



Risky deal, risky business

Khudoni hydropower plant, Georgia



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Executive summary

The Georgian Power Sector Strategic Environmental Impact Assessment document, the Khudoni Environmental and Social Impact Assessment and the Preliminary Environmental and Social Screening report, prepared under the World Bank infrastructure pre-investment facility grant assistance project, have been reviewed by Association Green Alternative and CEE Bankwatch Network.

The World Bank considers Khudoni to be a high value energy sector investment project for long-term purposes in the Georgia- Joint Needs Assessment document that was conducted after the events of August 2008 in Georgia.

The project aims to prepare necessary documentation for the construction of the 202-metre Khudoni hydrological power plant (HPP) in the high mountains of west Georgia - Svaneti, located two thousand metres above sea level on the Enguri River. According to official calculations, the Khudoni HPP will require four to five years of construction with a total project cost of USD 780 million, with an installed capacity of 638 MW, and will produce 1,445 TWh of output annually. During the implementation of the project an area around 400 ha is expected to be flooded, while the total volume will be 350 million cubic meters. According to the Ministry of Energy of Georgia, 25 percent of the work in Khudoni is already completed in the form of existing infrastructure.

The present report reviews the documents provided by the Georgian government and the World Bank; a number of independent research reports regarding the Georgian power sector and highlights the concerns of the local people towards the Khudoni HPP as expressed during the public hearings organized in Svaneti in summer 2008.

The Georgian government is promoting the Khudoni HPP as the best option for construction. The hydro power plant construction is promoted by a preliminary environmental and social screening report, as well as in the Strategic Environmental Assessment (SEA) of Georgia's power sector.

However, based on a review of the documentation and field trips, Green Alternative and the CEE Bankwatch Network have come to the conclusion that the Khudoni Dam is unacceptable for a number of reasons, including:

- High impact on population during the project implementation, the village of Khaishi and a number of small settlements for which Khaishi is the administrative centre, would be forced to resettle. In total, around 1 500 people are expected to be relocated. That is a significant number for the Zemo Svaneti region (8 000 - 10 000 people).
- Vulnerability of population the majority of the Khaishi population has already been resettled once during the Soviet time. The majority chose to go back to their homeland and attributes the resettlement to Soviet Union governance practice. The re-resettlement is difficult and unacceptable for local villagers, this was clearly stressed by the majority of attendees at the public hearings in Khaishi. People from surround-ing villages and Mestia (the administrative centre of Zemo Svaneti) are also against of the resettlement of Khaishi village.
- Economic justification the screening report, as well as the SEA do not provide economic justification for the project, the data presented does not include evidence that all relevant external costs are integrated into the project budget. In addition, the regional overview study of potential electricity export schemes to justify the economic viability of proposed project are not reviewed in SEA.
- High level cumulative environmental impact of existing and potential HPPs in the Enguri Gorge the Enguri HPP on the Enguri River already exists, just downstream from the proposed Khudoni Dam. In addition, there are also plans to construct a number of other dams on the Enguri and Nenska rivers. The cumulative impact of the HPPs on the environment and the climate of the region, in conjunction with global climate change processes, would be high and negatively affect the unique biodiversity and water quality of Svaneti.
- Increased isolation of Zemo Svaneti region the construction of the Dam would isolate the villages of Zemo Svaneti region even more. The dam construction will increase the road distance from Kaishi to Mestia (the administrative centre of Svaneti) from 18 to 30 km, that could have an even harder impact on the socio-economic situation of the region's population. Today, the road from Jvari to Mestia in winter can be covered in 4-5 hours that is expected to rise to 6-7 hours should the road be lengthened.
- High impact on cultural heritage the construction of the HPPs will have enormous impact on existing and largely unstudied cultural heritages.
- Khudoni HPP is not the best option for Georgian energy security the SEA undertaken by the World Bank
 also clarifies that the Khudoni Dam construction does not represent the best option for Georgian Energy
 security, one of the arguments regarding possibilities to generate financial inflows from Khudoni, through
 selling energy to neighbouring countries, particularly to the Russian Federation is highly
- Risk assessment Khudoni is located just above the Enguri Dam, which since the 1993 Georgia-Abkazia conflict has been under Georgian-Abkaz joint management. Since August 2008, Russian Troops partially control the dam. During the August 2008 conflict, there were a number of statements about the possibility of terrorist attacks to damage the stoplog of Enguri dam, while in September there were concerns raised about safe operation of the dam by the Georgian staff.
- Flawed public participation process Even though the Public Participation Process was flawed, it still wasn't taken into account during the decision-making process. Despite the two other alternatives being reviewed during the public hearings and public support for one of them, the Government promotes the major alternative based on purely financial justifications.
- The SEA study done for the Georgian Power sector was carried out with lots of flaws, including the improper assessment of environmental impact of different energy developments, renewable development scenarios are misleading, while energy efficiency is not considered at all. There should be additional consultation organised and all opinions should be duly taken into consideration.

Recommendations

The World Bank and The Government of Georgia decided to continue phase II of the World Bank grant that includes preparation of ESIA and RAP for Khudoni construction, despite the outcomes brought by the SEA study.

We consider, that it is necessary for the Georgian government and the World Bank to take a final decision on the full cessation of Khudoni Hydro Power construction, while all remaining money from the World Bank technical assistance grant should be used for the preparation of Khudoni HPP construction conservation project.

In addition, it is important that the World Bank and Georgian government seriously assess the quality of the SEA document report and continue working to create a document that would include all existing renewable scenarios, energy efficiency and assess trade potential with neighbouring countries, as well as consider the clear environmental implications on nature as well as its mitigation.



Khaisi villagers protest construction of the dam

Background information on the Khudoni Dam

At the end of July 1, 2008 the Ministry of Energy of Georgia published two reports prepared within the World Bank preliminary investment facility (grant NH204-GE) related to the development of Khudoni Power Station on the river Enguri.

The Khudoni Environmental and Social Impact Assessment report and the Preliminary Environmental and Social Screening report was prepared by Italian-French Consortium BRL Ingenierie / ARS Progetti and the Georgian Power Sector Strategic Environmental Impact Assessment, by Serbian company SEEC. The technical-economical feasibility study prepared by Swiss Colenco Power Engineering/Stucky has not been published.

According to the statement of July 1, 2008 the Ministry of Energy opened a wide public consultation process regarding the Khudoni power plant and received comments regarding the above-mentioned documents till July 8, 2008. The purpose was to take further decisions regarding the construction of the

Khudoni power plant and whether or not to proceed with the second stages of the dam construction.

The initial construction of the Khudoni dam began in 1979. Protests, from the local population, civil society groups and the newly-christened national movement, against a construction which threatens extreme risks for ecological disaster and requires the resettlement of a number of unique villages (including Khaishi), combined with momentum from the impending dissolution of the Soviet Union, led to the cessation of construction ten years later. In June 1989, according to a decree of the Georgian cabinet of ministers, the dam construction was stopped.

After the Rose revolution , the Georgian government started actively to promote the construction of the 202-metre Khudoni hydrological power plant. According to official calculations, the Khudoni HPP will require four to five years of construction with a total projected cost of USD 780 million, with an installed capacity of 638 MW, and will produce 1,445 TWh of output annually. According to the Ministry of Energy of Georgia 25 % of the work in Khudoni is completed in the form of existing infrastructure, and consequently is seeking private and international investors for construction.

