



Netherlands Commission for  
Environmental Assessment

# Advisory Review of the Environmental and Social Impact Assessment of the Khudoni Hydropower Project

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Georgia



3 June 2013





Netherlands Commission for  
Environmental Assessment

Mrs Khatuna Gogoladze  
Minister of Environment

**your reference**

**your letter**

**our reference**

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*Date: April 2013*

*Subject: Advisory review of the draft ESIA – Khudoni hydropower project, Georgia*

Dear Mrs. Gogoladze,

In February 2013, you requested the Netherlands Commission for Environmental Assessment to review the draft Environmental and Social Impact Assessment (ESIA) for the Khudoni Hydropower Project. It is my pleasure to submit herewith our advice, prepared by an independent working group of the Commission.

I would like to draw your attention to the following issues:

- The Commission noticed that after 30 years of insecurity, the people of Khaisi are in need of clarity with regard to their future. I would like to suggest that you visit Khaisi together with the Minister of Energy, to inform the people about the position of the government.
- I would like to suggest to execute a social cost-benefit analysis for Khudoni HPP. This analysis will provide information to show the costs and benefits of the project from a public perspective. This could benefit you and other competent authorities greatly, in taking a well-informed and accountable decision.
- I would like to suggest that you, in cooperation with the Minister of Energy, execute a Strategic Environmental Assessment for the development of a National energy / hydro-power strategy in cooperation. This assessment will provide you with the opportunity to discuss the alternatives for energy supply in the public arena.

The Commission would appreciate to be kept informed of the way this advice will be used.

I would like to reiterate the willingness of the Commission to review the updated ESIA.

Yours sincerely,



Rudy Rabbinge

Chairman of the Working Group – Advisory review of the Environmental and Social Impact Assessment for Khudoni hydropower project, Georgia.

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# 1. INTRODUCTION

## 1.1 The project

### 1.1.1 The proposed project

The Khudoni Hydropower Project (Khudoni HPP, see map for location in figure 1) in Georgia is undertaken by Trans Electrica Georgia Ltd. In December 2009, a memorandum of understanding (MoU) was signed between Trans Electrica Ltd. and the Government of Georgia, represented by the Ministry of Energy, for the construction of Khudoni HPP on a build, own and operate (BOO) basis. An implementation agreement was signed between the Government of Georgia and Trans Electrica Ltd. on April 28, 2011 for further action, leading to the construction of the project on a BOO basis. The agreement proposes reserving the electricity produced during winter months for use in Georgia and freely trading excess electricity generated at other points of the year. After last year's elections a new government took office and started renegotiations on the MoU. This MoU was signed in May 2013.

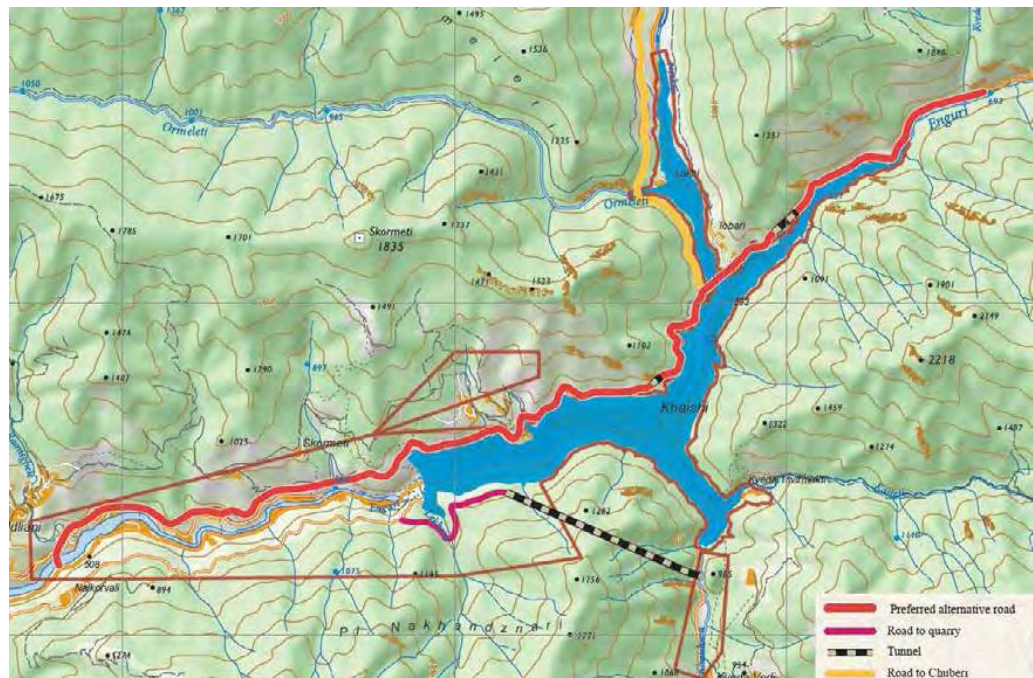


Figure 1: location of Khudoni dam, reservoir, diverted roads and the village of Khaishi

The project envisages a concrete 200.5 m high arch dam, 522 m long at the crest, with a flooded reservoir area of 528 ha and electricity generation capacity of 702 MW with an estimated annual generation of 1,500 million kW. The Zugdidi–Jvari–Mestia road, the only asphalted access road into the Svaneti valley, will be partially flooded; consequently a new 15 km road will be constructed along the new reservoir on the right bank of the Enguri Gorge. Furthermore, a 3.5 km access road to the village of Chuberi will be rebuilt at the right bank of the Nenskra tributary. In Khaishi and surrounding villages (256 households) will have to be resettled due to flooding.

### 1.1.2 History of the project

Khudoni HPP has a long history. Its implementation is part of the Cascade Master Plan on the Enguri River. During the Soviet period the Enguri Dam and Hydro Power Plant and Vardnili Cascade were developed and constructed. The first proposal for the Khudoni HPP was approved on the 31st of August 1978 by the United Ministry of Energy of the Soviet Union. The Project configuration was initially approved by the Tbilisi branch of 'Hydro Project' under the Soviet Union in 1984. This configuration comprised of a 200m high concrete arch dam, with an underground power house. The construction of this dam was suspended in 1989 after the collapse of the Soviet Union. The already finished components (buildings, river diversion tunnel and other tunnels, cofferdams, underground powerhouse, left abutment) have been left unfinished and either collapsed or are in a bad state.

The plan for the construction of Khudoni HPP has been revitalised in recent years. Its configuration based on the old soviet plans has undergone two reviews. The first was made by CORE INTERNATIONAL INC in 2005 and was in the form of Advisory Assistance to the Ministry of Energy of Georgia. The second review, by Stucky Colenco JV in 2007, was an initiative of the World Bank, who also provided a financial grant.

## 1.2 The ESIA and request for advice

On behalf of Trans Electrica Ltd., Caucasus Environmental NGO Network (CENN) has carried out an Environmental and Social Impact Assessment (ESIA) of the Khudoni HPP. The Association for Protection of Landowners' Rights (APLR) prepared the project's Resettlement Plan. The issues related to risk and safety were studied by experts assigned by Trans Electrica Ltd. In addition, a financial analysis related to the project's funding was carried out by Trans Electrica Ltd.

The internationally acknowledged purpose of ESIA is:

- To provide the Ministry of Environment with an overview of all the pros and cons of the project for the environment (e.g. biodiversity), society (e.g. people

affected, cultural heritage), and the national economy (private / societal costs and benefits).

- To inform and consult the public in a transparent and accountable manner.
- To secure public goods.

Based on this information and the response of civil society the ministry can decide on the environmental licence for the project and, if needed, set conditions.

The scope of the present ESIA study includes construction and operation of Khudoni HPP and a new section of Zugdidi-Jvari-Mestia road, including construction of the dam, arrangement of a water reservoir, selection of sites for quarries of inert materials, road construction to Chuberi village and resettlement.

The Netherlands Commission for Environmental Assessment<sup>1</sup> (hereafter called “the Commission”) received a request from the Minister of Environment Protection of Georgia dated 1 April 2013 (see Appendix 1), to review the Environmental and Social Impact Assessment (ESIA) for the Khudoni Hydropower Project (Khudoni HPP). The Commission was requested to base its review on international best practices for hydropower projects, including EU legislation and guidelines from the World Bank and the International Finance Corporation (IFC).

Apart from the review (i), the Commission was also asked to review the available information on economic costs and benefits (ii), to visit the proposed project site (iii), to arrange meetings with NGOs (iv), and to present preliminary findings at the end of the mission in Georgia (v).

A review panel under the Ministry of Environment Protection has already reviewed the draft ESIA from the perspective of Georgian legislation. The Commission considers this review of good quality, providing relevant and detailed comments from the perspective of rules and regulations applicable in Georgia. Because of the availability of this review and the request from the Ministry of Environment to base its review on international best practice, the Commission does in its advice not refer to Georgian legislation, such as the legislation on EIA.

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<sup>1</sup> The Netherlands Commission for Environmental Assessment is an independent advisory body, has a legal basis in the Netherlands and was established in 1985. For more information see: [www.eia.nl](http://www.eia.nl)



## 1.3 Approach followed by the Commission

### 1.3.1 Working group

This advice is prepared by a working group of experts of the Commission. The working group represents the Commission and comprises expertise in the following disciplines: geology and underground construction, hydrology and dam engineering, ecology and environment, resettlement and social/cultural heritage aspects, environmental and water resources economics, and EIA process. For the composition of the working group of experts, see Appendix 2.

For the preparation of this advice, the working group visited Georgia in the period 4 – 12 April 2013 (See Appendix 3 for the detailed programme). After an introduction day in Tbilisi, meeting representatives of the ministries of environment and energy, the EIA review panel under the Ministry of Environment Protection, the investor and a number of NGOs, a three day visit was undertaken to Upper Svaneti from 4 to 7 April. The entire Zugdidi – Mestia road was travelled starting from the downstream side at the existing Enguri Dam. The night and following day were spent at Khaishi and surrounding villages which according to the proposed project will be flooded. The visit covered inspections of the dam site and the proposed quarry area. A general impression of the reservoir area was gained, including the Khaishura and Nenskra tributaries. The visit continued upstream by car, along the Enguri river towards Mestia. Both in Khaishi and Mestia public meetings were held with local stakeholders and affected people. In addition, a number of households and individuals were interviewed in Khaishi and Tobari. During the field visit the working group was accompanied and supported by two Georgian resource persons: Ilia Chkheidze (geologist) and Nino Gazava (interpreter). Upon return in Tbilisi a meeting was attended with an independent EIA review panel, installed by the Green Movement of Georgia. Preliminary findings of the Commission were presented in a public meeting attended by approximately 70 interested people, followed by a press conference. The work of the Commission received extensive press coverage during the entire mission period.

A draft of this advice was discussed on 29 May with the Prime Minister, the Minister of Environment, the Minister of Energy, the dep. Minister of Economy, the dep. Minister of Finance, the Minister of Culture, dep. Minister of Infrastructure and a number of representatives from Svaneti. The draft advice was made public on the website of the Ministry of Environment in the Georgian language (on 29 May) and a draft of the report was presented during a public meeting that was attended by approximately 50 people and the national press.

The Commission would like to thank the Minister of Environment and her staff for their support and open attitude during the visits to Georgia in April and May.

### 1.3.2 Approach

Prior to the visit in April the experts have carried out a desk review of the ESIA, including the following documents:

- CENN (October, 2011). Khudoni Hydro Power Project (702 MW). Scoping document
- CENN (May 2012). Khudoni Hydro Power Project Environmental and Social Impact Assessment (ESIA) – Draft
- Id. Non-technical Summary
- Id. Appendix A. Stakeholder Engagement Plan

Even though the request was to review the ESIA for the Khudoni HPP, additional documents have been taken into account in order to get a more complete and comprehensive overview of the project. Additional documents included:

- Comments on the Khudoni Hydro Power Project Environmental and Social Impact Assessment (ESIA) Report (2012). EIA Review Commission of the Ministry of Environment Protection.
- The census and socio-economic assessment of the population living in area affected by Khudoni hydropower plant project. Final Report 2012. Institute of Social Researches.
- Resettlement Action Plan. Khudoni Hydropower Plant Construction Project. May 2012. Prepared by the Association for the Protection of Landowners' Rights.
- Project background documents prepared by the investor (Trans Electrica Ltd., Khudoni Hydro Power Project (702 MW) Detailed Project Report, Volumes I, II and III (Main Report, Cost Estimate, Drawings and Data), December 2010).
- Stucky-Colenco (Februari, 2013) Khudoni Hydropower Project. Geological Investigations and Services. New Geological Studies 2012 – 2013 (DRAFT executive summary only).
- Green Alternative (June, 2009). Risky deal, risky business. Khudoni Hydropower Plant, Georgia.
- Greens Movement of Georgia / Friends of the Earth – Georgia / The Independent Commission of Environmental Impact Assessment (not dated). Public con-

clusion on ESIA (preliminary version) of the Khudoni Hydro-power station project (702 MWT).

