglla project's design went through various stages. It was first developed by the previous owners of EGH, then modified by EGH following its acquisition by Odebrecht, modified again in some respects in discussions with financiers, and adaptively during implementation. It has a complex structure of advisory and supervisory organizations, and a correspondingly complex documentation. Social and environmental compliance is supervised separately against the Peruvian licenses and the lenders' safeguards, and there are additional measures voluntarily taken by EGH/Odebrecht.

The project scores highly because its location was well selected and it was generally well designed, with a small social and environmental footprint, and because there is a high degree of corporate commitment to sustainability combined with the scrutiny of international lenders.

In particular the requirements of the international financiers, who prompted a number of changes including the consolidated Environmental, Social, Health and Safety Management Plan and ongoing quarterly independent monitoring, have contributed to improved performance.

Despite these contributions, the project has not been able to overcome all gaps in the initial social and environmental assessments, partly because of technical constraints imposed by the original design, for example regarding downstream flows arrangements. Other gaps are found at the level of best practice, and are related to minor non-conformances, extensive monitoring that is not designed for management decision-making, and additional opportunities to improve public disclosure and prevent corruption.

The Chaglla project performs with one gap at the level of basic good practice (a score of 2), for one topic: I-20 (Downstream Flows).

It performs at the level of basic good practice (a score of 3, with two or more significant gaps at the level of proven best practice), for one topic: I-2 (Governance).

It performs with one significant gap at the level of proven best practice (a score of 4) on a further ten topics: I-1 (Communications and Consultation), I-5 (Infrastructure Safety), I-8 (Procurement), I-9 (Project-Affected Communities), I-14 (Public Health), I-15 (Biodiversity and Invasive Species), I-16 (Erosion and Sedimentation), I-17 (Water Quality), I-18 (Water, Noise and Air Quality), and I-19 (Reservoir Preparation and Filling).

It meets proven best practice (a score of 5) on the remaining seven topics: I-3 (Environmental and Social Issues Management), I-4 (Integrated Project Management), I-6 (Financial Viability), I-7 (Project Benefits), I-10 (Resettlement), I-12 (Labour and Working Conditions), and I-13 (Cultural Heritage),

The significant gaps that were identified by the assessment are summarized in the table on p. 8. Importantly, there were no gaps regarding Stakeholder Support, and the project maintains excellent relations with project-affected communities, national and local authorities, and other stakeholders.

The spider diagram on the following page 7 summarises the Chaglla assessment in numbers. Detailed comments for each topic follow in sections I-1 to I-20.

Sustainability Profile

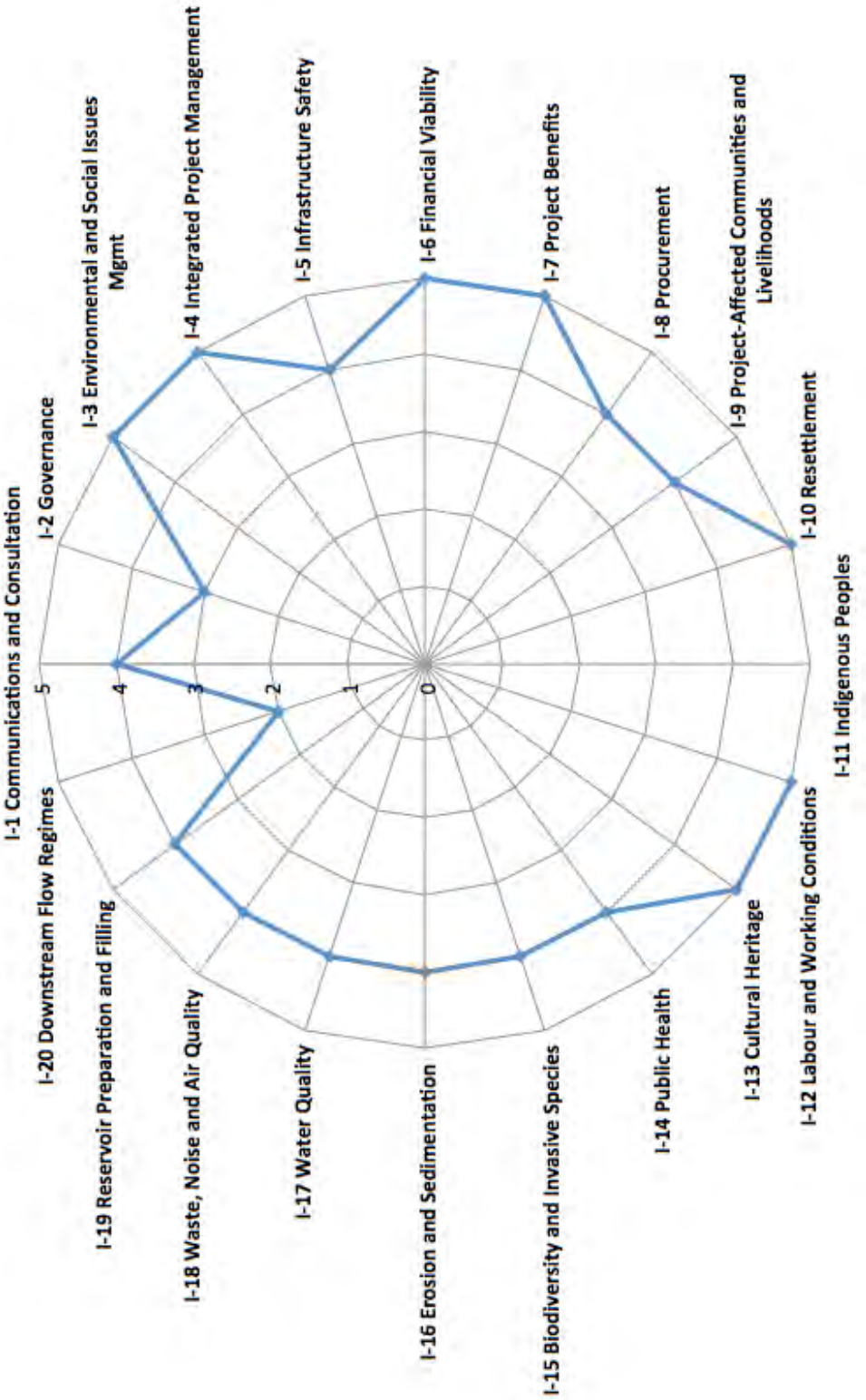


Table of Significant Gaps

	Level 3: Significant Gaps against Basic Good Practice	Level 5: Significant Gaps against Proven Best Practice
Assessment	I-20 The absence of a full assessment of all downstream flow issues, especially issues arising from the reduction or variation in flows in all river stretches resulting from filling, spilling and operations.	I-15 Biodiversity monitoring is not linked to the potential causes of biodiversity loss or a management response. I-18 The number of monitoring points and the frequency of monitoring does not allow the identification of links/inter-relationships.
Management	Click here to enter text.	I-1 The project has not taken some opportunities to disclose relevant project information, to show a high level of sensitivity of communication activities on the topics that are of interest to affected communities. I-2 Sustainability and anti-corruption criteria are not specified in the criteria for pre-qualification screening, approval, or selection of suppliers. I-8 Anti-corruption measures are not strongly emphasised in procurement planning. I-16 There are technical constraints on the project's response to emerging erosion and sedimentation risks. I-19 There are no processes in place to respond to risks and opportunities during the operation stage.
Stakeholder Engagement	Click here to enter text.	I-2 Not all significant project reports are publicly available, and available information is partially outdated.
Stakeholder Support	Click here to enter text.	Click here to enter text.
Conformance/ Compliance	Click here to enter text.	I-5 There are five minor non-conformances with project-approved practices. I-9 There are a number of inconsistencies between planning documents and the actual implementation of programs to mitigate the impact on project-affected communities. I-17 There are a series of ongoing non-compliances of site effluents with environmental quality standards.
Outcomes	Click here to enter text.	I-14 A public health centre in the project area will be completed too late to contribute to managing public health impacts of project-induced immigration during implementation.

Introduction

The Hydropower Sustainability Assessment Protocol

The Hydropower Sustainability Assessment Protocol ('the Protocol') is a framework to assess the performance of hydropower projects according to a defined set of sustainability topics, encompassing environmental, social, technical, and financial issues.

Developed by the International Hydropower Association (IHA) in partnership with a range of government, civil society and private sector stakeholders, the Protocol is a product of intensive and transparent dialogue concerning the selection of sustainability topics and the definition of good and best practice in each of these topics. Important reference documents that informed the development of the Protocol include the World Bank safeguards policies, the Performance Standards of the International Finance Corporation, and the report of the World Commission on Dams. To reflect the different stages of hydropower development, the Protocol includes four assessment tools that are designed to be used separately, corresponding to the Early Stage, and Preparation, Implementation and Operation stages of a project.

Applying the Protocol delivers an evidence-based assessment of performance in each topic, with a set of scores providing an indication of performance in relation to basic good practice and proven best practice. The scoring system is as follows:

5 Meets basic good practice and proven best practice;

4 Meets basic good practice with one significant gap against proven best practice;

3 Meets basic good practice with more than one significant gap against proven best practice;

2 One significant gap against basic good practice;

1 More than one significant gap against basic good practice.

Assessments rely on objective evidence to support a score for each topic that is factual, reproducible, objective and verifiable. Key attributes of the Protocol are: (i) global applicability, i.e. it can be used on all types and sizes of hydropower projects, anywhere in the world; and (ii) consistency, i.e. the consistency of its application is carefully governed by a system of quality control encompassing accredited assessors, terms and conditions for use, and the Protocol Council.[1]

Scoring is an essential feature of the Protocol, providing an easily communicated and replicable assessment of the project's strengths, weaknesses and opportunities. The scoring system has been devised to ensure that a Protocol Assessment cannot provide an overall 'pass' or 'fail' mark for a project, nor can it be used to 'certify' a project as sustainable. The Protocol provides an effective mechanism to continuously improve sustainability performance because results identify gaps that can be addressed, and the findings provide a consistent basis for dialogue with stakeholders.

Assessment Objectives

EGH has defined the following objectives for this assessment:

- Support potential efforts to access capital markets financing;
- Assure a smooth transition from implementation to operation stages of the project, promoting the continuation of international best-practices;
- Identify opportunities to achieve best-practice performance in the operation stage and optimize project strengths;

[1] Full details of the Protocol and its governance, are available on www.hydrosustainability.org.

- Align and disseminate lessons learned / information internally, to optimize integrated management of the project and enable capacity-building for continuous enhancement;
- Maintain stakeholders´ engagement and dialogue with society using a standardized tool for dissemination of Odebrecht's policies and practices; and
- Reinforce Odebrecht's image as a sectoral leader in sustainable hydropower development.

Project Description

The Chaglla hydropower project is located on the upper Huallaga River and named after the municipality of Chaglla, in the department of Huánuco on the eastern slopes of the Andes in Peru. The eastern slopes are characterized by high rainfall, steep topography and abundant biodiversity in the different altitudinal layers between lowland rainforest and high alpine tundra. The Huallaga generally flows in a northerly direction. It is a tributary to the Marañón River, which becomes the Amazon River when it joins with the Ucayali River. The project is located at about 1,000 m.a.s.l. where the Huallaga breaks through the last mountain range and opens into the wider middle Huallaga valley.

Figure 1. Peru Rivers Map

Administratively, the project influence area is divided between the district of Chinchao in the province of Huánuco (left bank of the Huallaga, as well as parts of the lower right bank) and the district of Chaglla in the

province of Pachitea (upper right bank). Most of the affected area belongs to the Comunidad Campesina (an area of traditional collective ownership) Pillao on the left bank. Some 3,000 people lived in the influence area of the hydropower project (without transmission line) in 2010.

Because the river valley is narrow and access to the area is difficult, it has been colonized relatively recently and the impact on settlements and cultivation is limited. Farmers cultivate subsistence crops, as well as cocoa at lower and coffee at higher elevations. Until a few years ago, the area downstream around the closest town Tingo Maria (55,000 inhabitants) was considered one of the global centres of coca production, and the drug trade and terrorist activities (Sendero Luminoso) undermined public security. Most of the coca production has been displaced to other areas and public order restored, but there are still remnants of illicit coca and marijuana cultivation in the wider area. The Huánuco department is one of the least developed in Peru and has experienced some outmigration. Population growth in the districts of Chinchao and Chaglla between 1993 and 2007 was 0.85% p.a. and 0.34% p.a., respectively.

Table 1. Social Indicators for Peru and Project Region (adapted from UNDP 2012)

	Affected by Hydropower Component	Affected by Transmission Line Component	Population	Human Development Index	Family Income (USD/month)
Peru	x	x	30,135,875	0.5058	221
Department of Huánuco	x	x	840,984	0.3746	142
Province of Huánuco	x	x	301,396	0.4431	188
District of Chinchao	x	x	26,290	0.2298	90
Province of Pachitea	x	x	69,003	0.2095	77
District of Chaglla	x		11,750	0.2496	103
Province of Ambo		x	57,957	0.3088	109
Department of Pasco		x	297,591	0.4114	136
Province of Pasco		x	156,259	0.4622	163

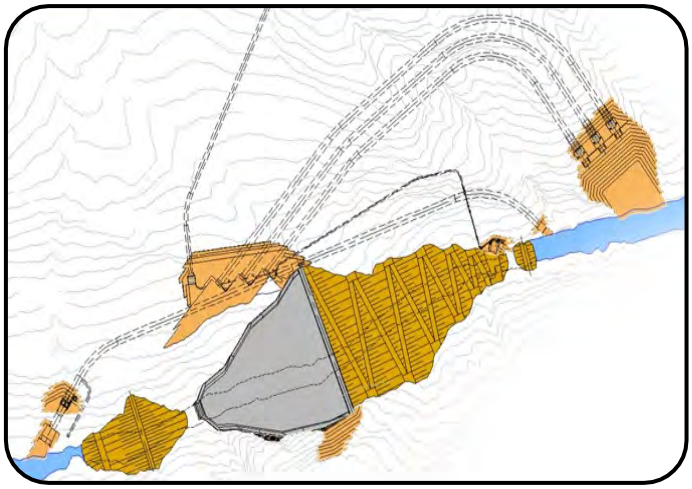
In 2011, Peru's theoretical hydropower potential was estimated at 236 GW (out of which 66 GW were excluded because there are already hydroelectric concessions or protected areas). In the upper Huallaga sub-basin, the theoretical potential is 6.8 GW (out of which 2.0 GW have been excluded). During the Peru hydropower master planning exercise in the 1970s, supported by the German technical cooperation, one project in the same stretch (Huallaga-90, 565 MW) was selected as one of 10 priority projects. Pre-feasibility and feasibility studies were prepared in the 1980s and 1990s. The project was taken up again by Empresa de Generación Huallaga S.A. (EGH) in the early 2000s, and a concession and environmental license obtained. When EGH was acquired by Odebrecht Energia S.A. in 2009, further adjustments were made after an evaluation of alternatives, including moving the location some kilometres downstream. This move allowed increasing the energy generated while significantly reducing the project impact, shortening the length of the bypass stretch from approximately 26 to 15 kms. This final configuration has obtained all necessary concessions, licenses and permits (one concession modification is pending). Construction started in May 2011, financial closing with the current financing package was achieved in July 2013, filling of the reservoir was begun in September 2015, and commercial operations are to start in February 2016.

The map below shows the villages and road network before the project, with the construction area including dam, headrace tunnel, and powerhouse superimposed in a red rectangle. The paved main road between Huánuco and Tingo Maria is shown in black in the upper left corner. Dirt roads are shown in orange. The project built a 29 km access road on the left bank, from the main road at Pte. Chinchavito to the dam site. The dam will form a narrow 17 km long, 4.66 km^2 reservoir with a volume of 345 million m^3. This represents a relatively small flooded area for the amount of energy to be produced, contributing to the small footprint of the project.

Figure 2. Project Area

The project consists of a 202 m high concrete-faced rockfill dam with a volume of 8.5 million m^3, three spillway tunnels, a powerhouse with a 6 MW Francis unit at the foot of the dam (which uses the environmental flow discharge), a 14.4 km long headrace tunnel, and an above ground 450 MW powerhouse with two identical Francis units; as well as access roads, work camps, industrial areas, quarries, deposit sites, and transmission lines. Most of the project infrastructure is on the left bank.

Figure 3. Layout with Dam and Cofferdams; Diversion, 3 Spillway and Headrace Tunnels; and Small Hydropower Plant with Penstock (flow direction from left to right)



The catchment above the dam is 7,150 km^2 large and generates an average runoff of 164 m^3/sec. The reservoir will be operated within a narrow range of 1 m, implying that there will be no seasonal storage, continuous generation and frequent spilling in the wet season (November to March), and daily storage and peaking generation in the dry season. The Huallaga River carries a large sediment load, which will fill up approximately 70% of the reservoir over its first 25 years of operation.

Figure 4. Computer-Generated Image of Dam and Reservoir

A 25 km long 34 kV transmission line from Piedra Blanca provides construction power since June 2013, and will later connect the small powerhouse at the foot of the dam to the Chaglla substation and national grid. The main powerhouse will feed into the national grid via a 127.5 km long 220 kV transmission line with 270 towers, that runs into a south-westerly direction to a substation at Paragsha in the department of Pasco. For the first 15 years starting October 2016, a power purchase agreement for 284 MW of firm energy was signed with Electroperú S.A., a state-owned power generation and distribution company, after a public auction. The remaining energy will be sold on the spot market. Total average annual energy generation is estimated at 2,736 GWh.

The Chaglla project is being financed by equity contributions from Odebrecht and loans from a number of development and commercial banks. The total investment is estimated at USD 1.3 billion. The turnkey EPC contract is with a consortium of Odebrecht subsidiaries; a number of subcontracts (for example for the electro-mechanical equipment and the transmission lines) are with other contractors.

Assessment Process

The assessment was carried out as the second assessment under the IHA – Odebrecht Sustainability Partnership. IHA provided a team of assessors to conduct the assessment. The on-site phase was conducted in the period 11/06/2015 to 17/06/2015, and comprised site visits and interviews held in the project region, as well as in Lima and Washington D.C., and telephone interviews. A draft report was filed on 16/07/2015 and comments received from EGH/Odebrecht on 07/08/2015. Some additional information on the beginning of the

filling of the reservoir was received on 03/09/2015, and considered for the relevant topics. This final report was filed on 02/10/2015.

This is an official assessment. The assessment team are accredited by IHA, and the assessment was conducted with the full support of EGH/Odebrecht. There were no observers to this assessment.

Assessment Experience

The assessment was very well organised by Amalia Lorena Carrillo Vasquez of EGH (the single point of contact) and Luiz Gabriel Todt de Azevedo of Odebrecht, with the assistance of Edmaldo Luiz da Silva, the EGH Project Implementation Director, the Local Support Team, and staff from Odebrecht headquarters and the Santo Antonio project in Brazil. They assembled a substantial amount of documentary evidence, and organised interviews with internal and external stakeholders. Two senior social and environmental consultants of EGH also supported the assessment. The need for interpretation in some interviews was resolved with the use of a capable interpreter.

While the timing of the assessment – on short notice during a busy period of consolidation and finalization of works before reservoir filling – was a challenge, all parties contributed in a flexible manner to deliver a final report within 3 months of the decision to go ahead with the assessment.

Odebrecht has benefited considerably from the experience gained during the Santo Antonio assessment, in terms of systematically managing the large amounts of verbal, documentary and visual evidence involved in an assessment, to ensure that all statements in the assessment report can be clearly linked to specific evidence.

The Assessment Team would like to thank all of the EGH and Odebrecht staff involved for assisting the team during the assessment process. The Chaglla project is being implemented by a very impressive group of people, with a strong commitment to stakeholder relations and sustainability management. We would also like to thank all the internal and external interviewees for providing their time to gather and provide a wealth of evidence.

Layout of this Report

This report consists of twenty sections numbered in direct correspondence with the twenty topics of the Protocol's Implementation tool. Four appendices are provided, including the written letter of support of the project developer (required for an official Protocol assessment), and detailing the items of visual, verbal and documentary evidence referred to under each topic.

For each topic (except Indigenous Peoples, which is Not Relevant), findings are provided according to the criteria used in the Protocol's methodology: Assessment, Management, Stakeholder Engagement, Stakeholder Support, Conformance / Compliance, and Outcomes. Findings are presented against a statement of 'basic good practice' and a statement of 'proven best practice' for each, with a 'Yes/No' indication of whether the scoring statement is met. A summary of the significant gaps against the scoring statement, the topic score and a brief summary are presented at the close of each topic section.

1 Communications and Consultation (I-1)

This topic addresses ongoing engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The intent is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes maintain good stakeholder relations throughout the project life.

1.1 Background Information

This topic addresses all aspects of stakeholder engagement, and ongoing communications with corporate and project-related stakeholders.

The hydropower project is located within the jurisdiction of the Chaglla and Chinchao districts, in the provinces of Huánuco and Pachitea respectively, in the Huánuco department. The Chaglla-Paragsha Transmission Line (TL) will require rights-of-way in the provinces of Ambo (San Rafael and Ambo districts), Huánuco (Chinchao district), Pachitea (Umari, Molino and Panao districts), Daniel Alcides Carrion (Santa Ana de Tusi district), and Pasco (Pallanchacra, Simon Bolivar, San Francisco de Asis, Huariaca, Yanacancha and Chaupimarca districts).

Peru is a multicultural country, with more than 14 ethnolinguistic families and 72 ethnic groups. The National Institute of Statistics and Informatics (Instituto Nacional de Estadística e Informática) indicates that 16% of the adult population in Huánuco department was illiterate in 2013, the highest rate in the country.

The main stakeholder groups of the project are:

- physically and economically displaced families and otherwise directly and indirectly affected communities;
- temporary workers, suppliers and non-Odebrecht contractors working for the project;
- national, regional and local government institutions e.g. Ministry of Energy and Mines (MEM, Ministerio de Energía y Minas), Agency for Environmental Assessment and Enforcement (OEFA, Organismo de Evaluación y Fiscalización Ambiental), National Water Authority (ANA, Autoridad Nacional del Agua), Ministry of Culture, Supervisory Agency for Energy and Mining Investments (OSINERGMIN, Organismo Supervisor de la Inversión en Energía y Minería);
- Odebrecht employees;
- power offtakers and the Committee of Economic Operation of the National Interconnected System (COES, Comité de Operación Económica del Sistema Interconectado Nacional);
- NGOs;
- shareholders; and
- financing banks.

Stakeholder engagement issues related to specific topics are described under the stakeholder engagement criterion findings under each topic. Internal and institutional communications are also included in the scope of this topic, but other relevant aspects are elaborated in topics I-2, I-3, I-4 and I-12.

1.2 Detailed Topic Evaluation

1.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Communications and consultation requirements and approaches have been identified through an assessment process involving stakeholder mapping, supported by ongoing monitoring.*

The first identification and mapping of stakeholders was undertaken during the process of preparing the EIAs for the hydropower component (Walsh) and the transmission line (TL) component (JGP). The stakeholder identification for the hydropower component was carried out at the same time to establish the social baseline in the areas of direct (Pampamarca, Santa Rita Sur, Huanipampa and Higrompampa) and indirect influence (San Martín, Huanchag (Chulla), Agua Nueva y Pillcopampa). It involved workshops in Higrompampa, Huanipampa and Pampamarca, and interviews with stakeholders present in the areas of direct and indirect influence. The hydropower EIA indicates that TV, mobile and telephone communications are not available to all households in the communities in the area of influence; battery radios are commonly used, and some communities have a public phone. The EIA's social baseline also provides data on illiteracy levels by community, age and gender. One of the objectives of the assessment was to identify local leaders and the political and institutional actors, their demands, expectations and concerns.

Communication and consultation requirements in the Peruvian law are identified in both EIAs including special consultation requirements if the project affects rural communities ('comunidades campesinas') and indigenous communities ('comunidaded nativas'). The project does not affect indigenous peoples, but a number of 'comunidades campesinas'. Both EIAs describe the institutional context and their role in the project. The EIAs also make reference to other organisations with regional presence, for example, DEVIDA (Comisión Nacional para el Desarrollo y Vida sin Drogas), the Institute for Development and Environment (IDMA, Instituto de Desarrollo y Medio Ambiente), the NGO Islas de Paz, the Provincial Municipality and sectoral bodies, e.g. for health and education.

The Environmental, Social, Health, and Safety Management Plan (ESHSMP, equivalent to an EMP compliant with international standards) consolidates the stakeholder mapping for both the hydropower and the transmission line components, including stakeholders at community, district, provincial and regional levels. The ESHSMP also contains an analysis of potential conflicts associated with identified (internal and external) stakeholders to be considered in the Community Relations Plan, and a risks inventory is regularly updated.

During construction, EGH updated the list of community leaders and presidents to indicate their interests, level of influence and their views on the project using a 'traffic-light' colour score. The stakeholder mapping and the list of leaders is updated as necessary in response to the findings of social experts working with communities; the last update was undertaken in 2015 after elections in the communities. Communications requirements and approaches for affected local communities are described in the Communications and Consultations Programme of the hydropower EIA and the Social Communication Programme in the TL EIA, which considers the participation of vulnerable groups (e.g. women). In addition, the Citizens Surveillance and Monitoring programme allows local affected stakeholders to monitor the implementation of socio-environmental and communication programmes. The EPC contractor Chaglla Construction Consortium (CCC) has an internal communications procedure for community relations, which requires them to monitor and analyse complaints and inform EGH.

At the corporate level, Odebrecht's Code of Conduct identifies broad categories of stakeholders and ethical relations with: clients, shareholders, partner companies, competitors, employees, suppliers and public and private entities.

Altamedia, on behalf of EGH's parent company Odebrecht Energia del Peru S.A. (OEP) monitors positive and negative news and sources about the project in the media (radio, TV, internet, newspapers) and social networks. Results from the period Jan 13 – Jun 15 indicate that there were 310 positive news and 16 negative cases. Negative cases were grouped into three categories: institutional and client relations; finance; and health, safety and environment.

The results of the communication activities (e.g. complaint cases, comments gathered at the community offices) are analysed to verify their effectiveness, as indicated in the programme. EGH can also perform opinion polls and discussion groups for that purpose. The community relations plan is also reviewed biannually.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the stakeholder mapping takes broad considerations into account.*

The stakeholder mapping contained in the ESHSMP takes broad considerations into account. It identifies a broad range of stakeholders according to the influence of the project: directly or indirectly affected, with probable interest in the project, with probability to influence the results of the project or company operations, internal or external interest groups, groups to maintain consulted and engaged, and groups to maintained engaged in the discussion of migration issues. Stakeholders identified are mainly located in the local or regional context, but for specific topics, e.g. biodiversity, the ESHSMP identifies other interest groups, for example ECOAN, ProNaturaleza, APECO, Tingo María University. Particularly for the TL, there is also an identification of vulnerable groups, and monitoring of socioeconomic conditions also aims to identify such groups. The stakeholder mapping analysis indicates the relationship of communities within the area of influence with the Project (i.e., allied, neutral, or conflicting).

Since 2013, IP Mercado conducted social surveys to assess the perceptions of the population towards the project to identify potential negative impacts.

OEP also identifies image risks (in the form of a matrix) associated with stakeholder relations and project activities. For example, relations with the community of Pillao and the vegetation clearance are identified as potential risks for the company image.

Criteria met: Yes

1.2.2 Management

Analysis against basic good practice

Scoring statement: *Communications and consultation plans and processes, including an appropriate grievance mechanism, are in place to manage communications and engagement with stakeholders; these outline communication and consultation needs and approaches for various stakeholder groups and topics.*

EGH is responsible for the implementation of communications and consultations plans and processes and grievance mechanisms for the project. Relevant plans are described below.

Consultation and communication programme for the hydropower component: This plan applies to the area of influence of the project and requires constant communication and provision of adequate information. Activities include: meetings with local communities and authorities on environmental management and other issues of interest (e.g. employment); cooperation with local authorities; engagement with vulnerable groups; a citizen participation and information office at the camp site; and two suggestion boxes in Higrompampa and Huanipampa.

Community relations plan for the TL component, and social requirements compliance plan prepared by EGH: These require provision of information about the project and its progress (two public meetings and three

rounds of participatory workshops in 13 communities); information campaigns using local radio stations; provision of information on EGH's website on benefits, impacts, compensation measures and effectiveness and grievance mechanisms (information should be updated every three months); consultation with relevant social stakeholders; a grievance mechanism; a citizen monitoring programme; distribution of a monthly community bulletin and information about local development activities. During operation, the project will continue monitoring and evaluation of impacts; perform two annual meetings with communities; and distribute the community bulletin every two months covering issues such as restrictions of right-of-way, maintenance activities, and progress on social programmes.

Other programmes relevant for communications include hiring of local labour programme (see I-12), land compensation and negotiation programme (see I-9), programme for local development support (see I-7 and I-9), and the monitoring and citizens surveillance committee (see I-9). Jobs and skills required by the project are advertised through local newspapers and community boards.

The preparation of the Project Design Document (PDD) also involved a local and global consultation process (2007-2008) as required by the Clean Development Mechanism (CDM) regulations.

CCC has developed a quality system procedure called 'community relations plan' to ensure that the requirements of the communication programmes are communicated to contractors and subcontractors in case they receive a complaint from the local public. This includes a clear procedure to respond to and investigate complaints. CCC also has an internal communications procedure to deal with any project correspondence.

The programmes' activities include specific communications approaches for various groups with different needs. For example, local workers or potential workers can use the Citizen Information and Attention Centres; and vulnerable people receive information through local visits and radio announcements. There have been over 680 visits in 2012, 1,808 in 2013, and over 870 in 2014; queries are mainly related to negotiations over compensation and jobs at the construction site.

The plans for communication before the end of construction and before the filling of the reservoir were implemented in July 2015. The ESHSMP requires the provision of information in advance of future significant activities, but it does not specify timing of implementation. The communication plan for the filling phase was not explicitly required by the management plans, which may be the reason why they were prepared late in the construction process (see I-4).

Communication between EGH and CCC is undertaken through the reporting mechanisms described in topics I-3 and I-4. Internal communication is guided by the principles of the TEO (Tecnología Empresarial Odebrecht), Odebrecht's Communications Policy, and the Code of Conduct guides relations with external stakeholders.

At the corporate level, OEP's website contains a news site which is also used to make announcements and clarify statements made in the media. The website also provides the Ethics Line telephone and email. Although the project has a dedicated section on OEP's website, it seems that it is not updated regularly and it does not provide relevant information on mitigation measures or disclose the management plans. This is not a significant gap at this level, since affected groups do not have access to the internet and receive the information through the other mechanisms described above.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, communication and consultation plans and processes show a high level of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics; and processes are in place to anticipate and respond to emerging risks and opportunities.*

Consultation mechanisms included in the programmes described above aim to reach all members of the community in a culturally appropriate manner. Specific consultation meetings have been undertaken with

vulnerable groups affected by the TL. Communities decide the location and time of their meetings. CCC has informed relevant stakeholders on specific issues, e.g. in advance of blasting works.

Environ's reviews provide recommendations for improving relationships with stakeholders, for example exploring ways to improve the project's relationship with neutral stakeholders in order to gain a larger group of supporters.

The management plans require informing on upcoming activities, job availability and programme implementation. Communications approaches do not show a high level of sensitivity to the topics that are of interest to the communities, other than project progress and implementation of social and environmental programmes. Interviews with affected communities indicate that there are concerns about issues such as impacts of impoundment and the creation of the reservoir, and that causes the spread of false rumours. Some external interviewees also indicated that the project could disclose more information. Issues that could have been better communicated include: the functioning of a hydropower plant, climate change around the reservoir, and downstream flows variations over time. The Chaglla visitors centre has been visited by local schools, authorities and researchers, but not all affected groups had the opportunity to visit the construction site to have a better understanding of the works and how the plant will operate. In addition, disclosure of specific terms agreed with community leaders to the rest of the community would reduce the risk of misuse of compensation funds and later opposition, as seen in Pillao. The project has not taken some opportunities to disclose relevant project information to reduce uncertain opinions of affected stakeholders and the risk of opposition; this is a **significant gap**.

At the corporate level, there are also opportunities to disclose more up to date project information, particularly on sustainability issues through the Odebrecht, government and financiers' websites to reach a broader range of stakeholders. This is addressed in topic I-2.

Criteria met: No

1.2.3 Stakeholder Engagement

Analysis against basic good practice

Scoring statement: *The project implementation stage involves appropriately timed and scoped, and often two-way, engagement with directly affected stakeholders; engagement is undertaken in good faith; ongoing processes are in place for stakeholders to raise issues and get feedback.*

The project engagement activities with directly affected stakeholders have been appropriately timed and scoped, and often two-way. The EIA process in Peru requires three rounds of workshops, one before the preparation of the EIA, one during its preparation, and one after the submission of the EIA to the MEM; and disclosure of the public hearing information in a national newspaper. This process was followed for the Chaglla and TL EIAs. During construction, engagement with directly affected stakeholders included additional workshops and monthly community visits by community liaison officers. Visits of community officers are related to currently relevant topics. Thirty-five visits were undertaken in May 2015, and those were related to planned blasting and other construction activities, and the finalisation of construction and reduction of job opportunities.

Engagement is undertaken in good faith; this has been supported by directly affected interviewees. Project-related workshops and visits allowed participants to ask questions and receive feedback. Regulators such as ANA and OEFA did not raise any concerns with the project's level of communication with them.

There are ongoing processes in place for stakeholders to raise issues and get feedback. Those include the Centres for Information and Citizen Services (CIAC, Centro de Información y Atención Ciudadana), and community liaison officers' visits to affected communities. Any complaints received by CCC are analysed and responded to within 10 days. Any complaints received by subcontractors are forwarded to CCC within 24 hours.

The project keeps records of queries raised at CIACs, their status and how they have been responded to. In May 2015, CIACs registered 10 queries, mainly related to job opportunities.

Other project engagement initiatives related to specific topic issues are addressed under subsequent environmental and social topics; for example community environmental monitoring committees, and Tingo María National Park (TMNP) management committee.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, engagement is inclusive and participatory; negotiations are undertaken in good faith; and feedback on how issues raised have been taken into consideration has been thorough and timely.*

Engagement has been inclusive and participatory with affected stakeholders as indicated by external interviewees.

Project negotiations are related to land and right-of-way compensations, and partnership agreements with local and regional government and organisations. CCC has a documented negotiation process, and EGH also has a land acquisition process and has contracted specialist legal consultants to provide advice in the valuation and negotiation of land acquisition. Communities had an opportunity to negotiate, and have enough time to agree internally on the conditions of acceptance. Communities did not receive legal support, but it appears that they were able to negotiate a fair price, in most cases over the market values (see topic I-9). Negotiations have reached agreements without any court cases. Complaints received on payment of compensations, damage or loss of crops, infrastructure, or materials, have been solved adequately.

Interviewees also indicate that feedback provided was through and timely. As of June 2015, there were no outstanding queries to be responded to, and times set internally to respond to queries are followed.

Criteria met: Yes

1.2.4 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to communications and consultation have been and are on track to be met with no major non-compliances or non-conformances, and communications related commitments have been or are on track to be met.*

Key national regulatory requirements for communications and consultation are those set out for the EIA preparation process, and the requirements of the communications programmes in the management plans. Those have been implemented successfully and the objectives are on track to be met. Since there are no native communities in the project area, the prior consultation process is not applicable.

The Plan for Community Relations and Contractor Communications should comply with Performance Standards 1, 4 and 7 and the Manual for Community Relations of the IFC. Verbal evidence from project stakeholders and compliance reports from OEFA (annual) and Environ (quarterly) indicate that national and international requirements on communications and consultations have been met and no non-compliances have been raised in the last reports. Environ indicates that community relations continue to be good and the project responds well to grievances received.

The plans for communication for construction demobilisation and communication on the filling of the reservoir are still being implemented as described in the plans.

Odebrecht's sustainability policy is focused on 5 pillars, one of which is 'political participation', and there are no non-conformances with the objectives related to communications and consultations (e.g. transparent dialogue

with communities, governmental entities and society; helping to strengthen public institutions and civil society; and coordinating partnerships and cooperation).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances*

There is a minor non-conformance in relation to website communications and updates. The project website is not updated quarterly, and it does not provide the information specified in the plan for compliance with social requirements of the TL. This is a significant gap against best practice, but it is closely related to the gap under I-2, Stakeholder Engagement, and will not be double-counted. No other non-compliances have been identified.

Criteria met: No

1.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

The project has not taken some opportunities to disclose relevant project information, to show a high level of sensitivity of communication activities on the topics that are of interest to affected communities.

1 significant gap

1.3 Scoring Summary

The project has a comprehensive stakeholders map, which is updated as required and analysed according to the relationship of communities within the area of influence with the project.

Communications and consultation requirements for affected stakeholders have been identified and implemented as set out in the EMPs and ESHSMP communications programmes. However, there are opportunities for more proactive communications on issues of importance to directly-affected stakeholders, and disclose more project information. This would reduce uncertain opinions of affected stakeholders and potential risks of opposition.

Fully functional grievance mechanisms are in place during the construction period (CIACs, community officers visits and suggestion boxes). Queries are responded within a maximum of 10 days and responses are thorough and timely. Engagement and negotiations are two-way, and undertaken in good faith. Communications activities are compliant with applicable national legislation and international standards, but there is a non-conformance related to the disclosure of information on the project website.

There is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

1.4 Relevant Evidence

Interview:	3, 5, 9, 10, 18-20, 34, 57, 58, 62, 64, 69
Document:	7-22, 28, 82, 124, 130-132, 154, 176, 181, 204-205, 356, 369, 372, 383, 386-387, 399, 463
Photo:	1

2 Governance (I-2)

This topic addresses corporate and external governance considerations for the operating hydropower facility. The intent is that the owner/operator has sound corporate business structures, policies and practices; addresses transparency, integrity and accountability issues; can manage external governance issues (e.g. institutional capacity shortfalls, political risks including transboundary issues, public sector corruption risks); and can ensure compliance.

2.1 Background Information

The Odebrecht Group is a global organisation of Brazilian origin present in 21 countries, with diversified businesses and a decentralised structure. Odebrecht began operations in Peru in 1979 with the construction of the Charcani V hydropower project in Arequipa (the first project outside Brazil). Since 2012, Odebrecht has expanded its presence in Peru through Odebrecht Infrastructure, Odebrecht Latinvest, Odebrecht Latin Finance (OLF), Odebrecht Environmental and Braskem.

OLF has a portfolio of projects focused on power generation and irrigation. In the energy sector, OLF structures and implements concessions in Peru, Panama and Mexico, and the Chaglla project is one of them. The Peruvian power generation projects are managed through Odebrecht Energía del Perú S.A. (OEP) under OLF. OEP acquired Empresa de Generación Huallaga S.A. (EGH) in 2009, a special purpose company created specifically for the construction and operation of the Chaglla project.

EGH had a generation concession from the Ministry of Energy and Mines (MEM, Ministerio de Energía y Minas) to develop a 360 MW project which was modified in 2011 to reflect changes in the optimised design for 406 MW (as of June 2015, this is under revision to obtain a modified concession for 456 MW). The transmission concession for the Piedra Blanca TL was awarded in 2013, and for the 127.5 km main TL in 2014. EGH, OEP, and OLF signed legal stability agreements with MEM after the concession award.

EGH is responsible for supervising the EPC (Engineering, Procurement and Construction) contractor during construction. The EPC contractor is a consortium formed by Constructora Norberto Odebrecht S.A. (CNO) Sucursal Peru and Odebrecht Perú Ingeniería y Construcción S.A.S.C. (OPIC). Topic I-4 provides further details on the EPC contractor. During operation, EGH will be directly responsible for implementing the project socio-environmental monitoring programmes and supervising technical operation and maintenance contractors.

Important events from a governance perspective have been the award and amendments of the concession agreement in 2009 and 2011 and the current modification process, and the award of the PPA through an open public tender process.

Transparency International's Corruption Perceptions Index indicates that Peru's score was 38 on a scale from 0 to 100 in 2014. At the time of the assessment, there were investigations in Brazil for alleged offenses with respect to contracts between Odebrecht and other Brazilian companies with Petrobras. The individual and former individuals of a Brazilian affiliate of the company that were involved in such investigations have yet to file their defense with regard to the charges filed against them.

Issues of communication and engagement with all stakeholders beyond governance are covered under topic I-1. Governance-related issues related to procurement are addressed under topic I-8.

2.2 Detailed Topic Evaluation

2.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Processes are in place to identify any ongoing or emerging political and public sector governance issues, and corporate governance requirements and issues, and to monitor if corporate governance measures are effective.*

The formal responsibility for identifying and assessing governance issues lies with the head of OEP, who shares this responsibility with the head of Administration and Governance of OLF; these then report to the head of Odebrecht´s Latin America division.

Each project under OEP has a leader who manages the project as their own autonomous enterprise; this is part of the governance philosophy of Odebrecht. The head of OEP prepares an action plan for each project, and a business strategy with targets considering potential risks with the leaders of each project and departments. The head of Odebrecht's Latin America division meets quarterly with the head of OEP and the heads of each Latin American country operation to discuss progress and any issues related to the implementation of their respective action plans and business strategies.

Political, public-sector and corporate governance issues are primarily identified in the quarterly meetings held by the leader of Odebrecht Latin America division, and, at country level, in meetings between the head of OEP and project leaders. OEP carried out a risks analysis of the legal framework in Peru, and the head of OEP´s management advisor monitors any legislation changes and political, institutional/public-sector issues. At project level, a risks matrix has been produced for Chaglla that is regularly updated, and includes risks associated with legislation changes, reporting and compliance.

Odebrecht's communications team monitors risks in relation to the project, including negative media and communications, risks of opposition, institutional relations and political issues. OEP and EGH have legal-commercial departments responsible for monitoring any changes in the legislation, and legal compliance with contracts.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no significant opportunities for improvement in the assessment of political and public sector governance issues and corporate governance requirements and issues.*

There are opportunities for improvement of the assessment of corruption risks and their impact on the public image of the company, as those are not referred in any risk analysis. This is not a significant gap as there are no reported project cases of corruption. There are also opportunities for improvement in relation to transparency and communications, for example in providing project affected communities more information on compensation agreements with their leaders and disclosing project practices on OEP's website; these are covered under topic I-1.

Odebrecht has made an effort to incorporate IFC's recommendations regarding their Annual Environmental and Social Monitoring Report, a new and more transparent global site (www.odebrecht.com) launched in June 2014, an Ethics Line and monitoring of cases, and a new version of the Code of Conduct (see Management). In addition, OEP aims to prepare their first Global Reporting Initiative (GRI) compliant report.

OEP and EGH processes include the evaluation of potential project risks and capacity shortfalls and bring in external expertise and advice as required. The project is also audited internally against legislative and regulatory requirements, which provides opportunities for improvement.

2.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to manage corporate, political and public sector risks, compliance, social and environmental responsibility, procurement of goods and services, grievance mechanisms, ethical business practices, and transparency; policies and processes are communicated internally and externally as appropriate; and independent review mechanisms are utilised to address sustainability issues in cases of project capacity shortfalls, high sensitivity of particular issues, or the need for enhanced credibility.*

The Odebrecht Group is governed by Odebrecht S.A.'s Board of Directors, which is responsible for the Company's political and strategic decisions. Odebrecht's companies' directors (including OLF's director) report to the board through a group of Senior Support Officers and Advisors led by the CEO; they are responsible for implementing the Board's decisions. The head of EGH reports to the head of OEP, who reports to the head of OLF. The head of OEP is responsible for preparing an action plan aligned with Odebrecht's performance and strategic goals for the next 2 years. The plan takes into account the analysis of growth and energy projections in Peru and the socio-political situation and provides a business strategy based on the current scenario. The strategy is based on institutional and community relations, financing, quality and performance, energy market, image, sustainability, technical support and employees. In 2015, OEP consisted of 51 employees working on the Chaglla project, 25 employees working on new power generation projects (9 of which on the Belo Horizonte hydropower project), and 17 employees working for Odebrecht Energy (the head office). The Odebrecht Entrepreneurial Technology (TEO) and the Vision 2020 guide the corporate management and goals.

At project level, each work unit and contractors are responsible for monitoring compliance, and EGH and lender's consultants also verify compliance with concession agreements, contracts and international standards. Environmental compliance is driven by Odebrecht's Sustainability Policy. EGH's accounts are regularly audited by their financial auditors and the lender's auditors (pwc and Ernst & Young).

Odebrecht has a sustainability policy and a sustainability corporate team dedicated to its management and implementation of corporate socio-environmental programmes in their work regions. The corporate sustainability management system includes a manual and corporate procedures for the calculation of Environmental and Social Performance Indicators (IDA, Indicador de Desempeño Ambiental and IDS, Indicador de Desempeño Social). OEP and EGH do not have an Integrated Environmental Management System certified under ISO 14001:2004 (Environmental) and OHSAS 18001 (Health & Safety). However, CCC is certified to ISO 9001.

Procurement is guided by procedures for the acquisition of goods and services. Further details are provided in topic I-8.

Grievance mechanisms available to internal and external stakeholders include a free and anonymous phone and email called Ethics Line (línea ética). An Ethics Committee is responsible for analysing, investigating and addressing complaints following a clear procedure. Since its implementation in 2014, there have been 36 cases in Peru of which 13 are related to the Chaglla project. Verbal evidence indicates that none of them are related to corruption or bribery issues.

The TEO is based on human and career development and transparent communication between the leader and employees. The TEO is also the basis for defining the principles, commands and specific procedures contained in the Group´s policies and codes, such as the Code of Conduct. The Code of Conduct was launched in 2014 and applies to all of Odebrecht's companies, employees, client relations, shareholders, suppliers and contractors.

The TEO, Vision 2020, sustainability policy, Odebrecht annual report and the Code of Conduct are available on Odebrecht's website and intranet (in Spanish and Portuguese), and employees receive training on issues such

as the Code of Conduct and sustainability. Odebrecht's website and annual report provide a very brief update on the Chaglla project and its construction progress. Other policies, such as the communications or procurement policies are not on the website, but this is not a significant gap since relevant suppliers receive the information during the contracting process.

Independent review mechanisms have been utilised to address project sustainability issues in the case of highly sensitive issues, for example, through the involvement of a panel of experts on infrastructure safety, and the lenders' financial, legal, environmental and social, and engineering consultants. The project also receives the advice of an international panel of experts on social and environmental issues. The International Finance Corporation (IFC) carries out an annual review of CNO's Environmental and Social Monitoring Report against IFC's performance standards as part of a Partial Credit Guarantee Facility to increase the amount of surety bonds available for the CNO's construction contracts in Latin America. A similar monitoring process of social, environmental, occupational health, and safety issues is carried out annually since 2008 by the Interamerican Development Bank (IDB), also under a guarantee facility.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, contractors are required to meet or have consistent policies as the developer; procurement processes include anti-corruption measures as well as sustainability and anti-corruption criteria specified in pre-qualification screening; and processes are in place to anticipate and respond to emerging risks and opportunities.*

EGH's contractors and subcontractors are required to comply with Odebrecht's policies on sustainability, quality and sustainability procedures, and the Code of Conduct. Contractors and subcontractors are contractually required to comply with requirements in the EMPs.

Since 2014 contracts with suppliers and contractors include an anti-corruption clause and the Code of Conduct which guides the relationships between employees, suppliers, public officials and requires compliance with laws and regulations. However, sustainability and anti-corruption criteria in pre-qualification screening are not specified in the criteria for pre-qualification, approval, and selection of suppliers; this is a **significant gap** against proven best practice. Criteria for approving suppliers (and registering them on the corporate database of approved suppliers) are based on the best interest of the company and the technical and professional qualifications of the contractor or service provider. Selection is also based on technical and financial alignment with the contract terms of reference.

Risks and opportunities are largely managed through the processes described above under Assessment and Management, basic good practice. Evidence provided indicates that there are no irregularities in the award of any of the contracts, concessions, licenses and permits for the Chaglla project; for example, no corruption issues have been reported through the Ethics Line. Other governance risks identified are related to community relations (e.g. Pillao) and subcontractors (CAMESA). For further information see topics I-9 and I-8 respectively.

There does not appear to have been any systematic internal assessment of EGH's labour policies against Odebrecht's labour policy requirements (see I-12), but this is not considered to be significant.

Opportunities to improve governance have been taken in response to internal and external reviews, for example, the launch of a revised version of the Code of Conduct, the Ethics Line, and the retrospective inclusion of anti-corruption clauses in contracts.

Criteria met: No

2.2.3 Stakeholder Engagement

Analysis against basic good practice

Scoring statement: *The business interacts with a range of directly affected stakeholders to understand issues of interest to them; and the business makes significant project reports publicly available, and publicly reports on project performance, in some sustainability areas.*

Identified stakeholders include clients, shareholders, partners, competitors, suppliers and employees, communities and institutions. As described in detail under topic I-1, the ESHSMP communications programme describes approaches to consultations with project related stakeholders on issues of interest to them. The project is active in local and regional media, mainly through the Info Region magazines and Red TV news, to attend to the interests and concerns of local communities.

Shareholders received project information through the mechanisms described under Management, and employees have a direct relationship with their leaders.