From the summer of 2005 the World Bank has been involved in negotiations with the Georgian government regarding the Khudoni HPP. The World Bank approved a technical assistance grant of USD 5 million for the Georgian government, of which around USD 1,75- 2,35 million would be needed for preparatory works (preliminary and feasibility studies, technical studies, and an Environmental Impact Assessment (EIA) and Resettlement Action Plan (RAP)).



In late November 2005, the World Bank proposed, "under the possible IBRD enclave energy project (USD 50 million), the development of a new hydropower resource at Khudoni that could generate more than 10 percent of annual consumption and about 20 percent of current hydropower production, improving the security of Georgia's energy supply. The project would be structured as an export oriented sale of power to neighbouring countries ".

Initially, it was supposed that in the spring of 2007 the preliminary reports would be in place, however, due to the Kodori Crisis in August-September 2006 that led to the closure of the Jvari-Kaishi road, the studies were delayed for one more year.

In addition, in 2006 the World Bank took the decision to prepare the Georgian Power Sector Strategic Environmental Impact Assessment in order to "evaluate alternative power development programs based on which candidate power projects could be prioritized; also, to carry out a preliminary strategic environmental assessment focussing on the viability of the Khudoni hydropower project, based on which decisions can be made whether this project warrants further assessment and implementation". This step was in response to the request of a number of environmental organizations, to prepare a power sector SEA in order to help "the government of Georgia to formulate a sustainable energy policy and provide it with different scenarios to achieve self-sustainability and energy security.

The World Bank also established an Environmental and Social Panel of Experts to provide independent advice to the Ministry of Energy of Georgia. The Panel compromising of Erik Helland-Hansen environmental / planning expert (Norway) and John Ambrose, environmental / social expert (Canada) is supposed to provide guidance on key issues and methods for the SEA, as well as environmental and social studies.

In the summer of 2008 the Ministry of Energy and the World Bank organized a public participation process for discussion of the SEA and Khudoni draft screening document.

Public participation process

The public participation process for the revision of the SEA and Khudoni HPP documents was unfortunately far from best practice.

The decision that the SEA and Khudoni screening documents should be reviewed together at public hearings was a bad decision as it does not allow the World Bank and the government to receive full, exhausted and argued analysis of the reports, their deficiencies and recommendations for their improvement.

Coming from the character of the SEA document, it is important to ensure a series of wide public discussions with the participation of energy specialists, environmentalists, economists and other interested stakeholders in order to define the future of the energy sector. Meanwhile during the five public hearings organised by the ministry (mainly in the regions and only one meeting in Tbilisi, at the end of July) the major public focus was shifted towards Khudoni Dam, as was expected.

The fact that the meeting in Tbilisi was held in the room of the deputy minister and special facilities were not organised, further proves that there were no interest at the ministry in seriously carrying out the exercise and inviting all relevant stakeholders – energy specialists, environmentalists, economists, differen ministries, international organizations and companies to discuss the issue in depth.

PLANNED HPPS ON ENGURI RIVER



While the information about the hearings was printed in newspapers and there were a number of announcements in some email lists, this type of approach does not work for the above-mentioned stakeholders and meetings needs to be seriously prepared. Unfortunately, during the public hearing in Tbilisi, a representative of the ministry stated that: "The document was prepared at the request of the World Bank and does not represent the interests of the Georgian government. All of the above raises the concern that the government does not consider the SEA as essential tool for informed decision-making and perhaps the absence of the relevant ministries during the meeting is another indication of it.

Taking into account the importance of the SEA report, it is essential that it undergoes independent review for qualitative assessment and that at least the State Ecological Expertise should be applied that would require the participation of the Ministry of Environment Protection and Natural Resources. It is hoped that the Khudoni Environmental and Social Panel will prepare an appropriate conclusion and this document will become public. Also the relevant consultation process with experts, international organisations, relevant ministries and civil societies regarding the SEA document should take place, in order to have a final document that would fully respect all opinions in laying the foundation for an optimal scenario for the development of Georgia's power sector.

Regarding the Khudoni screening document methods of ensuring wider and participatory hearings have also been not adequate. Indeed documents were uploaded on the Ministry web site and the information was published in some newspapers. However, it is not enough in order to inform locally affected people. It should be mentioned that newspapers are limited and do not reach the regions, while the Internet does not exist in the region of Zemo Svaneti, and is barely accessible in neighbouring ones.

In general, the population in the regions were not informed about the times and dates of the public hearings, nor its location or aims, as no information lists were distributed beforehand in an adequate manner.

For example in Jvari, the meeting started after an hour and a half because the organisers started to collect people after the presenters arrived. Some of the people, mainly Internally Displaced People (IDPs), left the room after 15 minutes. They had come for a meeting with local energy distribution company Energo Pro, who stopped delivering electricity to IDPs around three months before.

Consequently, meetings in all regions (Jvari, Mestia, and Khashi) started later than announced on the ministry website. The only place where lots of people were informed one week prior to the hearings was Khaishi.

During the hearings, a number of representatives of local governing bodies (local self –governing unit MPs, local authorities) confirmed that they have either not received any documentation or received it only one or two weeks prior to the public hearings.

The hearing held in Tbilisi was also characterised by low attendance. The majority in the room were employees of the Ministry of Energy and the total number of attendees was not more than 30 (10 World Bank staff and experts, four representatives of NGOs and two local citizens from Khaishi village). Accordingly, such a meeting may hardly be called a public hearing or could be said to have functioned as an involvement of the public in the decision-making process.

The absent people in the room could be explained by the formal approach of the event's organisers, insufficient distribution of information, and the timing – the last day of July, when most people are on holidays and so on.

According to the screening document, "The poor conditions of the communication infrastructure may be among the reasons the first Government messages informing the population about the Khudoni dam were not widely received". While it is not clear which messages the document refers to, it seems as if the first hearing organised by the World Bank and the government contradicts the main principles of the communication strategy formulated by the document, that "the communication strategy for the proposed Khudoni investment must at least ensure that information is: i) warranted to all parties concerned, ii) appropriately diffused at the different levels of the various stakeholders, iii) coherently diffused without contradictory or hidden messages".

Shortcomings of the SEA

3.1. The major shortcoming – the scope of the work and limited information

The SEA document should in fact present at least one scenario that could be acceptable in terms of environmental, social and economic factors. However, in the case of this particular SEA the aim was "to examine the "merit order" of potential investments and measures in a long-term generation expansion plan with respect to economic, environmental, social and strategic aspects. A key issue in this process was the examination the merit order of the proposed Khudoni hydropower project" and to "provide necessary insight to support, or otherwise, a decision to implement the proposed Khudoni investment project". The major shortcomings of the SEA backed by Terms of Reference (TOR) that does not require formulation of the best alternative scenario from the environmental, social and economic points of view, but rather prioritises the planned projects based on financial merits.

This leads to a number of uncertainties in the SEA including unclear assumptions about how many large HPPs need to be developed and stressing the problems of the power sector that have been under scrutiny for almost a decade: the need to assess the transmission system and interconnections with neighbours; assessment of projected trade; problems of excess water in summer time and so on.

