ISET

Project Report

Assessment of the Research and Training needs for the Georgian Energy Sector

Project initiator: **International School of Economics at Tbilisi State University (ISET)**

Project implementer: **Association of Young Professionals in Energy of Georgia (AYPEG)**

30 December 2011

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1. Project Synopsis

The aim of the report is to summarize main findings from the interviews conducted by AYPEG and provide suggestions and recommendations for the research and training needs in the Georgian energy sector. Report also includes individual interview summaries (40 in total) as an appendix that enables to identify each organizations opinion on the research and training needs.

1.1. Project Rationale

The aim of the project was to assess the main research objectives and training needs in the Georgian energy sector. Energy sector appears one of the most promising sectors in Georgia and especially hydro power which is one of the main resources of the country. On the other hand more than 80% of the energy resource remains unutilized. Consequently, now when Georgia is paving its own way of economic development, it is crucial to determine main research questions and access training needs. This will help to allocate intellectual/financial resources where it is mostly required and help the sector to exploit country's energy potential.

1.2. Description of the Project

The main approach to assess demand on specific research topics and training needs was to interview all relevant stakeholders in the energy sector. Organizations were asked to clarify what is the main challenge and problematic area for them that need additional research and what kind trainings were required for their staff; Moreover organizations were also asked similar questions for the whole energy sectors prospective.

At the first stage main stakeholders in the Georgian energy sector were defined. Afterwards AYPEG's staff[1] allocated all the stakeholders and interviewed them. During the interviews the number of stakeholders has changed because of two reasons: firstly some organizations/companies appeared to be subsidiary/holding companies and they spoke as one company. Secondly, during interviews more organizations were identified though interviewed companies which were relevant stakeholders in the energy sector as well.

[1] Appendix A includes the names of AYPEG members participated in the survey.

In total, AYPEG members have contacted 56 organizations. Name of those organizations, contact persons and response types are provided in appendix B. Out of 56 organization, 40 were interviewed and corresponding individual interview reports are attached on appendix C. 6 organizations requested to provide survey questionnaire via e-mail or phone call but did not respond to AYPEG so far. Finally, AYPEG could not contact 10 organizations or these organizations refused to participate in the survey. Figure 1 below illustrates percentage distribution of the organizations depending on their responses.

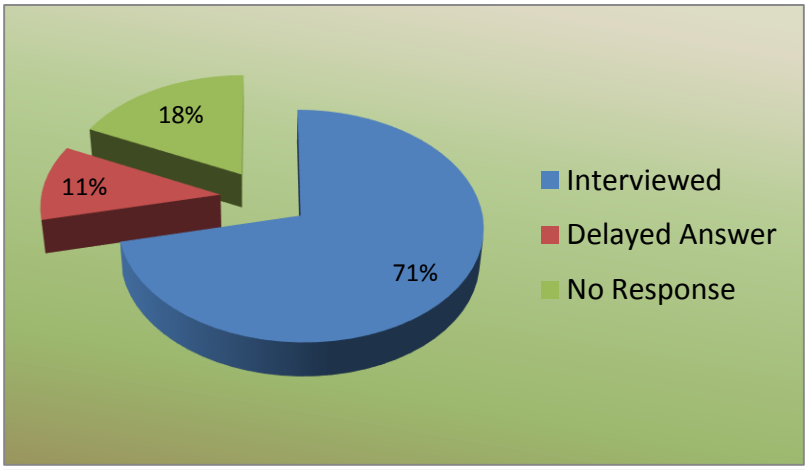

Figure 1: Distribution of stakeholders by their responses

Survey was comprehensive since it covered all the main actors in Georgian energy sector, including state owned and private companies, ministries, NGOs and international organizations. Figure 2 below illustrates distribution of organizations by their type

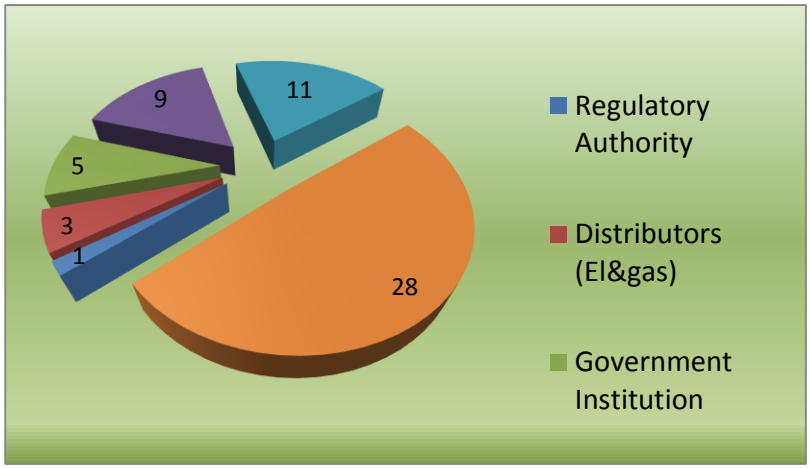

Figure 2: Distribution of stakeholders by their type

Despite above listed stakeholders differ in their business and type of activity still there are topics which are equally fascinating in terms of research and training needs. Next section provides this kind of topics and offers suggestions/recommendations on research issues and training needs.

2. Suggestions and Recommendations

Based on survey results, all the training and research needs are grouped in clusters and within each cluster most fascinating and necessary topics are suggested. Firstly, most frequently mentioned research clusters will be analyzed from different angels. The same approach will be applied for the training needs. Firstly most frequently mentioned training topics will be listed and analyzed.

2.1. Research needs and suggestions on most fascinating/necessary topics

There were revealed 7 research clusters that were mentioned at least by two different organizations during the interviews.

2.1.1. Energy Efficiency

Most popular topic revealed to be energy efficiency. Local and international energy experts claim that inefficient use of electricity is a huge problem for Georgia. Correspondingly most organizations, including World Bank, Tbilisi City Hall, WEG, EEC, environmental NGOs consider research on energy efficiency crucially important.

Interesting suggestion came out from the Tbilisi city hall. Before starting any energy efficiency activities, survey research that will reveal what is the level of knowledge about energy efficiency in the population of Tbilisi and Georgia will be extremely helpful and welcomed by Tbilisi City Hall since it will generate more specific idea what type of activities should be done in order to address this problem.

Research on implementation energy efficiency activities while constructing new buildings is another important topic that was highlighted during the interviews. Currently there in no law or legislation in Georgia that obliges construction companies to satisfy any energy efficiency requirements. What will be the costs and benefits for the society implementing energy efficient

standards? Another interesting topic is to estimate what is Willingness to Pay (WTP) of the households for energy efficient apartments/technologies.

According to the Ministry of economy and sustainable development, the creative ways to stimulate businesses to be more energy efficient (not by direct interventions by government via setting necessary rules for everybody) is the topic that needs investigation and research.

Also CBA in any other energy saving measures will be beneficial for the current energy sector in Georgia.

2.1.2. Energy Policy of Georgia

WEG, TBSC and HIPP mentioned that there is no clear energy policy in Georgia. In general government of Georgia claims that they are in the process of developing competitive power market, and there are two numbers: 2017 and 2023 when authorities think that power sector will be fully competitive. However most recent actions (allowing distribution companies to buy also HPPs and form vertically integrated monopolies) have nothing to do with the competition. The question arises why this happens and does Georgia really need to deregulate its power sector? World Bank named right word for the current condition of the Georgian Power market: “situation with challenges”. In this stage, it is crucial to estimate costs and benefits by opening the power market.

The role of the government on the competitive power market needs to be discussed and analyzed in Georgia. In competitive market, according to HIPP, government needs to take more active role via setting enabling environment.

The pros and cons joining EU energy community is huge topic that needs qualified research and analyses.

According to JSC Telasi, the question on increasing competition is tricky in the electricity sector because attracting foreign investments in new Georgian HPPs need certainty and guarantees. But in the competitive market it may be difficult to provide guaranteed high tariffs. So, more detailed research should be conducted on this direction.

ESCO reasons that analyzing foreign experience in power exchanges and real time markets will beneficial, moreover analyzing similarities and differences between Georgian power market and competitive ones will be interesting.

Aarhus Center came out with idea to conduct research that stresses how important it is for the society to be involved in the decision process in the Energy sector.

2.1.3. Existing Tariff Scheme and Calculation Methodologies

Currently there is flat consumer tariff in Georgia, set by GNERWC. Tariffs are regulated for transmission and distribution. In the generation sector only small HPPs are deregulated but in principle they have very small share on total production and also they sell almost all their productions to ESCO. While production costs and demand varies hourly and seasonally the research on the effect of changing current tariff scheme will be beneficial.

According to GNERC research on introducing seasonal tariffs and peak load pricing will have certain benefits for businesses and households. Exactly what will be these benefits and their economic value should be estimated and calculated.

Georgian national power academy do not sees significant reductions in retail prices because of distribution costs are higher during summer than winter in contrast generators that have significant revenues during summer time because of increased generation. However the academy proposes to conduct research on the following topic: "Costs and benefits analysis for seasonal tariffs in Georgia, what will be increased sales volume in summer caused by lower tariff"?

HIPP reasons to introduce not only seasonal but also daily, peak-load tariffs. Additionally HIPP points out that current tariff methodology is not transparent and compliant with international practice. To study EU's performance tariff methodology and its implementation in the Georgian Power sector will be helpful.

2.1.4. Cost-Benefit Analyses on New HPPs for the Country's Prospective

UNDP underlined that currently cost-benefit analysis are done by investors for particular HPPs. However, there is no coherent study on costs and benefits from Georgian government's perspective. According to UNDP to attract new investments in Georgian energy sector government

made very favorable laws for investors. Therefore, the questions arises whether under these laws building of new HPP that causes certain environmental damage and will belong to foreign investor forever is beneficial for Georgia and what are these benefits.

New HPPs are oriented on export and while export terms are not clear yet it is also not clear what benefits from export will be left in Georgia. According to JSC Telasi, if domestic demand will raise and currently all new HPPs are going to be built for export purposes how Georgia will going to satisfy the demand?

Another suggestion would be introducing BOO-T right to the investors rather than award them by BOO right. What will be efficient mechanisms that will support both: stable flow of FDI in the Georgian power sector and also the country's interests?

If we observe this phenomenon from environmental point of view, as suggested by Greens Movement of Georgia, the country is in trade-off between develop all HPP projects and increase power exports or leave Georgia's unique landscape and gorges as a national parks and develop tourism sector.

2.1.5. Energy Sector Planning and Forecasts

Number of NGOs and international organizations stressed that there is serious problem for the long-term energy sector planning at the government level. Short term and long term energy sector planning is absent from the country. There are no long term projections on the electricity, natural gas and oil demands. Forecasting is the area where ISET can contribute and help the sector; projections on the following topics appeared to be relevant:

- What will be domestic demand on electricity or other energy resources after 10, 30 or 50 years?
- What is the potential of energy resources that could satisfy domestic demand, what will be domestic electricity supply in the long-run?
- Will there be any gaps? And how Georgia can fill those gaps? What is the most beneficial integration level of the Georgian power market to the regional markets?
- What will be regional equilibrium electricity price in the long run? Will Georgia still be net exporter or it will import electricity especially during winter time?

2.1.6. Estimate potential benefits of the alternative energy resources of Georgia

Number of respondents, especially those involved in environmental protection activities, stressed the needs of deep, detailed research of Georgian alternative energy resources. Because concentrating only on hydro power creates the problem of energy security. As EEC suggested somebody should evaluate effect of climate change on the hydropower potential in Georgia, because water flow may be dropped significantly for certain areas. Thus energy security requires more emphasis on alternative energy resources.

Georgian national power academy highlighted benefits from developing wind farms, because in contrast to hydro power and solar energy, wind electricity generation peaks in winter in some places of Georgia. Exploiting all the ways to study better these places and finance this kind of projects is necessary. JSC Telasi proposed comparison of financial profitability between hydro and wind power plants (fixed costs, operating costs, reliability of output etc.).

Ways of geothermal energy utilization for the heating purposes in Tbilisi in terms of cost effectiveness should be studied. The same should be done for the installations of solar panels on the roofs. That research should be delivered to businesses and households in a popular language so they could understand what are their investment costs and future benefits from their expenditures.

2.1.7. Quality Control

In the country there in no quality standards, no quality control at any stage of electricity transmission process. Absence of quality control makes significant contribution to inefficiency in electricity transmission process. From 2009, GNEWRC monitors the duration and the frequency of electricity disturbances. The monitor is done based on the self-reporting done by distribution companies. There are still problems in methodology and additionally there is commercial quality what should be monitored.

GNEWRC suggested making a research related on this topic. World Bank and investors also agree that this is one of the things Georgia needs today. Besides efficiency this will create more sustainable and safe electricity system. Looking at foreign experience (Italy, Slovakia) for

determining the main aspects of the control system and collaborate recommendations for quality control implementation in Georgia is what was suggested by regulatory authority.

It is also beneficial from the point of view of investors. AEN and GEG agree that monitoring of the quality of transmission will significantly improve the situation. This will be also precondition for establishing more dense relationships with neighboring systems.

Additionally based on research or CBA one can assess the possible impact of adopting quality control system on efficiency, environment and other topics supported by NGOs, international and governmental organizations.

2.2. Revealed Trainings Needs in the Georgian Energy Sector

Significant share of surveyed organization refused the need for trainings for their staff but some of them talked about the need of training in general in the electricity sector.

2.2.1. Trainings on Energy Efficiency Technologies

Besides the research on energy efficiency issues, trainings in this direction will also significantly improve the situation. Training which will increase awareness of the society about the new energy efficiency measures will be beneficial.

Tbilisi City Hall suggests trainings for comrades of households who can share their knowledge in their living areas. This will improve energy efficiency for individual households as well as living blocks in Tbilisi.

Tbilisi city hall also suggests long term trainings in energy auditing, since each big buildings need diagnose and then figure out way to save energy.

As LLC “Gergili” suggested, energy efficiency is not supposed to be separate course. However, inserting this topic in the training courses is extremely desirable. WB also supports this idea and considers it as important aspect as those trainings will make to thought about efficiency as comfort, cost saving. The ministry of the environmental protection of Georgia concentrates on the trainings on a certain concrete software models and technologies that are needed for them.

Another audience for the high level training about energy efficient and renewable technologies is the CENN's trainees working in the South Caucasus countries.

2.2.2. Trainings on technical and engineering aspects in Energy

One of the highest demands is on engineering and technical trainings. This is a point where is a big gap between demand and supply. Companies cannot find qualified (even well educated) professionals with different technical specializations. On the market there is a lack of hydromechanics, hydraulic engineers, geologists and other related specializations. Though there is a huge demand on technical skills there is done little to improve the quality.

Companies such as GWP, Geosteel, KaztransGas Tbilisi, GIG, GOGC, GEG admit training in technical specializations. They have to design technical training programs for educating their future staff. All companies agree that such trainings will be beneficial for both, employers and the people who are willing to work in energy sector.

Another problem for the companies is the lack of knowledge related to new technologies. As Georgia is in the process of rehabilitation, old technology is replaced with new ones and there is a lack of professionals eligible for working with such technologies. Training in this direction is one of the central from the point of view of companies working on energy sector and dealing with such machineries.

2.2.3. Trainings on Cost-benefit analyses and energy economics

Financial analysis and evaluation of the projects is one of the central points in energy sector. Evaluation of different programs, financial analyses of the project, financial management appeared to be one of the demanding training topics.

High level CBA and financial analyses training which will be related to energy specific issues is desirable. GIG and AEN can be considered as participants for such trainings. Also financial part which will be related to project financing will be relevant. GIG is particularly interested in high level training program, for its staff, which will be provided in English. Other organizations such as AZEBI and Geosteel think that such trainings will be beneficial for their staff as well as for the people willing to work in energy sector as financial analysts.