The investor is acknowledged for providing the Commission with the relevant background information related to the financial analysis underlying the project proposal. Citations from this document will be limited in order not to infringe on the confidentiality agreements under which these documents have been made available to the Commission.

As requested by the Minister of Environment of Georgia the review framework is based on international best practices. Best practices in this respect are represented by the IFC and World Bank Policy, Performance Standards, and Guidance, the Report of the World Commission on Dams, the Commission's experience with four HPP EIAs<sup>2</sup> and the professional judgement of experts in the working group.

Even though a scoping report has been made by the proponent, the Georgian legislation does not foresee in a formalised scoping procedure. Consequently, a publicly reviewed and formally adopted scoping document (serving as the terms of reference for the ESIA study) is not available as a formal reference for the Commission.

The ESIA is prepared for the Minister of Environment in order to take a decision on the provision of an environmental license to the project proponent. Therefore, the available information has been reviewed on the following aspects:

- Completeness of information: is all information that is needed for decision making available?
- Correctness of information: is the information scientifically valid?
- Relevance of information for decision making: does the information help in coming to a decision?
- Implications for environmental decision-making: do gaps or weaknesses in available information lead to possible flaws in the decision making process?
- Remedial measures: recommendations on how to remedy the observed gaps in information.

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<sup>2</sup> Ghazi-Barotha (Pakistan), Bujagali (Uganda), Nam Theun II (Lao), Mem'vele (Cameroon).



## 2. MAIN CONCLUSIONS AND RECOMMENDATIONS

Main conclusion: The Commission has concluded that the Ministry of Environment cannot yet take a decision on the Khudoni HPP, as essential information is lacking in the ESIA. To remedy the observed shortcomings, additional activities are necessary. Conclusions and recommendations are summarised around the following main issues:

1. Social issues related to compensation, resettlement and cultural heritage;
2. Sediment load of the river and geo-hazards in relation to useful reservoir life;
3. Seismic risk;
4. Broader costs and benefits for Georgia;
5. Other issues.

More elaborate information and recommendations are provided in the following chapters 3 to 8.

### 2.1 Social issues related to compensation, resettlement and cultural heritage

The communication with potentially affected people of the Khaishi community as well as the inhabitants of the upper Svaneti region has been incomplete and not transparent. Flaws in procedures for resettlement planning and lack of information has resulted in significant distrust of the population in government and investor. The current situation therefore represents a high risk to the development of the project and is a potential source of conflict and obstruction to the project.

After decades of uncertainty, the Khaishi population wants clarity on their fate. On several occasions during the site visit representatives of the population in Svaneti have expressed the expectation that the newly elected government will provide transparency on the future of the region. A window of opportunity thus exists, if timely and appropriate measures are taken to de-escalate the present situation. To address these issues the Commission recommends the following:

- The investor needs to develop a communication and consultation strategy to address the issue of mistrust at the community and household levels. Timely disclosure of information on project plans, anticipated impacts and proposed

mitigation and compensation measures should be prepared by both the investor and the government.

- In addition, the ministries of environment and energy should show their intention to assure transparency and accountability concerning the communication and decision-making processes.
- In order to comply with international best practice, all necessary information has to be collected to produce a full-fledged Resettlement Policy Framework as a necessary first step to the required Resettlement Action Plan. The completed Resettlement Policy Framework should be part of the Environmental and Social Management Plan, included in the ESIA. The Resettlement Action Plan needs to be linked to the starting date of construction.
- The Commission recognises that according to international standards and good practice the group of people living in Svaneti, the Svans, may likely belong to a unique ethnic group and, if so, will need to be treated accordingly. There is need for a cultural authority (e.g., the Ministry of Culture) to address this issue.
- Further recommendations on improvement and completion of the ESIA refer to unequivocal definition of the project's area of influence, impacts levels, direct and indirect affected areas and villages.
- The context of historic issues needs to be studied as part of the social baseline. The ESIA should suggest ways of dealing with pending and conflict triggering issues.
- With respect to cultural heritage the Commission recommends to make a detailed description of all the cultural heritage sites and their precise location. A cultural heritage plan has to be outlined which begins with communication with the affected people, municipality, and authorities, and includes agreements of how safeguards are to be implemented.
- Given the complexity of these matters the investor is advised to hire an internationally experienced expert in RAP development to guide the process. Furthermore, an Advisory Group may be considered to overview the process and check the fulfilment of the core issues.

Time required: Time requirements for the implementation of a communication plan is very difficult to estimate. To regain trust of the affected people, full transparency is needed. Furthermore, significant time should be invested in an inventory of all concerns among affected people, and in addressing each of these concerns with appropriate information and where needed additional research. Once a communication chan-

nel and a minimal level of trust have been established, the following steps are easier to project.

A Resettlement Policy Framework (RPF) including survey, census and inventory can be made in six months and should be available in the final ESIA. Development and implementation of a resettlement action plan (RAP) will cost up to a year, but is not dependent on the environmental license. The RAP should be implemented before the start of construction. Time requirements depend on the number and experience of staff, and outcome of deliberations with affected people.

## 2.2 Sediment load and geo-hazards in relation to useful reservoir life

The estimated volumes of sediments of the Enguri River at the Khaishi hydrological post are based on sediment measurements from 1966 to 1986. The report states that 95 years will be needed to fill the dead-storage of the reservoir with average inflow of sediments, but also provides evidence of a highly fluctuating sediment load. The Commission has observed that the existing Enguri reservoir is filling up at a much higher rate; the Enguri river and several tributaries carry maximum loads of sediments from upstream areas. This can most probably be attributed to road construction. If the required reconstruction of approximately 20 km of roads along the planned reservoir is carried out similar to the recent upstream road improvement, the problem will be aggravated. Furthermore, the risk of landslides around the reservoir appears to be significant. All of this may result in an unacceptably short lifetime of the reservoir, given the severe social and environmental consequences of the project. There is a need for better information on sediment load of the Enguri River. As a consequence of high sediment load it might be necessary to adapt the design of the dam in such a way that it will be possible to flush sediments from the reservoir.

### Recommendations:

1. The Commission recommends to measure the sediment load of the Enguri at Khaishi during at least one (hydrological) year. Also, we recommend to measure the rate of sedimentation in the existing Enguri Reservoir. Based on these data, the lifetime of the reservoir can be estimated. Furthermore, these data may guide towards the redesign of the river diversion tunnel for future sediment flushing. This would extend the lifetime of the Khudoni reservoir and the operational lifetime of the dam.
2. The Commission recommends the ESIA to include field investigations to identify potential landslides and rock falls, a stability analysis, and the development of mitigation measures for unstable slopes to avoid landslides and rock falls into the reservoir area.



3. To reduce the impacts of erosion and increased sedimentation in the reservoir the Commission strongly recommends to change the design of new roads by-passing the reservoir in such a way that these problems are mitigated. The use of retaining walls and road side drainage are two possible anti-erosion measures. The same applies to the recently constructed roads in the upper Svaneti valley. The redesign of the 20 km new roads along the reservoir would be the responsibility of the investor. For the upstream road towards Mestia this responsibility would be with the Roads Department.

Time required: sediment measurements will have to cover at least one hydrological year covering all seasons to have a minimally reliable picture of sediment transport in the river toward the dam site.

## 2.3 Seismic risk

The proposed Khudoni HPP is located in an active seismic area. Active faults are identified in the vicinity of the scheme, and earthquakes with magnitudes from 5 to 7 have been recorded. The Commission concludes that the design criteria are according to international standards and recommendations. According to the investor, the project is under redesign and will be designed according to the seismic criteria given.

It is understood that under Georgian legislation the review of the design is part of the procedure to obtain a Construction Permit from the Ministry of Economy. Yet, in the light of the public debate about the risks of such a big dam in an earthquake-prone area, the Commission recommends to have an independent and publicly available expert review of the updated dam design.

Given the bad state of repair of the existing infrastructure and the high potential risk of land slides in the reservoir area, as part of the ESIA, the Commission also recommends a complete risk assessment for the Khudoni HPP related to potential geo-hazards, i.e. seismic risk, erosion and stability of natural slopes in the reservoir area, and stability of the dam foundation. Through a risk assessment, the potential risks (probability and consequences), are identified, ranked and a list of priorities can be made. Mitigation measures should be developed until acceptable levels of risk are obtained.

Furthermore, the Commission recommends that the effect of sudden failure of the Khudoni dam is recalculated in such a manner that the impact on the existing Enguri dam is clarified. The results shall be incorporated in the ESIA.

Time required: According to information provided by the investor, the redesign is virtually ready for review. An additional risk assessment can be finalised in one or two months.

## 2.4 Broader costs and benefits for Georgia

The existing analysis is a financial analysis from the investor's perspective. An analysis of the societal costs and benefits at national level is not available. The project involves more than just private costs and benefits. Important broader, public economic interests such as loss of property and livelihood, resettlement, environmental degradation, loss of flora and fauna, and the effects of the project on national energy supply and demand are largely ignored. On a smaller scale, the potential benefits of operating two dams on the Enguri river in conjunction is ignored.

Recommendations:

In order to get a proper overview of the costs and benefits of the Khudoni HPP the ESIA has to provide an overview of the potential advantages of operating the Khudoni and Enguri dam in conjunction.

Taking into consideration the scale of the project and its expected social, economic and environmental impacts, in addition, a financial analysis of the project's profitability to the investor, a supplementary extended social cost-benefit analysis is typically recommended in order to get insight into the costs and benefits of the project for Georgia. Such an analysis should answer the following questions:

- Is the project beneficial to the country as a whole? By how much?
- Who benefits and who loses? By how much?
- How will those who lose (land, property, livelihood, cultural heritage) be compensated? By how much?
- How will benefits be shared?
- Is this the most inexpensive way to generate additional energy capacity in Georgia?

Time required: an SCBA can be carried out in three to five months, depending on availability of data and expertise.

## 2.5 Other issues

**Compensation of biodiversity loss:** To compensate the loss of flora and fauna in the project area the report suggest to improve degraded forest around the reservoir. Given the high risk of erosion on the steep slopes surrounding the reservoir, the Commission advises against this and alternatively compensate biodiversity loss according to international best practice. Given the unique and coherent identity of upper Svaneti, it would be appropriate to look for the most valuable biodiversity hot spot areas in the entire valley. These areas should be turned into protected areas and thus will be preserved for the future. A combination with preservation of the cultural heritage of the valley is recommended, also with an eye to the economic potential (tourism) of such measures.

**Alternatives:** The ESIA is seriously flawed in providing information on alternatives. Part of this is explained by the history of the project and choices being made in the past. Nevertheless, the ESIA has to be understandable as a stand-alone document and should therefore minimally contain a summarising table allowing for a comparative analysis between all studied alternatives, and provide a reasoning behind the choice for the presently preferred alternative. The information should encompass technical design considerations and the environmental, social and economic impacts.

**Waste management plan:** A waste dump for 7 million m<sup>3</sup> of solid waste is proposed in the Khaishura Gorge. Because of the magnitude of this dump site the location of the Khaishura Gorge waste dump needs to be described in detail, including an assessment of its impact on landscape, ecology, erosion and sediment dynamics and human habitation. Appropriate monitoring and mitigation measures need to be described. Preferably, the announced waste management plan should be part of the environmental management plan (EMP) and be available prior to decision making.

**Neglected traffic movements:** Movements of heavy traffic from the lowlands into the Enguri Valley have been neglected. As this narrow and winding road is the only access road for the entire region of Upper Svaneti, the Commission recommends to provide quantitative information on traffic movements between Zugdidi and Khudoni HPP, assess the accident risk along the entire stretch, and provide a traffic circulation plan with maximum size and loads of trucks, a check on the availability of salvage equipment, and a calamity action plan.

## 2.6 Final remark:

Following a methodology provided by the World Bank, the Commission made its own comparison of Kudoni HPP with 49 other large dams around the world, based on 13 key indicators. Based on this comparison the Commission concludes that if the above issues are addressed and where necessary mitigated in an appropriate manner, the ratio between environmental- and social impacts on the one hand and generated power on the other hand is relatively favourable for Khudoni HPP. Furthermore, the Khudoni HPP could act as a driver of regional conservation and development if compensation measures for loss of biodiversity and cultural heritage are implemented according to international best practice.

### 3. PROJECT JUSTIFICATION

The Commission noticed that the ESIA does not provide sufficient arguments for the justification of the project. It is not possible to verify why the project is needed from a national energy demand and supply point of view, why hydropower is selected as the source of energy, and why the hydropower dam should be located in the Enguri basin. The only formal reference is the cascade plan from the Soviet period; the status of this old plan is unclear.

The verification for such large hydropower projects should be based on:

- a national policy on energy, preferably supported by a strategic environmental assessment (SEA), typically providing an overview of present and expected future social and economic development, the resulting development in energy demand, an inventory of power generation potential of the country, alternative options to meet the future energy demand based on different sources of energy (fuel mix), the desired level of self-sufficiency etc.
- an integrated water resources (or river basin) management plan for the Enguri River, also supported by an SEA, describing the available water resources, its present users and uses, its development potential based on, for example, an ecosystem services assessment, and identification of sites of unique natural or cultural heritage in need of protection.