Another shortcoming is that the SEA is based on limited information on planned development in energy sector. For example, the SEA highlights the fact that there are possibilities for the construction of five promising HPPs: Khudoni, Paravani, Tvishi, Namahvani and Zhoneti. The last three, the Namakvani Cascade, are reviewed within the SEA. However, the SEA lacks a list of the large hydro dams that were also prioritized by the Georgian government in 2007, including the Oni and Mtakvari Cascade, as well as small and medium sized hydro development programs.

In 2007, the Government of Georgia commissioned a risk assessment of investments in Georgian Greenfield hydro sites. The study was prepare by EconPoyry and it highlights the seven Greenfield HPP sites in Georgia, including Khudoni Dam and Namakvani. However, none of the other dams listed below has been reviewed in the SEA.

НРР	MW installed Capacity	TWh annual generation	Characteristics
Oni HPP	272MW	1475GWh	The proposed Oni Cascade is a 3-stage cascade to be constructed on Rioni River. Total costs of Oni are estimated at USD 477 million. Oni HPP has been prioritised by the Joint Needs Assessment Document .
Mtkvari HPP	235MW	596GWh	The site where it is located takes in up to 47 km of the upper Mtkvari River, near the Turkish border. The proposed HPP's aims to supply the surrounding districts and the national grid, as well as exports to Turkey.
Zestaponi HPP	89 MW	384GWh	The proposed 4-stage 89MW cascade on the Kvirila and Sakraula Rivers in the Zestaponi District.
Ponichala HPP and Digomi HPP	40.3 MW	224 GWh	The two proposed sites are located within the city limits of Georgia's capital Tbilisi, on the Mtkvari River. The two sites have identical technical specifications.
Enguri Arch Dam	10MW	74GWh	The proposed small run of river hydropower station at the bay after the Enguri Arch Dam could ensure year-round reliable generation at a high load factor.

Table 1 Planned hydropower plants in Georgia

In addition to that in 2008 the Ministry of Energy announced the Renewable Energy 2008 State Program that includes the construction of small and medium size HPP with a total installed capacity of 1000 MW. Unfortunately the SEA also lacks analysis of the program and its possible impact on the energy sector, as well as the environment and society.

It should also be underlined that the SEA fully ignores the energy efficiency scenario and energy efficiency is not even mentioned in the document (see below).

3.2. Major findings of the SEA

The Least Cost development plans presented in the study assume different economic development scenarios for Georgia. However, it is not clear what the economic development scenarios are for each particular Least Cost development plan presented. The demand forecasted for 2021 is 12,3 TWh. It is mentioned that during research that low and high scenarios for electricity consumption growth have been used in order to avoid errors of demand forecasting, including changes in population, structural changes in the economy and the introduction of energy efficiency. However, the alternatives developed by the SEA to achieve the demand of 12,3 TWh has a number of flaws.

The SEA does not mention the large generation capacity still available for rehabilitation. While Georgia has approximately 1600 MW of hydropower capacity that actually generates electricity at the moment, the installed capacity is around 2700 MW. The rehabilitation of these sites could bring around 2,2-2,5 TWh of additional hydro electricity. In general there is ongoing work towards rehabilitation of HPPs. For example, in August 2008, the EBRD started to consider rehabilitation of Vardnili I HPP, located in Gali, Abkhazian autonomous republic, to increase its capacity from 125 MW to 210 MW .

In addition, a government commissioned report clarifies that based on the an average economic growth rate in Georgia of 7%, an electricity-growth-to-GDP-growth ratio of 0,1, 0,5 and 0,9 in three scenarios, the total requirement for new electricity in Georgia by 2020 will be in the range of 2,2-8,8 TWh. Which means that in the case of a low demand scenario, the rehabilitation of the existing generation capacities would be enough.

Energy efficiency is also considered in terms of the electricity sector, as part of a possible source in demand forecasts. Georgia still has a higher electricity intensity in terms of GDP than most of its neighbours. The electricity sector efficiency potential is more than substantial, especially taking into account that 47% of consumed electricity goes to the household sector .

Even based on limited information, an improper TOR and questionable multi ranking criteria, the SEA finds that the inclusion of Khudoni Power plant in 2013 in comparison with other alternatives is a less stable alternative scenario than the construction and inclusion of the Namakvani Cascade, 2013-2015. In addition, according to the SEA, the Khudoni HPP could be optional under the high electricity demand forecast scenario in 2015, while under the Basic Demand forecast it is supposed to be developed in 2020. Meanwhile, under the so-called low demand scenario, Khudoni is not even considered, while Twishi and Namakvani HPPs are postponed to 2017.

The SEA confirms that generally the Khudoni dam is not the preferred option for energy security/ independence of Georgia. The state energy policy defines the goal of satisfying all energy demands through domestic production and to achieve energy independence through substitution of power generated by gas power stations by renewables, including large hydro. However, the Khudoni Power plant does not in fact serve that purpose. The SEA notes that from a power generation aspect, including generation ration in February, March and April, the Namakhvani Cascade is a more preferable option and has a certain advantage in comparison with HPP Khudoni. The SEA underlines that even though the "specific investment costs for Namakhvani cascade (1422 US\$/kW) are higher than for HPP Khudoni (USD 946/kW), the cost of average produced kWh from Namakhvani cascade (USD 40/MWh) is lower than from HPP Khudoni (USD 45/MWh). Furthermore, construction of the Namakhvani cascade is scheduled over a longer period, which is also an advantage from a financing point of view. Also, monthly distribution of the generation from the Namakhvani cascade is more suitable for Georgian power system than monthly distribution of the HPP Khudoni generation."

According to "World Experience for Georgia" (WEG) analysis, "the purpose of the Khudoni construction was to provide peaking power for southern Russia and the republics of Transcaucasus. Thus Khudoni is only an attractive project in the environment of open energy trade and cooperation in the region, if there is a reliable market for its peaking power in the neighbouring countries". However, the SEA as well as Ministry of Energy failed to provide any data confirming the fact that there is a reliable market for Khudoni.

The SEA underlines in the event of the base case scenario (that includes 576 MW thermal plants and 1086 MW hydro) and Alternative 1 Renewables (see below), as well as Alternative 2, (All three new hydroplants –Khudoni, Namakvani and Paravani), that "excess electricity during the wet season is wasted. If the excess electricity is exported, the potential revenue that might be realised is estimated at USD 274



million assuming USD 35/MWh." However, the SEA does not review the potential of electricity export in neighbouring countries.

Despite the above-mentioned and its own findings, it is very curious that the SEA advocates to develop all proposed projects under high environmental and social criterias, as most preferable option to satisfy all Georgia's energy needs till 2020 and even generate export capacity. However, it seems like a real wish list rather than a clear assessment of the different options.

Potential of electricity export in neighbouring countries

According to the official information, the technical export capacity to Turkey is about 700 GWh annually, and it is already fully utilised. The export capacities to other neighbouring countries are much higher, at 10 TWh for Russia, 2.2 TWh for Azerbaijan and 1 TWh for Armenia.