The business reports on project progress and sustainability areas through the website, the bulletin called 'Pura Energía', a bulletin called 'Boletín Comunitario' distributed to local communities, news published on Info Region, and Odebrecht's annual report. Other significant project reports publicly available are: the EIAs and EMPs which were made public during the EIA process and remain at the MEM and municipalities affected, available on request together with concession files at the MEM; the IFC annual review which contain references to the Chaglla project; the IDB annual review; and the concession agreements.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the business makes significant project reports publicly available and publicly reports on project performance in sustainability areas of high interest to its stakeholders.*

Odebrecht's main report is the annual report, which refers to the progress in the construction of Chaglla. Odebrecht's website has a section dedicated to the Chaglla project, but it only provides a brief description of the project and progress. Results of the IDS/IDAs are not public but Odebrecht Peru intends to produce a sustainability report in the near future. Community bulletins are tailored to the interests of the local community; however, there is still uncertainty around particular project issues amongst some local communities (this is addressed under I-1 and I-9).

Financial information on the project to date is not published on the website or the annual report. However, shareholders and project lenders receive the audit reports. The PDD is available on the United Nations Framework Convention on Climate Change (UNFCC) website.

Regulators and EGH's lenders and auditors publish some relevant project information on their websites. For example, OSINERGMIN briefly reports on the progress of the project as a result of their inspections. Hard- and softcopies of the EIA reports or Executive Summaries were also widely distributed locally. However, there are more opportunities to disclose more up to date sustainability project information. The IDB and Odebrecht Peru websites publish information on project progress and project reports, but there have not been any updates since 2011 and 2013 respectively. The Chaglla EIA is available at the IDB website, but not the ESHSMP, and the TL EIA and EMP are significant reports that are not available online, and their contents are not disclosed either on the project website or through the annual reports. This is a **significant gap** against proven best practice.

Criteria met: No

2.2.4 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *The project has no significant non-compliances.*

Verbal and documentary evidence from regulators and lenders indicate that the company and the project are compliant with their governance obligations. For confidentiality reasons, assessors did not have access to the Ethics Line cases that are under internal review or their causes.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *The project has no non-compliances.*

The assessors have not identified any non-compliances.

Criteria met: Yes

2.2.5 Outcomes

Analysis against basic good practice

Scoring statement: *There are no significant unresolved corporate and external governance issues identified.*

The project is well on track towards meeting the requirements of the concession and PPA agreements. All formal compensation settlements have been finalised as required by national and international standards, and in cases beyond requirements. The project completed negotiating compensations with a group of opportunistic settlers in the reservoir area (see topic I-9) just before the filling of the reservoir. The project reports to external organisations (mainly regulators and lenders) as required. Odebrecht has implemented some measures to improve their public image (e.g. new website and Code of Conduct) and clarify some media accusations on corruption. There are no project-related accusations or investigations in this regard. No significant unresolved corporate or external governance issues have been identified.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no unresolved corporate and external governance issues identified.*

The assessors have not identified any unresolved corporate or external governance issues.

Criteria met: Yes

2.2.6 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

Sustainability and anti-corruption criteria are not specified in the criteria for pre-qualification screening, approval, or selection of suppliers.

Not all significant project reports are publicly available, and available information is partially outdated.

2 or more significant gaps

2.3 Scoring Summary

Odebrecht is a global group of Brazilian origin encompassing diversified businesses and with a decentralised structure. Each project under OEP has a leader who manages the project as an independent enterprise; this is part of the governance philosophy of the group, the TEO. Political, public sector and corporate governance issues are primarily identified in the quarterly meetings held by the head of operations, and, at country level, in meetings between the head of OEP and project leaders. Independent review mechanisms are employed for various issues, including environmental and social, engineering and infrastructure safety.

Odebrecht's sustainability policy and system, vision 2020, the TEO and the Code of Conduct apply to all Odebrecht companies including OEP, EGH, contractors and subcontractors. Contractors must comply with their policies and the Code of Conduct, and regulatory requirements as specified in the contract, as well as an anticorruption clause. There are no indications for irregularities in the award of any of the contracts, concessions, licenses and permits for the Chaglla project. However, sustainability and anti-corruption criteria are not specified in the criteria for pre-qualification screening, approval, or selection of suppliers, which is a significant gap against proven best practice.

There are opportunities to disclose additional and more up to date information on sustainability issues, and this is a significant gap against proven best practice. There are no identified unresolved corporate or external governance issues.

There are two significant gaps against proven best practice, resulting in a score of 3.

Topic Score: 3

2.4 Relevant Evidence

Interview:	2, 7, 9, 10, 18-20, 34, 57, 58, 62, 64, 69
Document:	1-6, 22-27, 29-43, 45-47, 55-56, 63, 132, 237, 331, 362-367
Photo:	none

3 Environmental and Social Issues Management (I-3)

This topic addresses the plans and processes for environmental and social issues management. The intent is that negative environmental and social impacts associated with the hydropower facility are managed; avoidance, minimisation, mitigation, compensation and enhancement measures are implemented; and environmental and social commitments are fulfilled.

3.1 Background Information

The EMP prepared as part of the EIA is the main instrument for managing environmental and social issues in Peru. In the case of hydroelectric projects, the EIA and the EMP are approved by the General Energy and Environment Directorate (DGAE, Dirección General de Asuntos Ambientales Energéticos) at the Ministry of Energy and Mines (MEM). The MEM seeks the opinion of the National Water Authority (ANA, Autoridad Nacional del Agua) and the National Service of Protected Natural Areas (SERNANP, Servicio Nacional de Áreas Naturales Protegidas) if the project requires the use of water and is likely to have an impact on protected areas, respectively. The approved EIA is one of the requirements for a hydropower project to obtain a concession, which is awarded by the Directorate of Electricity Concessions of the MEM. There are no other existing hydropower plants on the Huallaga River. There are other plants under construction in the Huánuco department: Carmen (8.4 MW) and 8 de Agosto (19.83 MW) on the Monzón river; and under preparation: Belo Horizonte (180 MW), Nueva Esperanza (9 MW), Muchcapata (8 MW), Chaupiyacu (12 MW), Karpa (19 MW) and Santa Lorenza (18 MW). Santa Lorenza is located on the Huallaga, upstream of the Chaglla project in the Ambo province, and its construction is planned to start in August 2015.

During construction and operation, the Agency for Environmental Assessment and Enforcement (OEFA, Organismo de Evaluación y Fiscalización Ambiental) is responsible for overseeing compliance with the EMP. Since the project is financed by international institutions, the project is required to comply with international environmental and social performance standards.

Peru has a strategic framework and national polices on climate change risk management, adaptation and mitigation. The EIA guide for the electricity sector (MEM, 2001) refers to potential climate impacts of hydropower projects.

This topic addresses stakeholder engagement in relation to the management of environmental and social issues. Wider issues of communication and engagement with all stakeholders are covered under topic I-1, Communications and Consultation.

This topic concerns the overarching processes for environmental and social issues management. If there are any specific environmental or social topic issues, those will be referenced in this topic and covered in detail in the specific topic.

3.2 Detailed Topic Evaluation

3.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Environmental and social issues relevant to project implementation and operation have been identified through an assessment process, including evaluation of associated facilities, scoping of cumulative impacts, role and capacity of third parties, and impacts associated with primary suppliers, using*

appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.

EGH commissioned the initial EIA for the hydropower project, which was approved in 2009 by the MEM. The EIA and EMP were updated by Walsh in 2010 to incorporate design changes as a result of an optimisation process. The updated EIA involved additional socio-environmental field surveys in both seasons in the case of environmental aspects. At the time of seeking project finance, the EIA and EMP were subject to a gap analysis to ensure compliance with the IFC performance standards. As a result of the gap analysis and in agreement with the lenders, EGH and their consultants prepared an additional set of assessments on fish and ecology data, water quality modelling, downstream flow modelling, a resettlement action plan, and an analysis of the project carbon footprint.

The hydropower project EIA includes access roads, deposits of surplus materials, quarries and borrow areas, organic waste and wastewater treatment facilities. The construction of the 34.5 kV Piedra Blanca-Chaglla TL and some deposits were not included in the EIA, but those were subject of an environmental impact statement approved by the Huánuco regional government in 2010 and by MEM in 2012. The EIA assesses negative and positive impacts during construction and operation. Key construction impacts include land acquisition, loss of vegetation and habitats, noise and air quality changes, waste generation, and employment generation; and during operation, reduced downstream flows, generation of royalties for local districts, and changes in water quality and sediment transport.

JGP Consulting Company prepared the EIA for the Chaglla-Paragsha TL and expansion of the Paragsha substation; this was approved separately by the MEM in 2013. The EIA assesses negative and positive impacts during construction and operation. Key impacts include acquisition of rights of way, fragmentation of habitats, changes in noise and air quality, effects of electromagnetic fields, and employment generation.

No scoping of cumulative impacts was undertaken during the EIA process, but this is not significant since there were no relevant cumulative issues with other existing or proposed projects. Potential cumulative effects between the TL and the hydropower component are managed jointly through the ESHSMP (e.g. waste generation, loss of vegetation). At project commencement, the project verified that there were no mining concessions in the project area. As of June 2015, there is now one hydropower project planned upstream of Chaglla.

JGP's and Walsh's teams include experts from multiple disciplines who are registered with the MEM as approved EIA consultants. The EIAs include chapters on legal frameworks that describe the role of third parties in the project (e.g. MEM, ANA, SERNANP). Their capacity is not assessed in the EIA but key regulators have dedicated staff or departments working on energy generation projects.

Impacts from primary suppliers were not assessed in the EIAs, although the use of local materials from certain areas and the deposit of spoil is part of the study. Contractors performing work for the project are required to comply with environmental and social contractual requirements, and CCC's procedures related to excavations, waste management, rehabilitation and slopes management. Routine inspections check contractors against those procedures. Alluvial materials are sourced locally from designated areas, and cement and wood materials are ordered from approved suppliers. CCC verifies the quality of materials.

Most of the socio-environmental programmes include assessment and ongoing monitoring of issues through investigations and analyses. CCC identifies and assesses the impacts from each activity in a matrix format which is linked to regulatory requirements.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of environmental and social issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

Monitoring of environmental and social issues during project implementation takes into account interrelationships amongst issues. As indicated in the project's ESHSMP, EGH socio-environmental staff coordinates meetings between different activities to analyse possible interrelations; for example, fish monitoring data are analysed together with water quality data.

The environmental monitoring program has shown that it can take into account new risks and opportunities that become evident during implementation.

The project EIAs identified a number of risks, including workers' safety, community opposition, accidents, fires, earthquakes, dam break, landslides and land contamination, potential increase of hunting, risks of encountering archaeological remains, risks of increased access to preserved areas, and loss of species. Examples of new risks that became evident during implementation and that have been incorporated to the monitoring programmes are the monitoring of Kudzu to check for its re-emergence, and monitoring of fish on Huallaga's tributaries.

New opportunities assessed and monitored are: the provision of training to local workers to increase local employability; and explore measures to contribute to a reduction in GHG emissions (e.g. composting organic waste).

Criteria met: Yes

3.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified environmental and social issues utilising appropriate expertise (internal and external), and to meet any environmental and social commitments, relevant to the project implementation stage; plans are in place for the operation stage for ongoing environmental and social issues management; and the environmental and social impact assessment and key associated management plans are publicly disclosed.*

The hydropower EMP was updated in 2013 to incorporate the results of the gap analysis and additional programmes for the TL in the form of an ESHSMP. The ESHSMP is the main instrument for managing social and environmental issues. EGH's sustainability team is responsible for the management of project environmental and social issues and the implementation of the ESHSMP and EIA requirements, and supervise contractors' environmental and social compliance. EGH also has direct responsibilities for managing project social issues. EGH undertakes periodic inspections to verify that the EIAs' requirements are fulfilled. The team is formed by specialist in relevant aspects. EGH is supported by an expert panel of three external environmental and social specialists with experience in hydropower and international standards, and consultants that are hired to carry out archaeological works and surveys, and to manage legal aspects of compensations.

CCC also has an environmental manager who is responsible for ensuring contractors' compliance. CCC submits a monthly management report that includes an annex on environmental and social management for the hydropower works and an annex on environmental and social management on the TL prepared by the responsible subcontractor. CCC also reports monthly on sustainability indicators to Odebrecht´s corporate sustainability unit.

The project has developed clear procedures ('sustainability procedures') for the implementation of the ESHSMP. For example, there are procedures for identification and assessment of impacts, inspections and non-

conformities, eradication of Kudzu, waste collection and disposal, potable water treatment, compensation of land acquisition, social communications, community relations, and training. Procedures are reviewed and modified as required.

EGH will be responsible for socio-environmental management during operation. EGH's structure is already defined. Procedures will remain the same. EGH has prepared a 'master plan' for impoundment, which identified impacts during the filling and programmes to minimise and mitigate them. EGH has also prepared a 'transition plan' to manage socio-environmental issues during operation and impacts during the transition from construction to operation.

Odebrecht has implemented a new environmental and social performance indicators system (IDA/IDS) that every project has to report on. The indicators are a series of questions and assigned scores. Chaglla performs as 'excellent' in the last quarter of 2014.

OEFA carries out annual environmental on-site inspections on short notice. The last inspection report (August, 2014) raised a few minor non-conformities; verbal evidence indicates that EGH has closed these observations. EGH has to send OEFA an 'annual environmental management report' reporting on socio-environmental programmes contained in the EIAs. After the inspection, OEFA prepares a legal report with any non-compliances raised or closed from the last visit. This will also be required during operation.

IDB and Environ also carry out on-site visits (annually and quarterly respectively) during construction. These will continue during operation until the loan is fully repaid, but less frequently. Two years after operation, they will conduct only annual monitoring visits instead of quarterly. Environ reports, and identify non-compliances and provides recommendations for corrective actions.

The EIAs and EMPs and approval resolutions were publicly disclosed during the EIA consultation process and are available for consultation at the MEM. The lenders also disclose some relevant socio-environmental studies, plans and reviews.

A PDD was produced in order to register the project for certification of emissions reductions under the CDM. The PDD and the validation report are publicly available. The project was registered in June 2013 and the validation report indicates that the total emission reductions from the project are estimated to be 12,702,294 t of CO_2e over a 7-year crediting period, averaging 1,814,613 t of CO_2e annually.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; and plans and processes are embedded within an internationally recognised environmental management system which is third party verified, such as ISO 14001.*

The project impacts matrices also identified risks and are regularly reviewed. The EIAs contain contingency plans to manage risks of fires, spills, use of explosives, health and safety risks, accidents involving vehicles, earthquakes, and dam break. Construction procedures include procedures for responding to emergencies, such as oil spills, control of spill kits, simulations and training of workers. The Code of Conduct (signed by all employees) includes sections on sustainability compliance.

EGH staff undertakes inspections and recommends opportunities for improvement. Other opportunities are taken with partnerships and support to local/regional institutions (e.g. support to Huánuco government for the protection of the Carpish forest), and engaging communities in sustainability awareness activities.

Odebrecht has a number of corporate sustainability programmes to implement its sustainability policy. Corporate programmes implemented on the Chaglla project voluntarily include: bolstering farm production and its distribution chain; strengthening the supply chain for coffee and cocoa in the Huánuco region; CREER, a capacity building program for local workers; and 'Joven Parceiro' (or young workers programme).

The socio-environmental management programme contained in the sustainability procedures is designed based on the requirements of ISO 14001:2004 and ISO 26000, and is applicable to all construction activities. The procedures describe how specific project activities are going to be undertaken (e.g. excavations and waste management). One of the procedures, the socio-environmental management programme, describes how the project will follow the corporate socio-environmental strategy and commitments. OEP's and EGH's socio-environmental management systems are not ISO certified, and there are no plans do so in the future. However, the project counts with a number of third party review processes; those include: the lenders' environmental and social environmental reviews; the environmental and social panel of experts; and the IFC's environmental and social review associated with IFC's Partial Credit Guarantee Facility review of CNO.

Criteria met: Yes

3.2.3 Stakeholder Engagement

Analysis against basic good practice

Scoring statement: *Ongoing processes are in place for stakeholders to raise issues and get feedback.*

Key ongoing processes in place for stakeholders to raise environmental and social issues and get feedback are: meetings with the directly-affected population groups (general and on particular issues, for example a public meeting held in 2014 to raise awareness on potential indirect impacts of the opened access of the Carpish Range); circulation of a monthly community bulletin; the Ethics Line; visits of EGH's social officers; community offices. Other relevant institutional stakeholders (e.g. OEFA) raise issues directly to Odebrecht through inspections, and/or direct communication (e.g. Huánuco government, SERNANP). See topic I-1 for further details.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, feedback on how issues raised have been taken into consideration has been thorough and timely.*

Feedback on issues raised though the mechanisms listed above has generally had a short response time, and is considered by stakeholders to be thorough and timely. See topic I-1 for further information.

This is supported by verbal evidence from regulators, such as e.g. OEFA and the MEM, and local / regional governments. Environmental and social issues raised by regulators and lender's consultants are taken into consideration thoroughly and timely.

Criteria met: Yes

3.2.4 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in the environmental and social management plans have been and are on track to be met with no major non-compliances or non-conformances, and environmental and social commitments have been or are on track to be met.*

The project's relevant processes and objectives on socio-environmental management are the ESHSMP programmes as well as other voluntary corporate programmes implemented in the project area, and national legal requirements and authorisations required for specific works (e.g. permits for the extraction of alluvial materials). These requirements have been included in CCC's environmental impacts matrix and EGH's environmental and social commitments matrix. The last OEFA's inspection report (August 2014) raised a few minor non-conformities; verbal evidence indicates that EGH has closed this observations.

The project is required to comply with the IDB Environmental and Safeguards Compliance Policy, the BNDES Environmental and Social Guidelines, and the applicable World Bank Group's Environmental, Health, and Safety Guidelines. Overall the project has improved its performance since commencement and the construction of the access roads. Environ indicates that the project is substantially complying with the social requirements. Minor non-compliances with international standards appear to be well-managed to avoid re-occurrences, and are closed within the expected timeframe, for example the management of risks in the Carpish area; management of holdout landowners; payment of compensations for loss of land or loss of crops, infrastructure, or materials; and regularisation of payments to suppliers or workers from CAMESA.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

The project has a well-functioning system to respond to non-compliances. As indicated above, the latest Environ report (2014) and verbal evidence indicate that there are five minor non-conformances that still need resolving to be fully compliant with international standards. Actions have been implemented to address these issues and prevent re-occurrence and therefore this is not a significant gap.

No non-compliances have been identified against national requirements; and no non-conformances with corporate sustainability policies have been identified.

Criteria met: Yes

3.2.5 Outcomes

Analysis against basic good practice

Scoring statement: *Negative environmental and social impacts of the project are avoided, minimised and mitigated with no significant gaps.*

Negative socio-environmental impacts have generally been avoided, mitigated or compensated with no significant gaps as evidenced in the EIAs, ESHSMP, studies and reviews undertaken by EGH's and the lenders' socio-environmental consultants. Environ's report indicates that EGH and CCC are effectively managing the vast majority of the potential project-related environmental and social impacts. This is also confirmed with interviews with OEFA and other external interviewees.

Voluntary programmes have also delivered their results. For example, the CREER programme has trained 1,489 people, of which 671 are working on the project, and 100% of the generated organic waste is composted.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, negative environmental and social impacts are avoided, minimised, mitigated and compensated with no identified gaps; and enhancements to pre-project environmental or social conditions or contributions to addressing issues beyond those impacts caused by the project are achieved or are on track to be achieved.*

Negative impacts have generally been avoided, mitigated or compensated with no identified gaps. Environ's reports indicates that mitigation measures in place have been generally successful in avoiding, minimizing, or compensating the project's potential or actual adverse impacts, evidenced by minimisation of potential immigration impacts and lower rates of conflicting opinions. OPIC has been recognised as a 'Socially Responsible Company', an award given by the Peru 2021 Foundation for its ethical and transparent performance and good relations with the communities and the environment.

Examples of enhancements to pre-project environmental and social conditions include support to protect the Carpish range and tributaries (see I-15) and additional social services (see I-9 and I-7). Examples of contributions beyond impacts caused by the project include the registration of new species and publication of biodiversity books (see I-15), and enhanced local technical capacity.

Criteria met: Yes

3.2.6 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

3.3 Scoring Summary

Project socio-environmental issues and risks have been assessed in two EIAs and an environmental statement. Ongoing assessment of impacts and emerging issues and risks is carried out as part of the project procedures, taking inter-relationships into account. The implementation of the EMPs, ESHSMP and project-specific management procedures guides the management of socio-environmental issues.

CCC processes and procedures are certified in accordance with ISO 9001, but not to 14001 or OHSAS 18001, and there are no plans to certify the project once it starts operating. The socio-environmental management system is audited internally, and the environmental and social management processes are third party verified.

Processes are in place for stakeholders to raise issues, and feedback provided by the project is generally considered thorough and timely by both project-affected communities and regulators.

The project regularly reports to OEFA on the EIA requirements, and to the lenders and their environmental consultants (Environ). The project is required to comply with a number of international environmental and social standards. Although the project's performance has improved since the start of construction, it has some remaining minor non-conformances. These are addressed within established timeframes and managed to prevent re-occurrence.

Negative impacts from the project are generally avoided, minimised, mitigated or compensated and the project has contributed to enhance the pre-project socio-environmental conditions through project-related activities and partnerships, and Odebrecht's corporate sustainability programmes.

There are no significant gaps against proven best practice, resulting in a score of 5.

Topic Score: 5

3.4 Relevant Evidence

Interview:	3, 8, 9, 18-20, 34, 57, 58, 62, 70, 73
Document:	1, 9-11, 21, 23-25, 32, 34, 36-38, 42-88, 95, 124, 126, 128, 129, 131-132, 148-149, 173-177, 179, 181-183, 200, 218, 222-224, 260, 267, 272, 331, 372-383, 416-419
Photo:	4, 5, 106-107

4 Integrated Project Management (I-4)

This topic addresses the developer's capacity to coordinate and manage all project components, taking into account project construction and future operation activities at all project-affected areas. The intent is that the project meets milestones across all components, delays in any component can be managed, and one component does not progress at the expense of another.

4.1 Background Information

Organisation of the construction of the hydropower project is under the responsibility of EGH, as the project developer and operator. The construction of the hydropower project is being carried out by an EPC contractor, the Chaglla Construction Consortium (CCC) formed by CNO (55%) and OPIC (45%) under a lump-sum contract with EGH. Worley Parsons is the owner's engineer. CCC is responsible for preparing the basic and detailed engineering designs, supervision of electromechanical equipment installations and quality control, manufacturing plants inspections, supervision of commissioning of the project, procurement of necessary goods and services, and some of the environmental management (obtain licences; implement archaeological, waste, noise and air quality monitoring programmes, and social management programmes; train local population, employees and subcontractor on environmental issues).

OSINERGMIN is responsible to verify compliance with the commitments and the schedule specified in the Concession Agreement.

Intertechne (with assistance from Odebrecht Engineering) is the consortium's engineering designer, with responsibilities to elaborate the detailed designs for the hydropower project. The consortium contracted Alstom to manufacture, transport, install and test the electromechanical equipment.

CAMESA was responsible for the construction of the 220 KV Chaglla-Paragsha TL and the expansion of the Paragsha substation (civil and electromechanical works), as the EPC contractor for the TL. The works were directly supervised by EGH. CAMESA became insolvent in 2015 and their responsibilities were transferred to Union Eléctrica in June 2015, under subcontract with CCC.

EGH is finalising the contract with Alstom (as of June 2015) for electromechanical operation and maintenance (O&M). Odebrecht Energy Supplier (OCE, Odebrecht Comercializadora de Energía) will be responsible for buying and selling energy as the point of contact for COES. EGH will be responsible for the maintenance and operation of civil works and for the implementation of the socio-environmental programmes during operation.

Hydropower construction began in May 2011, and the Huallaga River was diverted in August 2012. In the EPC contract, the filling of the reservoir was planned for November 2015, with the first unit to be tested in November 2015 and the second unit in December 2015, seven months ahead of the schedule set out in the concession agreement (31.07.2016). The construction of the TL began in July 2013 and it is planned to be completed and tested by September 2015.

As of June 2015, the main ongoing project activities encompassed: reinforcement works of the headrace tunnel; finalisation of the intake gates, small hydropower plant, and spillway civil works; finalisation of the concrete dam face; installation of spillway gates; installation and dry testing of electromechanical equipment in the main and the small powerhouse; supply and installation of electromechanical equipment for the TL; contractual process with Alstom (O&M); finalisation of compensation of opportunistic settlers in the reservoir area; preparation of socio-environmental plans for operation; and transition activities from construction to operation.

This topic focuses on the management processes for project delivery. Detailed governance and environmental and social issues of the project are addressed under topics I-2 and I-3 respectively.

4.2 Detailed Topic Evaluation

4.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Monitoring of project progress, milestones, budget and interface issues, and of the effectiveness of management of implementation stage plans including construction management, is being undertaken on a regular basis during project implementation.*

Between the purchase of EGH by Odebrecht in 2009 and financial close in 2013, there were multiple and often parallel steps in project preparation, including concession awards and amendments, preparation and approvals of EIAs, optimisation processes for project siting and installed capacity, negotiation of EPC contracts and amendments, power auction, negotiation of PPA and amendments, negotiations with lenders, land acquisition and early construction activities.

The EPC contract contains the main construction plan including a chronogram for the following packages: basic engineering; camp mobilisation and access roads; hydropower civil works (dam, spillway, minimum flows, headrace tunnel, intake, powerhouse with the manufacture, supply, installation and testing of electromechanical equipment, drainage works, substation); environmental protection works; small hydropower plant; LT and expansion of Paragsha substation. The EPC contract foresees commissioning of both generating units in January 2016, seven months before the requirements of the concession agreement. The current EPC contract includes a monthly investment programme.

EGH, together with the owner's engineer, is responsible for monitoring the EPC contract progress, milestones, budgets and construction interface issues. The owner's engineer prepares monthly reports to EGH, reporting on actual completed work and costs, compared with the expected values as in the EPC contract. OSINERGMIN also undertakes monthly checks on construction progress of both components to ensure that the concession agreements are followed and that power generation will be delivered to Electroperú as agreed. EGH is also responsible for implementing and monitoring progress of the social and biodiversity programmes, and identifies any interface issues with other project components during construction and operation. As of June 2015, critical construction paths were the completion of the concrete face (by October 2015), and the filling of the reservoir (in November 2015).

Key interface issues under EGH's responsibility are the completion of the negotiation and compensation process for opportunistic land occupiers in the reservoir area, and the completion and implementation of transitional and operation socio-environmental plans.

CCC is divided into work units: TL, equipment, electromechanical equipment, commercial and contracts, logistics, engineering and quality control, manufacturing and installation ('production'), and health and safety. CCC's work units directors meet every month to coordinate the activities for the next 3 coming months, verify if there is anything that needs changing from the previous month, and possible interface issues. Each work unit divides their activities in work packages with a manager who is responsible for planning their budget, materials and resources, and this is approved and monitored by the work unit director. Each worker has to complete a diary report ('daily productivity report') with actual activities completed, resources and worked hours compared to forecasted activities.

Subcontractors report to CCC with monthly progress reports including deviations. Monitoring is also carried out at bi-weekly technical planning meetings. The engineering is also monitored by the lender's engineers (Mott MacDonald). Health and safety procedures are monitored by EGH and Odebrecht headquarters staff from Brazil. There is also regular coordination between the work units and the environmental managers from EGH and CCC. Environmental and social management on site is also monitored by the lender's environmental consultants (Environ) on a quarterly basis (further details are provided in topic I-3).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of the overall project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

EGH has already defined their organisational structure and defined responsibilities for the operation phase, and developed a 'transition plan' for the filling phase and a master plan for the operation phase. Key technical construction risks have been identified and considered in the engineering designs (see I-5) and socio-environmental risks are identified through a specific process (see I-3). Key risks during the transition between construction and operation are associated with the on time completion of preparatory works and implementation of the transition plan (see I-18), community information campaigns for the filling of the reservoir (see I-1 and I-18), and communication of emergency preparedness response plans (see I-5).

A major project risk identified during construction is that longer sections of the spillway tunnels required reinforcements, which had additional costs and timing implications. This resulted in the identification of opportunities to adapt the construction equipment used in the tunnelling works. These are closely monitored to ensure that even though they are on the critical path, they are not delaying the overall project schedule. An opportunity identified during implementation is the increase in capacity from 406 to 456 MW.

CCC's monitoring processes described above serve to identify, and solve potential interface issues between manufacturing, delivery, installation and commissioning of electro-mechanical equipment, and other civil works. CCC's quality check procedures help to identify potential problems in equipment and materials and report them to suppliers. Bi-weekly and monthly meetings mentioned above address emerging interface risks and look at opportunities for improving co-ordination and progress. Health and safety risks are mapped for each working activity and training is provided regularly on health, safety and environmental issues. Bonuses are on offer for completing works in advance, and penalties are included in contracts if there are delays.

Criteria met: Yes

4.2.2 Management

Analysis against basic good practice

Scoring statement: *An integrated project management plan and processes are in place that take into account all project components and activities with no significant gaps; and a construction management plan is in place that describes processes that contractors and others are required to follow to manage construction related activities and risks.*

The EPC contract describes the construction activities, milestones, scheduling and budget for all project activities under CCC's responsibility to ensure compliance with the concession agreement and the PPA. Work activities have their own procedures under CCC's management system, including procedures for the identification of health and safety risks for each activity. Subcontractors report to CCC using a predefined template that includes details of progress and potential issues (e.g. deviations from the contract and comments on activities). Deviations are also presented in daily productivity reports from each work unit. Subcontractors are responsible for health, safety and environmental management related to their activities following CCC's procedures. Other risks and interface issues are identified at daily and bi-weekly meetings, monthly planning meetings, and reviews undertaken by the owner's and lenders' engineers and consultants.

CCC's quality system is certified to ISO 9001. The CCC uses the CITADON document management and sharing system. CITADON has clear processes for generation, review and approval of project engineering and documents, and limits access to documents to relevant staff. The procurement documentation is also saved on CITADON.

The EPC contract includes penalties for delays in completing construction activities (none to date), and a conflict resolution process. CCC's contracts with subcontractors also include penalties in case of delays, and provide incentives for finalising activities ahead of schedule.

Elements not included in the EPC contract (e.g. biodiversity plans, social issues management and reservoir preparation) are contained in separate plans developed and implemented by EGH, mainly the transition plans, the emergency response plans and the social plans (including communication during the filling). EGH manages interfaces with CCC at planning meetings and through the reporting processes described under Assessment.

Both EGH and CCC have processes in place to identify, report, and address no-conformities raised by their internal or external audits.

EGH has a pre-operative plan approved by COES, and a defined structure for operation. Measures in place to ensure the transition from construction to operation include: incorporation of construction staff to the operation teams; agreements with contractors to implement plans during the filling and operational activities (e.g. Alstom, OCE); two staff from OCE are already working with COES to plan operations; demobilisation plans for the end of construction; plans for the preparation and filling of the reservoir.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the plan identifies a range of potential interface issues and sets out measures to manage interface and delay issues without impinging on overall project timetables and budgets; processes are in place to anticipate and respond to emerging risks and opportunities; and construction management plans ensure that land disturbance and waste generation activities will be managed so that later rehabilitation activities can be undertaken efficiently and effectively.*

CCC identifies potential interface issues and critical routes using MS Project and quarterly and monthly planning meetings and daily reports. The EPC contract includes clauses to allow flexibility/negotiations in budget. EGH identifies interface issues with CCC's activities though bi-weekly meetings. Internal and external inspections can also identify potential interface issues. For example, Environ raised a concern with the timing of compensation for occupiers in the reservoir area prior to filling. Examples of well-managed emerging interface issues are the increase of EGH's responsibilities over socio-environmental issues management, and procuring services from Union Eléctrica once CAMESA became insolvent in 2014. This caused some non-conformities, but did not have an impact on the overall project schedule and budgets, and EGH responded promptly.

Processes in place to anticipate and respond to emerging risks and opportunities include daily reports, planning and management meetings, inspections and audits (and the implementation of corrective actions), and procuring external expertise on specific issues. The structural damage of Mallgotingo bridge in March 2015 due to a flash flood during the rainy season was an example of an emerging risk. CCC was able to create an alternative route for vehicles and Mabey inspected the site to provide expert advice; the bridge was in use again in June 2015. Examples of opportunities include the use of new engineering technologies to save time and costs, for example the design of a mobile working platform to work on the concrete dam face more efficiently, safely and quicker, and preferences for keeping local EGH or CCC employees in EGH's operation team.

Contractors are required to present a programme to show how they will be able to complete activities on the critical path on schedule. This was the case, for example, for the works on the critical path on the embankment and at the upstream end of the spillway.

Risks and opportunities associated with the transfer from the construction and filling period into plant operation is an important project management component under EGH's responsibilities. EGH's master plan for the preparation of the reservoir has recently been prepared. Although the plans' chronograms show that the

proposed timing is followed, there was limited time to respond to risks if the implementation did not proceed as planned, with a potential impact on the EPC scheduling. For example, if the occupiers in the reservoir had decided to enter in a judicial process or if archaeological finds had been made during reservoir preparation, this might have delayed the planned filling date. Other risks are associated with communicating how the project will operate and the reduced flows downstream (see topics I-1, I-19 and I-20). Nevertheless, even if these risks were to materialise, because the project is ahead of schedule it is likely that it would still be able to meet the original targets associated with the concession and PPA.

The EPC contract contains two detailed annexes that specify the processes that need to be followed by CCC with regards to environmental as well as occupational health and safety issues. The contract also sets out the implementation of programmes of recuperation of degraded areas (e.g. spoil deposits and quarries), the treatment and control of liquid effluents, and the management and disposal of solid wastes (see topics I-3 and I-18). The project has 21 spoil deposit sites in use of which 5 were approved with the EIA, 9 were presented in the specification to the second revision, and 7 new areas were presented through an additional technical report. Topsoil has been removed, piled and kept for reuse in re-vegetation projects, 100% of the generated organic waste is composted and re-used in re-vegetation, and spoil dumps are landscaped, covered and re-vegetated with good results. Although at the beginning of the project revegetation of slopes along the access roads experienced some issues (see topics I-3 and I-15), corrective action plans have helped to manage non-conformities. Visual evidence shows good current site management of these aspects.

Criteria met: Yes

4.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in the integrated project management plan and the construction management plan have been and are on track to be met with no major non-compliances or non-conformances.*

The project is in full conformance with the EPC contract project master plan with no major non-compliances in project management. OSINERGMIN has not raised any non-conformances with the concession agreement. CCC's quality management system is certified to ISO 9001:2008 for constructing hydropower plants in Peru, by Bureau Veritas. The last audit did not encounter any non-conformances.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

There is no evidence of non-compliances or non-conformances with project management and construction management planning. The implementation of the pre-operational plans has little flexibility and contingency time and could develop into a gap if reservoir filling and related activities do not proceed according to plan.

Criteria met: Yes

4.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *The project is meeting overall budget and timing objectives and targets; interface issues are managed effectively; and construction risks are avoided, minimised and mitigated with no significant gaps.*

The project is meeting overall budget and timing objectives and targets against the EPC contract, the concession agreement and the PPA requirements. Filling of the reservoir began in September 2015 (November in the EPC contract). The first unit is to be commissioned by the end of November 2015 (December in the EPC

contract), and the second by the end of December 2015 (January in the EPC contract). The operation is planned to commence 7 months ahead of the schedule specified in the concession agreement. As of May 2015, 92% of the hydropower component was completed (against 85% of planned progress), with the turbines and most of the electromechanical equipment installed and undergoing dry testing. The spillway civil works and the dam concrete face works are on the critical path. Intertechne is preparing impoundment and commissioning plans. As of June 2015, the expansion of the Paragsha substation and the settlement of compensations for rights of way were completed, and 95% of the TL civil works were completed. There are some delays in the construction of the penstock of the small power plant, but this does not have an impact on the main schedule or minimum flows during filling.

The project is on track to be completed ahead of the EPC contract schedule if EGH's reservoir filling master plan continues to be implemented as planned. CCC experienced additional but manageable costs related to the tunnelling of the spillway and access roads, and these additional EPC costs are negotiated with EGH. Interface issues are managed effectively, particularly to enable the early delivery, installation, testing and commercial operation of the generation units.

Construction risks have been avoided, minimised and mitigated with no significant gaps. EGH and CCC have demonstrated capacity to successfully address unexpected interface issues, for example changes in the location of the camp due to the presence of archaeological remains.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, interface issues are anticipated, and avoided or minimised; and construction risks are avoided, minimised, mitigated and compensated with no identified gaps.*

CCC's internal interface issues are anticipated, and avoided or minimised through the management processes described above. EGH identifies, avoids, mitigates and manages interfaces between their social and environmental commitments and CCC's works. For example, coordination of land acquisition compensations, vegetation clearing and fauna rescue prior to and during impoundment stages.

Good examples of the anticipation, avoidance and minimisation of interface issues are the management of CAMESA's works on the TL to Paragsha, and logistics measures put in place to ensure quality and safe transportation of electromechanical equipment from Brazil.

There are no apparent gaps in avoiding, minimising, mitigating or compensating construction risks that have materialised, for example dust and noise nuisance, transport disruptions, additional land acquisition compensations, biodiversity offsets, unexpected encounter of archaeological remains and rock types, and avoiding or minimising health and safety risks.

Criteria met: Yes

4.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

4.3 Scoring Summary

The management of the Chaglla project is being undertaken at two levels: (i) EGH managing social and some environmental aspects during construction, impoundment and operation, managing operation activities, and overseeing compliance with the EPC contract and concession agreement, with support from the owner's and lender's engineers and consultants; and (ii) CCC managing construction works and subcontractors until commissioning date (planned in January 2016).

As of May 2015, 92% of the hydropower project was completed (against 85% of planned progress), as well as 95% of the TL civil works. The project is on track to be completed as scheduled in the EPC contract and 7 months ahead of the schedule in the concession agreement. Although there have been minor delays in the spillway tunnel works and small power plant, those are managed adequately and have not caused an impact on the overall schedule, and additional costs are manageable.

There are numerous examples of anticipation, avoidance, minimisation, management and compensation of construction-related risks. There was a risk of delay related to the settlement of compensations and low timing flexibility in the implementation of the impoundment master plan, as also discussed under topic I-19. The project has demonstrated examples of identification and preparation of plans to manage interface issues prior and during impoundment.

Topic Score: 5

4.4 Relevant Evidence

Interview:	5, 20, 21, 57, 64
Document:	29, 39, 89-126, 308, 384-385, 463
Photo:	6-8, 10, 12, 14

5 Infrastructure Safety (I-5)

This topic addresses management of dam and other infrastructure safety during project implementation and operation. The intent is that life, property and the environment are protected from the consequences of dam failure and other infrastructure safety risks.

5.1 Background Information

The Chaglla project has been designed, reviewed, approved and implemented by a group of developers, consultants, regulators and contractors with strong hydropower experience. EGH, with assistance from Intertechne, prepared feasibility and optimisation studies, starting from the initial concept design used to obtain the permanent concession for the development of a 406 MW hydropower project.

There are no agencies regulating dam safety in Peru, although there are plans to create an entity as part of the National Water Authority (ANA, Autoridad Nacional del Agua). The Ministry of Energy and Mines (MEM) reviews the feasibility studies to award concession. The National Institute of Civil Defence (INDECI, Instituto Nacional de Defensa Civil) is the national agency responsible for implementing the national risk management system, and developing emergency preparedness and response processes. Natural risks that may occur in the project area include earthquakes, floods, and landslides.

The concrete-face rockfill dam is 202m high and 273m long, with a net head of 336 m. The Maximum Probable Flood (MPF) is 6,527 m^3/s. During construction, upstream and downstream cofferdams were built, designed for a 50 year return period, with impermeable materials and earthquake-resistant.

The full supply level is at 1,196 m.a.s.l. and the water intake for generation is at 1,180 m.a.s.l to the left of the three spillway intake gates (one is complementary). The spillway tunnels will always be full of water during operation. The headrace tunnel is approximately 15 km long, divided in different sections and four work front accesses, and includes a surge shaft at about 900m upstream of the powerhouse. The spillway tunnels have an average length of 960 m and the design flow is 5,160 m^3/s.

During the filling, an outflow tunnel will discharge the required minimum flow. The intake for the small hydropower plant is located by the spillway tunnel closer to the dam.

This topic focuses on infrastructure, community and environmental safety. Public safety risks are considered in scenarios of dam break, dam releases, operation and maintenance of roads and the TL, and navigation in the reservoir (see topic I-18). Access to the site required the construction of a main road of 23 km with associated tunnels and bridges, which are also used by local communities. The safety of workers is addressed in detail under topic I-12.

5.2 Detailed Topic Evaluation

5.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Dam and other infrastructure safety risks relevant to project implementation and operation have been identified through an assessment process; and safety monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

The design and construction teams as well as the owner's engineers include the full range of specialists (e.g. engineering geologists, civil engineers, dam safety specialists, mechanical and electrical engineers) with a

proven record of designing and building hydropower plants in similar environments. The project is also advised by a panel of three independent experts.

Key dam and infrastructure risks have been identified during the project design and its optimisation, and the risks continue to be monitored during construction. The current design is based on the results of: cartographic data and surveys, a hydro-meteorological assessment, sediment samples, geological and geotechnical assessments, calculations of the MPF at different sections of the Huallaga river, reservoir assessment, retention times and sedimentation, geological faults, seismicity potential, geodynamics and karst potential, and the analysis of materials used for construction.

The Chaglla feasibility design was modified by Intertechne to include elements that provide better infrastructure safety, including an increase of the dam height (by 6 m) to avoid the construction of a bottom outlet and allow the retention of more sediments in the reservoir before they affect operations; modification of downstream slopes; modifications of the plinth; adoption of a tunnelled spillway to flush sediments when needed in the future, instead of a bottom outlet which could be blocked and be inaccessible for repairs at this depth; increase of the diameter of the diversion tunnel to 12.5 m; changes in the location and geometry of the main powerhouse and the generation circuit of the small powerhouse.

During construction and impoundment, key risks considered include: potential rock burst along the access roads and construction access points; landslides and slope instability; infiltration and collapses in tunnels; flash floods; earthquakes; fires and explosions; overtopping of coffer dams; and third party risks (e.g. terrorism). Public safety risks are considered in the design and construction of roads (e.g. dust, vibration and noise nuisance, accidents), impoundment preparations and procedures, and site access and management.

During operation, key risks considered include: dam overtopping and seepage; dam break; instability and landslides in the reservoir area; erosion in tunnels, dam, and spillway gates; obstruction of the intake and spillway tunnels; erosion downstream of the spillway; spillway gates failure; electromechanical failure; and sediments accumulation in the reservoir. The project has used the criteria set by the International Commission on Large Dams (ICOLD) for the design of major safety-related infrastructure, such as spillways, designed to discharge the MPF. The Maximum Credible Earthquake was calculated for a 10,000-year return period.

Monitoring instrumentation has been installed to monitor identified risks during construction and operation including: topographic measurement points for settlement; gauges to measure seepage; thermometers within the concrete face; flow measurements; extensometers; piezometers; accelerometers; superficial control points; terminal boxes and settlement cells. EGH will be responsible for monitoring civil structures and analysing data. Spillway gates and tunnels will be maintained and inspected; for this purpose, there are structures that allow the installation of temporary internal gates. Erosion during spilling periods caused by flow variations has been calculated and is not considered an issue. The sediment retention capacity was calculated using Brune's methodology in 'Design of small dams: a water resources technical publication. Bureau of Reclamation (1987)'; results were used to evaluate the frequency of maintenance of the turbines. Alstom will be responsible for monitoring electro-mechanical equipment and the TL. Monitoring plans are not available yet as Alstom is still being contracted.

During construction, seismic data is retrieved from the National Geophysical Institute (Instituto Geofísico del Peru), which monitors seismic activity through a national network of seismic stations.

CCC has a quality procedure to monitor of the quality of all structures during construction. Intertechne prepares a monthly report that contains an analysis of the dam instrumentation data. Worley Parsons (the owner's engineer) and Mott MacDonald (the lenders' engineer) supervise the quality of structures, including the TL. The independent dam safety experts normally visit the site every five months.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, consideration of safety issues takes into account a broad range of scenarios and both risks and opportunities.*

Public safety issues are considered across a broad range of scenarios. For example, public safety risks are included in project emergency plans that describe three different emergency scenarios. Design parameters are more conservative to account for potential climate variability effects. The project intends to flush sediments through the spillway to increase the project life considering the sedimentation of the reservoir, which will require adequate tunnel maintenance. The small power plant has an emergency ecological flow release system in case of failure.

Risks and opportunities for improvement are analysed in the lenders' and owner's engineers' inspections and reports, and results of simulations. Examples include drivers training on safety issues. EGH has prepared a preliminary risk analysis of navigation services in the reservoir. It is not clear how the risk of landslides into the reservoir has been taken into account, although verbal evidence indicates that geologists inspected the reservoir area.

Criteria met: Yes

5.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to address identified dam and other infrastructure safety issues, and to meet any safety related commitments, relevant to the project implementation stage, including providing for communication of public safety measures; a formal quality control program is in place for construction; safety management plans for the operation stage have developed in conjunction with relevant regulatory and local authorities; and emergency response plans include awareness and training programs and emergency response simulations.*

Construction and infrastructure safety related commitments are contained in the EPC contract and technical specifications. CCC has implemented a set of quality management procedures certified to ISO 9001:2008 to meet the requirements. Quality is also verified by the owner's and lenders' engineers. Intertechne prepares detailed designs that go through systematic processes of review and approvals by the owner's engineers before implementation. Civil structures and electro-mechanical equipment will be dry and wet-tested prior to operation. CCC has an annual safety programme which describes procedures for occupational safety training, including safe driving and operation of heavy vehicles; analysis of effectiveness of the training; procedures for transporting people and blasting; internal and external communications in cases of emergency involving communities, and visitors. CCC also has a procedure in cases of external emergency situations under different scenarios and mitigation measures to be adopted; this procedure also includes responsibilities for communications with government agencies and the fire brigade, and emergency simulations. The project also has an evacuation plan during construction and operation in case of floods, fires and explosions, landslides and collapses, and earthquakes. Spillway gates will be wet and dry-tested, and maintained as described in the engineering reports. Small non-structural cracks were identified in the main powerhouse walls during the assessment visit, which are being repaired.

Roads have been design in accordance with the DG-2001 National Standard. There are no national norms for the design of tunnels, but the Rock Quality Designation (Barton's Q-value) was applied to determine the level of reinforcement and concrete lining required. Adequate safety signage can be seen along the project roads, and drivers follow traffic rules.

During operation, EGH will be responsible for maintenance and operation of civil infrastructure, and Alstom will be responsible for electro-mechanical equipment and the TL. Major maintenance operations will be scheduled

during the dry season to minimise energy loss. Spillway gates will be controlled remotely and with a hydraulic system. Intertechne's manual for the filling of the reservoir describes relevant civil, mechanical and electrical considerations for each project component (e.g. spillway, concrete face, power houses) to verify that they are ready before filling. Public safety and management plans for the operation stage are still under development. The lenders' engineers have raised this issue, and the project aims to have the plans finalised before impoundment. Plans include a procedure for closing the diversion and impounding of the reservoir including controls on filling; environmental releases (including during impounding); procedure for commissioning (filling) the spillway tunnels including instrumentation observations and wet testing of gates; spillway operating instructions (order of opening/closing and reservoir operating levels); procedure for commissioning (filling) the head race tunnel; inspection and maintenance instructions/schedules; and the emergency preparedness plans. This procedure was finalised in May 2015.

EGH contracted Klohn Crippen Berger (KCB) in May 2015 to prepare the Emergency Response and Preparedness Action Plan in case of dam break or unexpected downstream flow variations. A flood map study has already been undertaken that indicates that Tingo Maria and its airport would be affected in case of dam break. The KCB proposal includes the identification of relevant stakeholders and their contacts; consultation; organisation of an emergencies committee; identification of resources and measures required; disclosure of plan with relevant authorities; alarm systems; simulations; and monitoring and training programmes.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; and public safety measures are widely communicated in a timely and accessible manner.*

Monitoring and inspections described above under Assessment, and results of simulations allow the project to identify risks and opportunities. For example, the last simulation (in March 2015) of an emergency level 3 (the most serious) identified 15 opportunities for improvement.

Other measures to address potential risks include: restricted private vehicle access and free bus transportation available for local residents to minimise the risk of accidents; changes to access roads designs to minimise safety risks of landslides; public communication of scheduled blasting activities; means to report any complaints on construction safety or nuisance (see I-1); construction testing of materials; protection of slopes near the small power house to prevent collapses; installation of log-booms during operation; and required performance guarantees from sub-contractors. Examples of opportunities include the participation of affected people in suppressing dust on roads, which increases traffic safety; new engineering technologies (for example innovative sealing techniques on the dam concrete face that allow more flexibility); and safety training for children and parents in relation to the TL.

The project has demonstrated a rapid response to emergencies, for example in response to the scour of Mallgotingo bridge's abutment, and the on-site manufacture of structures for tunnelling through areas of permeable rocks.

During construction, emergency procedures describe how to contact responsible civil-defence authorities and how to interact with the public and the media. Emergency plans for operation have not yet been finalised and communicated to relevant stakeholders. This is considered to be late, since the filling of the reservoir started in September and KCB plans to finalise all activities in September. This is not timely and accessible, especially since some affected stakeholders do not yet understand how the reservoir and downstream flows will affect them. It is a significant gap, but it is closely related to the gaps in topics I-19 and I-20 and is not double-counted here.

Criteria met: No

5.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to safety have been and are on track to be met with no major non-compliances or non-conformances, and safety related commitments have been or are on track to be met.*

Processes and objectives relating to safety have been and are on track to be met with no major non-compliances or non-conformances. There are no specific dam safety regulations or regulators in Peru, but the project has followed ICOLD design standards. The project has obtained relevant inspection certificates from the civil defence safety office at the Huánuco Government and relevant licences from the municipality of Chaglla for the camp site.