Due to the absence of such policies or plans (and related SEAs) a proper justification of the project is not possible. The Commission realises this is a government responsibility and not a responsibility of the proponent of the Khudoni HPP. Therefore, this argument has no bearings on the review of the ESIA.

Recommendation: The Commission recommends the government of Georgia for the medium and long term to create a national energy policy with emphasis on present and future economic development and growth in energy demand, identification of the preferred fuel mix, and identification of locations where energy options can be realised. Preferably, such a policy document is supported by a Strategic Environmental Assessment to weigh alternative fuel mixes and locations for power generation against environmental, social and economic aspects. Given the present pressure on water resources and the urgency for decision making, for the short term, the Commission recommends to develop a national hydropower policy or plan supported by an SEA for site selection and setting of environmental and social conditions.

## 4. BASELINE

### 4.1 Hydrology and sediment transport

The ESIA report (page 187) describes how data from multi-year observations of the Khaishi hydrological post are used for the determination of average annual discharges of the Enguri River. The mentioned data cover 45 years (1938–40, 1942–45, 1947, 1949–55, 1957–1986). During this period, the average annual discharges of the Enguri at the section of the Khaishi hydrological post are shown in Table 1.

*Table 1. River discharge of the Enguri at Kaishi for an average year.*

	Jan	Febr	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Year
M <sup>3</sup> /s	27.4	24.9	33.9	100	190	244	250	181	97.3	64.8	47.3	34.6	108
M <sup>3</sup> .10 <sup>6</sup>	72.8	60.2	90.8	259	509	633	670	488	252	174	123	92.7	3421

The table shows that in an average water year (50% probability) the annual discharge of the Enguri River is 3,421,500,000 m<sup>3</sup>/year. With a useful storage of the proposed reservoir of 223,000,000 m<sup>3</sup>, the river flow is thus sufficient to refill the Khudoni reservoir about 15 times per year. During the short refreshing period, the water quality in the reservoir will remain the same as the quality of the river water. Water quality problems in the reservoir, such as stratification and eutrophication are not likely.

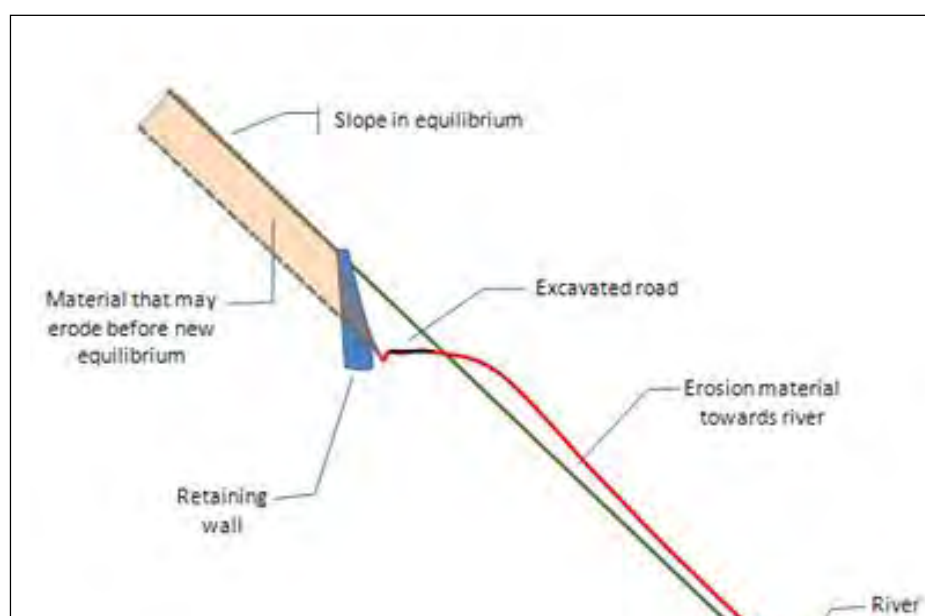
The volumes of suspended load and bed load (solid discharges) of the Enguri River at the Khaishi hydrological post are based on sediment measurements from 1966 to 1986. According to these data (p. 180), the solid discharges of the Enguri varied from 1.6 kg/sec (1969) to 97 kg/sec (1978), i.e. the maximum load is over 40 times higher than the minimal. The ESIA report states (page 192) that with a “*solid discharge of 10,000 years repeat interval (0.01%) about 20 years will be needed to fill the dead storage of the water reservoir (which equals 140 m<sup>3</sup>.10<sup>6</sup>) and about 95 years in case of permanent discharge of 2 years repeat interval*” (average inflow). Furthermore, the report states (p. 1919) that “*the methods for determining lower levels of solid sediments are not well developed due to the imperfectness of the existing measuring equipment and the complex nature of the movement of sediments*”.

It also states: “*As in the case of the existing Enguri (Ivari) water reservoir, the volumes of solid materials transported by dry ravines and generated as a result of abrasion of river banks will not be large since above full reservoir level, the slopes of the river are*

*covered by forests supporting the stability of the river banks. Moreover, no significant mudflow streams contribute soil to the reservoir."*

The Commission concludes that variability and uncertainty of sediment loads in the Enguri is significant. Furthermore, the Commission observes that sediment supply into the Enguri Reservoir may have increased significantly in the recent past and present, compared to the above mentioned period of sediment measurements (1966 to 1986). Reasons for this are:

- During the site visit of 6 March 2013, the manager of the Enguri Dam showed that sediments have filled the reservoir up to the lower spillway level, indicating that the dead storage of the Enguri reservoir is filled up in only 35 years of operation (since 1978).
- The Commission observed during the site visit of 6 March 2013 that the Enguri River carries a heavier sediment load than anticipated in the ESIA. According to the ESIA only the Khaishura tributary is characterised by mudflows accumulating large quantities of solid materials. However, during the site visit the Commission observed that the Enguri River carried higher sediment loads than the Khaishura River, probably up to its maximum transport capacity.
- The supply of sediment into the Enguri River is, to a great extent, due to recent road construction activities upstream of the proposed reservoir. Most erosion material either results from initial road excavation or from road-



*Figure 2: Schematic representation of causes of current erosion due to new road and position of recommended retaining wall.*



cleaning from soil and rocks falling from the instable slope above the road. Additional (and advancing) erosion is triggered by insufficient road drainage. Water accumulating in the road foundation causes instability, resulting in longitudinal cracks in the newly constructed road and subsequent landslides. Major parts of the valley slopes of the Enguri River seem just to be in equilibrium. Disturbance of this equilibrium by road excavation firstly resulted in rolling down of excavated material. Thereafter, the instable part of the slope above the road starts slipping, leading to frequent “road cleaning” whereby more sediment is moved down-slope. As observed, resulting sediments fall into the river (see figure 2). All these processes have been observed along the road to Mestia.

Recommendation: The Commission recommends to measure the sediment load of the Enguri River at Khaishi during at least one (hydrological) year. The Commission also recommends to measure the rate of sedimentation in the existing downstream Enguri Reservoir. Based on these data, the lifetime of the Khudoni Reservoir can be estimated. Further, these data may guide towards the redesign of the river diversion tunnel for future sediment flushing. This would extend the lifetime of the Khudoni Reservoir and the operational lifetime of the dam. However, since the Khudoni dam will under this design pass on a large proportion of its sediments to the downstream Enguri Reservoir, the expected reduction of sedimentation in the Enguri Reservoir will be less than anticipated<sup>3</sup>.

Recommendation: To reduce the environmental impact of recently constructed roads in the upper Svaneti Valley, the Commission recommends to design and build retaining walls along all instable slopes. Furthermore, road drainage should be installed in such a way that ponding of water is avoided in between the road and the upper slope. The redesign of the 20 km new roads along the reservoir would be the responsibility of the investor. For the upstream road towards Mestia this responsibility would be with the Roads Department.

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<sup>3</sup> A solution for the sediment problems in the Enguri Reservoir probably has to be found in dredging and pumping of sediments to the Black Sea coast where the reduced supply of sediments may over the last 35 years have created coastal erosion problems (not verified by the Commission).

## 4.2 Areas and settlements potentially influenced by the project

International good practice requires the defining of impact areas for use in the ESIA. The ESIA refers to various terms: ‘Area of Influence’ (page 30 & 377), ‘Project Area’ (p. 378 and beyond), and ‘around the project area’ (page 379). In addition the section 5.2 on Baseline Socioeconomic Conditions states that the area of influence covers ‘the village Khaishi and its adjacent areas’ (see also Appendix 4). Furthermore, the Stakeholder Management Plan lists three categories of impacted settlements, without providing clarity on who is affected in what manner, and to what extent.

The terminology used is unclear and no maps are provided to illustrate the impacted areas with respect to the project works. Given that the areas of project impacts are unclear, the issue of direct and indirect influence (first, second and third degree impacts) remains diffuse in the ESIA<sup>4</sup>. From the ESIA the reader cannot conclude who will be affected, in what manner, and where. This is of particular relevance in relation to the proposal of mitigation measures. The detailing of the term ‘Area of Influence’ and maps to delineate the areas of influence should be included in the ESIA. (Recognise that for each (category of) impact(s) the area of influence may be different).

**Recommendation:** The Commission recommends that the project’s area of influence is defined (i.e., project area, area of influence; direct and indirect impacts) and that the terminology is to be used consistently and uniformly in the ESIA.

Similar to the area of influence, also the numbers of households and names of villages are not precisely presented (see Appendix 4). No explanation is provided for why the villages are grouped as such (e.g., Khaishi Villages). It is not clear whether groups of villages experiences similar type or level of impacts. A stakeholder reading the document will not understand why numbers or names are missing or added/removed on at later stages.

The Commission noticed that a separate census and inventory was completed on March 13, 2012. This study included data from 184 directly affected households subject to resettlement. The ESIA cites these data (e.g., on page 379). The ESIA, in addition, states that physical resettlement of 256 households in 4 villages would have “a long-term and irreversible negative impact” (page 379). There is an obvious mismatch between ESIA and census with regard to the number of affected households. The ESIA does not provide precise baseline data on affected households, and is thus unable to address precise impacts and mitigation.

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<sup>4</sup> See IFC. 2012. Performance Standard 1 and Guidance Note 1 (GN14. No.8) (see also [www.worldbank.org/policies/guidance](http://www.worldbank.org/policies/guidance), World Bank Group; IFC good practice notes).

The ESIA does not provide information on the dependence of affected households on land and natural resources and/or government assistance. A great deal of the baseline is based on health at the municipality level (almost all secondary data), with little presented on agriculture, tourism, forestry, ecosystem services dependence, water use, etc.

Recommendation: The Commission concludes that the social baseline is seriously flawed and recommends that direct and indirect affected areas and villages are characterised by a baseline which includes demographic and socio-economic-cultural details. The baseline should also include information on:

- demography of the population in the affected villages, including in- and out-migration, and seasonality in migration;
- income/wage levels, the range of contributions to livelihoods, and economic vulnerability;
- health of the affected people;
- livelihood security and coping mechanisms, livelihood improvement needs/expectations;
- where relevant differentiation to gender aspects and identification of vulnerable groups;
- dependency on land, water and ecosystems;
- community based organisations and local institutions;
- cultural identity, social structures and status, kinship, social cohesion and networks;
- mobility and cultural / socio-economic linkages between project affected villages and with the outside world;
- political and social conflict issues;
- cultural practices of the communities (particularly the Svans);
- preferences of affected people for relocation sites and compensation.

The focus of the baseline must be on the directly and indirectly affected communities and households and should not be confused on data from administrative levels beyond the area of impact (e.g. at the level of Mestia municipality). These data would form the base for the resettlement policy and basic description for the resettlement action plan.

### 4.3 Legacy issues and challenges

The project has a history dating back to Soviet times when a start was made with the preparation of the dam site. It is unclear what arrangements have been made with inhabitants and land owners in those days. Stories exist about people that had already been resettled, but returned after the dam construction was brought to a halt. Furthermore it is understood that the present investor has been granted land entitlement for some 1500 ha of land for a symbolic amount of US \$ 1,-. Inhabitants state that people still have claims on this land. None of these legacy issues have been treated in the ESIA while they definitely have an impact on views and opinions of the inhabitants of the project area and beyond.

Recommendation: The context of historic issues needs to be studied as part of the social baseline in the ESIA. The ESIA should suggest ways of dealing with pending and conflict triggering issues.

### 4.4 The Svans as minority nationality

The ESIA presents arguments for the non-qualification of the Svan people of Khaishi villages as 'Indigenous Peoples', mainly based on their non-affiliation with the more remotely located Svans (upstream) and their closer ties to non-Svan areas in the south (downstream). The World Bank Group uses the term "indigenous people" in a generic sense and clearly states that there is no universal accepted definition. People may be referred to differently across countries by such terms as "indigenous ethnic minorities," "aboriginals," "hill tribes," "minority nationalities," "tribal groups", just to mention some. It is also noticed that part of Svaneti (not in the project area of influence) has been nominated for inclusion in the UNESCO Cultural Heritage site list.