The study "Potential export markets for Georgian electricity " commissioned by the Ministry of Energy of Georgia reveals some possibilities to export electricity in Turkey "though dependent to a large extent on Turkish generation costs and price of competing imports". In the case of Armenia and Azerbaijan the study does not see any advantage in exporting. In the case of Armenia, due to the "historical policy emphasis on self sustainability". In Azerbaijan due to the "lower-than-expected demand in recent years... prospects for cheap domestic gas" suggesting that "Georgian Exports to the Azeri market are relatively risky, at least in the medium term."

There is a possibility to make Iran "a market for electricity imports from neighbours implies – at least theoretically – a market for electricity from Georgia in the medium-to-long term, especially during the summer months". The study underlines that due to the "nature of the Iranian electricity trade" "any trade with Georgia may have a strong political dimension, which could complicate deals for private foreign investors". Actually, the study points out that the Caucasus region of Russia is currently in deficit and "could expand significantly by 2015 if demand growth is at the higher end of the prediction". In addition, it underlines that the Russian plans for large-scale electricity exports to Turkey "could also make the use of the existing lines for imports to Russia problematic in medium term".

Taking into account the general relations between Georgia and Russia, even before the August crisis of 2008, and especially afterwards, any hope of exporting electricity to Russia is highly hypothetical.

From 2008, the Government of Georgia is considering applying to the EBRD together with the European Investment Bank (EIB) and Kreditanstalt für Wiederaufbau (KfW) for the financing of the construction of a new 315 km high voltage transmission line from Gardabani to Zestaponi and a "back-to-back" substation at the Turkish border . In order to implement the project, the EBRD shareholders fund allocated EUR 180 000 for a consultant to prepare recommendations for GNERC and Ministry of Energy on the feasibility of an SPV structure, the implementation of the licensing and tariff methodology for the project, as well as recommendations on the power sector organisation, already required, or made necessary for the project, such as the establishment of an independent Transmission System Operator (i.e. separated from GSE).

3.3 Misleading renewables scenario

One of the shortcomings of the SEA is that the renewables scenario has not been reviewed properly. The Alternative 1, Renewable scenario, in the SEA includes the construction of large hydro and thermo power plants with 495 MW together installed capacity for small and medium size HPPs and wind. That alternative is recognised as expensive. However, despite the fact that the SEA admits "development of renewable resources can not be evaluated with adequate level of certainty because of lack of information" it argues that it is most expensive alternative. It should be stressed that in this particular case it includes not only the "construction of small HPPs and wind farm projects on the level of 44 MW per year in the period before 2015 and on the level of 55 MW per year in the period after 2015" but also 576 MW of thermo and 470 MW large Hydro.

The report argues that the renewables scenario "would need strong support from the government and other relevant institutions with the aim of providing economic feasibility for this kind of project." The SEA correctly admits that "without incentives and special status for these projects, renewable projects would hardly find their place in the future development of Georgian power system" and that "implementation of renewables at the assumed level would only postpone the need for the large hydropower projects ". However, one of the major shortcomings of the SEA is that it does not consider the official program of the Georgian government that claims that it would construct 78 small and medium size dams with total installed capacity around of 1000 MW .

While there is a clear lack of site-specific feasibility studies and more detailed assessment, there is ongoing work to attract investors for the construction of small and medium size HPPs:

From the Spring of 2008, the Georgian government has signed a number of memoranda: For construction of 7 HPPs in Adjara with total capacity of 119 MW for USD 167 million with a Turkish company

With a US company Doheny Global Group memorandum to construct 4-6 HPP's with a total capacity of 100 MW, with project costs of USD 150-175 million, through the support of OPIC and TDA .

In autumn of 2008 the Caucasus Energy and Investment Company announced that they received permission to construct 28MW HPP on Mtkvari river near Turkish Boarder with an annual output of 160 GW/h The Project HPP Nakra HPP-1,) for Enguri HPP, is supposed to be constructed by Enguri HPP, with the involvement of state budgetary funds. The installed capacity of the Dam will be 19 MW, output 90 GWh per year .

The above mentioned investment for the development of small and medium hydro shows that the projects are attractive for investors, and thus present a feasible (if not the best) alternative in Georgia, while Khudoni and Namakhvani HPPs do need to draw on public resources.

Renewables are more price-competitive than traditional energy sources, when environmental external costs related to traditional energy sources are properly accounting for. Taking into account the slow development of the Georgian Economy and non-existing energy efficiency, a decentralised energy system based on RES development can be developed step by step to respond the needs of local communities and industry, while bringing energy to the market quicker, compared to traditional energy sources.

In addition, the traditional pricing of energy fails to take into account the true costs of its production, as significant amounts of carbon dioxide emissions contributing to climate change; these sources also produce pollutants such as sulphur dioxide and nitrous oxides during the combustion process, which adversely affect human health and the environment; while large hydro power plant construction can cause environmental damage to river ecosystems and contribute to the loss of arable land. Meanwhile, most renewable energy source projects avoid these adverse consequences and thus are not laden with hidden costs. However, due to the "original" methodology used to assess the impact of renewables on the environment Georgian Power Sector, the SEA gave the opposite results (see below chapter 4).

Finally, renewable energy development can offer stability and reliability that Georgia's existing power system lacks and balance the poor quality of power from the grid. All of these are not considered in the report.

3.4 Elements of energy efficiency scenarios missing

The SEA does not consider an energy efficiency scenario. Even though Georgia has a huge potential for energy efficiency in electricity and gas sector. Distribution systems are owned by private companies and are still subject to high levels of loss; these losses can be reduced significantly through cost effective measures. By improving the technology and organisation of distribution companies, it is possible to reduce losses and save approximately 400 GWh electricity and 130 million m3 of natural gas in Georgia.

The research show that there is big potential for energy saving in Georgia in residential and non-residential sectors. For example, according to the researchers the replacement of incandescent bulbs with fluorescent bulbs could save around 350 GWh electricity, that equals the generation of output of big dam like Paravani. This will cost about USD 10-15 million and can be achieved in a relatively short period of time, while building an equivalent hydro plant will cost at least USD 120-150 million and will take 4-5 years. While the use of energy efficient equipment and technologies in the commercial sector can save about 10-15% of consumed energy.

Flawed environmental and social analysis in SEA

The SEA does not assess all existing scenarios from an environmental, social and economical perspective in order to find out most sustainable option for further development of the power sector. Unfortunately, to some extent, the multi-ranking criteria assessments proposed resulted in significant irregularities that in a number of cases contradict internationally recognszed practice, as well as the preliminary environmental and social studies for the Khudoni project.

4.1 Flaws in the environmental analysis

According to the SEA report the Khudoni HPP's impact on the environment includes no impact on vegetation and only a small negative impact on fauna (Table 9.1). The approach of the SEA working group, which assesses and calculates damage to vegetation and fauna but not the impact on ecosystem level, is a very strange approach.

According to WWF Caucasus office, it recommends that the Government of Georgia include a number of territories in the Central Caucasus area, within Lakhamuli and Khashi Forestry, in the list of reserve territories in order to expand and widen the nature reserve areas in Georgia by 2010. According to the Khudoni screening document "One of these areas, "Svaneti priority conservation area - PCA" (n°13) covers 2 320 km2, the whole upper Enguri watershed upstream of the village of Khaishi. The limits are approximately the valleys of the Nenskra and Khaishura tributaries. And the upper part of the projected Khudoni reservoir is within this PCA. Notable species associated with this priority conservation area are: Capra caucasica, Capra cylindricornis Rupicapra ruiocapra, Ursus arctos, Lynx Lynx, Tetrao mlokosiewiczi, Tetraogallus caucasicus, P. lorenzii, Vipera dinniki."

