



**United Nations Development Programme**

**Government of Georgia**

**Evaluation of UNDP/GEF Project: Georgia – Promoting the Use of  
Renewable Energy Resources for Local Energy Supply**  
(Project Code: 00034741)

**Final Evaluation Report**

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**May 2012**

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## ACKNOWLEDGEMENTS

We wish to acknowledge with gratitude the time and effort expended by all project participants and stakeholders during the evaluation interviews. This provided valuable insights, candid perspectives, and made the evaluation process more enjoyable for the entire team. In particular, we wish to thank the Project Management Unit and UNDP Georgia for arranging mission logistics and itinerary.

## ABBREVIATIONS

CDM	Clean Development Mechanism
CO	Country Office
DH	District Heating
DNA	Designated National Authority
EBRD	European Bank for Reconstruction and Development
ESCO	Electricity Sector Commercial Operator
FI	Financial Intermediate
FIAC	Foreign Investment Advisory Council
GCS	Geothermal Circulation System
GRDC	Georgian Reconstruction & Development Company
GEF	Global Environment Facility
GEEP	Georgia Energy Efficiency Programme (under EBRD)
GHG	Greenhouse Gas
GHW	Geothermal Hot Water
GNERC	Georgian National Energy Regulatory Commission (at present GNEWRC - Georgian National Energy and Water Regulatory Commission)
GoG	Government of Georgia
IPPs	Independent Power Producers
JI	Joint Implementation
KfW	Kreditanstalt für Wiederaufbau / German Bank for Reconstruction
kWh	Kilowatthour
LP	Landvirskjun Power
log-frame	logical framework matrix
MDF	Municipal Development Fund (under the MoF)
M&E	Monitoring and Evaluation
MoE	Ministry of Energy
MoEPNR	Ministry of Environmental Protection and Natural Resources
MoF	Ministry of Finance
MTE	Mid-Term Evaluation
MW	Megawatt
MWh	Megawatt hour
NACC	National Agency on Climate Change
NGO	Non-governmental Organization
OECF	Overseas Economic Co-operation Fund (Japan)
Prodoc	UNDP Project Document for “Georgia - Promoting Use of Renewable Energy Resources for Local Energy Supply”
Project	The project under evaluation: “Georgia – Promoting the Use of Renewable Energy Resources for Local Energy Supply”
PAR	Project Annual Report
PIR	Project Implementation Reports
PMU	Project Management Unit
PSC	Project Supervisory Committee
RE	Renewable Energy
REF	Renewable Energy Fund (under KfW administration)
REP	Rural Energy Program (USAID funded)
SHPP	Small Hydro Power Plant
SME	Small and Medium Size Enterprise
TA	Technical Assistance
UNDP	United Nations Development Programme
USAID	U.S. Agency for International Development
UNFCCC	United Nations Framework Convention on Climate Change

## EXECUTIVE SUMMARY

The UNDP/GEF Project 00034741 “GEORGIA – PROMOTING THE USE OF RENEWABLE ENERGY RESOURCES FOR LOCAL ENERGY SUPPLY” has been underway since May 2004 and it concludes in July 2012.

The project’s development goal is *to remove key barriers to the increased utilization of local renewable energy resources focusing initially on geothermal for heating and hot water supply, and small hydropower for local electricity production.*

To achieve this goal, the Project was designed with a number of barrier-removal *objectives*:

- To create a supportive institutional, legal and regulatory framework that would encourage long term development of Georgia’s renewable energy sources;
- To raise public awareness on the possibilities for commercial development of Georgian renewable energy resources and building the capacity of the local entrepreneurs to:
  - develop “bankable” investment proposals;
  - structure financing for the projects; and
  - manage the development and the implementation of the projects;
- To gain experience for and demonstrating the feasibility of financing renewable energy investments in Georgia and building the local SME capacity to manage these operations; and
- Documenting and disseminating the results, experiences and lessons learned and promoting the replication of the project activities at the national as well as the regional level.

The project underwent two substantial revisions in April 2009 and 2010 due to the rapid advancements in the Georgian power sector, and also due to problems with starting the Renewable Energy Fund (REF). However, the primary goals and results that were expected remained similar throughout the project:

- **Small hydropower component:** Improvement of the national regulations to support SHP projects, technical assistance (TA) and demonstration projects that would be financed by a Renewable Energy Fund (REF).
- **Geothermal component:** Reservoir testing and a reservoir model that was needed to improve the supply and management of this energy resource in Tbilisi. For the demand-side management the project planned to develop pilot metering and billing systems for the residences supplied by the geothermal reservoir which would improve the quality and rationalize usage of the energy source.
- **Renewable Energy Fund (REF):** Originally this REF was intended to be developed and managed by the project and UNDP, KfW, and other stakeholders; but this was later revised, and the project collaborated directly with a KfW managed €5 million REF which was established by a grant from the German government.
- **Clean Development Mechanism (CDM):** Advancement of CDM projects in Georgia and the eventual approval and registration of Georgian renewable energy CDM projects by the project.

In connection with the project results, it was anticipated that approximately 500,000 tons of CO<sub>2</sub> would be offset by the project's SHPP activities over 20 years.

The key issue to address during the evaluation was the additional impact of the project on the Georgia renewable energy sector, specifically the project's impact on the development of the small-hydro power project (SHPP) sector. As the project was impacted by the rapid developments in the Georgian energy sector during the project lifetime, it was of key importance to the evaluation to understand the limits of the project's ability to influence government policy and market developments, and what support, if any, did the changing government policies provide for the project's objectives?

Another key issue to evaluate was the project's impact on stakeholder perceptions of SHPP as a viable investment and financing opportunity in Georgia. Did the project improve access to public and private finance for SHPP projects in Georgia? Were such transformative results replicable and sustainable?

In regards to the geothermal energy sector, which is limited in geographic scope to only a handful of cities in Georgia: Was the project able to bring advances in rationalizing and improving the heat supply to residents in the Tbilisi district that were part of the project? Did the project bring innovation to the sector which could improve practices in Tbilisi and other cities?

## Development Context

In the decade after the collapse of the Soviet Union, Georgia was increasingly facing a serious energy crisis. The project was officially launched by UNDP in May 2004, but the original project preparatory work was carried out from 2001 to 2003. During its lifetime (2004 to 2012) the Georgian power sector experienced rapid developments and therefore the project needed to adapt its goals and strategy to the macro-context in Georgia. After 2000 Georgia was experiencing serious energy shortages and the country was plagued with frequent blackouts which harmed economic growth and adversely impacted the quality of life for all Georgians. In 2004, the power sector was characterized by:

- All thermal power stations and 3 out of 12 main hydropower plants being idle;
- Out of the 2,700 MW capacity of the country's hydropower plants (HPPs), only 59% was being used. Many HPPs were idle due to deterioration and lack of maintenance with the largest being Enguri (1300 MW) needing urgent rehabilitation;
- Significant "non-technical" transmission and distribution losses due to theft and bad administration practices (that resulted in bill collection rates in the order of 15-20%);
- Distribution companies that were out of money and not able to make large investments;
- District heating systems in all cities ceasing operations forcing residents to use available alternatives such as electricity, wood, gas, kerosene. This led to further overloading of an already overstretched grid power system.
- The development of local renewable energy resources was largely neglected despite the fact of the country's rich potential, in particular geothermal heat and small hydro power.
- Georgia was facing a serious energy crisis. The power supply system was suffering from regular disruptions. The situation worsened during the winter, when the use of electricity for heating purposes was increasing. The electricity supply had stopped entirely for many rural areas.

- Use of electricity, wood, gas, kerosene or other available means for heating needs had led to the i) environmental damage of forests; ii) overloading of the power system; iii) excessive household costs and iv) indoor air quality problems.

## Project Outcomes

The project met many of its goals but only after many setbacks and changes. Specific outcomes from the Project are as follows:

1. Raising awareness in the Georgian Government and local population of the need to support small-scale renewable and SHPP, and possible ways to implement such support.
2. Establishment of the KfW REF which funded SHPP rehabilitation projects.
3. Capacity building at the participating local banks to analyze project risk and perform project finance for SHPPs
4. Introduction of new design and construction techniques from international best practice which is being replicated in Georgia by local entrepreneurs for SHPP construction.
5. As a result of the project the financial barriers to RE development has been reduced by the establishment of the REF that can and should be expanded.

Rationalization of the geothermal reservoir usage to supply hot water (by metering) and improvements in estimating the reservoir's energy potential through modeling and monitoring.

## Evaluation Ratings

The evaluation team considers the overall project outcome to be rated as **Marginally Satisfactory** based upon the measurable impact the project had upon the SHPP sector from 2009 forward. Energy output almost tripled during this time, and some of the credit can be attributed to the project activities during its lifetime. The project also benefited from a dedicated PMU team that had to overcome many setbacks. However, problems with the geothermal component during the design phase led to a less than satisfactory outcome for that component in relation to its originally conceived plan, and more of the objectives and targets for the project should have been fully met by project completion.

The individual ratings for specific sections are shown in the following table:

Evaluation Parameter		Rating	Description
Project Formulation	Conceptualization & Design	Marginally Satisfactory	There were several design flaws which led to problems during project implementation, including REF design. Some of the assumptions regarding geothermal energy usage were overly optimistic.
	Stakeholder Participation	Satisfactory	The project inception phase dealt with the most important stakeholders during the initial consultations.
Project Implementation	Approach	Satisfactory	The project management team continually found ways to work around the obstacles and challenges that the project presented them.
	Monitoring & Evaluation	Satisfactory	Monitoring was consistent with UNDP and GEF standards and procedures.
	Stakeholder Participation	Marginally Satisfactory	Ministerial support should have been much stronger (in a perfect world) but in reality some parties were not supportive of the project aims during the beginning of the project.
	Financial Planning	Marginally Satisfactory	Budgeting and general project financial management was good, but some oversights were made in regards to utilizing TA money together with KfW that might have been fixed sooner.
Project Results	Objectives/Outcomes	Marginally Satisfactory	Many of the targets and objectives were only partially met, but quite a few were also fully met. Refer to Annex 2.

## Recommendations

As the project is in its final phase and winding down in 2012, the Final Evaluation can only offer limited recommendations or corrective actions to the project management.

In spite of significant deviation from the initial project plan there have been obvious achievements by the project and further work needs to be done for their sustainability. Therefore a general recommendation is to sustain the results of the project by utilizing the remaining opportunities on this project by successfully disseminating the results from the Final Workshop, and preparing the project website as a repository for the final project results, documents, and knowledge gained from the project.



Secondly, start the Validation of the 2 CDM projects that the project developed PDDs for (Ritsuela and Larsi SHPPs) before the project is finished. This would have a long lasting impact and be the first SHPP projects for Georgia if they are successfully validated and registered. Currently 3 projects are registered from Georgia, but all 3 of these projects were never started and Georgia does not currently have an operational CDM project that is generating CERs.

Another issue that could be resolved before the project ends is the Achi SHPP loan. There remains a small amount of funding left in the REF (€500,000) that could be loaned to the project, and Achi developers have applied for it. However, the local bank is reluctant to provide such a small loan and the issue is not resolved. If possible, the project could seek a compromise or assist with finding other financing solutions.

Finally, the UNDP management should consider increasing the project staffing in terms of man-days per month to carry out these and other remaining tasks effectively before project closes in July 2012. There is some budget left for the project to continue finishing some of its activities, and perhaps fulfilling more targets. However, the PM is now only working 25% part-time, i.e. 5 man-days a month since January 1, 2012, while other staff are also only on short-term or part-time contracts. In the opinion of the Evaluators this situation does not seem to be an effective management solution for the project and it is doubtful that much more can be accomplished in the remainder of 2012 if the project staffing situation remains the same.

## Lessons Learned

This project suffered from two major issues that caused the project management significant challenges:

1. Design flaws and overly-optimistic assumptions in the project design.
1. Lack of strong support within the government.

Long-term the project was destined to go off track at some point in a rapidly changing environment that was Georgia during the period of 2004 – 2008. It would have been more reasonable to break up the project into shorter term stages and make planned adjustments with the involvement of high level stakeholders (steering committee) periodically and to have undertaken adaptive management earlier.

It is clear to the evaluators that the project never had the necessary powerful government or donor sponsor that would resolve the emerging problems and remove obstacles. Without strong political champions to support the project it was destined to have serious setbacks during the turbulent times Georgia was experiencing. There was a limit to what political leverage and power UNDP and the Project Team could apply within the ministries and different levels of government, and particularly within the Ministry of Energy which was generally not receptive to some of the project goals in the early period of the project.

One of the reasons for the moderate success of the project in comparison to initial intentions was the insufficient cooperation from the government entities. It is recommended to support the Government of Georgia in further developing the RE legislation and setting up a RE agency that would be responsible for developing the RE strategy and policies. This would help in a proper development of RE resources in harmony with Georgia's development priorities. Whether the GEF or UNDP could support such an effort is unknown, but such an agency would greatly assist coordination between the different actors in the market.

The fast economic reforms and recovery of the energy sector outpaced the project development institutional structure's ability to change course. The legislation and policies were changing rapidly, making initial assumptions of the project design questionable. For example, assumptions about the energy mix, costs, availability, and affordability have significantly changed during the project lifetime and the technical condition of the power sector has dramatically improved; which has led to stabilization of the energy supply.

At the start-up stage there was an optimistic view of the potential to use of geothermal water for heating and although conceptualized properly (hot water supply first and heating next) the preparedness of the municipality for geothermal water use and its feasibility was overestimated. Also, the project was forced to work with a less than ideal partner because Geothermia was the only company with the long-term license.

The flexibility of project management in a dynamic environment is a positive lesson that might be applied in other similar circumstances. Project development in such an environment can be a learning process itself and fast reaction to a changing environment may be essential to achieve the achievable. The project benefited from having the same project manager during the entire lifetime of the project, and the same Program Manager for most of the project. This stability in the project kept it from failing even though so much of the government and institutional environment was changing. A major institutional barrier was outside the influence of the project. It could be called, "The lack of experience and capacity of the Government of Georgia to develop concrete programs and policy measures to promote the development of the country's renewable energy resources (apart from big centralized hydro power plants) and to ensure otherwise that a supportive legal and regulatory framework for leveraging investments for local, small- and medium-scale renewable energy projects."

In terms of the two sectors that the project supported some of the lessons from the project:

The project has made the steps in the right direction for the commercialization of the geothermal hot-water (GHW) distribution. There is a need to build on the interest of Tbilisi and Saburtalo district authorities and develop the follow-up projects in cooperation with other donors, namely establishing a transparent commercial billing and collection system.

Geothermal well testing and numerical calculations have clearly indicated the trend of declining output of the wells, therefore the arrangement of the circulation system becomes a vitally important next step for the sustainability of the supply of GHW in Tbilisi.

One can question, with the benefit of hindsight, whether the "prescription for the illness" might have been correct for the Georgian energy situation after 2004, i.e. whether supporting SHPPs in lieu of medium-hydro or other renewable energy types such as biomass energy was the correct program to implement based upon the seasonal imbalances in the energy supply. However, based on available data for electricity generation from SHPPs, one can detect a marked increase in output of almost 200% which relates to an increase in rehabilitation and expansion projects from 2009.

Furthermore, the construction of a new transmission line to Turkey is likely to open the market for more greenfield SHPPs to be developed. The experiences from the technical assistance from the Project and REF should be used for supporting the new HPPs that are likely to be developed for primarily the export of energy.

There are still some improvements to be made to assist SHPP investment, and for foreign investors in particular. For example, the tender process for new HPPs is mainly about depositing 170,000 USD

per MW and according to some critics does not screen the applicants ability to implement the project properly. It is still very difficult to receive a long-term power purchase agreement (PPA) for most projects and this makes it difficult for banks and investors to estimate the returns accurately. The methodologies for calculating wheeling rates need improvement, etc.

In the opinion of many experts, the new transmission line project will force many of the necessary improvements and for the Georgian sector to align its operation and reforms with the Turkish power sector if it is to be a long-term success. Such reforms will probably also assist the long-term SHPP sector development.

It was also mentioned by a few of the stakeholders that grant money (as the funding which established the REF) does not provide the correct incentives for government interest and buy-in. On the contrary, as it is “free money” there is less pressure to account for its proper usage and support the agenda for which it is intended.

Probably the number one lesson to be learned from this project is that only so much can be accomplished in terms of large-scale energy sector reform from such a financially limited GEF intervention. This should be considered for future GEF projects when planning for market and/or government regulation transformation initiatives.

## INTRODUCTION

The UNDP/GEF Project 00034741 “GEORGIA – PROMOTING THE USE OF RENEWABLE ENERGY RESOURCES FOR LOCAL ENERGY SUPPLY” has been underway since May 2004. It concludes in July 2012. The purpose of the current evaluation is to determine if the project accomplished its main goals and objectives. This was accomplished in this evaluation by assessing the project design, its implementation, attainment of defined objective, outcomes and outputs (original or modified) and other notable achievements.

This allows one to achieve the purposes stated in the “Guidelines for GEF Agencies in Conducting Terminal Evaluations”, where this Terminal Evaluation is meant

- a. To promote accountability and transparency, and to assess and disclose levels of project accomplishment
- b. To synthesize lessons that may help improve the selection, design, and implementation of future GEF activities
- c. To provide feedback on issues that are recurrent across the portfolio and need attention, and on improvements regarding previously identified issues
- d. To contribute to the GEF Evaluation Office databases for aggregation, analysis, and reporting on the effectiveness of GEF operations in achieving global environmental benefits and on the quality of M&E across the GEF system.

The evaluation was produced by a two-person team, consisting of a National Consultant (Murman Margvelashvili) and International Consultant (Jesse Uzzell). The two Specialists cooperated with each other in performing the work specified in the ToR. Each of the evaluators was assigned various sections of the Evaluation for which they were to provide written results of their evaluation. The International Evaluator was assigned the task of compiling the total report.

The key issue to address during the evaluation was the additional impact of the project on the Georgia renewable energy sector, specifically the project’s impact on the development of the small-hydro power project (SHPP) sector. As the project was impacted by the rapid developments in the Georgian energy sector during the project lifetime, it was of key importance to the evaluation to understand the limits of the project’s ability to influence government policy and market developments, and what support, if any, did the changing government policies provide for the project’s objectives?

Another key issue to evaluate was the project’s impact on stakeholder perceptions of SHPP as a viable investment and financing opportunity in Georgia. Did the project improve access to public and private finance for SHPP projects in Georgia? Were such transformative results replicable and sustainable?