2.2.4. Other Training Topics

- Trainings for small old HPP owners/managers in power trading. And for the medium term perspective training all the generators how competitive power markets function.
- Trainings in EU energy legislations, regulations, policy, EU energy community requirements for main policy makers in Georgia.
- Training on energy management, more specifically, CEI suggested comprehensive trainings on the HPP construction management.
- Trainings about new economic valuation mechanisms and methods for local experts working on environmental impact assessment

APPENDIX A: List of AYPEG Members Participated in the Survey

1. Ivane Pirveli
2. Nikoloz Sumbadze
3. Irakli Galdava
4. Giorgi Mukhgulishvili
5. Giorgi Kelbakiani
6. Natalia Shatirishvili
7. Salome Japiashvili

Appendix B: List of Organizations

#	Company/Organization Name	Type	Interviewed	Delayed Answer	No Response
1	Ministry of Economy and Sustainable Development of Georgia	Government Institution	1		
2	Tbilisi City Hall	Government Institution	1		
3	Georgia Energy Development Fund (GEDF)	State owned company	1		
4	Hydro Power Investment Promotion Project (HIPP), Deloitte Consulting LLC	International company	1		
5	TBSC Consulting	Privately owned company			
6	Georgina National Power Academy	Academy	1		
7	Green Movement of Georgia	NGO	1		
8	Georgian Green Energy Development Company	Privately owned company		1	
9	Winrock	International Organization	1		
10	LDT "Bakuri" (Machakhela HPP)	Electricity Generator	1		
11	LTD "GBG" Algeta HPP	Electricity Generator	1		
12	Clean Energy Group	Hydro Investment	1		
13	Gross Energy	HPP Construction	1		
14	Alliance Energy	Hydro Investment	1		
15	New Energy	Civil Construction			1
16	Georgian Oil and Gas Corporation (GOGC)	State owned company	1		
17	Georgian Industrial Group	Privately owned company	1		
18	Georgian International Energy Corporation	Privately owned company	1		
19	GeoSteel	Privately owned company	1		
20	HeidelbergCement	Privately owned company		1	

21	Georgian Railway	Privately owned company			1
22	Kaztransgaz-Tbilisi	Privately owned company (Gas distributor)	1		
23	World Experience for Georgia (WEG)	NGO	1		
24	Energy Efficiency Center (EEC)	NGO	1		
25	USAID	International Organization	1		
26	Policy and Management Consulting Group (PMCG)	Privately owned company			1
27	KfW Entwicklungsbank	International Organization	1		
28	United Nations Development Program (UNDP)	International Organization	1		
29	TELASI	Privately owned company (Electricity distributor)	1		
30	World Bank	International Organization	1		
31	Partnership Fund	Government Institution			1
32	Karchal	GSE & ESCO owned company			1
33	Aarhus Center Georgia	International Organization	1		
34	Tbili Sakhli	NGO	1		
35	Georgian Oil Transportation Company	State owned company	1		
36	Ministry of Environment Protection of Georgia	Government Institution	1		
37	Eurasian Partnership Foundation	International Organization			1
38	ENERGO-Pro Georgia	Privately owned company (Electricity distributor)	1		

39	BP Georgia	International company		1	
40	Caucasus Energy & Infrastructure	Privately owned company	1		
41	Gergili LLC	Privately owned company	1		
42	TEL Industry Georgia	Privately owned company	1		
43	Strait Oil & Gas Georgia	Privately owned company			1
44	Georgian Hydro power	Privately owned company			1
45	Energy Invest	Privately owned company			1
46	Azerbaijan Georgia Business Association (AZEBI)	NGO	1		
47	SAKRUSENERGO	Privately owned company		1	
48	CENN	NGO	1		
49	Georgian Water and Power	Privately owned company (Water Supply)	1		
50	SOCAR	International company			1
51	EnergoCredit	NGO	1		
52	GEOWEL	NGO	1		
53	Energy Initiative	NGO		1	
54	EBRD	International Organization		1	
55	Georgian National Energy and Water Supply Regulatory Commission	Regulatory Authority	1		
56	Ministry of Energy and Natural Resources of Georgia	Government Institution	1		
57	Electricity system Commercial Operator (ESCO)	State owned company	1		

Appendix C: All Individual Interview Reports

1. Interview with Georgian Energy Development Fund (GEDF)

Participated:

AYPEG: Ivane Pirveli

GEDF: Archil Mamatelashvili, CEO of GEDF

Background Information:

Georgian Energy Development Fund (GEDF) is a joint stock company established by Government of Georgia (GoG) on December 13, 2010. GEDF is created in order to serve as an investable vehicle in renewable energy project (mainly medium sized hydro power plants) in Georgia and in the CEE region. GEDF intends to invest all of raised funds in the renewable energy projects (major focus is medium sized hydro power plants in Georgia).

GEDF is currently conducted by a three board members. The Chairman of the Board is the Prime Minister of Georgia, while other board members are the Ministers of Energy and Finance

The expected lifetime of the Fund is 10 years; GoG will support renewable energy project development in two ways: 1) through early project development investment, and 2) through an offering of the government's shares in GEDF to potential investors. The aim of the government is to facilitate development and exit each project with consideration of private investor interests.

Areas of work:

- Identification and analysis of potential "green field" hydropower plant ("HPP") development sites, including river-basin planning – and investigation of other renewable energy projects in Georgia;
- Jointly – with a private investors – develop projects with an exit option for the Fund at various stages of development;
- Finance initial costs related to the development of identified HPP projects;
- Facilitate project investment promotion;
- Support potential financing arrangements with international financial institutions and/or private financial entities;
- Provide risk mitigation support for investors regarding project development (PPA, financial planning, legal risks, etc.)

Main findings from the interview:

According to GEDF the main problem in Georgian energy sector is the lack of local qualified energy engineers. Old energy professionals are experts in fundamental engineering but they have problems in adopting new technologies and exploiting new inventions. One of the main reasons this happen is that most news are in English which is foreign language for them. GEDF was skeptical about short-term trainings. According to Mr. Mamatelashvili This problem should be solved at the university level. Proper bachelor and master programs in energy engineering is envisioned as a most efficient way of resolving this problem.

For long term perspective if Georgia wants to be competitive the qualified local experts will be necessary. Because nowadays most feasibility studies and constructions for big HPPs could only be done via hiring international experts and it increases project costs. In this situation Georgian HPP projects could not compete with HPP projects in China, Peru or other developing country where cost of local qualified labor is cheaper.

Regarding market structure and tariff design in Georgia, GEDF thinks that changes in this direction are too early. When there will be high demand on electricity in the region that will drive new prices and if it will be significantly high than it is now, Georgian HPPs will export more electricity in Turkey or other regional countries. Currently Georgian electricity market is "closed", but as long as there will be excess demand in the region market should open and new trading rules and regulations will be required. But at the moment there is no need for changes.

Conclusions and suggestions:

There was not highlighted any specific research topics and also training needs for the Georgian energy sector at the moment (short-run period). Instead GEDF argues that for long term perspective high level MA or bachelor programs in energy engineering will be helpful; Furthermore market design changes and new trade regulations and rules will be required ones market will dictate need of it.

2. Interview with Tbilisi City Hall, Economic Policy Agency

Participated:

AYPEG: Ivane Pirveli, Nikoloz Sumbadze, Otar Antia

Tbilisi City hall: Mamuka Salukvadze, Chief Specialist. Coordinator of Energy Efficiency Affairs

Khatia Barbaqadze – Junior Specialist

Background Information:

On April 12, 2010, Tbilisi Mayor Gigi Ugulava signed the Covenant of Mayors. The latter is a formal commitment by city councils to reduce CO_2 emissions by 20% through energy efficiency and renewable energy actions. Under the aegis of the EU, the Covenant of Mayors has been proceeding already for several years. Over 2000 cities and towns in all 27 member states and 10

partner countries have signed the covenant, including 21 capital cities in the EU and three other capitals.

Sustainable Energy Action Plan for the City of Tbilisi

On March 30, 2011, Tbilisi City Hall presented the EU with its Sustainable Energy Action Plan for the City of Tbilisi, which envisages a 24% reduction of CO_2 emissions by 2020. This document includes a detailed plan of action for various sectors (the transportation sector, building sector, and municipal infrastructure sector).

Implementation of the Sustainable Energy Action Plan:

- To prepare a baseline emissions cadaster as a basis for the steady energy supportive plan; To submit a steady energy support plan within a year after signing the Covenant of Mayors; To mobilize the society on Tbilisi territory in order to participate in the activity plan.
- To arrange "Energy Days" together with the European commission and with other interested parties that will enable the citizens to use the advantage reached with the rational usage of energy.

An Energy Agency for Tbilisi

Since there is no special department in City hall which will work on energy related issues, plans are in place to create the Tbilisi Energy Agency, whose role will be to ensure successful achievement of all goals specified in the Sustainable Energy Action Plan by implementing relevant projects. GIZ is supporting efforts to conduct a feasibility study for such an agency.

Main Findings from the Interview:

Tbilisi city hall underlined that they have a huge work to do in order to meet their obligations under the covenant of mayors. Some of the projects that will reduce harmful GHG emissions are already in place, for example new 3500 microbuses that are cleaner than previews ones which were polluting environment. Next year City hall plans to announce tender for tram tracks and afterwards to introduce new, less polluting transportation type in Tbilisi - trams. Tbilisi city hall also plans to build special roads for bicycles.

Increasing awareness on Energy efficiency is major issue for City hall. They think that it is the area where they need active collaboration with AYPEG and other organizations in order to achieve success. The very first research and action should be investigated what information has population on energy efficiency, what is their knowledge on energy efficient activities and technologies. After that it will be easier to design proper training programs and action plans in order to increase awareness on energy efficiency in the capital.

In Tbilisi residential high buildings are “governed” by “comrade of households”. These persons are bridge between Tbilisi city hall and residents and they care about common interests of high building residents (like repairing roofs, elevators etc.). Tbilisi city hall suggests doing training for “comrade of households” in energy efficient technologies and activities, including solar panel installation costs and benefits.

Currently there is no law that regulates energy efficiency issues and Mr. Salukvadze thinks that this creates a lot of problems. There is no regulation that sets minimal requirements for new buildings in terms of energy efficiency.

Feasibility study on geothermal energy potential in Tbilisi will be extremely helpful. There is surface knowledge that Tbilisi “sits” on the warm water but exact places where these deposits are and their economic value is not yet studied. May be some of those are near the buildings and it will be extremely beneficial to use them. Biomass, wind and solar potential should also be estimated in the city.

The trainings and also new local professionals in energy management are required in the city. More specifically, Mr. Salukvadze thinks that each big buildings should have energy auditor whose responsibility will be implementation of energy saving and energy efficiency activities.

Conclusions and Suggestions:

Research Needs:

- Survey that will show what is the level of knowledge about energy efficiency in population of Tbilisi.
- Research economic and technical feasibility of alternative renewable energy resources. For example, installation of solar panels in the roofs in high buildings of Tbilisi and the ways of financing this activities (residential plus funds, state or city hall budget resources etc.)

Training Needs:

- Training for “comrade of households” on energy efficiency activities in buildings
- Training/activities for kindergartens, schools and universities that will increase awareness on energy efficiency.
- Trainings on energy auditing (how to save energy in buildings).

3. Interview with the Ministry of Economy and Sustainable Development (MESD), Sustainable Development Department

Participated:

AYPEG: Ivane Pirveli

MESD: 1) Nino Kvernadze – Acting Head of the Department of the Sustainable Development

2) Otar Antia – Chief Specialist of the Department of the Sustainable Development

Background Information:

In July 2010, the Ministry of Economic Development transformed to create the Ministry of Economy and Sustainable Development. Within this ministry, the Department of Sustainable Development was created in October 2010. MESD's role is to act as facilitator and process leader rather than regulator or donor.

The main functions of the Sustainable Development Department are to:

(1) Lead and facilitate efforts to develop and implement policies and programmers in the field of sustainable development

(2) Raise private sector awareness of green business opportunities, and

(3) Cooperate with international organizations and establish a network of partners among public agencies, business associations, government ministries, NGOs, and other entities.

Main Findings from the interview:

Sustainable development department at the Ministry seeks to provide bases for initiating efforts in several green sectors by raising awareness and providing actionable data and analyses to the private sector on specific, available business opportunities and their potential financial benefits. According to them newly established web-site **www.greengeorgia.ge** is opened by MESD exactly for that reason. No direct financial supports or subsidies will be given to "green businesses" in Georgia, instead MESD will help organizations by giving them relevant data, conduct feasibility studies and offer them appropriate trainings.

The concept "Green Georgia" is developed by sustainable development department and their main role is networking among ministries, businesses, research institutions and different international and local funds to achieve sustainable, green economy in Georgia.

Ministry names date February 2012, when feasibility study for the green business opportunities will be conducted and then will be much easier for them to speak training and research needs. Official presentation and opening of "Green Georgia" as a sustainable development department's brand will be on January 2012.

According to Ms. Kvernadze training on clean energy for the business companies and organizations on the sustainable economic growth will be helpful, since awareness on those issues in Georgia is very low.

MESD also plans to implement pilot programs in clean business opportunities and alternative energy resources in 2012-2013.

Conclusions and Suggestions:

Research Needs:

No clear and specific idea on research needs was outlined during the meeting. One general suggestion will be to research those technologies and opportunities that have double benefits: financial benefits for businesses and environmental benefits for Georgia.

Training Needs:

Training on clean business development opportunities, on sustainable economic growth for Georgian companies and organizations will be helpful and also welcomed by MESD, since those trainings will increase awareness.

4. Interview with TBSC consulting

Participated:

AYPEG: Ivane Pirveli

TBSC: Anna Ebanoidze, Senior Consultant in the area of Energy and Utilities, Food and Beverages, Financial Institutions.

Background Information:

TBSC Consulting is a management consulting firm located in Tbilisi, Georgia. TBSC helps organizations make better strategic and tactical decisions by performing detailed analysis needed to support those decisions.

Through strategic alliance with Larive Group, TBSC bridges the link between local and international companies in Western and Eastern Europe and Asia. TBSC assists western companies in expanding into the Georgian market and also helps Georgian companies expand into other markets, find foreign partners and benefit from modern technologies and know-how transfer.

TBSC consultants have experience in most of the industries in Georgia and in other countries as well. Consultants closely monitor developments within the sectors to be on top of the developments and identify opportunities for business development for the clients. TBSC's implemented projects are:

RID IEP Regional Infrastructure Development Impact Evaluation Project	Jan 2009 - Apr 2011
Benchmarking Of Border Crossing Process For BCRP	
Hydropower Market Feasibility Study	May 2008 - Jun 2008
Commercial Due Diligence Of Consumer Electronics Sector in Georgia	Jun 2009 - Aug 2008
Bread Market Due-Diligence	Jan 2011 - Feb 2011
Feasibility And Investment Design For Geothermal Domestic Hot Water in Tbilisi	Oct 2010 - Feb 2011

The most recent project of TBSC was to evaluate viability of creation small hydro power plant consolidator that would unify small HPPs output and thus create relevant power on the market.

Main findings from the interview:

According to TBSC there is not clarity on regulations for newly built HPPs in Georgia. By the Georgian law HPPs built after the 2008 are fully deregulated, but it does not provides detailed and clear information on transmission rules and regulations. It is not clear if there will be congestion on the transmission line which HPPs will be privileged to transfer electricity. Ministry of Energy and Natural resources of Georgia highlights wonderful electricity export opportunities from Georgia to Turkey but investors need more certainty in market rules and regulations. Thus electricity export opportunities for new HPPs needs more detailed analyses including ESCO's balancing tariffs for three months and transmission tariffs for the capacity allocations.

TBSC identifies the problem of ambiguous Energy Policy in Georgia. One the one hand country tries to join EU energy community which requires unbundling electricity businesses and bring competition in the sector. On the other hand it gives right to distribution companies (Energo Pro, Telasi) to buy HPPs and get monopoly power. In general, to make proper decisions the economic benefit for the country to join ENTSO-E should be estimated.

According to TBSC it is necessary to analyses costs and benefits for the country if Georgia will establish hourly power system balancing. Definitely prices and tariffs will change but what will be the economic consequence on the demand side (residential sector and industry) and on the supply side (generators and distributors) should be researched comprehensively.

TBSC advises to make training for old small HPP[2] owners in order to improve their trading skills. Currently they get satisfactory tariffs directly from ESCO, but this will not last forever so in the future they need to know how to deal with direct consumers, distributor companies or how to sell power in the competitive. And if Georgia will switch on the competitive market, meaning establishing day-ahead market than all HPP owners will be required to have basic knowledge in power trading.