The Khudoni Environmental and Social Panel notes in September 2007 that the SEA "environmental data may be incomplete/misleading. In the case for Khudoni the report says that there are no reserves or parks – providing a reason for not giving importance to the fauna of the area. But the interim report for the [Khudoni] EIA states the importance of the area's biodiversity (highest biodiversity index in Europe), the high level of faunal endemics and a number of species with a global or national threatened status. Based on incomplete information for the one area for which we are now familiar, the question arises as to how reliable the data is for the other schemes, and ultimately, how reliable is the matrix for comparing the environmental factors of the various schemes".

The document presented in July 2008 contains the same contradiction. Of course, the fact that the protected area is still in the planning process and the preparation of the law is within the boundaries of GEF/World Bank protected area development project raises fears that this area would not be included in

the protected areas system. However, even that fact could not justify the arguments of the SEA working group that the impact on biodiversity would be almost negligible. This is even more confusing, if we consider that almost no background studies are available.

4.2 Flawed environmental and social impact assessment of alternative

The SEA report also argues that a wind farm could have more "significant" impact on Fauna, while all assessed large HPPs have a "small negative" or "negligible" impact on fauna. (table 9.1)

The conclusion brought by the SEA report also argues that wind farms will have small negative impact on the landscape and tourism development, while the large HPPs' impact on landscape is negligible and has a small positive impact on tourism development. It is difficult even theoretically to agree on presented proposals not even mentioning particular case of Khudoni HPP, where the construction of the site would negatively impact on tourism development in Mestia region due to problems with road, while the Svaneti region is beautiful enough not to require artificially "nice" landscapes and fishing opportunities in the river Enguri and its streams more than enough already.

Despite the fact that wind farms may have some negative impact on wildlife and population, it mainly appears in form of the noise (even though modern turbines are more and more noiseless) and problems of location. If all technical parameters would be applied (on the spot it is possible to reduce the mechanical and aerodynamic noise in some extent), and a proper place for the wind farm would be chosen (e.g. if wind farm turbine will be at least 500 metres far from the residential area and not located in the corridor of migratory bird species) could substantially reduce the environmental impacts. Furthermore the maintenance of wind energy is more labour intensive, and thus creates employment opportunities.



The Enguri river

4.3. Unclear financial and economic justification

The economic and financial justification for the Khudoni HPP construction is not given in the SEA or in the screening document. The SEA is not clear about whether all of the extra costs related to the project are included in the financial calculations. In total, the SEA defines the project budget as USD 780 million, with the assumption that 20% of the work has been already finalised during Soviet times in the form of existing infrastructure.

During the public hearing in Tbilisi, a technical expert agreed that there could be around 25% extra costs, because the state of the above-mentioned infrastructure is not clear and said that there may be need of additional funds for its rebuilding or updating. It should be noted, that already few years ago some Georgian hydro engineers underlined that in order to construct Khudoni, the existing infrastructure should be reconstructed once again due to the fact that operation terms for that infrastructure had passed away a long time ago.

It appears that there could be also other external costs that are not calculated. For example, the SEA report highlights that the construction of the reservoir and related infrastructure could intensify erosion processes and presents these measures: "This negative impact of the reservoir can be neutralized by performing renegotiation of deforested areas and of the whole watershed, stabilisation works and replanting of erosion along the roads, implementation of drainage system and monitoring of slope erosion (page 74)". However, it looks as if these costs are not attributed in the general costs distribution figure.

The same could be said about the replacement road – the major road from Jvari to Mestia that is supposed to be constructed on the same slope because the old road would be below the water level. The new road should be 200 metres above the existing one, however the length of the new road that needs to be constructed and the feasibility of the construction on the highly eroded steep slopes has not established. According to some experts and local people the road would be at least 18-30 kilometres longer than the existing road and would require an investment of quite large sums and would increase travel time from Kaishi to Mestia, where 80% of the Svaneti population live, from 3-4 hour to 5-6 hours .

From that point of view it is important to examine other experiences from around the world. The World Commission on Dams report concludes that large dam construction analysis revealed that in average the overspend was more than 89% of preliminary assessments. The re-auditing of 81 dams clarifies that the overspend was 56% (according to official data 21%). In 1996 independent research of the World Bank clarifies that out of 66 large dam projects financed by the Bank the average overspend was 27% (the 4 largest dams with the biggest overspends were not included in analysis). The commission also collects data from other financial institutions that show that despite not included extra social and environmental costs, from the beginning most of the dams show very little return rate.

It is interesting that a World Bank letter to the Georgian prime minister Z. Nogaideli in 2006 states that the estimated project costs are USD 780 million, the economic rate is 5%, and the costs of the one kW of generated energy expected to be 4 US cents . According to information given by ECON on www. georgiahydroinvest.com, the "financial attractiveness of the site was evaluated based on a tariff just below estimated marginal thermal in Georgia 6.8 US cent / kWh for the initial seven years of full production. In this case the project is viable and appears financially attractive. In fact, the project covers all costs including costs of capital at a tariff of 6.5 US cents in the initial 20 year period".

The fact that neither the SEA nor the screening documents in 2008 address the issue of economic return and whether the project benefits society as a whole raises bigger concerns about the decision-making process in general.

4.4 Contribution to Georgian energy security

Traditionally, one advantage of hydroelectric systems over other forms of electricity generation is the use of reservoirs to store water during times of low demand and then quickly start generating during peak hours of electricity use. However, in the Georgian HPP the basic electricity generation utilities do not satisfy the needs for peak hours. The major peak of electricity consumption comes in winter and extra demand is covered by thermal power plants or is imported.

However, the seasonal aspect impedes the utilisation of hydro resources for the further development of the energy system. New hydropower plants will have peak generation during the spring/summer period when there is already an excess of electricity in the Georgian energy system.

In the period of May to July the surplus hydro energy compared to system demand is already high. The water discharge in rivers strongly increases, and electricity usage considerably decreases. As a result, an unproductive discharge of water in hydro plants may happen. Specialists estimate the amount of excessive energy at approximately 700-800 GWh annually, or about 10% of in-country electricity generation.

The problem of seasonal imbalance for the Georgian energy system is a result of the fact that Georgian power plants were planned and constructed based on the united energy system of the Soviet Union. After the breakdown of the Soviet Union and the isolation of the Georgian energy system, some of the capacity remained unloaded in the summer. The strategy of new generation development has to take into account this in-country seasonal energy imbalance in order to achieve real energy security for Georgian Energy system.

4.5 Lacks external shocks and risks assessment

The Khudoni Dam is located on the river Enguri, on the border between Georgia and the breakaway region of Abkazia. During the conflict between Russia and Georgia in 2008, additional checkpoints were introduced by Russia near the village of Khaishi. The Russians occupied the village of Khaishi on August 12, 2008 to guard the only road to Kodori Gorge which goes through Khaishi village.