In regards to the geothermal energy sector, which is limited in geographic scope to only a handful of cities in Georgia: Was the project able to bring advances in rationalizing and improving the heat supply to residents in the Tbilisi district that were part of the project? Did the project bring innovation to the sector which could improve practices in Tbilisi and other cities?

The Team began the evaluation with a literature review of a variety of existing documents, reports, presentations, and previous evaluations related to the project, including annual project implementation reviews (PIR's), the mid-term evaluation report and reports prepared by the project team. Following the desktop review, the evaluators met with and interviewed different stakeholders in Tbilisi (refer to Annex 4) during November 2011. There were orientation discussions with the UNDP Country Office and Project Manager with the UNDP Technical Advisor in Bratislava and a de-briefing meeting with UNDP staff. After the visit by the International Evaluator the Local Evaluator also had additional meetings with project stakeholders who were not available during the November 2011 interviews.

## 2. THE PROJECT AND ITS DEVELOPMENT CONTEXT

### 2.1.1 Background of the Project

In the decade after the collapse of the Soviet Union, Georgia was increasingly facing a serious energy crisis. The project was officially launched by UNDP in May 2004, but the original project preparatory work was carried out from 2001 to 2003. During its lifetime (2004 to 2012) the Georgian power sector experienced rapid developments and therefore the project needed to adapt its goals and strategy to the macro-context in Georgia. After 2000 Georgia was experiencing serious energy shortages and the country was plagued with frequent blackouts which harmed economic growth and adversely impacted the quality of life for all Georgians. In 2004, the power sector was characterized by:

- All thermal power stations and 3 out of 12 main hydropower plants being idle;
- Out of the 2,700 MW capacity of the country's hydropower plants (HPPs), only 59% was being used. Many HPPs were idle due to deterioration and lack of maintenance with the largest being Enguri (1300 MW) needing urgent rehabilitation<sup>1</sup>;
- Significant "non-technical" transmission and distribution losses due to theft and bad administration practices (that resulted in bill collection rates in the order of 15-20%);
- Distribution companies that were out of money and not able to make large investments;
- District heating systems in all cities ceasing operations forcing residents to use available alternatives such as electricity, wood, gas, kerosene. This led to further overloading of an already overstretched grid power system.
- The development of local renewable energy resources was largely neglected despite the fact of the country's rich potential, in particular geothermal heat and small hydro power.
- Georgia was facing a serious energy crisis. The power supply system was suffering from regular disruptions. The situation worsened during the winter, when the use of electricity for heating purposes was increasing. The electricity supply had stopped entirely for many rural areas.
- Use of electricity, wood, gas, kerosene or other available means for heating needs had led, to the i) environmental damage of forests; ii) overloading of the power system; iii) excessive household costs and iv) indoor air quality problems.

<sup>1</sup> Out of 2,700 MW (41%, 1,100 MW) was not used in 2004<sup>1</sup> The Law of Georgia on Electricity and Natural Gas (2010)

Among other factors acting at the startup of the project one needs to mention:

- The Government's reform strategy for the sector, outlined in the Government's Letter of Sector Development Policy (LSDP), which covered various technical and institutional aspects of the energy sector to promote investment and improve operations of the sector.
- Optimistic estimates of Georgia's unused hydropower potential. At the time the "economically feasible potential" was estimated at 40–50 billion kWh per year.
- The existence of about 30 small- and mini- (mostly privatized) hydroelectric plants in Georgia, most of them in need of serious rehabilitation. It was also estimated that in total it would be possible to build 160 small- and mini- hydropower plants in Georgia with a total net capacity of approximately 650 MW.
- During the PDF B phase of the project pre-feasibility studies and business plans were prepared for the eight most promising small-hydro power projects. Six additional small-hydro power plants were assessed in a further study commissioned by KfW.
- Georgia has abundant geothermal resources which to a large extent have remained unutilized. About 250 registered geothermal wells in Georgia with the depths of 200 to 4000 meters provide water of 30-108 C temperature with an estimated full output of 12.7 PJ equivalent to 0.7 million tons of CO<sub>2</sub>. The costs of geothermal heating were considered as a competitive alternative to the heating and hot water preparation with natural gas and, in particular, electricity. And it was considered to be a viable alternative for hot water supply.

Tbilisi was considered as the most appropriate place for geothermal development due to:

- The high density of residential consumers;
- existence of geothermal wells; and
- the extremely optimistic estimate of geothermal heat potential.

The overall objective of the project was to remove the key barriers to the increased utilization of local renewable energy resources with the focus on the use of geothermal resources for heating and hot water supply and the use of small hydro power for local electricity production. These resources had to be utilized for Georgia's increased energy security and economic development.

**The main barriers to the development of small-hydro were identified as:**

- Lack of experience and capacity of the Government of Georgia to develop the country's renewable energy resources (apart from big centralized hydro power plants) and to create enabling legal and regulatory environment.
- Lack of in-country information and experience on the state-of-the-art renewable energy technologies;
- Lack of in-country capacity to develop "bankable" investment proposals, feasibility studies and business plans;

- Lack of experience of the local SMEs and/or consultants to professionally manage and supervise renewable energy projects through their development, procurement and commissioning stages.

**Financial barriers including:**

- Small size of the individual RE projects and related high share of transaction costs;
- High perceived risks of developing and financing renewable energy projects in Georgia, leading to high interest rates, and difficulties in financing
- The weak financial status of renewable energy companies which hampered the attraction of financing
- High commercial interest rates with banks

**Institutional and Financial Barriers in the Heating and hot water supply Sector including:**

- Low solvency of the population,
- low level of organization of the apartment owners,
- limited possibilities for organizing the heat and hot water supply;
- Lack of experience with metering and consumption based billing systems for heat and/or hot water supply systems.

It was perceived that in the absence of the GEF support, the removal of the barriers described above would not take place or the process would be considerably delayed, resulting in major delays in the realization of the identified renewable energy potential.

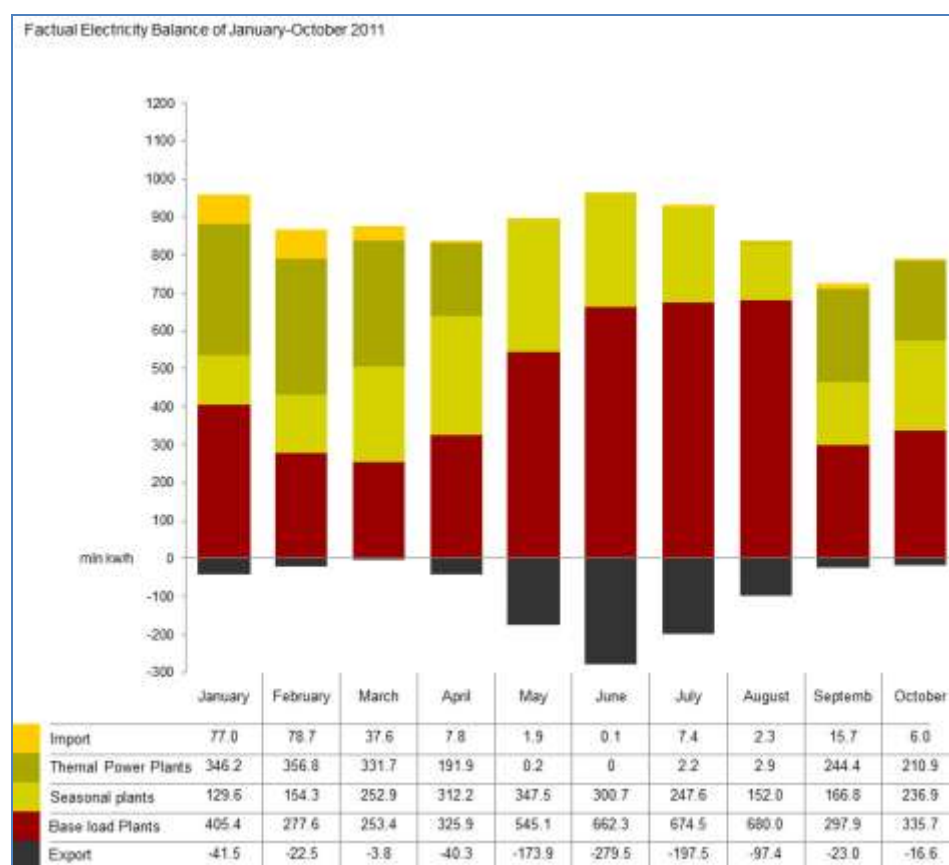
### **2.1.2 The Economics of Small Hydro Power in Georgia pre-2006 and post-2006**

Georgia has a well developed power system. Almost 100% of its populated territory is electrified. Georgia's current electricity consumption equals to about 8 TWh per year. The share of industrial consumption is low and about 60% of country's current power consumption falls on households and small businesses.

Georgia's average annual electricity consumption is about 8.7 TWh, out of which 7,8 TWh is supplied by hydro generation, while the remaining 0.9 TWh comes from the generation of thermal power plants operating on gas imported from Azerbaijan.

There are 46 generation companies operating in the Georgian power sector, of which three are thermal power plants and the rest – hydro power plants (HPPs). All of them are privately owned except major Enguri/vardnili HPP cascade on Russian controlled territory in Abkhazia. In 2010 the high water year thermal power plants generated 682.8 GWh, while HPPs - 9374.9 GWh. Deregulated small HPPs generated 317GWh or 3.2% of total generation

During the spring and summer increased hydro generation due to increased water flow and reduced demand results in an electricity surplus (1524.3 GWh in 2010) which is being partly exported to Russia and Turkey and partly lost. In winter the hydro generation is still insufficient and therefore thermal generation and/or import becomes necessary (222 GWh in 2010). This seasonal imbalance and dependence on export is one of the main barriers for the further development of hydropower in Georgia.



**Figure 1: Electricity Balance for January through October 2011. The base load plants are HPPs.**

A fundamental reform of the energy sector was carried out in 1995-2000 to bring it to closer correspondence with western standards. A vertically integrated state owned company “Sakenergo” was unbundled, and the Ministry of Energy and Fuels, Energy Regulatory Commission and the wholesale electricity market were established and their authorities clearly separated. Emergency rehabilitation of infrastructure and the privatization of distribution systems were carried out.

The period of 1999-2003 was a period of struggle for the energy sector. Further recovery was achieved mainly by improving the distribution sector to assure the cash flows necessary for investment in infrastructure.

Since 2003 intensive rehabilitation of large HPPs started and resulted in the improved reliability and availability of power. Due to further rehabilitation of HPPs there was a steady



growth in hydro generation from 2004 to 2010. Along with rehabilitation there was a major privatization of bundled packages of distribution and generation, or industry and generation and major changes in the legal and regulatory framework.

Significant changes in the state policies were reflected in numerous amendments to the Law on Electricity and Natural Gas during 2006-2009<sup>2</sup>. The Ministry was given regulatory, ownership and operational rights along with the responsibility for policy making. The Ministry now changes and approves the market rules, partially regulates the market instead of Regulatory Commission, approves electricity balances and manages the state shares in sector enterprises. It is authorized to make decisions on deregulation or partial deregulation, based on the state energy policy. Correspondingly the functions of the National Regulatory Commission of Energy and Water Supply were reduced.

In order to support the construction of hydro power plants the Georgian Government started the national program “*Renewable Energy 2008*”. It defines the principles and procedures for building new HPPs (big and small).

Under the program the investors are allowed to build, operate and own (BOO) hydropower plants. For 10 years after the start-up of a power plant, during 3 months of every winter season, the plant output must be sold to the Georgian internal market to any buyer, at any price or based on a Guaranteed PPA with the Commercial System Operator. The remaining period the HPP owner can sell the output without limitation including to export. Investors are required to submit to the Georgian government a bank guarantee for USD 170 000 for every megawatt of prospective installed capacity. BOO rights are granted based on a tender with preference given to the biggest financial guarantee or the shortest construction period. The formal BOO right is given by the Memorandums signed with the Georgian Government. Currently there are 22 memorandums signed for HPPs totaling 1890 MW capacity and 7.73 TWh annual generation. Out of this list the construction works have started on only 5 or 6 HPP sites.

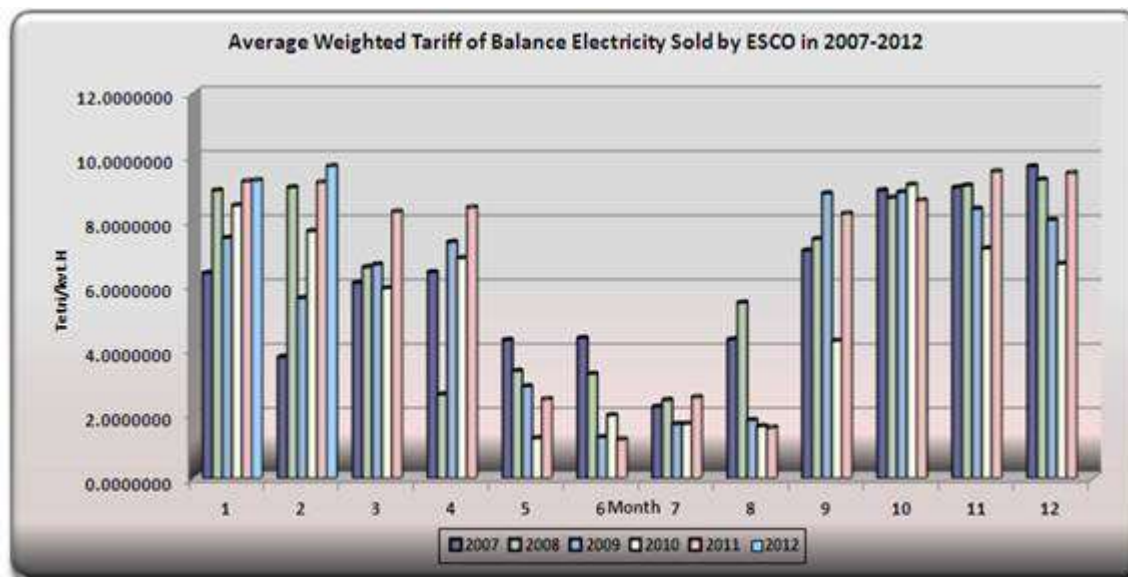
Before September 1, 2006 the Georgian electricity market was fully regulated by the Regulatory Commission who was setting all tariffs based on cost of generation. Since September, 2006 the Ministerial order introduced (partial) deregulation of the Market. Regulatory Commission is setting the upper limit for the tariffs of all power plants, only Enguri and Vardnili are having the fixed tariffs. The connection of generation and distribution tariffs to actual costs is not straightforward since there have been the examples when generation and distribution tariffs are set by the regulatory commission based on complex MoUs between the government and owner of these energy sector enterprises, involving various legal entities and various obligations on both sides, including e.g. the obligation to build the new HPPs. Small power plants with the capacity below 13 MW and newly built power plants (built after 2004) are not subject to the tariff regulation.

The mandatory single buyer wholesale power pool was abolished since September 1 2006. Most of electricity trade is now going through bilateral contracts. Un-contracted balance electricity and Reserve capacity are traded by Electric System Commercial Operator (ESCO) a government owned LLC was established that buys and sells on a monthly basis at no profit. The sale price of balancing energy at the ESCO is defined monthly as the average cost of electricity purchased. The typical summer prices are between 1-2 tetri (USD 0.6-1.3) per KWh

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<sup>1</sup> The Law of Georgia on Electricity and Natural Gas (2010)

while in winter they can increase up to 8-9 tetri (USD 0.4-0.5) per KWh. In 2010 ESCO purchased and sold on the internal market 1.43 TW of balancing electric energy, which constitutes about 12% of domestic electricity supply.



**Figure 2: Average weighted electricity tariff sold by Georgian ESCO from Jan 2007- Feb 2012.**

With these changes the share of open market for generation plants has significantly reduced since the wholesale electricity buyers are sourcing their electricity from own or affiliated generation plants. The principle of distributing the cheapest electricity at fixed tariff from government owned Enguri/Vardnili cascade is also unclear. Therefore, the situation is quite far from what can be called a competitive market on both the supply and the demand sides. The momentum for the creation of a competitive market through the unbundling and the creation of competitive conditions has been largely lost, and even reversed.

Joint Stock Company Energo-Pro Georgia supplies 2.8 TWH of energy to 850 000 consumers in the regions of Georgia. The company also owns a number of hydro and thermal power plants with installed capacity more than 368 MW. JSC “Telasi” is owned since 2003 by Russian RAO UES distributes 1.9 TWH of electric energy to its 416 500 consumers a year. RAO also owns two hydro and one major thermal power plants with installed capacity of about 500 MW.

Through the changes made in April 2009, the deregulation of the electricity generation tariffs started. In June of 2010, partial deregulation of electricity distribution, transit, and consumption tariffs started by introducing tariff caps instead of fixed tariffs.

Competition on the market is hindered by several factors: a. Distribution companies own major generation assets and satisfy significant share of their needs internally, b. Almost half of the country's power generation (4 TWh) is produced by two government owned power plants – Enguri and Vardnili HPPs and sold at fixed low tariffs of about 0.012 USD; c. In spring and

summer there is surplus hydro generation and water that can be used for generation of electricity is often spilled.

Since the country has a significant excess of generation potential in the summer, further development of hydro potential is oriented to the Turkish market. This is the main driver for construction of a major 500/400kV transmission line with DC back-to-back interconnection to Turkey. This Black Sea Power Transmission Line will start operation in Fall of 2012. The initial capacity of the line is going to be 350MW to be expanded to 700MW in 2013. Theoretically such a line could carry about 4-5 TWh annually, however available generation in Georgia will hardly be more than 1.5 TWh in the next 4 years until the new HPPs come on line. In addition, limitations on the Turkish grid do not allow the full utilization of the potential of this line in the near future.

As a step to market liberalization the consumers of all categories received the right to select a supplier (a power plant) directly by making an agreement with the supplier. This right is given to consumers of all categories including the general population. The transit tariff was set equal to the distribution tariff. Today this right is used only by qualified enterprises<sup>3</sup> because the technical and financial conditions of the transit services are not properly regulated.

### **Alternative Options for the Electricity Sale by Power Plants**

The law on Electricity and Natural Gas and the Electricity Market Rules provide several options for selling the electricity from newly built hydro power plant:

1. The investor is authorized at the project implementation stage (before HPP construction) to sign the preliminary power purchase agreement with any consumer (qualified company).
2. The commercial Operator of the Power System (ESCO) has the right to sign the guaranteed power purchase agreement with a new hydro power plant in case there is a corresponding Governmental decree/decision in place.
3. During 3 winter months the investor is obliged to sell generated power to Georgian market.
4. Export of electricity does not need a license or any other permits (except during the 3 months of winter given above).