Conclusions and suggestions:

<u>Research needs:</u>

- Export opportunities of Georgian new HPPs in the region. Identification of main obstacles and the lack of corresponding regulations and rules in the Georgian law
- Energy Policy in Georgia, benefits and costs joining EU energy community

[2] TBSC distinguishes small old HPPs from new small HPPs, since new ones are fully deregulated and old ones are getting satisfactory tariffs directly from ESCO.

- Impact of creating day-ahead market in Georgia on the suppliers (Generators, Distributors) and consumers (residential sector, industry); It is long term perspective says the government but what is the cost of delaying implementing it?

Trading needs:

- Training in power trading for the owners/managers of small old HPPs.

5. Interview with Georgian National Power Academy

Participated:

AYPEG: Ivane Pirveli

Georgian National Power Academy: Revaz Arveladze[3], President of the Academy

Background Information:

The Academy was founded in 1994 and it unifies 90 members. Among the members are 70 PhDs and professionals from GNERC, ESCO, JSC Telasi and other organizations working in the energy sector of Georgia. The main divisions of the academy are: Hydraulic researches, energy resources, hydro and thermal energy, energy systems, energy economics and environmental protection.

The main activities and goals of the academy are:

- Conduct scientific research and design pilot programs aiming development of energy sector;
- Conduct fundamental and practical research in energy and invent new technologies;
- Forecasting energy developments in Georgia and determine priorities; Make policy suggestions for developing scientific, technological, commercial and economic performance of the energy sector;
- Analyze/diagnose energy programs and projects;
- Prepare legal and regulatory documents and rules for the energy sector of Georgia
- Award best scientific works in energy sphere.

Key Findings from the interview:

In contrast to the most Georgian experts and Georgian ministry of energy, Mr. Arveladze thinks that Georgia does not have significant excess capacity of electricity. According to him in the long term Georgia will need imports. He stressed that now when Georgia has excess electricity

[33] Revaz Arveladze was Minister of Energy of Georgia during early 90s; He also was the member of Georgian parliament and was governing committee of energy.

production is temporary occurrence because per capita electricity consumption in the country do not exceeds 1700 kWh, while countries with average development level in Europe consume 7000-8000 kWh. According to him if Georgia will achieve middle income country level than domestic electricity consumption will roughly reach 40 billion kWh, the number which is pretty close to the economically feasible electricity production potential of Georgia. As though supply will satisfy demand in the long term but in reality it does not because consumption peaks in winter and electricity production is maximum during summertime. Thus even if Georgia will exploits its full economically feasible capacity of hydropower in the long run the country will need additional supply sources (approximately 10 billion kWh import) in the winter while it could export during summertime. Consequently research should be conducted to analyze regional/European power market developments and ways to increase integration between Georgian power market and regional ones. Export/import opportunities should be fully exploited if Georgia wants to receive benefits from the export and achieve security of supply for the long term.

Besides market developments research, for long term perspective it is necessary to research alternative energy resources in Georgia. According to him Georgia has significant potential in solar energy; however it has one disadvantage as hydropower: intensity of solar radiation decreases during the winter when there is peak demand. According to Mr. Arveladze from this point of view wind energy seems most prospective, since there are many potential wind farm places that are pro cyclical of the electricity demand in Georgia. But nowadays when there is now proper meteorological substations there are no data available that could help to determine exact potential and benefits of WPPs. Additional research on this direction will be helpful.

Mr. Arveladze does not see significant reductions in *retail electricity prices* during summer if GNERC will set seasonal tariffs. Needless to say that generation costs are considerably lower in summer because of cheap energy from the Enguri HPP, but distribution costs are changing in an opposite direction, the net result is that *Retail sale tariffs* would be slightly different during summer and winter. BUT Mr. Arveladze points that this issue certainly needs more research, calculations and forecasts.

Mr. Arveladze thinks that new HPPs should be awarded by BOO-T right not by BOO as it is now. Furthermore he thinks that concentrating only on the exporting electricity do not brings significant benefits to the country. He underlines that cheap electricity could increase competitiveness of energy intensive sectors in Georgia. Generally 1 billion USD worth of electricity can “produce” 3 billion worth of manufacturing goods and in this case electricity has multiplicative effect and is much more beneficial for country than direct export.

According to the president of the academy, there is serious lack of managers, finansists and economists in the energy sector of Georgia and any training/professional courses on those fields will be helpful employed in the energy sector.

Conclusions and Suggestions:

Research needs:

- Forecasting long term power demand in Georgia to observe long term equilibrium between domestic supply and demand;
- More deep and scientific research on wind potentials in Georgia;
- Research regional market developments, prices, demand and capacity projections;
- Costs and benefits for seasonal tariffs in Georgia, what will be increased sales volume in summer caused by lower tariff?
- Is current BOO scheming valid? Is it beneficial for Georgia? What if it will be substituted by BOO-T right?

Training Needs:

- Trainings in energy management, energy economics and financing infrastructure/energy projects reviled from the interview to be relevant nowadays.

6. Hydropower Investment Promotion project (HIPP)

Participated:

AYPEG: Ivane Pirveli

HIPP: Michael Jake Delphia, Chief of Party

Background Information:

Hydropower Investment Promotion project (HIPP) is a three-year project that will help attract local and foreign investment to Georgia's energy sector in an effort to add 400 megawatts of clean, green renewable power to the Georgian grid. HIPP project was launched in March 2010 and its budget is 8.9 Million USD[4].

HIPPs objectives are:

• **Development of engineering and technical information** – collating robust and comprehensive technical data on high potential hydro sites, whilst also preparing detailed studies to accelerate deals and inform Government policy.

[4] HIPP is part of the U.S. Government's 125 million USD post-conflict investment in Georgia's energy sector and an important part of the U.S. Government's 1 billion USD pledge to the people of Georgia

• **Outreach and Promotion -** developing investment grade marketing collateral and implementing an effective and comprehensive investor and industry outreach strategy.

• **Institutional Strengthening and Capacity Building** – developing the promotional, technical and legal capacity of the Government to reach, engage and support private hydro investors.

• **Public Private Partnerships** – addressing the concerns of investors through risk sharing, innovative financing and upfront analytical work.

HIPP already designed more than 30 prefeasibility studies for potential hydro sites in Georgia and communicated more than 500 worldwide potential investors.

Main Findings from the interview:

According to HIPP, Short term and long term planning is just absent from the government of Georgia. The new 10 point development plan could not be counted as a real long term plan and strategy for the country. More comprehensive planning should be done and it should keep up with economic development. Energy strategy should be the part of the general economic development plan and it should cover electricity, oil, gas, petroleum and environmental issues separately and jointly as for example Turkey does 10 year Generation Capacity Projection for the electricity sector.

There is no clearly underlined energy policy in Georgia. There is huge gap in understanding the role of government in competitive energy markets. In reality it is much harder to oversee a competitive market than regulated market. For example, when federal energy regulatory commission in USA declared that they wanted to deregulate electricity market they added 2000 more employees to deregulate. On regulated market government gives license, sets tariff and that is all. But competitive market requires government to take more active role and make sure that enable environment is in place. The role of the government in the competitive market should be clearly discussed and understood in Georgia.

According to Mr. Delphia Georgia has noncompetitive electricity market (because there are tariffs set by GNERC, balancing on the electricity market is in monthly and annul basis, not daily and hourly) and tries to sell its power in the competitive Turkish and South Eastern European markets.[5] According to him there is no place in the world where this has happened. Usually there is two competitive market and the traders are dealing back and force.

Georgian HPPs should operate for the Georgian non-competitive market and also for the competitive markets in Turkey and SEE which will be difficult for two reasons. First of all legislation and rules should be harmonized between Georgia and those countries and the

[5] Power Exchange (PX) opened in Turkey on 1 December, 2011. Usually Power Exchanges are real time markets where demand and supply in each hour determine clearing price. So prices vary yearly, seasonally, daily and hourly.

second HPPs should have traders who can follow hourly markets and make deals. There are serious training needs in understanding Power Markets (PX), how they function, how to trade, what is clearing house, day-ahead market, "nomination" and etc.

Trainings are also need in EU requirements and terminologies for the energy sector. If Georgia wants to join EU energy community then there is necessary to follow and understand for example what the European Union's Third Energy Package is. Also the terminology that uses EU should be fully compliant with Georgian energy rules and laws.

Tariff methodology and rate making are also issues that should be changed in Georgia. Current tariffs do not provide transparency, stability while they give "flexibility" to the GNERC which is not good at all. Performance Based Tariff Methodology is basic requirements of EU legislation and sooner or later Georgia should follow it if it wants to join energy community.

"I absolutely agree to change current flat tariff by seasonal tariffs, but I also agree tariffs on daily basis. It will be helpful for everybody, in summer lower electricity prices will lead load increase, hotels will drive new load and HPPs will increase their summer sales, much better for everybody"- notes Mr. Delphia.

Conclusions and Suggestions:

Research needs:

- The role of the Georgian government or Ministry in the competitive electricity market, where is Georgia now in terms of market competition and where it will/should go.
- The long term economic development plan which unifies energy sector as well (Oil, gas, electricity, energy transit fields)
- Tariff methodology and implementation of seasonally and daily tariffs.

Training Needs:

- Training how Power Exchanges function, how traders trade on the power exchanges, how day-ahead market is functioning. The training needs are obvious for Georgian HPP owners how to trade hourly in the competitive markets.
- Training in EU energy community developments, EU requirements, rules, regulations and terminologies.

7. The Greens Movement of Georgia

Participated:

AYPEG: Ivane Pirveli

Greens Movement of Georgia: Rusudan Simonidze, Co-Founder and current "Co-Chairman" of the organization

Background Information:

The Greens Movement of Georgia is a member of *Friends of the Earth* international greens organization. A Non-governmental organization, Greens Movement of Georgia, was established in 1988 and now has 46 local groups all over Georgia; Initiator and co-founder of the organization was ex-prime minister - Zurab Zhvania. The organization aims to protect the environment, to promote sustainable development, to discourage technocratic and utilitarian treatment of nature, to establish ecologically safe technologies and to promote solidarity and peace between people.

Main activities of The Greens Movement of Georgia:

- Conduct practical activities such as tree planting, clean-up actions, public awareness
- Raising projects, media, policy and legislative work and the development of ecologically safe technologies.
- Organization is working to stop the import of Genetically Modified Organisms (GMOs) in the country, prohibiting the construction of a toxic waste recycling factory, and implementing sustainable development projects with international partners.
- Environmentally friendly energy developments[6]

Main Findings from the Interview:

The Greens Movement of Georgia underlines three main problems in the Georgian Energy sector:

- There is no low and regulations on the energy efficiency in Georgia
- There is no law and support from the government to exploit countries alternative renewable[7] energy sources.
- Energy policy in Georgia is not environmentally friendly.

According to Greens the awareness on energy efficiency should increase but the main problem is that there is no any law or regulation that fosters and supports energy efficiency activities in Georgia. Especially there is problem of new buildings because developers are not obliged to construct energy efficient buildings. "The position of the Government is that market will regulate this itself- which is not correct and has no real outcomes because even now when

[6]The construction of the second largest HPP in Georgia - Khudoni Hydro Power Plant started in 1979 and was stopped after the protests over environmental concern in June 1989. The greens movement of Georgia was actively involved in protests and influenced stopping of the HPP construction.

[7] Alternative energy resource such as Wind, Biomass, Solar energy, Biogas, and it does not include hydro power which is traditional renewable energy. (I.P.)

heating is very costly in Tbilisi, people are not investing in the energy efficient technologies" noted Mrs. Simonidze. The support is necessary in terms of charters to businesses which implement energy efficient technologies.

Regarding to Government's policy - exploit maximally countries hydropower resources, greens do not see it to be rational because large scale projects such as Khudoni, Magana, damage biodiversity and unique landscape of Georgia. According Mrs. Simonidze Government policy is not coherent: on the one hand they promote and develop tourism but on the other hand they destroy this potential by developing large scale HPP projects on each significant river and gorge. There is tradeoff between tourism developments and increasing electricity exports[8] and somebody should take this into consideration when speaking on costs and benefits of new HPPs.

Another problem is that benefit for the country from newly built HPPs is not significant. If Turkish company will construct HPP and by the law it will acquire BOO (Build, Own, and Operate) right and sell power in Turkey there is a little benefit for Georgia while environmental costs are too high.

In Georgia even small HPPs (less than 13 MW) could not be counted as environmentally friendly renewable energy because they also have negative influence on the biodiversity (fishes, flora and fauna). Very limited small HPP projects could be counted as clean energy source. The better option for Georgia is to exploit solar and biomass energy which is on zero level currently.

Energy efficiency and exploiting alternative energy resources (including small scale, environmentally friendly HPPs) are envisaged by greens as the ways to satisfy domestic electricity demand.

Conclusions and Suggestions:

From the interview following could be suggested:

<u>Research needs:</u>

Somebody should estimate costs and benefits of building new HPPs in Georgia. Especially cost part that should include reduced tourism potential because of worsening landscape and esthetic beauty of gorges. This and other costs should be compared to the benefits from electricity exports which in itself should be properly calculated.

<u>Training Needs:</u>

[8] According to greens there is no need to construct Khudoni HPP, because supply and demand are now balanced and there is no domestic demand for that. So, new HPPs are constructed with the intention of exporting electricity

Greens stress that energy professionals that construct HPPs should train how they can mitigate environmental damages. They think that Georgian energy professionals are really highly qualified but "environmentally friendly design of HPP projects" is missing from their knowledge. These people should learn the ways how HPPs were constructed in Europe, especially in Norway and correspondingly trainings on that direction will be helpful.

8. Interview with Alliance Energy Inc. (AEN)

Participated:

AYPEG: Irakli Galdava, Nikoloz Sumbadze

AEN: Irakli Tkebuchava, Chief Executive Officer

Background Information:

Alliance Energy Inc. was founded in 2011 with the purpose of developing and generating hydropower, wind power, gas power, geothermal as well as carbon and energy trading. Alliance Energy Inc. is young, fast growing energy Company. The strategy of the company is to take advantage of the opportunities in the local energy market and develop renewable energy projects. Company is oriented on renewable energy and their scope of work includes construction and operation of HPP and consultancy services in energy sector. For now Alliance Energy is in construction process of Nabeghlavi HPP in Guria, western part of Georgia.

Main Findings from the interview:

Mr. Tkebuchava indicated some problems from the point of view of an investor that creates obstacles and breaks for investment process in hydro energy sector. He mentioned problems which their company had. When AEN won a tender for construction Nabeghlavi HPP, it took a while the registration procedure and they had to launch program without finalizing all the procedures needed before starting the construction. In the process of choosing tender proposals the decision is made based on two factors: date of launching (start date not a duration process) construction and guarantee sum per MW installed capacity.

Another aspect mentioned during meeting is the dominance of foreign companies in investment projects. In most cases foreign companies win a tender and build HPPs. The reason why Georgian companies cannot win in tenders is lack of experience in providing qualified proposal. There is lack of knowledge of modern software for calculation technical parameters (geological, hydrologic etc.).

Besides the needs in technical knowledge improvement, Mr. Tkebuchava thinks that financial analyses which can be used by companies, those who own and operate HPPs or just are involved in energy sector, can be useful training. He considers himself as one of the participants of such training. It can include CBA fitted to energy specificities.

Also the research which can bring new knowledge is considered to be very important by Mr. Tkebuchava but he could not emphasize a specific field of research. Another problem he mentioned is very high losses on electricity distribution level.

Conclusions and Suggestions:

Research Needs:

Research in the same direction also can be beneficial for all parties. Huge losses on distribution level can be mitigated by introducing quality control. Research in this direction will be great to be done. In addition, creating a document which will combine all legal issues which are related to investment process will have a positive effect on investments in HPPs.

Training Needs:

As Alliance Energy is mainly oriented on financial side, they greet a training which will be related to estimation a certain financial parameters specific for energy sector. Also trainings which will help Georgian companies to win a tender for HPP construction will help Georgian energy business to develop.