The Svan people living in Khaishi Village fit a number of characteristics, including:

- Self-identification as members of a distinct cultural group, the identity also being recognised by others;
- Collective attachment to a geographically distinct area affected by the project;
- A unique and distinct language, culturally identifying the Svans;
- Customary cultural practices, days and events that are separate from others;
- Social/family ties between Khaishi and surrounding project affected villages around and other villages in upper Svaneti appear to exist, although their significance requires more study.

The above characteristics can easily classify the Svan people as a unique community which may be referred to as an “ethnic nationality” group. The Svan people living in Khaishi cannot be separated out as not having an ethnic identity based on the arguments outlined in the ESIA. This matter may best be considered by the responsible authorities (e.g., Ministry of Culture).

Recommendation: The Commission recognises that according to international standards and good practice the group of people, the Svans, may likely belong to a unique ethnic group and, if so, will need to be treated accordingly. There is need for a cultural authority (e.g., the Ministry of Culture) to address this issue. The Commission points out that communication planning and mitigation measures will need to be addressed based on the ethnic status of the affected people.

## 5. PROJECT DESIGN

### 5.1 Technical design

Soil and bedrock in the area are briefly described in the ESIA report. The bedrock in the area is mainly metamorphic rock of sedimentary and volcanic origin from the Upper Paleozoic to Middle Jurassic period, partly weathered and covered by Quaternary deposits, mainly sand and gravel. The geology is in general described as complex.

The major geo-related hazards of the proposed Khudoni HPP are:

#### **Seismic risk**

The proposed Khudoni HPP is located in an active seismic area. Active faults are identified in the vicinity of the scheme, and earthquakes with magnitudes from 5 to 7 have been recorded. Seismic activity may be induced due to the reservoir regulations. In the ESIA study, the area of Khudoni HPP is classified as 9 according to the Richter scale. The selected design parameters are peak ground acceleration  $PGA=0,34g$ , maximum credible earthquake  $MCE=0,36g$  and operating basis earthquake  $OBE$  of  $0,16g$ .

Conclusion and recommendation: The Commission concludes that the design criteria are according to international standards. According to the investor, the project is under redesign and will be designed according to the seismic criteria given. It is understood that under Georgian legislation the review of the design is part of the procedure to obtain a Construction Permit from the Ministry of Economy. Yet, in the light of the public debate about the risks of such a big dam in an earthquake-prone area, the Commission recommends to have an independent and publicly available expert review of the updated dam design, included in the final ESIA.

#### **Erosion and stability of natural slopes in the reservoir area (and upstream)**

The Khudoni HPP reservoir area is located in a mountainous area with steep slopes. The bedrock is to a large extent covered with soil, outcropping rock is weathered and jointed. During the site visit several erosion scars, rock falls and landslides were observed both in the proposed reservoir area and in the area upstream of the reservoir. During regulation of the reservoir, landslides and rock falls will occur along the valley sides, creating scars in the terrain, contributing to sedimentation in the river and the reservoir itself if mitigation measures are not developed and implemented. There is also a certain risk of flood waves from potential landslides, overtopping the dam with a potential risk of damages to vital structures and the downstream area. The ESIA report does not mention the particular geo hazard of slope stability in the reservoir area.

**Recommendation:** The Commission recommends the ESIA to include field investigations to identify potential landslides and rock falls, a stability analysis, and the development of mitigation measures for unstable slopes to avoid landslides and rock falls into the reservoir area.

#### **Stability of dam foundation**

Parts of the dam foundation, tunnels and underground caverns were excavated in the 1980's. The tunnels are partly lined with concrete. Due to poor rock quality and soil overburden at the left dam abutment, the soil and rock is replaced by a gravity concrete structure to secure the stability of the concrete arch dam. The concrete gravity structure is partly constructed. Cofferdams were constructed in the 1980's and the diversion tunnel has been in operation. The cofferdams have, however, recently been overtopped and washed away. As a result the intake and outlet structures of the diversion tunnel were damaged. Today, the river follows the original riverbed. The excavated tunnels and their concrete structures (portals and lining), are partly in poor condition. Demolishing, removal and rehabilitation of structures, tunnels, underground constructions and their lining and support are considered to be necessary.

Apart from the ESIA, additional geotechnical investigations have been made at the dam site according to recommendations from the World Bank's Panel of Experts. Only a draft Executive Summary of the report was available to the Commission. From the summary it appears that these additional investigations are in line with the recommendations from the World Bank's Panel of Experts.

**Recommendation:** The Commission recommends a redesign and upgrading of the design and feasibility study of the Khudoni HPP in accordance with the available updated and new geological information (Stucky-Colenco, in prep). An independent review of the updated reports with investigations, test results and stability analysis is recommended.

**Overall recommendation on geo-hazards:** As part of the ESIA, the Commission recommends a complete risk assessment for the Khudoni HPP related to potential geo-hazards. By means of a risk assessment, the potential risks (probability and consequences), are identified, ranked and a list of priorities can be made. Mitigation measures should be developed until acceptable levels of risk are obtained.

With regard to dam failure, Chapter 7 of the ESIA states: "The parameters of dam-break wave and inundation zones downstream of the dam have been determined." However, no information is presented on the this wave and on the effect of the worst wave on the stability of the downstream Enguri dam.

**Recommendation:** The Commission recommends that the effect of sudden failure of the Khudoni Dam (worst case scenario) will be recalculated in such a manner that the



impact on the Enguri Dam (and possible downstream effects) will be described and made visible by a map. The results shall be incorporated in the ESIA.

## 5.2 Communication

Communication is a cornerstone of good ESIA. A well-informed public is capable to express opinions and concerns about a proposed project which ESIA is supposed to address. Best practice therefore recommends that affected people be informed of project plans, anticipated impacts, and time-lines.

In addition, communication during the ESIA process should also provide clarity in the case of misunderstandings among stakeholders and address their expectations and concerns. The ESIA does not address these issues adequately and there is little documentation of a communication process and disclosure of information. There are a number of key issues that have led to mistrust in both investor and government and that need to be addressed:

- Legacy aspect: historical aspects of the project need to be clarified (ownership, responsibility and compensation) (see section 4.3);
- Census and inventory: during the household survey people have not been informed on the purpose of the data collection;
- Churches and cemeteries: the local priest and community are uninformed of the information provided by the ESIA on the existing agreements with regard to churches and cemeteries, and in particular the implications this will have with regard to moving them elsewhere;
- Cultural heritage: handling and agreements have to be further detailed;
- Cultural Identity: recognition and respect for the Svan identity and culture (see section 4.4);
- Compensation: affected people have a complete lack of knowledge on compensation packages;
- Lack of government involvement and clarity in decision making;
- Lack of clarity and involvement by the investor.

The current situation is seen as a high social risk to the development of the project, which can lead to an escalating conflict situation.

Recommendation: The Commission therefore recommends a consultation and communication strategy to be developed and implemented by the investor to address the issue of mistrust and concerns among stakeholders. The strategy should be directed to both the community and household levels. Timely disclosure of information with regard to project plans, anticipated impacts and proposed mitigation and compensation measures should be done both by the investor and the government.

## 6. ALTERNATIVES

### 6.1 History of alternatives

It is understood that a great amount of historical information is available on the project. Alternatives have been studied in the past and choices have been made, based on arguments which may not always be clear now. Therefore, the Commission argues that a more comprehensive description and comparison of alternatives is necessary in the ESIA to be able to understand the choices that have been made.

Recommendation: The ESIA has to be understandable as a stand alone document and should therefore minimally contain a summarising table allowing for a comparative analysis between all studied alternatives, and provide a reasoning behind the choice for the presently preferred alternative. The information should encompass technical design considerations and the environmental, social and economic impacts.

### 6.2 Engineering perspective

As described in the ESIA, the Project configuration has subsequently undergone 2 reviews. The first was made by Core International Inc in 2005 and was USAID funded advisory assistance to the Ministry of Energy of Georgia. The second review, by Stucky Colenco joint venture in 2007, was an initiative of the World Bank.

- Core International Inc (USAID)

The Council of Ministers of Georgia commissioned two different groups of specialists to study all possible uses of the Enguri River's energy potential between elevations 510m (the highest level of the Enguri Reservoir) and 700m above mean sea level of the river. Based on this study, a revision of the initial version of Khudoni HPP project was carried out by TbilHydroproject in 1990–92. Preference was given to a two-step version, consisting of the construction of a 55MW Khaishi HPP (at 522m elevation) and the 638 MW Khudoni HPP (with max pond level of 670m). The Khudoni HPP was redesigned with calculated earthquake resistance increased from Richter 8 to Richter 9, and dam height decreased from 200m to 170m above river bed level.

- Stucky Colenco JV

In 2007, the Swiss Joint Venture Stucky Colenco carried out an extensive feasibility study for the Khudoni Project. In parallel, a 5-member panel of experts (World Bank) worked within the framework of the project. The concept of the dam was revised as an arch-gravity dam, to facilitate a geological fault in the dam's foundation. The elevation of the plant lower pool was estimated to be 515m with a full storage level at 700m above mean sea level. The dam's crest was planned at an elevation of 702m, the length of dam crest was 522m. Subsequent reviews and deliberations carried out by Stucky Colenco have concluded that by and large the original concept of Khudoni HPP (the works on which had been started in 1972) remains the best option.

Conclusion: In spite of the lack of a proper description and elaboration of the available alternatives in the ESIA, based on the available evidence, the Commission considers the proposed dam site and dam height well justified from an engineering point of view.

### 6.3 Economic perspective

The ESIA refers to the use of three economic evaluation criteria (ESIA, p. 16) to evaluate 4 project alternatives (ESIA, p.13): the existing Khudoni site and 4 other upstream locations, referred to as Khaishi site 1, 2 and 3. The economic criteria are the investment costs, the internal rate of return on the investment and the net present value of the investment. These are standard criteria in cost-benefit analysis (CBA). If multiple alternatives are involved, the projects' benefit-cost ratio can also be used to evaluate the alternatives. For the project owner, usually the project pay-back period would be another important criterion.

Based on these 3 indicators, the Khudoni site is 'the best performing' (ESIA, p.16). Remarkable is that no information is provided in the ESIA about the scores of all 4 alternatives on these economic criteria. It is only concluded that the Khudoni site is the cheapest option. Moreover, no information is provided about the expected benefits of the project. The report mentions the fact that already USD 178 million has been invested in the existing Khudoni site in the past, which 'will be lost should any other site be developed' (ESIA, p.16). The report also mentions that the Khudoni site is cheapest in terms of cost per kW installed, varying between USD 1,000 and 3,500 per kW. It is unclear what the basis is for this relatively broad range of cost values. Comparing this range with existing reviews in the literature such as those presented in the cost analysis of the hydropower sector by the International Renewable Energy Agency (IRENA)

shows that the average installed costs of hydropower plants in the US (USD 1,650/kW in 2010 prices) and hydropower plants worldwide (USD 1,000/kW) fall within this broad range<sup>5</sup>.

At the beginning of winter, both the Enguri and Khudoni reservoirs are due to be full. Water subsequently released from the Khudoni Reservoir becomes available for power generation at Enguri. The joint operation of both reservoirs would be beneficial for power generation. This issue has not been addressed in the ESIA but is important when one is interested to know the overall costs and benefits of the dam for Georgia.

Recommendation: the Commission recommends to perform a more extensive economic cost-benefit analysis to shed more light on:

- The relatively wide cost range of the preferred project alternative;
- The unknown cost-effectiveness of alternative project sites (inside and outside the Khudoni watershed);
- The lack of a proper energy demand analysis;
- The lack of information about the calculated environmental and social costs;
- The potential added benefits deriving from joint operation of Khudoni and Enguri HPPs;
- The economic profitability of the preferred alternative for the country as a whole compared to other possible hydropower projects.

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<sup>5</sup> Ninety percent of the 2155 hydropower projects in the US (total 43 GW) have project costs below USD3350/kW, while 90 percent of the 250 project evaluated worldwide (total 202 GW) had an average cost of USD 1,700/kW or less (IRENA, 2012).

## 7. IMPACTS

### 7.1 Environmental impacts in the ESIA

Following a methodology provided by the World Bank, the Commission made its own comparison of Khudoni HPP with 49 other large dams around the world, based on 13 key indicators (See appendix 5). Based on this comparison the Commission concludes that three environmental / social issues are major reasons for concern for the Khudoni HPP: (i) sediments and useful lifetime of the reservoir, (ii) resettlement and compensation, and (iii) cultural heritage.

If these issues are addressed and where necessary mitigated in an appropriate manner the ratio between on the one hand environmental – and social impacts, and on the other hand generated power is relatively favourable for Khudoni HPP. Furthermore, the Commission concluded that the Khudoni HPP could act as a conservation opportunity if compensation measures for biodiversity loss are implemented according to international best practice (see chapter 8). The outcome of this rapid comparative assessment is in agreement with, and thus provides additional support to the review observations of the Commission regarding the ESIA of Khudoni HPP.