Average annual rated tariff for electricity on the Georgian market is 0.025 USD/kW.h, therefore it is impossible to sell the electricity on the local market during the whole year at a tariff acceptable to the investor.

The most attractive market for the investors is Turkish market. Currently it can be possible to sell the electricity at the Georgian-Turkish border at 7.5 US cents/kW.h. However, before completion of the new “Black Sea Transmission Line” (Spring 2012) the technical possibilities to export the electricity over existing 220kV tie line are limited to 100-120 MW..

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<sup>3</sup> “Qualified Enterprise” – includes generation and distribution licensees, large direct consumers, importers, exporters, the Commercial System Operator, and small power plants.

## Taxes & fees

The purchase and/or import of materials, equipment and services necessary for hydro construction is subject to a generic 18% VAT. Electricity supplied to the final consumer under a direct agreement is subject to 18% VAT while electricity supplied to the local market for further sale as well as export is subject to 0% VAT.

According to the Georgian tax code the land occupied by HPP is tax exempted. There are no concession fees according to Georgian legislation. The payment for water use is also negligible. For example, for the Mtkvari HPP the fee will be 0.000001 GEL per cubic meter of water.

Import of all necessary materials and equipment needed for the construction of the HPP is subject to customs duties, which is 5-12% of the value of goods and some types of materials.

The permitting and licensing process has been substantially simplified for all hydropower plants. The HPPs below 13MW are not subject to generation licensing. The number of permits and licenses necessary for construction and start up of new hydro plants is reduced to a minimum. At present there are only 4 such permits and licences.

Despite deregulation of the electricity market (including export) and an attempt to create competition in the Georgian power sector, there are still some significant barriers to small HPP development that needed to be overcome, and the project sought to address some of these and other aforementioned problems during its lifetime:

1. There is lack of government interest in specifically supporting small HPPs due to their environmental and social benefits. Government support has focused on large hydropower.
2. No mechanisms for direct access to consumers: Although it is allowed to trade directly with end users, there are actually no mechanisms for such trade – no centralized trading platform, no consolidation mechanism for small HPPs and also no regulatory mechanism e.g. high wheeling tariffs.
3. The requirement of selling the output at the domestic market during the 3 winter months complicates the sale of electricity in the rest of the year, since it becomes necessary to secure the power purchase agreement for 9 months only.
4. CDM mechanism has not been used by HPP developers. This financial instrument is not used due to the shortage of in country expertise and knowledge and the low emissions factor (400g CO<sub>2</sub>E/KWh) that is going to be reduced even further in the future.
5. There is no direct market for small HPPs to sell in – There is a need for consolidation/pooling in order to reduce the administrative burden and facilitate the trade either abroad or internally in the country.
6. In general there is no practice of accounting for externalities in big HPPs and the gas price is subsidized compared to the regional prices. Therefore renewable energy sources are not getting adequate credit for their environmental and social benefits.

## 2.2 Results Expected by the Project

The project's development goal is *to remove key barriers to the increased utilization of local renewable energy resources focusing initially on geothermal for heating and hot water supply and small hydropower for local electricity production.*

To achieve this goal, the Project was designed with a number of barrier-removal *objectives*:

- To create a supportive institutional, legal and regulatory framework that would encourage long term development of Georgia's renewable energy sources;
- To raise public awareness on the possibilities for commercial development of Georgian renewable energy resources and building the capacity of the local entrepreneurs to:
  - develop "bankable" investment proposals;
  - structure financing for the projects; and
  - manage the development and the implementation of the projects;
- To gain experience for and demonstrating the feasibility of financing renewable energy investments in Georgia and building the local SME capacity to manage these operations; and
- Documenting and disseminating the results, experiences and lessons learned and promoting the replication of the project activities at the national as well as the regional level.

The project underwent two substantial revisions in April 2009 and 2010 due to the rapid advancements in the Georgian power sector, and problems with starting the Renewable Energy Fund (REF). However, the primary goals and results that were expected remained similar throughout the project:

- **Small hydropower component:** Improvement of the national regulations to support SHP projects, technical assistance (TA) and demonstration projects that would be financed by a REF.
- **Geothermal component:** Reservoir testing and a reservoir model that was needed to improve the supply and management of this energy resource in Tbilisi. For the demand-side management the project planned to develop pilot metering and billing systems for the residences supplied by the geothermal reservoir which would improve the quality and rationalize usage of the energy source.
- **Renewable Energy Fund (REF):** Originally this REF was intended to be developed and managed by the project and UNDP, KfW, and other stakeholders; but this was later revised, and the project collaborated directly with a KfW managed €5 million REF which was established by a grant from the German government.
- **Clean Development Mechanism (CDM):** Advancement of CDM projects in Georgia and the eventual approval and registration of Georgian renewable energy CDM projects by the project.

In connection with the project results, it was anticipated that approximately 500,000 tons of CO<sub>2</sub> would be offset by the project's SHPP activities over 20 years.

### 3. FINDINGS AND CONCLUSIONS

#### 3.1 Project Formulation

##### 3.1.1 Conceptualization and Design

The original Project Concept/Design was ambitious and addressed the potential for implementation of renewable energy development on several fronts: institutional, regulatory, business/financial and environmental (CO<sub>2</sub> emissions). The project had to overcome many difficulties during its implementation and the goals were modified according to the annual and mid-term review results.

As mentioned previously, the project was designed during a time of an energy crisis in Georgia and rapid changes due to the post-Soviet institutional infrastructure being dismantled. So it is no surprise that the original designers of the project could not anticipate all the developments in Georgia and its energy complex. However, one of the main lessons learned from successful UNDP projects is that adaptive management takes place early and does not wait for mid-term evaluations to take place, and there was evidence that such steps were taken for this project. For example in 2004 the project was aware most decision makers in government during the project formulation were forced to leave and that the new Minister of Energy was negative to the project idea of supporting small hydro power by establishing the REF. Additionally, the Tbilisi municipality had slipped from its commitments and the project was exploring alternative forms of co-financing for the geothermal component. These issues and possible ways forward for the project were discussed at length in the *Rutanen Mission Report* from August, 2004.

There was an initial Logframe Matrix established at the beginning of the project planning which was started in 2002. However, it became evident during the project implementation that the Logframe would need revisions to adapt to the changing situation that the project was operating within. After internal discussions and planning by the UNDP project team, a revised Logframe was updated in 2007 and 2010. The original (2004) and final revised (2010) project Outcomes/Outputs are shown and compared in Annex 1.

The main revisions of the project design and plan during the project lifetime are a result of the following key issues which arose during the project implementation:

- Lack of support by the Government of Georgia to establish a “green electricity tariff” to directly support small renewable energy project investments.
- Delays in the establishment of the Renewable Energy Fund
- Changes in how the REF would be capitalized and managed.
- Withdrawal by the Mayor of Tbilisi of the promised \$1 million municipal co-financing for the Geothermal project.
- Decisions to later develop a CDM Program of Activities (POA) project which was later reduced to a single CDM project activity.
- Delays in some of the disbursement of the SHPP rehabilitation financing by KfW.

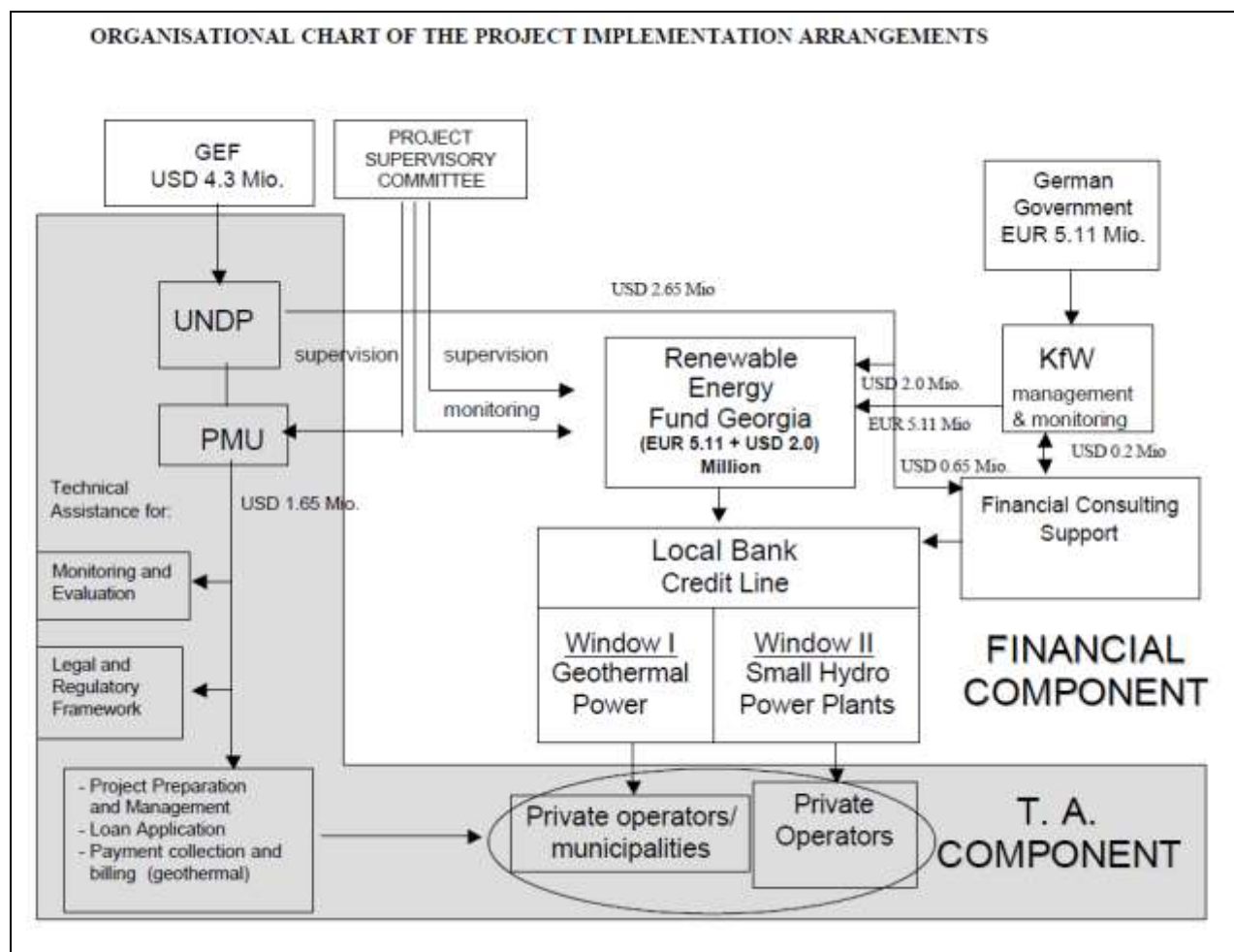
- Renewed focus on the role of the project to fund Technical Assistance activities (feasibility studies, technical capacity development at the banks, engineering design, construction management etc.) for the SHP and geothermal projects.

Overall, the original project design and main objectives contained in the Prodoc were good given the information available at that time. Consultations and interaction with other stakeholders and donor agencies such as the Ministry of Finance, Ministry of Environment, USAID, KfW, and the World Bank were apparent in the analysis and design.

However, there are some exception that cannot be overlooked, the most serious being: How the REF would be established, capitalized, and managed:

The Fund will be established in Georgia and it will be initially endowed with USD 2 million from GEF sources plus EUR 5.11 million from the sources of the bilateral German Financial Co-operation with Georgia. The Fund shall be open for co-financing also to other donor organizations and a specific emphasis during the project will be placed on leveraging these additional resources;

The funds will be administered by the programme banks. The Fund will finance loans extended by the programme banks to the eligible project sponsors. Eligible under the terms of this programme are electricity generation projects in private ownership with an installed capacity not exceeding 10 MW and investments for the utilization of geothermal resources for hot water and heating purposes.



**Figure 2: Envisioned organizational chart of the REF from the 2003 Prodoc.**

Unfortunately, it was finally determined in 2007 by the UNDP Legal department in New York that current UNDP policies would make it impossible for UNDP to disburse the \$2 million GEF grant into a REF. This surprising conclusion for the project management meant that several years of planning and preparation for the usage of the GEF funds for the geothermal component was now spent in vain and that the team would have to redesign the component as best they could considering the circumstances because the decision stopped the envisioned project finance for the geothermal project.

Finally in 2007, \$650,000 USD was provided to KfW (\$200,000 for management fees and \$450,000 for technical feasibility studies) to support the establishment and operation of the Renewable Energy Fund. In late 2011, \$340,000 in unspent funds was returned to UNDP leaving the total amount of technical assistance funding provided to KfW from UNDP as \$310,000.

It is unknown to the Evaluators why the Prodoc passed through the approval process with such a flawed critical design assumption. Possibly, the use of GEF funds to establish a revolving fund was a novel concept which had not been vetted by UNDP's Legal Staff and therefore no one at the regional level imagined it would violate UNDP policy. As of today, UNDP is not legally allowed to operate revolving funds or any financial mechanism which involves loans and not grants. Why a



legal opinion was not requested or given during the project approval process is also difficult to determine after so much time has passed. Fortunately, the project did manage to move forward with KfW and bring bankable projects to what became KfW's Renewable Energy Fund for SHP projects, and not all of the activities for the geothermal component were stopped.

In addition, the geothermal part of the project was partly designed using flawed assumptions:

- The assumption about the inadequacy of gas distribution network for the gas necessary for heating was not confirmed by future developments. Up to now there has been no limitation for gas use for heating.
- An overly optimistic estimate of geothermal resources to anything close to 5PJ (almost double of total domestic electric energy consumption) If this were realistic and feasible a much more intense program should be expedited by joint efforts of the government and donors.
- Assessment of GHW supply costs needed clarification etc.

Nevertheless, the staged approach of the project design was reasonable and envisaged:

- development of Geothermal resource for hot water supply at the first stage,
- well testing and resource verification,
- a pilot project for Geothermal pilot project with Geothermal Circulation and reinjection system

The geothermal well testing and reservoir modelling was not included in the initial scope of the activities, however the decision was adequate due to the inability to put together the funding for GCS. Now the results of testing indicate the possibility to increase productivity and avoid further well depletion of wells, and this can be used as sound motivation for establishing the reinjection systems .

There were some omissions and flaws in the geothermal project design as well. For example, the possibility of leveraging additional financial resources was overestimated. The technical part of this design was proven to be correct, however the financing plan turned out to be problematic due to UNDP's own procedural limitations, the municipality finding other higher priorities for utilization of their funds, and as well as the weakness of Geothermia Ltd. as a financial partner.

Another flaw of the design was too much reliance on the good will, acceptance, and cooperation of the stakeholders. Their capacity and the institutional barriers were underestimated. As a result,

- Due to other strategic priorities and partly due to the lack of institutional capacity and personnel, the Ministry of Energy did not consider RES development as a high priority. It became extremely difficult to introduce supportive regulations, norms or legislation for Renewable Energy Sources including small hydropower and geothermal energy.
- The operating company, Geothermia, was not prepared to implement the principles of proper technical and financial management provided through the project training, and the management was not strong enough to take entrepreneurial decisions on improving the business and attracting private investment.

The Municipality did not provide the co-funding for the Geothermal Circulation System and as a result the latter was not implemented. Another fundamental question is whether the project objective of supporting more hydropower for Georgia by the means used in most other countries was fully appropriate given the seasonal imbalances and hydro domination in the Georgian power supply, i.e. too much hydropower in the summer and not enough during the winter. Even though it was an unexploited resource in terms of the potential at the time of the project design, there was not a clear market for SHPP electricity production during the peak production months of the summer until recently. With the advantage of hindsight, one can see the potential electricity market if SHPPs are given preferential access to the export market via the Ministry of Energy's Black Sea Transmission Network Project, which is not yet completed. There also does not appear to be plans to support giving SHPP priority access to the export market, but rather to support large-scale hydro projects. If the situation changes this would radically improve the investment and development of SHPPs in Georgia. While it is not correct to state that the objective was wrong, the fact is that the energy market restructuring did not develop in a way that would support sufficiently SHPP from an energy-mix or policy perspective, and this had consequences for the project implementation.

The development of grid connected small HPPs (having usually higher cost per kWh of energy) is not economical and might not become the direction of state energy policy in the long-term. Georgia still has a large unused potential of large and medium HPPs and now has abundant electricity capacity for the internal electricity market. Even if Georgia had an obligation for CO<sub>2</sub> emission reductions in the energy sector and an unsaturated market, this might be more economically achieved through the development of larger HPPs. Therefore the focus on off-grid SHPP development in remote areas would be more appropriate and justified for the project.

The project design relied on well established methods of supporting small HPPs in other countries without sufficient account of Georgia's specifics that became obvious once the crisis situation was over in the electricity sector.

The design flaws had significant impacts on the project implementation. Therefore, despite having an ambitious and detailed design, **the Project Conceptualization and Design is rated as Marginally Satisfactory.**

### 3.1.2 Country Drivenness

One has to realize that the project design and startup coincided in time with the turbulent period of the "Rose Revolution" and the establishment of the new government and new economic and political reforms. The process was also remarkable for extremely frequent changes in government. Therefore securing the participation of higher ranking government officials and decision makers was not easy in view of ongoing large-scale economic political and energy sector changes.

The Project Steering Committee took about 2 years to be established. The first meeting was only held in December 2006. The Government of Georgia is represented at a high level by Ministers or Deputy Ministers themselves and the Committee is chaired by the Minister of Environment. Between 2004 and 2008, the Minister of Environment changed five times and the Minister of Energy twice. These changes caused serious problems as the Project Steering Committee (PSC) composition had to be approved by the Prime Minister of Georgia, and any approval would take

months by which time another Minister might have been removed. As a workaround the project formed a so-called Four-Partite Meeting of Donors and Executive Agencies to meet regularly in lieu of the PSC. It included representatives from KfW, UNDP, the Ministry of Environment, and Ministry of Energy. Another obstacle that project had to encounter was the liberal (libertarian) economic policy of the new government since 2004, relying fully on unregulated market forces and reluctance to impose any regulatory supportive or restrictive measures. The government, especially during the initial 3-4 years of the project, was closely following these policies. This was impossible to foresee at the project design and inception phase that coincided with the change of government in Georgia in early 2004 and start of new intensive economic and political reforms. In such a situation it was practically impossible for the project to promote special supportive measures for renewable energy and SHPP and Geothermal energy.