9. Interview with Clean Energy Group (CEG)

Participated:

AYPEG: Irakli Galdava

CEG: Jarand Felland, General Counsel

Nino Diasamidze, Project coordinator

Background Information:

Clean Energy Group (CEG) is a hydropower company with its head office in Norway. CEG develops projects in the countries with a functioning electricity sector and untapped hydro power potential. After a competitive tender, CEG has been awarded a license to develop the hydropower potential (**installed capacity of 175-400 MW**) of the Adjaristsqali river and its tributaries in the Autonomous Republic of Adjara, close to the Turkish border. Adjaristsqali hydro power project is expected to supply the Georgian and Turkish power systems with clean renewable energy. The final design will be based on the recommendations in the feasibility study currently under development. The construction phase is expected to be launched in late 2012/early 2013 and may take up to 6 years to complete the entire cascade.

Main Findings from the interview:

As Mr. Felland indicated, so far they are creating a database of skills. They have conducted number of interviews with potential employees. The main problem is to find experienced and

well educated staff in their operational area. They consider lack of skills in the region bigger problem than lack of skills in General. However, lack of appropriate skills can be the problem for the project. Company plans to send their staff in Norway for training. Company is interested in trainings but for now they cannot emphasize special skills they will need in the future.

Mr. Felland thinks that deregulation of the electricity market, which is planned by Georgian government, will increase the tariffs of electricity as generators have big markets abroad where they can sell electricity with higher prices. This will result of either higher price in Georgia or lack of electricity in the country. Georgia can think about deregulation after its GDP will rise by several times. This can be interesting topic for comprehensive research.

Conclusions and Suggestions:

Research Needs:

Research topic which came out from the conversation is related to electricity market deregulation and its effect on consumers.

Training Needs:

So far, company does not know what skills exactly they will need. But they agree that they will definitely need high skilled people in the future. AYPEG will keep in touch with Mr. Felland in the future getting the information needed for training program.

10. Interview with deregulated HPPs: Machakhela and Algeta HPPs

Participated:

AYPEG: Irakli Galdava

Machakhela HPP: Avtandil Mskhaladze, Director

Algeta HPP: Guram Gogorishvili, Director

Background Information:

Machakhela and Algeta HPPs are deregulated HPPs. Machakhela HPP is located in Adjara autonomous republic and its installed capacity is 1.6 MW. Total generation in 2010 of the HPP was 6.6 mln KWh. In the future rehabilitation of the power station is planned. Owner of Machakhela HPP is LLC “Bakuri’.

Algeta HPP is a small deregulated station with installed capacity is 1.25 MW and it is located in Tetritskaro district (The eastern part of Georgia). Total generation in 2010 of the HPP was 3.5 mnl kwh. Owner of Algeta HPP is LLC “GBG”.

Both HPPs has contracts with ESCO, which buys balancing electricity from the HPPs. In 2010, 97.2% and 100% of electricity generated was sold to ESCO by Machakhela and Algeta HPPs

respectively. In Addition, LLC "Bakuri" uses the electricity generated from Machakhela HPP for other businesses in Adjara.

Main Findings from the interview:

As the representatives of these HPPs mentioned, there are no problems related to legal or commercial issues which can create obstacles in the process of operation of power stations.

HPPs cooperate with audit and technical companies which give them financial, legal and technical services. They see no need of any additional training for them.

As training, research is also considered as unnecessary by HPPs. They do not see usefulness of the research results which can be used for better performance of the HPPs.

In contrary to Machakhela HPP, Algeta HPP does not consider the possibility of selling the electricity with primary contracts. However, Mr. Guram Gogorishvili mentioned that tariff set for deregulated HPPs in summer period is very low.

Conclusions and Suggestions:

Almost all HPPs are oriented on selling balancing electricity to ESCO which buys electricity from small HPPs according to predefined tariffs. For this reason some of them do not consider a possibility of selling the electricity to someone else. There is no clear steps defined how a buyer can get the electricity if it wants to buy. None of the sides (HPP, consumer, regulatory authority, Ministry) works on promoting electricity market. The research in this direction is a need for all sides of the market (including deregulated HPPs) but they do not see necessity of it individually. Training also will be good option for increase a "commercial capacity" of deregulated HPP owners. All this will contribute to development of electricity market.

11. Interview with Gross Energy Group (GEG)

Participated:

AYPEG: Irakli Galdava, Nikoloz Sumbadze

GEG: Anzor Chitanava - General Director

Vladimer Tatarishvili - Administrative Director

Anguli Tkebuchava - Technical Director

Background Information:

Company Gross Energy was established in 2007; since November 2009 it is functioning as Gross Energy Group. Founder members are famous energy specialists, engineers and executives. The team members are of standing reputation and have a long and successful experience in research, designing, construction, monitoring and management spheres. For now company is

building Nabeghlavi HPP and is participating in the project of construction HPP Cascade on the River Adjaristsqali.

Main findings from the interview:

Lack of qualified workforce in the power sector is a huge problem from the point of view of GEG. Company cannot find skills which they need. It mainly concerns to technical specializations but improvement of economic skills in energy sector is also important. Relations with neighboring systems are very important aspect for the power sector.

Quality control is considered the thing which can introduced at this stage. Privatization of distribution systems can create a precondition for improving quality. A lot have been done for quality improvement and there is a huge improvement compared to 90s. Real time pricing (RTP) is also considered as an issue to be discussed but as Mr. Anzor Chitanava mentioned we are too far from the time when Georgian government can think about introduction of RTP.

Conclusions and Suggestions:

Research Needs:

Research projects concerning to quality control is considered to be beneficial for the current stage but it is too early to think about introducing real time pricing.

Training Needs:

The vacuum between demand and supply of qualified workforce in electro energetic filed is huge. The gap comes from the lack of experienced and well educated people. This mainly concerns to technical specializations (hydromechanics, Hydraulic Engineering and etc.). Training is this field can help to reduce this gap.

12. Interview with Winrock Georgia

Participated:

AYPEG: Irakli Galdava

Winrock Georgia: Tornike Gotsiridze, Activity Leader

Background Information:

Winrock International is a nonprofit organization that works with people around the world to increase economic opportunity, sustain natural resources, and protect the environment. Winrock Georgia is established to help sustainable development of Georgia.

Main Findings from the interview:

Mr. Gotsiridze suggested paying a special attention to the recommendations from international donors such as EBRD, KfW, World Bank and etc. Those meetings with international donors will be helpful for designing a series of training programs. Additionally what can be done is to

involve foreign experts (investors, people experienced in electro energetic sector from EU countries), representatives from World Bank, EBRD and other organizations. Different methodologies of tariff calculation, topics from micro and macroeconomics, energy economics are some of possible topics which can be included in the training program. Discussions during courses will create additional interest and make a course attractive in the future for government institutions.

Research related to electricity supply quality control is what can be done. There is a lot research done in the Georgian electricity sector. So far the problem is utilization of those researches. Research on quality control is useful because GNERWC is interested in such research and can find its practical usage.

Conclusions and Suggestions:

Research Needs:

Research on quality control in electricity sector (including commercial, voltage and supply continuity) is what can be done. The effects of possible introduction of quality control on efficiency, tariffs and other related factors.

Training Needs:

Form a series of training courses relating economy (micro and macro level) and electricity sector. Also inclusion of other topics related to tariff calculation methodology is suggested.

13. Interview with World Experience for Georgia

Participated:

AYPEG: Natalia Shatirishvili

WEG: Murman Margvelashvili, Director, Energy Studies

Background Information:

World Experience for Georgia (WEG) is an independent think tank established to support Georgian society's progress to democracy based on the free market and adoption of European community standards. WEG structure is as follows: Board, Advisory Board and WEG Team.

Key objectives of WEG are:

- Facilitating the development of effective energy and environmental strategies and policies in Georgia;
- Facilitating the creation of effective legal, regulatory and structural framework for market oriented reforms and harmonization with best western (EU) standards in the fields of energy and environment protection;

- Public advocacy, building public awareness, encouraging public participation and civil society control in the fields of energy and environmental protection;
- Promoting good governance, transparent and informed decision making in energy and environmental sectors;
- Professional support to local and regional development programs and projects of strategic significance related to energy and environment;
- Promotion of new energy-saving energy-efficiency and renewable energy policies, technologies and practices.

The most recent projects are:

- Energy Efficiency Audit of Residential Buildings in Tbilisi for New Applied Technology, Efficiency and Lighting Initiative (NATELI)
- Preliminary Study for Feasibility Analysis of Shale gas Exploration in Georgia
- Green Energy Park in Tbilisi Zoo

Current projects are:

- Technology Needs Assessment - Georgia
- Development of Measures for Energy Efficiency and Renewable Energy Use in Multi-apartment Residential Buildings
- Raising the capacity of civil society through inclusive participatory dialogue
- Strategic Planning for Energy Sector of Georgia

Main findings from the interview:

WEG itself conducts different research in Energy sector. Therefore, in case there is research topic of interest of WEG it conducts it itself. However, there are some areas that WEG considers as mostly important in the Georgian energy sector.

- Energy sector planning. Unfortunately, at present no sound sector planning is made at government level. This negatively affects development of energy sector. Consequently, no energy balance and other statistical data exist. The last energy balance exists only for 2002. Department of Statistics does not generate any energy statistical data at all. Ministry of Energy in its turn, possess mostly data on electricity sector of Georgia. Ministry of Energy conducts only electricity balances. This situation makes it difficult for research and development institutions to conduct research and studies that require energy statistics data. As for government, without energy statistics they are not able to make any projections. At that time there are no official projections concerning development of energy sector, like demand growth projection for electricity, gas and other sources of energy, etc.

- Another priority area is renewable and energy efficient technologies assessment. Georgia has sufficient renewable energy potential which is not utilized. Irradiation over the year is about 50 % higher than in Germany, however, say solar water heating systems are not popular in Georgia, especially in residential sector. Situation is similar with other renewable technologies, which are presented on Georgian market but the market for them is not developed. One of the reasons for that is lack of information. Developed countries are actively using renewable technologies and have number of studies available. In Georgia there are some studies on technology but they are too few and more fundamental studies are needed on how the technology could be adjusted to Georgian conditions, on economics of the technology and prospects of its development. There is necessity for feasibility studies, economic evaluation of technologies, analysis of potential benefits, etc.

One of the priorities of WEG is intellectual development of its personnel. WEG is interested its staff to be trained in following disciplines:

- Project financing (preferably taught in English)
- Financial management (preferably taught in English)
- Accounting (preferably taught in English)

14. Interview with Energy Efficiency Center (EEC)

Participated:

AYPEG: Natalia Shatirishvili

EEC: George Abulashvili, Director

Background Information:

Energy Efficiency Centre (EEC) was established in 1998 by European Union within the framework of the EU Tacis Project "Creation of an Energy Efficiency Centre and Development Natural Energy Study in Georgia". The main objectives of EEC are: an improvement of energy efficiency in the country, an improvement the country's energy balance, to reduce the environmental impact, to improve the competitiveness of industry and commerce. In April 2005, the “The Energy Efficiency and Cleaner Production Centre EECP”, which was established at 2003, within the framework of the Georgian - Norwegian Capacity Building Program on Energy Efficiency and Cleaner Production, was integrated into Energy Efficiency Centre Georgia.

Key activities of EEC are:

<u>Energy efficiency</u>

- Awareness campaigns;

- Energy management practice;
- Energy Audit in Industrial Companies and buildings;
- Monitoring and targeting;
- Training of trainers;
- Training of staff.

Renewable Energies

- Development of use of renewable energy sources. In this purpose center research of potential of technical-economical resources and on analytical basis chooses and successfully implemented several pilot projects using hydro, bio and solar energy.

Analytical-informational

- Answering to European call for tenders oriented to the dissemination
- Providing informational and consultancy services for energy end users (population, organizations, municipalities and companies) through the seminars, workshops, dissemination of informational materials.
- Providing services related to business development, such as presentation of production, contact meetings, exhibitions of local and foreign energy efficiency technologies.

Training

- EEC published number of books, brochures and leaflets

The most recent projects are:

- Urban Heating and Residential Energy Efficiency for Utility Affordability in Georgia
- CDM as instrument for industrial development and poverty alleviation in Caucasus
- Utilization of Solar Energy for the Welfare of Ilto protected area neighboring villages

Current projects are:

- CDM Program of Activities for Greenfield Hydropower Projects in Georgia
- Capacity Building on Energy Efficiency in Georgia
- The Energy Efficiency Program For Georgian Communities - Energy Bus Project
- Energy Efficiency Top Down Approach - Improving Energy Performance of Government Buildings
- Georgia - Greenfield hydropower investment opportunities
- Clean Development Mechanism - Small Hydro Rehabilitation Project
- Promoting Energy Efficient Product Distribution through ICT Access
- Georgia Rural Energy Program
- Financial Engineering for Small Scale Hydro Power Stations in Georgia

Main findings from the interview:

A top priority for EEC is development of renewable energy technologies and energy efficient technologies. Research areas that EEC is interested in and considers important and actual in Georgian energy sector are:

- Vulnerability of Georgian hydro energy in terms of global Climate Change and energy security risks. Hydro energy is a priority sector for Georgia, since about 85% of electricity is generated from HPP and due to active construction of new HPPs and high voltage lines Georgia becoming a net exporter of energy. Investment in construction of HPP is a long-term investment since lifetime of HPP can be up to 90 years. However, generation of HPP is highly dependent on amount of water in the river it is built on. Climate change can change the amount of water in the rivers and consequently electricity production will change. Amount of rivers interesting in terms of energy production can be reduced. Moreover, Georgian energy security is mostly based on hydro sector. Therefore, estimation of possible effects of climate change on future of hydro sector in Georgia is important and necessary.
- Prospects of other than hydro renewable energy development in Georgia in terms of decentralized electricity generation and green certification. Currently the most developed renewable source of energy is hydro while other sources such as solar, wind or biogas are not exploited so far since currently they are not considered as priority according to ministry of energy. Under current market conditions they are considered as not economical. However, EEC considers that it worth estimating what are the prospects of development of new renewable sources of energy if there were decentralized electricity generation and green certification as it is in other developed countries. In this case other renewable energy sources can become competitive and if developed they will diversify energy sources which will straighten energy security in the country.

EEC is interested in intellectual and professional development of its team. Among training possibilities it distinguishes training on Projects Development on Sustainable Development Mechanisms. Instruction language can be English or Georgian.

15. Interview with USAID

Participated:

AYPEG: Natalia Shatirishvili

USAID: David Tvalabeishvili, Project Management Specialist at Office of Energy and Environment

Background Information:

The USAID Georgia mission manages a wide variety of development programs including economic growth, democracy building, health, energy and social development. It is also responsible for the largest share of programs fulfilling the U.S. Government's $1 billion pledge of assistance to Georgia after the conflict with Russia.

Energy and environment projects of USAID assist Georgia to attain energy security and promote environmental protection. The programs help diversify and secure energy sources by encouraging appropriate policy development, increasing indigenous energy supplies, promoting renewable energy and energy efficiency initiatives, encouraging competition, building human and institutional capacity, and expanding access to markets to promote trade and capitalize on Georgia's transit potential.

Programs of USAID in Georgia are:

- Improving Economic Competitiveness and Welfare
- Improving Delivery of Social Services
- Strengthening Democracy and Governance
- Enhancing Energy Security
- Safeguarding the Environment

Current energy programs in Georgia financed by USAID:

- Power and Gas Infrastructure Program (PGI)
    - Construction of the Poti-Senaki Segment of the Pipeline
    - Replacement and Rehabilitation of the Kutaisi - Senaki Pipeline
    - Electricity Transmission Upgrade, Reconstruction and Operation
    - Georgian Power and Gas Infrastructure Project Infrastructure Oversight and Capacity Building
- Hydropower Investment Promotion Program
- New Applied Technology Efficiency and Lighting Initiative 2
- Georgian Energy and Water Regulatory Commission (GNEWRC) Partnership Program
- Black Sea Transmission Planning
- Integrated Natural Resource Management in Watersheds (INRMW)
- Strengthening Local Capacity and Developing Structured Dialogue for Climate Change Adaptation, Natural Disaster Risk Reduction and Post-Conflict Environmental Rehabilitation in Georgia
- Support for National Parks Reform

Main findings from the interview:

- A top priority for Energy and Environment office of USAID is development of alternative sources of energy and energy efficiency. USAID has already financed many projects in this area and continues financing projects promoting energy efficiency or alternative

sources of energy. USAID regularly announces a grant competition and on competitions basis it chooses the proposals that USAID committee considers as addressing the hot topics in Georgian energy sector most effectively. USAID believes that number of research and feasibility studies is to be made in area of alternative energy sources development and energy efficiency. Due to certain reasons USAID cannot distinguish more concretely the most priority topics for it, but rather can give a direction.