The ESIA provides adequate information/evidence on:

- Impacts on aquatic and terrestrial flora and fauna, even though the information is of secondary nature and no local inventories have been carried out.
- Prediction of water quality and eutrophication processes in the Khudoni reservoir convincingly show that eutrophication process are unlikely to develop.
- Climate change (macro): the contribution to greenhouse gas emissions by the reservoir has been well elaborated and the conclusion that this is not of a major concern is justified.
- The local climatic impacts of the Khudoni reservoir will only be noticeable at very short distance from the reservoir.

The local climate in upper Svaneti is said to be affected by the existing Enguri Reservoir with supposed health impacts. The ESIA report provides well elaborated health statistics from Mestia municipality, indicating that the prevalence of a number of diseases is indeed much higher than in the rest of the country. No evidence is presented

that these health issues can be linked to the Enguri Reservoir. These pathologies are, most likely, related to natural climatic factors of this mountainous region.

With respect to the potential on-site environmental and health impacts during dam construction the information on ambient air, noise and vibration, and wastes is extensive, but some elements are found to be incomplete:

- The ESIA did not consider the impacts over increased traffic movements during construction from the lowland up into the valley. During the construction period we anticipate heavy traffic along this winding road to the dam site. Significant amounts of material will have to be transported to the dam site making use of the only available asphalted road, the Zugdidi – Mestia road. Since this is also the lifeline of the entire upper Svaneti valley, one can imagine that a land slide or a serious traffic accident may cause isolation of the entire valley from the outside world.

Recommendation: the Commission recommends to provide quantitative information on traffic movements between Zugdidi and Khudoni HPP, assess the accident risk along the entire stretch, and provide a traffic circulation plan with maximum size and loads of trucks, a check on the availability of salvage equipment, and a calamity action plan.

- A waste dump is foreseen in Khaishura Gorge where 7.1 million m<sup>3</sup> of non-hazardous inert construction materials (including rocky subsoil) will be dumped over a length of 4 to 5 km. The impacts of dumping such an enormous amount of material has not been well described. As mentioned in the ESIA, the landscape and ecological impacts will be a major challenge. Furthermore, improper disposal of waste may lead to increase sediment runoff into the Khudoni reservoir. The presence of people living in the same area has not been mentioned.

Recommendation: the location of the Khaishura Gorge waste dump needs to be described in detail, including an assessment of its impact on landscape, ecology, erosion and sediment dynamics and human habitation. Appropriate monitoring and mitigation measures need to be described. Preferably, the announced waste management plan should be part of the environmental management plan (EMP) and be available prior to decision making.

New roads bypassing the reservoir: The ESIA describes the need for 18.5 km of new roads to be constructed. In addition, there are access roads to the dam site and to quarries. The ESIA describes many of the instable sections along the proposed roads. However, table 4.1.14-1 of the ESIA suggests that the design anticipated for these roads is similar to the road towards Mestia (upstream of the proposed reservoir) where



the Commission has observed so many negative impacts on the environment due to construction induced erosion.

Recommendation: to reduce the impacts of erosion and increased sedimentation in the reservoir the Commission strongly recommends to change the design in such a way that these problems are mitigated. The use of retaining walls as shown in figure 1 and road side drainage are two possible anti-erosion measures.

## 7.2 Social impacts

### 7.2.1 People affected by the project – direct and indirect

The ESIA does not provide any distinction between groups of affected people according to the degree of impact from the project. Similar to the need to provide a clearly defined baseline with demographic and socio-economic-cultural details and maps of affected areas, in the impact description a categorisation should be made for groups of potentially affected people, according to the type of impact.

Some of the affected people would clearly fall into categories of physically or economically displaced ones (to be included in the resettlement policy framework and resettlement action plan). Others may fall into different categories based on the degree of loss, for example: fewer economic losses; marginal loss of access and use of resources; indirectly affected due to various temporary and permanent works/activities (construction in particular), roads and induced impacts.

All of these affected groups have to be included in an entitlement matrix (or compensation framework, as used in the draft RAP) and require a tailor-made package of livelihood restoration and social development measures (in a social development plan), where fairness and equity have to be central.

The households to be resettled are stated in the ESIA (although numbers vary) but nothing is provided with regard to the extent of economic or other compensatory household/persons categories which should be considered. Furthermore, the vulnerable groups/households are mentioned without succinct treatment of these groups in the impact or mitigation sections. In the latter, a social development framework or plan should have been included.

The following impact themes are not addressed adequately or are absent: transport and local community safety; camp followers (opportunists moving into the area); magnitude of work force and community awareness on possible effects if this; account of actual loss of services to the municipality; social fabric and mobility; local social and cultural institutional changes; host communities (the communities receiving resettled

people); changes due to loss or reduction of access to resources and cultural sites; food/livelihood security; quality of life; and communication and trust issues, to mention some important ones.

Recommendations: The Commission recommends that:

- different impacts are described and accordingly assessed and ranked, where possible, in terms of severity. The management plans (mitigation, residual impacts, and enhancement measures) need to reflect the degree of impact predicted and the associated remedies;
- clear definitions of persons affected by the project either directly or indirectly in relation to the project's area of influence be presented and used consistently throughout the ESIA. The defined groups of affected people would be the basis for the type of mitigation and enhancement measures proposed;
- a detailed household survey be conducted to provide a detailed baseline across the affected villages, providing clear distinctions between the expected level of impact;
- clarity is required in addressing temporary and permanent impacts.

## 7.2.2 Cultural Heritage

The ESIA reports on several cultural properties and heritage sites, including a church and cemeteries, and other archaeological sensitive sites. The Khaishi Church of St. Georg and various cemeteries are stated as the most sensitive of the cultural heritage sites affected by the project. There is good characterisation of the Church and the associated cemetery. There is less information about the other cemeteries. The ESIA does not point to precise communication, analysis or agreements with the authorities on the actions to be taken on the cultural heritage sites, although some suggestions for mitigation are made for this in the ESIA. See also Appendix 6.

Recommendations:

- The Commission recommends a detailed description of all the cultural heritage sites, their precise location, including stakeholder responses and agreements. These should be then dealt with in the impacts assessment and mitigation chapter;
- The Commission recommends that a cultural heritage plan is outlined which begins with communication with the affected people, municipality, and authorities, and include agreements of how safeguards are to be implemented.

## 7.3 Economic Impacts

### 7.3.1 The ESIA

The estimated costs of the project are USD 776 million without financing costs (ESIA, p.10). A private party will build and operate the planned KHPP, but the generation of hydropower in the project is in the interest of the country as a whole. In addition, an area of 528 ha will be flooded after the dam has been built, affecting 4 villages and 256 households in the project area. These will have to be relocated (ESIA, p.388), as well as a public road, which currently provides the only access in and out of the area.

The ESIA refers to calculated resettlement costs and the costs of environmental management and monitoring measures, and also the financial implications of 'social and cultural issues' are mentioned in the order of USD 4 million for the Khudoni site (ESIA, p.16). However, only a total cost figure of USD 60 million is provided for resettlement costs (ESIA, p.16) without any further explanation or clarification.

The economic value (opportunity costs) of the land lost due to flooding is not given. There is a short description of some of the current livelihood activities in the area (see ESIA, p. 230 and p. 234 for registered property rights to the land), but whether and, if so, how the loss of productive land is accounted for in the economic analysis (and how this might diminish through time due to the resettlement of the households) is unclear.

Also, no information is provided about the opportunity costs (shadow price) of local labour or capital (the latter as a basis for discounting future flows of costs and benefits in time). There is a brief discussion about peak employment during construction and employment during operation (p. 387 and 391), but how this employment is expected to structurally offset the social costs of resettlement is not quantified in economic terms.

Local employment and business impacts and opportunities are briefly discussed, including possible effects on tourism, and the increase of energy safety and the internal energy reserves of the country, transferring Georgia into an energy exporter, are mentioned as the main impacts after construction of the Khudoni HPP (ESIA, p.390). However, these impacts are not quantified in economic terms.

### 7.3.2 Information from additional documents

The information provided in the ESIA is insufficient to assess whether the information is valid, reliable and complete. Most importantly, there is no possibility to check the

estimated cost figures, while information about benefits is also missing. A request was therefore made for access to additional background information. This additional information is provided in Trans Electrica's Detailed Project Report, Volumes I, II and III dated December 2010. The information provided in these background reports is confidential. In order to not undermine the economic interests of the investor these reports will only be addressed in a generalised manner without revealing exact figures.

A number of issues arise from the background reports. First of all, the analysis presented in the background reports is a financial (cash flow) analysis, carried out from the perspective of the investor in the project, focusing on the direct financial expenditures and revenues from the project accruing to the investor. This makes sense since the report was written by and for the investor. However, this is the only additional economic information available and essential information about the broader economic impacts of the project is not available. This should have been taken into consideration according to international guidelines as outlined in the guidelines of the World Commission on Dams (2000), such as a comprehensive options assessment, recognising entitlements and sharing benefits.

The financial analysis lists the expected costs and revenues from the construction and operation of the project, including the costs of borrowing money. This information is also used to estimate tariffs. Costs are broken down into different cost components, construction costs making up the largest share of the total costs, followed by maintenance and electricity costs, installation and transportation costs. The main cost categories in the background report were checked with the technical experts of the Commission and no deviations were found with the types of costs that were expected to be included. However, the avoided costs of energy import for the country as a whole (the benefits of energy security) or the possible (positive) downstream effects of the new Khudoni HPP on the existing Enguri HPP (extending the lifetime of the existing dam as a result of reduced sedimentation and hence additional energy generation and benefits) are not accounted for since they do not affect the investor (and his investment decision).

The expected social (resettlement) and environmental (mitigation) costs seem to be accounted for, but without any further detail. A total cost figure is simply presented as in the ESIA, without further explanation which part of these costs refers to compensation of the resettlement of the 256 households, the loss of cultural heritage (social costs) and which part to environmental measures needed for example for erosion control or compensation for the loss of wildlife habitat.

Another remarkable finding in the background reports is the lack of any sensitivity analysis, often one of the most important steps in a CBA to identify the most important

project risks and uncertainties and key variables (internal or external to the project) that drive or largely determine the results of the CBA.

Conclusion: Taking into consideration the scale of the project and its expected social and economic impacts, in addition to a financial analysis of the project's profitability to the investor, a supplementary extended societal cost-benefit analysis is typically recommended in the international literature and endorsed by international organisations such as the World Bank and the World Commission on Dams to assess the broader economic costs and benefits for the country as a whole (Cernea, 1999; World Commission on Dams, 2000; Brouwer and Pearce, 2005; Namy, 2007)<sup>6</sup>.

The Commission concludes that the economic data and information in the ESIA are too limited to get a good overview of their validity and reliability. At most, insight is provided into the project's financial profitability from the perspective of the investor. The economic analysis is not complete and not based on international guidelines and standards. The project involves more than just private costs and benefits. Important broader, public-economic interests such as loss of property, livelihood, resettlement, environmental degradation due to soil erosion and loss of flora and fauna, and the effects on national energy supply and demand are largely ignored.

Recommendations: An extended societal cost-benefit analysis is recommended in addition to the existing financial analysis, answering the following questions:

- Is the project beneficial for the country as a whole and how much?
- Who benefits and who loses and how much?
- How will those who lose (land, property, livelihood, cultural heritage) be compensated and by how much? The exact details on this will only be available after the completion of the resettlement action plan (RAP) but the principles of compensation will be available in the resettlement policy framework (RPF).
- How will overall project benefits be shared? (For example the loss of flora and fauna may be compensated by installing protected areas in Svaneti; part of the benefits could be invested in long-term management of these areas. The same could apply to the protection and enhancement of the Svan culture and their cul-

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<sup>6</sup> Brouwer, R. and Pearce, D.W. (eds) (2005). Cost-benefit analysis and water resources management. Edward Elgar Publishing, Cheltenham, UK.

Cernea, M.M. (ed.) (1999). The economics of involuntary resettlement. Questions and challenges. The World Bank, Washington D.C.

Namy, S. (2007). Addressing the social impacts of large hydropower dams. The Journal of International Policy Solutions, Spring 2007, 11-17.

World Commission on Dams (2000). Dams and development. A new framework for decision-making. The report of the World Commission on Dams. Earthscan Publications Ltd.

tural history. So benefit sharing goes beyond the minimally required compensation for environmental impacts and resettlement.

- Is this the lowest cost option to generate additional energy capacity in Georgia?

## 8. MITIGATION AND COMPENSATION

### 8.1 Environmental mitigation

Mitigation measures for local fish fauna are adequate; monitoring of implementation of measures is a concern due to low inspection capacity.

The proposed fish passage is, because of the height of the dam, technically extremely difficult. A fish elevator is the only available solution. This does, however, not serve any purpose unless the Enguri Dam is also provided with such a passage.