There is no complete harmony between the country's general intentions and actual policy development; e.g. under the European integration and accession process namely EUs Eastern Neighborhood Policy there was a requirement to develop the Energy Efficiency and Renewable energy legislation and strategies that has not been developed mostly due to other higher shorter term priorities. Therefore the project was in harmony with the general long term country objectives and development priorities, however it didn't always manage to compete with the shorter term immediate preferences of the government.

In the course of the project there was a need to stabilize the country's electricity supply and therefore the government was mainly focused on large power projects. However in spite of this general strategy as a result of lobbying from UNDP/GEF project and USAID the government has created favourable conditions for small HPPs by deregulating the tariff and establishing the new market rules obliging the ESCO to purchase the electricity generated from SHPPs at favourable tariffs. It has simplified permitting and licensing procedures, granting the rights of direct sales and also allowed the sale of electricity from SHPPs to direct consumers at any level. However these changes are to be further supplemented by additional policies and implementation mechanisms to create a full enabling environment.

Georgia is a signatory to the UN Framework Convention on Climate Change and ratified the Kyoto Protocol in 16, June 1999. Georgia has also established a Designated National Authority (DNA) to participate in the CDM. Therefore the project design and objectives were aligned with the national and regional environmental and economic priorities that existed at the time but with the caveats discussed above.

### **3.1.3 Stakeholder Participation**

The main stakeholders of the Project include:

- Ministry of Environmental Protection (previously Ministry of Environmental Protection and Natural Resources);
- Ministry of Energy (now Ministry of Energy and Natural Resources)
- Ministry of Finance (for policy and regulatory guidance on financial matters);
- Kreditanstalt für Wiederaufbau / German Bank for Reconstruction (KfW) (who had agreed to provide initializing capital for the Renewable Energy Fund (REF));
- Local municipalities

- Local banks who serve as financial intermediaries in the management of credit lines for SHPPs;
- Municipal Development Fund which managed the REF
- SHPP owners and developers
- Geothermal license owners
- Participating banks – TBC and VTB
- Population in pilot project area
- Local NGOs and technical experts involved in the project implementation and related activities
- Investors interested in SMEs for SHPPs and geothermal development.
- Donor agencies active in Georgias energy sector including USAID, WB, EBRD and others,

During more than 7 years since the project design and inception most of the counterpart organizations have had major changes in their staff, therefore it is only possible to judge about stakeholder participation based on available reports and statements from project participants.

The project was preceded by previous projects and activities that laid the grounds for the suggested project strategy. *The PDF B phase of the project “Removing Barriers to the Development of the Small Hydro Power Sector for the Mitigation of GHG Emission in Georgia”*, pre-feasibility studies and business plans were prepared for the eight most promising small-hydro power projects and the main selection criteria for their inclusion was that the owners of plants were ready to invest their own resources. In a further study commissioned by the KfW in spring 2002, 6 additional small hydro power plants were assessed. All of this indicates pretty close cooperation for project preparation with SHPP owners as well as KfW. It was also based on previous studies done by other stakeholders e.g. WB study assessing the geothermal energy potential in Georgia.

Barrier analysis conducted at the design stage implied assessment of stakeholders’ capacities and was done in interaction with them.

While the Project was relevant to Georgia’s long term developmental priorities of a secure energy supply and maximizing the export of energy to neighboring countries, participation of policymakers has not been strong due to dynamic changes and immediate higher priorities.

Given the broad range of stakeholder involvement and their contributions to the planning of the project, **the Stakeholder Participation in the Project Formulation phase is rated as Satisfactory**

#### 3.1.4 Replication Approach

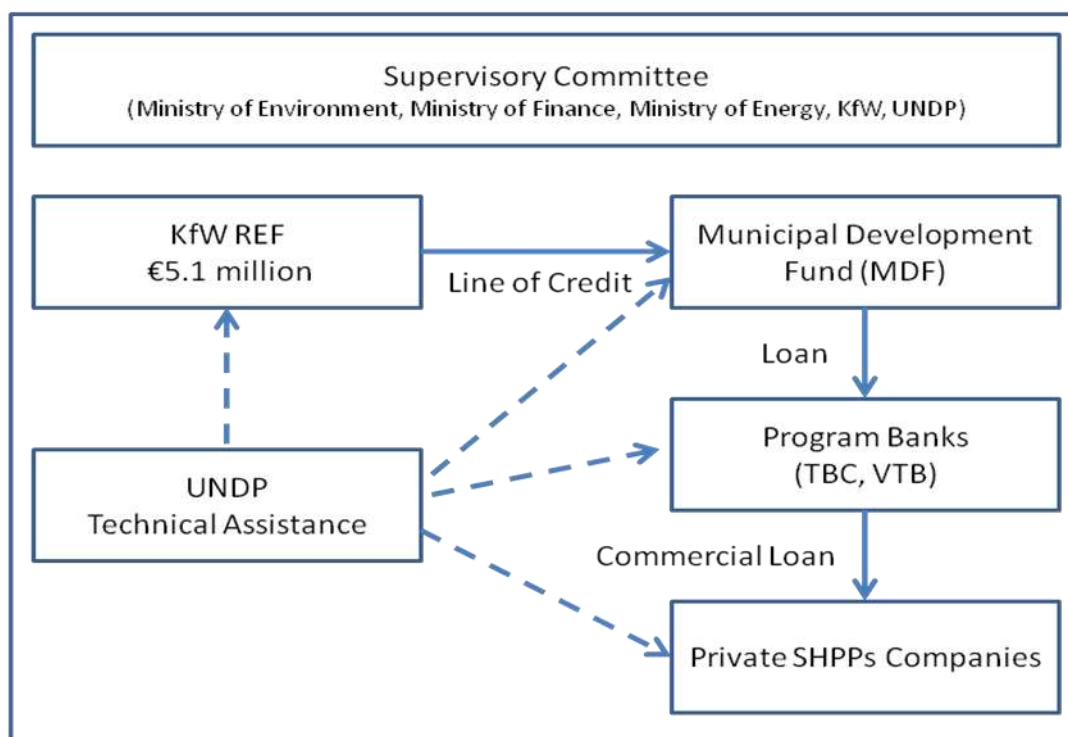
The key mechanisms for replication in this project were the:

1. Establishment of a Renewable Energy Fund that would be revolving and expanded.
2. Capacity-building activities at participating local banks aimed at improving their ability to assess the project risks and thus enable the banks to work with SHP project finance outside of the project’s scope.
3. Pilot SHP and Geothermal projects that would improve the “best practices” in the sector

4. Information dissemination activities and workshops aimed at informing interested parties of the project activities and results.
5. Preparation of a *Draft Renewable Energy Programme* in consultation with Georgian Government Officials aimed at influencing government legislation to support long-term investment in small-scale renewable energy projects.
6. Development and UN registration of a CDM Program of Activities (POA) for SHP projects including support for the establishment of a Coordinating Management Entity (CME)

The KfW REF was finally established in 2009, five long years after the project started. Figure 3 shows an overview of the REF structure. It was also decided that the REF would focus on rehabilitating existing SHPP in Georgia instead of investment in new SHPPs. However, the definition of rehabilitation was applied rather broadly and additional generation capacity could be added to the SHPPs. Currently 3 projects have been approved, and financing has been approved and disbursed for 2 SHPP rehabilitation projects at Ritsuela and Khadori-2. The final project is still waiting for the final approvals for financing. According to KfW the REF has been a success and they plan to build on the success by establishing a similar fund with €15-20 million for SHPPs in Georgia. While the exact details are not public yet, KfW plans to use the lessons learned from the REF to establish an improved governance process and will probably work with more local banks than the two that participated in the REF. As part of the project KfW also made a film about the rehabilitation work that the project funded.

In support of the REF and project goals, the project provided TA to the program banks in the form of feasibility studies and experts who could assist the banks in analyzing the technical risks of the project proposals. Prior to this time, the banks did not practice real project finance but based their decision only on the credit worthiness of the company applying for the loan, instead of the merits and risks of the project. According to statements from TBC bank staff, the project really helped them provide a new product and now they have a pipeline of 5 or 6 SHPPs (approx. \$30 million) to finance that are in addition to what the project provided. The project was credited for helping them develop the internal systems and procedures for analyzing the risk of SHP projects.



**Figure 3: Overview of the REF structure**

The project was also successful in improving the current practices in the SHP and Geothermal sectors. According to Joseph Michedlishvili, the Director of Peri Ltd (the company owning and constructing the Khadori-2 SHPP) the project revolutionized the way SHPPs are constructed in Georgia. This was due to the excellent input from the Icelandic engineering consultants (Landvirskjun Power) which were provided as TA from the UNDP/GEF project. For example, normally such SHP reconstruction would require 120 people, now only 40 people were required and the project needed half the time for completion. This had a strong impact on the financial feasibility of the project as income would be generated sooner and costs were lower. Accordingly, others in the SHPP industry took notice of the engineering and construction techniques that Peri LTD was using at Khadori-2 and have tried to use it with their own projects. This spread of innovations through informal industry and personal networks is a common phenomenon in communities of practice. To paraphrase differently: In a small country like Georgia where there is a small number of actors in the SHPP development and construction sector, many people know each other and enjoy discussing news about their business, including new developments such as those implemented by the project.

In regards to the geothermal sector, the project provided for the first computer reservoir flow model in Georgia and it is also the first to use individual heat consumption metering in apartment buildings served by Geothermia, the company with the current license to utilize the reservoir and provide the heat to the residents. As these practices are novel and necessary for the municipality, the practice of using meters to charge end-users for the heat they consume are planned to be continued and expanded by the municipal government after the project ends.

The project produced in 2007 the Renewable Energy Strategy (RES) and this was discussed at different workshops and meetings with government officials. It was difficult for the Evaluation Team to assess how strong an impact this RES had on government policy and regulations as de-regulation of

the energy sector was underway in Georgia. According to some of the people interviewed, the Ministry of Energy was not receptive to any policies which were not free-market based, and did not favour legislation directly aiding small-scale renewables.

In terms of the awareness raising the project has given presentations at a number of workshops during its lifetime and was discussed on talk shows and the mass media in Georgia. Video films and video clips were made about the role of local renewable energies in climate change mitigation in Georgia. The project web-site ([www.renenergy.ge](http://www.renenergy.ge)) was established but it does not appear to be currently updated for one year or finalized. Only an English version of the website exists, but it would have made sense to have one in English and Georgian languages. As the project is shutting down in 2012 it appears no plans to date have been made by UNDP to maintain the project website after July, 2012. The website is something which the project should improve before it is closed, and the final reports and presentations from the Final Workshop should be added.

In regards to the CDM component which was a late addition to project activities, the project experienced problems with finding and contracting the right consultant to design a full-scale CDM Project of Activities (PoA) and difficulties associated with establishing the CME. After a few false starts with developing the PoA it was decided by the project management to do a regular CDM project for the Khadori-2 SHPP. This CDM project has the Project Design Document (PDD) developed and as of February 2012 the project was assessing options for Validation including which company (DOE) to contract.

Overall, the project has had success in providing a platform for replicating and expanding the results of the project in the SHP sector. It is too early to tell what the long-term replication impact will be with the geothermal component, but anecdotal evidence points to an adoption of the metering practices by the municipalities. While the project website could be improved, it was clear that among the project stakeholders and target audience there was plenty of information available about the project and its activities through the years.

Where the project has had less impact to date is in regards to the CDM component as it will take probably 1 year more before the project is successfully registered. However, the real financial impact of CDM for SHP projects in Georgia is minimal due to a very low CO<sub>2</sub> emission factor for the Georgian electricity grid, which is dominated by large hydropower. This results in a low baseline emission factor and low generation of Certified Emissions Reductions (CERs) compared per MWh electricity produced, i.e. the income from CDM would be about half that for a comparable CDM project in e.g. China or India and thus will have minor influence on the project financials when this is coupled with the current low market prices for CERs. However, there are other positive reputational benefits which a company receives by hosting a CDM project and market prices may improve for CERs in the future.

## **3.2 Project Implementation**

### **3.2.1 Implementation Approach**

Evidence was provided that showed the periodic use (at least annually) by project participants of the “logical framework” (though this concept was called something different and formulated differently during the original formation of the project). Several workplans were established at different times

during the project but after the mid-term review in 2008 several changes in the project strategy and goals were made in order to improve results. This was mainly in response to the delays in the establishment and operation of the REF and other barriers outside the project's control as discussed in Section 9.1

One flaw of the design was too much reliance on the good will, acceptance, and cooperation of the Ministry of Energy, Tblisi Municipality, etc. In addition there were delays on two fronts in regards to establishing the REF:

- Problems related to UNDP rules and regulations which did not allow for co-capitalization of the REF with GEF funding
- Delays with the Steering Committee of the REF deciding which intermediary fund manager to use.

The first problem led to the decision by UNDP's Legal Department in 2007 that it would be impossible to use the \$2 million in GEF funding for capitalization of the REF. This caused delays in the project and a re-think about how to implement the geothermal component and REF. In regards to the steering committee, there was a power struggle going on between the Ministries and the Ministry of Finance was insisting that the intermediary fund manager would be hosted by them. Due to so many partners being involved in the REF steering committee there were significant delays in finalizing the REF creation.

The project management came up with alternative approaches to work around the implementation obstacles. For example, the \$2 million in GEF funding that was originally earmarked for the REF needed to be re-allocated for other activities, and this was done in coordination with the mid-term report to support additional technical assistance and activities to the REF and the geothermal consulting and model development. This was a logical example of adaptive management and good practice, albeit that it took place much slower than would have been ideal, but this was due in part to slow establishment of the KfW REF. Without the REF the project could produce little of value besides reports and awareness raising as the pilot projects were always the heart of project.

Once the REF was up and running in 2009, the project faced another big problem: the original SHPPs that the project had provided technical assistance to (feasibility studies, business plans, etc.) had tired of waiting for the REF to be established and the participants took the projects to USAID and other sources of financing that were looking for projects. This was a setback and required the project to source new projects for the REF. From a purely environmental perspective, it was not a setback since more than 3 SHPPs were put into operation as a consequence of the project activities during its lifetime.

During the first round of project selection the project had an open call for submission of SHPP project ideas in 2007 which were screened according to criteria developed by Posch & Partners. After which further feasibility and business plans were developed for discussion with local banks. At this time a major flaw was discovered in the screening process by the project team as the original criteria did not place much emphasis on a deep analysis of the financial capability of the project developer to secure co-finance. This lesson was carried over to the next round of project requests in 2009 which resulted in proposals being received from 24 applicants, of which 14 were screened to produce a short-list for further feasibility and business plans, and eventually the full development of 5 feasibility studies for Khadori-2, Abasha, Borjomi, Tskhomareti, and Achi SHPPs. These were companies which had a stronger ability to meet the financial criteria of local banks. This process is outlined in Figure 4.



During the loan application and due diligence with the local bank other proposals were delivered from projects that were from other programs in Georgia. Ritsuela SHPP submitted and eventually became one of the 2 projects KfW approved for loans.

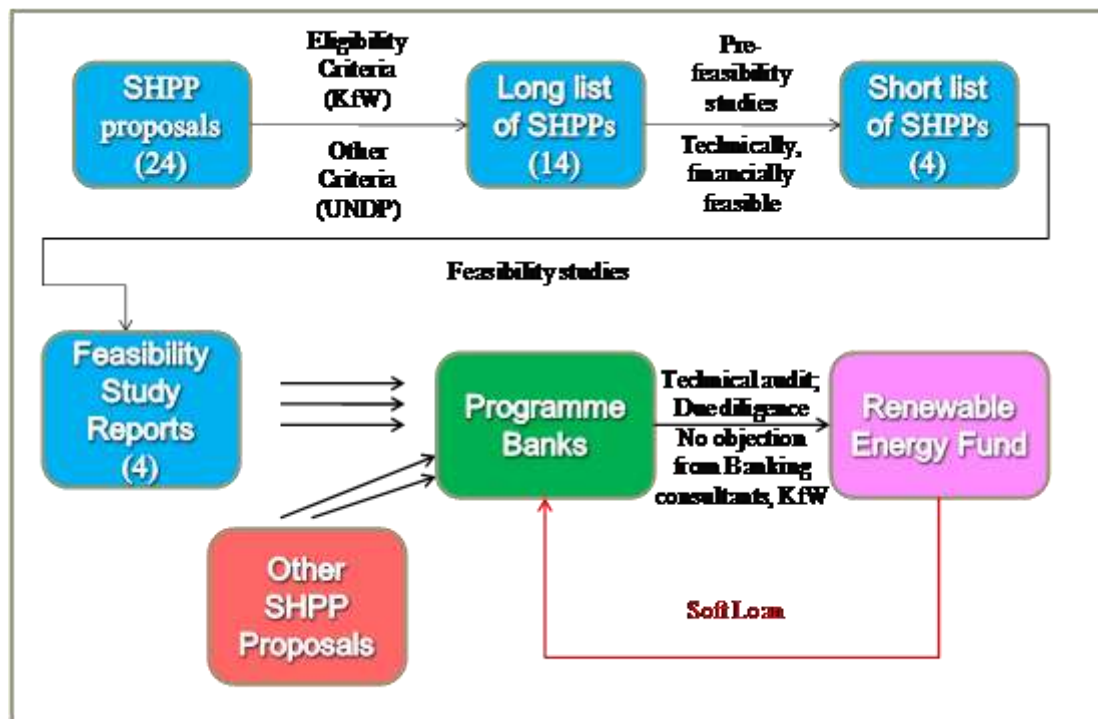


Figure 4: Selection process for the project SHPPs.

Once the new projects were developed on paper by the project and local companies some other unexpected problems arose which caused significant delays. A good example is the case of the EIAs. The Khadori-2 SHPP renovation project was exempted from EIAs by governmental decree, but during its internal decision-making process, KfW staff decided to enforce its internal requirement for a separate EIA for Khadori-2 of the SHP projects, but not for Ritsuela for unknown reasons. This resulted in over a 1 year delay in loan approval for the Khadori-2 project. At this stage the project management could only assist with getting the EIA issue solved and there is evidence that this was done.

However, the problems facing the SHPP component were minor compared to the challenges the project faced implementing the geothermal energy component. Early in the project design, the plan was to finance large-scale utilization of the geothermal energy through the REF. Once this was becoming impossible, the project team managed to convince the Mayor and municipality to co-finance the project funding by \$1 million. After time passed and plans were being made to attract additional investors the new Mayor reversed the decision and withdrew the co-financing.