- USAID actively sends its staff members to different trainings. Each year USAID develops a training plan according to which staff members are trained on topics that were considered as a priority for USAID. Currently such priority areas in Energy are Climate Change and Clean Energy. Preferred instruction language is English.

16. Interview with Joint Stock Company "Telasi"

Participated:

AYPEG: Natalia Shatirishvili

Telasi: Paata Tsintsadze, Head of Department of Relations with State Agencies

Background Information:

JSC Telasi is a private electricity distribution company. The Mission of "Telasi" consists in reliable and high-quality power distribution to the customers of Tbilisi.

The Company is wholly-controlled by members of the RAO UES Group (Shareholder Group). The majority of the Company's funding is from, and credit exposures are to, this Shareholder Group. As a result the Company is economically dependent upon the Shareholder Group. At present Telasi is going to build a new HPP Krami 3. Krami 1 and 2 already belong to RAO UES.

Telasi distributes electricity only within capital city and its suburbs, number of its customers is more than 370 000.

Main types of business activities of the Company are as follows: purchase and sale of electric power; maintenance and operation of electric grids; power transit services; technical service of customers; administration of unified system of power and water supply, as well as refuse collection in the City of Tbilisi.

Services provided for customers and operation of electric grids are performed through 15 customer service centers, 2 operating sections and 10 operational districts located in all the administrative districts of the city.

Main findings from the interview:

During the interview the most actual and important topics to be studied in Georgian energy sector were identified as follows:

- Estimation of prospects of competition in generation sector. Currently under existing law generation sector considered as being on the free market and there is competition, however, in reality it is strongly regulated by ESCO and Ministry of Energy. What are the prospects of increasing competition should be studied. However, this question can be tricky, since in order to attract foreign investors in electricity generation sector, more exactly, in hydro, it is necessary to provide them with guarantees. However, in case of competition, tariffs on generated energy can be reduced which will reduce potential revenues of owner of HPPs. In terms of real competition it may be difficult to give guarantees of high tariff on generated electricity to investors.
- Mechanisms of utilization of hydro energy should be studied. Currently building of new HPPs process is oriented on export only. This realizes in high tariffs on generated energy for new HPPs and building of new high voltage transmission line which will give possibility to export electricity to Turkey. However, since sufficient amount of new HPP are going to be built and the high voltage line is only one there will be high competition for this line. Moreover, Georgia is developing economically and expecting its GDP to grow. This means that electricity consumption will grow as well. With all new HPPs oriented on expert how increased electricity demand in Georgia will be satisfied? If purchase electricity from new HPPs for domestic use the tariff for consumers will inevitably rise with all following consequences. Such scenario and this complex question should be studied.
- Prospects of development of other than hydro renewable sources of energy should be studied. There are number of studies on this direction, however, at that time there are no sound study with concrete suggestions or recommendations. Georgia has wind and solar irradiation potential which is not exploited so far. Many studies indicate that wind energy is too expensive compared to cheap hydro. However, in studies wind power plant costs usually compared to existing HPPs costs that were built even in Soviet time. HPP has high fixed cost but very low variable and once fixed costs are covered it become the cheapest source of energy. Therefore, may be would be reasonable to compare costs of new wind power plants with costs of new HPP. In this case costs of generation of wind turbines lower. However, of course wind energy is less reliable than hydro. All these aspects should be carefully studied. Situation with solar energy is the same. There is no sound study on prospects of utilization of solar energy either from generation side (PV to generate electricity) or from demand side (technologies to utilize solar energy like solar water heaters). Diversification of sources of energy is vital for energy security.

There is no special training need in Telasi. Head of each department usually decides whether particular training that is already on the market will contribute to professional development of departments' personnel and it case it is Telasi pays for the training.

17. Interview with United Nations Development Program (UNDP)

Participated:

AYPEG: Natalia Shatirishvili

UNDP: Paata Janelidze, Project Manager

Background Information:

UNDP established its presence in Georgia in 1993. They work to promote national development and set their priorities in agreement with the Georgian Government. Closely cooperating with national institutions, civil society and the private sector, UNDP assists Georgia in four major areas:

- Democratic Governance,
- Economic Development,
- Environment and Energy, and
- Crisis Prevention and Recovery.

Key programs of UNDP in Energy:

- Local renewable energy resources. In co-operation with the German Development Bank KfW, UNDP encourages the development and use of small hydro and geothermal resources in Georgia. UNDP implements model projects in the mountainous regions of the country to show the benefits of these initiatives and to attract local investors.
- Trans-boundary initiatives. In Armenia, Azerbaijan and Georgia, UNDP works to protect the water and related natural resources of the Kura-Aras river basin. UNDP is also carrying out studies of the impact of Climate Change on the Caucasus region.

The related projects are:

- Renewable energy resources for local energy supply
- Small hydropower resources at the community level
- Reducing trans-boundary degradation of the Kura-Aras river basin
- Strengthening Capacities of the Georgian Oil and Gas Corporation (GOGC) for Sustainable Development and Energy Security
- Project Preparation Funding for Refrigeration Sector

Main findings from the interview:

- Interesting topic for research for UNDP and for Georgian energy sector according to UNDP opinion is good cost-benefit analysis of new HPP that are being built and those

that are going to be built. More concretely, under existing law what are the benefits of Georgia from new HPP and those that are to be built needs to be investigated. In order to attract new investments in energy sector Georgian government made very favorable laws for investors. Under this legislation foreign investor is full owner of HPP that he builds till the end of the lifetime of the plant; he does not need to pay for water use, environmental damage, etc. He will have to pay transmission tariff, which is not defined yet. These laws stimulate investments in hydro energy sector and there are number of HPPs that are going to be built in the near future. In comparison to traditional fuels hydro is considered as renewable and environmentally friendly source of energy, however, HPP and especially big HPP with reservoir causes certain environmental problems. Therefore, the questions arises whether under these laws building of new HPP that causes certain environmental damage and will belong to foreign investor is beneficial for Georgia and what are these benefits. Usually cost-benefit analysis is made for investing company for particular HPP, however, there is no coherent study on costs and benefits from Georgian government's perspective. New HPPs are oriented on export and while export terms are not clear yet it is also not clear what benefits from export will be left in Georgia.

- UNDP do not have any training needs. The structure of its work is as follows, for each project they hire an expert/consultant that is qualified in particular area of the project. The consultant then trains other team members if necessary. Therefore, as a rule, UNDP does not send its staff members to any training held by other organization.

18. Interview with KfW Entwicklungsbank

Participated:

AYPEG: Natalia Shatirishvili

KfW: Enrico Spiller, Director Sector Coordination, South Caucasus, Energy – Transport

Background Information:

KfW is the promotional bank for the Federal Republic of Germany. They promote reform processes, investments, and accompanying advisory services in developing and transitioning countries. KfW currently finances two priority projects in the energy sector which focus on broadening potential energy export markets and developing the renewable energy sector with hydro power investments.

Black Sea Transmission Network (BSTN)

BSTN builds 260 km of 400/500 kV transmission lines and a 700 MW back to back converter station. Plus it includes the adaptation of several substations, in order to connect Georgia's grid with Turkey by 2013. It encourages new domestic investments in hydropower resources and allows their access to high value regional markets. Cooperation with EBRD, EIB, EC (NIF), and

the Georgian Government brings the overall financial investment for the project up to 290 mln. EUR.

Renewable Energy Fund of Georgia (REF) REF provides funds for the rehabilitation of up to 3 small hydropower plants. Grant money is administered through local commercial banks (VTB and TBC), which on-lend to hydropower investors.

KFW is the lead donor in Georgian Energy sector

Past and ongoing projects:

- Partial rehabilitation of Gardabani thermal power plant to secure energy for Tbilisi
- Rehabilitation and stabilization of energy supply from Kutaisi and Zestafoni transformer substations, and creation of debt restructuring agency
- Buying electricity and natural gas commodities to ensure quantity of supply
- Rehabilitation of power distribution systems, installation of electricity meters in homes
- Rehabilitation of 220 kV Alaverdi line between Armenia and Georgia
- Partial rehabilitation of the Gardabani substation and partial financing of the GSE management contract
- Rehabilitation of small scale hydropower plants through Georgian commercial banks
- Construction of 260 km of 400/500 kV transmission lines and converter station, plus adaptation of several substations, to connect Georgian energy grid to Turkey

Main findings from the interview:

Given the commissioning of the Black Sea Transmission Network in 2012 and 2013 which will connect Georgian electricity system with Turkish one, the most important issue is to make sure that

- Agreements with Turkey for power export will be signed.
- The transmission tariff will be defined and
- The framework conditions for generators in particular HPP´s will be improved.

All these issues can be studied and there are already a lot of different institutions involved but KfW does not see any outcome or useful proposal such as market rules (who has and when access to the grid to what conditions, who is buying surplus power etc.), priority access for renewable/small hydro's, feed-in-tariffs, PPA´s and etc. This is very complex question and requires coherent study to be made.

- There is no need to train KfW staff. Firstly they are only coordinators and do not have the responsibility for the projects since the project management is carried out in the headquarter in Germany. Secondly its staff is attending specialized internal sector seminars. Only in really extraordinary cases KfW will pay for external training.

19. Interview with Geosteel

Participated:

AYPEG: Giorgi Kelbakiani

Geosteel: Alexandre Kanishvili, Manager of Electricity Department

Background Information:

Established in 2007, GeoSteel LLC is a joint venture between Georgian Steel Group Holding Limited [GSGHL] and JSW Steel Netherlands BV [Wholly owned by JSW, India]. GeoSteel LLC, with its manufacturing base at Rustavi, Georgia is heading its way to be a market oriented organization, and develop new business in the steel sector in the Caucasian region and the CIS.

Geosteel is committed to manufacture highest quality steel reinforcement bars for the construction sector managed by highly motivated employees. To engage, develop and inspire local human resource and continuously expand our business process adopting safe and environmental friendly practices.

GeoSteel LLC is one of the largest direct foreign industrial investments in Georgia. It is a Joint venture of JSW Steel Netherlands BV [Wholly owned by JSW, India] and Georgian Steel Group Holding Ltd (GSGHL). JSW is a trusted name in the Global steel manufacturing having interests in Mining, Energy, Cement, Infrastructure, Building-Systems and Logistics.

JSW, with its headquarters in Mumbai, India has been in the business for over three decades and is a trusted global corporate in the business of steel making. It has diversified interests in Steel, Energy, Minerals and Mining, Cement, Infra-structure & Logistics and Information Technology. On its road to growth and expansion, JSW is going through a heavy expansion plan in the steel sector, and aims to be the world's Low cost and India's single largest plant by 2010. At present JSW is producing 7.0 million tons of steel and aims to achieve 10.0 million ton by 2010.

Main findings from the interview:

1. **Trainings:** Geosteel has need mostly in technical trainings, though they admitted that the trainings in financial analysis would be welcome.
2. **Economic Research:** According to Geosteel, they will be interested in research about the changes in Georgian electricity sector which result in changes of the electricity tariffs, considering the fact that they are large consumers (about 100 mln KWh per year) and even smallest change will important for them.
3. **Data:** According to Geosteel, previously, when they were still direct consumers, they were performing monthly forecasts of electricity usage for ESCO, but now they are subscribers of Energo-Pro and Energo-Pro is performing those forecasts now.

4. **Recommendations for the Energy Concentration:** Geosteel thinks that the main problems in higher education in Georgia (in energy field and in technical sciences) are the outdated teaching programs, outdated books and lecturers, the absence of the knowledge of the modern technologies and the absence of specialization. Beside these issues of the technical education, there issues also with human resource in financial analysis and marketing. Also, the problem is that the students get very low practical knowledge and there is a clear need of internships.
5. **Hot Topics:** Geosteel does not believe that the deregulation of the electricity generators in Georgia will be an improvement because, according to them the distribution company Energo-Pro already has too many generators on its own and might emerge as a monopolist in case of deregulation. Geosteel claims that Energo-Pro is already able to suffice 53% of the consumption of its subscribers with its own generators. Also Geosteel believes that such deregulation will mostly benefit the owners of the large power plants and not the owners of the small ones. Geosteel suggests not to take the Enguri WPP into account once counting the market power of Energo-Pro or other large generator companies. The reason of this is that Geosteel believes that Enguri HPP will never be deregulated because it is the most important strategic unit in Georgian energy sector and everything about the Enguri HPP is being decided on the level no lower than the prime minister of the country. Another issue according to the Geosteel is the new law about the reserve capacity of the electricity system. They think it is too costly.

20. Interview with the Georgian Industrial Group (GIG) and Georgian International Energy Corporation (GIEC)

Participated:

AYPEG: Giorgi Kelbakiani, Irakli Galdava

GIG & GIEC: Natia Turnava, Chairman of Board of Direcors

Background Information:

Georgian Industrial Group was established in 2006. It has already invested tens of millions in local economy and continues to support prospective businesses.

Currently Georgian Industrial Group is the largest holding company within the country. GIG embraces a number of subsidiary companies operating in energy sector, acquiring and processing of natural resources, production of building materials, logistics service, real estate development and etc.

Subsidiaries are concentrated on effective acquiring and processing of country's resources, which in fact fosters long-term development and success of the Georgian industry.

Georgian Industrial Group considers its number one priority the revival of Georgian manufacturing and development of the heavy industry. GIG actively cooperates with major Georgian and foreign partners. The holding puts great effort in implementing various social projects and in supporting local population. About 3,000 professionals are employed at the Georgian Industrial Group.

Our mission is to enhance Georgia's competitiveness and increase common wealth by effective utilization of country's natural and intellectual resources.

Georgian International Energy Corporation (GIEC) was incorporated on July 11, 2005. We are members of the GIG. GIEC is a young company. In a comparatively short period our corporation achieved a worthy place in the energy business and gained recognition of many industrial companies. GIEC provides services both to the companies of GIG holding and other commercial organizations.

GIEC is involved in three major sectors:

• Natural Gas - import and distribution. Company serves over 30 wholesale customers (cement, brick, glass and metallurgy production facilities, gas stations, SME, population). GIEC also operates a network of gas stations across Georgia.

• Hydro energy - Generation from small and medium HPPs. Currently company operates 7 small and medium HPPs. Generated energy is delivered directly to local customers and electricity distributors or is exported to Armenia and Azerbaijan. In the future GIEC plans to build several new HPPs in different regions of Georgia.

• Thermal energy - In the nearest future company plans to build thermal power plants (TPP) that will utilize coal mined in Tkibuli. Generated energy will be sold both on Georgian and foreign markets.

Main findings from the interview:

1. **Trainings:** Technical, Financial, Cost-Benefit Analysis.
2. **Economic Research:** both GIG and GIEC are interested in economic research, more market related research, research of specific markets and the effects of the legal and economic changes. Though they think that they will have more use of research of gas and oil markets rather than the electricity market since the latter is far from free market.
3. **Data:** GIG and GIEC will provide all the available data (for example the company exports) which is required data for the research if they will purchase the research. Though they will also consider the official data requests to help the students and the researchers with their research.

4. **Recommendations for the Energy Concentration:** According to GIG and GIEC, the course (at least a short one) in Energetic (technical) is a must for any student who is going to work in energy or in industrial sectors.
5. **Hot Topics:** According to GIG and GIEC, the most important topic in the energy sector of Georgia is the lack of the infrastructure. This creates barriers for the companies to sell what they produce and forces them to produce and sell less than they are able to. Second important issue is the lack of qualified professionals. There is a need of good project managers and financial analysts. Also, the very important issue is frequent changes of regulations. This changes the situation too fast and does not leave time for the companies to make adjustments. Finally, GIG and GIEC think positively about the deregulation in electricity generation sector.