The ESIA proposes compensation of the loss of forest and vegetation by forest improvement, 3 times the surface area that will be lost. Given the extreme erosion sensitivity of the steep slopes surrounding the Khudoni reservoir the suggestion to start re-planting of forests has to be looked upon with care. It will undoubtedly lead to increased erosion and thus aggravate the sediment problem in the reservoir. International best practice suggests that the best way to compensate the loss of biodiversity is to look for the best opportunities for biodiversity conservation.

Recommendation: the Khudoni HPP is located in upper Svaneti. Given the unique and coherent identity of upper Svaneti it would be appropriate to look for the most valuable biodiversity areas in the entire valley. As a biodiversity compensation measure such biodiversity hot spot should be turned into protected areas to preserve these areas for the future. A combination with preservation of the cultural heritage of the valley is recommended, also with an eye to the economic potential (tourism) of such measures.

### 8.2 Social mitigation, compensation and resettlement

The ESIA defines resettlement in a confusing way. Firstly, resettlement is suggested as a mitigation measure, while at the same time the ESIA presents data from a draft Re-

settlement Action Plan (dated May 2012). Involuntary Resettlement<sup>7,8</sup> in international practice includes both physical (losing a house) and economic (losing job or income) displacement which means that both physical and economic losses have to be considered. Physical displacement is said to occur for 256 households in four villages.

A draft Resettlement Action Plan<sup>9</sup> (RAP, May 2012), which is not included as part of the ESIA, was provided to the Commission, referring to 184 households to be resettled. The RAP presents a Compensation Matrix (also known as Entitlement Matrix). A Resettlement Action Plan is usually preceded by a Resettlement Policy Framework (including a draft entitlement/compensation matrix) which could be presented in the ESIA. Upon closer reading of the presented RAP it becomes clear that this should be considered as the Resettlement Policy Framework as it only provides the outlines of the resettlement policy for the project, but does not provide concrete details on actual implementation.

Table 2 below shows the steps that are needed before a Resettlement Action Plan can be made. The first column refers to the end products (documents), the second column provides the minimal contents according to best international practice, the third column describes what is presently available.

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<sup>7</sup> Terminology varies between and among international standards and national terminologies. Resettlement standards and processes are outlined in various documents in: [www.worldbank.org](http://www.worldbank.org); [www.ifc.org](http://www.ifc.org). Note that the resettlement process and formulation has to be tailored case by case due to timing, innate characteristics and expectations.

<sup>8</sup> Resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition. World Bank Group and EU EIA standards.

<sup>9</sup> Resettlement Action Plan. Khudoni Hydropower Plant Construction Project. May 2012. Prepared by the Association for the Protection of Landowners' Rights.



*Table 2: requirements for a resettlement policy framework, to be elaborated before a resettlement action plan can be developed and implemented.*

Documents	International recommendations	Present status in documents
ESIA	Resettlement Policy Framework to be included in ESIA.	Not included in ESIA but available in separate document, wrongly called the Resettlement Action Plan.
 Resettlement Policy Framework (RPF)	Time-line (1-year) for Resettlement Implementation in line with construction start to be provided	Time-line included, not in relation to start of construction.
	Census and inventory (household surveys) to be done for resettlement implementation.	Completed (March 2012) but incomplete and requires updating
	Setting of a cut-off date after inventory	Not done
	Cash payments to be avoided by proposing compensation alternatives (packages)	Alternatives not proposed
	Assuring ownership (property, land) as part of compensation	Not included in policy
	Livelihood restoration strategies (Plan) to be explored in relation to affected people needs	Not explored
	Community Assets Replacement Plan to be presented	Not presented
	Alternative Sites for resettlement need to be presented	Not presented
	Needs for host community studies to be assessed.	Not assessed
Resettlement Action Plan (RAP)	Development and implementation	

From the table it becomes clear that a significant number of steps still need to be carried out to be able to draft a fitting Resettlement Action Plan:

- A time line needs to be developed with the starting date of construction as a point of reference. This is not available yet.

- The census and inventory of project affected people needs to be updated, including a cut-off date after the final inventory. The presented census does not contain such a cut-off date. The Commission has observed recent construction activities in the projected reservoir area. Because of the lack of a cut-off date, the status of these new buildings is unclear as well as the right for compensation. Furthermore, it is probable that the available survey only presents physically displaced people and ignores economically affected and displaced people. So, not all project affected people are represented in the survey. The shelf-life of census and inventory (socio-economic) data used for resettlement planning needs to be considered, as considerable time and resources may be needed to update inventory data after 6 months.
- Based on the information from the social-economic baseline inventory alternative packages for compensation should be designed for different categories of affected people. Cash compensation should be avoided as experience shows that, for example, cash may not be invested for homes or livelihood restoration.
- Assuring ownership (property, land) in the proposed resettlement area as part of compensation. Agreements have to be arranged at individual or household level, which should be treated as sensitive information and not be published publicly.
- Livelihood restoration alternatives that could be explored in relation to affected people needs, i.e., identification of measures to improve (going beyond the livelihood levels before resettlement) or restore livelihoods (at levels before resettlement).
- Community Assets Replacement Plan. All physical structures belonging or providing services to the communities should be replaced (or available at the place of resettlement) so that direct and indirectly affected communities maintain use and services of these assets.
- Alternative sites for resettlement and the potential needs for host community studies. When larger groups of people are being resettled into another community, there may be a need to study the level of acceptance of these newcomers among the existing community.
- Furthermore, communication, disclosure and monitoring needs, have to be outlined and resolution mechanisms for potential conflicts and grievances have to be designed.

Recommendations:

- In order to comply with international best practice, the Commission suggests that all necessary information is collected and steps are taken to produce an elaborated Resettlement Policy Framework as a necessary step to the drafting of a Resettlement Action Plan. The Resettlement Policy Framework should be part of the Environmental and Social Management Plan, included in the ESIA.
- The investor is advised to hire an internationally experienced expert in RAP development to guide the process – internationally this is common practice with private investors in such large and complex projects.
- An Advisory Group may be considered to overview the process and check the fulfilment of the core issues.

As a reference Appendix 8 provides a detailed generic overview of steps for complete project development and implementation.

## APPENDICES

with the Advisory Review of the Environmental and  
Social Impact Assessment of Khudoni Hydropower  
Project – Georgia

(appendices 1 to 8)

## APPENDIX 1

### Letter with request for advice by the Ministry of Environment Protection of Georgia



საქართველოს გარემოს დაცვის სამინისტრო  
MINISTRY OF ENVIRONMENT PROTECTION OF GEORGIA

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6 G. Gulus Str. 0114, Tbilisi, Georgia, Tel: (+995 32) 2727200, 2727220, Fax: 2727237, [www.moe.gov.ge](http://www.moe.gov.ge)

# 1071

01 / აპრილი / 2013 წ.

To: Ms. Ten Holder

Director

The Netherlands Commission for Environmental Assessment

Dear Ms. Ten Holder,

Let me express our sincere appreciation for the long-standing and successful collaboration with the Dutch Government. Given the importance of the research issue and taking into account our cooperation we consider it appropriate to ask for your assistance in exploring Environmental and Social Impact Assessment (ESIA) for the Khudoni Hydropower construction project (702 MW).

I would like to ask whether an international working group of experts of the Commission for Environmental Assessment (the Commission) can execute an independent review of the ESIA for this hydropower project. For this the working group should make use of the following review framework:

- Georgian EIA legislation;
- EU legislation on EIA and large scale hydropower projects;
- International best practice for EIA for hydropower projects.

As part of this we would like to ask the working group to:

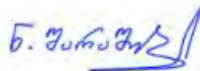
- Review of the available information on economic costs and benefits;
- Visit to the proposed project site;
- Arrange meetings with NGOs;
- Present the preliminary review of findings of these meetings.

Attached to this letter (see Appendix) is a joint agreement on advisory services to be delivered by the Commission.

Thank you in advance for your kind assistance and we are looking forward to further cooperation.

Yours sincerely,

First Deputy Minister



Nino Sharaashidze

**Appendix 1 to the letter**  
**Joint agreement on advisory services for the Environmental Impact Assessment (EIA) for the**  
**Khudoni Hydro-power project in Georgia by the Netherlands Commission for**  
**Environmental Assessment**

**Preamble**

This is an Appendix to the letter with a request by the First Deputy Minister of Environment Protection of Georgia to the Netherlands Commission for Environmental assessment (the Commission) to review the EIA for the Khudoni Hydropower project. This Appendix is a joint agreement between the Ministry of Environment Protection of Georgia and the Commission.

**1. The request**

Referring to the request by the First Deputy Minister of Environment Protection of Georgia to the Netherlands Commission for Environmental Assessment will provide the following services:

Review the following report: draft Environmental Impact Assessment for the Khudoni Hydro-power project. The deliverable prepared by the Commission is an advisory review report on the quality of the draft EIA for this project.

The Commission will review the EIA against the following guidelines:

- Georgian EIA legislation;
- EU legislation;
- International Good Practice Guidelines for EIA and hydro-power projects, eg. WB/IFC guidelines.

As a result of the independent position of the Commission the advisory review report will be made publicly available after consultation with the Minister of Environment.

**2. Approach by the Commission**

**General**

The Commission will compose an independent working group of international experts. This working group consists of a chairman, a technical secretary and experts covering at least the following fields of expertise: dam technology, geology, hydrology, ecology and sociology/resettlement. To secure the independency of the experts, the Commission guarantees that they have no interests in the Khudoni hydropower project.

The Commission can, in case required, provide advice on the environmental permit conditions. However, that requires another advisory report and funds.

The Commission will not advise on the approval of the Khudoni hydropower project.

**Preparation of the advisory review report**

The Ministry of Environment Protection of Georgia will provide the Commission with the EIA report and other relevant information.

The Commission will bring a one week visit to Georgia, including a visit to the proposed site

for the Khudoni hydropower plant.

The Ministry of Environment Protection of Georgia and the Georgian experts that have conducted the preliminary review of the Khudoni HPP ESIA will provide commission with their conclusions made on the project. Georgian expert in geology will accompany the working group during site visit of the Commission experts aiming to facilitate an optimal exchange of information and knowledge.

The Working group of the Commission will present the draft main findings of the review before departure to the Netherlands to both the Minister of Environment and the Minister of Energy of Georgia.

### **Preparation of the advisory review report of the draft EIA**

The Commission will review the EIA. The specific date of the visit will be agreed upon by the Ministry and the Commission.

The Commission will give the Ministry of Environment Protection two weeks time to respond to the draft advisory review report. The final advisory review report will be presented by two representatives of the working group of the Commission, to both the Minister of Environment and the Minister of Energy, in both Georgian and English languages.

The Commission will make the final advisory review report publicly available after the report has been presented to the Minister of Environment.

### **3. Budget and services**

The government of the Netherlands will pay all costs for the working group of experts of the Commission: professional fee for the Commission working group experts, flight tickets, hotel costs, DSA and working group transport costs (car hire or flight) in Georgia.

The Commission cannot pay for the contribution, participation, travel and hotel costs and DSA for the technical expert(s) or resource person(s) from Georgia, who might accompany the working group.

The Ministry of Environment Protection of Georgia takes care of the organization of the mission in Georgia as well as the visit to the site of the Khudoni project. The Ministry of Environment Protection will ensure availability of the necessary technical expert(s) who will accompany the working group of the Commission during the site visit.



## APPENDIX 2

### Project Information and Working Group Composition

**Proposed activity:** The Khudoni Hydropower Project (Khudoni HPP) in Georgia is undertaken by Trans Electrica Georgia Ltd. In December 2009, a memorandum of understanding (MoU) was signed between Trans Electrica Ltd. and the Government of Georgia, represented by the Ministry of Energy, for the construction of Khudoni HPP on a build, own and operate (BOO) basis. An implementation agreement was signed between the Government of Georgia and Trans Electrica Ltd. on April 28, 2011 for further action, leading to the construction of the project on a BOO basis. The agreement proposes reserving the electricity produced during winter months for use in Georgia and freely trading excess electricity generated at other points of the year. After last year's elections a new government took office and started renegotiations on the MoU, which was signed in May 2013.

**Categories:** DAC/CRS: 23065 – Hydro-electric power plants

**Project number:** Netherlands Commission for Environmental Assessment OS24 – B017

**Progress:** The Netherlands Commission for Environmental Assessment (NCEA) received a request from the Ministry of Environment Protection of Georgia to review the draft Environmental and Social Impact Assessment (ESIA) for the Khudoni Hydropower Project. An expert working group of the Commission studied the ESIA and additional documentation and visited Tbilisi and the location of the Khudoni HPP and surrounding area in April 2013.