In addition, Geothermia, the local company with the license to utilize and manage the geothermal reservoir until 2017 was not prepared to implement sound technical and financial management and was not motivated or well capitalized enough to improve the business and attract additional investment funds. Despite attempts by the project and assistance such as a business plan

development in 2006, discussions with Lisi Lake investors in 2008 and other potential private investors, Geothermia was not an attractive investment opportunity for private investors. The likelihood of Geothermia renewing its license is very low according to people the evaluators interviewed, and the project management made a wise decision to transfer the ownership of the meters and other assets purchased by the project to the municipality, so that these improvements and assets will stay with the municipality when another company receives the license for operating the geothermal heating system.

As for development of the potential geothermal well by the investor/developer in Lisi lake, one should consider the fact that after completion of the MTE report in May 2008, there was an August war resulting in the Russian occupation of Georgian territories and there was also the effects of the world financial crisis which started in mid-2007. Both of these events had a major impact on economic development in Georgia, including the plans for development of Lisi lake infrastructure by GRDC and the development was stopped indefinitely. The war also impacted all of the components of the project in regards to delays in implementation.

Well-testing and reservoir modeling was not included in the initial scope of activities, however the decision to include it after the mid-term review in 2008 was appropriate due to the inability to put together the funding for the Geothermal Circulation System (GCS). The results of the testing indicated the possibility to increase well productivity and avoid further depletion of the geothermal wells. The results can be used as sound motivation for establishing the well reinjection systems after the project finishes, and was a good investment. It is clear that the Lisi lake studies are also not lost, as the development may be re-started at some point in the future and the knowledge developed by the project could be utilized then for environmental benefits.

Some of the implementation challenges were made more difficult by UNDP's own procurement policies. If there were not a minimum of three bidders for a tender, then the tender needed to be run again. If a tender amount is over \$100,000 a UNDP Headquarters Committee called the CAP (Contracts, Assets and Procurement Management) needs to carefully consider and approve the tender result. It was commented that UNDP procedures led to long delays and some of the procedures are not appropriate for an undeveloped market. This applied in particular for the geothermal component. In some cases there was not a developed infrastructure of suppliers in Georgia for the services which were needed by the project. This caused severe headaches for the project staff and required additional resources from the UNDP office to request exemptions or re-run tenders. As examples:

The Request for Quotation (RFQ) for geothermal reservoir testing was announced in February 2008; then it was re-announced in April 2008. Since no responsive bid was received the scope was split (preparatory phase and testing itself) and tendered separately. In July 2008 a tender for preparatory works for testing was announced and the winning company contracted in September 2008. The tender for the testing was announced in May 2009 and then re-announced in June 2009 that finally resulted in selection of the Contractor.

The tender for the Assessment of the Scale of Utilization of Geothermal Energy Resources and Estimation of Payable Demand of the customers of Saburtalo Pilot Geothermal Project was announced twice.

The tender for the Procurement and installation of Geothermal Hot Water Metering System and their appurtenances in Tbilisi was announced 3 times in 2011

Another issue that the project had to overcome during implementation was problems with the CDM component. After initially planning to develop a leading-edge CDM Program of Activities (PoA) including establish a Coordination / Managing Entity (CME), the project had to scale-back its goals and develop only one CDM SHP project. The reasons for this were due in part to complications during the selection of the consultant and difficulties working with project partners in another similar activity (to support small hydro PoA in Georgia) being funded by the Norwegian Government with work done by Statkraft consultants. Eventually the chosen consultant did not in fact have the technical capacity to develop a PoA and the Project Design Document and there was no support for the establishment of a CME, and the objective was scaled-down and changed to a normal PDD for the Kalari 2 SHPP which is currently being finalized. This result is not optimal as the impact of successfully establishing a CDM PoA for SHPP for Georgia is that the financial benefits would have gone beyond one or several projects and could have ideally covered the entire sector. However, the project was not responsible for establishing the PoA CME and took steps to at least produce something of value from the CDM component.

There is strong evidence of adaptive management during the project implementation as contained in the PIRs, interviews, project documents, and actions taken after the Rutanen Mission Report in 2004 and Mid-term review in 2008. It is the opinion of some UNDP staff that some actions could have been implemented quicker by the PMU. However, some problems were outside the project managements' control or influence, while some were internal UNDP problems that were eventually rectified by the project management. Sometimes it is not how one starts but rather how one finishes. By acknowledging the problems during project implementation and by taking steps to rectify these problems the **Implementation Approach of the Project is rated as Satisfactory.**

### 3.2.2 Monitoring and evaluation

As noted in the previous sections, the project activities were monitored and reported in accordance with the project plan (LogFrame, annual PIRs, etc.). Minutes of major meetings with stakeholders and site visit reports were produced. Monthly and quarterly reports were compiled by the PMU and provided to the UNDP staff in accordance to procedures. The Program Officer for Environment and Energy in UNDP from 2004 to 2010 spoke highly of the PMUs efforts and stated that there were no issues in regards to monitoring and reporting during her time with the project.

Due to various circumstances the creation of the REF and the completion of the demonstration projects were severely delayed. The mid-term evaluation report (2008) was a catalyst which enabled UNDP to make several critical changes to the project. Therefore strong evidence exists that the project management did its best to "turn-around" a project that had poor results by 2008. It should be noted that 3 annual project extensions were required the final one in December 2010. There were solid justifications for providing these extensions as contained in the project revision documents and LogFrame updates, and these revisions were discussed internally in UNDP with the Regional TA's involvement. Judging by the results in 2010 it appears that their actions eventually worked and the project results were greatly improved from the situation in 2008. **Therefore the Monitoring and Evaluation of the Project is rated as Satisfactory.**

### 3.2.3 Stakeholder participation

The project has enjoyed wide publicity during its lifetime. A great number of workshops, seminars and conferences, and TV casts were used to inform about the project goals, its outcomes, and to promote establishment of enabling environment for RE and SHPP and geothermal energy in particular. The project information was posted to a special website and was updated to reflect project progress. The list of outreach activities can be found in Annex 5. The list of stakeholders that the project interacted with are listed in 9.1.3. The general public and NGO groups were not very involved with this project due to the nature of the small-scale energy activities.

Stakeholders were informed about the information produced by the project through the reports disseminated to them and workshops organized by the Project. In March 2012, the Project held a final project workshop and all key project stakeholders were invited to this workshop. A copy of the agenda to this workshop is listed in Annex 8 of this document.

The experience of interaction with the government and public has been mixed. Government policy proved difficult to influence in part because of the agenda of the project was initially not totally aligned with the beliefs and objectives of the new Minister of Energy, and in part because the Ministry of Environment is considered less powerful than the Ministry of Energy and Ministry of Finance. For example, the Ministry of Energy did not buy-in to the project and initially KfW could not receive a Letter of No Objection from the Ministry.

On the one hand, frequent changes of personnel at the ministerial level followed by staff volatility at lower levels has had a negative effect on the Project's ability to establish a stable policy dialogue with Government entities. For example, there have been six changes of the Minister of Environment since the commencement of the project in 2004. The ministry of energy was mostly preoccupied with big power projects. As for Geothermal energy it is not covered by any energy legislation and there is even no staff position in the ministry that would be tasked with the issues related to geothermal energy use. This may be changed since recently management of natural resources has been added to the function of the ministry. Major damage to the project was caused when the Tbilisi Municipality decided to withdraw their USD 1 million co-funding from the Geothermal pilot project funding.

On the other hand, there have been a positive experiences as well:

- Unlike in many other projects where there is a change of Project Manager, this project has benefited from having one experienced Project Manager for 8 years from start to finish who established long-term relationships with stakeholders
- Lobbying activities in collaboration with other stakeholders have lead to legislation changes providing some benefits for the SHPPs.
- The local assembly of Saburtalo district has decided to provide funding for the pilot project to complete the connection of residents to new distribution piping for GHW.
- Overall the interaction with government entities can be considered as marginally satisfactory.

There were several other projects in Georgia going in parallel with the Project and focusing on promoting RE and SHPPs in particular:

- Promoting Clean Technologies in Mountainous Regions of Georgia (Oni Region), with a budget of USD 0.288 million (UNDF TTF: 0.127 million and UNDP TRAC: USD 0.161 million);
- Promoting the Use of SHP at Community Level (USD 1 million, donated by the Norwegian Government).
- The USAID-funded Georgian Energy Security Initiative (GESI) which had a 'community development component' and was followed in 2005 by the 4-year Rural Energy Programme (REP). This project and the aforementioned Norway-funded project were implemented in parallel and in close coordination with the UNDP-GEF project; including SHPP rehabilitation
- The Georgia Energy Efficiency Program (GEEP) is a new program, administered by EBRD. EBRD started a credit line in November 2007 for the energy efficiency and renewable energy projects. Their manager had agreed to avoid project overlaps with this Project until April 1, 2008 at which time various SHPP investors would be considered for GEEP financing to complete construction of their projects in 2008.
- The Norwegian Government Programme (2010-11) to support PoA (Programmatic CDM) for small hydro in Georgia which had up to 500,000 Euros available for such, activities and which unfortunately was not successful and support was discontinued in 2011.

One example of collaboration and networking was the development of draft Energy Efficiency and Renewable Energy legislation under USAID/Winrock International/WEG activity where the Project Manager was taking active part and contributing his experience with the problems of development of SHPPs and geothermal resources. Another example is the initially close interaction with the Norwegian CDM PoA project .

In general, one can agree to the MTE report in conclusion that the UNDP/GEF PMU was:

*well-connected with the donor community and tried to find synergy between the various donor-funded activities* (German KfW, American USAID, European EBRD, Norway fund, UNDP TTF). For example, due to the close consultations between UNDP/GEF project and USAID/Winrock, REP which initially focused on community-owned SHPP projects with significant grant component, changed its approach from partially subsidization to commercial lending; as such, financial sustainability of REP demonstration projects became a key criteria for selection. In addition, the UNDP/GEF-KfW project and USAID/WI REP have increased interest in partnering with international financial institutions (such as EBRD in financing RE projects).

On the other hand, outreach activities to potential SME investors and local engineering firms would have strengthened the Project and thus **Stakeholder Involvement in Project Implementation is Marginally Satisfactory** .

### 3.2.4 Financial Planning (R)

The project financing, co-financing and expenditures are shown in Annex 7. As expected Technical Assistance was the largest expenditure during the lifetime of the project which was according to plan. The project was consistently disbursing below its annual budget for most of the years, and this had to do many of the delays which were mentioned previously. In the opinion of the evaluators a low disbursement rate is not necessarily negative as it shows that the project is tightly managing its

financial resources and saving them for a time when the obstacles and delays are overcome. This appears to have been a prudent use of resources by the project management.

Evaluating the cost-effectiveness factor is not straightforward and not easily measured. One cannot simply focus on the immediate accomplishments of the project to make this assessment. The project has had a lasting impact on the development of the market for SHPPs and has demonstrated how to properly utilize geothermal sources for the future. These elements are described in other parts of this Evaluation. It is appropriate to consider all of these impacts as benefits which were accrued from having made the project's financial investments. While the project can only directly take credit for the financing of 2 SHP projects, it also developed many feasibility studies and some of these SHP projects were eventually implemented outside the project. However, in terms of the direct environmental benefits that have accrued from the project expenditures, it would be a high cost per ton of CO<sub>2</sub> reduced, if this metric were the only determining one. For example, over a 20 year time period the 2 SHPP projects are estimated to reduce 680,000 tons of CO<sub>2</sub>e. This would roughly give an abatement cost of \$20 per ton of CO<sub>2</sub> reduced, if the \$14.8 million in total project finance (GEF plus co-financing) is attributed to these reductions over 20 years. This is without considering the time value of the \$14.8 million after 20 years, at 7% interest it would be worth almost \$60 million after 20 years, which in turn would make the abatement cost roughly \$50 per ton of CO<sub>2</sub>e reduced if averaged over 20 years.

The TA money that was to be eventually managed by KfW could have had better oversight according to some project participants. In 2011 \$340,000 (out of \$650,000) was given back to UNDP which had not been previously budgeted to be used by the project for other activities. As mentioned before, the \$1 million in co-financing that was promised by the Tbilisi municipality was later withdrawn which reduced the co-financing for the geo-thermal component to zero.

**Overall the Financial Planning and Cost-effectiveness of the project is rated as Marginally Satisfactory, however this is really consequence of the design flaws and external problems the project faced, and much less a consequence of the project team's financial management of the funding.**

### 3.2.5 Sustainability.

The sustainability and long-term impact of the project can be judged by several issues:

- The establishment of the REF is a serious factor for the long-term impact of the project if KfW officially launches the €20 million follow-up REF fund.
- The experience gained through the technical assistance as well as the financing of SHPP projects will be useful for local entrepreneurs and at the local banks, and has led to a small (approx. \$30 million) pipeline of SHPPs at the local VTB bank.
- The Local municipality of Saburtalo District is involved in ongoing geothermal metering project. They are not satisfied with commercial performance of Geothermia Ltd. According to the comments from the local assembly, they are determined to take actions including inviting a new commercial operator for geothermal resource utilization to apply for the license.

- The geothermal well testing and numerical calculations have clearly indicated the trend of declining output of the wells, therefore the arrangement of circulation system becomes vitally important step for sustainability of supply of GHW in Tbilisi. If this was not done by the project no action would be considered by the municipality.
- The arrangement of metered and insulated GHW distribution system under the pilot project is clearly a step for commercial and technical *sustainability of utilization of GHW*. As part of the project's planning for a new operator, all of the hard assets (meters, etc.) have been transferred to the municipality and not to Geothermia.

Also, the project did eventually interest some government officials to support renewable energy and SHPP investments and as the ongoing evolution of the Georgian legislation proceeds the project's influence cannot be discounted. If the CDM project is ever registered by the project then this will be a milestone for Georgia as no HP or SHP projects are currently registered as CDM projects from Georgia.

### 3.2.6 Execution and implementation modalities.

According to information received from UNDP staff, this project follows a typical approach used by UNDP/GEF projects. The UNDP Country Office (CO) supports the project's implementation by maintaining the project budget and project expenditures, contracting project personnel, experts and subcontractors, carrying out procurement, and providing other assistance upon request of the National Executing Agency. The UNDP Country Office also monitors the project's implementation and achievement of the project outputs and ensures the proper use of UNDP/GEF funds. Financial transactions, reporting and auditing are carried out in compliance with the national regulations and UNDP rules and procedures for national execution. UNDP Atlas system has been implemented for the project and the evaluators have been shown completed Atlas reports to 2011.

As it is stated in the most recent independent NEX project audits such distribution of responsibilities within the Project appears reasonable and auditors consider the Project management structure to be appropriate. According to UNDP staff, there have never been any problems uncovered by the NEX audits.

The implementation arrangements for the project have been designed to provide transparency and accountability. Project budget and workplans were made available, project progress have been regularly reported on to the key stakeholders, and made available to the general public through the project web-page (though it is unclear how often it was updated in practice).

A Project Steering Committee (PSC) was formed to provide overall guidance and support for project implementation activities but only after almost 2 years from the project start. The PSC met only 2 or 3 times during the project lifetime. This was probably not frequent enough given the obstacles the project was trying to overcome and should be viewed as a break from normal UNDP practice. However, as explained earlier, there were legitimate reasons for this situation, as the Prime Minister needed to approve the individual composition of the PSC (i.e. each person, not the position). As so many ministers changed during the project lifetime the PSC was constantly being sent back to the PM's office for approval, which would take several months or more. To compensate the PMU established the so-called "Four Partite Meeting of Donors and Executive Agencies" to act when the PSC could not officially meet.

### 3.3 Results

#### 3.3.1 Summary of Results

After a few false-starts and set-backs the project did manage to develop 2 pilot SHP projects and have them financed through the KfW REF and local banks. A detailed assessment of the project achievements to date according to the LogFrame is shown in Annex 2. Overall the results of the project can be summarized as:

1. Raising awareness in the Georgian Government and local population of the need to support small-scale renewable and SHPP and possible ways to implement such support.
2. Establishment of the KfW REF which funded SHPP rehabilitation projects.
3. Capacity building at the participating local banks to analyze project risk and perform project finance for SHPPs
4. Introduction of new design and construction techniques from international best practice which is being replicated in Georgia by local entrepreneurs for SHPP construction.
5. As a result of the project the financial barrier to RE development has been reduced by the establishment of the REF that can and should be expanded.
6. Rationalization of the geothermal reservoir usage to supply hot water (metering) and improvements in estimating the reservoir's energy potential through modeling and monitoring.

The exact environmental benefits to date are more difficult to calculate as neither SHPPs are in operation yet. During the mid-term review estimates were made of future CO<sub>2</sub> reductions. These estimates were not conservative in regards to which projects can be directly assigned as a result of this project. During this evaluation we have chosen to focus on the SHPPs that were financed through the REF and provided TA by the project. These are shown in Table 2 below and represent approximately 680,000 tons of CO<sub>2</sub> reductions over 20 years according to electricity production estimates from the feasibility studies.

**Table 2: SHPP projects and the Estimated CO<sub>2</sub> reductions.<sup>4</sup>**

<b>Project</b>	<b>Size (MW)</b>	<b>Est. Annual MWh</b>	<b>Annual CO<sub>2</sub> Reductions</b>	<b>CO<sub>2</sub> Reductions over 20 years</b>
Ritseula SHPP	16	49000	19.6 thd tons	0.4 mln tons
Khadori-2 SHPP	5	35000	14 thd tons	0.28 mln tons

Khadori-2 5MW of capacity with 35GWh annual production

Ritseula – 6.5 mw plant with 21GWh annual output going to 16MW with 70 GWh annual output

However, despite the fact that the project only financed 2 SHPPs there is evidence that the wider impact on the market was tangible and measurable. During the latter half of the project lifetime the

<sup>4</sup> The KfW REF is still considering providing a small amount of financing which is left in the REF (approximately 500,000 USD) to Achi SHPP that was developed by the project. However the local bank is reluctant to proceed with such a small loan and the issue has not been decided by the time of the Final Evaluation.



output from SHPPs increased markedly in Georgia. This can be considered to be attributed to several of active processes of small hydropower rehabilitation started under various donor, government and private activities mainly since 2006-2007. It not possible to delineate and quantify this project's exact contribution to the SHPP sector development, but the trend is clearly shown in Table 3 and Figure 5.