21. Interview with the Georgian Oil and Gas Corporation (GOGC)

Participated:

AYPEG: Giorgi Kelbakiani, Salome Japiashvili

GOGC: Temur Gochitashvili - Advisor of General Director, Tamar Shoshiashvili - PR Manager

Background Information:

Georgian Oil and Gas Corporation was founded by the order of the ministry of Economy of Georgia, on March 2006 and entered state shares of joint-stock company "Georgian International Oil Corporation", "Georgian Gas International Corporation" and National Oil Company "Georgian Oil". In September 2011 the corporation changed its legal form and from a limited liability company it was transformed into a joint stock company.

GOGC operates in the areas of oil and gas transportation, engineering and construction. GOGC manages state interest in oil production contracts on the territory of Georgia, coordinates rehabilitation process of the existing oil and gas transportation infrastructure and participates in the development of the regional transit routes to fully realize energy potential of Caspian and Black Sea basins.

Main findings from the interview:

1. **Trainings:** GOGC claimed that they only have need for pure technical trainings.
2. **Economic Research:** GOGC claimed that they have also no need for economic research since they have their own group of analysts.
3. **Data:** According to GOGC, they will be glad to help the students and the researchers with their research providing both advice and data. Though they admitted that their data is available only for authorized users of their website and that they have to consider any official data request together with their lawyers. Besides they claimed that they only own incomplete data about the oil and gas balances in Georgia since they are

not the only agent in this field and their advice is to address the GNERC for the most complete data.

4. **Recommendations for the Energy Concentration:** According to GOGC, the course (at least a short one) in energetic (technical) is a must for any energy student.
5. **Hot Topics:** According to GOGC, the most important topic in the energy sector of Georgia is the integration with Europe. This includes legal, technical, economic and market adjustments and is essential for Georgia to become the part of the European Energy Community. GOGC proposed to look at the EU's Third Energy Package in order to have more clear idea of what are the requirements for this integration. Another important topic for Georgia is the transit projects (pipelines) which, unfortunately, cannot proceed since the political situation in Georgia creates high level of uncertainty and makes it impossible to make good forecasts. On the meeting it was also discussed one specific EU requirement which implies for each country to have a reserve capacity of natural gas. One way for country to build up such capacity is to build a storage capacity. Though, since building the storage capacity is costly, Georgia prefers another way which implies long term contracts of uninterrupted supply; however, the first way is still being considered.

22. Interview with KazTransGaz Tbilisi

Participated:

AYPEG: Giorgi Kelbakiani

KazTransGaz Tbilisi: Irina Janjgava, Director Personnel Policy and Chancellery Department

Background Information:

KAzTransGaz Tbilisi is a distributor company which supplies Tbilisi with natural gas. The state company "KazTransGaz" is the part of the national Kazakhstan Company "Kazmunaigaz". "KazTransGaz" owns large shares and governs several gas transportation and energy companies, not only in Kazakhstan, but also outside its ranges. The last acquisition of "KazTransGaz" became "TbilGazi", which has been declared bankrupt since October 13, 2005 and which before has been on state donation for several years. The debt of "Tbilgazi" to the state and large creditors was more than 110 mln USD.

The 2000 km network, which was previously owned by "Tbilgazi" and which served more than 230 thousand consumers, 4 700 communal objects and 600 large industrial objects, belongs now to "KazTransGaz".

Currently Tbilisi is being supplied from 3 different directions: The gas distribution stations are in Gldani, Navtlughi and Gachiani. Also, there are additionally 9 distribution stations and 657 items that help to supply Tbilisi. Tbilisi is being supplied by 3 step system: High Pressure

(aggregate length of such pipelines is 210 km), Average Pressure (700 km) and Low Pressure (1100 km).

Peak consumption of the gas in Tbilisi reached in 1989 with the annual consumption of 2,05 billion. Currently annual gas consumption is more than 700 ml and based on statistical estimations this number with double through the investment projects carrying out in Tbilisi.

Main findings from the interview:

1. **Trainings:** KazTransGaz Tbilisi has need of technical trainings. No need for economic trainings.
2. **Economic Research:** KazTransGaz Tbilisi admitted that they might be interested in marketing research.
3. **Recommendations for the Energy Concentration:** According to KazTransGaz Tbilisi, there is need for student to be more aware of technical aspects. Also, they think that it will be very useful for students to be familiar with the security measures and safety standards. They will be also welcome to the interns.
4. **Hot Topics:** The infrastructure of the gas distribution is the most important topic in their sector.

23. Interview with Caucasus Environmental NGO Network (CENN)

Participated:
AYPEG: Giorgi Mukhigulishvili
CENN: Rezo Getiashvili – Public outreach specialist

Background Information:

CENN - Caucasus Environmental NGO Network - is a non-governmental regional organization established in 1998 and specialized in the fields of civil society development and institutional strengthening, environmental research and policy, resources management, compliance management, and communication and environment. Since its establishment, CENN has worked at the local, national and regional levels in the Caucasus region.

Competences

- Civil society development and institutional strengthening
- Environmental research and policy
- Resources management
- Compliance management
- Communication and environment

Services

- Civil society building

• Advising
• Consulting

Main findings from the interview:

From 2010 CENN is a coordinator of the project, which aimed development of the Third Thematic Group of the National Platform of the Eastern Partnership Civil Society Forum. Planned activities within the framework of the project include:

1. Capacity building, awareness raising, development and implementation of the vision, activities, and forms of cooperation, principles and mechanisms of information exchange of the group.
2. Identification of current high priority issues in the fields of energy security, environment, and climate change within the "Eastern Partnership" process; the examination of these issues and their introduction to the Civil Society Forum and other stakeholders.
3. Initiation of participatory work and commencement of a thematic and constructive dialogue among state institutions and civil society.

One of the main tasks for CENN is to conduct environmental impact assessment for environmental activities; that activities might be construction of hydro power plants or installation energy utilities. Now CENN is conducting environmental impact assessment for Khudoni hydro power plant. For that CENN hires local as well as foreign economic experts. (Local experts have old fashion methodological approaches; it might be helpful for them to be involved in trainings about new economic valuation mechanisms and methods).

CENN has designed a special portfolio of services intended for those who wish to put a green office policy to practice and protect the environment. Its office greening team visits offices to offer recommendations on how to transform the workplace into a more environmentally friendly place. CENN is also conducting a campaign to involve more offices in green practices. The main component of the Green Office Campaign is encouraging offices to separate waste, as well as helping them to get rid of the separated waste through organizing its regular pick-up.

CENN has branches in different region of Georgia. The trainees of CENN make permanent trainings in different fields (energy efficiency, preservation biodiversity, climate change and etc.) for the residents of the region. However the trainees have to improve their knowledge and for that they should be retrained.

CENN is actively participating in the discussion with ministry of energy and natural resources about forest code of Georgia (analog of Austrian Forest code). Although CENN need expertise in Austrian forest code; studying its experience and results of the code.

Conclusions and Suggestions:

From the interview following could be suggested:

Research needs:

- Research about Austrian forest code; its efficiency and effect on biomass consumption.

Training Needs:

- Trainings about EU energy policy for journalists working with CENN
- Trainings about new economic valuation mechanisms and methods for local experts working on environmental impact assessment.
- Trainings about energy efficiency, renewable energy resources for CENN's trainees working in different regions of the Caucasus countries.

24. Interview with EnergoCredit

Participated:
AYPEG: Giorgi Mukhigulishvili
EnergoCredit: George Zurashvili, Deputy Team Leader

Background Information:

Energocredit is a credit line that was designed to increase the competiveness of Georgian business. Thanks to old, inefficient machinery, technologies and buildings, many companies in Georgia use up to three times as much energy per unit of GDP as their western competitors. For energy intensive companies this is a serious competitive disadvantage, about to become even worse as energy prices increase. This is why the EBRD put in place the USD 35 million for Energocredit credit line to provide loans through local partner banks of up to USD 2.5 million to companies in Georgia with serious energy saving potential. For such companies the savings potential is a great they can often repay big investments in very little time, while also boosting capacity, profits, and competitiveness.

Main findings from the interview:

EnergoCredit has credit line in three directions:

- Consumer credit (from 18%)
- Credits for small and medium enterprises (20 000-500 000 USD, from 10%)
- Corporate credit (more than 500 000 USD, from 10%)

Energocredit also provides Georgian banks (Bank of Georgia, TBC bank, Bank Republic, Cartu Bank) with consultations identifying loans for energy efficient products and defining related risks. All the consultations are free for banks till now, but from the next year EBRD intends restructuring energocredit and make it profitable business. So in the future to evaluation EE products, Georgian banks might hire energy specialists from energocredit.

Energocredit has already investigated imported energy efficient technologies in Georgia and its suppliers. Researchers of Energocredit have analyzed energy consumption in different sectors of economic in Georgia. One Energocredit client found that a USD 3.3 million investment could be repaid from energy savings in just 1.3 years. The team showed he was using twice as energy per ton of production compared with international firms.

For the next year Energocredit plans to publish a book about "Energy Efficiency and Investment". The guide-book will provide people with the information how to get credits and whether it will be profitable or not.

Conclusions and Suggestions:

From the interview following could be suggested:

Research needs:

- It might be helpful to identify most energy intensive commercial and industrial companies in Georgia.

Training Needs:

They do not have training needs.

25. Interview with GeoWel/American Chamber of Commerce

Participated**:**
AYPEG: Giorgi Mukhigulishvili
GeoWel: George Welton, Director of GeoWel and American chamber of commerce

Background Information:

The American Chamber of Commerce in Georgia is an association aiming to promote the development of commercial relations between Georgia, the United States of America, and the international community in Georgia. The Chamber was officially registered in Georgia as a non-profit non-commercial organization on September 29, 1998.The Chamber protects and promotes the common economic interests of its members and represents their opinions on all types of business matters while striving to facilitate constructive solutions to economic issues concerning Georgia-US business relations. The Chamber promotes its goals by establishing relations with key policy makers and appropriate governmental bodies in both the US and Georgia on subjects of interest to its members. Additionally, the Chamber collects and disseminates timely information concerning areas of interest, organizes conferences and seminars, works on legislative initiatives of concern to the business community in Georgia, and most importantly, provides an ongoing forum for members of the American business community to gather to share knowledge, experiences, problems and solutions.

GeoWel undertakes research in economic development, business and governance in Georgia and the Former Soviet Union. Its research integrates primary and secondary materials in order to produce a comprehensive and action-oriented research document that is designed to help their clients design or modify their projects, policies or products. They combine international and local expertise to ensure that the highest standards of research are combined with rich and detailed local understanding. Their researchers have undertaken projects for UN Agencies like UNDP and UNICEF, for development organizations like the UK's Department for International Development, GTZ, CARE International and the International Organization for Migration and for civil society organizations like the Eurasia Partnership Foundation and the International Budget Partnership.

Main findings from the interview:

In 2010 GeoWel conducted a research about "Matching Vocational Education in Georgia with Labor Market Needs". Many sectors that employ large numbers of technical people are hardly covered by the vocational education and training (VET) system at all. Sectors as diverse as utilities, rail, steel, food-processing and logistics have almost no public training and have to provide almost all of their training in-house. The research study attempts to investigate the reasons for this mismatch and possible corrections to it. The analysis of the sectors and skills provided in the current system revealed a heavy concentration of training in five areas: construction, restaurant/hotel/tourism, textiles, IT and transport/automotive. In addition, the current system trains significant numbers in general office skills such as PC use, book-keeper/cashier and secretary/receptionist. To compare this to skill need primary data from the Georgian national statistics office was scrutinized to identify the most labor-intensive sectors and sub-sectors in the economy. Then, from the combination of existing labor market surveys and interviews by the study team a general sense emerged of skill needs in each sector. At the current time the following sectors seem to be large employers with little or no VET training directed at them:

• Chemicals and pharmaceuticals

• Electric production and delivery (electricians are trained but mostly for the construction industry)

• Gas transportation and delivery

• Water and sewage

• Mining and processing

• Logistics and rail

In these sectors companies are forced to provide considerable in-house training and tend to recruit people for technical positions with little or little or no formal qualifications. Therefore,

there seems to be an opportunity to develop training in these areas. On top of this, there seems to be considerable demand, particularly for general 'mechanical' or 'electrical' training. Mechanical and electrical training exists already but it generally focuses on the automotive and construction sectors. More general training in these areas is needed to provide a baseline of expertise upon which particular industries can build.

In terms of sectors there is no VET training in the following sectors, in spite of considerable demand: utilities (electricity, gas and water/sewerage), mining and processing, chemicals and pharmaceuticals, rail and logistics. As for skills, there is a high demand, in a wide range of industries, for general mechanical and electrical skills and welding. In terms of services there also seems to be considerable demand for accounting skills, particularly when combined with other skill-sets, such as sales or import/export.

Conclusions and Suggestions:

From the interview following could be suggested:

GeoWel as a think tank does not need trainings for its employees and additional research. They have sufficient resources to provide all the trainings and research in their own. However, based on their research ""Matching Vocational Education in Georgia with Labor Market Needs" there is no VET training in the following sectors, in spite of considerable demand: utilities (electricity, gas and water/sewerage), mining and processing, chemicals and pharmaceuticals, rail and logistics.

26. Interview with Georgian Water and Power

Participated:
AYPEG: Giorgi Mukhigulishvili
GWP: Giorgi Chkhartishvili, Energy Director

Background Information:

"Georgian Water and Power" (GWP) is a leading company on the water supply market of Georgia and South Caucasus. The company provides high quality service to the population of Tbilisi and its neighborhood, as well as to state organizations, industrial and commercial objects. Georgian Water and Power serves about 400 000 customers throughout the city. Out of which about 2000 are budget organizations, 15 000 commercial objects and the rest of them are residential customers.

Industrial complex GWP produces ecologically clean and stable water, creates vital product and delivers it to the customers; as well as provides wastewater services. GWP generates electricity as well. Power is generated by Zhinvali Hydro and Tetrikhevi Hydro plants. Both hydro plants are connected to the unified power system of Georgia.

Main findings from the interview:

Company is working hard to supply water in Tbilisi uninterruptedly and introduce of modern, progressive and ecologically safe technologies for producing water, which will be most effective in the process of raw water treatment from bio contamination. Georgian Water and Power undertakes to introduce modern technologies, restore and reconstruct facilities of drainage systems and not to allow discharge of contaminated water to the River Mtkvari. To increase the reliability of Zhinvali – Grmagele tunnel, the company is rehabilitating raw water stations and distribution network, as well as the infiltration (spreading) sites. To control water discharge from water storage reservoir into the active riverbed of River Mtkvari and deliver it to Tbilisi filter stations GWP carries out urgent works which imply connections and underground communications of new buildings to water supply system of the city. One of the main goals of the company is to develop a new metering program and flexible debt recovery system for the residential sector. Metering will be implemented gradually, according to a special project and plan.

Daily water consumption per person in Georgia is quite high than in other neighboring countries. Also, according to the data of "Georgian Water and Power", about 48-50% of the population in Tbilisi does not pay the cost of water supply that causes serious financial damages to the Company.

Conclusions and Suggestions:

From the interview following could be suggested:

Research needs:

- Research to identify what is the other barriers rather than economic that people do not pay the cost of water.

Training Needs:

- Most of the local engineers are old skilled and they might need trainings to raise their qualifications when adopting new technologies.

27. Interview with Georgian Gas Transportation Company (GGTC)

Participated:
AYPEG: Salome Japiashvili
GGTC: Tamar Shoshiashvili, PR of Georgian Oil & Gas Corporation

Background Information:

Georgian Gas Transportation Company was founded in 1999, 30 December.

The core activities include:

- To provide natural gas transportation and transition via territory of Georgia; unbroken supply of gas to consumers.

- Gas Transportation Company also executes gas transit, delivery and transportation through Armenia.
- It provides recording of gas flow, conservation of regime, monitoring accuracy, secure functioning of gas pipeline and detecting the reasons of gas loss.