In addition, during the Enguri Dam rehabilitation funded by the EBRD and the EU there were a number of the violent accidents on the Dam staff. It should be mentioned that the Enguri Dam and hydro power plants, which lie in the heart of the Georgian–Abkhaz conflict zone, have become integrally related to the struggle between the two parties. The complex has enormous economic importance. It is the only source of electricity in Abkhazia and is vital for sustaining de facto independence; rebuilding infrastructure ravaged by war and maintaining economic and social well-being. For Georgia the facility is important to state building since it provides most of the country's electricity. Both sides therefore need the complex to continue to generate electricity, but with the dam on the Georgian side of the border and the power plants on the Abkhaz side they have been forced to cooperate.

It should be mentioned that in case of the Khudoni Dam all construction work would be carried out on the Georgian side and that fully excludes any interest from the Abkaz side for its safety and security.

Review of the preliminary environmental and social screening documentation

Reviewing the alternatives to Khudoni

According to the draft report, nine alternatives were considered to the Khudoni HPP, with three variations of each (various location, higher and lower dam etc). However, the alternatives were presented in such a manner that it is impossible to notice differences between them, especially in terms of the impact. For example, while the impact on cultural heritage has been identified for almost all nine alternatives, the same could not be said with regard to social and environmental impacts.

In addition, it appears that during the public hearings there were already three major alternatives chosen and agreed between technical experts and social and environmental experts groups as the basis for deeper work. As a result three major alternatives were presented and discussed during the hearings, however, it is very difficult to speak about the plusses and minuses of these alternatives based only on information provided during the hearing, as major information was missed in report itself. The only alternative reviewed in detailed by the report is an old project.

The major alternative promoted by the government and the World Bank has significant social impacts on the population living in Khaishi and its surrounding areas, while the two other alternatives avoid flooding the village. However, the alternatives that have less negative social impact are barely described in the screening document or described in a very confused and diffusive manner.

Taking into account the fact that that construction of any large dam is connected with irreversible changes and risks for the environment and society, the decision making process should accordingly be undertaken based on full consensus among society members. It should also be noted that Georgia has huge potential for the development of renewable energy, that is acceptable from both an environmental and social point of view and even from an economical point of view requires less extra costs as well as smaller exploitation costs.

Despite the fact that during the hearings in the regions three alternatives was presented, it looks like that the decision was made beforehand on purely financial grounds. While itself, the screening document does not give any financial-economic evaluations of the alternatives, it is not clear based on which advantages the old project was chosen as the major alternative.

The language of the document (both in Georgian and in English) is heavy; the conclusions are diffused and unclear. For example, according to the executive summary from the preliminary cost evaluation of environmental measures, the basic alternatives are recognized as the most expensive options. The "Khudoni historical site" has very high costs for resettlement of about 450 households and reconstruction of basic infrastructure (roads, water supply, provision of electricity ...) and community and service infrastructures (school, medical services, police and fire-station...)".

According to the screening document the most preferable option environmentally is option 6 (Khaishi-B) and 7e to 7h (Khaishi-A downstream), "The Nenskra river is let out of perturbation (except for tunnels); the population directly affected, infrastructure and flooded agricultural areas are moderate compared with other options; flooded forests areas are also moderate (or equivalent to other options) compared with options 5 and 7 (7a to 7d)" and admits that option 5 is bad option from an environmental and social impact perspective.

And in conclusion it states "without economical consideration, all dams with lower levels of crest (option 3 or 4, with maximum normal level at 700 m elevation) are of course less harmful to all environmental criteria (only one village directly affected, flooding of forests and cultural areas is very moderate). Nevertheless, both the Enguri river and the Nenskra river are affected. The resulting impact on the environment and population could be decreased by environmental measures."

It should be stressed that it is unclear what the document is actually trying to state and how the above mentioned fits the logic of promoting the historical Khudoni site. It should be stated that it is important to have the executive summary written in a way that explains to a wider audience and decision-makers all the concerns and related problems for informed decision-making.



Concerned villagers of Khaishi

Social impacts

The screening document highlights the major project alternative that would have high impact on the population – during the project implementation the resettlement of the village of Khaishi and some surrounding villages is proposed.



Khaishi is the administrative centre for a number of small settlements, while number of downstream villages would be flooded (Barjashi, Idliani, Nalkorvali, Skordzeti, leburtskhila, totani), some upstream villages (Cheri, Kedani, Lakhani, Mukhashura, Tsitskhvari, Kveda Vedi, Zeda Vedi, Zemo Marghi, Jorkvali, Tobari, Kveda Tsvisminda, Zemo Tvisminda, Kvemo Marghi, Kvemo Ipari) will be isolated and stay without basic services – school, post, bank, hospital etc. Altogether the relocation of around 1 500 people is expected from Khashi that is a significant number for the Zemo Svaneti region (8 000 - 10 000 people).

The population of Khaishi is already vulnerable, due to the fact that the majority of them have been already resettled once during the Soviet time to other parts of Georgia. The resettlement in the lowlands was unacceptable and stressful. The majority could not withstand with new environment and chose to get back to homeland. The re-resettlement for local villagers is difficult and unacceptable, this was clearly stressed by the majority of attendees at the public hearings in Khaishi. People from surrounding villages and Mestia (the administrative centre of Zemo Svaneti) are also against the resettlement of Khaishi village.

In addition, it should be stressed that since the early 1990s people have been waiting for a final decision regarding the Khudoni project. The dam was associated with the Soviet Union and after independence the belief grew that the dam would not be constructed and this created hope for stability. From the 1980s some residents of Zemo Svaneti have resettled in the Kvemo Kartli, Samtskhe-Javaketi and Tetritskario regions as a consequence of ecological disasters. Resettlement practices in Georgia relating to ecological refugees created more problems than they solved, because a plan and strategy for the resettlement of ecological refugees does not exist. In addition, the existing practice of resettling Internally Displaced People (IDPs) because of ethnic conflicts also raises questions among the Khasihi population about the ability and willingness of the authorities to deal with resettlement issues with respect to human, social, economic and cultural rights.

Unfortunately, some parts of the report are unclear, ambiguous or incomprehensible. According to the study, in the description of vulnerable groups, there are 20-30 IDPs in Khaishi, including ecological refugees from the village of Veda, living in Khaishi Hospital, most of them unemployed; some getting a state pension; some surviving through subsistence farming. However, the document states that: "The presence of IDPs can cause jealousy in the population when, for example, they get help which is not available to the very poor. In any case IDPs are always in difficult conditions with an insecure supply of food, having no access to land for subsistence farming, which is why they are considered vulnerable. (page 87)". However, it is not clear what document meanss by that.

The IDPs (refuges, ecomigrants and so on) certainly represent socially vulnerable groups and up to now in Georgia, and particularly in Zemo Svaneti, have never been questioned. Indeed, the majority of people in Zemo Svanetihave already know quite well what it is to be an IDP after the Abkasian-Georgian conflict. Khaishi villagers have several times stressed that there are so many IDPs in Georgia with almost unresolved problems (shelter, employment, social protection) and they fear that in the case of Khaishi resettlement they will be joined by IDPs.

The screening document admits that a land registry does not exist in Zemo Svaneti. From the 1st of November, consultants have begun working on preparations for the RAP, and at the same time the population was asked to register their property before the end of November, 2008.