**Table3: The output of SHPPs in Georgia over the last 4 years. The trend for rehabilitation as well as construction of new HPPs can be observed from the output figures of the plants.**

Small HPPs		Installed Capacity	Output (GWh)				
			2007	2008	2009	2010	2011
	<b>Total</b>	91.80	107.54	126.32	258.20	314.33	295.68
1	Tetrikhevi HPP	12.40			18.76	35.99	39.00
2	Bzhuzha HPP	12.24			60.69	60.83	63.95
3	Sioni HPP	9.14	15.59	10.09	15.47	32.37	30.28
4	Martkopi HPP	3.86	6.10	2.67	3.70	8.68	9.53
5	Alazani HPP	4.80	11.87	24.50	26.15	29.07	12.99
6	Abuli HPP	2.00	1.46	2.81	3.48	5.01	5.46
7	Algeta HPP	1.25	1.76	0.23	0.59	3.51	4.22
8	Chala HPP	1.50	5.11	4.44	4.25	4.00	4.31
9	Chkhori HPP	3.35	0.00	7.42	22.10	21.84	15.54
10	Dashbash HPP	1.26	3.55	6.28	5.63	7.23	8.95
11	Intsoba HPP	1.65	3.81	4.53	2.19	4.84	5.84
12	Kabali HPP	1.50	0.00	1.66	4.95	6.10	5.40
13	Mashavera HPP	0.80	1.46	1.15	1.61	2.04	2.45
14	Misaktsieli HPP	3.00	7.01	6.77	6.41	7.63	8.24
15	Ritseula HPP	6.10	25.14	22.45	27.23	29.61	26.71
16	Skuri HPP	1.02	2.79	2.79	3.63	3.06	3.86
17	Tiriponi HPP	2.40	8.00	4.69	9.14	8.41	4.37
18	Khertvisi HPP	0.60	0.67	0.33	0.31	0.61	1.73
19	Machakhela HPP	1.60	7.83	7.81	7.74	6.58	6.71
20	Kekhvi HPP	1.00	0.75	0.82	0.00	0.00	0.00
21	Kazbegi HPP	0.38	0.91	1.03	1.28	1.61	1.66
22	Energetik (Akhalkalaki) HPP	0.59	0.71	0.87	0.59	1.12	0.86
23	Ghoresha HPP	0.15	0.00	0.00	0.00	0.00	0.00
24	Igoeti HPP	1.05	2.15	6.29	3.99	3.37	0.57
25	Dmanisi HPP	0.50	0.19	1.04	1.12	1.01	0.00
26	Sanalia HPP	5.00	0.69	3.77	4.90	3.12	3.05
27	Achi HPP	1.00		1.27	4.46	4.86	3.62
28	Kinkisha HPP	1.40		0.20	1.54	1.47	2.04
29	Kakhareti HPP	2.00		0.41	8.98	10.47	9.59
30	Sulori HPP	0.80			2.79	2.93	2.16
31	Okami HPP	1.60			3.08	2.32	1.00
32	Bododa HPP	2.50			1.35	4.65	3.52
33	Zvreti HPP	0.26					0.94
34	Rustavi HPP	1.50			0.08		3.21
35	Pshavela HPP						0.93
36	Khadori 1	1.60					3.02
37	Sakeni *	1.60	X				
38	Omarishara*	0.25		X			
39	Bramba*	0.40		X			

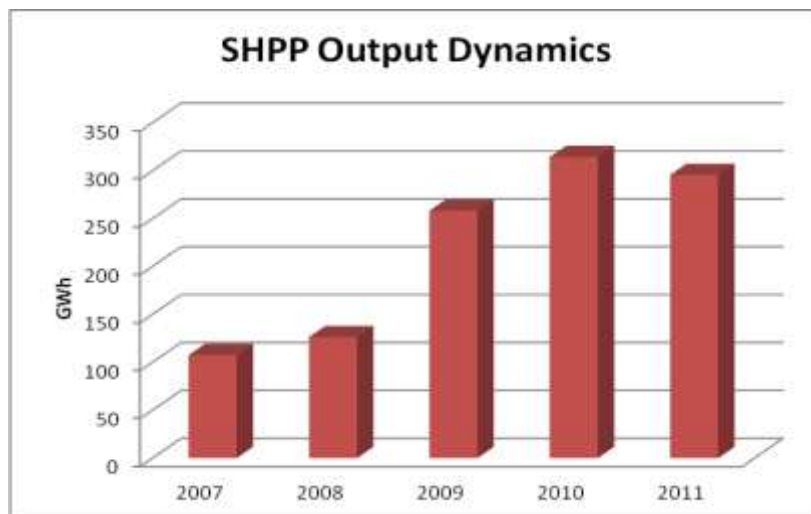


Figure 5: Annual total electricity output from the SHPPs listed in Table 3.

So seen in this perspective the project's SHPP component can be called a success together with related activities that took place in Georgia by donor and governmental agencies to support SHPP sector development. The output of SHPPs in Georgia went up approximately 300% between 2007 and 2011! Certainly a strong improvement for which the project and PMU deserves some credit.

In regards to the geothermal project, Figure 6, shows graphically the actions that failed (i.e. investment) and the components that were successful. The geothermal pilot project was a partial success overall and as mentioned earlier, there are long-term benefits to the Municipality of Tbilisi from the project.

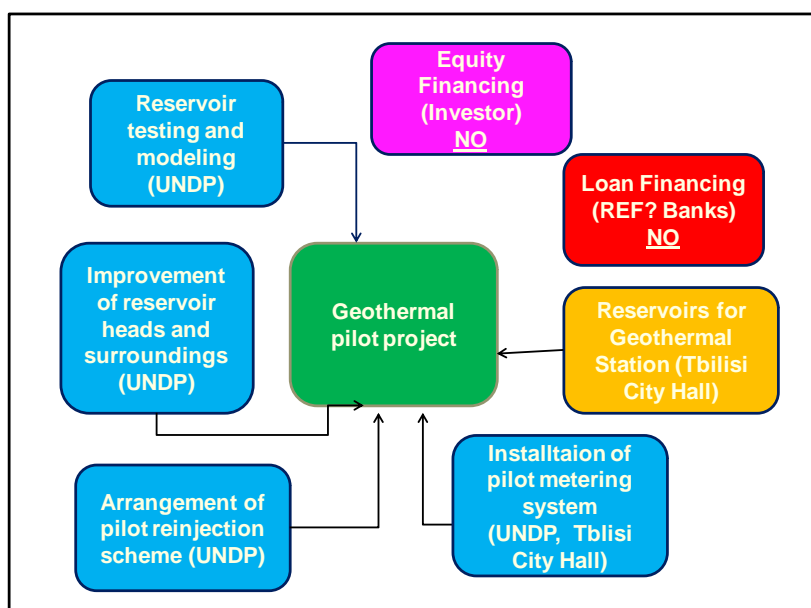


Figure 6: Components of the Geothermal Pilot Project

When reviewing the targets contained in the final LogFrame (Annex 2), many were only partially achieved. Meaning that in many cases the project had some success but could not fully meet the target by the time the project finished the Final Evaluation. There is the possibility that some targets may be fully met before the project closes in July, 2012.

**Overall, based on the fact that many of the objectives and targets in the Log-frame were only partially achieved by the end of the project, the overall rating of the project results is Marginally Satisfactory.**

### **3.3.2 Contribution to upgrading skills of the national staff**

The project has contributed to the skills of local people and organizations through the following factors:

Management of this complex program in a quickly changing environment was a significant challenge and the personnel in management and implementation of the program has acquired the skills and experience of managing the projects in a complex dynamic environment. Supervising the infrastructure construction projects is another skill acquired by the staff. The staff acquired also the skills for outreach by participating in various TV shows and other media projects. Participation in training and development of business plans and feasibility studies. In summary, the project has resulted in a valuable multifaceted set of skills for the project staff that can be readily applied in other development projects.

The banks involved in the program have acquired the experience of working with the projects in the energy sector. They have gone through evaluation of business plans this can be a step in the direction of starting the project financing versus financing only with firm collateral as it was taking place up to now.

Commercialization of Geothermal water distribution is a major challenge in utilizing this resource in Tbilisi. Installation of new piping and metering system will help to reduce thermal and commercial losses. The experience of installation and operation of a new system will be a first valuable step towards further improvement of the system and can be replicated on a wider basis.

Preparation of feasibility studies for SHPPs has resulted in better skills of the respective SMEs to develop business plans and feasibility studies, develop bankable projects, structure financing for the projects, and to manage their development

This was a possibility for PERI and GIEC to develop their experience and knowledge in small HPP development including business plan development and cost/benefit analysis, interaction with the banking sector and organizing the business. PERI that was a purely construction contractor company has become a HPP developer on its own and has taken alternative steps for financing the construction work.

HPP developers have mentioned the significant benefit they received through interaction with site supervisors. Awareness and observance of Health and Safety measures and improvement in general on-site working culture and practices were mentioned by the project managers of both Project HPP sites.

## 4. RECOMMENDATIONS

As the project is in its final phase and winding down in 2012, the Final Evaluation can only offer limited recommendations or corrective actions to the project management.

In spite of significant deviation from the initial project plan there have been obvious achievements by the project and further work needs to be done for their sustainability. Therefore a general recommendation is to sustain the results of the project by utilizing the remaining opportunities on this project by successfully disseminating the results from the Final Workshop, and preparing the project website as a repository for the final project results, documents, and knowledge gained from the project.

Secondly, start the Validation of the 2 CDM projects that the project developed PDDs for (Ritsuela and Larsi SHPPs) before the project is finished. This would have a long lasting impact and be the first SHPP projects for Georgia if they are successfully validated and registered. Currently 3 projects are registered from Georgia, but all 3 of these projects were never started and Georgia does not currently have an operational CDM project that is generating CERs.

Another issue that could be resolved before the project ends is the Achi SHPP loan. There remains a small amount of funding left in the REF (€500,000) that could be loaned to the project, and Achi developers have applied for it. However, the local bank is reluctant to provide such a small loan and the issue is not resolved. If possible, the project could seek a compromise or assist with finding other financing solutions.

Finally, the UNDP management should consider increasing the project staffing in terms of man-days per month to carry out these and other remaining tasks effectively before project closes in July 2012. There is some budget left for the project to continue finishing some of its activities, and perhaps fulfilling more targets. However, the PM is now only working 25% part-time, i.e. 5 man-days a month since January 1, 2012, while other staff are also only on short-term or part-time contracts. In the opinion of the Evaluators this situation does not seem to be an effective management solution for the project and it is doubtful that much more can be accomplished in the remainder of 2012 if the project staffing situation remains the same.

## 5. LESSONS LEARNED

This project suffered from two major issues that caused the project management significant challenges:

6. Design flaws and overly-optimistic assumptions in the project design.
7. Lack of strong support within the government.

Long-term the project was destined to go off track at some point in a rapidly changing environment that was Georgia during the period of 2004 – 2008. It would have been more reasonable to break up the project into shorter term stages and make planned adjustments with the involvement of high level stakeholders (steering committee) periodically and to have undertaken adaptive management earlier.

It is clear to the evaluators that the project never had the necessary powerful government or donor sponsor that would resolve the emerging problems and remove obstacles. Without strong political champions to support the project it was destined to have serious setbacks during the turbulent times Georgia was experiencing. There was a limit to what political leverage and power UNDP and the Project Team could apply within the ministries and different levels of government, and particularly within the Ministry of Energy which was generally not receptive to some of the project goals in the early period of the project.

One of the reasons for the moderate success of the project in comparison to initial intentions was the insufficient cooperation from the government entities. It is recommended to support the Government of Georgia in further developing the RE legislation and setting up a RE agency that would be responsible for developing the RE strategy and policies. This would help in a proper development of RE resources in harmony with Georgia's development priorities. Whether the GEF or UNDP could support such an effort is unknown, but such an agency would greatly assist coordination between the different actors in the market.

The fast economic reforms and recovery of the energy sector outpaced the project development institutional structure's ability to change course. The legislation and policies were changing rapidly, making initial assumptions of the project design questionable. For example, assumptions about the energy mix, costs, availability, and affordability have significantly changed during the project lifetime and the technical condition of the power sector has dramatically improved; which has led to stabilization of the energy supply.

At the start-up stage there was an optimistic view of the potential to use of geothermal water for heating and although conceptualized properly (hot water supply first and heating next) the preparedness of the municipality for geothermal water use and its feasibility was overestimated. Also, the project was forced to work with a less than ideal partner because Geothermia was the only company with the long-term license.

The flexibility of project management in a dynamic environment is a positive lesson that might be applied in other similar circumstances. Project development in such an environment can be a learning process itself and fast reaction to a changing environment may be essential to achieve the achievable. The project benefited from having the same project manager during the entire lifetime of the project, and the same Program Manager for most of the project. This stability in the project kept it from failing even though so much of the government and institutional environment was changing.

A major institutional barrier was outside the influence of the project. It could be called, “The lack of experience and capacity of the Government of Georgia to develop concrete programs and policy measures to promote the development of the country’s renewable energy resources (apart from big centralized hydro power plants) and to ensure otherwise that a supportive legal and regulatory framework for leveraging investments for local, small- and medium-scale renewable energy projects.”

In terms of the two sectors that the project supported some of the lessons from the project:

The project has made the steps in the right direction for the commercialization of the geothermal hot-water (GHW) distribution. There is a need to build on the interest of Tbilisi and Saburtalo district authorities and develop the follow-up projects in cooperation with other donors, namely establishing a transparent commercial billing and collection system.

Geothermal well testing and numerical calculations have clearly indicated the trend of declining output of the wells, therefore the arrangement of the circulation system becomes a vitally important next step for the sustainability of the supply of GHW in Tbilisi.

One can question, with the benefit of hindsight, whether the “prescription for the illness” might have been correct for the Georgian energy situation after 2004, i.e. whether supporting SHPPs in lieu of medium-hydro or other renewable energy types such as biomass energy was the correct program to implement based upon the seasonal imbalances in the energy supply. However, based on available data for electricity generation from SHPPs, one can detect a marked increase in output of almost 200% which relates to an increase in rehabilitation and expansion projects from 2009.

Furthermore, the construction of a new transmission line to Turkey is likely to open the market for more greenfield SHPPs to be developed. The experiences from the technical assistance from the Project and REF should be used for supporting the new HPPs that are likely to be developed for primarily the export of energy.

There are still some improvements to be made to assist SHPP investment, and for foreign investors in particular. For example, the tender process for new HPPs is mainly about depositing 170,000 USD per MW and according to some critics does not screen the applicants ability to implement the project properly. It is still very difficult to receive a long-term power purchase agreement (PPA) for most projects and this makes it difficult for banks and investors to estimate the returns accurately. The methodologies for calculating wheeling rates need improvement, etc.

In the opinion of many experts, the new transmission line project will force many of the necessary improvements and for the Georgian sector to align its operation and reforms with the Turkish power sector if it is to be a long-term success. Such reforms will probably also assist the long-term SHPP sector development.

It was also mentioned by a few of the stakeholders that grant money (as the funding which established the REF) does not provide the correct incentives for government interest and buy-in. On the contrary, as it is “free money” there is less pressure to account for its proper usage and support the agenda for which it is intended.

Probably the number one lesson to be learned from this project is that only so much can be accomplished in terms of large-scale energy sector reform from such a financially limited GEF intervention. This should be considered for future GEF projects when planning for market and/or government regulation transformation initiatives.

## ANNEX 1. FINAL EVALUATION TOR'S AND EVALUATOR BIOS

Final Evaluation ToR Submitted separately.

### International Expert

Mr. Jesse Uzzell, 43, M.Sc. in Environmental Engineering from the Royal Institute of Technology (KTH), Sweden and a B.Sc. in Aerospace Engineering from Texas A&M University.

Experience since 1995 in working with environmental topics, particularly in the energy sector. After joining DNV in 1998 in Oslo, Norway he worked with developing DNV's services related to Emissions Trading, Joint Implementation, and the Clean Development Mechanism of the Kyoto Protocol. Mr. Uzzell was involved in some of the first emissions trading projects and initiatives focused on the certification of corporate GHG emissions and project-based reductions for such clients as the World Bank, BP, the Prototype Carbon Fund, and various National Governments. In 1998-99 he worked as a verifier for the ILUMEX project in Mexico, which was the first large-scale GEF/World Bank energy-efficient lighting project where the carbon offsets were independently verified. The ILUMEX project set the standards by which future GEF energy efficiency projects would be developed.

After leaving DNV in 2005 he has devoted his time to promoting and developing Climate Futures into a leading carbon advisory and brokerage firm specializing in carbon financing (JI/CDM & GIS) for alternative energy, forestry, and energy-efficiency projects. Regions of business activity are Eastern Europe, Russia, China, and the EU. Climate Futures currently has offices in Stockholm, Sweden, Riga, Latvia, and Hangzhou, China.

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### National Expert

Dr. Murman Margvelashvili, 55, Graduate of Tbilisi State University, Ph.D. in High Energy Physics from Moscow Institute of Nuclear Research. Conducted scientific research in Physics – Tbilisi, Moscow, Dubna, Ferrara, Trieste, CERN (1978-1996). From 1994 Participated in a wide range of energy projects:

- Emergency power sector procurement, rehabilitation feasibility studies for hydro and thermal power plants, natural gas transmission system, electricity Transmission & Dispatch; Least Cost Planning for Georgian Power Sector. Project Manager - Burns & Roe Enterprises Inc. USAID (1994-1998)
- Assessment for privatization of generation plants, electricity and gas distribution companies; Management contracts for power sector enterprises; Training in Power System Planning; Commercialization and privatization of electricity and gas distribution systems. Project manager – Hagler Bailly, USAID (1998-2000)
- Management of electricity Distribution region, regulatory relations, tariff calculation and negotiations, corporate training. Project manager, Regioni Manager, Head of Department – AES Telasi - JSC Telasi (2000-2011)
- Energy sector strategic planning, policy research, Energy Efficiency and Renewable Energy policy, legislation, technical and economic assessment, pilot projects; Technology Needs Assessment (mitigation), energy emergency planning, Education needs in Energy sector, HPP feasibility studies in Georgia and abroad. Director Energy Studies – WEG, World Experience for Georgia (2007- td).