Main findings from the Interview:

They are not interested in any kind of trainings or researches as they just take orders, execute them, and are therefore, not involved in any kind of researches or trainings.

This company has close connection to Georgian Oil & Gas Corporation. That is why I was redirected to Georgian Oil & Gas Corporation, which has its own research & analytical group and do not need any assistance in researches.

28. Interview with Aahrus Centre Georgia

Participated:
AYPEG: Salome Japiashvili
Aahrus Centre Georgia: Tamuna Gugushvili, Public Outreach Specialist

Background Information:

Aarhus Centre Georgia was established in 2005 as a joint initiative of the Organization for Security and Cooperation in Europe (OSCE) Mission to Georgia and the Ministry of Environment Protection and Natural Resources of Georgia. Since 1 June 2009, the Centre has been functioning within the framework of an "Environment and Security Initiative "(ENVSEC) project that is administered by the OSCE. The aim of the Aarhus Centre is to facilitate implementation of the Aarhus Convention at the local level and thus promote access to environmental information, public participation in environmental decision-making and access to justice. In particular Aarhus Centre:

- Provides access to environmental information via regularly updated website and environmental library and by organizing different informational campaigns;
- Monitors public participation process in environmental decision-making and provides the Ministry of Environment Protection and Natural Resources of Georgia with recommendations to improve the effectiveness of the process;
- Prepares various guidelines to explain rights and obligations under the Aarhus Convention;
- Provides legal and other consultations to the public on environmental matters;
- Promotes public awareness and environmental education through publicity, workshops, training opportunities, disseminating informational and educational material, various campaigns, etc.

Financial support to the Centre is provided within the framework of the "Environment and Security Initiative", while the Ministry of Environment Protection and Natural Resources of Georgia provides the space within its facilities.

Main Findings from the interview:

The organization itself does not need any kind of trainings or assistance in research process. However, they pointed out some issues that are relevant today in energy sector and that could become potential topics for trainings & research. Particularly, priority for Georgian energy sector is hydroelectric power generation. Additionally, strategic and sustainable development should include such issues as environment protection. They stressed out the environmental impact of new power plants. However, in their opinion the finances for environmental issues should come from the government. Aahrus center sees Armenia and Turkey as Georgia's strategic partners. Although, it was mentioned that Georgia needs harmonization with these countries.

Energy Efficiency and Renewable Energy sources were one of the main topics that were discussed during the interview. Renewable Energy sources need to be investigated in depth and Georgia's potential might be unexpectedly great in this field. Georgian society and government should understand the necessity of energy efficient systems. The government to increase the incentives of using energy efficient technologies for the companies can introduce the model of voluntary certificates for Energy efficient systems.

Conclusions & Suggestions:

Research Needs

- The environmental impact of new and old power plants
- Energy Efficiency and Renewable Energy sources; perspectives in Georgia (exact technologies that we need for more efficient energy systems)
- Energy policy issues; A research that stresses how important it is for the society to be involved in the decision process
- Energy Efficiency and its necessity for the society and the government; Making the benefits clear

Training Needs

- Training that increases awareness of the society in Energy Efficiency & environmental matters.
- Renewable Energy sources in Georgia and the perspectives we have in this field

29. Interview with Ministry of Environment Protection of Georgia

Participated:

AYPEG: Salome Japiashvili

Ministry: Marina Shvangiradze, Medea Inashvili, Climate Change Department

Background Information:

One of the most important goals of the Ministry is to support sustainable development of the country in the field of environment; to organize environmental planning system; to elaborate and implement state policy, target programs, strategy of environmental protection for sustainable development, national environmental action programs and management plans in the field of environmental protection and natural resources; to protect and preserve unique landscapes and ecosystems, rare and endangered species of flora and fauna that are characteristic for the country, biodiversity, atmospheric air, water, land and mineral resources; to implement public administration (regulation, registration, supervision and control) on waste management and chemicals; to follow the Georgian legislation in the field of environmental protection and to implement the international commitments within its competence.

In terms of public relations, the Ministry of Environment Protection of Georgia provides public access to environmental information, their participation in environmental decision-making process and to support development of environmental education and raising environmental awareness.

Nowadays Ministry of Environment Protection coordinates 15 international environmental conventions among the convention ratified by Georgia, 3 protocols and 3 agreements to these conventions. In addition, the Ministry carries out certain actions and participates in environmental activities under **7** international environmental conventions and protocols**,** which are not ratified by Georgia yet.

The Ministry of Environment Protection of Georgia presents National Report on State of Environment (SoE) in every 3 years which is a document summarizing the information about the environmental situation in Georgia. The document reflects the main trends in environmental policy, provides information on environmental quality, ongoing environmental projects and consequences of environmental activities.

Main Findings from the interview

Due to climate changes, the new researches are constantly needed to estimate the potential of renewable energy sources. The situation is changing rapidly and the information that is available needs to be refreshed. The demand for new technologies and the specialists of the technologies is sharply increasing. This is why projects need assessment in technical issues and exact knowledge of technologies.

Ministry often needs specialists for renewable energy technology specialists which are hard to find in Georgia. This is why they need fixed models and trainers who would help them learn the models that can be attached to Georgia's situation. As for solar energy technologies, several NGOs work in this field. MOE soon will be involved in several projects where they might need assessment in researches and also trainings might be very helpful.

The format of the interview soon turned into brainstorming of research and training ideas, which I will just right down as bullet points:

Conclusions & Suggestions:

Research Needs

- How to reduce emissions in Georgia
- Energy efficiency effects of pressed biomass (90% more energy efficiency)
- To estimate the total amount of biomass in Georgia (New information due to climate change)
- Agricultural Waste management
- Investigating the contents of litter in order to use it as a recourse later
- Audit of buildings in order to implement energy efficient systems
- How to increase energy efficiency while building
- Hydro energy; estimate the potential (Information needs to be updated)
- Estimating the wind energy potential
- Investigating the technology models for renewable energy sources and their comparison (Which producers, how to estimate the best technologies?)
- How to increase the transport energy efficiency
- How the sophisticated bureaucratic system helps reducing the transport usage since every destination for getting a document is located in one place. So called "One Window Approach"
- Analysis of alternative transport possibilities
- How to distinguish high quality Energy Efficiency and Renewable Energy technologies from each other; which producers to prefer

Training Needs

- Training about Energy Efficiency and Renewable Energy sources; particularly certain concrete models and technologies that are needed for them.
  The models can be purchased from worldwide companies (Mainly from Netherlands).
  Training should offer the model and teaching the way of dealing with the model & its technologies. (Certainly both parts of the training are very important)

30. Interview with Casa Calda, Tbili Saxli

Participated:
AYPEG: Salome Japiashvili
Tbili Saxli: Inga Benidze, Manager

Background Information:

Casa Calda Ltd. was established in 2001 in Tbilisi, Georgia. The company has taken a leading place on Georgian and Transcaucasian market.

Casa Calda Ltd. specializes in many fields. It makes import, selling, installation and provides service of heating, ventilation, conditioning, plumbing, firefighting and sewerage systems materials.
The company owns an information system, which enables distance management of heating, ventilation, conditioning, plumbing, firefighting and sewerage systems, installed by us. Casa Calda Ltd. has partners in 14 countries, Italy, Germany, Austria, Switzerland, Turkey and The U.S.A. The Company is an official representative of Ferroli, an Italian corporation manufacturing heating, conditioning and ventilation systems.

Casa Calda Ltd. is notable for its highly qualified and experienced team, trained in Italy, in our partner companies.

Main Findings from the interview

- The company is interested ONLY in technical matters. The trainings they would need might be connected to technical issues such as installing solar heating systems.
- The manager also mentioned that solar systems are expensive to install and this prevents them from introducing solar systems in Georgia, although later, it can be more efficient than other systems. Shortly, costumers do not want to pay once higher price even if it means to save some money later. She mentioned that it would be good if people would understand energy efficiency matters better.
- The general awareness of the consumers' needs to be increased as they are not familiar with primitive energy terms and heating systems
- Estimation of future expected prices of solar systems is one idea of a research.

31. Interview with World Bank

Participated:
AYPEG: Salome Japiashvili
World Bank: Soso Melitauri, World Bank Representative in Georgia

Background Information:

The Country Partnership Strategy (CPS) for Georgia for FY10-13 has been prepared against the backdrop of twin crises – the August armed conflict with Russia followed by the global economic downturn. As a result, the joint World Bank/IFC strategy focuses on post-conflict and vulnerability issues in the near term, and strengthening the foundations for medium term competitiveness and growth.

The World Bank Group's Strategy

The FY06-09 CPS was prepared in the aftermath of the Rose Revolution. After just 18 months, the new Government had moved quickly on reforms across the development spectrum – in stabilizing the macro and fiscal situation, improving governance, strengthening infrastructure, introducing sweeping reforms in education, slashing red tape for businesses, and deepening poverty alleviation. Building on this rapid reform legacy, the last CPS was focused on assisting Georgia in implementing a second phase in its reforms focusing on three areas:

• Generating growth and jobs by further removing barriers to private sector development and improving infrastructure, finance and markets;
• Enhancing human development and social protection through improved education, health, social protection and community services; and
• Strengthening public sector management and budgetary processes to enable Georgia to better plan and meet its own development goals.

Main Findings from the interview

World Bank does not intend to have any projects in energy field. However, the electricity sector is the main priority. The main question concerns the quality of consumer service and the full exploitation of Georgia's recourses.

- Georgia has no serious gaps in energy sector. The right word the current situation would be: situation with challenges. One of the challenges is the quality of service in electricity Sector. The service sector needs to be investigated and later it can be sophisticated to meet the worldwide standards.
- Government needs to have exact goals that are determined for a certain period. For instance, to make the tariff system more flexible and appropriate for the market.
- The stability of power is poor and needs to be improved. The worldwide standards are not satisfied. Such as:
  1. Sustainability of the sector
  2. Long run steadiness
  3. Preparedness for shocks
  4. Good financial condition
- It is extremely important for attracting investors to investigate and evaluate risks in the energy market. First, we need to know what kind of risks there are. Second, what kinds of contracts are needed to reduce the risks? What portion of the risks will remain after the contract? What does it cost to decrease the degree of riskiness? What amount of money is it possible to gain from the projects in the long run? Since the interests for the Government and the investor are completely different after building a power plant, it is essential to know how to direct the interests to the same point. (Government just needs the power plant to be built and the investor is interested in the period after having it already built)

- Energy security and Independence is the issue that government is actively working on currently, which is a right thing to do. The partners can be found in the region for Georgia since it is known that there will be the deficit of electric energy in the region for the next 20 years. (South part of Russia, Turkey, Caucasus) Who will pay for achieving the full security of Georgian Energy system, government, investors or consumers?
- Observe seasonality in the region, Investigate Energy Efficiency and Smart Grid perspectives. Carry a research to know what perspectives are there to make the buildings energy efficient.
- Trainings for improving the consuming standards and inform the citizens about them
- Trainings in the Energy Efficiency field.

32. Interview with the Azerbaijan Georgia Business Association (AZEBI)

Participated:
AYPEG: Nikoloz Sumbadze
AZEBI: Maka Alioglu, Project Manager

Background Information:

Association of Azerbaijan Georgia Business Association (AZEBI) was established in 2009. It unites companies from Azerbaijan which operates in Georgia or businesses started in Georgia by azerbaijanian investors. Those companies are working in wide variety of industries and cover the following industries such as gas and oil distribution, construction and development, furniture production, pharmacy and etc. Currently association includes 30 Azrbaijanian companies such as SOCAR, Black Sea Terminal, Azerbaijan Airways, Embawood Georgia and so on.

Areas of work:

- Deliver consulting services
- Strengthen relationships between the member companies
- Update members on most important legislative changes
- Organize different business conferences, forums and round tables
- Act as a liaison between member companies and government structures
- Guarantee the participation of member companies in different exhibitions, business forums, conferences and tenders
- Create HR department in order to help citizens of Georgia in finding jobs among Azerbaijani and Georgian companies working throughout Georgia

Main findings from the interview:

Interview itself was very informative and productive. It covered not only energy sector perspectives in terms of research and training needs but also other economic sectors as well. In general Azerbaijani businesses are very successful in Georgia and even willing to grow and invest money in different sectors as well. Next year association intends to enhance its

members' number. It will join Azenko, which is working in electricity sector, namely transmission and construction. As Ms. Alioglu mentioned, main challenges of Azerbaijani companies today is to know which sector is the most attractive for further investments. These companies have money to invest but they ask recommendations to the association. However, association itself does not have capacity to conduct research or market analysis in order to provide vulnerable information. For the recommendations they ask partners' or personal friends working in different sectors in Georgian economy. It is also considerable that, Azerbaijani companies are not willing to pay for different kind of research or analyses in order to have valuable information for the sectors development. One of the reasons might be lack of experience this kind of work and final results and its usage.

One of the association's responsibilities is to create HR database of Georgian unemployed people. This database includes people with different work experience. When Azerbaijani companies need to hire staff they ask to association to find appropriate person which satisfies job requirements. As a result, Azerbaijani companies have already employed people which were sent from AZERI. Job positions were in financial and HR departments as well as administrative or even drivers. Interview revealed that Azerbaijani companies still have tiny problems to find experienced people. It is possible to conduct different types of trainings such as public relations, human resource management, financial management and audit. Based on interview, we can cooperate with AZERI to organize various trainings.

Conclusions and suggestions:

Training needs:

Training can be conducted on human resource management, HR, financial management and audit, general overview of Georgian economy and sectors in terms of current situation and potential growth. For the companies working in the energy sector, trainings in energy basics and overview of Georgian energy sector will be appropriate at this moment.

Research needs:

During the interview no clear and specific research needs were outlined in the field of energy. As Ms. Alioglu mentioned there was not any kind of research from Azerbaijani companies working in energy sector of Georgia because they are large enough to conduct research themselves. However, based on organizations needs, association seems potential research to be conducted on overview of Georgian sectors in orders to identify potential sectors for Azebaijani investment. At the same time market analysis, level of competition, demand and price projections can be used as a potential research.

33. Interview with the Caucasian Energy and Infrastructure (CEI)

Participated:

AYPEG: Nikoloz Sumbadze

CEI: Giorgi Abdushelishvili, CEO

Background Information:

Caucasus Energy & Infrastructure (CEI) is a joint stock company organized in compliance with the Georgian legislation. CEI holds a mandate to invest in Transcaucasian companies engaged in the production, transmission and distribution of gas and electricity. CEI raised USD 50 million from institutional investors in its IPO in February 2008. The offering was the largest ever in Georgia amounting to 0.5% of the country's GDP. The shares were subscribed by several financial institutions with a wide geographical distribution including Kairos, Firebird and East Capital. In Q3 2009, CEI obtained a license for the construction and operation of a 48 MW hydropower plant on the Mtkvari River in Akhaltsikhe. CEI set up a special purpose vehicle Mtkvari HPP LLC for the implementation of the Mtkvari HPP project. The construction works started in November 2009 and are fully underway, expected to be completed in 2014. The company currently represents the sole investable vehicle admitted to trading on the Georgian Stock Exchange (the "GSE"), which offers investors a broad exposure to the Georgian energy sector. The main market for CEI shares is the GSE, where the company trades under the ticker NRGY. In March 2008, CEI appointed Bank of New York Mellon as the depository bank for its Global Depository Receipts program. One GDR represents ten local shares. The Company is considering listing its GDRs on one of the leading European stock exchanges.

Areas of work:

- Production, transmission and distribution of electricity and gas Distribution
- Extraction, distribution and marketing of crude and oil products
- Management of water utilities
- Development of cargo warehousing and logistics
- Management of toll roads
- Waste management and recycling
- Development of carbon emission trade-related opportunities

Main findings from the interview:

According to CEI, Georgia has huge potential in term of electricity production with the low corruption rate. Currently they are building Mtvkavi HPP (installed capacity 48MW) and in the future they are planning to start at least 2-3 new HPPs construction. Our country is very attractive for foreign investments and this process is supported by the effective involvement of government. Regulation and laws are simplified which intends to create enabling environment for the investments. The only problems might be raised due to lack of educated juridical personal to prepare legal documents and fit in the process timeline. As for CEI, they are interested to macro-economic research, research electricity prices in Georgian and in the region after 3 year, when they will start to generate electricity and even energy prices in general. CEI considers Georgian electricity market as a one of the major trading place but they also intend to

sell electricity abroad, in Turkey as well. In this case, research on Turkish electricity market and effects of economic indicators on electricity prices is in need.