Safety related commitments are on track to be met and plans are on track to be prepared before impoundment; no issues have been raised by Worley Parsons or Mott MacDonald on this regard, although they are aware that emergency and operation plans have to be finalised soon. Mott MacDonald's latest report also recommends EGH to check potential COES requirements for testing and commissioning, other than the requirements in the EPC contract.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

The project quality control system follows a process for identifying and addressing non-conformances with corrective measures. The owners engineer (Worley Parsons) supervises and confirms that measures are resolved following this process. The latest Worley Parsons' engineering report (May 2015) indicates that there are five minor construction non-conformances with engineering specifications that did not have a financial or chronogram impact; for example the use of 'bolsacrete' (a methodology not approved by the project) in three tunnel excavation areas. This non-conformance is a recurrent issue as raised by Worley Parsons over 4 months. Tunnels are safety relevant project components. The use of bolsacrete in tunnel excavations is not an approved project practice. At the time of the assessment there was no evidence of how this issue has been resolved. This is a **significant gap** against proven best practice. No other non-compliances or non-conformances have been identified.

Criteria met: No

5.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Safety risks have been avoided, minimised and mitigated with no significant gaps.*

Safety risks have been avoided, minimised or mitigated with no significant gaps. Management of public safety issues has improved since the beginning of construction. For example, the number of complaints from local residents on dust and damaged infrastructure has decreased, and no major issues with road accidents have been reported. Plans address identified risks and the operation emergency and infrastructure monitoring plans are on track to be developed and disclosed before impoundment.

It is not clear how safety issues upstream will be identified and managed during operation (e.g. public safety signage around the reservoir), but it is assumed that operation management plans will contain this information once finalised. Only occupational safety issues associated with navigation in the reservoir have been identified to date. Downstream safety issues will be addressed in the dam break emergency and response plan.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *Safety risks have been avoided, minimised and mitigated; and safety issues have been addressed beyond those risks caused by the project itself.*

Safety risks have been avoided, minimised or mitigated, although there is an unexpected delay in the preparation and disclosure of operation emergency plans. Access paths affected by the reservoir will be replaced by a fluvial transport system that takes public safety issues into account.

Safety issues addressed beyond those risks caused by the project itself include: provision of equipment and resources to the local government to restore local roads affected by landslides or natural run-off; traffic safety campaigns in schools; and the use of the project ambulance in case of medical emergencies among community members.

Criteria met: Yes

5.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are recurrent minor non-conformances with project-approved practices.

1 significant gap

5.3 Scoring Summary

This project has assessed and managed key infrastructure and safety risks including overtopping, landslides and collapses, road accidents, erosion and sedimentation, electromechanical failures, dam break, earthquakes, infiltrations, and movements. These risks have been considered in the design optimisation and detailed designs. Since there are no specific national norms on dam safety or tunnels, the project has used internationally recognised standards (e.g. ICOLD).

Management is guided by quality procedures defined by CCC and its implementation is supervised by the owners' engineer and the lenders' engineer. Routine monitoring is undertaken. The project also seeks regular advice from a panel of international experts on dam safety. Relevant operation monitoring plans and filling procedures have been and are being prepared by Intertechne. Alstom is being contracted and will be responsible for the monitoring, maintenance and operation of electro-mechanical equipment; relevant plans have not yet been prepared. There are some risks of delay in the preparation and disclosure of these plans and the emergency-response plan, which are addressed in topic I-4.

The project has five minor identified non-conformances with technical specifications, and some are recurrent and in safety-relevant areas; this is a significant gap against proven best practice. Safety risks have been avoided, minimised or mitigated with no identified gaps and the project has contributed to addressing public-safety issues beyond those risks caused by the project itself.

There is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

5.4 Relevant Evidence

Interview:	5, 21,3 8-41, 61, 69
Document:	96, 118, 112-114, 123, 133-156, 281, 357-360, 370-371
Photo:	9-30, 127-128

6 Financial Viability (I-6)

This topic addresses project financial management, including funding of measures aimed at ensuring project sustainability, and the ability of the project to generate the required financial returns to meet project funding requirements. The intent is that the project is proceeding with a sound financial basis that covers all project funding requirements including social and environmental measures and commitments, financing for resettlement and livelihood enhancement, and delivery of project benefits to project-affected communities.

6.1 Background Information

The Chaglla project is a major investment with a total estimated cost of approx. USD 1.3 billion for the EPC contract, interest during construction, and other pre-operative expenses. Equity financing is contributed by Odebrecht for an estimated USD 520 million, bridge loans were obtained from a group of commercial banks while negotiations for long-term debt were ongoing, and USD 774 million of debt financing was finally raised from a consortium of commercial and development banks, at the time of financial closing on July 5th, 2013:

- Banco Nacional de Desenvolvimento Econômico e Social (Brazil, BNDES) - USD 341 million (limited to financing imports of goods and services from Brazil)
- IDB A-loan of USD 150 million, plus a B-loan of USD 184 million from a consortium of five commercial lenders (Banco Bilbao Vizcaya Argentaria, Société Générale, DNB Bank, Sumitomo Mitsui Banking Corporation, and Crédit Agricole)
- Corporación Financiera de Desarrollo (Peru, COFIDE) through Deutsche Bank – USD 100 million

The loans are denominated in USD, with an unusually long tenor (17.5. to 18.5 years) and an average interest rate of 6.01%.

Disbursements to date have been used for the EPC contract (USD 963 million), interest during construction (USD 98 million), and pre-operative expenses (USD 52 million). This last item includes administrative expenses, taxes, insurance, owner's engineer, and USD 12 million categorized as 'sustainability fees', including USD 3.2 million for land acquisition and easements.

During the first 15 years of operations (2016-2031), an estimated three quarters of the revenues of the project will depend on sales through a power purchase agreement with Electroperú, and one quarter on the sale of any surplus energy on the spot market, which is run by the Comité de Operación Económica del Sistema Interconectado Nacional (COES). COES is an independent agency that operates the power system to achieve high reliability at low costs. Power prices in Peru are relatively low because generation is dominated by hydropower and natural gas, which - under Peruvian regulations - is available to generators below world market prices. Additional revenues may be achieved from the sale of CERs, as the project has been registered with the CDM. Arrangements after 2031 will depend on what is most advantageous at the time. After commissioning, the main cash outflows will be for debt service and dividends, operation & maintenance (largely outsourced to Alstom), and taxes. The financial model demonstrates that the debt-service coverage ratio will be maintained above 1.0 even under highly averse hydrological conditions (95% exceedance probability).

6.2 Detailed Topic Evaluation

6.2.1 Assessment

Analysis against basic good practice

Scoring statement: *An assessment has been undertaken of project financial viability, including project costs and revenue streams, using recognised models and including risk assessment, scenario testing and sensitivity analyses; and monitoring of the financial situation during project implementation is being undertaken on a regular basis.*

The generation potential, costs, and financial viability of the project were first assessed in the original feasibility studies. After acquiring EGH, Odebrecht developed several financial models and hired BNP Paribas in 2010 for a bankability study, to review the model and advise on a financing strategy. Several aspects of the financial model were further explored through specialist studies, such as hydrology and generation potential (DHI 2010), taxes (PwC 2011), and spot market revenues (Mercados Energetico Consultores 2011 and BA Energy 2013). Lender's bids were invited and a detailed financial model was prepared for the lenders, which included multiple assumptions that allowed various sensitivity analyses, specifically for different fossil fuel prices, demand growth, hydropower overcapacity, construction and commercial operation start dates, inflation and exchange rates, LIBOR, construction costs, etc. The lenders' engineer Mott MacDonald provided a comprehensive technical report in 2012 that reviewed constructability, construction costs, the generation potential and the financial model. The financial model was also reviewed by Ernst & Young Terco (2013).

Both EGH as the owner and the EPC contractor CCC are continuously monitoring the implementation costs. Odebrecht is continuously monitoring developments in the Peruvian energy market, as this is also relevant for revenues from any other future investments. A simplified financial model, which reflects the decisions already taken, is being updated monthly to take new information into account.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, project costs and revenue streams are fully detailed; and financial viability of the project has been analysed and optimised including extensive scenario testing, risk assessment and sensitivity analyses.*

The project budgets are detailed and have been shown to be very close to actual implementation costs. The financial models are detailed enough to cover all relevant costs and revenues on a monthly basis until December 2070. Multiple scenarios were reviewed during the preparation of the financial model used for the debt negotiations. Spot market prices, which are particularly difficult to forecast, have been estimated through detailed market simulations using recognised models. The participating lenders and their advisers assessed the financial viability and risks in detail, and in response, a complex package of some 25 financing and security agreements, as well as amendments to existing project documents such as the EPC and PPA contracts, was negotiated.

Criteria met: Yes

6.2.2 Management

Analysis against basic good practice

Scoring statement: *Measures are in place for financial management of project implementation; plans are in place for financial management of the future operating hydropower facility.*

Although the EPC contractor and the owner belong to the same corporate group, the same separate financial management processes as with any typical EPC arrangement are used, and supervised by the owner's and the lender's engineers. Procurement takes value-for-money considerations into account, and cost developments are closely tracked, for example by the lenders' engineer on a quarterly basis, based on past figures and forecasts provided by EGH.

To simplify interactions with the consortium of lenders, these have appointed the Bank of New York Mellon as their administrative agent. The agent receives a 'Monthly Transfer Certificate' that details the planned expenditures and required disbursements for the next 30 days. Two covenants need to be taken into account in calculating disbursements, namely 1) that the debt/equity ratio remains below 70/30, and 2) that the difference between the BNDES and the IDB (A+B) loans remains less than USD 80 million.

Odebrecht's internal controlling policies require four separate reporting formats:

- Annual Plan: Forecast the project's financial planning for the next two years and consolidates the real financial data of the project to-date.
- Annual Plan Monitoring: This report updates the Annual Plan on a quarterly basis and compares real figures and emerging trends to the ones in the 'Annual Plan'.
- Monthly Monitoring: This reports consolidates the monthly real figures and compares them against the previous forecasts.
- Monthly Accounting report: Financial Statements are prepared and distributed internally on a monthly basis.

An investment commitment agreement was signed with the government in 2011, which allows EGH an early recovery of VAT paid on goods and services. In 2012 a legal stability agreement was signed, in which the company and the government agreed that EGH will not be affected by adverse tax law changes for a period of ten years (Including income tax).

COES has approved a pre-operative plan, and will establish a definitive amount of firm energy based on their procedures once the plant enters into operations.

The financially most relevant contracts for future operations have already been concluded, namely the long-term loan agreements (17.5-18.5 years), PPA (15 years, which also includes an agreement in which the government warrants its other commitments towards the project such as the PPA auction procedure, results and price agreement), and O&M (5 year) contracts. The PPA is with an experienced, solvent company, is in the same currency as the debt (USD), and includes price escalation formulas and take-or-pay clauses. The O&M contract is a fixed-price contract in USD, also with an experienced and solvent company.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, financial management plans provide for well-considered contingency measures for all environmental and social mitigation plans and commitments; and processes are in place to anticipate and respond to emerging risks and opportunities.*

The original budget at the time of financial closing included contingencies of USD 247 million over base costs of USD 968 million, including contingencies of USD 45 million for environmental and social measures and USD 91 million for general unforeseen costs. An Equity Support Agreement was concluded with the lenders to guarantee that Odebrecht would provide the expected base equity contribution as well as a contingent equity contributions (capped at an amount calculated by the lender's engineer), which might be required in case of cost overruns to complete the project.

Financial risks were analysed in detail and a series of risk mitigation measures taken. For example, after hedging, 93% of interest rates are fixed; the debt was sized to enable full debt service coverage even under

adverse hydrological conditions; and hydrology was investigated by a specialist company. A broad range of risks has been insured during construction, and insurance requirements for the operation stage identified. Apart from relatively minor cost increases (see below), no significant unforeseen adverse developments occured during implementation.

A number of opportunities were identified to save costs and increase revenues. Most importantly, the installed capacity was increased from 406 MW to 456 MW, which will increase generation in an average hydrological year from 2,530 GWh to 2,736 GWh. This opportunity was identified after the dam design was changed to pass the Maximum Probable Flood, which required additional hydrological data analysis. On the basis of these additional data, which showed higher flows, an engineering optimization study was undertaken by Intertechne in 2013, which showed that (on a net present value basis) for an additional investment of USD 10 million in the powerhouse and additional O&M costs of USD 4 million, an additional USD 63 million in revenues could be obtained. Odebrecht is also investigating whether the project debt could be refinanced on the bond market, once the completion risk is overcome (no completion guarantees were provided at the time of financial closing). In the long term, power prices are more likely to increase, especially if gas subsidies are reduced and interconnections with neighbouring countries such as Chile and Brazil with higher prices are built.

Criteria met: Yes

6.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to financial management have been and are on track to be met with no major non-compliances or non-conformances, and funding commitments have been or are on track to be met.*

EGH files its audited annual financial statements (since 2011 according to International Financial Reporting Standards, and audited by PwC) with its owners and lenders, as well as with the Peruvian securities markets' regulator (Superintendencia del Mercado de Valores); information is available for the general public upon request. Annual financial statements have been in USD since 2012. None of the past four audited financial statements has identified any significant financial risks or financial management problems. External advice and oversight has been strong.

Cost overruns of USD 10 million can be attributed to the capacity increase, and USD 28 million to additional tunnelling costs (which were the only category in the EPC contract to be billed on the basis of unitary prices by class of rock, and not a fixed price). These cost overruns are relatively small compared to other hydropower projects, and are well covered by the technical contingencies in the budget.

Using an in-house contractor such as in the case of the Chaglla project, typically reduces conflicts of interest with the owner. Also in this case, the EPC contractor performed well and no financial non-conformances or non-compliances have been reported. Both debt and equity disbursements have been made timely, and the financial covenants have been respected. Both Odebrecht and the Peruvian state have respected the terms of the contracts between them.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

No financial management non-conformances or non-compliances have been identified.

Criteria met: Yes

6.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *The project or the corporate entity to which it belongs can manage financial issues under a range of scenarios, can service its debt, and can pay for all plans and commitments including social and environmental.*

Despite the relatively high dam and major tunneling works, the cost per installed MW is approximately USD 2.9 million, close to the global average. Generation is constrained by the pronounced dry season and the fact that the reservoir offers no seasonal storage; power prices in Peru are relatively low; and CDM revenues are less than hoped for when the project was initiated. There is also limited experience in Peru with project finance deals of this magnitude. Under these circumstances, putting together a viable financing package and a strong financial management framework was both a challenge and an important element of project success.

The complex long-term financing deal that was closed in 2013 earned several 'deal of the year' awards. While negotiations between creditors and sponsors were protracted and required significant spending on advisers and interim arrangements, they resulted in precedent-setting arrangements, including the first time the two agency lenders BNDES and IDB co-finance a power project, and the first time BNDES invests in a major project in Peru.

The social and environmental commitments of the project are relatively minor from a financial point of view, due to the small footprint of the project. New social and environmental commitments came up during the implementation, as a result of interaction with local stakeholders and the safeguards teams of the long-term lenders, but they could easily be absorbed financially. The debt sizing appears conservative, and there are no concerns that commitments towards lenders could not be met.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *The project can manage financial issues under a broad range of scenarios.*

EGH with the support of the Odebrecht group has already demonstrated its ability to financially manage a major project under rapidly changing circumstances and requirements of financiers. Generation is expected to start early, providing additional funds. The project has used state-of-the-art mitigation strategies for a broad range of financial risks, and should be able to service its debt and provide the expected rate of return to shareholders under a broad range of scenarios. Once completion risk is superseded, Odebrecht may be able to refinance the project, thus making significant capital available for new investment opportunities.

Criteria met: Yes

6.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

6.3 Scoring Summary

The Chaglla project is one of the largest private investments in Peru, in a rapidly expanding but very competitive power market. It has significantly expanded best practices in private infrastructure project finance in the country. The conditions of the debt package, Odebrecht's commitment to provide additional equity, if required, and a successful implementation largely within schedule and budget, allow the project flexibility to deal with any conceivable scenarios and provide security to lenders and other stakeholders that all financial commitments can be met. There are no significant gaps against proven best practice, resulting in a score of 5.

Topic Score: 5

6.4 Relevant Evidence

Interview:	47, 63, 68
Document:	41, 157-172, 372, 405-414
Photo:	none

7 Project Benefits (I-7)

This topic addresses the additional benefits that can arise from a hydropower project, and the sharing of benefits beyond one-time compensation payments or resettlement support for project-affected communities. The intent is that opportunities for additional benefits and benefit sharing are evaluated and implemented, in dialogue with affected communities, so that benefits are delivered to communities affected by the project.

7.1 Background Information

This topic is about the active sharing of benefits with communities, whether as a result of a legal obligation or as a voluntary measure. It addresses benefits that are unrelated to negative impacts (discussed under I-9) and that are not unintended side effects (such as improved transport as a result of the access road that was built for the project).

Peru has a fiscal mechanism - the so-called 'canon' - to redistribute the corporate income tax from projects such as mines, gas fields and hydropower stations, between different levels of government. In the case of hydropower, 50% of the tax revenue remains with the central government, while the other 50% are divided according to the project's location between departmental (1/4) and district governments (3/4).

EGH/Odebrecht also have a strong commitment to voluntary corporate social responsibility measures. This topic will describe two sets of programs that qualify as benefit sharing, namely (i) the promotion of local training, employment, and business growth, and (ii) community development support.

7.2 Detailed Topic Evaluation

7.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Opportunities to increase the development contribution of the project through additional benefits and/or benefit sharing have been assessed. In the case that commitments to additional benefits or benefit sharing have been made, monitoring is being undertaken on delivery of these commitments.*

The legal obligation to pay income taxes and the fact that these are distributed between various levels of government is well known and does not need to be assessed separately. The project has made an estimate of its future income taxes through the financial model, which suggests that these will rise over time from USD 3.5 million in 2017, the first full year of operations, to about USD 30 million p.a. by 2030.

Regarding voluntary benefit sharing, one of the programs implemented in the Chaglla project is the CREER program, Odebrecht's standard approach to developing skills and employability in local residents, in combination with a commitment to employ as many local residents as possible, where new projects are planned. Between 2008 and 2012, almost 160,000 people have been enrolled globally in Odebrecht's Acreditar/CREER programs. The local interest in training and employment programs has been demonstrated through multiple inquiries at the project's information centres. Other opportunities have been identified through a review of local supplier capacities, which led to the identification of 18 agricultural producer cooperatives and subsequently, support for an agro-business network.

The EIAs and the early engagement with stakeholders identified many social problems in the project area that would benefit from additional investments, from regional infrastructure gaps to individual problems at the household level. Initially the project did not have a clear mechanism to assess needs and priorities. According to the first Environ monitoring report, because of a desire to help and to avoid potential conflicts, and the lack of a detailed plan, the project supported multiple unrelated requests, which carries risks such as: evoking a

position of vulnerability; creating community expectations and/or dependency; developing unsustainable targets; implementing inappropriate solutions. A Program to Support Community Development was then developed in the ESHSMP, under the responsibility of EGH, which describes criteria for prioritizing communities, projects, planning, disclosure, and assessment indicators. One of the ways in which community priorities were identified was through support for community anti-poverty roundtables ('Mesas de Concertación de Lucha Contra la Pobreza').

Monitoring of the delivery of project benefits is through various mechanisms. Future use of 'canon' resources will be monitored through government systems and where these are working, through participatory budgeting mechanisms. Monitoring of CREER training programs and the share of local workers is through standardized Odebrecht HR mechanisms. The monitoring of community development support programs is through EGH's sustainability team.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the assessment of delivery of project benefits takes into consideration both risks and opportunities.*

The risks and opportunities regarding the 'canon' are assessed by the Peruvian government, which has passed a series of laws, decrees and guidelines for the recipients of the 'canon' resources. As fiscal resources, these are subject to the regular budgeting, procurement and audit processes.

One of the key risks of the CREER programs is the creation of unrealistic employment expectations; the program needs to maintain a reasonable relationship between local trainees and employees. On the other hand, the program creates a well-prepared workforce that is loyal to Odebrecht and may continue to work on other Odebrecht projects.

The delivery of community development support, beyond legal obligations, is an opportunity to obtain widespread community support (a 'social license to operate'), but can also carry risks such as conflicts between those who receive support and those who do not. For example, before supporting the Comunidad Campesina Pillao that wants to separate from the Chinchao district and become its own district, it was critical to establish that the Chinchao district is not opposed to this move.

Criteria met: Yes

7.2.2 Management

Analysis against basic good practice

Scoring statement: *Measures are in place to deliver commitments by the project to additional benefits or benefit sharing; and commitments to project benefits are publicly disclosed.*

Resources from the redistribution of the 'canon' can be used for the following purposes:

- Up to 5% for the elaboration of project studies,
- Up to 20% for maintenance of locally and regionally important infrastructure,
- 75% or more for investments.

While the department of Huánuco has not received any revenue from the 'canon' for hydropower to date, there is some experience with similarly structured 'canons', for example from the mining sector. The key to successful use of 'canon' resources is the ability to select, budget, and implement priority investment projects, something that local governments are already doing. However, the 'canon' resources will allow them to expand their investments, in some case significantly. 5% of the tax revenue or initially USD 172,000 per year will be

shared by the districts of Chinchao and Chaglla. The amounts that district and departmental governments receive, as well as their expenditure budgets are publicly disclosed.

Up to the end of 2014, the CREER program at Chaglla had trained 1,489 local residents in a number of courses (Basic, Civil Works, Heavy Machinery, Defensive Driving, Catering Services, Environment, Explosives Handling). 671 graduates were employed in the project.

Also up to the end of 2014, the project canteen at the main camp had purchased 553 tons of produce from farmers associations, for a total of approximately USD 400,000. The associations have been selected by tender and have since been supported through workshops, technical assistance, quality control, machinery (for example for packaging), presence in agricultural fairs, and management advice. Six of the farmers associations have been able to establish new marketing routes and sell their products to Lima and Huánuco wholesalers and supermarkets.

The community development support program is oriented towards the needs and priorities expressed by communities. An annual budget is approved by EGH's management. Agreements specifying the terms of the support and their own contributions, as well as the acceptance of results and termination of support, are signed with communities. Support can range from a small donation of materials to repair a single structure, to a program that applies to a range of villages (for example, the donation of electric generators to five villages), to a longer term commitment. One example for the latter is the support for the legal process of converting the Comunidad Campesina Pillao, created 79 years ago from a large estate, to a district. This has been a community aspiration since 1983, and has been made more feasible by a 2011 government decision that facilitates recognition of new districts. The project has supported this initiative through a consultant, and has helped prepare development plans. As a district, Pillao would be eligible for revenues from the 'canon', which is one of the motivations.

There are also some commitments to continue community development support into the operation stage, principally through the Construction-to-Operation Transition Plan, although these are still more at the level of options and need to be further specified. A further support for schools, health services and technical assistance for income generation of USD 150,000 p.a. from the start of operation has been made contingent upon the possible revenue from carbon credits. All commitments that have formally been made with communities are disclosed, but not all options that are still under discussion, such as in the Transition Plan.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

The support to three larger villages (San Pablo de Pillao-Santa Isabel de Pillao, Pampamarca, Chinchavito) in drafting their Concerted Development Plans is a good example of a process to prepare local communities for the future and plan the priority investments that they may want to finance from the 'canon' resources. Internally within EGH, the Transition Plan has been used as an opportunity to reflect on the project's community relations, consider important operational requirements and opportunities (such as maintenance of roads and embankments, cleaning of the reservoir, payments for ecosystem services, maintenance of connectivity in the bypass stretch, provision of services to camp, promotion of tourism etc.) and develop options that involve local communities. Another option identified is to help workers transfer to Odebrecht's possible next hydropower project in the country.

Criteria met: Yes

7.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to project benefits have been and are on track to be met with no major non-compliances or non-conformances, and any additional benefits or benefit sharing commitments have been or are on track to be met.*

The processes to deliver project benefits are being implemented as planned and agreed with beneficiaries. There are no indications for any non-compliances or non-conformances.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

No non-compliances or non-conformances have been identified.

Criteria met: Yes

7.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Communities directly affected by the development of the hydropower project have received or are on track to receive benefits.*

Communities in the project area are already benefitting from training and employment opportunities, from additional sales of agricultural products, and from diverse community development initiatives. Most of the benefits discussed under this topic reach a wider range of beneficiaries than the priority groups (families who sold part of their land, villages with major influx of migrants) discussed under I-9. Once operations start, their districts will also receive additional revenues that can be used to improve social and economic infrastructure.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, benefits are significant and the project has delivered or is on track to deliver significant and sustained benefits for communities affected by the project.*

For many poor rural communities in Peru, the traditional way to receive benefits is through public works and handouts. EGH's approach to establish longer-term relationships and to support the management and income capabilities of local communities in the long run may not have been their first preference, but is more likely to result in long-term improvements.

The 'canon' resources will provide a significant boost to the revenue of districts, including the future district of Pillao. The future income potential of families has been increased through training, work experience, agricultural extension services, support to their farmer's associations, and through linking people up with government programs such as health insurance and conditional cash transfers.

Criteria met: Yes

7.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

7.3 Scoring Summary

The Chaglla project shares significant benefits with local communities through a variety of mechanisms: the distribution of tax revenue to local governments for investments, the support for local capacity development and employment, and community development support, which is responsive to the individual community's needs and preferences. EGH/Odebrecht are voluntarily contributing more than required by law and by the lenders' social safeguards, and are providing these contributions through mechanisms which foster sustainability. There are no significant gaps against proven best practice, resulting in a score of 5.

Topic Score: 5

7.4 Relevant Evidence

Interview:	22, 25-28, 35, 36, 43, 68, 72
Document:	11, 14, 16, 24, 37, 38, 46, 47, 62, 69, 70, 73, 74, 173, 174, 177-180, 200, 266, 267, 314
Photo:	14, 15, 31-36

8 Procurement (I-8)

This topic addresses all project-related procurement including works, goods and services. The intent is that procurement processes are equitable, transparent and accountable; support achievement of project timeline, quality and budgetary milestones; support developer and contractor environmental, social and ethical performance; and promote opportunities for local industries.

8.1 Background Information

The following findings are provided in relation to two areas of procurement for the project: the procurement by EGH of works, goods and services, including the EIAs, the Chaglla Construction Consortium (CCC, the EPC contractor), the owner's engineer (Worley Parsons), and Alstom for operation and maintenance activities; and the procurement activities of the construction consortium. EGH contracted CCC after obtaining the permanent concession to develop Chaglla. CCC's companies were involved in the development of the technical documents required for the concession application. EGH did not consider other possible companies to undertake the works, because having an experienced in-house contractor has obvious advantages.

EGH has procured over 100 contracts for services (mainly socio-environmental) and goods. The CCC has procured services from about 87 national and international companies. A key part of procurement concerned the supply of the three generating units (funded by BNDES), and the construction of the Chaglla-Paragsha TL.

Procurement is guided by CCC and EGH procurement procedures. BNDES required the contracting of a Brazilian company to procure electromechanical equipment. IDB also has specific guidance for procurement by private sector clients; procedures should result in competitive market prices for goods and services that meet the needs of the project, and involve competitive tendering methods for large contracts.

The project's major needs for the supply of materials are for fuel, steel and cement. The consortium's 7 largest current contracts total over USD 57 million value, out of USD 72 million.

The Huánuco department does not have a large number of companies with capacity to provide services and goods required for the project.

8.2 Detailed Topic Evaluation

8.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Major supply needs, supply sources, relevant legislation and guidelines, supply chain risks and corruption risks have been identified through an assessment process; ongoing monitoring is being undertaken to monitor effectiveness of procurement plans and processes.*

The CCC undertook an initial assessment of supply needs and sources at the time of preparing the EPC proposal using unitary market prices. EGH and CCC have a decentralised structure where each department and works package manager is responsible for assessing supply needs. EGH's and CCC's commercial departments authorise purchases and contracts with suppliers and subcontractors, through the process described in the Management section. Their commercial departments assess applicable relevant legislation and guidelines.

Potential corruption risks and supply chain risks, such as H&S risks, and risks associated with manufacturing and transporting equipment and materials from abroad, are also identified by the commercial departments and have management procedures as described under Management below.

The project's procurement plans and processes have been reviewed annually as part of the ISO 9001:2008 certification by Bureau Veritas. CCC evaluates the performance of their contractors with contractual requirements, using a standardised procedure that provides a score from 0 to 5 against a range of indicators (i.e. non-conformities, quality, service, reliability, technical assistance, contractual requirements, occupational health, and environmental management).

EGH, and Worley Parsons as the owner's engineer, have responsibility for monitoring the EPC contract. Audits are also performed by the regulatory authorities, lenders' engineers (e.g. Mott MacDonald), financial auditors (PWC), and lender's environmental consultants. Full details of this are provided in topics I-3 and I-4.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the assessment includes opportunities for local suppliers and local capacity development.*

Before the start of construction, CCC's commercial department assessed the available local, regional and national suppliers' capacity to expand on Odebrecht's existing suppliers database. The Chaglla consortium has 240 suppliers on their database, and approximately 95% of suppliers are from Peru. Finding local/regional, and in cases national suppliers with the required technical expertise or goods specifications was one of the main procurement challenges of the project. Where possible, the project has created opportunities for local suppliers, and local capacity development. For example, local farmers provide food for the camp's canteen, and they receive assistance to access alternative markets in preparation for the demobilisation of construction activities and future decrease of food demand.

Criteria met: Yes

8.2.2 Management

Analysis against basic good practice

Scoring statement: *Measures are in place to guide procurement of project goods, works and services and address identified issues or risks, and to meet procurement related commitments.*

The EPC contract is the project's most important measure for guiding construction procurement and sets the responsibilities of CCC (see topic I-4). EGH's procures services required under their responsibilities, for example technical assistance for socio-environmental issues (e.g. EIA for the TL, and legal advisors for land acquisition), engineering consultants (e.g. owner's engineer), and the electromechanical operation and maintenance services for operation.

EGH and CCC have separate but similar procedures for procuring services and goods, which require seeking a minimum of three offers prior to selecting a final candidate. EGH's and CCC's procurement is undertaken through direct closed invitation process; only the procurement of electro-mechanical equipment went through an open tender process as a lender's requirement. EGH's procedures are not ISO 9001 certified, while CCC's procedures are. Both are subject to internal audits.

EGH and CCC use a database of approved local, regional, national and international suppliers. Suppliers wanting to become approved must provide legal and tax information. Approved suppliers may enter procurement processes.

EGH's selection criteria are based on expertise and references from EGH or other Odebrecht companies, technical competence and presentations, and technical visits to contractors. Selection is undertaken by the unit requesting the service with the legal assistance of the commercial department. The procedure does not state in

which cases it will be acceptable to proceed with the selection process if there are less than three offers under consideration, and does not refer to a standardised selection procedure.

CCC's selection criteria are based on technical aspects (including guarantees, scheduling and supervision), commercial evaluation, tax compliance and methods of payment, requirements for need/support of materials, equipment, transport and other facilities. This is based on a documented selection, evaluation and re-evaluation procedure. Direct service orders are possible for contracts under 5,000 soles (approximately USD 1,570). CCC's subcontractors prepare a monthly progress report for CCC that includes details of the contract and potential deviations. This is also followed by each work unit director and the owner's engineer. All CCC's contracts and associated procurement documentation are saved in CITADON.

CCC's process for the purchasing of goods is integrated in an Oracle system where at least three approved suppliers receive automatic notifications of required materials and can provide their quotes. Selection of goods is based on price against current market prices. Orders over USD 20,000 require the approval of the CCC's commercial manager. Materials require an acceptance certificate. Only urgent purchases of materials (e.g. cement) could be performed directly.

CCC and EGH use standard contract templates for suppliers and subcontractors that include provisions on occupational health and safety, environmental management, applicable legal requirements, health and safety risks (see topic I-12), clauses on grievance processes, an anti-corruption clause (since 2014) and conflict of interests, obligations to comply with a suppliers' code of ethics and labour legislation, and quality management.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities; sustainability and anti-corruption criteria are specified in the pre-qualification screening; and anti-corruption measures are strongly emphasised in procurement planning processes.*

The management processes described above (and processes described under I-4) serve to anticipate and respond to emerging risks and opportunities, for example, through monitoring of contractors' performance, and requesting monthly reports. Processes to respond to emerging opportunities include EGH's work with potential local suppliers and local labour to improve their capacity, and observations of Bureau Veritas on CCC's quality management system. An example for anticipation and management of risks is the dismissal of CAMESA from the project for not fulfilling the contractual requirements (see topic I-4), before this non-performance could affect the critical path.

EGH and CCC's pre-qualification system consists of the registration of potential suppliers described above, as only approved suppliers can access project procurement. The information required to register a supplier in the database includes solvency and legal status, but it does not include sustainability or anti-corruption criteria. This is a significant gap against proven best practice, addressed under topic I-2, and therefore not counted again under this topic.

Suppliers are required to comply with an anticorruption clause, the Brazilian anti-corruption law, and a code of ethics during contract duration. However, anti-corruption measures are not strongly emphasised in procurement planning, for example in EGH or CCC's procurement processes. Issues related to corruption risks such as money-laundering, bribery, favouritism in awarding contracts, and extortion through the supply chain are not addressed in the processes. The anti-corruption clause in contracts does not refer to the Peruvian legislation which covers attempted corruption, extortion, passive and active bribery, money laundering, and bribery of foreign officials (Decree No. 635 of the Peruvian Penal Code), or other practices prohibited by the lenders in their procurement processes. This is a **significant gap** against proven best practice.

Criteria met: No

8.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to procurement have been and are on track to be met with no major non-compliances or non-conformances, and any procurement related commitments have been or are on track to be met.*

Processes and objectives relating to procurement and procurement-related commitments are on track, including adherence to EPC contract and project evaluation processes, and delivering on commitments to build and use local capacity. The replacement of the TL contractor has not had a major impact on the EPC contractual requirements. There are no major non-conformances or non-compliances identified.

BNDES specifically required the procurement of electromechanical equipment from a Brazilian company through an open tender process. The project was compliant with this requirement. No other specific project procurement requirements from lenders had to be followed.

EGH received only two offers in their tender for O&M services, and contracted with Alstom as one of the bidders. This contravenes the services procurement procedures that state that three quotes should be obtained for comparative purposes, and do not clearly spell out in which situations this does not have to be followed. However, it is also good practice to appoint the manufacturer to perform the maintenance of their own equipment, and is not considered a non-conformance.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

No non-compliances or non-conformances were identified in this assessment.

Criteria met: Yes

8.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Procurement of works, goods and services across major project components is equitable, efficient, transparent, accountable, ethical and timely, and contracts are progressing or have been concluded within budget or that changes on contracts are clearly justifiable.*

Major project procurement was undertaken under the EPC contract and met the requirements of fair and transparent procurement processes with clear responsibilities. Although the EGH procurement processes are not as clear as those implemented by CCC, evidence reviewed for major contracts (e.g. the EIA for the TL) does not suggest any deficiencies.

The procurement of electromechanical equipment required an open tender process with a view of contracting a Brazilian company as a lender requirement. This is largely equivalent to open international bidding considering that most major manufacturers of electromechanical equipment have subsidiaries in Brazil, and most of them submitted offers for this opportunity.

Although some project work units have experienced some deviations in time and budget (e.g. tunnelling for the spillway encountered more rock type III and IV than expected), those have not affected the overall schedule of budget of the EPC contract and modifications are justifiable, as shown by the owner's engineer's reports.

Major changes, for example the contracting of Union Eléctrica to replace CAMESA, or the addendum of the EPC contract to increase the capacity from 360 MW to 400 MW, and to include the 6 MW hydropower station, are fully justifiable based on technical and commercial grounds.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, opportunities for local suppliers including initiatives for local capacity development have been delivered or are on track to be delivered.*

EGH has delivered opportunities for local suppliers (where possible) and local capacity development. About 95% of suppliers are national, and only if there was no sufficient capacity or required materials available in Peru, did the project procure them internationally. Topic I-12 describes the commitments for hiring and training local labour, which are on track.

Supplies of food to the site canteen have provided an increased income to local farmers, and EGH has provided support to farmers' organizations to maintain this income after construction.

Criteria met: Yes

8.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

Anti-corruption measures are not strongly emphasised in procurement planning.

1 significant gap

8.3 Scoring Summary

The CCC undertook an initial assessment of major supply needs and sources at the time of preparing the EPC contract using unitary market prices. EGH and CCC have a decentralised structure where each department and works package manager is responsible for assessing supply needs and requesting required services. Monitoring of contract requirements is carried out by the director of each working unit, the owner's engineer, and lender's financial and engineering consultants.

The EPC contract is the main procurement guide for construction. EGH and CCC have procurement procedures for contracting services and purchasing goods. Where possible, the project provided opportunities for local suppliers and local capacity development.

Procurement of major contracts followed fair and transparent processes; major contracts are delivered on time and within budget; and changes are justifiable. However sustainability and anticorruption are not part of the prequalification procedures (i.e. approval of suppliers) or the selection process, and overall anti-corruption measures are not strongly emphasised in procurement planning by either EGH or CCC.

There is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

8.4 Relevant Evidence

Interview:	2, 7, 11, 21, 38, 42, 71
Document:	20-21, 26, 35, 64, 96, 184-199, 361
Photo:	none

9 Project-Affected Communities and Livelihoods (I-9)

This topic addresses impacts of the project on project-affected communities, in relation to economic displacement, impacts on livelihoods and living standards, and impacts to rights, risks and opportunities of those affected by the project. The intent is that livelihoods and living standards impacted by the project are improved relative to pre-project conditions for project-affected communities with the aim of self-sufficiency in the long-term, and that commitments to project-affected communities are fully delivered.

Topics I-10 'Resettlement' and I-11 'Indigenous Peoples' that follow, specifically address two sub-sets of project-affected communities.

9.1 Background Information

The project area is largely located along a narrow valley that was previously difficult to access. For people living in or cultivating land in the valley (the 'direct influence area'), the impacts of the project are profound, particularly during the construction period, but also during future operations. They include loss of land; noise, immigration and other construction impacts; employment and other economic opportunities; changed ecosystem services (for example, potential loss of fishing due to changes in the Huallaga river); social programs supported by the project; and improved road access, with all the consequent economic, health, education and other opportunities. The villages of Huanipampa and Higrompampa are surrounded by project infrastructure, while other villages have relocated along the access road. Some people have turned from isolated farmers, depending for their cash income on one uncertain harvest per year, to industrial workers with regular paychecks. For most affected people living at higher elevations (the 'indirect influence area'), however, both positive and negative impacts are less pronounced.

The most direct negative impact of the Chaglla project on local communities is through acquisition of lands and of rights-of-way along the transmission line, and consequently, economic displacement. The table below shows the affected areas, both in terms of hectares and in terms of affected households, who are either members of a Comunidad Campesina (traditional area of collective ownership) or private landholders (with or without a formal title):

Table 2. Areas and Families Affected by the Acquisition of Lands and Rights-of-Way

		Total Area (in ha)	Comunidad Campesina (in ha)	Private Owners (in ha)	State (in ha)	Members of Comunidad Campesina (no. of households)	Private Owners (no. of households)
Hydropower Project	Access Road	119.56	76.38	43.18	0	39	57
	Headrace Tunnel	11.61	0	0	11.61		
	Dam	140.40	101.85	38.55	0		
	Surge Shaft	4.92	4.92	0	0		
	Powerhouse	13.93	13.93	0	0		
	Reservoir	469.66	208.96	260.70	0	33	26
Transmission Line 220kV	Transmission Line	320.94	242.54	76.33	2.07	1006	323
	Chaglla Substation	0.98	0.98	0	0	0	0
	Paragsha Substation	0.86	0.86	0	0	0	0
		1082.86	**650.42**	**418.76**	**13.68**	**1078**	**406**

Out of the total of 1,484 households affected, between 50 and 100 lost a significant part of their cultivated areas (see below), and 33 families had to be physically resettled in new homes (see I-10). The 127.5 km TL affects more people than the reservoir and other works. However, for most people in the right-of-way of the TL, impacts are relatively minor, as they can still cultivate the land below the line, and their homes are not affected.

A total of 16 Comunidades Campesinas are affected, 13 by the TL only, two by the hydropower project only, and one (CC Pillao) by both. Members of these communities are assigned plots with usufruct rights as permanent leases. Where such a plot needs to be acquired, part of the compensation (for crops, infrastructure etc.) goes to the individual member, while another part (for the land itself) goes to the community. Selling off land is a community decision.

The project's mitigation and compensation programs have mostly focused on communities and individual households that are losing land to the project. However, there are also others who are affected in different ways, especially those living in villages close to construction sites, which experienced rapid change. They are covered under this topic I-9. Other social groups and issues are covered under separate topics:

- I-7 covers the sharing of benefits with communities which are unrelated to negative impacts (such as payment of transfers, technical support for recipient entities, support for local businesses and employment, and voluntary programmes and development initiatives),
- I-10 covers families which have been physically displaced,
- I-12 covers labour and working conditions for those employed on the project,
- I-5, I-13 and I-14 cover three special issues affecting all communities in the project area, namely public safety (including traffic safety), cultural heritage, and public health.
- Issues related to human uses of the Huallaga River are covered under I-16, I-17, and I-20.
- Community impacts related to solid waste and wastewater, dust, noise and other emissions are covered under I-18.

9.2 Detailed Topic Evaluation

9.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Issues relating to project-affected communities have been identified through an assessment process utilising local knowledge; and monitoring of project impacts and effectiveness of management measures is being undertaken during project implementation appropriate to the identified issues.*

For the hydropower component, the first EIA by Minpetel – approved by the MEM in 2009 - included an evaluation of social impacts, partially based on public consultation events, but is not reviewed in detail here. The Walsh EIA (2010) on the modified project contains a social baseline (chapter 4.4), an evaluation of impacts (chapter 5) and a social management plan (chapter 7). The social baseline is based on a series of participative rural evaluation workshops (annex 4.4.1) and well-documented interviews in 18 communities (annexes 4.4.2-20). A gap analysis of the Walsh EIA was conducted by JGP Consultants in 2010.

For the TL component, JGP developed an EIA in 2012 and modified it in response to comments by the MEM in 2013, including an Annex 62, which serves as the EMP.

A number of additional specialist studies have been commissioned to better understand the issues affecting local communities. 96 families whose land was affected are considered 'priority stakeholders' and have been followed closely. For example, to ensure that the income potential remains sufficient even after selling off part of the property, for 158 plots managed by these 'priority stakeholders' the agricultural potential was evaluated; 50 families were identified that would lose more than 90% of their property (but not necessarily more than

90% of their cultivated or cultivable land); 12 families were identified that even with intensive technical support could not generate sufficient income because the remaining area would be too small; for these 12 families a separate detailed study on their vulnerability (including family situation, use of compensation payments, alternative income sources etc.) was undertaken. In 2013, for the 81 'priority stakeholders' that remained in the area, a detailed agro-economic baseline survey was undertaken, which demonstrated the low productivity and income from key crops, and the need for technical assistance.

Monitoring of social impacts during implementation has been conducted through a number of mechanisms. Media reports, records of visits to information centres, complaints and questions raised by the local population have been kept and analysed. Most interactions have to do with training and employment opportunities, social programs, and compensation for loss of land or damages. The liaison officers and other staff are in frequent contact with communities. The stakeholder maps have been updated over time, with detailed registers of responsible authorities and communities in the region, and the attitudes of the leaderships of the different villages towards the project (positive, neutral, conflictive) have been noted (see also I-1).

There are two other social monitoring instruments that are updated regularly. Firstly, there is a socio-economic impact study, which tracks 16 qualitative and quantitative living standards and livelihoods indicators for the 'priority stakeholders' mentioned above. The number of these families who could be monitored dropped from 96 (during the baseline studies in 2009) to 86 (2013) and then to 79 (2014), because families have moved elsewhere or do not live in the area permanently. This monitoring instrument has been contracted until December 2017, and could be extended if necessary. Secondly, there is a detailed half-annual census of all inhabitants and buildings in four communities in the direct influence area (Pampamarca, Huanipampa, Higrompampa, Santa Rita Sur), which documents migratory flows, a number of social indicators, and positive or negative perceptions of the project. The two monitoring instruments cover different areas, with some overlap. The first one focuses on San Juan de Monterrey, Puquio, Higrompampa and Huanipampa communities along the access road that was built first and where a significant number of families lost portions of land. The second one focuses on the communities that are closest to current construction sites, have seen the largest in-migration and social changes, and will now go through an adjustment period as construction comes to an end and the workforce is largely demobilized.

Monitoring data that are relevant for social issues are also gathered through a variety of other means discussed under other topics, for example, through monitoring of dust and noise emissions (I-18). Data are reviewed, analysed and reported through multiple mechanisms: reports by various consultants, CCC and EGH; reporting for the Peruvian government and the lenders; ad hoc and regular reports. There is reporting on three different kinds of social commitments: legal and regulatory commitments, summarized in the Walsh and JGP EIAs which were the basis of the approvals by MEM; commitments with the lenders, also called 'Environmental and Social Provisions and Requirements' and defined by the Common Terms Agreement with the lenders; and Odebrecht's voluntary commitments.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of project-affected communities issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

As described above, there are multiple monitoring mechanisms to detect any positive and negative developments among the project-affected communities. Inter-relationships can refer to, for example, the relationships that enable more students to attend education in Pampamarca, requiring an increased number of teachers and classrooms: the opening of access roads and the community bus service that make it easier to reach school, alternative income sources outside of agriculture so that families require less work from their children, but also a coffee plague that reduced labour requirements. As a result, after a secondary school was

opened in Pampamarca, the number of students increased from 64 to 472, and the number of teachers from 2 to 19. The monitoring programs have evolved over time to address issues that were not initially considered, such as the risk that cash compensation for land may result in remaining holdings that are insufficient for sustainable income generation.

Criteria met: Yes

9.2.2 Management

Analysis against basic good practice

Scoring statement: *Measures are in place to address identified issues that affect project-affected communities, and to meet commitments made to address these issues; and if there are any formal agreements with project-affected communities these are publicly disclosed.*

Following the social management plan in the hydropower EIA, a more specific Compensation and Involuntary Resettlement Plan for the hydropower project was developed by LOHV Consultants from 2010 and finalized in 2011. By this time, however, the land acquisition program had already started, driven by the needs of the construction program for early works such as access roads and establishment of camps. This led to an inconsistent approach to compensation during the early stages of the hydropower project. By the time the ESHSMP was prepared, land acquisition for the hydropower project was largely complete. A number of corrective actions were taken to consolidate the approach with the one for the TL (see below).

A separate Compensation and Involuntary Resettlement Plan for the TL by Miranda & Amado was developed in 2014. This was then annexed to the more comprehensive ESHSMP by JGP, which was first presented in Feb. 2013 and later updated, and contains actions with clear responsibilities for CCC and for EGH. Regarding project-affected communities (and leaving out socially relevant programs which are covered under other topics), they are divided as follows:

- CCC: Management of interaction between communities and private site security company; Management of transport to ensure minimum community impact; Community relations and communication; Emergency response, including emergencies that affect local communities (e.g. wildfires)
- EGH: Overall supervision of compliance with ESHSMP; Community relations (information, grievances, monitoring of commitments); Land acquisition and compensation along the TL; Management of migration flows

CCC's responsibilities, in particular site security and traffic safety, have been well managed. The two most relevant programmes for this topic are land acquisition and management of migration flows, directly under EGH.

The principles for land acquisition are established as follows:

- Payment of fair market values for land and replacement values for improvements; where market values are not available (e.g. because land of Comunidades Campesinas is not typically sold), payments to be calculated generously;
- Outright land purchase only where it cannot be avoided, otherwise indemnification of project's temporary or permanent right of use (or owner's restriction of use);
- A land title is not necessary for compensation, but land ownership will be established formally to allow EHG to hold title;
- Land holders are eligible for land-for-land compensation and agricultural technical assistance;
- Commitment to avoid expropriation and to seek the free, prior and informed consent of the Comunidades Campesinas;

- To manage expectations, overpayment should be avoided; development support can be provided separately through the Community Development Programme (covered under I-7).

All land and easements required for the project have now been acquired, both for the hydropower and the TL component. The last outstanding area - which was resolved just before reservoir filling - concerned approximately 7 holdout landholders in the reservoir area. No expropriation has become necessary. Formal titles for EGH are still being processed in a number of cases, but landholders have received compensation. The largest single landholder was the Comunidad Campesina Pillao, which voted in a General Assembly in March 2012 to sell 340 ha of land and establish 106 ha of easements along the TL for the project. While there was general agreement within the community, some members were not satisfied with the final alignment of the TL, which may have to do with commitments by the TL contractor CAMESA that were not upheld (payments for access, to suppliers, and to workers). EGH has now assumed responsibility for these through a formal agreement with the community.

Other issues that arose during land acquisition for the hydropower component were that (i) land-for-land compensation and accompanying technical assistance in agriculture were initially not available, (ii) compensation payments for some families were higher than specified in the plans, leading to potential conflicts, (iii) the cut-off date was not implemented uniformly (which may have contributed to the persistent problems in the reservoir area). These were identified with the help of lenders and their consultants, and corrective actions implemented. At the end of 2014, 547 families (including many who were not affected by land acquisition) were participating in the agricultural technical assistance program for producers of coffee, cocoa and aguaymanto (*Physalis peruviana*, or golden berry), which is co-sponsored by DEVIDA.