**Procedural information:**

Receipt formal request for Advice	: April 2013
Site visit to Georgia by NCEA working Group	: April 2013
Submission of Final Draft Review Advice	: May 2013
Submission of Final Review Advice	: June 2013

**Composition of the working group of the NCEA:**

Mr R. (Rudy) Rabbinge – chairman  
Mr S.S. (Shivcharn) Dhillion – expert on: social aspects, cultural heritage, resettlement  
Mr J.K.G. (Jan) Rohde – expert on: geology – seismic risks  
Mr R. (Roel) Sootweg – expert on: biodiversity  
Mr R. (Roy) Brouwer – expert on: environmental economics  
Mr M.G. (Rien) Bos – expert on: dam technology – hydrology

**Technical secretary:**

Ms A.J. (Arend) Kolhoff

## Appendix 3

### Programme of the visit of the working group of the Commission to Georgia

3 April Wednesday	– Departure of the working group to Georgia
4 April Thursday	<ul style="list-style-type: none"> <li>– 03.00–05.00 Arrival the Commission working group in Tbilisi</li> <li>– 12.00 –13.30 Meeting with the Georgian experts who have conducted the review of the ESIA report /Ecological expertise at the Ministry of Environment Protection.</li> <li>– 14.00–15.30 Meeting with the Minister of Environment at the Ministry of Environment Protection.</li> <li>– 16.00–17.00 Meeting with representatives from the Ministry of Energy and investor Transelectrica Georgia at the Ministry of Environment Protection.</li> <li>– 17.30 – 18.30 Public hearing for NGOs at the Ministry of Environment Protection.</li> </ul>
5 April Friday	<ul style="list-style-type: none"> <li>– 07.30 Departure to project site in Upper Svaneti by car</li> <li>– 15.00–16.00 Meeting with staff of the Enguri dam</li> </ul>
6 April Saturday	<ul style="list-style-type: none"> <li>– Site visit</li> <li>– 11.00 – 13.00 Meeting with Khaisi villagers</li> </ul>
7 April Sunday	<ul style="list-style-type: none"> <li>– Site visit</li> <li>– 13.00 – 15.00 Meeting with people from Mestia</li> <li>– 15.00 – 15.30 Meeting withy dep. Governor of Upper Svanetti</li> <li>– 16.00 Return to Tbilisi by helicopter</li> </ul>
8 April Monday	<ul style="list-style-type: none"> <li>– Preparing the presentation</li> <li>– 16.00 –18.00 Meeting with Independent Commission initiated by Green Movement</li> </ul>
9 April Tuesday	<ul style="list-style-type: none"> <li>– Preparing the presentation</li> <li>– 16.00 Presentation of (preliminary) findings to the Ministers of Environment Protection and Energy at the Ministry of Environment Protection.</li> </ul>
10 April Wednesday	<ul style="list-style-type: none"> <li>– 11.00 –13.00 Presentation of the preliminary findings in a public meeting</li> <li>– 13.00 – 14.00 Press conference (NGO–s and journalists) at the Marriott Courtyard</li> <li>– 16.00 De–briefing at the Netherlands Embassy</li> </ul>
11 April Thursday	– Departure of the working group members

## Appendix 4

### Methods, Baseline Elements and Impact Areas

#### *Methods and Baseline*

A targeted baseline study of the populations residing within a project's area of influence is the cornerstone of social enquiry in the ESIA process<sup>1</sup>. Social baseline surveys help to predict the capacity of the local population to cope with the range of impacts (negative as well as positive) that the project may bring. Surveys provide valuable information which permits the identification of the range of project affected people – as the degree of impact (direct or indirect) can vary greatly. The proper identification can point to the type of mitigation and other remedial measures that may be required (e.g., resettlement, social development planning, livelihood enhancements and other specific social safeguards). The ESIA does not define project affected people although vulnerable groups<sup>2</sup> and Internally Displaced People (section 5.2.5, page 228) are said to be present. The area of influence is also not defined clearly and is confusing due to the terminology used (see section on Terminology below).

The text and tables in the social baseline provide a view of the administrative set-up (section 5.2.2, page 226). There are 3 levels that can be distinguished: (i) Samegrelo–Zemo Svaneti region; (ii) Mestia Municipality and (iii) Khaishi Village. The use of the term *Khaishi community* (–by villages – as in Table 5.2.3–2 and in several sections in the ESIA) is not mentioned or elaborated upon as to what it comprises and the rationale for lumping the different villages together. It thus appears this is a construct for the ESIA, which may be useful due to their similarity in a number of social–economic characteristics although, notably, this is not explained or elaborated upon, and thus lack obvious rationale.

Most of the data is secondary in nature (e.g. of sources: Mestia municipality (undated); Department of Socially Vulnerable People; National Census of 2002) with some primary data (undated) from the Village head of Khaishi. The current social baseline provides a general overview of Mesti municipality which has 134 settlements, of which the Khaishi village<sup>3</sup> is one settlement. There are no household surveys conducted as part of the ESIA to provide a baseline which could have been used for the recommendation of the development of potential social development plans. The draft RAP is based on a social–economic baseline of PAP of 184 HH. The fact remains that there is no clear and detailed social baseline related to the villages that have direct or indirect impacts. The general superficial baseline related to the Khaishi village is the main focus in the ESIA, and it remains unclear what the baseline of constellation of villages/settlements within the Khaishi Village group is.

In the ESIA, Migration (section 5.2.4) trends and income (section 5.2.7) levels are importantly outlined briefly for the Mesti municipality but little is known of the Khaishi community. It is possible that remittances can be sizeable for income contribution to some groups and HH in the affected villages. An agricultural baseline (section 5.2.11, page 235) is presented for the Mestia municipality with little elaboration of the affected communities and HH. There is, however, little mention on the flow within

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<sup>1</sup> IFC. 2012. Performance Standard 1 and individual components of PSs; IFC. Addressing the social dimensions. Good Practice note 2003.; IFC. Performance Standard 1 and individual components of PSs.

<sup>2</sup> In the ESIA vulnerable groups in the population include: population below the poverty line, people with disabilities, retired people, Internally Displaced People (IDP), pensioners and children (section 5.2.5). Numbers are given for the Khaishi community for some of these groups.

<sup>3</sup> Note that the ESIA also makes reference to the Khaishi Village (and its adjacent areas) which includes the 14 villages which will be affected (directly or indirectly)

the region, and the links and dependencies that may be there among villages and local markets. It is also mentioned that in the Khaishi community each HH owns 2–3 heads of cattle, pigs and poultry. It is uncertain if economically vulnerable HH also have similar holdings. Prices of products in Mesti municipality are provided. It is stated also that the forest is used for grazing and NTFP. No details of use, reliance, economic value and livelihood contribution are provided. The agricultural information is highly inadequate. The distribution of agricultural land and forest land with respect to residence areas and animal shelters and hay storage sheds (usually away from homes, section 5.2.10, page 234) are not mentioned or shown in maps. No information on coping strategies exists in the ESIA.

The tourism baseline (5.2.12) is presented for Mestia municipality and it is not known how the tourism trade and industry is located among the villages affected by the project, although some numbers are given for the Khaishi community. Education (section 5.2.6) is elaborated to include aspects of numbers of types of schools and total student numbers. It is not always clear if children from affected communities of villages within the constellation of Khaishi Village have to travel/walk long distances to school although 5–10 km is stated for some students. Infrastructure (section 5.2.8) for Khaishi Village is well elaborated. Water supply appears to come from springs (numbers unknown) and there is no sewage or waste management system in the Khaishi village (section 5.2.8). Each of the themes above is covered within a page (except for infrastructure (3 pages) and health (15 pages) with focus on Mesti municipality and some on Khaishi village.

## Impact Areas

The impact areas (zones) of the project remain unclear in the ESIA, as a range of terms are used without definition. The *Area of Influence* of the Khudoni HPP is stated (section 1.5, page 30) to be at the lowest part of the Zemo Svaneti depression. The latter is part of the watershed of the Eguri River. The section elaborates that the *Area of Influence* includes the a range of assets<sup>4</sup> of villages (commonly referred to as being part of the Khaishi community<sup>5</sup>, Table 5.2.3–2) located upstream of the dam site: (i) on the right side of Engiru river – of villages Leburtskhila, Idliani, Skormeti, Tobari, Lakhani and Kveda Kedani (6 villages), and ; (ii) on the north and north–western slopes of the Samegrelo (Egrisi) range and the slopes of the north–western section of the Svaneti range – of villages Nalkhorvali, Khaishi, Kveda Tsvirmindi and Kveda Vedi (4 villages) totally to 10 villages. In addition, the planned new roads are said to pass through and influence the villages of Vedi, Idliani, Cheri, Chuberi. Altogether 14 villages are potentially impacted (page 30). In the impact section the 11 villages are stated as being impacted. This list appears to include Vedi (influenced by the road) but not Idliani, Cheri and Chuberi villages (likely not influenced by the road). Table 6.2.1 provides a tabulated summary of the ‘description of *the project area*’ listing 14 villages in *the project area* while 13 are provided in parenthesis and the missing village Khaishi is listed below the above list – making up 14. The same Table provides information on households numbers in the *project area* (184), settlements *around the project area* which will be indirectly affected (16) and households in the *around the project area* 351. A “long-term and irreversible negative impact” is also stated as related to physical resettlement providing a number of 256 households (page 379) – including the villages of Khaishi, Lukhi, Tobari and Dakari. Note that Dakari is not included in the Area of Influence (section 1.5, page 30 and list of villages of the Khaishi Village group (Table 5.2.3–2) – thus how this villages is treated in the baseline is uncertain and it is possible that it is not part of the Khaishi village group. The basis of these data is referenced to the draft Resettlement Action Plan of Khudoni HPP (APLR 2012). It is also stated

<sup>4</sup> These include, ‘residential houses, farmlands, agricultural lands, forests and meadows of villages’ (page 377).

<sup>5</sup> The Khaishi community is not defined and the rationale for grouping the villages (settlements) under this community is not clear.

that a 3–4 km stretch downstream the dam site will also be influenced due to the location of construction facilities.

In addition, the Stakeholder Management Plan (included as Annex to the ESIA) states three categories of impact, which are not used in the ESIA baseline:

Category I	Gagma Kaishi, Khaishi, Kvemo Khaishi, Lukhi, Tsvimindi and Zemo Khaishi (6 villages)
Category II	Settlements located very close to the maximum water level of the reservoir: Dakari, Lakhami and Tobari (3 villages)
Category III	Kvemo vedi, Nankbuli, Vedi, Zeda Vedi (4 villages)

## Appendix 5:

### Impacts of Khudoni HPP compared to other large dams

Following the methodology provided by the World Bank in its “Good Dams, Bad dams” document<sup>1</sup>, the Commission has used 13 criteria to make a comparison of the Khudoni dam with 49 other large dams around the world, using data from the ESIA.

- A. Flooded area per MW: Khudoni HPP will have a capacity of 702 MW with a reservoir surface of 520 ha. The indicator thus stand on 0.74 ha per megawatt. Among 49 large dams analysed only two have an indicator value lower than 1 ha per megawatt. The global average for HP dams is 40 ha per megawatt. Even when considering that Khudoni will not operate at full capacity during the entire year, the reservoir surface area in relation to its electricity production is relatively small.
- B. Water retention time: With a mean river flow of 114 m<sup>3</sup>/sec and a reservoir volume of 364,5 Mm<sup>3</sup>, the average water retention time is 37 days. Water quality problem usually increase with increasing retention time, especially in case of overseasonal storage. Khudoni's retention time is very short; water quality problems related to retention time are not to be expected.
- C. Biomass flooded: Water quality and release of greenhouse gasses is linked to the flooding and gradual decay of organic matter, most notably trees. The largest portion of the flooded area is forest, but the forests will be logged before flooding. The EIA provides a well elaborated section on the expected climate impacts of the dam. It concludes that the emissions from the reservoir will by far be outweighed by the emission reduction if the electricity would otherwise be generated in gas-fired power plants.
- D. Length of river impounded: In total approximately 21 km of river will be impounded. The head difference of the river bed is considerable resulting in a relatively short reservoir (15 km) and thus a short impoundment length. So the reservoir length is relatively short. Two side branches contribute to the length of the impoundment.
- E. Length of river left dry: Irrelevant since the dam will be located near the top of the Enguri reservoir.
- F. Number of downriver tributaries: The reasoning is that the more naturally flowing tributaries downstream of the dam, the more of the original biodiversity will have a chance to survive. In the Khudoni case, the existing Enguri dam has already seriously changed the dynamics and migration patterns of the river. Downstream of the Enguri dam only one tributary (Magara river) enters the river providing minimal natural habitats for migratory fish and aquatic species. Construction of the Khudoni dam will not significantly change this situation. (According to one informant dams are also foreseen for the Magara river. If no appropriate passages for migratory aquatic life are

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<sup>1</sup> George Ledec & Juan David Quintero (2003). Good dams, bad dams: environmental criteria for site selection of hydroelectric projects. Latin America and Caribbean Region Sustainable Development Working Paper 16. The World Bank.

foreseen here, the entire Enguri basin would then be cut off for these species. This may have repercussions for aquatic life in the Black Sea.)