It should be mentioned that Georgian legislation does not require the preparation of a social impact assessment document, nor the mitigation of social impact. While the World Bank would prepare the ESIA based on its own policies and best international practice, it is unclear according to the law who should review the social impact assessment plans, and if there is any state agency responsible for overseeing its implementation.

In accordance with the Georgian constitution the right to property is recognised and guaranteed and "the abrogation of the universal right to property, of the right to acquire and inherit property shall be impermissible". The constitution allows the seizure of property for the purposes of pressing social need", only in cases as expressly determined by law, under a court decision or in urgent cases determined by the Organic Law and only with appropriate compensation" (article 21). The only law that regulates compensation of material damage during infrastructure projects is the law governing the expropriation of property for public purposes.

However, the law only compensates material damage to registered property. Georgian legislation does not recognise the rights of people who have no formal legal title to the land or other assets (like tenants, squatters, natural resource users, communities and vulnerable groups), despite the fact that it could be traditionally used by the above mentioned group. In addition, the law does not make provision for relevant compensation in case of dismantled infrastructure or distorted services.

The legislation therefore does not require early notification and consultations to potentially affected people, nor does it require the preparation of the Resettlement Action Plan. The method of expropriating property includes the Decree of President that appoints the expropriator (physical or judicial person), that should pay relevant compensation in accordance with a court decision.

In the case of Khudoni, while the World Bank will prepare the RAP according to the World Bank OP.4.12, the unregistered owners/users of property remain in danger of being uncompensated based on practices and realities in Georgia. This has been clearly demonstrated by the Baku-Tbilisi-Ceyhan Oil pipeline case (2003-2007), when in a number of cases the owners of the land were not reimbursed for their losses, due to corruption, improper registry, restricted assess to the courts and so on.



The cultural heritage of Svaneti

Economic activity and poverty in Svaneti

The social impact of the Khudoni construction is underestimated. The major cause of poverty, according to the study, is scarce fertilite land in Svanetia. However, the poverty in Svanetia is deeply connected with the problems of the sustainable use of natural resources, including existing pressure for increased wood consumption as fuel, overgrazing; illegal logging and export, soil degradation and erosion, desertification, environmental pollution and natural disasters. In the last few decades a drastic change of climate has become noticeable and there have been more frequent natural disasters - floods, landslides and avalanches occur that damage the environment seriously and destroy the economic infrastructure.

It should be underlined that despite wide spread poverty Svaneti has a huge potential for agricultural production, development of small hydro and mineral waters industry. At present, more than 300 monuments have been discovered and more or less studied: former dwelling sites, defense and worship buildings, burial grounds, roads and paths, caves, mining pits, etc. The materials, discovered as the result of an archeological dig, reflect the long process of social development from the 6th-century B.C. up to the Middle Ages. These finds have proved that Svaneti was a powerful hearth of the "Bronze Colchis Culture". In addition the enormous number of national monuments and beautiful landscape gives the potential for tourism development, not to mention the wider possibilities for sustainable agricultural activities including the production of the crops as well as cattle rearing.

The major constraint is the existing isolation due to problems with transportation, lack of communication and the conflict between Abkazia and Georgia, on the border of the Svanetia. However, the scarcity

of local budgetary resources makes it difficult to cope with the existing constraints. In this regard the local administration is not independent in financing priority development programs as the tax system is designed in a way that no financial resources are available locally for rehabilitating key infrastructure: access roads, bridges, irrigation and draining systems, water supply systems, sanitation, education and the health sector, which have an immediate impact on community livelihoods.

Poverty results from the above-mentioned reasons, and not just the scarcity of the land, while it is clear that the economic activity in Zemo Svaneti remains below potential. The screening document admits that Dam construction would not bust the sustainable employment in the region and predicts the same level of poverty after the finalization of the construction if the extra measures are not taken in order to develop sustainable agricultural and tourism development activities.

From that perspective it's clear that the construction of the Dam would not bring any long-term relief for poverty reduction for Svaneti residents and/or ensure development of social and economic infrastructure to address the sustainability of livelihoods. It is recognised by preliminary environmental and social screening report "increasing employment opportunities linked with the construction of the dam and the provision of services to the workers (people from Khaishi and from all the villages)", however, it does not assess how many employment places would be created eventually. It is clear that while some of the residents will be employed in construction activities as unqualified personnel, the majority qualified and even unqualified workforce will be brought in by the construction company outside of the Svaneti and even Georgia. This was clear during the BTC pipeline construction, as well as other projects when foreign companies prefer to bring their own workforce even for unqualified work.



Landslide on the main road

Cultural heritage and traditional livelihoods

The impact on cultural heritage looks to be significant. On the one hand there is clear evidence that from an archeological point of view that flooded area represents the interest while the archaeological heritage is largely unstudied.

The local population is highly concerned with the impact of the possible construction on Saint George's Church and cemetery (including ancient ones). The potential impact on cultural heritage has been stressed several time during the public hearings. According to the screening document "Loss of culturally significant sites (there are only few archaeological sites, but sites such as churches and burial sites are also important to people) will cause: impacts on the population's feelings of place, history, culture and memories",

The possible mitigation measures raised in order to preserve the cultural heritage sites, like "Complementary archaeological excavations, relocation of cultural monuments (Kaishi church and cemetery) if necessary, consult wishes of the population with relation to rites before relocation of burial site" looks unlikely to be enough.

For communities that in the twentieth century tried to hang on to and maintain the ancient traditions, using ancient customs as a part of everyday life, identifying themselves with their ancestors and forefathers, these types of impacts are very sensitive.

The measures proposed are not enough, especially taking into account that the authors of the screening document admitted that indigenous peoples policy "is applicable to the Khudoni HPP Project regarding the preserved and original way of life of the Svans with their own language and traditions, ancient customs still being a part of their everyday life, and the predicted flooding of Khaishi and some other hamlets".

As a mitigation measure to avoid disruption of social networks and cultural interaction from the presence of non-Svan permanent workers and their families, the following is proposed:

Family clans and kinship relations taken into account Prevention of conflicts between local people and immigrant workers (workers' code) and their families (information on Svan way of life and rules). Development of an area-based, integrated development Project for the Svaneti Region

However, it is clear that the introduction of thousands of males for construction activities would clearly affect the social network in a negative way and will cause disturbances and disrupt local communities even from as far as Khaishi. The work camps will increase crime, drug and alcohol use in area, have negative gender impacts within the local communities, with potential of driven or forced prostitution, the acceleration of sexually transmitted diseases and sexual harassment. From that point of view it is clear that the proposed mitigation measures are not enough and in the case of the construction of any type of HPP in Khudoni the deeper programs for preservation of Svaneti original way of livelihood will be required.

Climate change and its impacts

According to the report "Climate evolution in the study area is analysed in relation with: (i) global changes over the 20th century, and (ii) the implementation of the Enguri reservoir in the '80s. (page 45)". Unfortunately, in the document climate change is reviewed in the 20th century, based on data from 1905 till the beginning of the 1990s, and according to the report "shows small changes for temperatures and precipitations in the study area".