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## ANNEX 2. REVISED 2010 LOG-FRAME (BASED ON APRIL 2004 LOG-FRAME)

Including comments based on the Final Evaluation (**given in *Bold/Italics***) and the comments from the 2008 Mid-term Review

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b><i>Observed April 2008 &amp; December 2011</i></b>
<p><b>Development Goal:</b> To increase the utilization of the local renewable energy resources in Georgia based on the sustainable development principles and to encourage the role of the local small and medium size enterprises in developing these resources.</p>	<p>The share of the local renewable energy resources in the total energy supply</p> <p><i>Target:</i> 15-25 GWh of additional (rehabilitated) SHPP by 2009 and Subartalo geothermal energy for heat in Tbilisi</p> <p>Baseline: Few if any SHPPs in operation throughout Georgia. Hot water is directly supplied from geothermal sources in an unsustainable manner.</p>	<ul style="list-style-type: none"> <li><i>Partially achieved;</i></li> <li>The share of local renewable energy resources has increased mainly due to rehabilitation of large-scale hydropower plants and subsequent smaller dependence on thermal-fired capacity. Project interventions have had the impact of increasing donor interest in financing SHPPs (i.e. USAID and EBRD).</li> </ul> <p>Partially Achieved</p> <ul style="list-style-type: none"> <li>An important step is made for commercialization of geothermal water supply for residential consumers. This can increase the efficiency of geothermal energy use dramatically. It makes no economical sense to use geothermal water for heating instead it should be used steadily over the year for hot water supply.</li> <li>Two HPP projects are underway financed by REF.</li> </ul>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<p><b>Project Purpose:</b> Removing the key barriers to the increased utilization of renewable energy resources for local energy supply.</p>	<p>Additional investments made in RE.</p> <p><i>Target:</i> At least USD 10 million worth of additional investments made to new renewable energy projects by the end of the project.</p> <p><i>Baseline:</i> No investments planned on small RE projects such as SHPPs and geothermal projects</p> <p><b>Additional Purpose Indicator (2010):</b> Reduction of 15,700 tCO<sub>2</sub> by the end of the Project from small hydropower and Geothermal projects. The same investments will lead to a reduction of 500,000 tCO<sub>2</sub> over 20 years.</p>	<ul style="list-style-type: none"> <li>• <i>Not yet achieved;</i></li> <li>• No investments have yet been made due to the unavailability of financing from the REF and lack of an appropriate legal framework for SHPP</li> </ul> <p><b>Partially Achieved.</b> Investments have been made but not totalling \$10 million (approx. \$7 million). The SHP projects have not completed construction or been commissioned yet therefore the CO<sub>2</sub> reduction goal is not met at this time but possibly the project will reduce over 500,000 tCO<sub>2</sub> in 20 years.</p>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<b>Immediate Objective 1:</b> Creating a supportive institutional, legal and regulatory framework for the long-term development of Georgia's renewable energy resources.	<p>The share of renewable energy in the Georgian energy sector.</p> <p><i>Target: see above</i></p> <p><b><u>Revised Targets</u></b></p> <p><b>Government renewable energy policies revised to encourage new investment</b></p> <p><b>Government renewable energy programme financed and operational</b></p>	<ul style="list-style-type: none"> <li>• <i>Partially achieved.</i></li> <li>• See above</li> </ul> <p><b>Partially achieved. Some barriers still exist for RE Projects but the situation has improved steadily since the project started</b></p>
<b>Output 1.1:</b> An updated analysis of the key institutional, legal and regulatory barriers to the development of local renewable energy resources in Georgia	<p>An updated report on the key institutional, legal and regulatory barriers to the development of local renewable energy resources in Georgia finalized by the first year of the project and updated annually.</p>	<p>Project reports</p> <p><b>Achieved</b></p>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<b>Output 1.2:</b> Recommendations on the legal and regulatory changes and other incentives to promote the investments in the development of the local renewable energy resources.	<p>Number of laws and regulations that support RE development</p> <ul style="list-style-type: none"> <li>• An updated report on the key institutional, legal and regulatory barriers to the development of local renewable energy resources in Georgia finalized by the first year of the project and updated annually.</li> <li>• Recommendations on the legal and regulatory changes to support RET investments finalized by the end of the first year of the project and updated by the third year and in the final project report.</li> </ul> <p><i>Baseline:</i> Legal and regulatory framework for large RE projects in Georgia</p> <p><i>Target:</i> Legal and regulatory framework for the long-term development of Georgia's RE sources (small hydropower) is created</p>	<ul style="list-style-type: none"> <li>• <i>Partially achieved</i></li> <li>• The August 2004 Rutanen mission report as well as PIRs and APRs provide good information on current institutional, legal and regulatory barriers to development of SHPPs as well as planned barrier removal actions,</li> <li>• The GoG has enacted some tariff changes due to joint lobbying efforts of the Project in collaboration with USAID<sup>17</sup>. SHPPs (&lt; 10 MW) were deregulated thus improving the enabling environment. However, the current legal and regulatory framework has market-based tariffs that are supportive for larger power projects but not fully</li> </ul> <p><b>Achieved</b>  <b>Brief Analyses of Georgian Hydropower Sector by P.Tsintsadze</b></p> <p>supportive for small hydro investments in terms of guaranteed revenues and debt servicing (see discussion in main text)  A draft law on Energy Saving, Energy Efficiency and Renewable Energy Resources is prepared but not approved yet. The Parliament of Georgia has adopted "State Policy in Power Engineering Domain". However, the issues related to RE development are not addressed. In particular, no special incentives including financial incentives are introduced for renewable energies.</p> <p>Government program "Renewable Energy 2008" has been adopted that defines the procedures for new HPP construction and simplifies permitting and licensing requirements for SHPPs. These mechanisms still not sufficient for effective development of SHPPs, however the main problem of seasonal imbalance of supply and demand is also being addressed through various efforts of strengthening export potential of the country.</p>
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<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<p><b>Output 1.3:</b> Adoption of a national RE program (strategy) to provide a coherent institutional, regulatory and financial framework to promote RE investment in Georgia</p>       <p><b>Revised Output 1.3</b> <b>Recommendation for a national RE program to provide a coherent institutional, regulatory and financial framework to promote RE investment in Georgia</b></p>	<p>The recommended changes in the legal and regulatory framework and the national RE program adopted by the beginning of the fourth year of the project.</p> <p><i>Baseline:</i> A number of RE strategies developed but none of them approved or implemented</p> <p><i>Target:</i> Georgia's RE Strategy and detailed action plan is approved and a supportive environment for its implementation created</p> <p><b>Revised Output 1.3 Indicator</b> <b>Draft Renewable Energy programme prepared in consultation with government and presented to government for adoption by project closure.</b></p>	<ul style="list-style-type: none"> <li>• <i>Partially achieved,</i></li> <li>• Project legal and regulatory experts in cooperation with the International Technical Advisor (ITA) analysed legislative changes and determined remaining barriers and gave specific recommendations in the 'Renewable Energy Strategy' study, prepared by Posch and Partners (September 2007) that has yet to be approved by the Ministry of Energy.</li> </ul> <p><b>Partially Achieved</b></p> <p><b>The State program "Renewable Energy 2008" was adopted which promotes the construction of HPPs. It defines the simplified procedures for acquiring BOO rights by prospective HPP investors but provides no special treatment to SHPPs</b></p>
<p><b>Immediate Objective 2:</b> Raising public awareness on the possibilities for commercial development of the local renewable energy resources in Georgia and building the capacity of the local entrepreneurs to develop "bankable" investment proposals, to</p>	<p>Number of financing decisions and number of demonstration projects under implementation</p> <p><i>Baseline:</i> No financing decision concluded and no SHPP projects or geothermal</p>	<ul style="list-style-type: none"> <li>• <i>Partially achieved.</i></li> <li>• Engagement of stakeholders commenced with Project design and into the early stages of Project implementation;</li> <li>• Private entrepreneur interest (rehabilitation of SHPP)</li> </ul>

<sup>17</sup> By the start of the project, the main problem for SHPP s was the unavailability of reliable buyers of the produced energy. The Georgian Wholesale Electricity Market (that no longer exists) had significant arrears to the power producers and its payment rate was about 30%. Since the SHPPs were allowed to sell only limited blocks of their energy directly, deregulation was a crucial issue for the growth of SHPPs.

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
structure financing for the projects and to manage the development and the implementation of the projects otherwise.	<p>implemented commercially</p> <p><i>Target:</i> Financing decisions concluded for the first demo projects by the end of the second year and for at least 10 new commercially feasible renewable energy projects by the end of the third year. The first demonstration projects successfully under implementation by the end of the third year. The project development and implementation managed primarily by the local stakeholders.</p> <p><b>Revised Objective 2 Indicators</b></p> <p><b>Financing decisions concluded for the first 3 demo projects by the end of year 6 and for at least 3 additional new commercially feasible renewable energy projects by the end of year 7.</b></p> <p><b>The first demo projects successfully under implementation at the end of year 6.</b></p> <p><b>The project development and implementation managed primarily by the local stakeholders with technical oversight by the Project.</b></p>	<p>waning due to delays in the startup of REF.</p> <p><b>Partially Achieved, though perhaps not on the scale originally envisaged. Several companies have proposed SHPPs to the local banks and interest in SHPPs from Chinese and other international investors was noted in Georgia. Financing decisions outside the REF could not be verified but the local banks have a small pipeline of SHPPs that they are evaluating.</b></p>
<b>Output 2.1:</b> Increased public awareness on the existing business opportunities in developing the local renewable energy resources (incl. a more detailed mapping of the potential sites for that).	<p>An updated map and description of the possible sites suitable for renewable energy development available by the end of the first quarter of the second year.</p> <p>Level of participation in project development.</p>	<ul style="list-style-type: none"> <li>• <i>Achieved</i> – an inventory map of possible SHPP sites is available</li> <li>• <i>Partially achieved</i></li> <li>• 23 SHPPs and 2 geothermal sites were included into the long list, out of which 14 SHPPs and the Saburtalo geothermal project were shortlisted and subsequently</li> </ul>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
	<p><i>Target:</i> At least 20 requests of support with a solid business idea for further development of RE projects received by the end of the second year. The project development and implementation managed primarily by the local stakeholders.</p> <p><b>Revised Target</b></p> <p><b>At least 10 requests of support with a solid business idea for further development of RE projects received by the end of year 6.</b></p>	<p>pre-feasibility studies have been prepared/updated.</p> <ul style="list-style-type: none"> <li>As Tbilisi municipality has <i>de facto</i> pulled out, a new potential geothermal investor has been identified for a Spa resort housing development close to Tbilisi. The investor for geothermal project could provide up to 100% equity financing pending results of well tests and subsequent feasibility analysis;</li> </ul> <p>Subsequent slowdown of investor activity has hampered further development of the project, but the issue is still pending and the results of well testing may encourage the development of Geothermal circulation system by investor</p> <p>local municipality has been involved in geothermal metering pilot project and is providing cofunding for consumer connection. As alternative to well utilization for GRDC needs the GHW can be supplied to more residents.</p> <p><b>Achieved. 14 were investigated by the project.</b></p>
<p><b>Output 2.2:</b> Enhanced capacity of the local entrepreneurs to develop “bankable” investment proposals, to structure financing for the projects and to manage the development and the implementation of the projects otherwise.</p>	<p>Feasibility studies, business plans and off-take agreements finalized for at least 10 new, commercially feasible RE projects by the end of the second year</p>	<ul style="list-style-type: none"> <li><i>Partially achieved</i> – only 4 feasibility studies for SHPPs have been completed to date, namely: <ul style="list-style-type: none"> <li>Chkhorotsku SHPP (5.4 MW)</li> <li>Tskhomareti SHPP (0.5 MW)</li> <li>Borjomi SHPP (0.6 MW)</li> <li>Abasha SHPP (1.8 MW)</li> </ul> </li> <li><i>Pending</i> – <ul style="list-style-type: none"> <li>A simple handbook on developing and structuring</li> </ul> </li> </ul>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<p><b>Revised Output 2.2</b> Enhanced capacity of the local entrepreneurs to develop “bankable” investment proposals for SHPPs, to structure financing for the projects and to manage the development and the implementation of the projects otherwise</p>	<p><b>Feasibility studies, business plans and off-take agreements finalized for at least 4 new, commercially feasible SHPP projects by the end of year 7.</b></p>	<p>financing for renewable energy investments will be prepared after establishment of REF</p> <ul style="list-style-type: none"> <li>○ Business plans, power/heat purchase agreements for 6 SHPP and the geothermal project and financing proposals need to be finalized</li> </ul> <p><b>Achieved.</b> The above feasibility studies were financed by other means than the KfW REF but the process improvee the capacity of the local entrepreneurs.</p> <p>The mentioned feasibility studies were done by the contractor "Posch &amp; Partners" in 2006-2009. Later P&amp;P prepared also Feasibility study for Achi SHPP; Another contractor Landsvirkjun Power has prepared FSR for Khadori-2 SHPP and updated FSRs for Achi and Ritseula SHPPs</p> <p><b>Chkhorotsku</b> was financed under USAID-financed Rural Energy Program; Tskhomareti applied for a loan to the Renewable Energy Fund but its application wasn't accepted; Abasha implemented rehabilitation at reduced scale; Borjomi was not implemented</p>
<p><b>Output 2.3:</b> The first demonstration projects to be financed through the proposed Renewable Energy Fund (REF) successfully under implementation.</p>	<p>Number of demonstration projects under implementation and number of financing decisions</p> <p><i>Target:</i> At least one geothermal project and five SHPPs successfully under implementation by the end of the third year of the Project.</p>	<ul style="list-style-type: none"> <li>• <i>Partially achieved;</i></li> <li>• The startup of the REF has been delayed (as explained in the main text and in this table below). KfW has received a ‘no objection’ letter from the Ministry of Finance in April 2008.</li> <li>• No loans have been issued and some investors are losing interest due to delayed startup of Renewable Energy Fund (i.e. have presented their plans to the USAID project for funding support).</li> <li>• Loans to two SHPPs committed/disbursed</li> <li>• GHW Distribution system pilot project under</li> </ul>



Project Strategy (taken from Prodoc)	Indicators (taken from Prodoc and APR-PIR)	<i>Observed April 2008 &amp; December 2011</i>
<b>Revised Output 2.3</b> The first demonstration projects to be financed through proposed Renewable Energy Fund successfully under implementation with GHG emission reductions in the order of 15,700 t CO <sub>2</sub> after Year 7.	<b>Revised Target</b> At least 3 small hydro project rehabilitations successfully under implementation by the end of year 6.	implementation in 40 buildings of Saburtalo district. <ul style="list-style-type: none"> <li>Well testing has been completed and results analyzed.</li> </ul> <b>Partially Achieved.</b> Two SHPPs rehabilitations are finishing construction now and the third SHPP has the KfW loan committed. GHG reductions not accomplished yet.
<b>Output 2.4:</b> Enhanced capacity of the management and the operating personnel of the plants to properly manage, operate and maintain the small hydro and geothermal facilities.	Successfully conducted construction, commissioning and operation of the pilot plants under the management of the local SMEs  <b>Revised Target</b> Successfully conducted construction, commissioning and operation of the pilot plants under the management of the local SMEs and technical oversight by the Project by the end of year 7	<ul style="list-style-type: none"> <li><i>Partially achieved</i></li> <li>As REF has issued the is not operational, none of the demo SHPPs are under implementation</li> </ul> <b>Partially Achieved.</b> There were construction delays and none of the SHPPs are online yet. But this should happen in 2012. Consultants (LP) were obtained by the project to improve the practices for plant operation and maintenance.
<b>New Output 2.5:</b> Increased awareness and technical knowledge of geothermal resource potential	<b>Investment by investor in Lisi Lake geothermal demo project. Lisi lake geothermal resources provide heat and hot water by the end of year 7</b>	<b>Partially Achieved.</b> Lisi Lake housing project was never developed, but the geothermal analysis could be used by future investors/developers that build on the site. Increased awareness and technical knowledge of geothermal resource potential - Partly achieved through the comprehensive well testing and reservoir numerical simulation and 3D modelling study completed in 2011

Project Strategy (taken from Prodoc)	Indicators (taken from Prodoc and APR-PIR)	Observed April 2008 & December 2011
<p><u>Immediate Objective 3:</u> Gaining experience for and demonstrating the feasibility of financing renewable energy investments in Georgia and building the local capacity to manage these operations.</p> <p><b>Revised Objective 3:</b> Gaining experience for and demonstrating the feasibility of financing renewable energy investments in Georgia and building the local capacity to manage these operations.</p>	<p>Functioning of the Renewable Energy Fund (REF)</p> <p><i>Baseline:</i> Non-existence of any financial mechanism for RE investments</p> <p><i>Target:</i> The successfully in operation returning the investments made</p> <p><b>The Pilot Renewable Energy Fund successfully in operation; Capacity of Programme Banks to appraise loan applications of SHPP investors</b></p>	<ul style="list-style-type: none"> <li><i>Partially achieved</i> <u>Investments have been made but not returned yet</u></li> </ul> <p><b>Achieved. KfW's REF has been functioning and the two local banks participating in the project have learned how to analyse SHP projects for loans.</b></p>
<p><b>Output 3.1</b> The Pilot Renewable Energy Fund and Credit Line established</p>	<p><i>Target:</i> The necessary legal agreements and other documents for the establishment of the RE Fund and the Credit Line finalized by the end of the first year.</p>	<ul style="list-style-type: none"> <li><i>Partially achieved;</i></li> <li>UNDP funds were transferred to KfW for fund management (USD 200,000) and financial consultancy (USD 450,000);</li> <li>However, due to internal rules., UNDP cannot contribute directly to Fund itself, as was originally foreseen in the Prodoc (with US\$ 2 million)</li> <li>REF startup delayed by unsuccessful efforts by UNDP to transfer funds and Government delays in approving the final setup of the Fund (see also discussion in main text on delays in setting up the REF)</li> <li>Ministry of Finance finally signed a "no objection" letter to KfW on the REF arrangements in April 2008, allowing KfW to setup the REF for operations, select program banks and hire financial consultant to</li> </ul>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
	<b>Revised Output 3.1 Indicator</b> <b>The necessary legal agreements and other documents for the establishment of the RE Fund and the Credit Line finalized by the end of year 6.</b>	Program Banks. While it will take several months for REF to become operational, the REF will be able to disburse funds for the 2009 construction season.  <b>Achieved</b>
<b>Output 3.2</b> Enhanced awareness and capacity of the selected Financial Intermediate to effectively manage the Fund and the Credit Line	Investment proposals received  <i>Target:</i> The financing decisions for the first demonstration projects both in small hydro and geothermal field concluded by the end of the second year.	<ul style="list-style-type: none"> <li>• <i>Not yet achieved;</i></li> <li>• The financial intermediaries (commercial banks) that will participate in REF will be selected by KfW in a competitive process (tendering)</li> <li>• UNDP has transferred funds for financial consultancy and fund management;</li> <li>• REF expected to be operational by the end of 2008;</li> <li>• Tbilisi municipality dropped out as an investor for geothermal project. A potential new investor, the Georgian Reconstruction Development Company (GRDC) has been found and will support a geothermal project pending results of testing of two geothermal wells for hot water supply to a projected new settlement area, north of Tbilisi. Later GRDC activity for development of Lisi settlement has slowed down.</li> </ul>
<b>Revised Output 3.2</b> Enhanced awareness and capacity of the selected Financial Intermediate to effectively manage the Fund and the Credit Line	Investment proposals received after operationalization of the Renewable Energy Fund  The financing decisions for the first demonstration projects in small hydro concluded by the end of year 6.	<b>Achieved. The Municipal Development Fund (MDF) was used as the financial intermediate for the REF.</b>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<b>Output 3.3</b> Additional financial resources leveraged for the capitalization of the Fund or for renewable energy investments otherwise.	<p>The capital based of the Renewable Energy Fund increased and/or additional financing for renewable energy investments leveraged otherwise by the end of the project at the amount at least equal to the initial capital of the Fund.</p> <p><b>Revised Output 3.3 Indicator</b></p> <p><b>The capital base of the Renewable Energy Fund increased and/or additional financing for renewable energy investments leveraged otherwise by the end of the project at the amount at least equal to the initial capital of the Fund.</b></p> <p><b><i>Purchase Agreement (ERPA) for various SHPPs financed by the REF</i></b></p>	<ul style="list-style-type: none"> <li><i>Partially achieved</i></li> <li>Project was the first amongst the donor community to promote investments in RE in Georgia, and catalysed the interest of USAID (Rural Energy Program), EBRD (GEEP) and the Norwegian government in funding and/or starting programs to promote RE development in Georgia.</li> <li>Commitment obtained from municipality on cofounding consumer connection under the GHW distribution system pilot project.</li> </ul> <p><b>Partially Achieved. KfW has decided to launch another REF for Georgia that will be approximately 3 times the original but it will not be operational until the end of 2012 at the earliest.</b></p> <p><b>An ERPA for the purchase of CERs from the CDM SHP projects has not been signed.</b></p>
<b>Immediate Objective 4</b> Documenting and disseminating the results, experiences and lessons learned and promoting the replication of the project activities at the national as well as the regional level.	<p>Existence of reports documenting results, experiences and lessons learnt</p> <p><i>Target:</i> Final project report documenting the results, experiences and lessons learned.</p> <p>Expressions of interests to replicate the project activities at the national and regional level.</p>	<ul style="list-style-type: none"> <li><i>Partially achieved</i></li> <li>The project's progress reports (APR-PIRs) and other technical reports describe issues and lessons learnt. These have not yet been disseminated to the public.</li> </ul> <p><b>Partially Achieved. Film is being produced about the project, etc. but so far no Expressions of Interest have been received to replicate the project activities.</b></p>