- G. Likelihood of reservoir stratification: Even though the Densimetric Froude Number for this reservoir is very low (far below 1.0) due to the extreme depth of the reservoir near the dam site, stratification is not expected due to the very short water retention time.
- H. Useful reservoir life: The dam will trap sediments that would otherwise enter the reservoir of the Enguri dam; in this respect the Khudoni dam will expand the lifetime of the (larger) Enguri dam. During the site visit it was observed that Enguri reservoir has largely filled up its dead storage with sediments. Furthermore, serious landslides, erosion and sediments flows were observed in the upstream catchment, putting in serious doubt the calculated lifetime of the Khudoni reservoir which is based on old and most probably obsolete Soviet data (see chapter 4.1).
- I. Access roads: In case new roads would be constructed, so far undeveloped areas would be opened up for human exploitation. This is not the case as the valley has been inhabited and exploited for centuries already and a main road passes through the valley. However, some road stretches have to be realigned through relatively untouched forest, which may lead to serious additional erosion and sedimentation when constructed without mitigative measures.
- J. Persons requiring resettlement: In total 256 households (or 189 households according to census) have to be resettled, amounting to an estimated 1000 persons. The number of people displaced per megawatt thus reaches 1.4 per megawatt generated power. From a global perspective this indicator is very low; the global average lies around 58 displaced persons per megawatt. Resettlement location and action plan are not available yet (see chapter 8.2).
- K. Critical natural habitat affected: Most forests in the valley are degraded secondary forests; for each hectare of forest lost as a mitigation measure 3 hectares will be restored, with an emphasis on red-listed plant species. For red-listed fauna an inventory of natural refuge and nesting places will be made. Mitigating measures include animal passages under newly constructed roads and creation of artificial refuge sites. Khudoni HPP could represent a conservation opportunity if mitigation measures are implemented according to international best practice (see chapter 8.1).
- L. Fish species diversity and endemism: The existing Enguri dam has already had its impact; Khudoni HPP will not significantly affect the fish population of the river basin. Locally, appropriate mitigation measures are proposed by the EIA to maintain the local fish diversity.
- M. Cultural property affected: This is the case. The reservoir area (most likely) does not coincide with the proposed Upper Svaneti World Heritage Site for which official boundaries still have to be established. Yet, archaeological sites, a church and several very old cemeteries will be flooded (see chapters 4.5 and 7.3.2). It is unclear both from the ESIA as from personal information from the local priest, how these issues will be dealt with. Furthermore, the potential impacts of Khudoni HPP to a relatively large proportion of the Svan population of upper Svaneti merits special attention.

Conclusion: based on a comparison with 49 other large dams around the world, the Commission concludes three environmental issues are major reasons for concern for the Khudoni HPP: (i) sediments

and useful lifetime of the reservoir, (ii) resettlement and compensation, and (iii) cultural heritage. If these issues are addressed and where necessary mitigated in an appropriate manner the ratio between environmental and social impacts, and generated power scores relatively positive for Khudoni HPP.



## Appendix 6

### Cultural Heritage and Resettlement

#### *Cultural Heritage*

Cemeteries have to be dealt with on case by case basis and the communities have to be central in this along with the Clergy ('Partriarchate' in ESIA) and authorities. An exhumation plan as part of the framework plan) has to be made, with process and costs outlined. Importantly a participatory process has to be laid out to handle any excavation and relocation (disinterment and re-interment) of burial sites, adaption of new sites (i.e., modifying a place for compatible use). Outlining perceptions and cultural ties to burial sites and other locations of local cultural value, acceptance towards transfer of these sites of cultural value has to be documented as part of the baseline. Importantly with reference to legal requirements and culturally preferred options, the ESIA has to identify or suggest for the identification of technical services available in the region to conduct excavation, relocation and adaptation (where adaptation will not substantially detract from its cultural significance). The community discussions and opinions have to be better documented in the baseline.

Agreements with authorities have to be made on how cultural sites will be dealt with.

#### *Resettlement Planning*

With respect to economic displacement the degree of loss or change in the livelihood base and in-kind replacement possibilities decides if the affected persons will be subject to physical displacement. In all HPP projects there will be households and individuals who will lose only part of their assets and/or livelihood base and these would be subject to a range of compensation options. There will also be persons, households or communities that believe that they are affected directly or indirectly, and the baseline has to show as clear lines as possible so dispel such misunderstandings and eventual expectations. The Khudoni HPP ESIA does not build the baseline or impact chapters to address the above issues. The RAP typically does not deal beyond the household and individuals that are directly affected (project affected people/households). Indirectly affected people, households and communities are dealt with by the safeguards, mitigation and compensatory planning within the ESIA and thus the ESMP. Social development and enhancement plans which are linked to indirectly affected households and communities are part of the ESMP and not RAP. The linkages and interactions between plans in the RAP and ESMP have to be addressed.

All RAP related processes have to be completed prior to the start of construction (ideally 3 months before legal processes should be complete, and where possible all relocation). In the ESIA there are suggested RAP related processes<sup>1</sup> during the operation period, which would not be recommended or allowed following international standards.

The RAP also has to address the status of host communities, if this is relevant. Prior to the RAP addressing this, the ESIA has to make an assessment of this through community consultations on resettlement options and preferences. If the host settlements/villages are highly populated, have limited resources for sharing with in-coming households, and differ socio-culturally then there may be need for rapid ESIA of the host communities. This should be addressed in the ESIA as an option to consider given the characteristics (e.g., set of criteria) of the host communities.



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<sup>1</sup> Note physical relocation may be staggered due to distance to (and timing) of construction areas but all legal agreements and transactions must be complete before construction.

## APPENDIX 7




### General timeline and links between ESIA and Safeguards, Communication Processes, and Project Development Phases.

(NOTE: Tailoring is absolutely necessary as in practice the development and implementation of components is dependent on time frames, expertise and team sizes, local social acceptance levels, funds and goals of measures planned. Time lines are thus nearly always staggered. Experts are needed to guide the process so that project affected people rights for resettlement (including assistance for legal clarifications) are not violated. EMP time-line is not be underestimated as this can be a even more time consuming if the Unit working on it is inexperienced and requirements are not clearly outlined. Communication costs can be substantial and should include accounting for (breaking down steps, time of consultations and HR needs. Monitoring, evaluation and adaptation are key elements to include.)

Project Development	Technical Feasibility and Environmental-Social Status and Assessment	Communication
Planning Stage - general	<b>Screening:</b> Early stage (can be looking at several projects)	Core (administrative) stakeholders consulted. Communities may be informed depending on the situation.
Planning Stage – project specific 	<b>Scoping:</b> Promising projects looked at from technical and E&S perspective. Areas of concern and ToR for the EIA*. Also sometimes synonymous to “Pre-feasibility Technical and EIA” studies	Detailed Communication with PAPs and community, and regional authorities
Feasibility Stage	<b>Feasibility Technical and ESIA Study</b> (generally 6 months to 1-year, or more, highly dependent on project size and impacts)	<b>Detailed Communication and Disclosure Planning</b>
	<ul style="list-style-type: none"> <li>• ESIA Start</li> <li>• Defining scope and detailed methods (all themes)</li> <li>• Field Work and Analysis</li> <li>• Impact Assessment</li> <li>• Mitigation and Enhancement Measures (may include draft resettlement policy)</li> <li>• Environmental Management Plan (EMP) and</li> </ul>	Stakeholder Analysis and Detailed Communication plans drafts  Communication during ESIA (all records kept)  Working drafts of Stakeholder Management / Public

## APPENDIX 7

### General timeline and links between ESIA and Safeguards, Communication Processes, and Project Development Phases.

	Safeguard Recommendations		communication and Disclosure Plans complete
<b>ESIA approval and Permit Issuance</b>	<b>Full EMP and Safeguard Development</b> (full elaboration for implementation, - generally 1-year, highly dependent on impacts)		<i>continue communication</i>
 <b>Detailed Final Design Phase</b> RAP and SDP Units in Place. EMP Unit in Place.  <b>Tender Document Preparation</b> 	Continue required gathering of additional data and studies needed	Resettlement Process review and set-up of working Unit / Team (process can take 1 year, depending on size of RAP Unit and relocation numbers)	Detailed planning of communication for all EMP and Safeguards to all stakeholders.
	Elaboration of all EMP Plans by EMP Unit  For Example: -Transport and Road Plan -Slope Stabilization Plan -Conservation / Biodiversity Plans -Social Development Plans-SDP- (e.g., health, training, education, gender) -Awareness Plan -Cultural heritage and Enhancement Plans -Special/Vulnerable People's Plan -Safety and HR Plan -Emergency Plan	Update Resettlement Policy and planning. Prepare grievance procedures. Start formulating Resettlement Action Plan (RAP)	Detailed Communication with all stakeholders essential for needs and acceptance of measures. Disclosure of timelines, and planned resettlement policies and social enhancement plans.
		Inventory	Detailed Communication with PAPs and community, and regional authorities. Discussion on resettlement options and preferences, livelihood restoration, community assets, SDPs etc.
		Setting cut-off date for eligibility for compensation. Resettlement options.	Detailed Communication with PAPs and community, and regional authorities. Disclosure of Developer's Final Resettlement Policy and Livelihood Plans, and Social development/compensation plans (SDPs). Finalization of resettlement with PAPs.
		Livelihood Restoration and Social Development compensation detailing in RAP.	<i>External guidance may be useful.</i> <i>External monitoring of process may be required.</i>
	Grievance Redress Mechanism	Grievance Redress Mechanism	Disclosure of Grievance Mechanism
	Final Agreements with responsible stakeholders or implementing agencies	Final Agreements with PAPs and signed before construction. Start of	Disclosure of final time lines.
	Implementation of EMP started	<b>Compensation completed.</b> <b>Relocation started and completed.</b>	<b>Monitor and Evaluation (internal and independent)</b>

## APPENDIX 7

### General timeline and links between ESIA and Safeguards, Communication Processes, and Project Development Phases.

		(RAP implemented, except for monitoring)	
<b>Construction Phase (start)</b>	<b>Implementation of EMP started (full)</b>	Relocation only allowed if distant from construction (staggered time-line)	Detailed Communication and Disclosure continues
monitoring by contractor, developer and independent experts.	Monitoring and Evaluation (internal and independent) of all measures.	Monitoring and Evaluation (internal and independent) of each PAP and livelihood adaptation.	Monitor and Evaluation (internal and independent). Analysis and, where necessary, adaptation.
	Implementation of EMP completed		
<b>Operation Phase</b>	EMP implementation only if required for certain plans	No resettlement	Communication continues Monitor and Evaluation (internal and independent)
	Monitoring and Evaluation (internal and independent) – environmental and social		



\*EIA – is used due to convention. The trend is now to call the document ESIA.

HR 0 Human Resources; ToR = Teams of Reference; PAPs = Project Affected People; RAP = Resettlement Action Plan; SDP= Social Development Plan

EMP = Environmental Management Plan may be also referred to as the ESMP (Environmental Social and Management Plan) or ESMAP (Environmental and Social and Management Action Plan).

## Appendix 8

### Photos

	<p><i>Picture 1        The Khudoni HPP is located in a mountainous area with steep slopes. The landscape shows traces of landslides, rock falls and erosion scars.</i></p>
	<p><i>Picture 2 Unstable slopes in the reservoir area in the vicinity of the proposed dam site (right bank)</i></p>



## Appendix 8

### Photos



*Picture 3  
Unstable rock slopes  
in the reservoir area  
in the vicinity of the  
proposed dam site  
(left bank)*



*Picture 4      Right  
abutment of the  
proposed arch dam,  
excavation partly  
done for the dam  
foundation*

## Appendix 8

### Photos



*Picture 5  
Concrete structure  
and gallery tunnels in  
dam foundation,  
right side of valley*



*Picture 6  
Concrete gravity  
structure and  
unstable gravel  
slopes upstream of  
dam abutment right  
side*



## Appendix 8

### Photos



*Picture 7  
Precast concrete  
elements for  
inspection gallery  
tunnel, right  
abutment*



*Picture 8  
Remains of the  
eroded cofferdam  
foundations*



## Appendix 8

### Photos



*Picture 9  
The collapsed  
structure of the  
diversion tunnel  
intake*



*Picture 10  
Openings of access  
tunnels downstream  
of the dam, right side*



*Picture 11  
Access tunnel  
opening, slides and  
rock falls have  
occurred*



## Appendix 8

### Photos



*Picture 12  
Opening of the  
tailrace tunnel*

*Photo 13. Collapsed inlet of river diversion tunnel*



*Photo 14 Landslide due to erosion at outlet  
of river diversion tunnel.*





## Appendix 8

### Photos



*Photo 15.  
Heavy sediment load  
in the Enguri river  
immediately  
upstream of the  
proposed Khudoni  
dam site (6 April  
2013).*

*Photo 16. Sediment supply towards the Enguri river due to road construction.*



*Photo 17. Instable mountain slopes above newly constructed road*





## Appendix 8

### Photos

*Photo 18. Also rocky slopes can be instable and yield sediments.*



*Photo 19. In sufficient road drainage cause instability in the road foundation and leads to landslides.*



20 & 21 Khaishi main village





## Appendix 8

### Photos



22 & 23: Khaishi - Meeting with inhabitants





## Appendix 8

### Photos



24: Upper Svaneti