The principles for management of migration flows are established as follows:

- Focus on the hydropower component, because the TL component has a comparatively small, specialized and mobile workforce, and does not generate a significant influx of people;
- Immigration is not negative per se. It can provide much needed dynamics in a rural economy and society, and many newcomers are friends and relatives of local residents. However it can also create inflation, insecurity, and conflicts over access to resources, services and opportunities;
- Actions to consist of (i) a Socio-Economic Monitoring Programme (see above), (ii) a Programme of Social Communication Related to Migration; (iii) a Programme of Assistance to Municipalities, and (iv) a Programme of Social Inclusion;
- Support for local actors such as community leaders, government officials, cooperative and private businesses to encourage self-responsibility and sustainability.

The purpose of the social communication activities was to inform local officials and other stakeholders of the immigration trends and socio-economic developments, including the real labour demand of the project. The assistance to municipalities focused on land-use planning (including the development of three Concerted Development Plans, for Chinchavito, Pampamarca and San Pablo de Pillao/Santa Isabel), institutional strengthening, support in accessing government programs, and support for social and physical infrastructure development. For example, in Pampamarca the project contributed in various ways to a new water and sewerage system, health centre, primary and secondary school, waste management centre, and road improvements. The social inclusion activities are directed at vulnerable community members and immigrants and can consist of facilitating access to government programs, literacy courses, improvement of houses etc. The free community bus service can also be considered as an activity that promotes social inclusion.

Demobilization of the project has begun recently and presents its own challenges. In some villages, a large proportion of the working age population was employed in the project. For example, on average over the past years, some 400 workers from the Comunidad Campesina Pillao have been employed; in the case of the small village of Higrompampa with 32 families, even 48 workers. Some of the villages may now lose part of their population, or register higher rates of unemployment and underemployment. The project is preparing local

communities through information events at the workplace and in villages as well as through supporting business initiatives, technical assistance in agriculture, and local government planning. The impact of demobilization will be buffered through a program to employ local residents in site rehabilitation and clean-up, as well as preferential access to the permanent workforce during operations.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

In general, both CCC and EGH (which are often indistinguishable for local residents) have established close relationships with communities in the vicinity through community liaison officers, information centres, extension workers, project employees, project visits, and formal monitoring programmes, including the Citizen Monitoring and Surveillance Committee, which allow them to identify emerging issues.

An example for a risk is that an official of the Comunidad Campesina Pillao misused the compensation funds provided by the project, which were going to be invested in facilities for the community. The community then complained that not all elements agreed were provided, and EGH has to re-negotiate with them. Similarly, when the TL contractor CAMESA had to be replaced, CCC stepped in and assumed its obligations. In response to complaints that parts of the access road were closed to individual traffic because of safety reasons (although accessible through the free community bus service), the project started a program to accredit individual private residents and their vehicles to use its roads. No accidents have been reported. At Chulla, near the main industrial plant, there were fraudulent land sales by local residents and a small community established itself, only to have to leave again with the support of the project.

Opportunities have been identified in several instances when the project was able to assist individuals and communities to access government programmes, something that is often difficult in remote areas because of a lack of knowledge of such programmes and a lack of ability to navigate the application process. For example, the secondary school in Pampamarca required an extended process of negotiations, including several visits to the Ministry of Education in Lima that were sponsored by the project.

Criteria met: Yes

9.2.3 Stakeholder Engagement

Analysis against basic good practice

Scoring statement: *Ongoing processes are in place for project-affected communities to raise issues and get feedback.*

The communications and consultation process has been described under I-1. Both the contractor CCC and the owner EGH have ongoing communications plans, with dedicated teams and communication channels. While local residents often communicate with representatives of CCC, which have a greater presence in the field, any relevant information is forwarded to EGH, which also oversees the grievance mechanism. Landholders that were not satisfied with the valuation of their land or other aspects of the compensation process also had access to a Claims Resolution Committee (Comité de Atención a Reclamos).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, feedback on how issues raised are taken into consideration is thorough and timely, and project-affected communities have been involved in decision-making around relevant issues and options.*

All community representatives that were interviewed found the communication processes satisfactory and the attitudes of project representatives supportive and constructive. Established timelines and formats of responses to community inquiries, complaints and requests have generally been followed. Community preferences have been taken into account where possible, for example in the case of the alignment of the road around Higrompampa. Despite these efforts, there are still uncertainties among local residents over basic issues (for example, whether the access road that passes by Higrompampa and Huanipampa will become a public road, or how to express interest in a job) and rumours (for example, that local springs will fall dry because of the tunnels, or that the climate around the reservoir will change), which need to be countered with culturally appropriate information.

Criteria met: Yes

9.2.4 Stakeholder Support

Analysis against basic good practice

Scoring statement: *Affected communities generally support or have no major ongoing opposition to the plans for the issues that specifically affect their community.*

No communities have been identified that have major ongoing opposition to the project as such, or to specific plans. The latest surveys in the four most directly affected villages show that a majority (between 55% in Huanipampa and 71% in Pampamarca) see the project as 'beneficial' or 'very beneficial'. Support or opposition from individual community leaders has also been tracked. The project has integrated itself closely into the communities, by training and preferentially hiring local people, obtaining goods and services (principally food for the camp) locally, and supporting local authorities in managing the growth process.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, formal agreements with nearly all the directly affected communities have been reached for the mitigation, management and compensation measures relating to their communities.*

Multiple agreements with individuals and communities have been concluded, most of which regarding the sale, lease, or establishment of easements on property. The return of leased land to owners (for example, after a temporary work site is closed) generally involves the option for the owner to receive the land back 'as is' or returned to its previous state. The acceptance of returned land is confirmed through a formal agreement. Formal agreements of acceptance are also concluded with communities that receive support from the project.

Criteria met: Yes

9.2.5 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to project affected communities issues have been and are on track to be met with no major non-compliances or non-conformances, and commitments have been or are on track to be met.*

As confirmed by community representatives, the lenders' ESC and other stakeholders, there are no major non-compliances and non-conformances. Key performance indicator targets for social issues (share of local workers above 30%, and 90% of grievances resolved within 30 days) have generally been surpassed.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

In general, the large number of EIAs and EMPs prepared for the different components of this project by different consultants at different stages in the process are not always consistent with each other. The social management requirements and reporting for the government and the lenders are separate and have not been consolidated. Where changes to plans have been made, as they should be in line with continuous learning during project implementation, the original documents have generally not been updated into one currently valid plan. While the project team is able to handle these complexities, they can be confusing to external stakeholders.

One example for a non-conformance between the programs for affected communities in the ESHSMP, and the actual implementation, is the monitoring of influx and socio-economic conditions in Pampamarca, Huanipampa, Higropampa and Santa Rita Sur. The ESHSMP initially called for quarterly, and an update for biannual surveys. Four surveys in July 2013, October 2013, September 2014, and April 2015 (results not yet compiled) have actually been carried out to date. There are valid reasons to reduce the frequency (to avoid interview fatigue and to avoid creating expectations), but the ESHSMP has not been revised to reflect these decisions.

There were also initial mistakes and inconsistencies in the early approach to land acquisition and compensation that, while later largely rectified, did not conform to the project's plans or the lenders' guidelines. Some of them had a continuing impact on project-affected communities and the project. The most obvious one is related to long drawn-out negotiations in the reservoir area (Agua Nueva), which became even more confused through the efforts of an opportunistic local politician, but were resolved just in time.

These non-conformances constitute a **significant gap** against best practice.

Criteria met: No

9.2.6 Outcomes

Analysis against basic good practice

Scoring statement: *Livelihoods and living standards impacted by the project have been or are on track to be improved, and economic displacement is fairly compensated, preferably through provision of comparable goods, property or services.*

Monitoring results show improvements of living conditions and living standards both among the four directly affected villages and among the priority stakeholders, i.e. those landholders – mostly along the access road – that lost a major part of their holdings. Compensation for economic displacement has generally been seen as fair and has not generated major controversies. Not all negative impacts have been or will be directly compensated; for example there are no provisions to compensate for the loss of fishing in the Huallaga. However, these are generally minor impacts compared to the issues of most interest to communities – agricultural incomes, road access, and social services. The project has managed to avoid overwhelming the absorptive capacity of host communities.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the measures put in place to improve livelihoods and living standards are on track to promote self-sufficiency in the long-term.*

All local communities will have to adapt to a situation with much reduced economic activity when the construction of the project comes to an end and a much smaller workforce is selected for operations. It is

expected that some families will leave, including workers who have upgraded their skills and can now work for contractors – including Odebrecht – in other locations, and opportunistic immigrants; and other families will revert to their previous lifestyles centred on agriculture, but now with increased skills, road access, savings and investments.

For the families most directly affected (the 'priority stakeholders') who have lost land, the detailed monitoring allows tracking of subjective views of heads of households, on 15 qualitative indicators on a scale of 1 to 5 (from 'very poor' to 'self-sufficient'). The indicators include food security, productive assets, income, housing, water, power, education, health, support services, telecommunications, transport, social/cultural/sports activities, security, agriculture, commerce/animal husbandry. All indicators saw a significant rise from the baseline study in 2009 to 2013, and then a levelling off to 2014, after the land acquisition process was concluded. Some indicators actually fell between 2013 and 2014, which may be attributed to a coffee disease ('roya amarilla') that affected the region. The majority continued to rise, most significantly support services, demonstrating the impact of the agricultural extension service. On the whole, for the average respondent the indicator values are now in the third category ('less poor'). This demonstrates that affected families are moving in the direction of self-sufficiency.

Significant benefits from agricultural technical assistance, which is contracted until December 2016, will not be observed for some time, when new varieties of coffee, cocoa and other crops are harvested and the impact of improved agricultural practices such as organic fertilization can be seen.

Criteria met: Yes

9.2.7 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are a number of inconsistencies between planning documents and the actual implementation of programs to mitigate the impact on project-affected communities.

1 significant gap

9.3 Scoring Summary

The Chaglla project is having a profound impact on a number of communities in the Huallaga valley along the access road and near to the construction sites, and a less important impact on other communities living at higher elevations and along the transmission line. Directly-affected communities have seen improvements in their living standards and conditions, and are generally supportive of the project. This topic has focused on the land acquisition programme and the programme to manage the influx of migrants (while other negative and positive impacts are covered under other topics). Both programmes have been well handled once initial difficulties had been overcome, although they could have been more consistent and more successful if they had been in place before construction started. Minor inconsistencies between planning documents and actual implementation on the ground are seen as a significant gap, resulting in a score of 4.

Topic Score: 4

9.4 Relevant Evidence

Interview:	12, 13, 22, 23, 25-28, 35, 36, 43, 44, 46, 68, 72
Document:	8-10, 14-16, 18-21, 24, 37, 38, 43, 46, 47, 53, 54, 60, 68-70, 73, 74, 88, 110, 127, 128-132, 175, 176, 181-183, 200-202, 204-215, 267, 356, 427, 463
Photo:	14, 15, 20, 35-48

10 Resettlement (I-10)

This topic addresses physical displacement arising from a hydropower project development. The intent is that the dignity and human rights of those physically displaced are respected; that these matters are dealt with in a fair and equitable manner; that livelihoods and standards of living for resettlees and host communities are improved; and that commitments made to resettlees are fully delivered.

10.1 Background Information

The project required the physical resettlement of 33 families, a relatively small number for a hydropower project of this size. Most of these opted for cash compensation for their home, while a minority had their homes replaced by EGH. Most families resettled on their own plots or in their own village. They were monitored closely and received priority in negotiations and employment opportunities. Almost all of them are involved in agricultural activities and also receive compensation for land or crops and/or new land; in this regard, they are not treated differently than other families affected by land acquisition and supported by the project, as described under I-9. Host communities are generally not affected.

Most of the homes were acquired and families moved before the end of 2012. Although financial closing occurred only in July 2013, IDB had been reviewing the adequacy of the resettlement action plans since 2011, and a corrective action plan was agreed and reported upon by EGH during 2012, to ensure alignment with IDB and IFC safeguards.

10.2 Detailed Topic Evaluation

10.2.1 Assessment

Analysis against basic good practice

Scoring statement: *An assessment of the resettlement implications of the project has been undertaken that establishes the pre-project socio-economic baseline for resettlees and host communities; monitoring is being undertaken of implementation of the resettlement plans, and to see if commitments made to resettlees and host communities have been delivered and are effective and to identify any ongoing or emerging issues.*

The physical displacement of families was not addressed in the Walsh EIA for the hydropower project. However, EGH commissioned a Compensation and Involuntary Resettlement Plan for the hydropower project from LOHV Consultants, and LOHV was also engaged in negotiating land acquisition. Other consultants involved in assessing physical resettlement issues were the law firm Miranda & Amado (who verified LOHV data and information on legal and institutional aspects), Divisoria (who undertook a diagnostic study of 89 families in 2012 who had sold land to EGH, including 23 who sold their house), and General Service (cadastre and productive potential). Miranda & Amado were also commissioned for the Compensation and Involuntary Resettlement Plan for the TL, and have since supported EGH in all formal aspects of land acquisition. The JGP EIA for the TL stated that no homes will be affected and physical displacement avoided.

EGH has provided reports that cover physical displacement issues as part of the implementation of the resettlement and compensation plans to IDB (especially during 2012, and later on two special cases in Chulla and in the reservoir area, see below). It has documented the construction of replacement houses of better quality than the original homes, and the assistance provided to all families moving to their new homes. It has also monitored in detail the situation of the 'priority stakeholders' with regards to livelihoods and living conditions, as described under I-9.

Only 5 out of 33 families opted for a replacement house, while 28 families preferred cash compensation. It is well known that while most resettlees prefer cash compensation, there can be problems with managing cash effectively. IDB did not recommend cash compensation, but accepted it after it was demonstrated how agricultural income would be maintained.

Most of these families remained within their communities, and are known personally to project staff. The number of 'priority stakeholders' (affected by land acquisition) who have been tracked in detail has diminished over time, from 96 (during the EIA baseline studies in 2009) to 89 (Divisoria 2012), 86 (EGH 2013) and then 79 (EGH 2014). The 79 families in the last survey include most (24 out of 33) physically resettled families. 9 families have moved elsewhere or do not live in the area permanently, and thus could not be included in the survey. However, their primary residence and occupation are known, and they are not considered vulnerable. Their move might be a sign of upward mobility that was made possible by the compensation payments. Some have a second home in larger towns to improve educational options for their children, or to run a business.

Because of the small number of resettled families that now reside in other communities, mostly in larger towns such as Tingo Maria and Huánuco, and considering the background level of migration in the project area over the past years, there are no noticeable impacts on host communities.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the assessment of delivery of commitments to resettlees and host communities takes into consideration both risks and opportunities.*

The surveys of 'priority stakeholders' that cover most resettled families are exemplary in their level of detail, and look at a range of indicators that would allow the identification of risks and opportunities. They do not distinguish between results for those families that lost their homes and those who lost cultivable land, but the underlying database would easily allow separate evaluations.

The risk that compensation payments may be used unwisely could only be excluded if the subgroup of families who lost their homes, accepted cash compensation, and moved out of the area could be tracked with comparable survey instruments. Such surveys for this subgroup are not available. This is a gap, but it is not considered significant because the number of potentially affected families is very small, and available evidence indicates that there have been no risks of impoverishment among this group.

Criteria met: Yes

10.2.2 Management

Analysis against basic good practice

Scoring statement: *Measures to address resettlement are documented in a Resettlement Action Plan; measures are in place to deliver commitments to resettlees and host communities, and to manage any identified issues relating to resettlement, including provision of grievance mechanisms; and formal agreements with resettlees and host communities are publicly disclosed.*

The project has developed a series of land acquisition plans that cover resettlement requirements. In the 33 cases where acquisition of a home could not be avoided, owners were given a choice between rebuilding the home (of similar style, at least in the same size, and of better quality) and accepting cash compensation. 5 homes were rebuilt in San Juan de Monterrey, Higrompampa and Chulla. Compensation was calculated according to established guidelines, and generous enough for 28 out of 33 families to prefer. All agreements were negotiated, and no expropriation was necessary. All families received logistical support in their move, including transport, disassembly or demolition of their existing home and transport of salvageable parts, and in two cases, temporary rental of homes.

Land acquisition started before the EHSHMP and the definitive plans for community relations and communications were in place, but separate grievance and dispute resolution mechanisms were established. EGH and their consultants worked closely with resettlees and very few formal complaints have been registered. Environ does not mention any concerns about the resettlement program in their monitoring reports, with the exception of two separate areas (additional to the 33 cases) which are described below.

The formal records of negotiations and agreements with individual resettled families are private contracts and as such, are not publicly disclosed. Because there was no need to resettle entire settlements, but only individual families, there were no agreements with entire communities. The principles of valuation and the process of land acquisition were publicly disclosed and clearly communicated to affected people.

During the final alignment of the TL, it was confirmed that no resettlement is necessary. Approximately 47 households are considered directly affected, because they live within a land parcel affected by the TL, but do not need to move.

There are two special cases where the resettlement process has been more complex. Both have been well documented in special reports by EGH and in the Environ reports, and EGH tried to resolve them in close cooperation with community leaders.

Firstly, during construction a small community established itself at Nueva Chulla on the left bank, in a precarious position between the riverbank and the main industrial plant, as a result of fraudulent subdivision and sale of parcels. The intention was probably to obtain compensation payments or to benefit from their position close to construction traffic, for setting up small shops etc. Some of the new owners built houses. Eventually, the community of Huanchag to which Nueva Chulla belongs, accepted that all people could move there, and although EGH was not required to, paid compensation for 15 houses to expedite their move.

Secondly, the settlement of Agua Nueva in the reservoir area continued to be a problem until just before reservoir filling. Agua Nueva is a part of the Comunidad Campesina Pillao on the left bank, with which a sales agreement had already been concluded in 2012. There were approximately 7 holdout landowners, some of which built houses since negotiations started in 2010, for speculative purposes. While some compensation might be paid for the buildings, this is not considered a case of physical displacement.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Beyond the monitoring efforts described above, designed to track the conditions of families that were resettled several years ago, there are also on-going interactions with them. Significant efforts have been made to restore and improve agricultural livelihoods through provision of adequate land and technical assistance, as described under I-9, and participating families are followed individually and closely to identify any issues. The same non-significant gap as noted under 10.2.2. applies, regarding risks and opportunities for families who moved out of the area and are no longer included in the detailed surveys.

Criteria met: Yes

10.2.3 Stakeholder Engagement

Analysis against basic good practice

Scoring statement: *Ongoing processes are in place for resettlees and host communities to raise issues and get feedback.*

The mechanisms for resettlees and host communities to raise question or complaints are the same as for other local stakeholders (see I-1), with the exception of the additional dispute resolution mechanism (Comité de Atención a Reclamos) described under I-9.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, feedback on how issues raised have been taken into consideration has been thorough and timely, and resettlees and host communities have been involved in decision-making around relevant issues and options.*

As described under I-1, feedback to stakeholders including resettlees has been thorough and timely, and there are no outstanding queries. Resettlees have been involved in choosing compensation methods and where applicable, locations and designs of replacement homes.

Criteria met: Yes

10.2.4 Stakeholder Support

Analysis against basic good practice

Scoring statement: *Resettlees and host communities generally support or have no major on-going opposition to the Resettlement Action Plan.*

Families who have been resettled have participated in negotiations and have accepted compensation results. There have been no expropriations or legal cases, very few complaints from resettlees about the process and outcomes of resettlement, and none from host communities. The detailed surveys among priority stakeholders demonstrate high levels of satisfaction with living arrangements among resettlees. The dispute in Agua Nueva is not considered a part of the resettlement process.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there is consent with legally binding agreements by the resettlees and host communities for the Resettlement Action Plan.*

As part of the Compensation and Involuntary Resettlement Plan, an information campaign and public consultation process was implemented. As described under I-9, the Comunidad Campesina Pillao of which most resettlees are members, then voted for the sale of its land to the project and negotiated a sales contract with EGH. Individual households – inside as well as outside the Comunidad Campesina – also negotiated compensation agreements for their individual assets such as houses with EGH.

Criteria met: Yes

10.2.5 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in the Resettlement Action Plan have been and are on track to be met with no major non-compliances or non-conformances, and any resettlement related commitments have been or are on track to be met.*

Because there was initially – e.g. in the Walsh EIA - little awareness of physical displacement, and no detailed resettlement action plan, the processes and objectives evolved over time. There is no evidence that those contained in the LOHV and Miranda & Amado Compensation and Involuntary Resettlement Plans, and the ESHSMP have not been met. However, these are still quite general and leave significant room for

interpretation. No major non-compliances with Peruvian land and compensation regulations have been identified.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

No non-compliances and non-conformances with Odebrecht/EGH plans and commitments, lenders' guidelines and Peruvian land and compensation regulations have been identified.

Criteria met: Yes

10.2.6 Outcomes

Analysis against basic good practice

Scoring statement: *Resettlement has been and is being treated in a fair and equitable manner, and resettlees and host communities have experienced or are on track to experience a timely improvement in livelihoods and living standards relative to the pre-project baseline.*

It has been widely confirmed that resettlement was conducted in a respectful, fair, equitable and efficient manner. Those communities where most of the resettlement took place, have been shown to have experienced significant improvements in their living standards and generally, in their livelihoods. This can also be demonstrated for the 24 individual resettled families that were surveyed in 2014. The 9 families that were not covered by the same survey instrument generally reported to have used their compensation to buy additional productive land, build homes, develop small businesses, or to purchase property in Tingo Maria (in some cases, to facilitate education of their children). These are robust indications that their livelihoods and living standards have improved.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the measures put in place to improve livelihoods and living standards are on track to promote self-sufficiency in the long-term.*

The resettled families received adequate replacement homes or compensation, and were otherwise treated like all other priority stakeholders. For example, they were offered participation in the agricultural technical assistance program, and according to the latest survey from 2014, 40 out of 79 priority stakeholder families opted to participate actively. As concluded under I-9, the package of assistance measures is on track to promote self-sufficiency amongst directly affected groups, including resettlees. The same non-significant gap as noted under 10.2.2. applies, regarding self-sufficiency for families who moved out of the area and are no longer included in the detailed surveys.

Criteria met: Yes

10.2.7 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

10.3 Scoring Summary

The project has required resettlement of a relatively small number of families, and most of these could remain in their own community or even on their original plots, which reduced the burden both on themselves and on host communities. Families were given a choice between a replacement home and cash compensation, and the process of compensation and transition was generally well handled. Post-resettlement assistance was the same as for other families who lost land, and is described under I-9. Resettled families who remained in the area, as other priority stakeholders, are monitored closely and are reporting improvements in living standards and generally, in livelihoods. There are no detailed surveys of livelihoods and living standards for 9 families who have left the project area, which is considered a non-significant gap because this small sub-group is not considered vulnerable. There are no significant gaps against best practice, resulting in a score of 5.

Topic Score: 5

10.4 Relevant Evidence

Interview:	22, 24, 25-28, 35, 68, 72
Document:	24, 37, 38, 46, 47, 88, 128, 131, 201-207, 212-214, 216, 267, 428-430, 463
Photo:	49-52

11 Indigenous Peoples (I-11)

This topic addresses the rights, risks and opportunities of indigenous peoples with respect to the project, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalized and vulnerable segments of the population. The intent is that the project respects the dignity, human rights, aspirations, lands, knowledge, practices and natural resource-based livelihoods of indigenous peoples in an ongoing manner throughout the project life.

This topic is Not Relevant in the case of Chaglla. While indigenous people make up a large share (about one third) of Peru's population, there are no recognized 'Comunidades Nativas' in the project area. In the Resettlement and Compensation Plan for the TL, the project undertook a detailed analysis of 11 affected 'Comunidades Campesinas' (including the most directly affected one, Pillao on the left bank) against the ILO Convention 169 criteria: descendants of original inhabitants at the time of colonization; maintenance of institutions and practices; self-recognition as indigenous. While one community had some historical roots in original inhabitants, and several had a large proportion of Quechua speakers, none of them would qualify as indigenous against these international definitions. Neither would the villages on the right bank, where only a minority of older people still speak Quechua and which are not formally part of a Comunidad Campesina. No other groups are known in the region that meet the definition of Indigenous Peoples and that could be affected by the project.

12 Labour and Working Conditions (I-12)

This topic addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The intent is that workers are treated fairly and protected.

12.1 Background Information

The workforce on site reached a maximum of 3,538 employees in May 2014, having risen steadily from about 300 in May 2011. There are now around 3,200 employees on the site, with 2,500 residing at the camp, but the number is decreasing as the project nears the end of the construction stage. In the operation stage, the project will initially employ 138 employees on site (108 EGH and 30 Alstom). These figures include subcontractors. The TL workforce is also reducing from 1,242 in October to 1,100 in December. Odebrecht Peru Ingeniería y Construcción (OPIC) projects employ a total of 15,000 employees, consisting of 11,000 Odebrecht staff and 4,000 subcontractor staff across Peru.

Odebrecht employees working on the project may be contracted by EGH or OEP, or the CCC consortium members (CNO Peru and OPIC). Other employees may be contracted by specialist sub-contractors such as Alstom, or a range of service providers. Please note that where the findings refer to subcontractors, they refer to the latter group of sub-contractors and service providers, and do not refer to employees of the consortium members.

Occupational Health and Safety (OHS) on the site is managed by the consortium's health and safety manager. Human Resources (HR) issues are addressed by OEP's Directorate of Personnel and Administration, and specifically EGH's Chief Financial Officer and Administrative Management and a Human Resources team, at the site. The consortium's commercial division addresses HR and OHS of service provider's employees.

Where this topic addresses stakeholder engagement, it is in direct relation to the management of human resources and labour management issues. Wider issues of communication and engagement with all stakeholders are covered under topic I-1. In terms of safety, this topic assesses the safety of workers while wider issues of community safety are dealt with under topic I-5. There is also some overlap with topic I-7, in terms of the benefits the project realises through its capacity-building activities.

12.2 Detailed Topic Evaluation

12.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Human resources and labour management requirements have been identified through an assessment process, including occupational health and safety (OH&S) issues and risks; and processes are in place to identify any emerging or ongoing issues, and to monitor if management measures are effective.*

The ESHSMP included initial plans that the contractor had to follow, which were based on an understanding of HR and labour management requirements. For example, the health and safety management plan includes references to a law on OHS, and safe work procedures and personal protective equipment for various tasks, training, oversight and worker health management and first aid / emergency response. The workforce management plan refers to freedom of association, forced labour, anti-discrimination, child labour, grievance mechanisms, insurances, conditions at the camp, and hiring of local workers etc., and requirements of IFC Performance Standard 2 on Labour and Working Conditions.

Ongoing processes used to revise or determine new requirements or identify emerging requirements (such as new legislation) are: EGH monthly reports on its ESHSMP requirements concerning HR and OHS; assessment of

safety on any new task or activity; procedures to identify the requested numbers of employees at the camp and in the office for the operation stage (the project is currently assessing work requirements and whether existing employees can be re-assigned); and the consortium commercial division's regularly updated plan for services requirements.

There are numerous processes to monitor the implementation and effectiveness of HR and OHS management, which can be divided into internal processes, reporting processes, and external audits. They include:

- Internal audits of compliance with the project SST (Seguridad y Salud en el Trabajo – Health and Safety at Work system, which is integrated into the EMS), for example the latest conducted over 8-10th April 2015;
- Internal audits of safety for CNO;
- Internal reporting within Odebrecht Peru on employee numbers, including by categories such as expatriates, age, gender, etc;
- CCC reporting to EGH on safety indicators (including incident frequency (no time lost), lost-time incident frequency, days lost to injury, and the proportion of time spent in training);
- Reports of the TL contractor (CAMESA) on health and safety;
- Monthly monitoring reports on noise levels, ergonomics / posture at work in a range of functions, and lighting levels;
- Employees are monitored on a weekly basis on their safety performance, using a combination of individual and group indicators;
- Monthly reports by the sub-contracted medical team (the Nova Vida company) on all aspects of worker health;
- Quarterly reporting by EGH on its ESHS commitments, including significant sections on health and safety, and detailed data and tables on all incidents, and including reporting on key performance indicators: lost-time accident frequency rate per 1,000,000 person-hours (target 1.55 for 2015), total accident frequency rate per 1,000,000 person-hours (target 12.4 for 2015), and severity frequency rate (total lost days) per 1,000,000 person-hours (target 35);
- Quarterly auditing by the ESC (Environ), reporting on ESHSMP commitments including adherence to international labour standards; and
- Audit reports on adherence to labour law (both HR and safety) by the National Superintendency of Labor Inspection (Superintendencia Nacional de Fiscalización Laboral).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, the assessment takes broad considerations into account, and both risks and opportunities.*

Identification of HR and OHS requirements was based on a broad understanding of requirements, up to international standards. As an example of the breadth of risks assessed, ergonomic monitoring was conducted in April 2015 to assess the risk of osteo-muscular problems, and health monitoring recognises the cost of absences due to osteo-muscular problems. Continuing monitoring, auditing and reporting by EGH, and including Environ reports and associated processes, provide a means to assess emerging risks and opportunities. For example, the risks associated with demobilisation – and the opportunities for individual employees – were identified by EGH. This also should allow EGH to determine whether it is fully in conformance with Odebrecht corporate requirements (for example on equality or human rights).

There does not appear to have been any systematic assessment of EGH labour policies against Odebrecht labour policy requirements (such as the Code of Conduct, gender equality and human rights commitments etc.) but this is addressed under I-2.

Criteria met: Yes

12.2.2 Management

Analysis against basic good practice

Scoring statement: *Human resource and labour management policies, plans and processes are in place that address all labour management planning components, including those of contractors, subcontractors, and intermediaries, with no significant gaps.*

The project has numerous highly detailed policies, plans and processes in place for both HR and OHS issues, including: corporate policies; a project administrative policy; performance indicators for managers; hiring, induction and training processes; accommodation, leisure and medical facilities; the SST system and procedures; and requirements for subcontractors.

Corporate policies include: the Odebrecht Health and Safety at Work Policy, March 2015; the Odebrecht Code of Conduct (related to Odebrecht's Tecnología Empresarial Odebrecht, TEO) which includes commitments concerning opportunity at work, equality, ethics in the work environment, respect for the law, social responsibility and human rights, forced and child labour, sexual exploitation of minors and trafficking, and health and safety; provision of a leaflet summary of the code of conduct to all employees, and signing of the code of conduct by all employees; policy on induction and development of employees; EGH internal employment rules, setting out working hours and days, worker rights, disciplinary procedures, and policies on sexual harassment, wellbeing and security of employees, and HIV and AIDS; and Odebrecht Peru internal health and safety rules.

The project administration policy encompasses labour rules such as family visits, approval of travel and reimbursement of expenses (hotel rates etc.), camp accommodation, food and laundry services, and camp rules.

Directors' job descriptions include a section on safety, referring to safety programmes, establishing a culture of prevention, and indicators (in one example, days lost to injury less than 35, and zero fatalities). OLF also sets targets and reports on occupational health and safety.

The project keeps a matrix of the range of positions in each department, describing the position, required education and experience, and competencies. There are formal procedures for hiring and induction of workers beginning with the completion of a request form, and including medical examinations and health and safety training during induction. A file on each employee is kept, which includes: the request for labour form, details of the position, emails raising the request, HR procedures on suitability, a declaration from the employee, employee's CV, ID card, signed Code of Conduct, police clearances, bank and address details, and personal data (contacts etc). Training is described in more depth under Level 5 below.

Accommodation, canteens, leisure and medical facilities are of a high standard. Accommodation is in gender-segregated blocks with 2 to 4 persons per room and 17 to 22 rooms per block depending on seniority, and sufficient washing and bathroom facilities. A wide range of leisure facilities are provided including two clubhouses, one with a gym, and evening cinema entertainment, and football and basketball facilities etc. Two water treatment plants provide potable water by sedimentation and chlorination, but an additional plant uses UV-treatment on the water to produce better tasting water for water dispensers at the camp and in the field. Medical services include a well-equipped medical centre with 4 doctors, 3 ambulances, a dedicated radio channel, and medics positioned at the powerhouse and industrial site, who continuously monitor workers in the most stressful positions (e.g. working at height).

Environmental and operational management systems include a great range of procedures on OHS issues. For example, the assessors were provided with the following that specifically address safety: the management of personal protective equipment; safety during excavation; cutting, welding, assembly and installations; the concrete plant; open-cast blasting; electric welding and hot cutting; occupational hygiene; transportation

services and lifting of loads; working at heights; transportation of people and supplies; working in confined environments; and maintenance of equipment and vehicles. All tasks are subject to Job Hazard Analysis, and foremen conduct Daily Safety Briefings prior to starting work. Displays of hazards maps are shown at all main sites. In addition the 'PREVER' system provides additional procedures for hazardous areas.

Procedures concerning occupational health concern: occupational disease monitoring; standards of individual and collective health; emergency first aid; prevention of damage to hearing; prevention of respiratory diseases; ergonomics; food-poisoning; vehicle lubricants.

Some procedures specifically address equality, such as the procedure for induction of people with disabilities and reduced mobility, and there is a procedure in the operational management system for the employment of local people with few qualifications.

An accident register form is used to record incidents, and these are compiled with worker witness statements, further analysis of the risk, and evidence of subsequent additional training for workers (lists of signatures), and possibly reports of any investigation committee held to discuss the accidents.

Odebrecht provides a voluntary pension and insurance plan (ODEPREV) for all employees.

Emergency equipment such as fire-fighting systems are installed at the powerplant, and temporary signage is in place in advance of permanent signage that is to be installed.

Subcontractors are required to follow very similar procedures, including induction and keeping documentation of on each employee. Subcontractors provide 'status forms' to the consortium detailing their employees, pay, and insurance, and provide monthly reports. The commercial division requires subcontractors to submit reports with their invoices on conformance, to be approved by Odebrecht's HR Department, before payment can be made.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Continuing monitoring, auditing and reporting by EGH, and Environ reports and associated processes, provide means to anticipate and respond to emerging risks and opportunities. In addition, the health and safety requirements in the EMS are updated and added to as required, and Odebrecht's legal department follows any legal HR developments, and participates in discussions with unions at a national level.

Examples of measures taken as a response to emerging risks or opportunities were:

- The planning of a demobilisation programme to carefully manage the process of demobilisation, and enable local employees to maximise their future opportunities (involving raising awareness, teaching home economics, and a database of possible employment opportunities on other projects);
- Incentives for employees to meet safety targets, for example a raffle of motorcycles (scooters) that was open to only those fully in compliance with their safety targets (980 out of 1,300 were eligible in the last raffle).

The project continuously takes opportunities to provide training to employees. Monthly reports on on-the-job and internal training show numerous events (between 15 and 90 per month over 2013 to 2015). External training courses are provided to a large number of employees, in budgeting, lead auditor ISO-9001:2008, occupational and environmental medicine, safety inspection on bridges and cranes, logistics and operations management, dam safety, and occupational psychology etc. The Continuing Professional Qualification Programme (CREER) has trained 1,489 individuals, 671 of whom were employed. These have included women

and men as mechanical and electrical engineers, manager of the WWTP, and waste processing centre manager, for example. CREER beneficiaries are highly satisfied with the process.

The project has taken opportunities to use Odebrecht's *Joven Parcero* and *Joven Constructor* programmes to recruit and develop staff. *Joven Parcero* is a selective programme of on-the-job and additional training for young professionals to develop careers in Odebrecht (50 individuals on Chaglla alone, narrowed down from 2,000 applications). *Joven Constructor* is a 1-week multi-disciplinary course on business administration to complement the *Joven Parcero* programme.

Criteria met: Yes

12.2.3 Stakeholder Engagement

Analysis against basic good practice

Scoring statement: *Ongoing processes are in place for employees and contractors to raise human resources and labour management issues and get feedback.*

The project has a good relationship with its employees and contractors, and employees interviewed during this assessment described the processes for raising issues as simply their foreman and then the HR Department. In addition to these, the legally-required Comité de Obra (Work Committee) is an important formal mechanism, when (as described by employees) they need to negotiate with senior personnel.

The Work Committee is elected by employees, and consists of 11 representatives. Committee members serve the committee in a full-time capacity, visiting all work sites on a weekly basis, and providing an office open from 7am to 9pm. The committee is a process for ensuring compliance with legal requirements, and represent employees. The Work Committee is officially recognised by the Ministry of Labour, and meets on a regular basis. The Work Committee addresses civil construction workers only, and does not represent service employees. They coordinate with the Peru Federation of Construction Workers. In addition, a sub-committee on health and safety meets occasionally.

The Work Committee uses a publication 'Know Your Employment Rights in Civil Construction' produced by CONAFOVICER (Comite Nacional de Administracion del Fondo para la Construccion de Viviendas y Centros Recreacionales para los Trabajadores de Construccion Civil del Peru; National Management Committee of the Fund for Housing Construction and Recreational Centres for Civil Construction Workers of Peru).

Employees are able to join a union if they wish, but there are no union members on the site (and the employees interviewed saw no need for this, especially if they would be required to pay a subscription). They described how they are aware of their rights through the Work Committee visiting their workplaces to describe their rights.

An Ethics Line telephone number (or website address), as referred to on the Code of Conduct leaflet provided to employees, is available for employees to raise issues confidentially, but few are strongly aware of it (even CCC Commercial Division did not refer to it when asked about processes for raising issues).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, feedback on how issues raised have been taken into consideration has been thorough and timely.*

There is no evidence that feedback is not satisfactory. The Work Committee provides an annual report for workers.

Criteria met: Yes

12.2.4 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to human resource and labour management have been and are on track to be met with no major non-compliances or non-conformances, and any labour related commitments have been or are on track to be met.*

The project has put in place processes and met its objectives without major ongoing non-compliances and non-conformances.

The latest ESC (Environ) reports show that all indicators for both the hydropower and the TL components (lost-time accident frequency etc.) conform with targets (frequency indicators are lower than target). The project performs highly on labour management, and there are very good relations between employees, the Work Committee and management. The highest possible standards of safety management were observed during the site inspection during this assessment.

The Huánuco Labour Department (Deputy Director of Promotion and Protection of Fundamental Rights), Ministry of Labour in Huánuco, is confident that the project meets all labour law requirements, on the basis of their inspections (which cover working conditions, pay, leave / rest days, and safety).

The processes described under management above enable corrective action to be taken to ensure conformance and compliance. An example of non-compliances mentioned in interview, is the failure of some subcontractors to pay salaries, which were corrected in two cases by CCC withholding the payment of subcontractor invoices. In addition the Environ reports included an action to ensure that CAMESA improves health, safety, and working conditions for T-Line workers, which has now been addressed.

The assessors have carefully considered whether the number of fatalities that has occurred is a significant non-conformance with the project's and Odebrecht's zero-fatality target. There have been six fatalities during construction. Two fatalities were due to landslides, one to collapsing rock during tunnelling, and three in accidents involving heavy machinery (two in adits to the tunnel, and one, in January 2015, at the small hydropower plant). Accident reports were compiled on each incident, including witness statements from employees, and corrective action taken by additional training, and installing sensors and collision guards on vehicles. The higher than expected number is explained by safety managers as the result of a high proportion of local, relatively inexperienced staff, and the hazardous conditions in the area. In an interview during this assessment, the Work Committee maintained that the company has done all that it can to reduce or eliminate accidents and fatalities. This is supported by the accident frequency indicators, which are lower than targets and lower than in heavy construction and civil engineering industries in other countries (for example, significantly lower than in the U.S., according to Bureau of Labor Statistics). The assessors therefore do not consider the number of fatalities to be a result of negligence and a non-conformance.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

There are no legal non-compliances, and any non-conformances that arise are effectively identified and addressed through the processes referred to above. Further examples are: noise monitoring showed widespread exceedances in March 2015 at the vast majority of points monitored, but it had improved by April; and Environ has observed non-conformances at the TL site, for example in October 2014 in the Carpish area, and previously with camp conditions and delayed payment of workers.

Interviewed workers indicated that they work 12 hour shifts (including a 1 hour break) so they obtain a higher rate (60-100% more), and often work Sundays and holidays (100% more). Peruvian law and EGH employment

rules allow overtime, on a voluntary basis, above the standard 8 hours per day and 48 per week, where circumstances demand it.

Workers in one interview raised an issue that workers feel less able to raise concerns with their foremen and the HR Department, as the project demobilises and workers become anxious to do everything they can to maximise their chances of remaining employed for as long as possible. They fear being laid off if they refuse to work in the evening or on a Sunday, and are concerned that safety could be compromised by a rush to complete works. There is no corroborating evidence of this, and no other interviewees, including the Work Committee, raised this concern. The project operates with two 12-hour shifts, so it is inevitable that some employees face a choice between leaving employment with the project or working on the night shift.

Criteria met: Yes

12.2.5 Outcomes

Analysis against basic good practice

Scoring statement: *There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights.*

There are no identified inconsistencies. The purpose of the Environ reports is to determine whether the project meets a range of environmental and social standards, including IFC Performance Standard 2 on Labour and Working Conditions. The project is legally-compliant and Peru has ratified all eight of the ILO's fundamental conventions (concerning freedom of association, right to organise and collective bargaining, forced labour, child labour, equal remuneration, and discrimination).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, labour management policies, plans and practices are demonstrated to be consistent with internationally recognised labour rights.*

The Environ reports demonstrate that the project is consistent with internationally recognised labour rights.

Criteria met: Yes

12.2.6 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

12.3 Scoring Summary

The project's management of labour and working conditions is based on an initial broad assessment of HR and labour management requirements, resulting in two programmes (labour management and safety) in the project's ESHSMP. EGH monthly reports on its ESHSMP requirements and external audits provide a means to identify and respond to emerging risks and opportunities.

The project has detailed and numerous policies, plans and processes in place, in particular corporate policies, HR processes, and a health and safety management system, and requirements are pushed down to subcontractors. Implementation and effectiveness is monitored through internal processes, reporting processes, and external audits, including the use of indicators.

The project performs very highly on HR and OHS management. The highest possible standards of safety were observed during the site inspection. The project has a good relationship with its employees and contractors, and there is no evidence that feedback on any issues raised is not satisfactory. The project meets international standards, and workers are treated fairly and protected. There are no significant gaps against proven best practice, resulting in a score of 5.

Topic Score: 5

12.4 Relevant Evidence

Interview:	4, 16, 17, 29, 49, 50, 51, 52, 55, 59
Document:	24, 26, 70, 110, 111, 217, 218-239, 278-280, 391-400, 435, 436, 437, 438, 461, 462
Photo:	7, 8, 61-64, 66-80

13 Cultural Heritage (I-13)

This topic addresses cultural heritage, with specific reference to physical cultural resources, associated with the hydropower facility. The intent is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance.

13.1 Background Information

Peru is rich in cultural heritage resources, and important archaeological sites are known at higher elevations in the Huánuco department. The project area on the eastern slopes of the Andes was not part of the core Inca Empire, but it was close to trading routes for products like salt, corn and coca with the eastern lowlands, and local populations adopted the Inca culture. During the colonial period and until recent times, the area was lightly populated and poor, and no significant local buildings or other tangible resources remain. Local oral history indicates historical connections to ceremonial centres in the highlands. Historical trails may still be known to locals and have reportedly been in use, including until recently for the drug trade and as a retreat for terrorist groups.

Archaeological and other physical cultural resources (such as paleontological remains) are part of the Nation's Cultural Heritage and under the responsibility of the Ministry of Culture. The Ministry and its agencies maintain registers of known archaeological remains, and infrastructure projects require 'Certificates of Non-Existence of Archaeological Remains' to proceed, as well as monitoring programs and chance find procedures during implementation. All archaeological investigations – including those without excavations – require permits from the Ministry. Supervision is through departmental offices of the Ministry.

13.2 Detailed Topic Evaluation

13.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Cultural heritage issues, with respect to physical cultural resources, that are relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

Archaeology issues were first reviewed in the baseline sections of the Minpetel and Walsh EIAs, both of which did not identify any archaeological remains within the area of evaluation, except for isolated pieces of pottery. 'Certificates of Non-Existence of Archaeological Remains' were issued both for the original and the modified hydropower project locations. The version of the JGP TL EIA reviewed by the assessors did not contain an archaeological baseline, but the Ministry again issued a 'Certificate of Non-Existence of Archaeological Remains'. Eight archaeological sites are located just outside the TL right-of-way. The area of responsibility for archaeological monitoring during the TL construction includes both the right-of-way and the pre-existing access roads.

Remains are typically identified during construction when vegetation and topsoil are removed. Projects are therefore required to have archaeological monitoring plans and the required staff to monitor several work fronts in parallel. During construction, EGH was supported by Trashumantes consultants on the hydropower component and EVSA consultants on the transmission component, and had an archaeological team with up to 8 staff. There are regular monitoring visits by Ministry of Culture supervisory staff, who are also brought in when works are halted because of significant finds, to approve the course of action.

The area is not known for paleontological resources, and the EIAs do not specifically address palaeontology. 25 fossils such as ammonites were found during works, and treated in the same way as an archaeological chance find.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of cultural heritage issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

There are no significant inter-relationships with other issues. The permanent availability of archaeological staff as well as the training and information materials that workers and local communities received, allows a close monitoring of all works for possible archaeological finds.

Criteria met: Yes

13.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified cultural heritage issues, and to meet commitments, relevant to the project implementation stage; plans are in place for the operation stage for ongoing cultural heritage issues management.*

An overview of the project's approach to cultural heritage management is provided in the ESHSMP under the 'Program for exploration, rescue and preservation of the archaeological, historic and cultural heritage', under the responsibility of EGH.

In accordance with the Ministry-approved monitoring plan, the operational archaeological routine during works is the following:

- Preliminary reconnaissance on foot before works start,
- Exploratory excavations in case of superficial indications, and to allow delimitation and signposting of identified sites,
- Identification and excavation of chance finds, to determine whether they are isolated/out of context or significant/in context, in which case Ministry supervisory staff will be called in,
- Written, graphical and photographic records, as well as recording of precise location and numbering,
- Collection, cleaning, and processing of materials,
- Hand-over of materials to Ministry of Culture,
- Reporting.

The most significant find in the Huallaga valley, close to Huanipampa, revealed an Inca-era stone path and foundations of an adjacent building, possibly a resting place, as well as funeral sites. It was identified during preparatory works for the main camp, which was originally going to be entirely located on the left bank, and caused the relocation of part of the camp to the right bank. The site is now fenced, roofed and signposted. Similarly, the avoidance of archaeological remains was also one of the criteria identified in the EIA, for the optimization of the alignment of the TL and placement of towers. It was also a condition of approval of the archaeological monitoring plan by the Ministry; another condition was manual transport and assembly of tower elements should they be close to an archaeological site, to avoid opening up access roads.

As of October 2014, the monitoring programs had resulted in 25 chance finds and 4 archaeological sites. 53,435 pottery fragments, 25 fossils, 197 artefacts/instruments, 37 necklace beads, 46 bones, and 56 ceramic pieces had been collected, and a total of 1.5 tons of materials was handed over to the authorities.

No new works are planned for the operations stage, therefore no monitoring plan and permanent presence of archaeologists are required. Chance finds will be subject to the same regulations as during implementation.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

The archaeological monitoring programmes are designed to allow projects to respond to risks and opportunities.

During the filling of the reservoir, there is a risk that previously unidentified archaeological sites would be flooded. This is considered unlikely, since none were found in earlier surveys or through archaeological monitoring during removal of vegetation, and because the narrow valley in the reservoir area is an unlikely place for settlements and trails.

Criteria met: Yes

13.2.3 Stakeholder Support

Analysis against basic good practice

Scoring statement: *There is general support or no major ongoing opposition amongst directly affected stakeholder groups for the cultural heritage assessment, planning or implementation measures.*

There is general support among the population for the archaeological programme, although the current population in the project area does not consider itself as direct descendants of prehistoric populations, and has not shown a particular interest in archaeological investigations. In some places, there has been a lack of awareness – such as burning vegetation over a site – or some reluctance to accept restrictions in the use of land. The typical method of the Ministry to permanently mark and interpret archaeological sites is to erect a brick wall on the side of the closest road, which was initially rejected by landholders at least in one case, at Gongapata along the TL, but ultimately accepted. Local labourers were occasionally contracted to support archaeological works; in the case of Huanipampa, 42 labourers were contracted for 3 months.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, formal agreements with the directly affected stakeholder groups have been reached for cultural heritage management measures.*

Formal agreements have been reached with landholders and community leaders for the erection of 'archaeological walls'. Plots have been acquired as necessary, to locate project components away from archaeological sites. The archaeological site at Huanipampa has been handed over to the Ministry of Culture.

Criteria met: Yes

13.2.4 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in place to manage cultural heritage issues have been and are on track to be met with no significant non-compliances or non-conformances, and cultural heritage related commitments have been or are on track to be met.*

The Ministry of Culture has provided all necessary authorizations and approved all monitoring plans and other project reports, and has established a good working relationship with project staff and consultants. There was an incident when local people called in the authorities in the belief that a site near the power house and substation was being damaged; while this interrupted works at this site for three months, there were shown to be no archaeological remains. There was also some confusion because the Ministry's departmental office Pasco stopped works by the TL contractor at some stage, although the departmental office Huánuco was responsible for monitoring the entire TL. The Ministry has confirmed that there were no non-compliances, and the Environ quarterly supervision reports have raised only minor observations on the archaeology programme.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

No non-compliances or non-conformances have been identified.