While Mr. Abdushelishvili outlined research needs in energy sector; he also emphasized needs of qualified staff for energy companies. Currently there is a lack of new generations in very specific fields of energy such as hydro engineers, engineers, geologist, topographers, civil engineers, construction managers and etc. As for CEI, they are forced to hide three different persons for one position – construction manager due to lack of appropriate staff. These problems have to be solved at the university level. Universities and companies should work together to popularize such specialties and young people must be motivated to specialize in those fields. In addition, introductory courses for energy companies are significant for non-energy staff of the companies to motivate and increase their understandings in energy basics. As for efficient construction process, there is a need of trainings in project management, construction management, supervision, building budgeting and monitoring while in the operation process of HPPs, there is a need of personal and consequently trainings in commercial environment, marketing and regulations.

Conclusions and suggestions:

Trainings:

Based on interview with CEI representative following training needs were outlined: project management, construction management, supervision, building budgeting and monitoring, commercial environment, marketing and regulations for energy utilities. At the same time, introductory courses in energy basics will be beneficial in general.

Research:

Interview revealed following research needs: impact of macro-economic parameters on energy utilities, research of electricity prices in Georgia and in the region after 3 year, when they will start to generate electricity and research of energy prices in general.

34. Interview with the ENERGO-PRO Georgia

Participated:

AYPEG: Nikoloz Sumbadze, Irakli Galdava

ENERGO-PRO Georgia: Avtandil Dvalishvili, Head of Public Relations Division

Background Information:

JSC ENERGO-PRO Georgia is wholly owned by the ENERGO-PRO a Czech based company. The company entered Georgian energy market on June 29, 2007. Measured in number of customers served, sales and service territory, ENERGO-PRO Georgia is the largest energy company in Georgia, providing electricity generation and distribution throughout its service area, mainly in

west Georgia. It owns and operates 10 medium size hydro power plants, with a total capacity exceeding 414 MW. 7 of which are located in western Georgia. The company's service area covers over 70% of the Georgian land plot; within EPG serves over 860 000 western Georgian customers; out of which 820 000 customers represent households and 42 000 are commercial and state organizations.

Areas of work:

- Generation
  - Lajanuri Hydro Power Plant - Installed capacity 113 MW
  - Rioni Hydro Power Plant - Installed capacity 48 MW
  - Gumati Hydro Power Plant - Installed capacity 67 MW
  - Shaori Hydro Power Plant - Installed capacity 38 MW
  - Dzevrula Hydro Power Plant - Installed capacity 80 MW
  - Atsi Hydro Power Plant – Installed capacity 16
  - Satskhenisi Hydro Power Plant - installed capacity 14 MW
  - Chitakhevi Hydro Power Plant - Installed capacity 21 MW
- Distribution
  - Electricity grid rehabilitation
  - Replacement of old cable systems,
  - Replacement of depreciated wooden poles with reinforced concrete ones,
  - Repair and equipment of transformer units and substations.
  - Individual re-metering

Main findings from the interview:

Based on Interview ENERGO-PRO does need any type of research and training. They mostly need technical personal. As part of Czech Energy Company they have capacity to conduct independent research and provide on-job trainings for their employees. Company also accepts university students, mostly from Georgian Technical University and Akaki Tsereteli State University for the internships. Successful intern are offered jobs and employed by ENERGO-PRO. As Mr. Dvalishvili stated they are working on individual re-metering which will be finished in 2013 and grid rehabilitation in order to ensure security of electricity supply. Future research on electricity prices, smart metering or market deregulation is not in the agenda of the company at this moment. However they realize that research in this direction must be done by the GNERC or other government body.

Trainings also were not attractive for them. Because they have long term courses where company's staff is re-trained and upgrades qualification based on company's requirements. Despite this fact, ENERGO-PRO emphasizes lack of experienced personal in the labor market for energy companies. In this case they suggest university based educational programs which will be constructed based on energy companies' needs.

Another issue raised during the interview was debates with its consumers. According to ENERGO-PRO, number of debates has decreased but there is a lot of work to be done in this direction to fully satisfy every consumer. They provide hotline and field service.

Conclusions and suggestions:

ENERGO-PRO is not interested any kind of training or research at this moment.

35. Interview with the Gergili LLC

Participated:

AYPEG: Nikoloz Sumbadze, Irakli Galdava

Gergili LLC: Revaz Enukidze, Director

Background Information:

Gergili is a health, safety, environment and engineering consulting company based in Tbilisi. It provides superior solutions for environmental, natural, cultural and sustainable resource needs in private and public sectors. Company can assist asset owners or local governments with an in-depth feasibility study and technical assessment of potential emission reductions. Also experts of Gergili have the extensive experience in projects of international and national importance such as: the Baku-Supsa Pipeline (WREP); the Baku-Tbilisi-Geyhan (BTC) pipeline; South Caucasus Gas Pipeline (SCP); Establishment of water supply and decontaminating systems for different industrial enterprises in Georgia, preparation of documentation packages needed for an environmental permit for PEPSI Company financed by EBRD. At the same time Gergili was actively involved in evaluation and review of Environmental and Social Impact Assessments of the above projects, baseline studies as well as in the selection process of BTC/SCP pipelines routs.

Areas of work:

- Environmental baseline studies
- EIA Projects
- Environmental issues related to the business and industrial activities, identification of environmental safety problems and different ways of their solution
- Projects covering the human health and biological environment protection issues
- Full cycle documentary support for Kyoto qualification
- Environmental risk assessment
- Providing projects with juridical information
- Environmental legislation and standards
- Establishment of environmental management systems (EMS)
- Environmental Audit
- Establishment of Waste Management System
- Health and Safety Management System

- Traffic Management
- Planning and implementation of anti-erosion activities
- Database processing with GIS
- Designing the water supply and decontaminating systems and monitoring them
- Biologically and chemically polluted environment remediation (water, soil)
- Nursery agricultural organization.

Main findings from the interview:

While Gergili provides environmental consultancy, it emphasizes main problems in energy sector of Georgia as a lack of experiences and knowledge of full and high quality coverage of projects in terms of environmental issues. Even projects have conducted valuable feasibility studies of environmental impact assessments they are not considered in the process of project implementation. Based on environmental studies, some potential HPPs projects in Georgia have negative effects on environment. However, government still supports their implementation due to grabbing more investments in Georgia. According to Mr. Enukidze, such studies must be considered in the process of project implementation. At the same time further research and analyses must be conducted in order to accomplish effective allocation of natural resources. Geologic, hydrologic, socio-economic research is essential to determine projects effects on nature and local dwellers as well.

Gergili considers Georgian market as a small and low demand of the consultant for environmental issues as a problem. As a result, there is a lack of experienced personal in this sphere and projects implemented in Georgia require hiring international staff for environmental studies. There is a need of trainings or qualification courses which help people to update their knowledge and learn modern approaches for environmental studies but it is inefficient. As Mr. Enukidze states there are many cases when international experts are giving trainings to local workers. These international experts have presentation template which they use in every country. It is necessary to train local staff based on local examples and cases. Mr. Enukidze thinks that trainings on environmental issues must not be entire training whereas it should be one module of the training. As for training, Gergili supports trainings in alternative energy sources, energy conservation in building construction, energy basics for non-energy staff of the company or how to conduct feasibility studies.

Conclusions and suggestions:

<u>Training needs</u>:

Training can be conducted on feasibility studies, energy conservation in building construction, waste management and alternative energy sources. For the companies working in energy sector, trainings in energy basics for ordinary staff and will be appropriate at this moment.

Research needs:

As for research needs, Gergili outlined different research possibilities. They stressed out the importance of environmental assessment of hydro power plants' construction. At the same time, impact assessment of sun collectors' installment for Georgian ADP living in Tserovani. Furthermore, research in impacts of business and industrial activities, identification of environmental safety problems for Georgian and different ways of their solution;

36. Interview with the TEL Industry Georgia

Participated:

AYPEG: Nikoloz Sumbadze, Irakli Galdava

TEL Industry Georgia: Lasha Bibiluri, Technical Director

Background Information:

TEL Industry Georgia Ltd is a joint enterprise along with Tavrida Electric Ukraine LLC. Operating in Georgia since 2003, it consists departments which offer customers elaboration, design and construction of electrical facilities, equipment production and assembly, adjustment and alignment. Specifically TEL Industry change old and outdated equipment which do not comply with modern demands of reliability and functionality. Furthermore, they carry out a broad spectrum of works involving both modernization of separate distribution cabinets at 6-10 KV substations and replacement of oil circuit breakers by vacuum ones, and construction of new distribution equipment including installation, adjustment and startup. Main clients are generating, distribution and direct electricity consumers such as Telasi, ENERGO-PRO, Enguri HPP, Zhinvali HPP, Boldoda Ltd, Achi HPP, Alazani HPP, Georgian railway Ltd, The Georgian International Energy Corporation LTd and etc.

Areas of work:

- Legal service for disputable issues among consumers and energy companies
- Preparation of necessary technical documentation in electricity sector such as instructions for safety, electrical operation, fire extinguisher and personnel management
- Design of electricity supply for individual and multi-apartment buildings
- Design of transmission lines
- Design of transformer and high voltage substations
- Design of small hydro power plants' (up to 100 MV) electrical appliances, relay protection and control
- Trainings
- Internships

Main findings from the interview:

According to TEL Industry Georgia, Georgian hydro power stations need to be equipped with modern technologies, infrastructure and well-educated staff. New technologies and equipment which are installed require specific knowledge and experience to operate HPPs and Georgian electricity system efficiently. Currently there are some cases when in Georgian HPPs, for example in Tetritskaro region, do not have on-duty personal which are responsible to manage HPPs and turn on or turn off in case of emergency situations. As Mr. Bibiluri states, they often have problems to convince HPP owners in the advantages of rehabilitation of out-dated equipment rather than buying new ones. Even though, TEL Industry representatives provide valuable information how rehabilitation will increase equipment's productivity, they do not conduct cost-benefit analysis and provide information in financial terms. Thus, research in this direction is necessary and crucial.

As TEL Industry in working more technical fields, they have professional staff which does not require any training. Company sends them aboard to learn and apply new technologies. Furthermore, it accepts students for internship programs from Georgian universities. However, TEL Industry is willing to participate in training programs which will help its non-energy staff to understand energy basics and concepts in depth. At this moment, they are willing to participate in introductory course in energy and financial reporting and management in energy.

Conclusions and suggestions:

Training needs:

Training can be conducted on introduction to energy, financial reporting and management in energy.

Research needs:

During interview there was not outlined specific research need in general, which would help sustainable development of Georgian energy sector. As TEL Industry states research in cost-benefit analysis of old and new technologies installation is needed in order to provide investors with financial information and show them pros and cons of each of this methods.

37. Interview with Electricity System Commercial Operator

Participated:

ISET: Eric Livny, Irakli Galdava, Giorgi Kelbakiani

ESCO: Zaza Dvalishvili, Deputy General Director, ESCO

Background Information:

The "Electricity System Commercial Operator" (ESCO) launched its business on September 1, 2006. It is Joint Stock Company and 100% of stocks are owned by the Ministry of Energy of

Georgia. Electricity System Commercial Operator is headquartered in Tbilisi and executes following functions:

- Buys and sells the balance electric energy (capacity),
- Trades the guaranteed capacity,
- Sets up and maintains the unified register of wholesale purchase and sale,
- Submits relevant information to the dispatch licensee,
- Inspects the meters used in wholesale accounting,
- Supports the construction of new electric power plants,
- Implements other functions, as contemplated by the law.

Main findings from the interview:

ESCO is interested to cooperate with ISET PI in both training and research projects. The main research topics of their interest include those, related to future development of Georgian wholesale markets.

As Georgia plans to fully deregulate electricity supply market, it becomes crucial to have efficiently functioning electricity market. One of the main priorities for ESCO is to be done research about opportunities to introduce real time pricing (RTP) for mass market consumers in Georgian electricity market. Analyze includes:

- Looking at foreign experience of introducing RTP. Effects on Household behavior, benefits and cost, efficient use on electricity. How the experience of foreign countries can be compared to the case of Georgia. What was the situation in other countries and how it can be compared too Georgian case. What are the similarities and differences;
- Identification of possible obstacles, costs and benefits for Georgia from adopting RTP technology. Reliance on one biggest hydro power plant (Enguri HPP) is considered as one of the technical problems for RTP adoption. Also high cost potential increase in electricity prices in the short-run can create additional problems.

38. Interview with the Georgian National Energy and Water Supply Regulatory Commission (GNERC)

Participated:

ISET: Eric Livny, Irakli Galdava, Giorgi Kelbakiani

GNERC: Nugzar Beridze, Head of Electricity Department

Background Information:

GNERC is the main regulator of the energy sector in Georgia. The Commission is independent from the state and is financed by a regulation fee levied from licensees, importers, suppliers

and the electricity system commercial operator (ESCO). The Commission consists of 5 members, appointed by the President of Georgia. It is headquartered in Kutaisi.

Key functions of GNERWC:

- Licensing of electricity generation, transmission, dispatch and distribution;
- Licensing of natural gas transportation and distribution.
- Determining the regulatory environment: standards and methodologies e.g. concerning dispute resolution, calculation of regulation fees, licensing and tariff methodologies, tariffs and normative losses.;
- Regulating consumer tariffs for electricity generation, transmission, dispatch, distribution, etc.; tariffs for new consumer accessing transmission or distribution grid; tariffs for natural gas transportation, distribution, and in certain cases, consumer tariffs.
- Regulating water tariffs;
- Resolving disputes between licensees, importers, exporters, etc.
- Coordinating the certification process in the field of energy;
- Regulating billing, reporting, fee paying procedures in the electricity and gas sectors;

The Commission is eligible:

- To request any information and data from state and non-state stakeholders;
- To issue legal acts
- To raise Commission staff qualifications through training, etc, including abroad.

Main findings from the interview:

A top priority for GNERC is to improve the quality of services provided by regulated monopolies in the energy sector, especially electricity retailers. Quality of services is monitored by GNERC based on data reported by the regulated companies. These data may not be reliable.

- One idea for a project would be to develop a survey methodology to obtain a more objective picture and monitor progress. In additional to the purely “technical” aspects, quality of services has many “commercial” dimensions including time to answer a phone, restore supply, or connect a new customer.
- Another suggestion is to analyze and, if possible, test alternative fee collection methods. The current method (immediate disconnection for at least 24 hours) is unnecessarily brutal, inflicting damages on consumers (households) and the retail companies themselves (=electricity not consumed and disconnection/reconnection work). A different method could be employed using fines and delayed (but costly) disconnection of customers, on the one hand, and compensation of damages by the retail company in

case of late or faulty service provision. This could result in higher revenues for the retail companies, better service and lower costs for consumers.

GNERC considers Slovenia and Slovakia to be at the forefront of customer services in the electricity sector among transition nations. Italy is viewed as a global leader. An element of the quality control systems employed by these countries is a software package allowing for real-time monitoring of technical and commercial quality.

Another priority for GNERC is to gradually introduce seasonal and peak load tariffs to induce greater energy efficiency and stabilize energy supply.

- Time-variant "peak load" tariffs could incentivize both households and business to shift a part of their energy consumption to off-peak period, reducing system load during the day, generating energy savings and reducing the cost for customers. This could result in very significant savings (water losses avoided) given that much of Georgia energy supply comes from hydro. An important research task would be to estimate the price elasticity of substitution between day-time and night-time consumption of electricity. This could be done through comparisons with other countries (separately for households and different types of businesses), survey of consumers, or experimentation (the best method). Another, related task would estimate the (distribution of) gains resulting from different schemes. Also, one could explore the question of what tariff scheme would induce consumers and/or retail companies to invest in smart meters (an important cost element).

Seasonal tariffs might affect investment decisions of energy intensive businesses (the research needs should be further clarified).