It should be noticed that in Kvemo Svaneti according to data from the Climate Change centre, based on "Climate Change projects 2006 results" in Lenthekhi region, "for last 15-20 years the average air temperature in comparison 1955-1970 period increased by 0.4%, while sums of annual precipitation is around 8%. The sharp increase of precipitation caused significant increase in the flow of the river Tskhenistkali, which in the given period increased by 40%. Significant rise of atmospheric sediment and

river flows during last 15-20 years was followed by sensible activation of floods, landslides and landslips, as well as erosion processes. "

Taking into account that the Kvemo Svaneti region was chosen as a typical mountainous region, it is required to have deep analysis of climate change and modelling of the development scenarios in Georgia, and only on that basis make conclusions. Based on different scenarios climate change may have negative impacts on hydro energy production due to the change in hydrological balance, however, incorrect calculations in future may bring irreversible damage to the environment and peoples.

Significant micro-climate changes induced by the Enguri reservoir are recognisable one to two kilometres from the dam. The same approach to Khudoni may be accepted: "Concerning the future Khudoni Dam, the impact on local climate should be the same as observed for Enguri, with a significant increase of air temperature above the reservoir and surroundings, and possible winter fogs."

However, what is really interesting here are the cumulative impacts. According to the study "no significant change on rainfall and climate in the upper valley is to be expected" from the Khudoni Dam. However, while itself in the formation of climate change the leading role will still be played by moist air masses from the Black Sea, but exclusion of Enguri, Khudoni and later Tobari HPPs cumulative impacts on the Enguri Gorge's micro-climate, as well as on the regional climate, is not acceptable. All of this should be considered not independently as it is in the study, but in the context of global climate changes and ongoing processes in the region.

Health care

The micro-climate and regional climate impacts on the healthcare of the local population and the environment should be considered in a global climate change context. For example, in the Lentekhi region, according to statistical data an increase of circulatory system and heart diseases was confirmed, that is same as fixed in Tbilisi. According to the researchers it could be caused by climate change, as the blood circulatory diseases are a group o diseases that is related to climate change. According to the reviewed report the same is true for Zemo Svaneti: "high blood pressure and heart diseases are prevalent".

It should be noted that part 7.4 of the healthcare issues. It says, "Both in Khaishi and in other parts of the region, people claim an increase of health problems (basically arthritis) due to the presence of the Enguri dam which would have altered the micro-climate. Contradictory evidence, supported by scientific studies, has been found by the Team." However, in the report there is no statistical data or any medical research conclusions (or references to any studies) with regard of the healthcare situation in the region.

During the public hearings the Report team announced that they studied statistical data during the the filling of Enguri reservoir and afterwards but could not find any significant increase in skeletal diseases. However, during the public hearings the population, including medical personnel from the local hospital, stated the opposite.

Unfortunately, in a study the impact on healthcare is assessed as high during the construction period, while during its exploitation it is almost ignored. The impact is assessed as low, as "Possible increase/outbreak of diseases due to air humidity in the surroundings of the reservoir (cumulative impact with the Enguri reservoir)." However, to make this conclusion more evidence is needed. In addition, the modelling of the cumulative impact should include a time feature, so it is necessary to assess the HPP exploitation impact in that direction.

The research highlights that the risk to health is high: "Introduction/changes of contagious diseases (acute respiratory infections, HIV/AIDS and other sexual diseases...)". While preliminary studies indicate that during the HPP exploitation there are no impacts on health.

Meanwhile, the World Health Organization in its 2000 report for the World Commission for Dams, requires full Health Impact Assessment for large Dam projects. The report highlights that health is considered to be: "...a state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity". In addition, the WHO among the human health issues related to dam construction and operations recognises the following communicable diseases (vector-borne, water-borne, sexually transmitted, zoonoses, other parasitic), non-communicable diseases (poisoning by minerals, biological toxins, pesticide residues, industrial effluent, circulatory and skeleton diseases, injuries and malnutrition), as well as psychosocial disorders.



Biodiversity

The preliminary assessment of the biodiversity impact as well as background data is provided in a confusing manner, especially in the Georgian version.

The background data is to some extent unclear, lacks explanations for the impact of existing pressure on biodiversity. For example, according to the document "bear and chamois are designated as endangered in Georgia's Red Data Book while West Caucasian tur and East Caucasian tur are globally endangered and vulnerable, respectively. Unmanaged and illegal hunting has almost pushed the turs to extinction in entire Svaneti." However, the Caucasian tur is on the red list too.

The documents states that "In some parts of Svaneti, people kill various birds for use in pagan rituals". However, the only known species till now was the domestic cock, and there are no other references in the document to the ritual's impact on the environment.

Without providing enough background data, from one side the document confirms the change of landscape, disruption and destruction of the habitat areas for flora and fauna, however the impacts are described as modest or low. For example, according to the document, page 122, the Impact on Wildlife, that includes "Loss of habitats for terrestrial species including game, endemic and protected species. The escape of animals from the flooded area with possible temporary and indirect effects on the equilibrium of fauna in the surroundings areas. The barrier effect due to the filling up of the reservoir will be "Moderate". As a mitigation measure, document proposes "Possible compensatory measures: (i) protection and reforestation of the watershed; (ii) involvement of the electricity company in the implementation of forest areas with a protection status and natural protected area". Leaving aside the confusing nature and content of the

proposed mitigation measures, it is not clear why the impact is moderate if there is clearly destruction of full habitat, and in which direction the mitigations would be concretely implemented.

The document states that the dam would cause the "barrier effect for aquatic communities, and especially for reproductive migrations of trout from the Enguri reservoir to upstream rivers" and assesses its impact as "Low to moderate", with proposal to have "No mitigation measure (a fish ladder is not conceivable due to the height of the dam)."

The document acknowledges that as a mitigation measure the introduction of commercial value in order to increase the fishing resource. It looks like an artificial intervention rather mitigation measure, not to mention that the introduction of alien species in prohibited.

According to the document the "project will have no impact on protected areas, as there is currently no protected area within the study area." And "the creation of a protected area in the upper valley is in the project and can be seen as a compensation of the artificialisation of the medium valley due to hydroelectric development.", while "the impacts can be qualified as: null". However, it is unclear what the basis of the statement is. Recalling the WWF recommendations, referenced in chapter 4, Svaneti priority conservation area - PCA" (n°13) covers 2 320 km2 the whole upper Enguri watershed upstream of the village of Khaishi.". Background studies in the area are very few and neglect the need to have the protected area on that territory in a way as to not intervene with Khudoni construction is artificial and creates danger for unique biodiversity.

Conclusions

The financing of the Khudoni dam – or any other large dam – does not represent effective investment for the Georgian power sector; rather it would lead its development along an unsustainable path. Due to the huge investments it will require a significant increase of tariffs if it will be used for domestic purpose, while for the majority of the Georgian population (around 50%) high electricity prices are already unaffordable.

The impact of the Khudoni Dam construction on Svaneti and Enguri river gorge is much greater than the sum of the economic commodities provided by the land and water. It is the livelihood of the region, its history and inspiration, and is deeply embedded first of all in the heart and lives of Svans, and Georgia as a whole.

There are better ways to meet Georgia's energy needs and to provide stimulus to its economic development. Instead of choking the valley with dams, the old development communist model based on gigantism should be replaced with one that would support and celebrate the region's rich cultural and ecological heritage.

Green Alternative

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