Criteria met: Yes

13.2.5 Outcomes

Analysis against basic good practice

Scoring statement: *Negative cultural heritage impacts arising from project implementation are avoided, minimised, mitigated and compensated with no significant gaps.*

There are no cultural heritage values in the project area beyond archaeology and, to a much lesser extent, palaeontology. The project location and design have avoided interfering with archaeological sites. Those sites that have been identified previously or during implementation have been protected effectively. Materials that were recovered from chance finds have been catalogued and made available for research and display.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, negative cultural heritage impacts arising from project implementation are avoided, minimised, mitigated and compensated with no identified gaps; and contributions to addressing cultural heritage issues beyond those impacts caused by the project are achieved or are on track to be achieved.*

There are no identified gaps in the archaeology programme, which has also made some contribution beyond project impacts. Awareness among local communities and workers about cultural heritage issues has been raised. Project visits typically include visits to the Huanipampa site, and some materials were temporarily displayed in the project information centre. The identification of sites and the recovery of chance find materials in a previously unexplored area of Peru will provide some inputs to historical research. Some sites can be visited and materials will be displayed, and there is some resulting potential for tourism; the community of Huanipampa has shown interest in managing their site for tourism. However, Peru has many more remarkable archaeological remains than these.

Criteria met: Yes

13.2.6 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no significant gaps against proven best practice.

0 significant gaps

13.3 Scoring Summary

The only cultural heritage issues of relevance in the Chaglla project area and along the TL are archaeology issues, and these have been well assessed and managed. EGH has ensured that appropriate expertise was permanently available and that all regulatory requirements were followed. Some sites were identified and materials recovered, and the project has contributed to improving knowledge about the history of the region. There are no significant gaps against best practice, resulting in a score of 5.

Topic Score: 5

13.4 Relevant Evidence

Interview:	25, 45, 46, 56, 72
Document:	24, 37, 38, 46, 47, 55, 56, 76-80, 240-260, 267, 415, 423, 424, 463
Photo:	53-56

14 Public Health (I-14)

This topic addresses public health issues associated with the hydropower project. The intent is that the project does not create or exacerbate any public health issues, that improvements in public health are achieved through the project in project-affected areas where there are significant pre-existing public health issues, and that commitments made by the project to implement public health measures are fulfilled.

14.1 Background Information

Peru's public health performance has made significant progress in the past decades. For example, between 1990 and 2013, the under-five mortality rate dropped from 80 to 17 per 1,000 live births, and deaths from Malaria have almost disappeared. More than 80% of the population now use improved water sources, and more than 70% improved sanitation facilities. Nevertheless, the 78% of Peruvians living in urban areas have better living conditions and receive better health care than those in remote rural areas. Malnutrition and stunting in children are still common. Before the project, the next health centre (Level 2) for people in the direct project area was in Chinchavito and the next small (Level 1) hospital in Tingo Maria, both hours away on difficult roads. The Chinchavito health centre serves a population of 2,586 people and has a medical doctor, obstetrician and nurse on staff; there are also some satellite facilities and periodic visits of medical staff in other villages.

Potential negative health impacts of the project are related to changes in the environment during construction and operation, immigration and the related burden on existing health facilities, and community-workforce interaction. Potential positive impacts are health services and facilities provided by the project, improvements in living conditions, and improved access to health services.

14.2 Detailed Topic Evaluation

14.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Public health issues relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

Some basic information on the baseline health situation and health infrastructure in the influence area of the hydropower and TL components is provided in the Walsh and JGP EIAs. In the Walsh EIA, the only public health impact identified is the improved road access to health facilities. The social management plan lists a number of public health interventions, especially for women and children. Annex 4.4.15 reports the absence of insect vectors for diseases such as malaria in the area, although on the basis of only a single survey. In response to comments on the EIA, JGP confirms that there are no conceivable health risks from the reservoir. In the JGP EIA, the only public health impact identified is the use of public health facilities by project workers, and the only mitigation strategy is the internal provision of health services. The public health assessment in these EIAs is insufficient.

Health concerns were initially focused on workers' health and safety. The ESHSMP takes a more systematic and broader approach to public health, especially to community-workforce interaction. Its aim is to bring the project into compliance with international standards such as IFC Performance Standard 4 (Community Health, Safety, and Security). Both EGH and the lenders' environmental and social consultants are regularly reporting on public health issues and programmes.

Systematic monitoring has been undertaken annually (2013 and 2014) of the public health situation in the area close to the hydropower project (Pampamarca, Santa Rita Sur, Huanipampa and Higrompampa), based on surveys among villagers as well as data from the nearest public health centre in Chinchavito and the project's own workforce health centre. The objective of the monitoring is to detect any trends, attribute them to specific causes, where possible (such as community-workforce interaction), and to design public health interventions. In the project health centre, 16,149 consults were conducted in 2014, compared to 7,451 in 2013. The most frequent concerns were respiratory, musculoskeletal, and digestive problems, infections and parasites. In the four villages, the most frequent concerns were respiratory (mostly in children) and digestive diseases, followed by parasites (mostly in children), urinary infections, dental problems, skeletal pains, ear problems, and skin problems. Other infectious diseases registered in the Chinchavito health centre were tuberculosis (1 case in 2013 and 2 in 2014) and sexually transmitted diseases (STDs, 19 cases in 2013 and 124 in 2014). No cases of HIV, malaria or dengue have been detected.

CCC is also conducting 3-monthly monitoring of insect vectors in various parts of the construction site, which have confirmed their absence.

Many people are screened during periodic health campaigns, and data are collected, shared and analysed.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of public health issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities for different community groups that become evident during implementation.*

As roads were first improved on the right bank and then built on the left bank of the Huallaga, access to health care became significantly easier. For example, travel time from Santa Rita del Sur to the Chinchavito health centre dropped from 3-4 hours to 1 hour. At the same time, the income status of many families improved, which implied improved nutrition, living conditions and access to care and medication. These concurrent effects are taken into account when health data are analysed.

Health monitoring data are collected by age group, gender and village, thus allowing more specific analysis.

Criteria met: Yes

14.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified public health issues, and to meet commitments, relevant to the project implementation stage; plans are in place for the operation stage for ongoing public health issues management including hand-over to local authorities as appropriate.*

The following public health activities were supported by the project, in partnership with other entities:

- A series of health campaigns since 2011 (diagnostics and treatment of general health issues as well as specialist care - dental, reproductive health, eyes, psychology, breast and cervical cancer; distribution of medicine; educational talks on hygiene, nutrition, teenage pregnancy, HIV/AIDS, STDs), benefitting more than 6,000 local people;
- 3-month training of community health promoters, with 13 certified promoters at the end of the programme in Nov. 2014;
- Support for the existing Chinchavito health centre (new waiting room and bathrooms), which was close to the first access road camp;

- Support for obtaining approval for the new health centre in Pampamarca, the main settlement in the project area;
- Provision of basic medicine and first aid kits to villages;
- Construction of school bathrooms and biodigestors in 5 villages.

Other measures that contribute to improved public health outcomes are the management of work camps to ensure a healthy workforce and public order around camps; measures to improve water supply, wastewater and waste management in some villages; measures to assist people in obtaining identity cards, a precondition to register with the public health insurance (Seguro Integral de Salud); measures to assist poor people to benefit from the conditional cash transfer program 'Juntos', which requires preventative health, nutrition and education compliance; and the occasional use of the project health centre and ambulances by local villagers in case of emergencies.

The strategy of the project has been to educate local communities, mostly in preventative health care, and to provide logistical and monitoring support to local health authorities and NGOs like Caritas, rather than implementing measures by itself. Therefore, no facilities have to be handed over. The socio-environmental team will continue this strategy, on a smaller scale, during operations. According to the ESHSMP, the health monitoring programme would run one year into operations, although this now appears superseded. According to the Construction-to-Operation Transition Plan, there will be a program called 'Healthy Communities' with activities in water, wastewater and solid waste management; an expanded health program including a mobile health unit would be funded if carbon market revenues materialize.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

The monitoring efforts of the project and the public health centres are able to detect trends such as epidemics when they occur. For example, in response to the increased cases of STDs, EGH implemented a program from November 2014 to increase awareness, prevention and screening. The project also provided some support to the downstream municipality of Tingo Maria during a 2013 dengue epidemic. During operations, there will be continued socio-economic and health monitoring, as well as monitoring and periodic clean-ups of the reservoir, to ensure that no health risks emerge.

Criteria met: Yes

14.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in place to manage public health issues have been and are on track to be met with no significant non-compliances or non-conformances, and public health related commitments have been or are on track to be met.*

No non-compliances or non-conformances have been identified. There were a number of planned activities in the Walsh EIA, which have been implemented. Commitments in the other original plans, including the ESHSMP, were quite generic. Besides a commitment to a monitoring programme, they did not include commitments to programmes or investments in any particular villages. The health campaigns and the other measures listed under Management were planned separately, and have been implemented as planned. There is a voluntary commitment to continue health measures into the operations phase, contingent upon carbon revenues.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

No non-compliances or non-conformances have been identified.

Criteria met: Yes

14.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Negative public health impacts arising from project activities are avoided, minimised and mitigated with no significant gaps.*

Dust and noise emissions during construction are controlled as described under I-18, and industrial installations are located as far away from settlements as possible. Community-workforce interaction is controlled, among other things, through small shops that are operated by community members inside the work areas, by an 11pm curfew, control of entry into camps by non-authorized people, worker health exams (entry, annual, exit), provision of training and condoms to workers, and zero tolerance for drugs and alcohol among workers. Local communities cooperated in these efforts, for example by rejecting an 'amusement centre' in Pampamarca, and the area around the work camps makes a very orderly impression. During operations, the reservoir is unlikely to cause any health impacts because of its distance to settlements, altitude/temperature, and relatively short retention time, and neither should the TL and other project components.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, negative public health impacts arising from project implementation are avoided, minimised, mitigated and compensated with no identified gaps; and enhancements to pre-project public health conditions or contributions to addressing public health issues beyond those impacts caused by the project are achieved or are on track to be achieved.*

Despite the efforts listed above, there has been a significant increase in STDs between 2013 and 2014. No analysis of the causes has been documented, but it likely that the increase has to do with the interaction between the local communities, workers and immigrants, as well as increased health awareness and access to health services, leading to a higher rate of cases that are diagnosed and treated.

The increased pressure on public health services – particularly rural health centres - resulting from project-induced immigration was not adequately identified in the original EIAs and EMPs. The project expanded access to health services through temporary campaigns and other measures, and facilitated the construction of a permanent health centre in Pampamarca, a village that grew from 500 to 1,727 inhabitants between 2010 and 2014 and serves as a hub for the population in the direct influence area. However, that health centre is coming too late to have an impact on the health situation during construction. It is still under construction in mid-2015, although the temporary health centre was already reported to be 'overwhelmed' in Environ's first monitoring report in 2012. It will open at a time when the population is expected to drop again after the end of construction. This delay is not a direct responsibility of EGH, but of the public health services; it is a **significant gap** against proven best practice.

At the same time, the project has already contributed directly or indirectly to numerous significant improvements to living conditions, which are contributing to improved health outcomes. These include better road access to health care, but also better sanitation, income generation, indoor cooking conditions, nutrition and several others. Awareness of health issues and availability of health care have significantly improved, and openness to modern medical care has increased, especially among women, many of whom had not had access

to modern reproductive health care before. The impacts of these changes will be seen in the health status over time.

Criteria met: No

14.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

A public health centre in the project area will be completed too late to contribute to managing public health impacts of project-induced immigration during implementation.

1 significant gap

14.3 Scoring Summary

While the Chaglla project will have minor negative impacts during operations, there are significant impacts during construction, related to interactions of the community with the workforce and other immigrants, and the additional burden on public health services. This has been generally well handled, although with some delays caused by inadequate original planning, in particular in the construction of a rural health centre, which is seen as a significant gap against best practice.

At the same time, the project is also having major positive effects on the public health situation, both through direct interventions such as health campaigns and indirectly because living standards are improving and health services are easier to access.

Topic Score: 4

14.4 Relevant Evidence

Interview:	12-14, 23, 25, 72
Document:	24, 37, 38, 46, 47, 55, 56, 60, 69, 76-80, 95, 261-271
Photo:	57-60, 70, 74, 79

15 Biodiversity and Invasive Species (I-15)

This topic addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the project. The intent is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the project-affected area that are sustainable over the long-term; that biodiversity impacts arising from project activities are managed responsibly; that ongoing or emerging biodiversity issues are identified and addressed as required; and that commitments to implement biodiversity and invasive species measures are fulfilled.

15.1 Background Information

The project is situated in one of the most biodiverse eco-regions in the world, on the headwaters of the Amazon basin, the largest river system in the world. It is located within a highland tropical rainforest eco-region, the Peruvian Yungas, which occur on the eastern Peruvian Andes, forming a transition zone between the Amazonian moist forests at lower elevations to the east and the Central Andes at higher elevations to the west.

SERNANP is the national agency responsible for managing protected areas. Peru has 76 nationally-protected areas, totalling over 22 million hectares, equivalent to almost 17% of national territory. There is one protected area wholly in the Huánuco region, Tingo Maria National Park, which is located approximately 20 km downstream of the project powerhouse, on the left bank of the Huallaga, and is over 4,700 ha in area. In addition, parts of three protected areas that cross regional borders lie within Huánuco region (Cordillera Azul, El Sira and Cordillera Huayhuash). Around 20 protected areas encompass the Peruvian Yungas, and specifically Rio Abiseo National Park to the north of Huánuco region and Yanachaga-Chemillen National Park to the south protect Yungas at a similar altitudinal range.

An area or habitat known as 'Carpish' forest lies to the west of the project area. BirdLife International has recognised the Carpish area as an Important Bird Area (IBA, the area is coded PE072), delineating 220,000 ha on the left bank of the Huallaga, so the left bank in the project area lies entirely within this IBA. The initial part of the TL runs directly through the Carpish area, but an alignment with the least impact was chosen. The south-eastern boundary of the IBA is defined by the Huallaga River. The Carpish area is also recognised by the Alliance for Zero Extinction (AZE, the area is coded PER11) because of the presence of a range of critically endangered amphibian species. The area is not legally protected because similar habitats are protected in a number of protected areas in Peru, but the Huánuco Regional Government has declared the Carpish Forest as an "Area of Public Interest for Conservation" as the first step to promote its legal protection.

Terrestrial and freshwater biodiversity in the region is little surveyed or understood, and it is possible to discover species that are new to science. Very little is understood of aquatic biogeography. At these elevations, Peru's fish biodiversity is higher than in Colombia, although Colombia has greater fish biodiversity overall. The montane zone is predominantly fluvial, and with high diversity of fishes, algae and benthic macroinvertebrates. A total of 75 species (including 26 endemic) have been reported for the Upper Marañón, and a total of 95 (30 endemic) in the Upper Ucayali, which are Amazon tributaries equivalent to the Huallaga. There is no detailed understanding of species' habitat requirements, for example in relation to sedimentary rivers. Science for Nature and People (SNAP; a new collaboration of The Nature Conservancy and partners) is attempting to identify the highest conservation value areas for migratory fish in western Amazonia.

Threats for biodiversity include ongoing conversion of forest for shifting agriculture and cattle rearing, and hunting or capture for the pet trade. Communities in the project area hunt for meat consumption, out of fear of large carnivores and their conflict with livestock, for reasons of superstition (bats), and because they

erroneously believe all snakes to be venomous. Invasive species are not considered to be a great threat in this region, compared to other regions, but invasive rainbow trout are present in the Huallaga and its tributaries.

15.2 Detailed Topic Evaluation

15.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Biodiversity issues relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

The project has conducted a range of assessments of biodiversity issues relevant to implementation and operation. The modified EIA (Walsh, 2011) includes identification of relevant legislation, identification of species found in the area including species in IUCN or CITES categories, and a very general description of the project's impacts ("habitat alteration" etc.) during construction and operation, which are considered of moderate significance. The TL EIA (JGP, 2012) provides a 239-page description of vegetation, terrestrial fauna (mammals, birds, and herpetofauna) and fish fauna in the area, and a more thoughtful analysis of impacts (including impacts such as opening up access routes for deforestation, and bird collision with transmission towers). The ESHSMP also re-caps the identification of the main issues, in the Biodiversity Compensation Plan and the Ecological Flow Management Plan.

Additional studies have included: a complementary survey of terrestrial fauna (2011); over 35 species ecology data sheets; an Aquatic Ecosystems Baseline Consolidated Report (2011); a survey on *Chaetostoma* spp. and a range of morphological and genetic analyses of *Chaetostoma* spp. and *Astroblepus* spp. (armoured catfishes, see below); and additional surveys of the Andean night monkey (*Aotus miconax*), military macaw (*Ara militaris*) and herpetofauna species.

Two reports – Consolidated Report on Terrestrial Fauna, and Consolidated Report on Ichthyofauna – provide succinct summaries. The former identified species of conservation interest and their INRENA (Instituto Nacional de Recursos Naturales), IUCN and CITES categories, whilst the latter provides information on the distribution of newly discovered species in the *Chaetostoma* and *Astroblepus* genera, which are endemic to the Huallaga basin. Surveys and monitoring for the project have found totals of 24 mammal, 13 bird, 5 herpetofauna, and over 40 fish species at the project site.

The consolidated fauna report states that certain 'key species' were the subject of additional surveys because of their conservation status, endemicity, restricted distribution and sensitivity: *Aotus miconax* as it is endemic and it was thought to be at the limit of its range at the project site, *Ara militaris* as it was thought to inhabit forest along the river channel, and herpetofauna because two species were found that are new to science (*Stenocercus chinchaoensis*, a species of whorltail iguana, and Enyalioides sp., a species of dragon-esque wood-lizard). These studies were carried out in agreement with the IDB in order to meet safeguards requirements, due to the need to understand possible critical habitats. The TL surveys discovered four species of small rodents and a possible further lizard species and four species of frog that are potentially new to science.

The project commissioned two detailed analyses of satellite imagery, firstly for an area of 57,000 ha along the Huallaga encompassing the project area and project sites, and secondly for a larger area of the catchments (including Mallcutan, Lluto and Chimao catchments) which the TL crosses. These studies created land use categories, mapped areas of forest and anthropogenic activity, analysed trends from 2005 to 2011, 2011 to 2014, and presented results for individual catchments. The project is planning to repeat a study on vegetative cover in 2015. If the project continues to repeat the analysis in future, it could provide a basis for monitoring the influence of the project, and its conservation plans, on forest cover.

All assessments have been carried out using appropriate expertise, from Walsh and JGP consultants in the EIAs, through to experts on specific taxonomic groups for the ongoing surveys (provided through a consulting firm, Biosfera). For example, a biologist at the Lima Natural History Museum with a focus on large mammals including night monkeys, was employed for the night monkey surveys. A 'Gap Analysis' was prepared by JGP on the original Walsh EIA, which provided numerous comments on biodiversity sections of the EIA.

The project conducts hydrobiological monitoring and monitoring of terrestrial fauna. Hydrobiological surveys were conducted to establish a baseline, and monitoring has continued on a quarterly basis since July 2013. Currently, twenty-four points are surveyed, including upstream of the dam site (which will become the reservoir), the main river between the dam and power house, downstream of the powerhouse, and the Lluto, Chimao, Santa Clara and Mallacutan tributaries. Plankton, benthos, fish, and water quality (temperature, oxygen, pH, conductivity) are monitored.

Monitoring of terrestrial fauna, including mammals, birds and herpetofauna, to date has consisted of inventorising species and their relative abundance at four locations in nearby forests: well upstream, outside of the area of influence on the left bank; slightly upstream of the dam site, at the confluence with the Rio Tambo, within the area of influence; slightly downstream of the dam site, also within the area of influence; and near the power house on the left bank, also within the area of influence. Monitoring has been conducted on three occasions: in October 2013 (transition dry to wet season), November-December 2013 (wet season), and March-April 2014. This monitoring is carried out as part of the ESHSMP. In addition, monitoring is carried out to meet an EIA commitment on fauna and vegetation: ten sampling points in riverine, intermediary and montane forest, and xeric scrub; with five reports from August 2013 to May 2015.

In addition, contractors provide detailed reports on the fauna they have chased from the site during works, flora species translocated and seeds collected, and fish rescued following the diversion of the river.

The project also monitors biodiversity in relation to the TL. Monitoring is conducted in three zones defined by vegetation type, at specific points for vegetation, and in defined sampling areas for mammals, birds, and herpetofauna.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of biodiversity issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

The consultants responsible for the monitoring programmes have made improvements to their methodologies as the need arises. For example, the choice of sampling locations has been amended to allow better comparison between areas, the number of hydrobiological sampling points was increased (from 15 to 24) and sampling techniques amended to include the use of nets. Through these changes, monitoring has taken account of the risks and opportunities (for monitoring) that have emerged during implementation. The project's decision not to monitor the Andean night monkey, military macaw and certain herpetofauna species can also be considered as an adjustment in monitoring, in response to findings of the initial assessment that the project would not particularly affect them.

Monitoring incorporates inter-relationships amongst issues to some degree, for example water quality parameters are included in hydrobiological monitoring, and one of the fauna sampling points which is far from the project site is a 'control' against which changes at the other sampling points can be compared. However, it is not clear how the hydrobiological, terrestrial, or TL monitoring is designed in relation to specific project activities and impacts, or how data is analysed with data on possible drivers of impacts, such as noise, or the area of vegetative cover that is restored. The monitoring produces inventories of the species sampled, and diversity indices, but with no indication of how any significant changes would prompt a management response.

The latest fauna monitoring report for ESHS purposes states that variations in the presence of species are not conclusive, because the sampling effort is not robust enough for all taxa, and it recommends basing monitoring on key species or groups of species rather than species richness of large taxonomic groups, and choosing monitoring stations with greater similarities between them in altitude, climate and composition of fauna. There may be a requirement for improved understanding of the food preferences, life history and migration patterns of the endemic fish species, for example, before monitoring could be better designed and made relevant to any management response. There is no ongoing monitoring of vegetative cover across the project area, or levels of hunting by the local community, both of which could have been affected since the opening of the access road. In summary, biodiversity monitoring is not linked to the potential causes of biodiversity loss or a management response, which is a **significant gap** against proven best practice.

Criteria met: No

15.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified biodiversity issues, and to meet commitments, relevant to the project implementation stage; and plans are in place for the operation stage for ongoing biodiversity issues management.*

Processes for managing biodiversity issues and commitments during project implementation include: the rescue of fauna and flora from sites prior to construction works (this is mainly scaring away in the case of fauna) and re-introduction of flora, particularly orchids, to intact areas; rescue of stranded fish following the diversion of the river; the use of native species for revegetation of construction sites (using seedlings grown in the project seedling nursery from seeds collected from construction sites); a leaflet to raise awareness to prevent hunting by workers and environmental education in local schools; and eradication of the kudzu vine (*Pueraria* sp.) which is an invasive species, and which the project was originally using for slope stabilisation. The rescue of fauna and flora is of minor significance for conservation purposes, but is useful for extending knowledge on the presence of species in the area, environmental education, and studying orchid phenology.

Reservoir preparation and filling presents significant issues for biodiversity. On filling, habitat in the reservoir area will be permanently lost; and flow downstream of the dam will be lower for a period of 45 to 60 days whilst the dam is filling (flow will be of 3.69 m^3/sec immediately below the dam, compared to averages of 53.6 m^3/sec for September or 109.2 m^3/sec for October, but will increase due to tributary inflows with increasing distance from the dam). To minimise biodiversity impacts of the loss of habitat for the reservoir, the project has cleared 7 'sectors' from the dam to the reservoir tail, totalling 38 ha out of the reservoir area of 200 ha. Initially, fauna was scared away with smoke and noise; then vegetation was cleared including removal and relocation of some flora species such as orchids; and logs will be collected (a report will be issued to the national forest service SERFOR). A project report on clearance and the initial 2 days of filling, provided since the assessment, indicates that 27 species, just over half of which were mammal species, were identified during 'scaring away' activities, and 92 individual animals (half of which are lizards) have been rescued. Any immovable or injured fauna have been or will be transferred to a field-based custody centre prior to release, then to a nursery if they do not recover overnight, or ultimately to the Universidad Nacional Agraria de la Selva or termination if necessary. A fish rescue plan to maximize survival of fish in the Huallaga river downstream of the dam during the filling of the reservoir, by removing them prior to filling or rescuing them during filling, and then relocating them to tributaries, rescued or translocated a total of over 10,000 fish on the first two days of filling (though there was 10% mortality).

Plans for the operation stage are set out in the Walsh EIA, and are mainly focused on reservoir filling, but also include: to permanently maintain an environmental flow to minimize downstream effects; to monitor characteristics of the fish upstream and downstream of the reservoir; and introduce fish fry in watercourses if

necessary, to ensure the presence of fish species in the river. The TL EIA does not include plans for biodiversity for the operation stage. The ESHSMP includes two important plans for the operation stage: a biodiversity compensation plan, and a management plan for ecological flow. EGH has been developing the compensation plans further, and has agreed that a new action plan, to be submitted to IDB in October, will supersede the existing ESHS plans.

The original ESHS compensation plans were initial ideas and combined restoration of areas of modified habitat with support to Tingo Maria National Park and the University of San Marcos (see Outcomes, level 5). In addition to these activities, the project seeks to support the designation and conservation of 1 or 2 micro-catchments on the Huallaga, in an 'offset plan', which is allocated USD 2 million over 3 years. Studies have included: an initial study comparing alternative micro-catchments (which ruled out those that are too short or have insufficient flow); an initial 2014 version of the offset plan; a rapid biological assessment, 2015; fish ecology studies, 2015; studies on the Santa Clara and Mallacutan microcatchments (on riverine and terrestrial ecology), and studies on social and legal issues. A proposal will be sent to IDB by the end of October with action plans, schedule and a budget.

The offset plan is linked to the management of environmental flows, as a key objective is to maintain habitat connectivity of the Huallaga with its tributaries upstream of the powerhouse. It is technically impossible to alter the plans for minimum flow set out in the EIA (although there are studies concerning ramping up and down of flows downstream of the powerhouse – see topic I-20). Instead, the project has conducted bathymetric surveys of the river channel downstream of the dam, will monitor the behaviour of the river immediately after impoundment, and plans to undertake physical measures to ensure that connectivity with the tributaries is maintained despite the minimum flow, on an ongoing basis. These measures may include weirs or physical interventions at the confluence with the tributaries.

There are no plans regarding invasive species. There are few invasive species in the area, and they are very recent introductions: rainbow trout is an aggressive and widespread species, in the Huallaga, Lluto and Mallacutan tributaries, and people in the Chimao area raise trout in ponds. An invasive garden snail species is present in the Carpish forest. The project has ceased using an invasive grass species *Brachiaria brizantha* and the kudzu vine (*Pueraria* sp.) in its revegetation programmes.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Processes are in place for some emerging risks and opportunities, but not all. Reporting to OEFA and IDB, including on biodiversity commitments, will remain in place through the operation stage (see I-3). Continuing hydrobiological monitoring and scrutiny of connectivity of flow in the river channel will enable a management response that will attempt to ensure connectivity.

However, not all biodiversity monitoring is linked to the potential causes of biodiversity loss or a management response. For example, surveys of the Andean night monkey are not related to the identification of mitigation measures. Although hunting of these monkeys (or capture for the pet trade) or habitat conversion has not increased during construction, there are no plans to monitor or manage these risks during operation (when a large number of local staff will have been laid off). In addition, there is no understanding of reduced flow on, or monitoring of, the invasive rainbow trout; and there is no understanding of whether lowered flows will enable increased fishing by local fishermen or predation by birds in the main channel; there do not appear to be any alternative plans that could be followed in the event that it is physically impossible to maintain connectivity (but note that connectivity has been maintained over the initial 2 days of filling) or that the offset plans are not accepted by the authorities, for example continuing the relocation of stranded fish. There are no plans to tag

fish to determine survival rates, or rescued fauna to determine survival rates. This is a **significant gap** and is the same as that identified under Assessment.

Criteria met: No

15.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in place to manage biodiversity issues have been and are on track to be met with no significant non-compliances or non-conformances, and biodiversity related commitments have been or are on track to be met.*

All commitments including legal commitments are met. Legal requirements include avoiding biodiversity impacts, minimising effects on the aquatic ecosystem, and conserving habitat. There are no significant non-compliances or non-conformances.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

There are no non-compliances or non-conformances.

Criteria met: Yes

15.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Negative biodiversity impacts arising from project activities are avoided, minimised, mitigated, and compensated with no significant gaps.*

It is very difficult to judge the significance of biodiversity impacts given the limited knowledge of biodiversity in the area, but the footprint of the project is very small in comparison to the extent of the Yungas habitat. To date the project has minimised its biodiversity impacts, and it is likely that it will compensate for any loss of habitat through the offset strategy – both compensation for the fragmentation of the Huallaga by ensuring connectivity with two tributaries of the Huallaga, and compensation for the loss of forest habitat by the conservation of forests within their catchments. One of the proposed catchments, Mallacutan, is part of the Carpish IBA / AZE area, and the "Area of Public Interest for Conservation" proposed by Huánuco Regional Government with a budget of USD 2.5 million.

Civil society interviewees did not report any concerns with the project, and indicated that it is considered to be an example of good practice. SERNANP officers at Tingo Maria National Park do not consider that the project has had any adverse impact on the park (for example through the presence of workers, or improved road access) and do not anticipate any future impacts.

If it proves to be physically impossible over the longer-term to maintain connectivity with the tributaries, or the offsetting strategy is not successful, then biodiversity impacts would not be fully compensated.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, negative biodiversity impacts arising from project implementation are avoided, minimised, mitigated and compensated with no identified gaps; and enhancements to pre-project biodiversity*

conditions or contribution to addressing biodiversity issues beyond those impacts caused by the project are achieved or are on track to be achieved.

There are no identified gaps. Assuming the plans for ensuring connectivity and offsetting are successful, impacts on connectivity of the river and loss of habitat will be compensated. In the case of conservation of habitats, the area to be protected would be considerably greater, and of much higher value for conservation than the forest that has been lost for the project facilities. The length of river protected by the offset plan is designed to be greater than the length of river lost to the reservoir and de-watered stretch below the powerhouse. It is unclear whether it would compensate for the impact of the dam on connectivity with the upper reaches of the Huallaga because little is understood of the impact of fragmentation or whether the fish are migratory. There is no precedent in Peru for offsetting, and this would be the first of its kind, under a new regulation concerning offsetting that came into force in December 2014.

The project is making a contribution to biodiversity conservation beyond its own impacts as follows:

- Support to Tingo Maria National Park. Through a USD 300,000 agreement (compared to a USD 200,000 annual operational expenditure of the park), the project has supported an inventory (mainly flora with some fauna; based on existing and new surveys), and the publication of a book celebrating 50 years of the park and related events, and will support maintenance of check-points and bathrooms, a study on afforestation on restoration plans and community-based conservation, and the potential of obtaining carbon credits.
- Support to the ichthyology collection at the Natural History Museum at Santa Clara University. A USD 31,500 grant to the collection, which is the only collection of ichthyology samples in Peru, was made in 2014, concerning support to infrastructure (a new building) and tidying of the collection's samples.
- Various publications, including on orchids of the area, on a new frog species, inventory of Tingo Maria National Park, and the new lizard species.

Note that the ichythyology collection has a new building with two rooms, but is it not clear what the EGH contribution covered or the University contributed, and the collection needs further work, and a full-time manager. There is a university thesis on *Chaetostoma* but the ichthyologists could not point to any published articles based on their work in Chaglla. There is a missed opportunity for the project to make a much more significant contribution to the study of the endemic species of the river, but this is not considered to be a significant gap.

Criteria met: Yes

15.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

Biodiversity monitoring is not linked to the potential causes of biodiversity loss or a management response.

1 significant gap

15.3 Scoring Summary

The project is situated in one of the most biodiverse eco-regions in the world, on the headwaters of the Amazon basin. The project has conducted a broad range of assessments of biodiversity issues relevant to implementation and operation, which have led to the discovery of several species that are new to science.

Biodiversity impacts are or will be mitigated by rescue of fauna and flora, rescue of stranded fish following the diversion of the river, and the use of native species for revegetation. The loss of riverine habitat, and the possible fragmentation of tributaries from the Huallaga are the most significant issues, and these are being managed through physical works to maintain connectivity with tributaries, and an offsetting strategy. The project is contributing significantly beyond its own impacts through support to Tingo Maria National Park, support to Peru's only museum ichthyology collection, and publications.

There is a range of monitoring programmes in place, for terrestrial fauna and fish, for the main project and the TL. Although monitoring produces inventories of the species sampled, and diversity indices, it is not clear how any significant changes would prompt a management response. There is also no indication how monitoring of connectivity following impoundment would prompt a response measure such as a fish translocation programme. There is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

15.4 Relevant Evidence

Interview:	1, 15, 37, 48, 66, 67
Document:	23, 2, 4, 37, 38, 43, 57, 58, 61, 65, 71, 72, 260, 285, 286, 288-296, 298, 299, 346, 388, 401, 402, 422, 431, 432, 433, 463
Photo:	81-99

16 Erosion and Sedimentation (I-16)

This topic addresses the management of erosion and sedimentation issues associated with the project. The intent is that erosion and sedimentation caused by the project is managed responsibly and does not present problems with respect to other social, environmental and economic objectives; that external erosion or sedimentation occurrences which may have impacts on the project are recognised and managed; and that commitments to implement measures to address erosion and sedimentation are fulfilled.

16.1 Background Information

The project is located in the mountains of the eastern Andes, with high relief and steep, narrow valleys. The land is shaped by fluvial, gravitational and karst erosion processes on sedimentary rocks (mainly limestone):

- the banks of the Huallaga and its main tributaries are subject to fluvial processes, i.e. lateral and vertical undercutting of the banks. During the dry season, the Huallaga river has low suspended sediment and low erosivity, but in the wet season, the large volume of water carries a lot of sediment and suspended matter, raising its erosive potential;
- gravitational processes refers to landslides and mudslides, which are small to medium (of the order of a few hundreds of m^3) and occur more frequently during the rainy season and in deforested areas;
- karst processes refer to the development of sinkholes and underground caves etc., due to the action of slightly acidic rainwater and run-off on the limestone base, as seen downstream of the project site at Tingo Maria National Park.

Alluvial deposits accumulate at the confluence of tributaries with the Huallaga River, and there are fluvial deposits within the river channel, particularly in the northern part of the project area (i.e. downstream).

Baseline surveys in the EIA showed greatly varying readings of total suspended solids. In the dry season, total suspended solids are in single figures on both the Huallaga and its tributaries (the maximum was 7 mg/L, and lowest undetectable, less than 2 mg/L), whilst in the wet season, readings ranged from 79 to 995 mg/L on the Huallaga and were 30, 11 and 8 mg/L on the three tributaries surveyed.

Potential issues of erosion and sedimentation are: during construction, higher sediment load in the Huallaga or its tributaries resulting from diversion or erosion from construction sites, and erosion and degradation on the construction site; during operation, sedimentation of the reservoir, erosion of the river bed due to spilling, erosion downstream of the powerhouse, and altered sedimentation dynamics downstream of the dam. The catchment is relatively well forested, and conversion for cattle pasture is limited, so sediment levels are probably not greatly raised due to anthropogenic land conversion. Mining activity and potential additional hydro projects far upstream would also affect sediment levels.

16.2 Detailed Topic Evaluation

16.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Erosion and sedimentation issues relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

A series of studies have been conducted using appropriate expertise, mainly for the operation stage, but also in some cases for implementation. Erosion and sedimentation issues were originally assessed in 1994 as part of the feasibility study on the original project by Lavallin International Inc (now SNC Lavallin), and presented in a

detailed annex to the study. This identified sources of sediments, estimates of transport of suspended sediment and bed load, deposition in the reservoir, and degradation downstream of the dam and powerhouse.

This analysis was subsequently updated in the Intertechne technical studies for the project, commissioned by EGH. In addition, EGH commissioned sediment modelling (reporting in 2009) which considered alternatives for managing sediments in the reservoir, comparing design options of flushing through a bottom valve, flushing through spillways, or a combination of a bottom valve and spillways.

EGH commissioned a University of Piura team to conduct physical modelling of the behaviour of water through the spillway structures, including modelling of velocities and pressures in the spillway tunnels and dissipation pond, and they delivered their final report in 2012.

The Walsh EIA (2011) includes identification of erosion and sedimentation issues, but it is rather limited (identifying erosion related to the construction of the coffer dam and dam, erosion due to spilling, and reduced erosion in the river below the dam due to lower flow velocity) and does not identify any issues of sedimentation dynamics. It includes a brief description of a Programme on Erosion and Sedimentation. The environmental management programme for the contractor included in the ESHSMP included measures on erosion control and the management of rainfall. The document setting out the PREAD (procedure CHC-MA-PG-014 in the EMS, see Management below) also includes a detailed description of the local climatic conditions, geology, seismicity, and geomorphology of relevance to the PREAD programme. The EIA programme and PREAD address issues during the implementation stage.

In addition, NHC (Northwest Hydraulic Consultants) have conducted analysis of sediments (transects and sieve analysis) downstream of the dam and of the powerhouse. EGH have contracted NHC to model the effects of reduced flows and erosion during filling and operation on riverbank communities and existing infrastructure (e.g. bridges) from the powerhouse to Tingo Maria.

Monitoring of the effectiveness of erosion control programmes/procedures has been conducted in the implementation stage through the regular environmental inspection and reporting procedures (see I-3) and water quality monitoring. The water quality monitoring programme, as described under I-17, includes monitoring of total suspended solids at 9 locations on the Huallaga, up and downstream of project components (dam, industrial plant, camp, powerhouse, and one upstream of Higrompampa). Environmental and social monitoring by ENVIRON on conformance with IDB requirements has also identified sedimentation issues.

During filling, EGH will monitor the effect of reduced flows on river behaviour including erosion and sedimentation downstream of the dam. They have contracted NHC to propose a monitoring regime for erosion and sedimentation downstream of the powerhouse to Tingo Maria. Monitoring of sediment in the reservoir after 5 years of operation is a legal obligation.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of erosion and sedimentation issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

An example of how monitoring takes account of inter-relationships is the monitoring of water quality and fish, upstream and downstream of the rockfall at the Lluto tributary (see Management below). In addition, water quality monitoring points have been located in relation to project components, although there does not appear to be any analysis of the results or a process to respond if the data indicates an impact; for example there is no analysis that would link sedimentation monitoring with biodiversity (but this gap is addressed under I-15).

No opportunities (such as rehabilitation of areas of erosion not caused by the project) have become evident during implementation, so this aspect of the above scoring statement is not relevant.

Criteria met: Yes

16.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified erosion and sedimentation issues, and to meet commitments, relevant to the project implementation stage; plans are in place for the operation stage for ongoing erosion and sedimentation issues management.*

During the implementation stage, CCC has implemented a major programme for the rehabilitation and stabilisation of degraded areas (PREAD, Programa de Recuperación y Estabilización de Áreas Degradadas). The EMS procedure describing the programme lists relevant legislation, responsibilities, the areas where rehabilitation and stabilization will be expected, steps to be taken in each area (diagnosis/identification, measures to mitigate or avoid impacts, mechanical, vegetative, soil and rock stabilization techniques, and maintenance during the recovery process), and details such as the tree species to be used.

Additional CCC procedures include measures concerning erosion prevention, specifically: the control of earthworks (cut and fill) and the use of containment structures to prevent erosion (CHC-MA-PG-016 including slope control, surface drainage measures and control of machinery, equipment and heavy vehicles); the control of quarrying and excavations (CHC-MA-PG-017, including avoiding possible erosion on slopes), and the control of underground excavations (CHC-MA-PG-018, including drainage measures).

A major incident occurred in the Lluto tributary in November 2013, when rocks and debris falling from the project quarry blocked the tributary entirely. CCC addressed the issue immediately and EGH has developed a restoration plan for the Lluto tributary, which will begin following closure of the quarry in April 2015. This will address any impacts arising for water quality in the Lluto.

During the operation stage, the main issues are altered downstream geomorphology, and sedimentation of the reservoir. Altered downstream geomorphology is unpredictable, so this is addressed as a risk below, and in I-20.

An annual flushing procedure has been designed to flush sediment from the reservoir to allow it to continue to operate after 25-30 years, after which time sediments are predicted to reach the spillway intakes. (The alternative of a bottom outlet, or some combination of a bottom outlet and flushing using the spillways were considered in the 2009 sedimentation analysis). The procedure will involve lowering the reservoir level to the spillway level at the time that a significant flow is expected, on the basis of upstream monitoring (800 m^3/sec). In theory, a large flow at high velocity will flush sedimentation through the spillway, and keep the headrace tunnel intake free of sediment so that the project can continue to operate.

Other erosion and sedimentation issues will be managed through technical design features of the project. Technical design features are: the dissipation pond; a drainage chamber built into the slope adjacent to the powerhouse to drain and stabilise the slope; a turbine coating designed to withstand abrasive sediments that will allow the turbines to last 30 years according to the manufacturer; and design of the channel downstream of the powerhouse (as a result of the numerical modelling described above). The dissipation pond was built beneath the spillways to dissipate the energy of the water spilled and prevent erosion of the riverbed in this location. The minimum flow through the spillways will be 180 m^3/sec so that the spilling water will hit the pond more than 30 m from its edge, and any damage to the edge of the dissipation pond will be avoided. The dissipation pond was designed on the basis of physical modelling of spilling. Two vertical ducts above the opening of each spillway intake will avoid vortices forming as the water is spilled.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

During the implementation stage, EGH's systems for monitoring compliance with environmental management procedures would enable emerging risks to be identified and corrective action to be taken. Monitoring of sedimentation, and oversight by OEFA and Environ provide processes to respond to emerging risks. The project does not have a systematic process to identify and appraise opportunities, but there appear to be few opportunities in the area during implementation, so this is not significant for this topic. Regarding ongoing opportunities during operation, the biodiversity compensation plans described under I-15 may provide a process to support the restoration of degraded areas in the Mallacutan and Santa Clara catchments.

During operation, EGH and its consultants will monitor erosion and sedimentation downstream of the dam carefully, with the intention of responding with physical measures. In addition, EGH will monitor sedimentation levels in the reservoir biannually in the first 5 years of operation and annually thereafter, which would prompt a response if sedimentation occurs more quickly than expected. It is not clear what processes would be used to respond to emerging risks related to erosion around the dissipation pond, or erosion downstream of the powerhouse. It is not clear whether the project will be able to respond to such emerging risks – for example it may be impossible to engineer connectivity with the tributaries, and the project has little option except to wait until the spillway flushing mechanism can be used if the reservoir fills with sediment more quickly than expected. The sedimentation study concluded that relying on the spillway only was the least favourable option. Technical constraints on the project response to emerging erosion and sedimentation risks are a **significant gap** against proven best practice.

Criteria met: No

16.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in place to manage erosion and sedimentation issues have been and are on track to be met with no significant non-compliances or non-conformances, and erosion and sedimentation related commitments have been or are on track to be met.*

Objectives have been and are on track to be met. Blocking of the Lluto tributary due to slippage of material from the adjacent quarry was a major non-conformance, but the issue has been followed closely, particularly by Environ consultants, and the project has removed the material and continues to monitor sediment levels.

The regulator (OEFA) did not raise any non-compliances in an interview, and there are no major non-conformances with IDB's requirements. In a letter to MEM in 2011, in response to an observation they made, EGH put its commitment to reservoir bathymetric monitoring in writing, to determine changes in the level of sediments, as well as to establish the proper frequency, according to the level of sediment load.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

There are no ongoing non-compliances or non-conformances.

Criteria met: Yes

16.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Erosion and sedimentation issues during project implementation are avoided, minimised and mitigated with no significant gaps.*

During project implementation, run-off of material from construction sites has been avoided, with the exception of the temporary infilling of the Lluto tributary due to a rockfall from the adjacent quarry in November 2013. CCC removed the materials by December 2013. There is no indication that this has had any ongoing impact, for example on endemic fish species.

Monitoring of total suspended solids at the 9 points described above, in 2014 showed: in May (end of the wet season) values rising from 517 mg/l upstream of the dam, to 1,013 downstream of Higropampa, then falling to 834 downstream of the powerhouse; in August (end of the dry season) varying levels between the lowest of 45.8 upstream of the dam to the highest of 258 mg/L downstream of the industrial plant; in November (wet season) varying levels between the lowest of 64 upstream of the industrial plant, to the highest of 308 upstream of Higropampa. These data do not show any clear conclusions, except that the range does not exceed the wet season baseline particularly, though it greatly exceeds the dry season baseline, and possibly that the effect of each project component can be seen in the dry season.

This evidence suggests that impacts of the project sites on sediment levels in the Huallaga have not been avoided. It is likely that, although construction site management avoids run-off, there is an unavoidable impact arising from the diversion of the river, both at the dam site (coffer dam and diversion tunnel) and powerhouse. These impacts were highlighted by the NHC consultants in their inspection report dated November 2013. This stated that high suspended sediments have more of an impact during the dry season, as this is the period when biological production is maximum in the river, for primary and secondary producers and fish. However, the consultants also stated that the impact is not long term. There is no evidence that this is a significant impact, either on biodiversity or communities, so it is not considered to be a significant gap.

During operation it is expected that larger sediment will accumulate at the tail and smaller sediment nearer the spillways. Between 7.6 and 11.6 million tonnes per year will be trapped in the reservoir, so it will be filled in 25 to 30 years, requiring the need for a flushing mechanism if the life of the project is to be extended beyond that. Erosion of the riverbed below the spillway is avoided by the dissipation pond, erosion downstream of the powerhouse will be avoided by the re-designed channel, and any impacts of altered sedimentation dynamics downstream of the dam will be mitigated by physical works (for more details, please refer to I-15).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, erosion and sedimentation issues during project implementation are avoided, minimised, mitigated and compensated with no identified gaps; and enhancements to pre-project erosion and sedimentation conditions or contribution to addressing erosion and sedimentation issues beyond those impacts caused by the project are achieved or are on track to be achieved.*

There are no issues requiring compensation, during implementation. The project has not provided any enhancements to pre-project conditions or contributed to issues beyond project impacts, but this is not a significant gap, as there are no opportunities for this during implementation.

During operation, offsetting plans (described under I-15) may provide compensation for the fragmentation of the river for aquatic biodiversity caused by altered downstream geomorphology. It is unclear whether compensation will be required for other downstream impacts, for example on bridges, but the planned monitoring (see Assessment above) indicates that the project would take action to avoid or mitigate any impacts instead.

Criteria met: Yes

16.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are technical constraints on the project's response to emerging erosion and sedimentation risks.

1 significant gap

16.3 Scoring Summary

The project is located in an area with high relief and frequent landslides, and the river carries a significant amount of sediment, with alluvial deposits accumulating at the confluence with tributaries. The project conducted detailed sedimentation studies in 2007 and 2009, and has recently commissioned physical and numeric hydrodynamic modelling.

During the implementation stage, CCC has implemented an extensive programme for the rehabilitation and stabilisation of degraded areas, and has monitored the effectiveness of erosion control programmes/procedures through broader environmental inspection and reporting procedures.

During the operation stage, sedimentation in the reservoir will be managed by a flushing procedure, so that it may continue to operate after 25-30 years. Other erosion and sedimentation issues will be managed through technical design features, such as the dissipation pond.

However, it is not clear whether the project will be able to respond to emerging risks, such as any physical impossibility in engineering connectivity with the tributaries or the risk that the reservoir fills with sediment more quickly than expected. Technical constraints on the project's response to emerging erosion and sedimentation risks are a significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

16.4 Relevant Evidence

Interview:	32, 48, 55, 65
Document:	23, 24, 37, 38, 43, 45, 55, 64, 78, 79, 80, 81, 305, 307, 310, 315, 319, 320, 389, 444, 445, 446, 447, 448, 449
Photo:	42, 81, 82, 100-109

17 Water Quality (I-17)

This topic addresses the management of water quality issues associated with the project. The intent is that water quality in the vicinity of the project is not adversely impacted by project activities; that water quality issues are monitored and addressed as required; and commitments to implement measures to address water quality are fulfilled.

17.1 Background Information

High rainfall and flows in the wet season, resulting in landslides and river-bank erosion, and high levels of organic content in sediments entering the river are the main determinants of water quality in the Huallaga. The Huallaga and its tributaries have a high level of total suspended solids during the wet season, and high levels of parameters that reflect a high organic content, such as total nitrogen, phosphates and coliforms, exceeding national standards.

The Ministry of Environment has established National Environmental Quality Standards for Water (Decreto Supremo No. 002-2008-MINAM), which set out standards for a range of parameters in categories of water bodies and function. Rivers in the project area are required to meet Category 4 "Conservation of the aquatic environment" standards. Water Resources Law No. 29338 (2009) and Resolution No. 0291-2009-ANA (of the National Water Authority) also define responsibilities for water management and water quality protection.

Potential issues of water quality for the Chaglla project are:

- During construction, run-off and effluent from the project's sites and camps, including effluents from wastewater treatment plants (WWTPs);
- During operation, altered water quality in the reservoir resulting from altered temperature and chemical properties; altered water quality downstream; and continuing run-off and effluents from the project sites and camp.

In the project area, there are no direct industry effluents discharging into the river, and the effect of effluents from settlements is negligible. Communities do not use the main stream of the Huallaga for gathering or extraction of drinking water, instead extracting water from tributaries and springs.

Mining in the upper Huallaga catchment may contribute pollutants, particularly heavy metals to the river. An MEM-sponsored 1997 study investigated the industry and its environmental impact. The industry was mainly located in Pasco and Ambo provinces near the towns of Cerro de Pasco, Colquijirca and Ambo, and the annual production was significant in relation to the domestic production of both zinc and lead, providing 7% and 23%, respectively. Recent news reports suggest that mining continues to be a source of pollutants in the upper catchment. In addition, water quality in the upstream Huallaga will be influenced by domestic and industrial effluents in the town of Huánuco.