<b>Project Strategy</b> (taken from Prodoc)	<b>Indicators</b> (taken from Prodoc and APR-PIR)	<b>Observed April 2008 &amp; December 2011</b>
<b>Output 4.1</b> A system for monitoring the GHG emission reductions of the suggested demo projects.	The MVP protocol developed and the operating personnel of the projects trained for its use and, as needed, the required equipment for monitoring installed by the start of the first demo projects.	<ul style="list-style-type: none"> <li>• <i>Not yet achieved</i></li> <li>• From the 4 feasibility studies the potential CO<sub>2</sub> emissions reductions can be calculated (see Section 2.1.2)</li> <li>• Some GHG reduction calculations have been made in PIRs of 2009,2008 As per Paata.</li> </ul> <p><b>Partially achieved. A Monitoring Plan has been developed as part of the CDM PDD. But it has not been implemented as the projects are not online.</b></p>
<b>Output 4.2</b> A project midterm and final monitoring and evaluation report	The project midterm and final monitoring and evaluation reports finalized.	<ul style="list-style-type: none"> <li>• <i>Not yet achieved</i></li> <li>• Mid-term evaluation report to be finalized</li> </ul> <p><b>Achieved.</b></p>
<b>Output 4.3</b> Project results, experiences and lessons learnt disseminated at the national and regional level.	Regional workshops and other public outreach activities organized at the national as well as at the regional level.	<ul style="list-style-type: none"> <li>• <i>Partially achieved</i></li> <li>• SHPP developers have been approaching the project and the REF in search of financing. Due to the delays in establishing REF, two or three proponents have turned to a new financial facilities established by EBRD and USAID.</li> <li>• Some results and lessons learnt have been disseminated through website, in mass media and TV casts as well as by participation in national and regional events</li> </ul> <p><b>Achieved.</b></p>

## ANNEX 3. LIST OF PERSONS INTERVIEWED

Marika Valishvili - Ministry of Energy

Sophie Kemkhadze – Assistant Resident Representative UNDP Georgia

Nino Shanidze - KfW

George Khachidze and Grigol Lazriev - Ministry of Environment

Irakli Diasamidze – TBC Bank

Jake Delphia, Tom Sherwood – Deloitte. HIPP project USAID contractor

Otar Vardigoreli – Geothermia LTD

Gia Melikadze – Professor, Geothermal association

Giga Khorguani – Contractor, Geothermal metering project

Zura Samsonidze – Project Manager, Georgian International Energy Corporation

Irakli Vardigoreli – EBRD, Banker

Irene Milorava – ESCO, General Director

David Bibineishvili – Head of Saburtalo district assembly

Joseph Michedlishvili – Director Peri Ltd.

Paata Charakashvili – Head of International Relations Division – Municipal Development Fund

David Sharikadze - Head of Energy Department – Ministry of Energy and Natural Resources

## ANNEX 4. LIST OF DOCUMENTS REVIEWED BY THE EVALUATORS

### Documents reviewed for this evaluation includes:

- 1) UNDP Draft Programme Document for the Republic of Georgia (2006 – 2010);
- 2) UNDP and Government of Georgia, Country Programme Action Plan (2006 – 2010);
- 3) UNDP-GEF Georgia “Promoting the Use of Renewable Energy Resources for Local Energy Supply”, 2004, Project Document;
- 4) UNDP Annual Progress Reports and Project Implementation Review Reports;
- 5) UNDP Meeting Notes from PSC meetings and Project Meetings;
- 6) UNDP/Rutanen, Mission Report of August 2004;
- 7) UNDP/Posch & Partners, Pre-Feasibility and Feasibility Studies for SHPP Projects for Chkhorotsku, Tskhomareti, Borjomi, Abasha, 2006;
- 8) UNDP/Posch & Partners, Renewable Energy Strategy for “Georgian – Promoting the Use of Renewable Energy Resources for Local Energy Supply”, 2007;
- 9) USAID/Winrock International/WEG, Energy Efficiency Potential in Georgia and Policy Options for Its Utilization, February 2008;
- 10) Government of Georgia, “Georgian Law on Electricity and Natural Gas”, 1997;
- 11) Government of Georgia, “Main Directions of State Policy in the Power Sector in Georgia”, June 2006;
- 12) Ministry of Finance, Georgia, Dossier for Selection of Program Banks for Program for Promoting Renewable Energy, February 2007.
- 13) APR/PIR 2005
- 14) APR/PIR 2006
- 15) APR/PIR 2007
- 16) APR/PIR 2008
- 17) APR/PIR 2009
- 18) APR/PIR 2010
- 19) Project Mid-Term Evaluation Report For UNDP/GEF Project 2008

- 20) Brief Analyses of Georgian Hydropower Sector Prepared for UNDP under Contract #2011/147 of 29 April, 2011 P.Tsintsadze
- 21) Estimation of Available Resources of Tbilisi Geothermal Reservoir and Arrangement of Pilot Geothermal Circulation System. Georgian Geothermal Association, 2011
- 22) Pilot project proposal - The Use of Geothermal Energy Potential for Hot Water Supply in the Saburtalo Pilot District- Ministry of Environment/National Agency for Climate Change – 2000; Rambol 2002.
- 23) Saburtalo Geothermal Project Well Testing Program, UNDP, Posch & Partners, KWI, Nov. 2006
- 24) Internal UNDP Mission Report by Vesa Rutanen, August 9-15, 2004.



## ANNEX 5. LIST OF OUTREACH ACTIVITIES BY THE PROJECT

Project objectives and the results achieved have been presented at the International and National Workshops. Among them:

1. “Climate Change and Renewable Energy Resources”. Alternative Energy for new Georgia. Tbilisi, May, 2004
2. “Examples of Renewable Energy Project Financing in the Caucasus Region”. Workshop on Project Financing and the Clean Development Mechanism. EBRD; ECOFYS. Tbilisi, August, 2004
3. “CDM Market for Renewable Energies”. Seminar on Small Hydro Project Development in Georgia. Tbilisi, May 2005
4. Workshop “Small Hydropower Engineering in Georgia” organized by the Energy Efficiency Center (Georgia) and Energy Saving International AS (Norway). Tbilisi, June, 2006
5. Financial Engineering of SHPPs. Part II. Tbilisi, September 2006
6. Capacity Building for Reduction of Greenhouse Gas Emissions. Yerevan, Armenia, October 2006
7. New Market Rules and Small Hydropower. Bakuriani, Georgia, December 2006
8. Renewable Energy Financing in Georgia. Tbilisi, Georgia, July 2007
9. Renewable Energy potential in Georgia. USAID/WEG Tbilisi, Georgia, November 2007
10. Information Seminar under the Norwegian-Georgian capacity building and project development programme “Financial Engineering for Small Hydropower Plants in Georgia” 2008
11. Participation in development of Draft EE and RE laws under USAID/Winrock Int./WEG project. May-June 2008
12. Policy Workshop: Urban Heating in Georgia Issues and Future Agenda. June 2008, Tbilisi
13. Seminar for media on GEF projects. Kolkheti National Park, July 2008
14. Workshop organized by the UNDP/GEF Project “Financing Opportunities for the Renewable Energy Projects under the UNDP-GEF/KfW Project”. Bakuriani, November 2009.
15. “Role of Development of Renewable Energies of Georgia in Climate Change Mitigation”. Workshop organized by the UNDP under the UN Week programme, November 2009
16. Workshop organized by the Norsk Energi: Demonstrate & define a structured CDM PoA to support environmentally good Economic Development-Especially towards the promotion of Small Medium Enterprises in Georgia. Tbilisi, August, 2010
17. IFI Workshop organized by the USAID-financed HIPP project. Bazaleti Lake, September, 2010
18. Donors Coordination Task Force on Climate Change under the Climate Week in Georgia organized by the Ministry of Environment Protection. Tbilisi, October, 2010

19. Regional Workshop “Legislation and Policies to Promote Energy Efficiency and Renewable Energy. Carbon Projects and Financing” organized by the TACIS Project “Support to Kyoto Protocol Implementation”. Tbilisi, February, 2011
20. Round Table Towards the Green Economy: Cleaner Production as a Tool organized by the REC Caucasus. Tbilisi, May, 2011
21. Video Film and Video Clip on the Role of RE in Climate Change Mitigation in Georgia, in the framework of Project Awareness Raising Campaign; Shown on national and regional TV channels (2010).
22. TV-story and video film on Project results (focusing on pilot projects) made and shown (2011)
23. Project Manager participated in a number of TV casts on Project activities, pilot projects, renewable energy and Climate Change Mitigation events in Georgia.



## ANNEX 7. PROJECT COSTS, BUDGET, AND CO-FINANCING

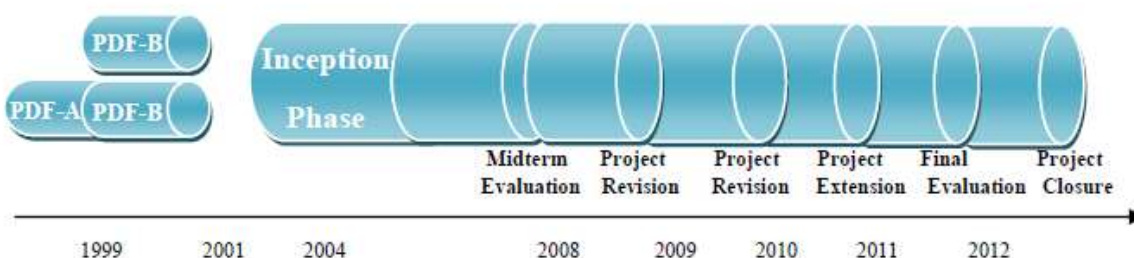
**Table 7-2: Co-Financing and Leveraged Resources**

Name of Partner or Contributor (including the Private Sector)	Nature of Contributor[8]	Amount used in Project Preparation (PDF A, B, PPG)	Amount committed in Project Document[9]	Additional amounts committed after Project Document finalization	Estimated Total Disbursement to 30 Jun 2011	Expected Total Disbursement by end of project
<b>GEF Contribution</b>	GEF	435,000.00	4,300,000.00	0.00	3,470,000.00	\$4,300,000
<b>Cash Cofinancing – UNDP managed</b>	Bilateral donor	\$0	\$0	\$1,000,000	\$968,224	\$1,000,000
<b>UNDP (TRAC)</b>	UN Agency	\$0	\$0	\$185,247	\$185,247	\$185,247
<b>Cofinancing – Partner Managed</b>	KfW (bilateral donor)		\$5,780,000	\$0	\$0	\$5,780,000
	Municipality of Tbilisi (co-financing for geothermal pilot project)		\$1,000,000	-\$1,000,000	\$0	\$0
	Private sector (equity financing by the investors of small hydropow)		\$2,400,000	\$1,000,000	\$0	\$3,400,000
<b>In-Kind Cofinancing</b>	Government of Georgia		\$150,000	\$60,000	\$180,000	\$210,000
<b>Total Cofinancing</b>		\$0	\$9,330,000	\$1,245,247	\$1,333,471	\$10,575,247
<b>Total for Project 2011</b>		\$435,000	\$13,630,000	\$1,245,247	\$4,803,471	\$14,875,247
<b>Comments</b>	Amount used in the project preparation: PDF-B (geothermal) - US\$ 200,000; PDF-B (small hydro) - US\$ 210,000; PDF-A (small hydro) - US\$ 25,000.					

## **ANNEX 8. FINAL PROJECT WORKSHOP AGENDA**

## ANNEX 9. PROJECT TIME-LINE

### Project timeline



**In 1998** the workshop held in the frame of the UNDP/GEF project “Enabling Georgia to fulfil its commitments to the UNFCCC” decided to apply for the PDF-A funding for preparation of the proposal on development of small hydropower in Georgia. PDF-A was implemented in 1999. The output of the PDF-A was the proposal for PDF-B “Removing Barriers to the Development of the Small Hydro Power Sector for the Mitigation of GHG Emission in Georgia”, which was implemented in September 2000 - December 2001.

**In 1999-2000** the GEF project “Removing Barriers to Energy Efficiency of the Municipal Heat and Hot Water Supply in Georgia (PDF-B)” was implemented.

**In 2002** upon request of the Government of Georgia UNDP country office with support of Regional Bureau for Europe and the CIS (RBEC), namely the Regional Technical Advisor started preparation of proposal for the full-size GEF project based on results of above mentioned PDF-Bs, namely on promoting the use of small hydropower and geothermal energy.

The Project proposal was sent to GEF and received approval of the GEF Council in October 2002. During the mission to Georgia **in January 2003**, representatives of KfW and UNDP reached a cooperation agreement and determined the scope of the Project for approval by the Management of KfW and UNDP. As an outcome of the agreement, Aide-Memoire was signed by the Deputy Minister of State of Georgia, UNDP Resident Representative and KfW Senior Project Manager. Based on the findings presented in Aid-Memoire the Project Proposal was revised.

**In February 2004** the Project Document has been endorsed by the GEF CEO.

**In April 2004** the Project Document has been approved by the UNDP Resident Representative and Minister of Environment of Georgia. Project implementation started in May 2004 when the Project Manager was selected and first annual work plan prepared.

**Inception phase.** Just after starting the Project it became obvious that due to the political changes in Georgia, the Project environment also was changed significantly. It was also observed that there are some major obstacles that have effectively hampered its effective start-up. **In August 2004** with the assistance of the international consultant the situation in the country had been re-assessed that confirmed that the Project is implementable; implementing strategy adjusted and a draft plan of action developed to overcome the most immediate barriers to the effective launching of the project. Due to

so many Government changes a special “Four Partite Meeting of Donors and Executive Agencies” is formed to act when the Project Steering Committee could not officially meet, which was quite often during these years of Project.

Around the same time in 2004 the Tblisi Municipality informs the project that the earlier financial commitment for the geothermal portion of the project is withdrawn in lieu of trying to assist the Project to find an investor.

**In mid-2007** UNDP’s Legal Department officially rejects the possibility for the Project to finance the Geothermal component with GEF funding via the REF.

**Mid-term evaluation.** In April-May 2008 the Mid-term Evaluation (MTE) was conducted. The Evaluation Team consisted of Mr. Roland Wong and Mr. George Abulashvili. MTE concluded that “the Project will require an additional 2 years beyond April 2009 (the current date of closure) to an end date of April 2011 to be able complete all activities”.

**In August 2008** the conflict with Russia starts and much of the economic activity and new construction in Georgia is halted for many months. Afterwards the effects of the Global Economic Crisis which impacted Eastern Europe in late 2008 conspire to halt Project activities at Lisi Lake and other projects around Georgia.

**In March 2009** the Project Supervisory Committee (PSC) agreed on the proposed extension of the project duration until April 2011 without cost extension. The PSC also agreed to increase the scope of the Technical Assistance and reallocate USD 2 million earmarked by project design for capitalization of Renewable Energy Fund and financing of geothermal hot water supply pilot project to expanded technical assistance.

**In April 2009** the Substantive Revision of the Project was approved by the UNDP and Ministry of Environment. Since the financial disbursements of the REF, managed by KfW, has proceeded slower than it was planned and the final implementation the pilot projects was completed by 2010 the Project was revised again (substantive revision) **in November 2010**. Under this substantive revision the duration of the Project was extended until **December 31, 2011** without a budget increase. The Project Document was revised accordingly.

Due to the same reasons the project duration was extended until **June 30, 2012** without a budget increase. The Project Document was not revised and the primary activities in 2012 were the Final Evaluation, Final Workshop, and Lessons Learned Report.

## **ANNEX 10. COMMENTS BY STAKEHOLDERS (ONLY IN CASE OF DISCREPANCIES WITH EVALUATION FINDINGS AND CONCLUSIONS)**

Since no conflicting comments were received from stakeholders, this Annex is not applicable.