This topic includes suspended sediments as an issue of water quality, but processes of erosion and sedimentation are addressed under I-16.

17.2 Detailed Topic Evaluation

17.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Water quality issues relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

Water quality issues were assessed in detail as part of the Walsh EIA, including the use of water quality modelling and appropriate expertise. The Walsh EIA includes a baseline assessment of the Huallaga, Tambo, Chimao and Lluto, for wet and dry seasons, based on 11 sampling locations. The parameters presented were: pH, temperature, electrical conductivity, Dissolved Oxygen (DO), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Hydrogen Sulphide, Ammoniacal Nitrogen, Hydrocarbons, Oils and Fats, Chemical Oxygen Demand (COD), total hardness, nitrates, phosphates, Biological Oxygen Demand (BOD), total coliforms, faecal coliforms, organochlorine pesticides, Polycyclic Aromatic Hydrocarbons, and total and dissolved mercury, arsenic, barium, cadmium, copper, nickel, lead and zinc. The EIA does not include detailed predictions for either construction of operation stages, but describes 'significant but moderate' impacts on TDS, TSS, dissolved oxygen, and oils and fats.

An annex to the EIA presents two reports (phase 1 and 2) on water quality modelling, providing predictions for 12 years following impoundment. The model used was CE-QUAL-W2, a 2-dimensional (longitudinal-vertical) hydrodynamic and water quality model, used extensively throughout the world in 116 different countries. It was run for a simulation period of 1997 to 2009, for 27 km downstream of dam, under wet season and dry season conditions, and for a scenario with a reduced reservoir volume to reflect 20 years of sediment accumulation. The reports present results for DO, carbon load, CO_2, temperature and algae for the reservoir, and DO and CO_2 for the downstream river. The modelling was conducted by the experts who developed the model, at the Engineer Research and Development Centre in the USA.

EGH has contracted consultants (Cadabeco) to conduct monthly monitoring of water quality. They take samples at nine points on the Huallaga and four on its tributaries, and the effluents of project facilities. They report monthly on surface water (Huallaga and tributaries), WWTP effluents, drinking water quality, and effluents from the tunnel construction site, concrete plant, oily wastewater processing site, and metals acid-pickling site. In addition, they have contracted CAMESA to conduct quarterly monitoring in relation to the TL, who sample points on the Huallaga and tributaries, for the same range of parameters. In addition, the hydro-biological monitoring (described under I-15) incorporates some water quality parameters. Water quality parameters are also summarised in EGH's monthly environmental reports.

In addition, the Walsh EIA includes basic requirements for operation stage water quality monitoring (a list of parameters, at three points, upstream of the reservoir, the dam, and downstream of the camp).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of water quality issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

Monitoring is designed to take account of inter-relationships as follows: water quality is integrated into the hydrobiological monitoring; and water quality monitoring is carried out in relation to specific project sources of effluent and up and downstream of the project to allow any causes of changing water quality to be established. Water quality issues and corrective or preventive actions are identified in relation to each project component

through monthly inspections by the CCC environmental specialists, and quarterly EGH environmental and social compliance reports. Reporting of the ESC, Environ, also provides a process to examine and respond to any inter-relationships. In addition, modelling of water quality took into account the inter-relationship between sedimentation accumulation and reservoir volume (the bottom of the reservoir for scenario 2 was set at 1149.88 in order to capture the impact of the 20 years of sediment deposition).

The locations of sampling points have been adjusted through the implementation stage, as risks emerge or opportunities for improvement emerge, for example to cease monitoring following the closure of particular project sites, and also to involve community representatives in sampling activities. Additional sampling points for hydrobiological and water quality monitoring were introduced on the Lluto tributary, following its restoration after being filled in by debris from the quarry. Community participatory monitoring is a further means by which inter-relationships could be identified.

Reports by the ESC also provide an opportunity to consider inter-relationships. For example, in December 2014, some comments were made on the point sources of pollution, and attributing the high concentration of suspended solids to drilling and heavy traffic in the tunnels.

The breadth of parameters monitored is also indicative of the incorporation of risks: a wide range of metals are monitored in the samples taken in the main river, and in effluents from tunnelling, the concrete plant, and the metals processing site. Further examples are: ALA began wider monitoring of water quality (physical, chemical, and microbiological) in the Huallaga catchment, starting in December 2014, and expect to repeat this 2-3 times per year; and project-level monitoring is conducted on a monthly basis, rather than quarterly as originally recommended in the Walsh EIA.

Criteria met: Yes

17.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified water quality issues, and to meet commitments, relevant to the project implementation stage; and plans are in place for the operation stage for ongoing water quality issues management.*

The project has put a range of processes in place during the implementation stage, including the establishment of WWTPs for domestic wastewater, and a range of EMS procedures to manage water quality.

The project uses two WWTPs: a right-bank plant, processing 150 m^3/ day, with bioreactors for domestic wastewater treatment, and ponds for grey wastewater; and a left-bank plant, processing 60 m^3/day, which will be closed in the next few months. The main industrial plant (with rock crushing, concrete batching, a fuel station, and carpentry sites) includes water settling ponds at the truck cleaning station, and a settling pond for rock crushing. Two pits are used for the settling and disposal of effluent from tunnelling, at Adit 3.

EMS or operational procedures include procedures for: the management of run-off; cleaning and maintenance of treatment of oily water (grease traps, settling tanks) at fuel stations, mechanics workshops, truck cleaning / cement batcher; operation and maintenance of the WWTPs; operation and maintenance of pools for greywater treatment; management and treatment of effluents; and cleaning and maintenance system of industrial water treatment. In addition there are procedures for water extraction and treatment, and the management of drinking water fountains.

The restoration plan for the Lluto tributary, described under I-16 can also be considered as a management response to an incident concerning water quality.

Plans are very similar for the operation stage: continuing wastewater treatment and the management of effluents. There are no plans to manage water quality in the reservoir, as the modelling predicted that reservoir and downstream water quality will not exceed national standards.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

EGH's systems for monitoring compliance with environmental management procedures enable emerging risks to be identified and corrective action to be taken. These include inspections by the local water authority (ALA) to check compliance with environmental quality standards. For example, the maximum permitted level of faecal coliforms in the effluent at the main WWTP was exceeded in November 2014, raising a non-compliance, which prompted the WWTP manager to amend the aeration system used.

Support to three larger villages (San Pablo de Pillao - Santa Isabel de Pillao, Pampamarca, and Chinchavito) in drafting their Concerted Development Plans, as referred to under I-7, has provided processes for improved wastewater management in these villages.

Criteria met: Yes

17.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in place to manage water quality issues have been and are on track to be met with no significant non-compliances or non-conformances, and water quality related commitments have been or are on track to be met.*

In addition to environmental quality standards, the project is also required to comply with licences concerning the volume of water it is permitted to extract (ANA licences dated February 2012, November 2013, and April 2014, of which the latter extends the project's licence to use the water until March 2016). OEFA and ALA both stated in interviews in this assessment that the project is in compliance with its legal requirements.

The accidental in-filling of the Lluto tributary was not in compliance with the project's commitments, but this has now been corrected.

The latest report by the ESC (Environ) found the project to be in material compliance with its commitments for the period October December 2014. Any non-conformances previously raised have been solved (e.g. a plan for the restoration of the Lluto).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

However, water quality monitoring data shows some non-compliances with environmental quality standards, some of which are ongoing. These are described in further detail under Outcomes. The 4th Quarter 2014 ESCR also refers to a range of minor non-compliances, specifically concerning oil and grease, total suspended solids; total coliforms, faecal coliforms, pH, copper, nickel and lead. Additionally, results for free (residual) chlorine at the site for bottling water for workers' consumption was higher than permissible, and the reports for the TL continue to omit results for oil and grease and coliforms.

Volumes of effluent are small compared to river flows, and the river has naturally high levels of TSS, coliforms, and metals in the river, so there is no risk of significant impacts on the river and this issue is not considered a

significant gap under 'Outcomes'. However, not meeting environmental quality standards for a number of parameters on an ongoing basis are non-compliances, and must be considered as a **significant gap** against proven best practice.

Criteria met: No

17.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Negative water quality impacts arising from project activities are avoided, minimised and mitigated with no significant gaps.*

Significant negative impacts have been avoided, minimised and mitigated. A range of minor non-compliances with environmental quality standards continue to occur, but they will not result in significant impacts due to the small volumes of effluent compared to river flows, and to the high natural levels of TSS, coliforms, and metals in the river. Monitoring in the first three months of 2015 shows that: in the Huallaga and its tributaries, pH, DO, and physico-chemical parameters except TSS comply, but TSS, faecal coliforms, total coliform, copper, chromium, nickel and lead exceed national standards; WWTP effluents meet with all legal standards; potable water produced at the water treatment plant complies with legal standards, but free residual chlorine repeatedly exceeds legal standards in water fountains; in the tunnel, pH is not met at one sampling point, TSS exceeded at 2 points, and total iron not met at 1, out of 5 points monitored; at the concrete plant, pH, TSS and total iron are not met; the oily wastewater treatment site complies with pH and oils and fats standards; and the metals treatment site does not comply with TSS. In addition, TL monitoring shows that Total Nitrogen, Ammoniacal Nitrogen, Total Phosphates and DO were repeatedly exceeded in several points through 2014-15.

Impacts arising from reservoir impoundment during the operation stage are not considered to be significant. Modelling of reservoir and downstream water quality found that: the high elevations of the intake and spillways result in water being withdrawn at depths where water will be relatively well oxygenated; DO concentrations of dam outflows rarely fell below 6 mg/l and averaged close to 7.5 mg/l compared to the Category 4 standard of 5 mg/l; the part of the reservoir with zero DO varied from 25-50 m from the bottom depending on the time of year for the average flow year; oxygen depletion in the reservoir results from decaying organic matter as a result of inflowing organic matter and decaying algae that have dropped below the photic zone; the reservoir will be more stratified during the dry season, but because of the near-surface withdrawals and the assumed inflow temperatures, often the reservoir was not strongly stratified; dam outflows of CO_2 exceeded reservoir inflows in only one low flow year, because of ongoing decomposition of organic sediments; and DO in the downstream river was generally well above 6 mg/l, and generally approaching 8 mg/l close to 100% saturation.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, negative water quality impacts arising from project implementation are avoided, minimised, mitigated and compensated with no identified gaps; and enhancements to pre-project water quality conditions or contribution to addressing water quality issues beyond those impacts caused by the project are achieved or are on track to be achieved.*

There have been no issues requiring compensation during implementation, and it is unlikely that they will arise during operation.

The preparation of the Pampamarca Concerted Development Plan identified a target of increasing access to basic wastewater services from 2% to 90% by 2021 amongst the rural population, which, with improved access to water supplies, is an 'emblematic' goal of the plan. Continuing support to this target will contribute to water

quality issues beyond the impacts of the project. In addition, the project has supported drinking water supplies in Higrompampa and Huanipampa, but strictly speaking this is not related to surface water quality.

Criteria met: Yes

17.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are some ongoing non-compliances of site effluents with environmental quality standards.

1 significant gap

17.3 Scoring Summary

The Huallaga and its tributaries have high levels of total suspended solids during the wet season, and high levels of total nitrogen, phosphates and coliforms, exceeding national standards. Water quality issues were assessed in detail through water quality modelling. The project has used a range of processes during the implementation stage, including WWTPs for domestic wastewater, and a range of EMS procedures to manage water quality.

Consultants are used to gather extensive monitoring data for the project and the TL, on the Huallaga and its tributaries, and including effluents of the most polluting project sites. Reporting on environmental commitments allows any risks and inter-relationships to be identified.

Significant negative impacts have been avoided, minimised and mitigated, but a range of minor non-compliances with environmental quality standards continue to occur. This is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

17.4 Relevant Evidence

Interview:	30, 32, 55, 60, 65
Document:	23, 24, 37, 38, 43, 45, 55, 62, 78, 79, 80, 109, 312, 313, 314, 319, 320, 341, 403
Photo:	101, 106, 107, 110-115

18 Waste, Noise and Air Quality (I-18)

This topic addresses the management of waste, noise and air quality issues associated with the project. The intent is that noise and air quality in the vicinity of the project are of a high quality and not adversely impacted by project activities, and that project wastes are responsibly managed.

18.1 Background Information

The project's construction site is complex, with several locations of construction, tunnelling, an 'industrial plant' (crushing and concrete batching, and a fuel station), two camps (left bank and right bank), smaller facilities (such as the small concrete plant, and the plant nursery), and the TL. It produces a wide range and a large volume of solid waste, hazardous wastes and spoil. By the end of 2014, it had produced 12,500 tonnes of solid waste, not including spoil.

Tunnelling, blasting and crushing, the use of the helicopter for the TL construction, generators, and the access road and vehicles are sources of noise and air pollution. The community of Huanipampa is sandwiched between the left and right bank camps, but most other centres of population are some distance from the sites. The nearest landfill site that conforms to modern standards is at Lima, where all of Peru's landfills are located. The management of wastewater and effluents are addressed under I-17.

18.2 Detailed Topic Evaluation

18.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Waste, noise and air quality issues relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.*

The 2010 Walsh hydropower project EIA and 2012 JGP TL EIA include an initial identification of waste, noise and air quality legal requirements, issues for both implementation and operation stages, and initial proposals for management measures. These and the subsequent ESHSMP (see Management below) were prepared using appropriate expertise. Procedures for waste, noise and air quality management, as described under Management, also identify legal requirements.

Monitoring has been undertaken as follows, and is summarised in EGH's annual report on environmental management:

- Monthly reports on kilograms of waste produced in recyclable and non-recyclable categories, describing the type of waste (for example non-recyclable includes oil-contaminated cloth, fluorescent lights, hospital waste, domestic waste), source, and destination. The reports provide charts for volumes in the preceding year for metals, wood, paper / cardboard, plastics, waste oils, hazardous waste, and domestic waste;
- Monthly letters to OEFA detailing the kilograms of hazardous waste produced and their final disposal;
- Air quality monitoring in five locations at the site (powerhouse site at Santa Rita, between the concrete plant and Higrompampa community, right bank camp, left bank camp, and at Huanipampa), conducted quarterly (in February, May, August and November during 2014) of PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, and H_2S;
- Noise monitoring in the same five locations, also quarterly (in February, May, August and November) of daytime and night-time dB(A) (A-weighted decibels);
- Measurement of soil contamination (benzenes, toluenes, polychlorinated biphenyl and others) at five locations (2 points at the industrial plant, left bank camp, powerhouse, and one of the tunnel shafts);

- For the TL, monitoring of air quality (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, H_2S, and O_3) at seven locations on a quarterly basis, and monitoring of noise for 30 minute intervals at 5 points (including the office and cafeteria) monthly.

The Walsh EIA does not propose noise or air quality monitoring to continue in the operation stage, but it does require electro-magnetic monitoring at the substation and powerhouse.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of waste, noise and air quality issues during project implementation takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

Monitoring of inter-relationships and risks would require some analysis that links monitoring results in one area, such as noise, with results in another, such as biodiversity. A further example is noise and the satisfaction of local communities. The project has used a community-level monitoring system, Comité de Monitoreo y Vigilancia Ciudadana (CMVC), consisting of community-level representatives who check progress and potential project impacts, thereby allowing links with community-level impacts to be monitored. In addition, interviewees described how, if a formal complaint (a claim) is raised by the community, monitoring near to the community is arranged and the results fed back to the community.

However, waste, noise and air quality monitoring appears to be determined primarily by regulatory reporting requirements. EGH does not do any other analysis or monitoring to investigate links between waste, noise and air quality and other issues – biodiversity, for example. The number of monitoring points and the frequency of monitoring, which is lower than proposed in the EIA, also does not appear to be designed to allow the identification of links/inter-relationships. The project has taken a number of opportunities during implementation (see Outcomes), but their impact is not monitored – for example there is no monitoring of particulates in the locations where women have been employed to water the road. This is a **significant gap** against proven best practice.

Criteria met: No

18.2.2 Management

Analysis against basic good practice

Scoring statement: *Processes are in place to ensure management of identified waste, noise and air quality issues, and to meet commitments, relevant to the project implementation stage; and plans are in place for the operation stage for ongoing waste management.*

Detailed procedures are in place. Firstly, the project has followed the processes set out in the ESHSMP, the most relevant parts of which include the contractor's environmental management procedures, EGH's compliance assurance plan, and a plan for spills management. In addition, CCC has established an environmental management system (EMS) and integrated environmental requirements into operational procedures. Implementation of these and related compliance procedures such as reporting to OEFA, OEFA audits, and Environ audits, are described under topic I-3.

Procedures that specifically concern waste, noise and air quality are:

- An EMS procedure on waste management, with three accompanying instructions on waste collection and destination, electrical appliances, and composting;
- A procedure for the bioremediation of soils contaminated with oils and fats, to reduce contaminants to minimum levels that allow their use in the recovery of degraded areas;

- A procedure for the treatment of oily wastewater, referring to settling tanks and grease traps etc., and the collection of deposits for treatment at the Waste Management Centre;
- A procedure on noise and air particulates in the operational control system, which requires identification of activities with noise/air impacts, refers to legal requirements, and follows the EMS procedure on identification and evaluation of environmental aspects and impacts. It specifically refers to: particulate emissions from the industrial plant, cement plant, and vehicles; combustion gases from vehicles; and environmental and occupational safety limits on noise;
- Further specific procedures such as operational procedures on equipment maintenance (including vehicles) to manage air quality and noise, an operational procedure for blasting tunnels, requiring measurement of oxygen levels for occupational safety purposes, and procedures and checklists for maintenance, corrective and preventive operation and control of air conditioning units.

The project has established waste separation and collection facilities across the site (even the collection bins are made from recycled chemicals drums), and a comprehensive Waste Management Centre. Waste is separated before it is transported to the centre, where it is stored. Metals, plastics, cardboard, and tyres are sold for recycling, oil drums are cleaned and sold for recycling, and wood is donated to the local community or is chipped for composting. Large-scale bio-activated composting is carried out on organic waste, and the resulting product used in site rehabilitation. A contractor is used to dispose of batteries and electronic waste, as required by the Huánuco authorities. Now that the centre has equipment to compress the residual waste, only 1 or 2 trips per week to a Lima landfill are required. Employees have been frequently trained in waste separation.

Construction spoil is crushed and shaped into terraces for revegetation, or re-used in construction of the dam. The assessors saw examples on site, including one in which 70,000 seedlings were planted (cedar and *Brachiaria* grass – an invasive species, see I-15). There are 25 deposit areas in total. Plans are under development for the decommissioning of the small concrete plant, and the industrial plant.

Air quality in the tunnels is managed with an extraction system that is required to be positioned less than 30 m from the work front. Enclosures around air compressors are used to reduce noise. Roads are constantly irrigated to reduce dust levels.

There are no plans for the operation stage, other than the general plans set out in the EIA. This does not clearly distinguish management measures for the operation stage, but it refers to waste management, and the maintenance of vehicles and machinery to minimise noise. Waste, noise and air quality management will continue to be integrated into the EMS, and this will be transferred from CCC to EGH. EGH will follow Odebrecht's corporate management system.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

EGH's systems for monitoring compliance with environmental management procedures enable emerging risks to be identified and corrective action to be taken. For example, the assessors were provided with an example of a non-compliance report concerning separate waste collection bins at TL construction sites.

The project has used its relations with local communities to identify and appraise opportunities. It has taken opportunities to improve waste management (such as the adoption of a crusher to reduce residual waste volume), and to contribute to waste management issues in the local community, as described under Outcomes. The opportunity to support the development of a modern landfill in the Huánuco region, that would serve the project as well communities, was not feasible as it would have required in-depth studies and licensing, and landfills can only be managed by registered companies.

Criteria met: Yes

18.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives relating to waste, noise and air quality have been and are on track to be met with no significant non-compliances or non-conformances, and any related commitments have been or are on track to be met.*

Processes and commitments have been implemented without any non-compliances or non-conformances. Monitoring data, provided for 2014 and partly for 2015, show that all parameters were within legal standards (noise at some of the TL sampling points exceeded residential standards in January 2015, but these locations are far from residential areas, and are required to meet less stringent standards for commercial / industrial areas).

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

The Walsh EIA sets out requirements for noise and air monitoring at a much greater number of locations than is being implemented, as shown on a map annexed to the EIA, so monitoring cannot be said to fully in conformance with the EIA commitments. This is a **significant gap**, but is considered to be the same as that described under Assessment. There is no evidence of any other non-compliances or non-conformances.

Criteria met: No

18.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *Negative noise and air quality impacts arising from project activities are avoided, minimised and mitigated with no significant gaps, and project wastes managed responsibly.*

Negative noise and air quality impacts arising from project activities are avoided, minimised and mitigated, and the project manages wastes with great responsibility. The project consistently exceeded its target to recycle more than 80% of its solid waste in the second half of 2014, and through the life of the project to date has recycled 76%. Revenue from sales of material for recycling is now over USD 0.3 million meaning that the waste collection centre covers all of its costs. Landscaping of construction spoils, using compost generated from the project's organic waste, minimises the impact of construction waste.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, negative noise and air quality impacts arising from project activities are avoided, minimised, mitigated and compensated with no identified gaps; project wastes are managed responsibly; and the project contributes to addressing waste management issues beyond those impacts caused by the project.*

All impacts are mitigated as far as possible, and wastes are managed responsibly. The project was a finalist in a National Environmental Award sponsored by the Ministry of Environment for its composting achievement in using 100% of organic waste from the canteens (approximately 100 tonnes monthly), which reduces the project's requirement for fertilizer for rehabilitation areas and reduces GHG emissions from landfill.

The project has made a number of efforts to contribute to waste management beyond the impacts of the project:

- A solid waste management project with the town of Pampamarca, including analysis of volumes of waste generated, by residents and businesses and by type, the establishment of a waste management centre, and series of awareness-raising talks attended by 199 people;
- A small community composting project in Chichipara, which was carried out over 1-2 months, and established a small organic waste composting facility with associated community-level training;
- Promotion of good environmental practices, such as reducing deforestation and segregation of waste, among the CMVC; and
- A new project on knowledge transfer on waste management with the Tingo Maria authorities (Tingo Maria has only controlled dump sites).

In addition, it is notable that waste management and dust management is complementary with enhanced employment opportunities for local people. The waste management centre employs 25 people (the foreman is from Tingo Maria, for example), the project runs a scheme in which local women are employed to hose down roads in their communities to reduce dust from project vehicles during the dry season, and the project is now considering a proposal to employ the local community to clear aquatic weeds and solid waste that will collect in the reservoir during the operation stage.

Criteria met: Yes

18.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

The number of monitoring points and the frequency of monitoring does not allow the identification of links/inter-relationships.

1 significant gap

18.3 Scoring Summary

Waste, noise and air quality issues were identified in EIAs and in subsequent management planning. The project has established a Waste Management Centre, and EMS procedure on waste management, waste collection, composting, bioremediation of soil, and noise and air particulates, for example. Monitoring has been undertaken on waste production and processing, noise and air quality monitoring in five locations, measurement of soil contamination at five locations, and additional TL monitoring. The project reports on a monthly basis on waste produced, and provides summaries in monthly and annual reports, and monthly letters to OEFA. EGH's systems for monitoring compliance with environmental management procedures enable emerging risks to be identified and corrective action to be taken.

The project performs highly on this topic, offering a model of waste management in particular, meeting international standards. All impacts are mitigated as far as possible, wastes are managed with great responsibility, and the project has supported a number of projects on community waste management. The project consistently exceeded its target to recycle more than 80% of its solid waste in the second half of 2014.

The project has used a community-level monitoring system, allowing links with community-level impacts to be monitored. However, EGH does not do any other analysis or monitoring to investigate links between waste,

noise and air quality and other issues. There is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

18.4 Relevant Evidence

Interview:	31, 32, 65
Document:	23, 24, 37, 38, 43, 45, 48, 50, 51, 55, 62, 68, 78, 79, 80, 86, 108, 334, 335, 338, 339, 340, 342, 343, 344
Photo:	41, 106, 107, 116-126

19 Reservoir Preparation and Filling (I-19)

This topic addresses management of environmental, social and economic issues within the reservoir area during project implementation, and planning for reservoir management for the operating hydropower facility. The intent is that reservoir preparation and filling is well managed, taking into account construction, environmental and social management requirements, and future power generation operation, maintenance and multi-purpose uses where relevant.

19.1 Background Information

The reservoir will have an area of 4.66 km^2, a volume of approximately 350 million m^3, and an estimated average 28 days retention time. It will have a limited operating range, with minimum operating level at 1,195 m.a.s.l., and a maximum operating level of 1,196 m.a.s.l. The intake for the small hydropower plant is at 1,190 m.a.s.l., intakes for the main powerhouse are below this, and the spillway intakes lowest, at 1,180 m.a.s.l.

The reservoir area is a steep forested valley with a limited area converted to pasture land. There are no dwellings or cultivated land in the area, or valuable infrastructure or habitats of conservation value.

EGH commenced reservoir filling on 1st September 2015, and they estimate that the closing of the diversion and reservoir filling will take between 45 and 60 days.

19.2 Detailed Topic Evaluation

19.2.1 Assessment

Analysis against basic good practice

Scoring statement: *The important considerations prior to and during reservoir filling and during operations have been identified through an assessment process; and monitoring of implementation activities is being undertaken appropriate to any identified issues.*

Issues of reservoir filling and operations have been assessed through the EIA process, extensive biodiversity surveys and monitoring, the recent preparation of a reservoir filling master plan, and through the assessment of GHG emissions. The EIA included identification of the minimum flow during filling and biodiversity impacts of the creation of the reservoir, and resettlement implications. Detailed modelling of water quality was conducted in 2011, providing hydrodynamic and water quality models of the reservoir (and the Rio Huallaga downstream of the reservoir) to predict a range of water quality impacts in a range of hydrological conditions. The EIA identified the issue of methane emissions from the reservoir. An emissions assessment of the entire project using the World Resources Institute and World Business Council on Sustainable Development GHG Protocol dismissed the need for any calculation of reservoir emissions as the 'power density' is 96.67 W/m^2, well above the limit of 10 W/m^2 below which the IPCC recommends emissions calculations. EGH, using Intertechne, has prepared a technical manual for the closing of the diversion and commencement of filling, which includes analyses, such as discharges in the tunnel and filling times at alternative times of year.

Some important considerations during the operations stage have been assessed, in particular water quality, and also effects on vector-borne diseases (no risks, as there is no malaria and no dengue in the region). There is hardly any assessment of the operation stage issues of multiple uses, public safety, buffer zones, and shoreline erosion, however this is not considered a significant gap, because, with a very limited population in the reservoir area and a limited operational range in reservoir levels (1 m), there will be few impacts or issues.

Relevant monitoring includes oversight of the master plan programme described under Management below, ongoing water quality monitoring (in the reservoir and downstream river), and ongoing biodiversity monitoring

(described in I-15). The communications plan for reservoir filling also refers to a community-level monitoring / surveillance group.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, monitoring of reservoir preparation and filling activities takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

Inter-relationships and any risks or opportunities concerning social and environmental impacts would be integrated by EGH's environmental and social manager, for example between forest clearance and biodiversity rescue, or fish rescue prior to and following impoundment, and community oversight. Further details are provided under Management.

Criteria met: Yes

19.2.2 Management

Analysis against basic good practice

Scoring statement: *Measures are in place to address identified needs during reservoir preparation and filling; and plans are in place to manage the reservoir and any associated issues for the operating hydropower facility.*

A programme of measures is in place concerning reservoir preparation and filling. The Technical Manual sets out the sequence of closure and filling, all of the conditions that must be met by the civil works, mechanical equipment and electrical equipment, and the inspections that will be carried out.

The sequence of closing and filling was: first, build a cofferdam around the entrance to the diversion tunnel, so that the river will temporarily flow through an adit into the tunnel, and that the diversion tunnel gates and surrounding structures can be inspected; demolish the coffer dam, so that the river flows through the gates and diversion tunnel again; install a valve in the adit to provide a temporary ecological flow; close the gates in the diversion tunnel so the reservoir begins to fill, and the valve will allow a temporary ecological flow; install a plug in the diversion tunnel (which will include six outlets which would provide the ecological flow if the valve failed); after the reservoir level reaches the intake for the ecological power house, close the valve in the adit.

EGH is following a carefully prepared 'master plan' with the objectives of managing all social and environmental actions necessary for filling the reservoir, analysing and defining the interactions between these activities, and establishing deadlines for implementation. The programmes included within the plan concern: forest clearance and germplasm rescue; chasing away and rescue of fauna; archaeological finds (no finds are expected but a chance find procedures will apply during forest clearance); fish rescue; and communications. Implementation of the communications and the forest clearance programmes has already begun on the right bank.

The timing of filling, for the beginning of September, appears to be optimal (after the driest part of the year, and in advance of the start of the wet season in November) so that filling will begin slowly but there is plenty of scope to fill the reservoir within the coming wet season.

The forest clearance programme cleared 38 ha out of 200 ha to be inundated. The remaining 162 ha do not include intact forests or are not accessible, and the other 270 ha of the reservoir area are within the river channel. The only purpose of this is to reduce impacts on biodiversity, as water quality impacts or significant GHG emissions are not expected. The teams followed a series of occupational safety procedures including procedures for clearing with power tools, fauna and flora rescue, PPE, medical emergencies and first aid, emergency response, etc. Biodiversity rescue plans are described under I-15.

The communications plan for filling prioritises local communities in the reservoir area, but includes communities downstream to Tingo Maria, as well as public and environmental authorities. It seeks to ensure that all are informed and that the public take necessary precautions, and is being implemented through community-level talks and meetings with authorities.

Interviewees stated that a manual of operation is currently being finalised, but this has not been presented as documentary evidence. There are technical manuals for the operation of the tunnel and spillway intake gates. Plans in place for the operation stage include: a 4 m buffer zone around the reservoir shore (the project owns the area up to 1,200 m.a.s.l.) which is a legal requirement; and an agricultural assistance programme to people around the reservoir, which is a 2-year programme available to 71 households. The project is considering a proposal, referred to in their Construction-to-Operation Transition Plan, to hire local labour to clear solid waste and aquatic weeds from the reservoir in future.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Plans for filling the reservoir are very carefully considered: any interfaces in the master plan for managing social and environmental impacts are being overseen and integrated by EGH's social and environmental manager; and the technical filling procedure includes the six outlets in the tunnel plug as a contingency measure in the event of the failure of the valve providing the minimum flow. The construction consortium is available if any unexpected events require physical interventions, and the pace of filling over 45-60 days is thought to provide sufficient leeway to respond to any matters arising. Four boats, two upstream and two downstream, will be available to address emergencies related to public safety or biodiversity rescue.

However EGH has not conducted any analysis of risks, which would allow them to take informed decisions on the required response. In the event of the failure of the valve, EGH would be faced with a decision on whether to open the gates in the diversion tunnel slightly to allow a minimum flow of 3.69 to pass, or avoid any risk of opening/closing the gates (which can be severe as recently seen in Colombia) by abandoning the minimum flow until the reservoir level reaches the small power plant intake. This is an unlikely scenario, and there is no indication of it occurring from the first two days of filling, but there is no anticipation of the risks or the difficult decisions that would have to be made.

There are no processes in place to respond to risks and opportunities in the operation stage. For example, there do not appear to be any ongoing plans for the management of public safety risks on the reservoir (safety notices, life-saving equipment etc.), the management of landslides into the reservoir, faster-than-expected sedimentation of the reservoir (see I-16), or mechanisms to identify opportunities to use the reservoir for local transport, navigation, aquaculture etc. The absence of processes to anticipate and respond to risks during operations is a **significant gap** against proven best practice.

Criteria met: No

19.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *Processes and objectives in place for reservoir management have been and are on track to be met with no significant non-compliances or non-conformances, and reservoir management related commitments have been or are on track to be met.*

Legal commitments are set out in the EIA and MEM approval, and EGH will require a licence from ALA prior to filling. All objectives and commitments concerning reservoir preparation, filling and management are on track.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances.*

There is no evidence of any non-compliances or non-conformances.

Criteria met: Yes

19.2.4 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

There are no significant gaps against basic good practice.

0 significant gaps

Analysis of significant gaps against proven best practice

There are no processes in place to respond to risks and opportunities during the operation stage.

1 significant gap

19.3 Scoring Summary

Filling began on 1st September 2015 and will take between 45 and 60 days. The reservoir will have a small surface area, an operating range of only 1 m, and a short retention time. It is in a steep forested valley with no dwellings or cultivated land in the area, or valuable infrastructure or habitats of conservation value.

Issues of reservoir filling and operations were assessed through the EIA process, biodiversity surveys and monitoring, and the preparation of a reservoir filling master plan. A programme of measures is in place including technical procedures for the sequence of closure and filling, and the master plan including vegetation clearance, fauna and flora rescue and community communications.

Implementation of the master plan is being monitored, and there will be ongoing water quality and biodiversity monitoring in the reservoir and downstream monitoring, and community-level surveillance. Plans for filling the reservoir are very detailed, and experience from the initial days of filling indicates that risks are of low probability. However, there are no processes in place to respond to risks and opportunities in the operation stage, such as public safety or navigation. This is one significant gap against proven best practice, resulting in a score of 4.

Topic Score: 4

19.4 Relevant Evidence

Interview:	53, 54
Document:	24, 37, 38, 83, 260, 278-283, 337, 345, 463
Photo:	127, 128

20 Downstream Flow Regimes (I-20)

This topic addresses the flow regimes downstream of project infrastructure during the project implementation stage. The intent is that flow regimes downstream of project infrastructure are planned and delivered with an awareness of and measures incorporated to address environmental, social and economic objectives affected by those flows.

20.1 Background Information

Rainfall and flows in the project area follow a unimodal distribution. In the period 1966 to 2015, monthly average flows in the Huallaga at the dam site range from 39 m^3/sec for August to 328 m^3/sec for March. The minima and maxima through this period were 16.6 m^3/sec in August 1966 and 839 m^3/sec in December 1993.

The annual average flow at the dam site is 164 m^3/sec. Tributary inflows downstream of the dam site are relatively minor (single figures) apart from Chinchao at 21 m^3/sec (ca. 10 km downstream of the powerhouse where the river meets the main road to Huánuco), Jarahuasi at 56 m^3/sec (just downstream of Chinchao), and Monzón at 189 m^3/sec (at Tingo Maria). Tributary inflows raise flow in the Huallaga to approximately 180 m^3/sec by the power house, 201 before Chinchao, and 290 before Monzón. (All figures are annual averages).

The project will have the following effects on flows in the Huallaga:

- During reservoir filling, reduced flow downstream of the dam and beyond;
- During operations in the dry season, reduced flow between the dam and the powerhouse;
- Also during dry season operations, varying flow downstream of the powerhouse because of daily peaking operations;
- Due to spilling operations in the wet season, a varying flow between the dam and the powerhouse, and possibly some variation from natural flows downstream of the powerhouse;
- During flushing of sediment from the reservoir, significant immediate increases in flow downstream of the dam.

There is no legal requirement in Peru for a minimum flow for social or environmental reasons, but the EIA process provides an opportunity to assess impacts and determine legal commitments. The project is designed to provide a minimum flow of 3.69 m^3/sec below the dam. This is 20% of the average flow in the driest consecutive three months in the period 1966-2009 (which was July to September 1966), and is approved by MEM.

20.2 Detailed Topic Evaluation

20.2.1 Assessment

Analysis against basic good practice

Scoring statement: *Issues in relation to flow regimes downstream of project infrastructure during the project implementation stage have been identified and assessed; and monitoring is undertaken to assess effectiveness of flow management measures or any emerging issues during project implementation.*

Reduced flows were initially identified in the Walsh EIA but with few details, referring to reduced flows between the dam and power house and the proposed 3.69 m^3/sec minimum flow as a mitigation measure. The JGP gap analysis of the EIA identified the need to better understand the project's effects on flows, and EGH asked JGP to produce two further analyses: Analysis of Downstream Flow Impacts (May 2011) which determined monthly flows downstream of the powerhouse for approximately 16 km and a brief assessment of impacts on fish species; and Instream Flow Incremental Methodology – Phase I Physical Habitat Simulation

(February 2012) which determined flows for the dewatered stretch plus a further 2.5 km downstream of the powerhouse, and impacts on the availability of suitable habitat for a selection of fish species. In addition, a brief survey of the habits of subsistence fishermen in the project area was conducted (also by JGP, November 2011).

The ESHSMP included an environmental flow management plan with the objective of minimising the impact of reduced flows on fish habitat availability, with a four stage plan to study effects on habitat availability, develop a baseline, design a mitigation strategy, and prepare a monitoring / adaptive management plan.

In keeping with the ESHS environmental flow management plan, and prompted by intensive collaboration with the IDB, EGH has commissioned a further range of studies, including state-of-the-art modelling, and the assistance of international independent consultants. This is a commendable advance on standards of downstream flow assessment, especially in contexts where there are no regulatory requirements for minimum flow.

Canadian specialists, NHC, were commissioned to analyse the availability of fish habitat and connectivity. NHC applied PHABSIM (Physical Habitats Simulation Technique) based on cross-sectional surveys of river morphology, using a 1-dimensional model of the river from the dam site to Chinchao, and 2-dimensional models for a short stretch from the dam to the Lluto tributary and a 2 km stretch downstream of the powerhouse. In light of the complexity of the study, EGH agreed with the IDB to evaluate it with the assistance of international independent experts from the USA and Spain with extensive experience in downstream flow regimes. They concurred with the study's conclusion that extirpation of any species is unlikely. NHC was also used to observe flow conditions at the confluence of the Huallaga and its tributaries on two occasions (wet season and dry season) to assess connectivity. Since then, EGH has commissioned the company to carry out more detailed bathymetric surveys of the river, and to design and assist in the construction of mitigation works during reservoir filling.

The above-mentioned assessments focused largely on habitat availability for fish species between the dam and the powerhouse, because this was considered to be the most critical issue through intense discussions involving Odebrecht, IDB, Environ, NHC, etc.

EGH have also commissioned NHC to prepare a ramping study, which will: identify hotspots of community interest and public use in the de-watered stretch and downstream of the powerhouse, and determine ramping rates to ensure public safety; perform 1-dimensional hydraulic modelling between the powerhouse and Tingo Maria to quantify maximum ramping rates; and develop a plan for monitoring and an alarm system.

Despite the technical quality and depth of the above-described assessments, there are gaps in the identification or assessment of all issues, especially issues arising from the reduction or variation in flows in all river stretches resulting from filling, spilling and operations.

Referring to the effects listed in the Background:

- *During reservoir filling, reduced flow downstream of the dam and beyond* – although issues of fish habitat are assessed in great detail, there is no assessment of issues arising from the reduction of flows beyond the powerhouse, including social issues;
- *During operations in the dry season, reduced flow between the dam and the powerhouse* – as above, fish habitat issues assessed in commendable detail, but the assessment of other environmental and social issues is not documented;
- *Also during dry season operations, varying flow downstream of the powerhouse* – public safety issues will be assessed through the ramping study, but other social issues or environmental issues are not assessed; the preparation of the ramping study is late given that the operating regime was fully understood at the time of the project's approval;

- *Due to spilling operations in the wet season, a varying flow between the dam and the powerhouse, and possibly some variation from natural flows downstream of the powerhouse* – not assessed in any way;
- *During flushing of sediment from the reservoir, significant immediate increases in flow downstream of the dam* – not assessed in any way.

In addition, the NHC study concerns hydraulic modelling, i.e. the velocities and depth of flows. It is based on surveys of the current cross-sections of the river, without incorporating an understanding of how sedimentation dynamics will change these profiles following impoundment (but note that the NHC proposal for the ramping study includes the potential effects on river sediments and channel morphology resulting from ramping). No assessment has been made of the combined effects of reduced flows, sedimentation dynamics, and changes in water quality. For example, it is not known how much of the flow runs beneath the alluvial riverbed, and there is a risk that 3.69 m^3/sec would run fully beneath the riverbed, and be unavailable to fish (though initial indications from the first 2 days of filling suggest that this risk was unfounded).

The absence of a full assessment of all downstream flow issues, especially issues arising from the reduction or variation in flows in all river stretches resulting from filling, spilling and operations, is a **significant gap** against basic good practice.

Regarding monitoring, detailed plans to monitor the river during filling are already under implementation, for example to monitor connectivity with tributaries. In addition, the EIA requires monitoring of reservoir inflows, flow at the small powerhouse and spillways during operation, and downstream of the powerhouse.

Criteria met: No

Analysis against proven best practice

Scoring statement: *In addition, monitoring of downstream flow issues takes into account inter-relationships amongst issues, and both risks and opportunities that become evident during implementation.*

Not assessed.

20.2.2 Management

Analysis against basic good practice

Scoring statement: *In the case that a need to address downstream flow regimes has been identified, measures are in place to manage identified downstream flow issues; and where formal commitments have been made, these are publicly disclosed.*

Measures that are planned are: the provision of the minimum flow of 3.69 m^3/sec during filling through complex infrastructural measures (see I-19) including pipes in the plug in the diversion channel in case the valve system fails; the provision of the 3.69 m^3/sec minimum flow through the small power house during operations, with a by-pass channel to ensure that flow is not interrupted during maintenance; limits on the rate of ramping flows up and down during dry season operations; and an Emergency Response Plan currently under preparation. Measures that have recently been implemented in preparation for reservoir filling are: physical mitigation measures that will be taken to ensure connectivity with tributaries in the stretch between the dam and powerhouse to allow passage of fish even when flows are at a minimum; and a communications plan for informing downstream communities prior to and during filling. EGH is taking an adaptive management approach during filling. In an interview, EGH referred to their intention to prepare a plan for public safety during the wet season when spilling, which will possibly include an alarm system.

There is an absence of measures to manage other issues, but it is impossible to determine whether these are necessary due to the significant gap in Assessment: social issues other than public safety, and environmental issues other than fish habitat connectivity during filling and dry season operations, environmental issues (including fish habitat availability) resulting from spilling, and social issues beyond the dam area resulting from

varying flows due to spilling; any issues arising from flushing. There are no contingency plans to follow in the event of community concerns that may result when they encounter reduced flows during filling and operations.

The only formal commitment made to date is the 3.69 m^3/sec minimum flow. This was publicly disclosed during the EIA process. However, interviews with external stakeholders (such as communities near the river and OEFA, ANA and Tingo Maria National Park) during the assessment indicate that they have little understanding of this minimum flow or the variations in flow that will result from operations and spilling. There are no plans to publicly disclose further commitments, such as those determined by the ramping study.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, processes are in place to anticipate and respond to emerging risks and opportunities.*

Not assessed.

20.2.3 Conformance / Compliance

Analysis against basic good practice

Scoring statement: *In the case that a need to address downstream flow regimes has been identified, processes and objectives in place to manage downstream flows have been and are on track to be met with no significant non-compliances or non-conformances, and downstream flow related commitments have been or are on track to be met.*

The only legally-required downstream flow commitment is the 3.69 m^3/sec minimum flow, and the project will probably meet this commitment. Other commitments, for example on ramping, are yet to be made, but it is very likely the project will meet these commitments.

Criteria met: Yes

Analysis against proven best practice

Scoring statement: *In addition, there are no non-compliances or non-conformances*

Not assessed.

20.2.4 Outcomes

Analysis against basic good practice

Scoring statement: *In the case that a need to address downstream flow regimes has been identified and commitments to downstream flow regimes have been made, these take into account environmental, social and economic objectives, and where relevant, agreed transboundary objectives.*

As NHC stated succinctly, project operations will result in a highly modified hydrograph that changes the magnitude, frequency, duration, timing and seasonality of flows within the reduced flow segment on a daily, monthly and annual basis.

Following the same structure of effects on flows set out in the Background:

- *During reservoir filling, reduced flow downstream of the dam and beyond* – the commitment to provide a minimum flow of 3.69 m^3/sec will provide approximately 50 m^3/sec less than flows at this time of year, for the filling period of 45 to 60 days, meaning that flows could be 70-80% lower just before the Chinchao inflow, about half before Monzón (at TNMP), and a third lower immediately after Monzón.

- *During operations in the dry season, reduced flow between the dam and the powerhouse* – the committed 3.69 m^3/sec minimum flow at the dam site will be augmented by tributary flows to reach about 9 m^3/sec before the powerhouse on average in the driest month, which will be about 40 m^3/sec lower than pre-project flows on average.
- *Also during dry season operations, varying flow downstream of the powerhouse* – no commitments are yet made, but COES will dispatch the Chaglla HPP to minimise overall system power costs and is likely to require peaking operations for 7 hours a day, whilst the ramping provisions will ameliorate this for public safety reasons. Flows will be roughly 40 m^3/sec lower than pre-project flows on average for 17 hours a day, varying between ca. 9 m^3/sec to ca. 75 m^3/sec (9 plus the turbine flow of 66 m^3/sec) below the powerhouse when generations start and stop each day.
- *Due to spilling operations in the wet season, a varying flow between the dam and the powerhouse, and possibly some variation from natural flows downstream of the powerhouse* – the spillways can be operated only above a flow of 180 m^3/sec to ensure that spilling does not damage the dissipation pond. This means that flows downstream of the dam could increase from 3.69 to 180 and more when spilling begins, but ramping up is *technically* infeasible. It is not clear whether spilling will begin and cease once or several times each season, but subtracting turbine flows from average monthly flows shows that spilling will continuously exceed 180 on average in only one month (March) per year, meaning that spilling could stop and start during 4 or 5 months per year. This underlines the significance of the gap under Assessment.
- *During flushing of sediment from the reservoir, significant immediate increases in flow downstream of the dam* – this is a long term consideration, but in 25-30 years, the flushing process will increase flows from 3.69 to hundreds of m3/sec.

It is impossible to conclude that the commitments described above take into account environmental, social and economic objectives. Flows are overwhelmingly determined by economic objectives, with a very limited minimum flow commitment and a dry season flow regime that will take account of only safety issues by ramping restrictions. The figure of 3.69 is based on an outlier low flow of 17 m^3/sec (in 1966 – the first year in the dataset) but the next lowest month was 27 m^3/sec, and Q_{95} for August is actually 26 m^3/sec. On the other hand, it is impossible to conclude whether there are important social and environmental values other than fish habitat and public safety that will be affected, without a documented assessment of the issues, as described under Assessment. The river canyon is steep in most places, the river is turbid, and it is widely considered that the communities do not currently use the river frequently. The brief JGP survey found that fishermen use the river, but for subsistence, most replying they fish 'at least twice a week' especially during the dry season. Numerous biodiversity surveys have not identified any biodiversity issues other than fish habitat connectivity, such as river bird breeding grounds etc. Although flows cannot be considered to take into account environmental, social and economic objectives, which is a **significant gap**, it is the same gap as that described under Assessment.

Criteria met: No

Analysis against proven best practice

Scoring statement: *In the case that a need to address downstream flow regimes has been identified and commitments to downstream flow regimes have been made, in addition these represent an optimal fit amongst environmental, social and economic objectives within practical constraints of the present circumstances.*

Not assessed.

20.2.5 Evaluation of Significant Gaps

Analysis of significant gaps against basic good practice

The absence of a full assessment of all downstream flow issues, especially issues arising from the reduction or variation in flows in all river stretches resulting from filling, spilling and operations.

1 significant gap

Analysis of significant gaps against proven best practice

Not assessed.

20.3 Scoring Summary

The annual average flow at the dam site is 164 m^3/sec. The project will reduce and will alter the daily, weekly or monthly variation in flows both between the dam and powerhouse, and downstream of the powerhouse, depending on the season, peaking operations, and spilling operations.

Reduced flows were initially identified in the EIA and the ESHSMP, but these assessments focused largely on the minimum flow requirement and impacts on fish species. An assessment of flows during peaking operations, to determine maximum ramping limitations, is now being undertaken. EGH has commissioned a range of studies, including state-of-the-art modelling and reviews of independent experts, to assess the impacts on fish species and their habitats.

However, there has been no identification or assessment of all the issues, especially issues arising from the reduction or variation in flows in all river stretches resulting from filling, spilling and operations. For example, during reservoir filling, flows could be 70-80% lower just before the Chinchao inflow, about half before Monzón (at Tingo Maria National Park), and a third lower immediately after Monzón, for a period of 45-60 days. During operations in the dry season, flow between the dam and powerhouse will be a guaranteed minimum of 3.69, which is about 40 m^3/sec lower than pre-project flows on average. Due to spilling operations in the wet season, there will be rapid increases in flow from 3.69 to 180 m^3/sec or more downstream of the dam.

The project has commitments to deliver the minimum flow and put in place ramping limitations, but it is impossible to conclude that the commitments and flows described above take into account environmental, social and economic objectives. Flows are overwhelmingly determined by economic objectives. There is one significant gap against basic good practice, resulting in a score of 2.

Topic Score: 2

20.4 Relevant Evidence

Interview:	33, 60
Document:	23, 24, 38, 63, 275, 304, 346-350, 354, 355, 450, 451, 455, 456, 457, 458, 459, 460, 463
Photo:	65, 129

Appendix A: Written Support of the Project Developer

ODEBRECHT

Chaglla HPP Camp, June 24th 2015

EGH-DI-0203-2015

MR. RICHARD TAYLOR
Executive Director
International Hydropower Association
Nine Sutton Court Road
London Borough of Sutton
SM1 4SZ - United Kingdom

Reference: **IHA Sustainability Protocol Assessment – Chaglla Hydro Project**

Dear Mr. Richard Taylor,

Empresa de Generacion Huallaga S.A. ("EGH"), concessionary company responsible for the construction and operation of Chaglla Hydropower Plant, located in Chinchao, Huanuco, Peru, commissioned the International Hydropower Association ("IHA") to undertake an official assessment based on the Hydropower Sustainability Assessment Protocol ("HSAP") on Chaglla HPP.

This letter confirms that EGH is fully supportive of this assessment and will cooperate fully and provide information and arrangements, as required by the IHA assessors, to allow a comprehensive evaluation of the project against HSAP criteria.

EGH is therefore committed to continuous improvement of its socioenvironmental practices.

Kind regards,

Edmaldo Luiz Da Silva
Director de Implantación
Empresa de Generación Huallaga S.A.

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Página 1 de 1

Appendix B: Verbal Evidence

No	Interviewee	Date	Location	Lead Interviewer
1	Robinson Olivera, MSc (c) Hydrobiologist, Researcher at Museum at San Marcos University	11.06.	Natural History Museum Lima	Douglas Smith
2	Iris Cárdenas, Electricity General Director, MEM Alcides Claro Pacheco, Director of Electric Concessions, MEM	11.06.	DGE - MEM Offices Lima	Aida Khalil
3	Renato Boluarte, General Director of Energy Related Environmental Issues, MEM Liber Quiros, Electricity group coordinator, MEM Carolina Tello, Legal coordinator, MEM	11.06.	DGAE - MEM Offices Lima	Aida Khalil
4	Allan Chan, Odebrecht Peru P&O Director Alejandro Huamán, Odebrecht Energía Finance and Administration Director	11.06.	Odebrecht HQ Offices Lima	Douglas Smith
5	Guillermo Echeandía, Electric Audit Sub Manager, OSINERMING	11.06.	OSINERMING Offices Lima	Aida Khalil
6	Raúl Pérez Reyes, Vice Minister of Energy and Mines	11.06.	DGE - MEM Offices	Aida Khalil
7	Erlon Arfelli, DS Odebrecht Energia - Latin Fund Ricardo Weyll, Odebrecht Peru Legal Director Alejandro Huamán, Odebrecht Energía Finance and Administration Director	12.06.	Odebrecht HQ Offices Lima	Aida Khalil
8	Alexander Baltar, Socio Environmental Director Odebrecht Infrastructure Renato Dell Erba, Socio Environmental Manager Odebrecht Infrastructure	12.06.	Odebrecht HQ Offices Lima	Aida Khalil
9	Mickely Cuba, Sustainability Director, Odebrecht Peru Sonia Donayre, Communications Manager, Odebrecht Peru Ana Yi, Communications Officer, Odebrecht Peru	12.06.	Odebrecht HQ Offices Lima	Aida Khalil
10	Manuel Boluarte, Inforegion Magazine Director	12.06.	Odebrecht HQ Offices Lima	Aida Khalil
11	Alex Mollison, EGH Commercial Manager	12.06.	Odebrecht HQ Offices Lima	Aida Khalil
12	Lorena Carrillo, EGH Sustainability Manager Wendi Gonzales, CCC Sustainability Leader Fiorela Moya, EGH Social Management Lupe Ayllón, EGH Social Projects Implementation LT Daniel Gross, Social Senior Consultant	12.06.	Health Campaign Site	Joerg Hartmann
13	Eva Ostos, Caritas Health Campaign Coordinator Miguel Alfonso Meza, Caritas Medical Doctor Timoteo Perez Zevallos, Huanchag Village Secretary Filomeno Malpartida, Huanchag Village President	12.06.	Health Campaign Site	Joerg Hartmann
14	Antonia Echevarría, Promotora de Salud de Santa Rita Sur	12.06.	Health Campaign Site	Joerg Hartmann
15	Pedro Gamboa, State Protected Natural Areas Service (SERNANP) Representative Carlos Sanchez, Director of Tingo María National Park	12.06.	Tingo María National Park	Douglas Smith
16	Alan Pinto, CCC Commercial Manager Pool Alarcón, Sub-Contractors Responsable	12.06.	Site Camp	Douglas Smith
17	David Juan Garrido Arrunátegui, APC worker Ibrahim Llerena Nole, APC Administrator and Operations	12.06	Site Camp	Douglas Smith

18	Jose Manuel Qwistgaard Suárez, Technical Secretary Huallaga Multisectorial Comission for Social and Economical Development - Presidencia Consejo de Ministros (CODEHUALLAGA – PCM) Cristian Velazco, EGH Sustainability Manager	13.06.	PCM Offices	Aida Khalil
19	Nelly Ambicho, Higrompampa villager Feliciano Atachagua, Mallgotingo villager Honorato Martinez, Santa Rita Sur villager	13.06.	Site Camp	Aida Khalil
20	Lorena Carrillo, EGH Sustainability Manager Wendi Gonzales, CCC Sustainability Leader Fiorela Moya, EGH Social Management Rosita Sifuentes, Community Liaison Officer Raúl Cabello, Community Liaison Officer Russel Barrueta, Community Liaison Officer	13.06.	Site Camp	Aida Khalil
21	Pedro Schettino, CCC Contractor Director Alan Pinto, CCC Commercial Manager	13.06.	Site Camp	Aida Khalil
22	Juan Canturín, resettled person and Agriculture Technical Assistance Program beneficiary, San Juan de Monterrey	13.06.	Homes and cultivated land	Joerg Hartmann
23	Kelly Ruiz, Chinchavito Health Post Nurse	13.06.	Chinchavito Health Post	Joerg Hartmann
24	Adrián Ferrari, resettled person, San Juan de Monterrey	13.06.	Relocated house	Joerg Hartmann
25	José Tejada, Chinchao Municipality Sociologist Aldo Rodriguez, Chinchao Municipality	13.06.	San Juan de Monterrey	Joerg Hartmann
26	Clever Ambicho, Higrompampa Village President	13.06.	Site Camp	Joerg Hartmann
27	Lorena Carrillo, EGH Sustainability Manager Daniel Gross, Social Senior Consultant Wendi Gonzales, CCC Sustainability Leader Oscar Hidalgo, EGH Agricultural Asistance Program Leader Fiorela Moya, EGH Social Management Christian Velazco, EGH Sustainaility Manager	13.06.	Site Camp	Joerg Hartmann
28	Manuel Cubillas Callan, Pillao Community President Jonel Malpartida Sifuentes, Pillao Distritalization Comission President	13.06.	Site Camp	Joerg Hartmann
29	Danilo Cunha, CCC Administrative and Finance Manager	13.06.	Site Camp	Douglas Smith
30	Claudia Lazo Ureta, Wastewater Treatment Plant Operator Jose Collazos Cespedes, Water Treatment Plant Operator	13.06.	WWTP Right Bank	Douglas Smith
31	Daniel Jara, CCC Waste Management Leader David Coca, Waste Management Foreman	13.06.	Waste Management Centre	Douglas Smith
32	Luis Eduardo Vargas, EGH Environmental Management Hydropower Plant Haniel Torres, CCC Environmental Management TL Daniel Jara, CCC Waste Management Leader	13.06.	Site Camp	Douglas Smith
33	Carlos Lucio, CCC Engineering Manager Edmaldo Da Silva, EGH Implementation Director Juan David Quintero, Senior Consultant Juan Miguel Nemi, EGH Environmental Management TL	13.06.	Site Camp	Douglas Smith
34	Lorena Carrillo, EGH Sustainability Manager Luis Eduardo Vargas, EGH Environmental Management Hydropower Plant Juan Miguel Nemi, EGH Environmental Management TL Wendi Gonzales, CCC Sustainability Leader Daniel Torres, CCC Environmental Management TL Juan Miguel Nemi, EGH Environmental ManagementTL Fiorela Moya, EGH Social Management Hydropower Plant and TL	14.06.	Site Camp	Aida Khalil

35	Local Production and Market Network Program (APL) Beneficiaries: Humer Espinoza, San Pablo de Pillao Florencio Carlos, Buenos Aires Lucio Astete, Consorcio Grade Chaglla Oscar Hidalgo, EGH Agricultural Asistance Program Leader Fiorela Moya, EGH Social Management Daniel Gross, Senior Social Consultant	14.06.	Site Camp	Joerg Hartmann
36	Local business people: "Gustitos" Restaurant Erick Mamani, Huanipampa villager Marcos Luis, Huanipampa villager	14.06.	Site Camp	Joerg Hartmann
37	Rafael Tamashiro, EGH Biodiversity Management Juan David Quintero, Senior Consultant Daniel Cossios, PhD Zoologist, President of Peruvian National Association of Mastozoology / Biosfera Consultant German Chávez, Centro de Ornitología y Biodiversidad (CORBIDI) Herpetologist	14.06.	Site Camp	Douglas Smith
38	Edmaldo Da Silva, EGH Implementation Director Pedro Schettino, CCC Contractor Director Carlos Lucio, CCC Engineering Manager	15.06.	Site Camp	Aida Khalil
39	Carlos Lucio, CCC Engineering Manager Miguel Golik, Resident Engineer (Owner's Engineer Worley Parssons) Wilbert Alvarez, EGH – E&M Planning and Interface Coordinator Carlos Corral, CCC Electromechanical Erection Manager Cesar Ortuño, CCC Quality Control Pedro Schettino, CCC Contractor Director Edmaldo Da Silva, EGH Implementation Director	15.06.	Site Camp	Aida Khalil
40	Carlos Lucio, CCC Engineering Manager Miguel Golik, Resident Engineer (Owner's Engineer) Gilton Maffini, INTT Engineering Project Manager Pedro Schettino, CCC Contractor Director	15.06.	Site Camp	Aida Khalil
41	Bayardo Materón, Panel de Expertos, Independent Consultant	15.06.	Telephone call	Aida Khalil
42	Pedro Schettino, CCC Contractor Director Alan Pinto, CCC Commercial Manager Danilo Cunha, CCC Administrative and Finance Manager Carlos Corral, CCC Electromechanical Erection Manager Rodrigo Bonfim, CCC Administrative and Finance Responsible Pool Alarcón, CCC RP Sub Contractors	15.06.	Site Camp	Aida Khalil
43	Yonel Baltazar Coronel, Teacher Pampamarca Educative Institution	15.06.	Site Camp	Joerg Hartmann
44	Alex Rodriguez, Huanipampa Villager	15.06.	Site Camp	Joerg Hartmann
45	Huanipampa Archeological Site and Orchids Nursery Isaías Atachagua, CCC Orchids and Nursery Responsible Haniel Torres, CCC Environmental Management TL Juan Miguel Nemi, EGH Environmental Management TL Rafael Tamashiro, EGH Biodiversity Management	15.06.	Site Camp	Joerg Hartmann
46	Haniel Torres, CCC Environmental Management TL Juan Miguel Nemi, EGH Environmental Management TL Wendi Gonzales, CCC Sustainability Leader Fiorela Moya, EGH Social Management	15.06.	Site Camp	Joerg Hartmann
47	Julio Carrasco, EGH - Odebrecht Energia Financial Manager	15.06.	Skype call with Lima	Joerg Hartmann
48	Isaias Atachagua, Orchids and Nursery Responsible Rafael Tamashiro, EGH Biodiversity Management	15.06.	Seedling Nursery	Douglas Smith

49	CREER Program workers: Aida Ordoñez Evaristo, Oficial Ferrero Nicolas Presentacion Tineo, Oficial Ferrero Rolinda Condezo Tolentino, Oficial Ferrero Hugo Raraz Loarte, Carpenter Official	15.06.	Site Camp	Douglas Smith
50	Work Committee CCC: Wilmer Mostacero Leon Miguel Angel Elias Mamani Jerson Lajara Ferrari Jackson Izquierdo Sánchez	15.06.	Site Camp	Douglas Smith
51	Pablo Hernández, CCC Health, Safety and Sustainability Manager	15.06.	Site Camp	Douglas Smith
52	Danilo Cunha, CCC Administrative and Finance Manager Martin Bartra, CCC RP Human Resources Gilda Céspedes, CCC RP PandO Pablo Hernández, CCC Health, Safety and Sustainability Manager Gregory Ramirez, CCC Doctor Omar Robles, CCC RP Sustainability Integrated Programme Teodoro Tello, Asistencia Social	15.06.	Site Camp	Douglas Smith
53	Edmaldo Da Silva, EGH Implementation Director Juan David Quintero, Senior Consultant Lorena Carrillo, EGH Sustainability Manager Rafael Tamashiro, EGH Biodiversity Management Luis Eduardo Vargas, EGH Environmental Management Hydropower Plant	15.06.	Site Camp	Douglas Smith
54	Carlos Lucio, CCC Engineering Manager Gilton Maffini, INTT Engineering Project Manager	15.06.	Site Camp	Douglas Smith
55	Luis Eduardo Vargas, EGH Environmental Management Hydropower Plant Juan Miguel Nemi, EGH Environmental Management TL Haniel Torres, CCC Environmental Management TL	15.06.	Site Camp	Douglas Smith
56	Carlos Ortega, Director of Decentralized Office of Culture Huánuco (DDC-HCO) José Onofre, Archeologist DDC-HCO Giomar Gallegos, EVSA Consulting - TL Archeologist Monitor Rafael Tamashiro, EGH Biodiversity Management Juan Miguel Nemi, EGH Environmental Management TL	16.06.	DDC Huanuco Offices	Joerg Hartmann
57	Rosalia Storck, Vice Governor of Huánuco Region Fidel Montes, Economic Development Manager Ana Medina, Environmental Management Sub Manager	16.06.	GORE Huánuco Offices	Aida Khalil
58	Pierre Paolo Marzo, Defensor del Pueblo Huánuco (Ombudsman)	16.06.	Defensoría Huánuco Offices	Aida Khalil
59	Lourdes Rodriguez Ruiz, Ministry of Labour Regional Representative Huánuco	16.06.	Labour Ministry Huánuco Offices	Douglas Smith
60	Nils Fretel, Local Water Administrator (ALA)	16.06.	ALA Huánuco Offices	Douglas Smith
61	Juan Miguel Nemi, EGH Environmental Management TL Roberto Ruiz, EGH Security Responsible Pablo Hernandez, Health, Safety and Sustainability Manager	17.06.	Telephone call with Lima	Aida Khalil
62	Andrés Arbe, Legal Advisor on Land Use Rights, Miranda and Amado	17.06.	Odebrecht HQ Offices Lima	Aida Khalil
63	Cesar Butron, COES President (Comité de Operación Económica del Sistema Integrado Nacional)	17.06.	COES Offices Lima	Joerg Hartmann
64	Ricardo Uceda, Proetica IPYS	17.06.	IPYS Offices Lima	Aida Khalil

65	Juan Orlando Cossios, OEFA Electricity Coordinator Ronald Huerta, OEFA Electricity Supervisor Carlos Salas, OEFA Environmental Lawyer	17.06.	OEFA Offices Lima	Douglas Smith
66	Luis Alberto Gonzales, The Nature Conservancy	17.06.	TNC Offices Lima	Douglas Smith Joerg Hartmann
67	Jessica Amanzo, SERFOR Knowledge Management Director	17.06.	SERFOR Offices Lima	Douglas Smith
68	Luiz Gabriel Azevedo, Odebrecht Infraestructure Director Sustaintability	23.06.	Skype call with Brasilia	Joerg Hartmann
69	Nestor Coral Sotelo, INDECI Huanuco Director	26.06.	Telephone call with Huánuco	Aida Khalil
70	Greg Reub, ENVIRON CORPORATION (CH Chaglla Environmental Auditor)	25.06.	Skype call with Washington DC	Aida Khalil
71	Emmanuel Boulet, IDB Principal Environment Specialist	24.06.	IDB Offices Washington DC	Douglas Smith
72	Daniel Gross, Senior Social Consultant	16.06.	Lima	Joerg Hartmann
73	Edmaldo Da Silva, EGH Implementation Director Lorena Carrillo, EGH Sustainability Manager	17.06.	Lima	Aida Khalil

Appendix C: Documentary Evidence

Ref	Author / Organisa-tion	Title	Date	Language	Description / Notes /Weblink
1	IFC	Performance Bond Due Diligence by IFC	Apr 2011	English	http://ifcext.ifc.org/ifcext/spiwebsite1.nsf/78e3b305216fcdba85257a8b0075079d/588013312f5b7fc385257878005a2627?opendocument
2	Odebrecht Peru	Primer Reporte de Implementación de Programas para el Desarrollo del Entorno	2013	Spanish	http://issuu.com/odebrechtperu/docs/1er_reporte_implementacion_de_programas_para_desar?e=0/2315414
3	CNO	Revista Odebrecht Informa	2004-2015	Spanish	http://odebrecht.com/es/comunicacion/odebrecht-informa
4	CNO	Relatorios Anuales Corporativos	2006-2014	Spanish	http://odebrecht.com/pt-br/comunicacao/publicacoes/relatorios-anuais
5	CNO	Resumen de la Tecnología Empresarial Odebrecht (Quinta Edición)	2011	Spanish	http://www.odebrecht.com.pe/sobre-la-empresa/teo
6	Odebrecht Peru	Política de Sostenibilidad Corporativa	2015	Spanish	http://www.odebrecht.com.pe/sostenibilidad/politica-de-sostenibilidad
7	CCC	Mapeo de Actores Sociales en el Área de Influencia	2015	Spanish	Social Actors Mapping in the Area of Influence
8	CCC	Planes y Procesos de Comunicación y Consulta	2012-2014	Spanish	Procedure on Communication and Consultation Process
9	CCC	Registro de Visitas a los Centros de Información y Atención Ciudadana	2012-2015	Spanish	Records of Visits to Centers for Information and Citizen Services
10	CCC	Registro de Visitas de Relacionistas Comunitarios a las Comunidades	2014-2015	Spanish	Records of Community Relations Personnel Visits to Communities
11	CCC	Registros de Indicadores Sociales de Comunicación y Consulta)	2012-2015	Spanish	Records of Social Communication and Consultation Indicators
12	EGH	Mapeo de Autoridades Institucionales	2015	Spanish	Mapping of Institutional Authorities
13	EGH	Monitoreo de Noticias CH Chaglla	2015	Spanish	CH Chaglla Media Monitoring

14	EGH	Material Informativo del Proyecto para las Comunidades	2015	Spanish	Project´s Information Material for the Communities
15	EGH	Análisis de Quejas y Consultas del Proyecto	2014-2015	Spanish	Analysis of Project Queries and Complaints
16	CCC	Actas de Entrega y Conformidad de Compromisos con las Comunidades	2014-2015	Spanish	Minute of Delivery and Acceptance of Commitments with Communities
17	CCC	Comunicación a la Población por Voladuras Programadas	2015	Spanish	Blasting Schedule Communications to the Public
18	EGH	Campaña de Seguridad Vial	2014	Spanish	Road Safety Campaign
19	EGH	Campaña de Seguridad en la Línea de Transmisión	2014	Spanish	Transmission Line Safety Campaign
20	EGH	Talleres Participativos CH y LT	2007-2013	Spanish	Participatory Workshops for HP and TL
21	CCC	Registro de Quejas que Evidencia 100% de Quejas Atendidas / Resueltas	2013-2015	Spanish	Registration of Complaints which shows 100% of Complaints Addressed / Resolved
22	EGH	Boletines Comunitarios	2013-2015	Spanish	Community Bulletin
23	WALSH	Estudio de Impacto Ambiental Central Hidroeléctrica Chaglla	2011	Spanish	Chaglla Hydropower Project Environmental Impact Assessment
24	JGP / EGH	Plan de Manejo Ambiental, Social, Salud y Seguridad	2014	Spanish	Environmental, Social, Health and Safety Plan
25	CCC	Política de Gestión Ambiental Central Hidroeléctrica Chaglla	2015	Spanish	Environmental Management Policy
26	CNO	Código de Conducta	2014	Spanish	Code of Conduct
27	CNO	Presentación “Visión 2020”	2015	Spanish	“Vision 2020” Presentation
28	CCC	Plan de Comunicación Interna	2012-2014	Spanish	Internal Communication Procedure
29	CCC	Macroestructura Chaglla	2015	Spanish	Chaglla Macrostructure
30	Odebrecht Peru	Plan de Accion (PA) 2015-2017 Odebrecht Latin Fund	2015	Spanish	Odebrecht Latin Finance Action Plan
31	CNO	Relatório de	2014	Portuguese	Audit Report Bureau Veritas

		Auditoria Bureau Veritas			
32	CNO	Indicadores Corporativos de Desempenho Ambiental e Social	2008-2015	Portuguese	Corporative Social and Environmental Performance Indicators
33	IFC	IFC Annual Environmental and Social Monitoring Report (AMR)	2015	English	IFC Project Analysis
34	Odebrecht Peru	Reportes de Auditoria de la Oficina Matriz Perú	2014-2015	Spanish	Audit Reports from Headquarters to CH Chaglla
35	Odebrecht Peru	Distintivo Empresarios Socialmente Responsables	2015	Spanish	Socially and Responsible Company Distinctive
36	BID	Informe sobre Sostenibilidad de 2014	2015	Spanish	Sustainability Report 2014
37	ENVIRON	Environmental and Social Monitoring Reports	2012-2014	English	Quarterly Reporting by Environmental and Social Consultant
38	EGH	Informes Trimestrales	2014-2015	Spanish	Quarterly Environmental, Social, Health and Safety Borrower´s Report
39	EGH	Macroestructura EGH	2015	Spanish	Organization Chart
40	CCC	Matriz de Riesgos CH Chaglla	2015	Spanish	CH Chaglla Risks Matrix
41	EGH	Matriz de Risco Financeiro	2010	Portuguese	Financial Risks Matrix
42	CCC	Resultados de Análisis de KPI - Oportunidades de Mejora	2012-2015	Spanish	Analysis of Key Performance Indicators – Improvement Opportunities (*CIAC* visits Indicators 2012-2015)
43	JGP	Estudio de Impacto Ambiental Línea de Transmisión 220 kV SE Chaglla – SE Paragsha	2013	Spanish	Environmental Impact Assessment for the SE Chaglla – SE Paragsha220 kV Transmission Line
44	EGH	Campañas de Concientización sobre Cuidado de Especies Clave de la Línea de Transmisión	2014	Spanish	Key Species Awareness Campaigns – Transmission Line
45	CCC	Procedimientos de Sostenibilidad	2013-2015	Spanish	Sustainability Procedures
46	EGH	Informe Anual de Gestión Ambiental de la CH Chaglla (2012,2013,2014)	2012-2014	Spanish	Hydropower Plant Environmental Management Annual Reports
47	EGH	Informe Anual de Gestión Ambiental de la LT	2014	Spanish	Transmission Line Environmental Management Annual Report

48	CCC	Informes Mensuales de Manejo de Residuos Sólidos	2013-2014	Spanish	Solid Waste Management Monthly Reports
49	CCC	Reporte Final de Riego Vecinal	2013	Spanish	Final Report on Neighborhood Watering Program
50	CCC	Informes de Gestión de Residuos Peligrosos	2013-2014	Spanish	Hazardous Waste Management Reports
51	EGH	Declaración Anual de Residuos Sólidos CH Chaglla	2014-2015	Spanish	Chaglla Solid Wastes Annual Statement
52	EGH	Declaración Anual de Residuos Sólidos – Línea de Transmisión	2015	Spanish	TL Solid Wastes Annual Statement
53	EGH	Acta de Conformación y Reuniones del Comité de Monitoreo y Vigilancia Ciudadana	2014-2015	Spanish	Act of Formation of the CH Chaglla Monitoring and Surveillance Committee
54	CMVC / EGH	Informe Trimestral de Actividades Comité de Monitoreo y Vigilancia Ciudadana	2015	Spanish	Quarterly Reports of CH Chaglla Monitoring and Surveillance Committee
55	OEFA	Actas de Supervisión del OEFA	2012-2014	Spanish	OEFA´s Supervision Reports
56	EGH	Cartas de Levantamiento de Hallazgos del OEFA	2013-2014	Spanish	Corrective Action Letters to OEFA
57	EGH	Monitoreo de Flora y Fauna de la CH Chaglla	2013-2015	Spanish	Chaglla Flora and Fauna Monitoring
58	EGH	Monitoreo de Flora y Fauna de la LT	2014	Spanish	TL Flora and Fauna Monitoring
59	EGH	Video y Presentación de traslado de estructuras para LT con helicóptero	2014	Spanish	Video and presentation of helicopter transports for TL
60	EGH	Monitoreo Influx Socioeconómico	2013-2014	Spanish	Socioeconomic Influx Monitoring
61	EGH	Estudios de Especies Clave de Fauna	2011-2014	Spanish	Fauna Key Species Studies
62	CCC	Planes de Desarrollo Concertado	2013	Spanish	Development Plans
63	JGP	Análisis del EIA de la CH Chaglla	2010	Spanish	Gap Analysis EIA CH Chaglla

64	INTER-TECHNE	Informe de Caudal Máximo y Excedencias	2012	Spanish	Maximum Flow Report and Exceedances
65	EGH	Documentación para el Plan de Compensación Offset	2014-2015	Spanish	Documentation for Offset Compensation Plan
66	EGH	Cartas de Levantamiento de *Key Recommended Actions* de ENVIRON	2014-2015	Spanish	Key Recommended Actions Letters Response to ENVIRON
67	CCC	Programa Reforestando mi Comunidad	2015	Spanish	"Reforesting my Community" Program
68	CCC	Centro de Gestión de Residuos de Pampamarca	2012 y 2015	Spanish	Pampamarca Waste Management Center
69	CCC	Programa Escuelas Saludables	2013-2014	Spanish	Healthy Schools Program
70	CCC	Informe de Cierre Programa de Calificación Profesional Continua "CREER"	2014	Spanish	Closing Report of Continued Professional Qualification Program "CREER"
71	CCC	Informe de Reubicación de Orquídeas	2015	Spanish	Orchids Relocation Report
72	EGH	Informe del Programa de Conservación de Flora y Fauna en el Carpish	2014-2015	Spanish	Carpish Flora and Fauna Conservation Program
73	CCC	Programa Bus Comunitario	2012-2015	Spanish	Community Bus Program
74	CCC	Programa Kioscos Comunales	2013-2015	Spanish	Community Kiosks Program
75	CCC	Indicadores de Desempeño Ambiental	2014-2015	Spanish	Environmental Performance Indicators
76	CCC	Indicadores de Desempeño Sociales 2015	2015	Spanish	Social Performance Indicators 2015
77	CCC	Matrices de Impactos Ambientales y Sociales	2015	Spanish	Environmental and Social Impacts Matrix
78	EGH	Inspección Ambiental N° 12-2014-EGH	2014	Spanish	Environmental Inspection N°12-2014-EGH
79	CCC	Informe Mensual de Sostenibilidad	2014	Spanish	Monthly Sustainability Report

80	EGH	Inspección Rutinaria de Gestión Ambiental, Biodiversidad y Seguridad – Inspección N°01-2014-EGH	2014	Spanish	Routine Inspection of Environmental Management, Biodiversity and Security – Inspection N°01-2014-EGH
81	EGH	Plan de Restauración de la Quebrada Lluto	2014	Spanish	Lluto Creek Restoration Plan
82	Odebrecht Peru	Cambio Climático Oportunidad de Mejora en el Sector Infraestructura y Servicios de Construcción	2014	Spanish	Presentation: Climate Change Opportunity for Improvement in the Infrastructure Sector and Construction Services
83	EGH	Plan Maestro de Llenado de Embalse	2015	Spanish	Reservoir Filling Master Plan
84	CCC	Estimación de las Emisiones de Gases de Efecto Invernadero Evitadas por Compostaje de Residuos	2014	Spanish	Estimated Greenhouse Gases Emissions Avoided by Waste Composting
85	Odebrecht Peru	Buenas Prácticas Ambientales - Cambio Climático	2015	Spanish	Good Environmental Practices - Climate Change
86	CCC	Ficha de Inscripción Premio Nacional Ambiental – MINAM	2014	Spanish	National Environmental Award Registration Form - MINAM
87	CNO	Informativo Digital de Desempeño Social Corporativo	2014-2015	Spanish	Corporate Social Performance Digital Information
88	EGH	Documentación de Derechos de Uso de Tierra y Compensación	2013-2015	Spanish	Documentation on Land Use Rights and Compensation
89	CCC	Informes de Planeamiento	2011-2015	Spanish	Planning Reports
90	CCC	Cronogramas Trimestrales de Actividades	2012-2015	Spanish	Quarterly Activity Schedules
91	EGH / OPIC	Contrato EPC	2011	Spanish	EPC Contract
92	CCC	Registro de Reuniones de Planeamiento	2015	Spanish	Planning Meetings Registration
93	CCC	Macroestructura Sostenibilidad	2015	Spanish	Sustainability Macrostructure
94	CCC	Buenas Prácticas de Ingeniería	2014	Spanish	Good Engineering Practices

95	EGH	Plan de Interfase Construcción - Operación	2014	Spanish	Construction – Operation Interface Plan
96	OSINERG-MIN	Informe de Supervisión OSINERGMIN	2014	Spanish	OSINERGMIN Supervision Report
97	CCC	Cronograma Detallado - Primavera/Oracle	2015	Spanish	Detailed Schedule - Spring / Oracle
98	CCC	Flujo de documentos - CITADON	2014	Spanish	Document Flow - CITADON
99	CCC	Procedimientos de Gestión Documentaria	2013-2015	Spanish	Document Management Procedures
100	CCC	Procedimientos de Calidad, Ingeniería, Producción y Logística	2013-2015	Spanish	Procedures: Quality, Engineering, Production and Logistics
101	CCC	Comunicación Interna de Manejo de los Campamentos	2014	Spanish	Camp Management Internal Communication
102	CCC	Informes de Auditoría ISO 9001	2011-2015	Portuguese / Spanish	ISO 9001 Audit Reports
103	CCC	Reporte de Progreso de Construcción	2011-2015	Spanish	Construction Progress Report
104	CCC	Indicadores de Avance de Obra	2014-2015	Spanish	Construction Progress Indicators
105	CCC	Informes Gerenciales Mensuales	2015	Spanish	Monthly Management Reports
106	CCC	Matrices de Riesgo Seguridad CH Chaglla	2015	Spanish	Chaglla Security Risk Matrices
107	CCC	Matrices de Riesgo Comunicaciones y Sociales	2012	Spanish	Social and Communications Risk Matrices
108	CCC	Procedimiento de Gestión de Residuos Sólidos	2013	Spanish	Solid Waste Management Procedure
109	CCC	Procedimiento de Gestión de Efluentes	2013	Spanish	Effluent Management Procedure
110	CCC	Procedimiento de Desmovilización	2015	Spanish	Demobilization Procedure
111	CCC	Programas de Seguridad (Liderarte, Prever, Capitán de Seguridad)	2015	Spanish	Safety Programs

112	Mott MacDonald	Reportes de Monitoreo de Construcción	2014-2015	English	Construction Monitoring Report – Mott MacDonald
113	Worley Parsons	Informes Ingeniería del Propietario	2015	Spanish	Owner Engineering Reports
114	Panel of Experts	Informes sobre la consultas de la Junta de Consultores/Panel de Expertos	2014-2015	Spanish	Panel of Experts/ Board of Consultants Reports
115	CCC	Presentación de Costos y Presupuestos de Equipos, Recursos y Materiales	2015	Spanish	Presentation on Costs and Budget of Equipment, Resources and Materials
116	CCC	Actas de Reuniones de Planeamiento	2015	Spanish	Planning Meeting Minutes
117	CCC	Informe de Subcontratista ALSTOM	2015	Spanish	ALSTOM Subcontractor Report
118	Mabey Bridge Engineer	Inspección al Puente Mallgotingo	2015	Spanish	Mallgotingo Bridge Inspection
119	CCC	Cronograma de Construcción y Operación	2015	Spanish	Construction and Operation Schedule
120	CCC	Matriz de Riesgos de Construcción	2015	Spanish	Construction Risk Matrix
121	CCC	Informe de Bureau Veritas	2014	Spanish	Bureau Veritas Report
122	CCC	Plan de Rehabilitación y Manejo de Residuos	2013	Spanish	Rehabilitation and Waste Management Plan
123	INTER-TECHNE	Ingeniería Básica del Proyecto	2012	Spanish	Project Basic Engineering
124	EGH	Organigrama de la fase de Operación	2015	Spanish	Organizational Chart of the Operation Phase
125	EGH	Informe del Cronograma Técnico, Ambiental y Social durante Construcción y Operación	2015	Spanish	Report of Social, Environmental and Technical Schedule during Construction and Operation
126	EGH	Aspectos Ambientales Operación y Mantenimiento	2015	Spanish	Environmental Aspects of Operation and Maintenance
127	CCC	Cierre de Instalaciones Temporales en Monterrey	2013	Spanish	Closure of Temporary Facilities at Monterrey

128	Miranda & Amado	Metodología de Tasación para Línea de Transmisión	2014	Spanish	Land Valuation Methodology for Transmission Line
129	CCC	Actas de Entrega de Componentes Auxiliares Cerrados	2013	Spanish	Auxiliary Components Closure Transfer Acts
130	EGH	Contrato Firmado con la Comunidad Campesina de Pillao	2012 / 2014	Spanish	Contract signed with the Pillao Community
131	CCC	Procedimiento de Negociación y Compensación por Uso de Tierras	2013	Spanish	Negotiation Procedure and Land Use Compensation
132	C.C. Pillao	Acta de Asamblea del Proceso de Negociación	2012	Spanish	Minutes of the Meeting of the Negotiation Process
133	EGH	Contrato de Servicios Plan de Atención de Emergencias Presa	2015	Spanish	Contract Services for Dam Emergency Procedures Plan
134	CCC	Monitoreo Topográfico del Campamento Margen Izquierda	2011	Spanish	Topographic Campsite Monitoring
135	Municipali-dad Distrital Chaglla	Licencia de Funcionamiento de Campamento	2014	Spanish	Camp Operating License
136	Municipali-dad Distrital Chinchao	Licencia de Construcción de la CH Chaglla	2012	Spanish	Chaglla Building Permit
137	ANA	Autorización de Ejecución de Obras de Aprovechamiento Hídrico	2011	Spanish	Works Execution Authorization of Water Use
138	HIDROENER-GIA Consultores	Estudio de Peligro Sísmico del Proyecto CHC	2010	Spanish	Chaglla Project Seismic Hazard Study
139	CCC	Evaluaciones Geológicas de las zonas aledañas al Proyecto	2014	Spanish	Geological Evaluation of Areas Surrounding the Project
140	INTER-TECHNE	Informes de Monitoreo de Instrumentación	2014-2015	Spanish	Implementation Monitoring Reports
141	INTER-TECHNE	Memoria de Cálculo de Estructuras	2012-2015	Spanish	Structural Analysis Memory
142	CCC	Planos de Trazo del Acceso Definitivo (Puentes Huallaga 1 y 2)	2012	Spanish	Final Access Plan (Huallaga Bridges 1 and 2)
143	INTER-TECHNE	Construcción de Túneles Carreteros 1 y 2 (Jaupar)	2012	Spanish	Construction of Highway Tunnels 1 and 2 (Jaupar)

144	CCC	Informes Mensuales de Calidad	2012-2015	Spanish	Quality Monthly Reports
145	CCC	Informes de Inspección de Seguridad a Estructuras	2015	Spanish	Structures Security Inspection reports
146	CCC	Simulacros de Seguridad y Salud en el Trabajo	2015	Spanish	Health and Safety Drills at Work
147	LACTEC / CEHPAR	Estudio de la Hipotética de Ruptura de la Presa	2012	Spanish	Hypothetical Study of Dam Break
148	CCC	Procedimiento de Atención a Emergencias Medio Ambiente	2013	Spanish	Environmental Emergency Procedure
149	CCC	Registros de Entrenamiento SST al Personal	2015	Spanish	OSH Personnel Training Records
150	CCC	Organización en Situaciones de Emergencia	2015	Spanish	Organization in Emergencies
151	CCC	Planes de Emergencia durante Construcción / Escenarios de Riesgo considerados	2015	Spanish	Emergency Plans for Construction / Risk Scenarios considered
152	SUNAFIL	Auditoría de Seguridad del Ministerio de Trabajo	2014	Spanish	Security Audit of the Ministry of Labour
153	CCC	Cronograma Anual de Simulacros	2015	Spanish	Annual schedule of Drills
154	CCC	Registro de Simulacro de Situación de Emergencia	2015	Spanish	Registration of Emergency Situation Drill
155	CCC	Programa Anual de Seguridad	2015	Spanish	Annual Safety Program
156	EGH	Planes de Seguridad en el Embalse	2015	Spanish	Reservoir Security Plans
157	EGH	Convenios Financieros del Proyecto Chaglla	2015	English	Chaglla Project Finance - Financial covenants
158	Ernst & Young	Modelo Financiero Limitado	2013	English	Limited financial model
159	BNP Paribas	Memo de Financiabilidad de Chaglla	2011	Spanish	Chaglla Bankability Memo
160	Mott MacDonald	Informe Técnico Final del Proyecto Hidroeléctrico Chaglla	2012	English	Chaglla Hydroelectric Project Final Technical Report
161	Mercados	Costos de	2011	Spanish	Operation & Maintenance Cost

	Energéticos Consultores	Operación y Mantenimiento			
162	PwC	Auditoría de Finanzas de EGH	2013-2014	Spanish	EGH Audit Financials
163	CCC	Acompañamiento de Avance de Producción	2015	Spanish	Production Progress Accompaniment
164	CCC	Acompañamiento de Costos Directos e Indirectos	2015	Spanish	Direct and Indirect Costs Accompaniment
165	EGH	Modelo Financiero Chaglla	2013	English	Chaglla Financial Model
166	BA Energy Solutions	Información del Análisis de Mercado	2013	Spanish	Market Analysis Information
167	PwC	Informe Revisión de Impuestos	2011	English	Chaglla tax review
168	EIA	US Energy Dep – Capital Costs	2013	English	US Energy Dep - Cap Cost
169	El Peruano	Ley 29764 Depreciación acelerada hasta 2020	2011	Spanish	Law 29764 - Accelerated Depreciation until 2020
170	EGH/ Electroperú/ Ministry of Finance/Pro -inversión	PPA	2011	Spanish	Information on public auction, PPA and associated contracts
171	INTER-TECHNE	Reporte del Incremento de Capacidad	2013	Spanish	Report on Capacity Increase
172	EGH	Presentación Viabilidad Financiera	2015	Spanish	Financial Viability Presentation
173	CCC	Apoyo a la Producción Local y Redes Empresariales	2015	Spanish	Support for Local Production and Enterprise Networks
174	CCC	Registros de Compostaje Caserío Chichipara	2015	Spanish	Composting Records Chichipara Village
175	WALSH	Línea Base Social del EIA	2010	Spanish	EIA Social Baseline
176	CCC	Actas de Arrendamiento / Alquileres	2013	Spanish	Lease / Rental Acts
177	CCC	Apoyo a la Electrificación Rural	2014-2015	Spanish	Support for Rural Electrification
178	C.C. Pillao	Apoyo a la Distritalización de la Comunidad Campesina de Pillao	2014	Spanish	Districtalization support to the Community of Pillao
179	UNFCCC	Bonos de Carbono	2013	English	Carbon Credits
180	EGH	Chaglla - Cálculo de Canon	2015	Spanish	Chaglla - Calculation of Hydroenergetic Canon

		Hidroenergético			
181	EGH	Gestión Social en la Etapa de Construcción	2013	Spanish	Social Management in the Construction Phase
182	DEVIDA	Informe de Línea base Proyecto Agrícola Público General	2013	Spanish	Baseline Agricultural Project Report
183	EGH	Monitoreo Influx Socioeconómico	2013-2014	Spanish	Influx Socioeconomic Monitoring
184	CCC	Procedimiento para Compras	2014	Spanish	Purchases Procedure
185	CCC	Indicadores de Desempeño de Subcontratistas	2014	Spanish	Subcontractor Performance Indicators
186	CCC	Procedimiento de Subcontratación	2014	Spanish	Subcontracting Procedure
187	EGH	Procedimiento de Compra de Materiales	2015	Spanish	Materials Purchase Procedure
188	EGH	Procedimiento de contratos	2015	Spanish	Contracts Procedure
189	EGH	Acuerdo Certificado de Interconexión	2014	English	Certificate Interconnection Agreement
190	EGH	Comparación de Propuestas EIA LT 220 kV	2015	Spanish	Comparison of Proposals for EIA TL 220 kV
191	EGH	Contrato EGH-051-2014	2014	Spanish	EGH-051-2014 Contract
192	EGH	Relación de Orden de Compra	2013-2015	Spanish	Purchase Order List
193	CCC	Procedimiento de Recursos Humanos - Mano de Obra Local	2013	Spanish	Human Resources Procedure – Local Workforce
194	EGH	Acuerdo de Compra de Energía	2011-2014	English	Power Purchase Agreement
195	CCC	Procesos de Compras de Materiales y de Contratación de Subcontratistas	2014	Spanish	Materials and Subcontractors Recruitment Purchasing Process
196	CCC	Listado de Contratos del Proyecto	2015	Spanish	List of Project Contracts
197	CCC	Proceso de Contratación del Contratista de la Línea de Transmisión	2012-2013	Spanish	Transmission Line Contractor Hiring Process
198	EGH	Cláusulas Anti Corrupción en Contratos	2014	Spanish	Anti-corruption Clauses in Contracting

199	EGH	Proceso de contratación del contratista del Operador	2014-2015	Spanish	Operator Contractor Hiring Process
200	EGH	Programa de Asistencia Técnica Agrícola	2014-2015	Spanish	Agricultural Technical Assistance Program
201	EGH	Monitoreo Personas Afectadas por el Proyecto	2013-2014	Spanish	Project Affected People Monitoring
202	EGH	Programa de Compensación y Reasentamiento Involuntario Línea de Transmisión	2014	Spanish	Transmission Line Compensation Program and Involuntary Resettlement
203	EGH	Reposición de Edificaciones CH Chaglla	2015	Spanish	Chaglla Replacement of buildings
204	LOV	Programa de Compensación y Reasentamiento Involuntario CH Chaglla	2012	Spanish	Chaglla Compensation Program and Involuntary Resettlement
205	EGH	Programa de Compensación y Reasentamiento Involuntario CH Chaglla	2013	Spanish	Chaglla Compensation Program and Involuntary Resettlement
206	EGH	Matriz de Compensación Tierra por Tierra	2012	Spanish	Compensation Matrix – Land x Land
207	EGH	Explicación Matriz de Compensación Tierra por Tierra	2015	Spanish	Explanation of Compensation Matrix – Land x Land
208	EGH	Informe de Avance de Personas Afectadas por el Proyecto	2013	Spanish	Project Affected People Progress Report
209	EGH	Planilla General LT 220 kV	2014	Spanish	Transmission Line 22 kV General Sheet
210	EGH	Caracterización Comunidades vs Criterios 169 OIT	2014	Spanish	Communities Characterization vs 169 OIT Criteria
211	EGH	Prospección de Aptitud Agrícola de Predios	2013	Spanish	Agricultural Lands Aptitude Prospection
212	EGH	Informe Línea Base Socios Prioritarios	2013	Spanish	Priority Partners Baseline Report
213	EGH	Informe PAPs 12 casos Potenciales Vulnerables	2014	Spanish	12 Priority Partners Vulnerable Cases
214	EGH	Situación Componente Embalse PCRI	2014	Spanish	PCRI Reservoir Component Situation
215	EGH	Cuadro de Áreas	2015	Spanish	Affected Areas Table for TL and HP

		Afectadas de la CH y LT			
216	EGH	Listado de Resumen de Documentos de Reasentamiento	2015	Spanish	Summary List of Resettlement Documents
217	CCC	Auditoría Interna SST	2015	Spanish	Internal Audit SST
218	CCC	Programa de Desmovilización CH Chaglla	2015	Spanish	CH Chaglla Demobilization Program
219	CCC	Histograma de Mano de Obra	2015	Spanish	Manpower Histogram
220	EGH	Requerimientos de fuerza laboral para la etapa de Operación	2015	Spanish	Chart on workforce requirements for the Operation stage
221	CCC	Procedimientos Seguridad y Salud en el Trabajo	2012-2015	Spanish	Procedures for Safety and Health at Work
222	CCC	Procedimiento de Gestión de Salud Ocupacional	2013-2015	Spanish	Procedures for Occupational Health Management
223	CCC	Informes Mensuales de Seguridad y Salud	2015	Spanish	Health and Safety Monthly Reports
224	CCC	Indicadores de Seguridad y Salud	2015	Spanish	Health and Safety Indicators
225	CCC	Ejemplo de Registro de Accidente	2015	Spanish	Accident Registration Example
226	CCC	Informes de Investigación de Accidentes	2011-2015	Spanish	Accident Research Reports
227	CCC	Monitoreo de Salud Ocupacional	2015	Spanish	Occupational Health Monitoring
228	CCC	Conformación de Sindicato de Trabajadores	2012	Spanish	Formation of the Union of Workers
229	CNO	Programa de Entrenamiento Joven Parcero	2014	Portuguese	Youth Training Program “Joven Parcero”
230	CNO	Programa Joven Constructor	2015	Spanish	Youth Builder Program “Joven Constructor”
231	Comité de Obra Chaglla	Actas de Reunión del Comité de Obra de Chaglla	2014	Spanish	Minutes of Work Committee Monthly Meetings
232	CCC	Status de Subcontratistas	2015	Spanish	Status of Subcontractors
233	CCC	Indicadores de Seguridad	2015	Spanish	Security Indicators
234	CCC	Requerimiento de Personal Obrero	2011	Spanish	Workers Requirement Personnel

235	CCC	Programa de Entrenamientos y Matriz de Cursos	2013-2015	Spanish	Summary of Training Provided to Employees
236	CCC	Registros de Auditoría Interna SST	2015	Spanish	SST Internal Audit Records
237	CCC	Política de Seguridad y Salud	2015	Spanish	Safety and Health Policy
238	Odebrecht Peru	Indicadores Mensuales de Integrantes	2015	Spanish	Monthly Reports on indicators
239	CCC	Indicadores de desempeño del PA Director de Contrato	2015	Portuguese	Performance Indicators of the Chaglla Contract Director
240	CCC	Procedimientos de Gestión de Arqueología	2012	Spanish	Archaeology Management Procedures
241	MINCUL	Certificado de Inexistencias de Restos Arqueológicos - CH Chaglla	2010-2012	Spanish	Certificate of Non-existence of Archaeological Remains – CH Chaglla
242	MINCUL	Plan de Monitoreo Arqueológico CH Chaglla	2011-2014	Spanish	Chaglla Archaeological Monitoring Plan
243	MINCUL	Cierre de Plan de Monitoreo Arqueológico CH Chaglla	2014	Spanish	Archaeological Monitoring Plan Closure
244	MINCUL	Actas de Supervisión CH Chaglla	2011-2012	Spanish	CH Chaglla Supervision Acts
245	CCC	Plano con hallazgo fortuito	2012	Spanish	Chance Find Map
246	MINCUL	Certificado de Inexistencias de Restos Arqueológicos - Línea de Transmisión	2013	Spanish	Certificate of Non-existence of Archaeological Remains – Transmission Line
247	MINCUL	Plan de Monitoreo Arqueológico Línea de Transmisión	2013-2014	Spanish	Transmission Line Archaeological Monitoring Plan
248	MINCUL	Actas de Supervisión Línea de Transmisión	2014	Spanish	Transmission Line Supervision Acts
249	MINCUL	Señalización y Delimitación de Sitios Arqueológicos – Línea de Transmisión	2013-2014	Spanish	Signage and Delimitation of Archaeological Sites - Transmission Line
250	EGH	Carta a OEFA por el cambio de diseño de campamento a	2013	Spanish	Letter to OEFA: Campsite Design Change due to Chance Find

		raíz del Hallazgo Fortuito			
251	CCC	Charlas de Inducción de Arqueología	2012	Spanish	Archaeology Inductions Talks
252	CCC	Plano de Evaluación Arqueológica sin Excavaciones	2015	Spanish	Archaeological Assessment Map without Excavations
253	CCC	Informe Final de Plan de Monitoreo Arqueológico de Chaglla	2012	Spanish	Final Report of Chaglla Archaeological Monitoring Plan
254	MINCUL	Acta Plan de Monitoreo Arqueológico de Accesos Preexistentes LT	2015	Spanish	TL Archaeological Monitoring Plan Supervision Act
255	EGH	Acta de Compromiso Señalización y Delimitación Sitio Arqueológico	2015	Spanish	Commitment of Signage and Delimitation of Archaeological Site
256	EGH	Foto de acompañamiento Construcción Muros Arqueológicos	2015	Spanish	Construction Process of Archaeological Signage Construction
257	EGH	Informe N° 15 Excavaciones	2015	Spanish	Report No. 15 Excavations
258	EGH	Solicitud de Supervisión Dirección Desconcentrada de Cultura Huánuco	2015	Spanish	Supervision Requesto to Decentralized Directorate of Culture Huanuco
259	CCC / Tras-humantes	Tríptico de Arqueología	2015	Spanish	Archaeology Information Leaflet
260	EGH	Plan Maestro de Llenado de Embalse	2015	Spanish	Reservoir Filling Master Plan
261	CCC	Campañas Médicas en las Comunidades	2011-2015	Spanish	Medical Campaigns in Communities
262	EGH	Programa de Monitoreo de Indicadores de Salud de las Comunidades (ESHS)	2013-2014	Spanish	Communities Monitoring Program Health Indicators
263	CCC	Certificado de Desratización y Control de Plagas	2013-2015	Spanish	Deratting Certificate and Pest Control
264	CCC	Promotores de Salud Comunitarios	2014	Spanish	Community Health Promoters
265	CCC	Servicios de Mantenimiento y Limpieza de Campamentos y Alojamientos	2014	Spanish	Maintenance and Cleaning Services for Camp and Accommodations

266	CCC	Actas de Instalación de Biodigestores en Centros Educativos	2013	Spanish	Installation Acts of Biodigestors in Educational Centers
267	EGH	Resumen Compromisos EIA	2013	Spanish	Summary of EIA Commitments
268	CCC	Salud Pública Malaria y otros vectores	2010	Spanish	Malaria Public Health and Other Vectors
269	WALSH	Salud Pública por Efecto del Embalse	2010	Spanish	Public Health Impact of Reservoir
270	EGH	Reporte de Acciones Sociales ESHS	2014	Spanish	Social Actions ESHS Reports
271	EGH	Plan de Interfase Construcción a Operación CH Chaglla	2014	Spanish	Construction to Operation Interface CH Chaglla Plan
272	EGH	Master Plan de Llenado de Embalse	2015	Spanish	Reservoir Filling Master Plan
275	EGH	Plan de Comunicación para Llenado de Embalse	2015	Spanish	Reservoir Filling Communication Plan
278	EGH	Plan de Desbosque Selectivo de Embalse	2015	Spanish	Reservoir Vegetation Clearing Plan
279	EGH	Plan de Rescate y Ahuyentamiento de Fauna Silvestre	2015	Spanish	Wildlife Rescue Plan
280	EGH	Plan de Rescate de Peces	2015	Spanish	Fish Rescue Plan
281	INTER-TECHNE	Manual para el cierre del desvío del río y comienzo de llenado del embalse	2015	Spanish	Manual for the diversion tunnel closure and beginning of reservoir filling
282	CCC	Manual de Operación	2015	Spanish	Manual of Operation
283	CCC	Estimación de sedimentación del reservorio hasta 25 años de operación	2015	Spanish	Estimation of reservoir sedimentation after 25 years of operation
284	EGH	Procedimientos de Seguridad para Actividades del Llenado del Embalse	2015	Spanish	Safety management plans - Reservoir Filling
285	EGH	Informes de Monitoreos a especies clave: *Aotus, Ara militaris,* lizards*, Astroblepus y Chaetostoma*	2011-2014	Spanish	Key Species Monitoring Reports: *Aotus, Ara militaris,* lizards*, Astroblepus y Chaetostoma.*
286	EGH	Estudios e informes de monitoreos de Biodiversidad	2011-2014	Spanish	Biodiversity Monitoring Studies

287	BIOSFERA	RAP Evaluación de fauna y flora Parque Tingo María	2014	Spanish	RAP Evaluation of Tingo Maria Wildlife Park
288	EGH	Convenio con Museo de Historia Natural UNMSM	2012-2014	Spanish	Agreement with UNMSM Natural History Museum
289	CCC	Informe de Rescate de Peces durante el Desvío del Río	2012	Spanish	Fish Rescue Report during River Diversion
290	CANDES	Informe de Rescate de Fauna y Flora del Desbroce de Obra	2011	Spanish	Flora and Fauna Rescue during Vegetation Clearing at Worksite
291	EGH	Libro por los 50 años del Parque Nacional Tingo Maria	2015	Spanish	50 Years Anniversary Tingo Maria National Park Celebration Book
292	EGH	Libro del Rescate de Orquídeas del Proyecto Chaglla	2015	Spanish	Orchids Rescue at CH Chaglla Book
293	EGH	Convenio con el Parque Nacional Tingo María	2013	Spanish	Agreement with Tingo Maria National Park
294	EGH	Informes de Rescate de Fauna Línea Transmisión	2014-2015	Spanish	Wildlife Rescue Reports - Transmission Line
295	EGH	Cartas de Comunicación de Monitoreo Biológico	2014	Spanish	Letters of Biological Monitoring Dates to Villages
296	CCC	Informe de Revegetación	2014	Spanish	Revegetation Report
297	CCC	Informe de Erradicación de Kudzu	2014-2015	Spanish	Kudzu Eradication report
298	EGH	Mapa de Ubicación de Estaciones Hidrobiológicas	2011	Spanish	Map of hydrobiological survey locations
299	EGH	Mapa de IBA y AZE en relación al Área de Influencia del Proyecto CH	2015	Spanish	IBA and AZE Map Reference related to Project Area of Influence
300	EGH	Programa de Compensación Restauración y Gestión Ecológica Fluvial en la Cuenca del Chaglla	2014	Spanish	Compensation, Ecological Restoration and River Basin Management Program
301	MHNSM	Publicaciones Departamento de Ictiología MHNSM	-	Spanish	Department of Ichthyology MHNSM Publications
302	EGH	Presupuestos de Programas de Sostenibilidad	2015	Spanish	Budget Sustainability Programs
303	EGH	Interrelaciones de caudales, calidad de agua, erosión y	2015	Spanish	Interrelationships flows, water quality, erosion, sedimentation in the downstream stretch

		sedimentación en el tramo de flujo reducido			
304	UDEP	Estudios Hidráulicos en Modelo Reducido PH Chaglla	2014	Spanish	Hydraulic Reduced Model Studies Chaglla HP
305	LAVALIN	Estudio de Sedimentos – Estudio de Factibilidad CHC	1994	Spanish	Sediment study - Feasibility Study CHC
306	EGH	Monitoreo Batimétrico Operación	2011	Spanish	Bathymetric Monitoring Operation
307	CCC	Procedimiento Programa de Recuperación y Estabilización de Áreas Degradadas	2013	Spanish	Procedure of Stabilization and Recovery Program of Degraded Areas
308	CCC	Procedimiento de Gestión Excavación Subterránea	2013	Spanish	Groundwater Excavation Management Procedure
309	CCC	Procedimiento de Gestión Excavación a Cielo Abierto	2013	Spanish	Open Pit Management Procedure
310	CCC	Procedimiento de Gestión de Movimiento de Tierra, Corte y Relleno	2013	Spanish	Management Procedure for Earthmoving, Cut and Fill
311	EGH	Informes de Monitoreo Ambiental CH	2015	Spanish	Environmental Monitoring Reports HP
312	EGH	Informes de Monitoreo de Calidad de Agua Superficial LT	2014-2015	Spanish	Surface Water Quality Monitoring Reports TL
313	EGH	Informes de Monitoreo de Calidad de Agua Potable	2015	Spanish	Potable Water Quality Monitoring Reports
314	CCC	Programa Aguampampa, Higrompampa y Huanipampa	2012	Spanish	Aguampampa, Higrompampa and Huanipampa Program
315	CCC	Plan de Restauración de Quebradas	2014	Spanish	Creeks Restoration Plan
316	CCC	Registros de Mantenimiento de Sistemas de Tratamiento	2015	Spanish	Maintenance Treatment Systems Records
317	CCC	Procedimientos de Mantenimiento de Plantas	2013	Spanish	Plant Maintenance Procedures

318	ANA	Resoluciones de Licencias de Recursos Hídricos	2012-2014	Spanish	Water Resources Licensing Resolutions
319	Wells	Modelo de Calidad del Embalse Fase 1	2011	English	Report on the Phase 1 of Water Quality Modeling Reservoir
320	Wells	Modelo de Calidad del Embalse Fase 2	2011	English	Chaglla Modeling Report Phase 2
321	CCC	Instructivo de Operación y Mantenimiento del Sistema de Tratamiento de Agua Potable	2013	Spanish	Operation and Maintenance Instructions for Drinking Water Treatment System
323	CCC	Instructivo de Plan de Intervención en las Quebradas	2013	Spanish	Instructive for Creek Intervention Plans
324	CCC	Instructivo de Limpieza y Mantenimiento de Bebederos de Campo	2013	Spanish	Instructive for Cleaning and Maintenance of Field Drinkers
325	CCC	Instructivo de Operación y Mantenimiento de Plantas de Aguas Residuales	2013	Spanish	Instructive for Operation and Maintenance of Wastewater Treatment Plants
326	CCC	Instructivo de Limpieza y Mantenimiento del Sistema de Aguas Residuales Industriales	2013	Spanish	Instructions for Cleaning and Maintenance of Industrial Wastewater System
327	CCC	Instructivo de Manipulación de Bebederos de Oficinas	2013	Spanish	Handling Instructions for Office Watercoolers
328	CCC	Instructivo de Operación, Limpieza y Mantenimiento del Sistema de Reaprovechamiento de Aguas Residuales Aceitosas	2013	Spanish	Instructive for Operating, Cleaning and Maintenance of Oily Wastewater Reuse System
329	CCC	Procedimiento de Gestión Control de Efluentes	2013	Spanish	Procedure for Effluent Control Management
330	CCC	Procedimiento de Gestión Captación del Agua	2013	Spanish	Procedure for Water Catchment Management
331	CCC	Matriz de Requisitos Legales	2013-2015	Spanish	Legal Requirements Matrix
332	CCC	Mapa de Monitoreo Etapa de Construcción	2011	Spanish	Monitoring Map for Construction Stage

333	CCC	Instructivo de Mantenimiento de Aire Acondicionado	2012	Spanish	Instructive for Air Conditioning Maintenance
334	CCC	Registros de Volúmenes de Residuos	2014	Spanish	Register of Waste Volumes
335	CCC	Compostaje con Microorganismos Eficientes	2014-2015	Spanish	Composting with Efficient Microorganisms
336	CCC	Participación en el Premio Nacional Ambiental 2014	2014	Spanish	Participation in the 2014 National Environmental Award
337	A2G	Inventario de Emisiones de Gases	2011	Spanish	Greenhouse Gases Inventory
338	EGH	Informes de Monitoreo de Calidad de Ruido - LT	2014-2015	Spanish	Noise Quality Monitoring Reports Transmission Line
339	EGH	Informes de Monitoreo de Calidad de Aire - LT	2014-2015	Spanish	Air Quality Monitoring Reports Transmission Line
340	CCC	Procedimiento de Gestión Emisión de Ruidos y Partículas a la Atmósfera	2013	Spanish	Procedure for Noise and Particles Emission into the Atmosphere Management
341	CCC	Instructivo de Limpieza y Mantenimiento Aguas Aceitosas	2012	Spanish	Instructive for Cleaning and Maintenance of Oily Water
342	CCC	Instructivo de Tratamiento de Suelo Contaminado por Hidrocarburos por Biorremediación	2012	Spanish	Instructive for Bioremediation Treatment of Soil Contaminated with Hydrocarbons
343	CCC	Proyecto de Manejo de Residuos en Comunidades Vecinas	2014	Spanish	Project Local Communities Waste Management
344	CCC	Ejemplo de Relatorio de No Conformidad	2014	Spanish	Non Conformity Report Examples
345	ALSTOM	Manuales de Operación de las Compuertas	2015	Spanish	Operation Manuals for Gates
346	NHC	Plan de Manejo de Caudal Ecológico	2012-2015	English	Ecological Management Flow Plan
347	NHC	Estudio PHABSIM CH Chaglla	2012	English	Chaglla Hydro Project PHABSIM Study
348	NHC	Revisión de Expertos del Modelo IFIM	2012	English/ Spanish	Expert Technical Reviews IFIM
349	NHC	Evaluación de caudales bajos en río Huallaga y tributarios	2013	Spanish	Chaglla Low Flow Assessment

350	NHC	Propuesta para Medidas de Mitigación de Caudal Ecológico	2015	Spanish	Proposal for Ecological Flow Mitigation Measures
351	CCC	Tiempo de retención en el reservorio por mes	2015	Spanish	Retention time in the reservoir, by month
352	EGH	Resumen de Acciones Aguas abajo	2012-2015	Spanish	Summary of Downstream Actions
353	CCC	Caudales Mensuales Chaglla	2014	Spanish	Chaglla Monthly Flows
354	CCC	Año Medio Operación CH Chaglla	2015	Spanish	Average Year Operation for CH Chaglla
355	EGH	Caudales de los tributarios del Huallaga entre Presa y Tingo María	2015	Spanish	Inflows from each tributary into the Huallaga, between the dam, powerhouse and Tingo Maria
356	Instituto Nacional de Estadistica e Informatica	Estadisticas de Indicadores Sociales	2013	Spanish	http://www.inei.gob.pe/estadisticas/indice-tematico/sociales/
357	iagua	Perú creará un Organismo de Seguridad de Presas	2015	Spanish	http://www.iagua.es/noticias/peru/ana-peru/15/05/28/autoridad-nacional-agua-presenta-propuesta-creacion-organismo
358	INDECI	Verificacion de condiciones de peligro inminente en Huanuco	2015	Spanish	http://www.indeci.gob.pe/sectores/reuniones/2013/14%20mar/indeci%20-%20TEMP_LLUVIAS2013_HUANUCO_SAN%20MARTIN.pdf
359	Instituto Geofísico del Perú	Servicio Sismológico Nacional	2015	Spanish	http://www.igp.gob.pe/portal/index.php?option=com_content&view=article&id=161&lang=es
360	Instituto Geofísico del Perú	Mapa de estaciones sismicas de la red nacional	2012	Spanish	http://www.igp.gob.pe/portal/images/documents/sismos/Red_Sismica_Nacional/estaciones_sismicas_2013_2.jpg
361	IDB	Products and Services for Private Sector Clients	2012	English	http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1896617
362	Transpa-rency Inter-national	Corruption by Country - Peru	2014	English	http://www.transparency.org/country#PER
363	RFI	Embargan bienes de constructora Odebrecht en Ecuador	2008	Spanish	http://www1.rfi.fr/actues/articles/105/article_9206.asp
364	Ecuador Inmediato	Secretario Anticorrupcion pide iniciar investigacion por peculado en central hidroelectrica San Francisco	2008	Spanish	http://ecuadorinmediato.com/index.php?module=Noticias&func=news_user_view&id=86695&umt=secretario_anticorrupcion_pide_iniciar_investigacion_por_peculado_en_central_hidroelectrica_san_francisco
365	ProInversion	Procesos en marcha	2012	Spanish	http://www.proyectosapp.pe/modulos/JER/PlantillaStandard.aspx?are=0&prf=2&je

					r=7649&sec=24
366	Odebrecht	Executives of the Odebrecht Group	2014	English	http://odebrecht.com/relatorio2013/en/administradores-da-organizacao-odebrecht/
367	Convoca	Cuotas y pagos millonarios de la Interoceanica	2015	Spanish	http://www.convoca.pe/investigaciones/cuotas-y-pagos-millonarios-de-la-interoceanica
368	Odebrecht	Central Hidroelectrica Chaglla	2013	Spanish	http://www.odebrecht.com.pe/negocios/infraestructura/obras-actuales/central-hidroelectrica-chaglla
369	CNO	Ediciones de 'Pura Energia' - Proyecto Chaglla	2015	Spanish	http://issuu.com/proyectochaglla
370	OSINERG-MIN	SUPERVISIÓN DE CONTRATOS (PROYECTOS DEL SECTOR ELÉCTRICO)	2012	Spanish	http://www.osinerg.gob.pe/newweb/pages/GFE/supervision_contratos4.htm
371	OSINERG-MIN	Ficha Técnica de Proyectos	2015	Spanish	http://www.osinerg.gob.pe/newweb/pages/GFE/supervision_contratos15.htm?3030
372	IDB	Chaglla Hydroelectric Power Project	2011	English	http://www.iadb.org/en/projects/project-description-title,1303.html?id=PE-L1113
373	OSINERG-MIN	GENERACIÓN ELÉCTRICA A INGRESAR AL SEIN. PERIODO: 2013-2020	2014	Spanish	http://www.osinerg.gob.pe/newweb/uploads/GFE/SupervisionContratos/Proyectos%20Generacion%20Electrica%20a%20ingresar%20al%20SEIN.pdf?9205
374	OSINERG-MIN	CENTRAL HIDROELÉCTRICA BELO HORIZONTE (180 MW)	2015	Spanish	http://www.osinerg.gob.pe/newweb/uploads/GFE/SupervisionContratos/sup6/61/5.2.6.pdf?6
375	InfoRegion	Invertirán más de US$ 500 millones en centrales hidroeléctricas en el valle del Monzón	2013	Spanish	http://www.inforegion.pe/desarrollo/161813/invertiran-mas-de-us-500-millones-en-centrales-hidroelectricas-en-el-valle-del-monzon/
376	Diario Ahora	Construirán Hidroeléctrica "Karpa" en Tantamayo	2014	Spanish	http://www.ahora.com.pe/index.php/en/component/k2/item/5725-construiran-hidroelectrica-karpa-en-tantamayo
377	OSINERG-MIN	CENTRAL HIDROELÉCTRICA SANTA LORENZA (18,7 MW)	2015	Spanish	http://www.osinerg.gob.pe/newweb/uploads/GFE/SupervisionContratos/sup6/61/5.3.16.pdf?6
378	FAO	PLAN DE GESTIÓN DE RIESGO Y ADAPTACIÓN AL CAMBIO CLIMÁTICO EN EL SECTOR AGRARIO, PERÍODO 2012-2021	2012	Spanish	http://www.fao.org/fileadmin/user_upload/FAO-countries/Peru/docs/Plangracc_RESUMEN.pdf
379	MEM	Evaluacion de la Vulnerabilidad y Adaptacion en el	?	Spanish	http://www.minem.gob.pe/archivos/Libro_Cambio_Climatico_SSE_GMZ_MINAM-MINEM-z900qz23zzr.pdf

		Sector Electricidad			
380	Programa de Adaptacion al Cambio Climatico, Peru	PacPeru Website	2015	Spanish	http://www.paccperu.org.pe/
381	MEM	Guia de Estudios de Impacto Ambiental para Actividades Electricas	2001	Spanish	http://www.minem.gob.pe/minem/archivos/file/DGGAE/ARCHIVOS/guias/guiaelectricidad.PDF
382	MEM	Lista de Empresa Autorizadas a realizar EIAs	2015	Spanish	http://www.minem.gob.pe/_detalle.php?idSector=2&idTitular=6851&idMenu=sub553&idCateg=1191
383	InfoRegion	Odebrecht realizó semana de la sostenibilidad en el Proyecto CH Chaglla	2014	Spanish	http://www.inforegion.pe/portada/183336/odebrecht-realizo-semana-de-la-sostenibilidad-en-el-proyecto-ch-chaglla/
384	InfoRegion	Se inicia construcción de hidroeléctrica de Chaglla	2011	Spanish	http://www.inforegion.pe/portada/102096/se-inicia-construccion-de-hidroelectrica-de-chaglla
385	Odebrecht	Odebrecht logra alcanzar uno de los principales hitos del proceso constructivo de la Central Hidroeléctrica Chaglla	2012	Spanish	http://www.odebrecht.com.pe/comunicacion/noticias/odebrecht-logra-alcanzar-central-hidroelectrica-chaglla
386	Odebrecht	Tecnología Empresarial Odebrecht	vario us	Spanish	http://odebrecht.com/es/organizacion-odebrecht/tecnologia-empresarial-odebrecht-teo/publicaciones
387	Odebrecht	Comunicado Odebrecht - Operación Lava Jato	2015	Spanish	http://odebrecht.com/es/comunicacion/releases/comunicado-odebrecht-operacion-lava-jato
388	SERNANP	Official Guide – Protected Areas, Peru	2013	English	
389	ANA	Monitoreo de la Calidad de Agua Superficial de la parte alta de la cuenca Huallaga	n.d.	Spanish	Powerpoint presentation
390	Proyecto Chaglla	Matriz de Competencia de Funciones	2015	Spanish	
391	Leonardo Borgatti, DI Mercado	Programa de Acción 2015-2017	2015	Spanish	Odebrecht Latin Fund Business Plan, including safety indicators
392	Proyecto Chaglla	Política de Administración Central Hidroelectrica de Chaglla	n.d.	Spanish	
393	Odebrecht	Resolución del	2012	Spanish	

	S.A.	Director Presidente – Política para Identificación, Desarrollo, Evaluación e Integración de Personas en la Organización Odebrecht			
394	Odebrecht S.A.	Resolución del Director Presidente – Programa de Homenagem Anual a Integrantes de Organizacão Odebrecht	2012	Portuguese	
395	SUNAFIL	Two 1-page inspection reports	Sept 2013 / Sept 2014	Spanish	
396	CONAFOVICER	Conoce Tus Derechos Laborales En Construcción Civil, 2013-2014	2013	Spanish	
397	Odebrecht Peru	Reglamento Interno de Seguridad, Salud en el Trabajo y Medio Ambienta	2012	Spanish	Small red booklet
398	EGH	Reglamento Interno de Trabajo	n.d.	Spanish	Small red booklet
399	Odebrecht Peru	Código de Conducta – Versión de Bolsillo, Resumen	n.d.	Spanish	Small, card-size leaflet
400	Odebrecht and Prima AFP	Plan Odeprev Peru	n.d.	Spanish	Leaflet on pension / insurance policy
401	MINEM	Resolución Ministerial - Linammientos de Compensación	2014	Spanish	Law on compensation areas
402	The Nature Conservancy	Science for Nature and People (SNAP) - A New Scientific Collaboration	n.d.	English	
403	MEM and Dirección General de Asuntos Ambientales	Evaluacion Ambiental Territorial de la Cuenca Del Rio Alto Huallaga	1997	Spanish	Report on mining activity by ADI International Inc
404	Graham Watkins	Is there such as thing as the 'perfect' hydropower dam?	2015	English	http://blogs.iadb.org/cambioclimatico/2015/01/09/thing-perfect-hydropower-dam/
405	Latin Lawyer	Project Finance: Boosting Peru's	2014	English	http://www.vonwobeserysierra.com/assets/files/Newsletter_2015/PDF_ARTICLE.pd

		Energy Matrix			f
406	World Finance	Odebrecht turns attention to hydroelectric projects in Peru	2014	English	http://www.worldfinance.com/markets/odebrecht-turns-attention-to-hydroelectric-projects-in-peru
407	UNFCCC	Chaglla Project Documentation	2013	English	http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1356246622.02/view
408	EGH / MEM	Concesión Definitiva de Transmisión de Energía Eléctrica No 414-2013	2013	Spanish	TL Concession Contract
409	EGH / MEM	Concesión Definitiva de Transmisión de Energía Eléctrica No 433-2013	2013	Spanish	TL Concession Contract
410	EGH / MEM	Concesión Definitiva de Transmisión de Energía Eléctrica No 344-2009	2013	Spanish	Hydropower Concession Contract
411	MEM	Modificación al Contrato de Concesión	2011	Spanish	Hydropower Concession Modification
412	Electroperú	Memoria y Estados Anuales	2014	Spanish	Information on PPA partner
413	EGH	Fijación de Precios de Energía en el Perú	2012	Spanish	Presentation on Power Market
414	IDB	Chaglla: One of the Longest Tenors in IDB's A/B Loan	n.d.	English	http://idbapp.net/syndications/case-study/chaglla-longest-tenor-in-idbs-ab-loan-history/
415	Inforegión	Odebrecht rescata el legado del Sitio Arqueológico Huanipampa en Huánuco	2012	Spanish	http://www.inforegion.pe/portada/128437/odebrecht-rescata-el-legado-del-sitio-arqueologico-huanipampa-en-huanuco/
416	MEM	Resolución Directoral-Aprobación del EIA-LT	2013	Spanish	http://www.minem.gob.pe/minem/archivos/RD%20332-2013.pdf
417	MEM	Aprobación del Resumen Ejecutivo del EIA de la LT y su distribución	2013	Spanish	http://www.minem.gob.pe/minem/archivos/1123-2013.pdf
418	EGH	Presentación: Recomendaciones clave	2015	Spanish	Review of actions taken during site due diligence/Quarterly Reports
419	ENVIRON	Key Recommendations from Table 5.1 of the "Environmental and Social Monitoring Report – Q1 2014"	2015	English	
420	EGH	Key Recommended	2015	Spanish	Response to OH&S recommendations for

		Actions / Seguridad y Salud Ocupacional en la construcción de la Línea de Transmisión			TL
421	EGH	Key Recommended Actions / Plan de Desmovilización Construcción	2015	Spanish	Demobilization of Construction Phase Workers
422	EGH	Key Recommended Actions / Atención a KRA Q3 Plan de Compensación	2015	Spanish	Correspondence with IDB - Biodiversity Offsets Plan
423	EGH	Key Recommended Actions / Cultural Heritage	2015	Spanish	Report on limitation of archaeological sites
424	EGH	Key Recommended Actions / Cultural Heritage	2014	Spanish	Approval of LT Archaeological Monitoring Plan
425	CCC	Plan de Calidad	2011	Spanish	Quality Assurance Plan for the Contractor
426	Odebrecht S.A.	Code of Conduct	2013	English	
427	EGH	Estudio de Impacto Socio Económico	2014	Spanish	Socio-Economic Impact Study
428	EGH	Matrix de datos PCRI	2013-14	Spanish	Data Matrix
429	EGH	Herramienta de Evaluación de Impacto Socio Económico	2013-14	Spanish	Individual records
430	EGH	Additional information on families accepting cash compensation	2015	English	
431	EGH	Monitoreo del Mono Nocturno *Aotus miconax* en el ámbito del Proyecto Central Hidroeléctrica Chaglla	2014	Spanish	Report on Night Monkey (*Aotus Miconax*)
432	Geomáticos Consultores	Análisis del cambio de bosque/no bosque para los años 2013/2014	2014	Spanish	Analysis of change in forest cover for the years 2013/2014
433	Geomáticos Consultores	Tendencias de las actividades antropogénicas en la Línea de Transmisión	2014	Spanish	Anthropogenic activity trends in TL area
434	EGH	Acta de reunión entre el área de	2015	Spanish	Minutes of meeting

		sostenibilidad de EGH y la Gerencia de Recursos Naturales y Gestión Ambiental			
435	CCC / workers	Convención colectiva de trabajo en obra para el proyecto Central Hidroeléctrica Chaglla	2011	Spanish	Collective work contract
436	CCC	Informe legal	2015	Spanish	Legal Report on Overtime Regulations
437	MINTRA	Reglamento	2002	Spanish	Law on Labor Day, Hours and Overtime Work
438	CCC	Reglamento	2011	Spanish	Employment Rules
439	MINTRA	Reglamento-Decreto Supremo Nº 7 2002	2002	Spanish	Regulations-Decreto Supremo 007/2002
440	EGH	Inspección rutinaria de medio ambiente y seguridad	2015	Spanish	Health and safety inspection nº 4 and 5/2015
441	EGH	Informe Trimestral EGH/BID	2015	Spanish	Report: Environmental and Social compliance Hydropower and LT 1st and 2nd Quarter 2015
442	EGH	Informe Trimestral EGH/BID	2015	Spanish	Report: Environmental and Social compliance Hydropower and LT 4th Quarter 2014
443	CCC	Campaña de Salud Preventiva Promocional	2015	Spanish	Preventive health promotional campaigns
444	Association Lavalin	Estudio de factibilidade central hidroeléctrica Chaglla (Huallaga)	1994	Spanish	Sedimentation study
445	Association Lavalin	Programa de muestreos de sólidos- Período Humedo	1994	Spanish	Data base sedimentation
446	INTERTECH-NE	Proyecto Básico – Informe técnico	2010	Spanish	Technical report - Sedimentation
447	Salazar, J.R y Reyes, M.F	Dimensionamiento de la presa, orificios de purga y comportamiento sedimentológico del embalse Chaglla	2009	Spanish	Sedimentation Report
448	Universidad Piura	Estudios Hidráulicos en modelo reducido PH Chaglla	2014	Spanish	Final Hydraulic Report
449	INTERTECH-NE	Canal de fuga - Modelación matemática del comportamiento hidráulico - Informe técnico	2011	Spanish	Technical report- Hydraulic mathematical model

450	JGP	Report on the Subsistence Fishing Habits of the population in the Project's Direct Area of Influence	2011	English	
451	JGP	Questionnaire administered (model)	2011	Spanish	Fishing Questionnaire
452	JGP	Database according to the respective sectors	2011	Spanish	Database on fishing habits
453	JGP	Encuesta - Aguas abajo del área del proyecto	2011	Spanish	Scanned individual records
454	JGP	Encuestas - Próximo a Casa de fuerza	2011	Spanish	Scanned individual records
455	Hernández, J.M D.	Informe aplicación IFIM-PHABSIM	2012	Spanish	Technical l Report – IFIM-PHABSIM
456	Nestler, J.M	Technical Review of Northwest Hydraulics Center's IFIM Report	2012	English	Memorandum
457	EGH	Terminos de Referencia	2014	Spanish	Terms of Reference Emergency Plan
458	EGH	Contrato – Plan de Emergencia	2015	Spanish	Emergency Plan Contract
459	JGP	Actualización del Plan de Manejo del Caudal Ecológico, ítem 6 del Plan de Manejo Social y Ambiental, de Salud y Seguridad	2012	Spanish	Ecological Flow Management Plan Actualization, Chapter 6 - ESHSMP
460	JGP	Baseline Information for IFIM/PHABSIM Modeling Chaglla Hydro Project – Huallaga River - Peru	2012	English	Baseline Information for IFIM/PHABSIM Modeling Chaglla Hydro Project – Huallaga River - Peru
461	US Dept. of Labor – Bureau of Labor Statistics	Employer-reported Workplace Injuries and Illnesses 2013	2014	English	
462	US Dept. of Labor – Bureau of Labor Statistics	Revisions to the 2013 Census of Fatal Occupational Injuries Counts	2015	English	
463	Odebrecht	Reporte de acciones del inicio de llenado del Embalse, 03.09.15	2015	Spanish	Report on reservoir preparation and first two days of filling; annexes include NHC Hydraulic Connectivity Management Plan and communication materials

Appendix D: Visual Evidence

Photo 1: Community bulletin

Photo 2: Newsboard on site

Photo 3: Visitor centre at Odebrecht offices in Lima

Photo 4: Project information centre on site

Photo 5: Closed deposit of materials on site

Photo 6: Progress on dam works - Monthly Productivity Panel

Photo 7: Progress on the spillway tunnels

Photo 8: Risks map at the spillway

Photo 9: Alstom manufactured turbine equipment

Photo 10: Concrete face dam works

Photo 11: Construction of the small HP

Photo 12: Downstream view of the dam, small HP and river diversion tunnel exit

Photo 13: Equipment under testing and commissioning

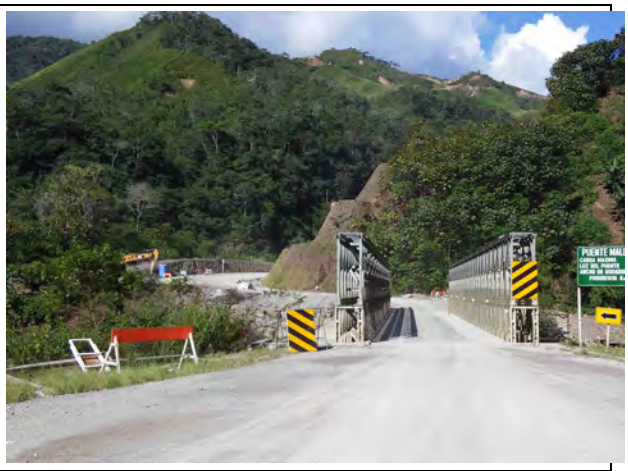

Photo 14: Mallgotingo bridge on new left bank road

Photo 15: Pillao tunnel 2 and signage on new left bank road

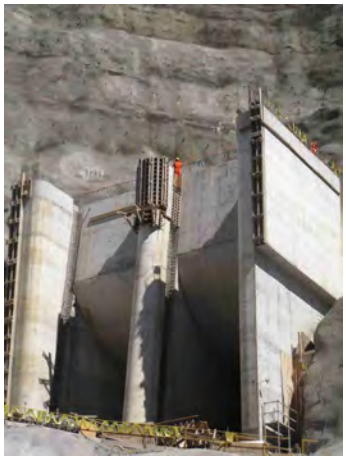

Photo 16: Intake gates

Photo 17: New batteries in powerhouse

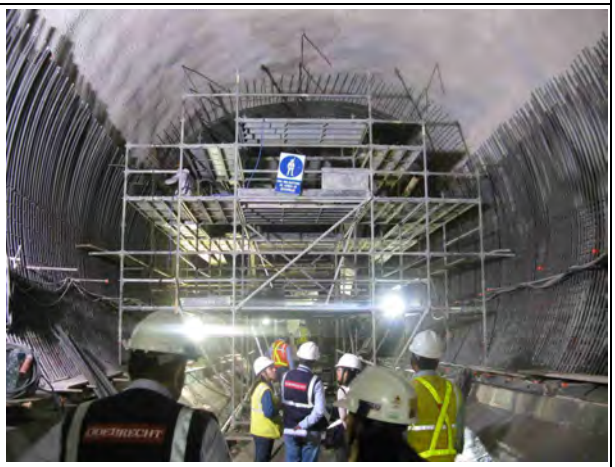

Photo 18: Reinforcement works in headrace tunnel

Photo 19: Reinforcement works in headrace tunnel (2)

Photo 20: Site gate and signage

Photo 21: Spillway stilling basin

Photo 22: Spillway tunnel

Photo 23: Substation on site

Photo 24: Turbine hall with two 225 MW generating units

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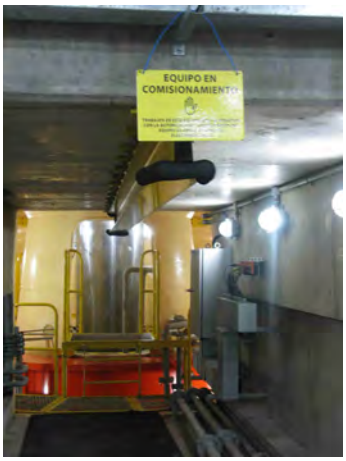
<tr><td> 
</td><td>  </td></tr>
<tr><td>Photo 25: Turbine under commissioning and dry testing</td><td>Photo 26: Dam from downstream with monitoring instrumentation chambers</td></tr>
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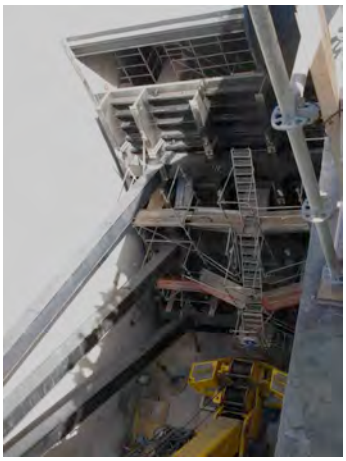
<tr><td>  </td><td> 
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<tr><td>Photo 29: Spillway radial gate being installed</td><td>Photo 30: Welding workshop near power house</td></tr>
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Photo 31: Tourism revenue benefits from biodiversity compensation measures

Photo 32: Pampamarca water and sewerage project

Photo 33: Town hall Pampamarca with project announcement

Photo 34: Training facility for CREER program

Photo 35: Agricultural extension talk on cocoa cultivation

Photo 36: Billboard for agricultural extension programme

Photo 37: Community bus service stop

Photo 38: Community bus service poster

Photo 39: Houses on right bank just over reservoir water level

Photo 40: Huanipampa village next to project road

Photo 41: Composting centre in San Juan de Monterrey

Photo 42: Local woman employed to suppress dust

Photo 43: New school Pampamarca

Photo 44: Old school Pampamarca

Photo 45: Project activities poster in Pampamarca

Photo 46: Project bulletin board in Huanipampa

Photo 47: Restaurants and bars outside work camp

Photo 48: Tingo Maria market area

Photo 49: Interview with resettled person in San Juan de Monterrey

Photo 50: Limited agricultural land in steep Huallaga valley

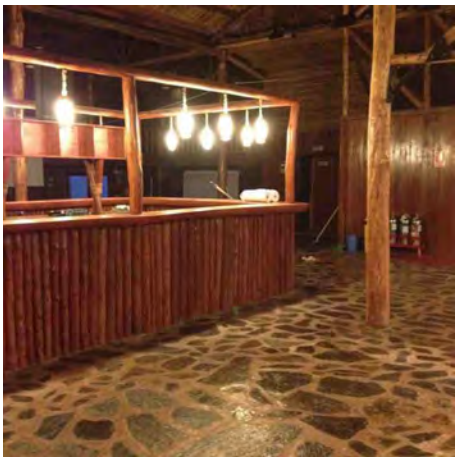
Photo 51: Resettlement home with downstairs shop on access road

Photo 52: Resettlement home on access road

Photo 53: Archaeological exhibit in project information centre

Photo 54: Huanipampa archaeological site billboard

	
Photo 55: Huánuco office of Ministry of Culture	Photo 56: Inca path archaeological site
	
Photo 57: Health campaign beneficiaries from Huanchag village in interview	Photo 58: Health centre Chinchavito
	
Photo 59: Interview in Chinchavito health centre	Photo 60: New health centre Pampamarca under construction

	
Photo 61: Canteen	Photo 62: Club-house bar for events, left bank
	
Photo 63: Club-house, left bank camp	Photo 64: Display of hazards at the left bank camp
	
Photo 65: Huallaga river immediately prior to the confluence with the Monzon	Photo 66: Display of Work Committee members, outside the canteen

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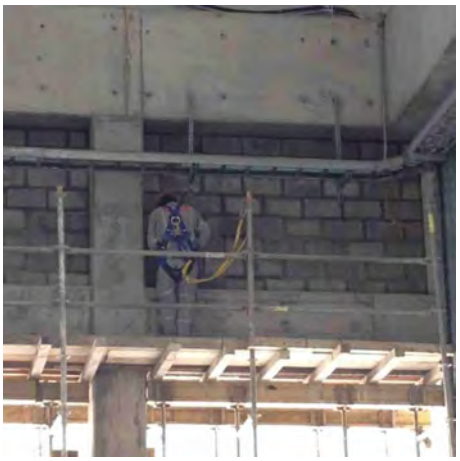
</td><td>  </td></tr>
<tr><td>Photo 67: Display on steps to take in an emergency, outside the canteen</td><td>Photo 68: Employee working at height with harness and tether, powerhouse</td></tr>
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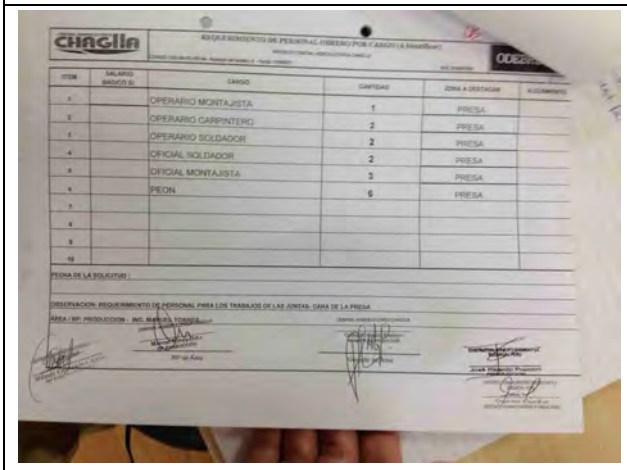
<tr><td> 
CHAGLLA
OPERARIO MONTAJISTA 1 PRESA
OPERARIO CARPINTERO 2 PRESA
OPERARIO SOLDADOR 2 PRESA
OFICIAL SOLDADOR 2 PRESA
OFICIAL MONTAJISTA 3 PRESA
PEON 6 PRESA</td><td> 
MATRIZ DE RESPONSABILIDADES</td></tr>
<tr><td>Photo 71: Example of a personnel request form</td><td>Photo 72: Example of an employee-signed description of responsibilities</td></tr>
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Photo 73: Example of temporary hazard barriers at the powerhouse	Photo 74: Examples of the water dispensers used at work sites (these at the waste management centre)
	
Photo 75: Fire alarm systems installed at the powerhouse, and temporary signage	Photo 76: Fire-fighting equipment seen in dormitory blocks
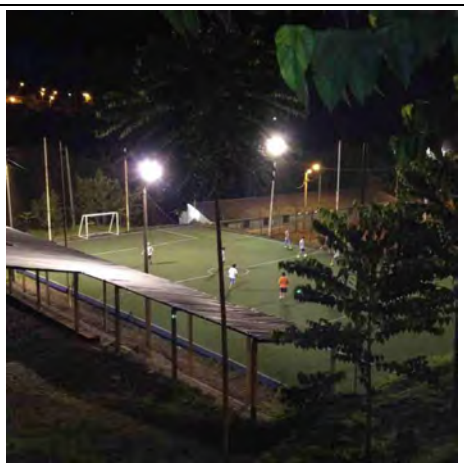	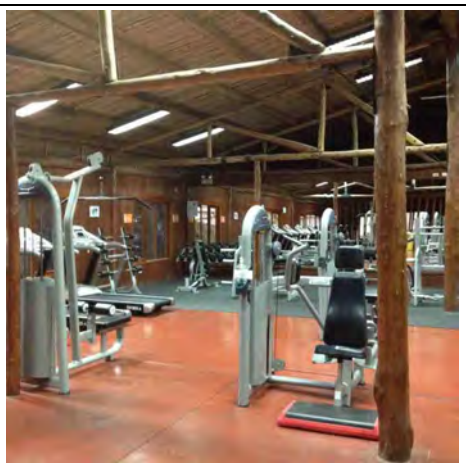
Photo 77: Football pitch, right bank camp	Photo 78: Gym, left bank camp

	
Photo 79: Kitchen facilities, all canteen facilities were observed to be clean and carefully managed to maintain food hygiene	Photo 80: Leisure facilities, right bank camp
	
Photo 81: Nursery seedlings	Photo 82: Tree seedling nursery
	
Photo 83: Armoured fish species found in Amazon tributaries	Photo 84: Chaetostoma specimens at the Ichthyology Laboratory

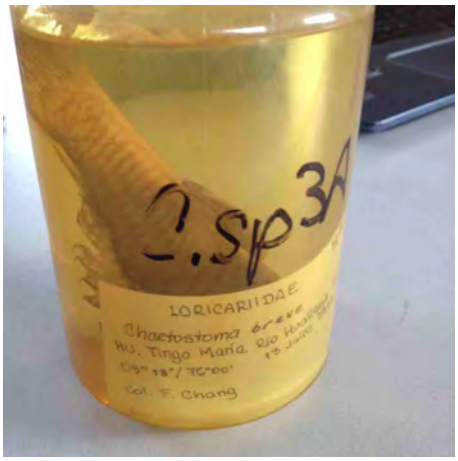	
Photo 85: Chaetostoma specimens at the Ichthyology Laboratory (2)	Photo 86: Chaetostoma specimens at the Ichthyology Laboratory (3)
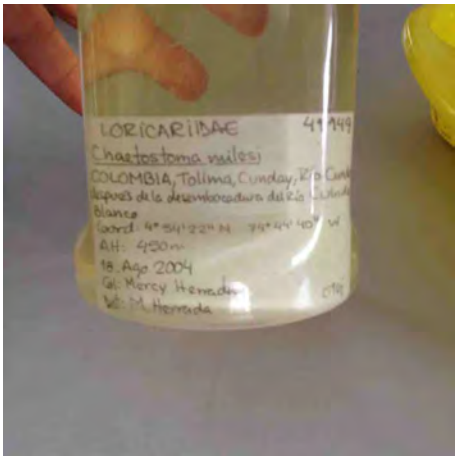	
Photo 87: Chaetostoma specimens at the Ichthyology Laboratory (4)	Photo 88: Chaetostoma specimens at the Ichthyology Laboratory (5)
	
Photo 89: Entrance to Tingo Maria National Park	Photo 90: Mallcutan tributary at its confluence with the Huallaga

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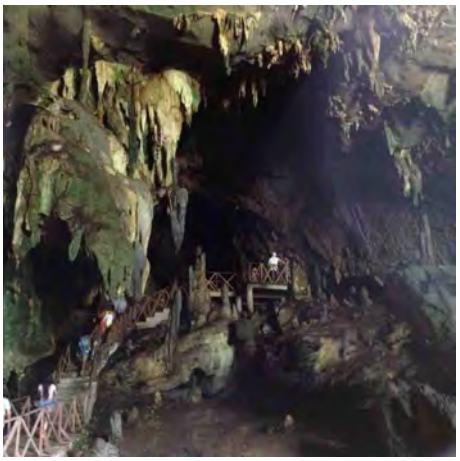
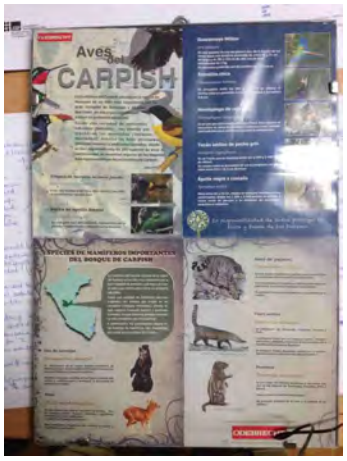
<tr><td>  </td><td>  </td></tr>
<tr><td>Photo 91: Manager of the nursery and orchidarium displays an example of an orchid</td><td>Photo 92: Oil-bird cave at Tingo Maria National Park</td></tr>
<tr><td>  </td><td> 
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<tr><td>Photo 93: Orchidarium</td><td>Photo 94: Poster to discourage wildlife collecting and hunting</td></tr>
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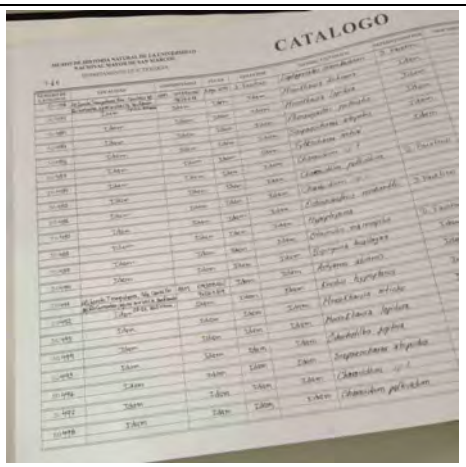
</td><td> 
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<tr><td>Photo 95: Ranger with notice board at TMNP</td><td>Photo 96: Records of samples at the Ichthyology Laboratory</td></tr>
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Photo 97: Samples at the University of Santa Maria Ichthyology Laboratory	Photo 98: Santa Clara tributary at its confluence with Huallaga
	
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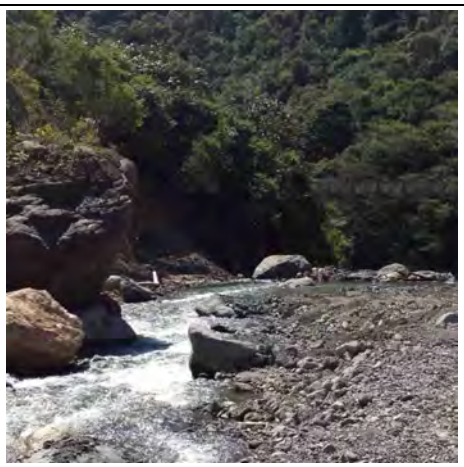
Photo 101: Strengthened riverbank at industrial plant	Photo 102: Example of a re-vegetated area

	
Photo 103: Example of an area undergoing re-vegetation	Photo 104: Example of an area undergoing rehabilitation and revegetation
	
Photo 105: Huallaga river at the point where spilling water will fall	Photo 106: Small concrete plant to be rehabilitated
	
Photo 107: Small concrete plant to be rehabilitated (2)	Photo 108: Lluto tributary at site of rock-fall from quarry, looking downstream

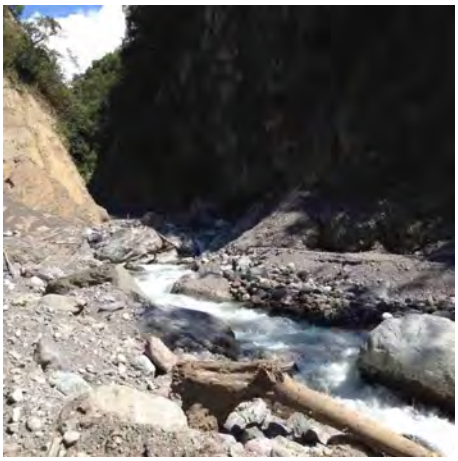


Photo 109: Lluto tributary at site of rock-fall from quarry, looking upstream

Photo 110: Discharges to Huallaga from Wastewater Treatment Plant, right bank

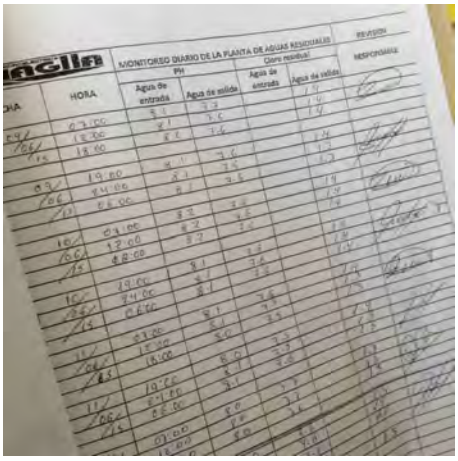


Photo 111: Monitoring form at Wastewater Treatment Plant, right bank

Photo 112: Ponds for the collection and settling of drainage water from tunnelling

Photo 113: Settling pond below cement batcher at industrial plant

Photo 114: Wastewater Treatment Plant, right bank
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Photo 119: Waste collection bins, made from re-used chemicals drums	Photo 120: Waste Management Centre

Photo 121: Waste Management Centre - blue drum storage

Photo 122: Waste Management Centre - poster depicting treatment of oil-contaminated water

Photo 123: Waste Management Centre - rubber storage

Photo 124: Waste Management Centre - storage of oil drums

Photo 125: Waste Management Centre - storage of oil-contaminated soils

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Photo 129: Huallaga River adjacent to Tingo Maria National Park	